

CATALOGUE

Of RENEWABLE ENERGY TECHNOLOGIES

Volume 1

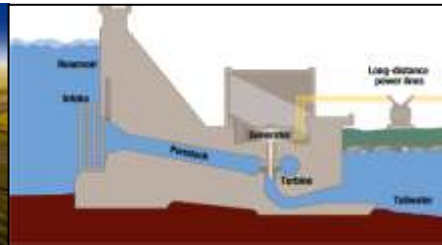


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SOLAR

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- Beijing Warmland Energy Service Co., Ltd



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Institution Company Supplier	Details			
Shenzhen Trony Science and Technology Development Co Ltd.	可再生能源技术成果 (已申请)			
	Technique Supplier:	Shenzhen Trony Science and Technology Development Co Ltd. 深圳市创益科技发展有限公司		
	Contact:	Hu Shengming 胡盛明	Submission Date:	2016-07-31
	Category of Technology:	Solar energy utilization technology 太阳能利用技术	The Specific Technical Category :	Other solar energy utilization technology 其他的太阳能利用技术
	Contact Phone No.:	15989875876	E-mail:	hu.shengming@trony.com
	Technical Name :	High efficiency low cost of amorphous/ microcrystalline silicon tandem solar cell manufacturing technology and production line		
	Technique Supplier:	Shenzhen Trony Science and Technology Development Co Ltd. 深圳市创益科技发展有限公司		
	Applicability:	Amorphous /microcrystalline silicon tandem solar cell production field; unrestricted conditions。		
	Technology Brief Description :	Low pressure chemical vapor deposition and plasma enhanced chemical vapor deposition technology are used in the production of amorphous /microcrystalline silicon tandem film solar cell; the key technology is crystalline /microcrystalline silicon efficiently and uniformly deposited; the key equipment mainly includes LPCVD, PECVD deposition technique equipments, laser ruling machines, PVD magnetron sputtering equipment.		
	Technical Information 技术信息:	Amorphous/ microcrystalline silicon tandem solar cell parameters: the conversion efficiency of 8.5% or more; the size of the single cell is 1.1*1.3m; If line added a small number of equipment, production capacity will reach 60 MW; the production area covers an area of 7000 m ² .		
Commercial Application:	Amorphous/ microcrystalline silicon tandem solar cell is used in photovoltaic power station, BIPV, off-grid system, garden light, solar streetlight, etc.			
Used Conditions:	Amorphous/ microcrystalline silicon tandem solar battery manufacturing technology is high maturity, the use of low maintenance cost, simple operation training; on the basis of the existing equipment and production capacity, if to added slightly a small part of the investment, the company will have 60 mw of fully automated production line.			

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Commercial Application Contacts/Telephone/E-mail:	JeeYee Solar Energy Intl Development Co., Ltd/ Zhang Xiuhua/ (86)595-68258888 Aurolite Electrical Ltd./Tao Chunying/ (86)20-22902666
Equipment Investment:	Company has already had a automated production line, production line mainly includes LPCVD, PECVD deposition technique equipment, PVD magnetron sputtering equipment, laser ruling machine, glass washing machine, the main control line, etc., and has achieved some production; on the basis of the complete production line, to invest 150 million yuan to add a small part of the equipment, the production will reach 60 MW capacity. Capacity; the 60 MW automatic production line of the total value is RMB 600 million yuan.
Operating and Maintenance Fees:	Amorphous/ microcrystalline silicon tandom on the raw materials for solar cells includes TCO glass, silane, etc. the automatic production cost mainly comes from the raw materials, water, electricity and other fees, as well as labor, equipment depreciation cost, repair, management fees, etc. By the calculation, production costs per watt for 3 yuan.
Investment Payoff Period :	With an annual output of 60 mw, need a total investment of RMB 600 million yuan, the payback period of RMB 600 million yuan investment is 4 years.
Other Revenue:	Because of amorphous/ microcrystalline silicon tandom film solar cell conversion rate increasing, the output value is increasing.
Technology Share:	Amorphous/ microcrystalline silicon tandom film solar cell is mainly used in solar garden light, solar lamp, BIPV, off-grid solar energy application product, micro-consumption electronic products, and photovoltaic power station; the domestic market share is more than 40% silicon thin film solar cells.
Technology Market Potential :	Amorphous/ microcrystalline silicon tandom film solar cell production technology includes LPCVD, PECVD deposition technique, laser technique score technology, plasma cleaning technology, tunnel junction, buffer layer and composite tandom structure using technology, high reflectivity back electrode in optical structure technology, laser processing insulation technology, etc. At present, there are many outstanding advantages that are the automatic silicon thin film solar cell production technology with high maturity, the government's new energy policy support, the green energy demand, the tremendous market potential, which can last until 2020.
Technical Advancement:	Company is one of China's largest silicon thin film solar cell manufacturer and solutions provider, the master of the second generation of thin-film solar cell production and core technology, with independent intellectual property rights. Related technologies with plasma cleaning technology, tunnel junction, buffer layer and the comprehensive use of tandom structure technology, high reflectivity back electrode in optical structure technology, laser processing insulation technology, etc, have a unique innovation, and obtain the corresponding patent. Amorphous/

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		microcrystalline silicon tandem solar cell production technology has reached the international advanced level.
Technology Maturity:		The company has independent intellectual property rights, using automated production equipment, technical process route, equipment and quite perfect system integration. The process flow: Super white glass cleaning – – Transparent conductive film plating – – Laser scoring transparent conductive film – – Washing again – – Silicon thin film deposition – – Laser scoring silicon thin film – – plating the back electrode metal – – Encapsulation – – Testing& storage. The production process has the characteristic of high maturity.
Technical Suitability:		Because silicon thin film solar cell production technology used by PECVD, LPCVD vacuum coating technique, laser technique technology, high technology maturity, silicon thin film solar cell production has the characteristics of low energy consumption, low pollution, high cleaning degree, low environmental dependence is low, the rich raw material including glass, silane, etc, unencumbered.
Technical Stability:		The company constantly updates technology, masters the production of the second generation of thin-film solar cells and core technology, with independent intellectual property rights, and has more than 140 related patents, including 89 invention patents.
Technology Security:		Company has established a full set of automatic production line, thin film solar cell production, processing, and design of complete supporting facilities, perfect; The market risk is small.
Achievements Promotion Barriers:		Because the production key technology and key equipment have been successfully solved, the mature technology is no other restrictions in the process of achievement transformation and promotion without solving technical problems and such aspects as talent cultivation.
Assignment of Intellectual Property:		Company has obtained the related patents and independent intellectual property rights, and can transfer technology in ways such as consultations, negotiations.

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Renewable Energy Technology Result (Application Submitted)			
Technology Provider:	TRUE SOLAR (S) PTE. LTD. a subsidiary of TRONY		
Contact Person:	Shengming Hu	Submission Date:	2016-07-31
Type of Technology:	Solar Technology	Specific Technologies:	Other solar energy utilization technology
Contact Number:	15989875876	Email:	hu.shengming@trony.com
Technical Name:	Sentry Pro		
Technology Provider:	TRUE SOLAR (S) PTE. LTD. a subsidiary of TRONY		
Scope of Application:	Off grid solar lighting applications, especially in the area without electricity		
Brief Description of Technology :	Sentry Pro is a combination of LED lamps and 12V DC power supply with Solar charging function.		
Technical Information:	Four kinds of solar packs:10W,15W,20W,30W,;can be used with Sentry Pro.The biggest output current is 10A and the output power is large.It can work in a wide range of temperature.		

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Commercial Application:	Sentry Pro have been sold to Japan, Kenya and other countries. In Japan, it was used mainly as disaster relief equipment.It brings light and power to the African countries.		
Operating conditions:	The technology of Sentry Pro is mature.It is easily to use and install,you only need to refer to the technical manual.		
Commercial application contact person/contact number/email :	1.ASKOM INCORPORATED 2.Gituka Investment, Kenya		
Equipment investment:	1. Solar Pack test equipment 2. Ultrasonic instrument 3. mould		
Operating and Maintenance Fee :	Due to the depreciation of the internal battery and other devices,it needs to cost 15% of the product cost to make it work.		
Payback Period:	The cycle of return on investment of this product is 1 year.		
Other benefits:			
Technology Share:			
Technology Market Potential:	The electronic circuit of the product is more advanced, the production line is fully automatic, Sentry Pro is reliable .At the same time ,the country's support for solar technology is strong and the clean energy is demanded strongly, so the potential market is huge in 2020.		
Technical Advancement:	Multi functional integrated, advanced and reliable battery, stable 12V power supply		
Technical Maturity:	The company has independent intellectual property rights, automated production equipment, and its technical processes, equipment and systems integration is quite perfect.		
Technical Applicability:	Due to the high maturity of the solar technology, its cleanliness and low environmental dependence, it can be used in power shortage areas.		
Technical Stability:	This product is stable without noise, suitable for electricity or power shortage areas, can be used in harsh conditions.		
Technical Safety:	We are preparing for CE certification and Lighting Africa certification procedure.		
Obstacle to promote the achievement:	The cost of the product is too high, we need to try to cut cost to make sure that low income households can afford it.		
Transfer of Intellectual Property :	In possession of product appearance patent		
Renewable Energy Technology Result (Application Submitted)			
Technology Provide:	TRUE SOLAR (S) PTE. LTD. a subsidiary of TRONY		
Contact Person:	Shengming Hu	Submission Date:	2016-07-31
Type of Technology:	Utilization technologies	Specific Technologies:	Other utilization technologies of solar energy

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		of solar energy		
Contact number:	15989875876		Email:	hu.shengming@trony.com
Technical Name:	TGC Mobile Solar Powered Platform			
Technology Provider:	TRUE SOLAR (S) PTE. LTD. a subsidiary of TRONY			
Scope of Application:	It applies to the rural areas with last mile logistics problem			
Brief Description of Technology :	TGC mobile solar powered platform, together with other off-grid solar applications, is committed to addressing last mile distribution network and logistics problems. The platform uses solar panels to charge the internal energy storage system. The energy storage system has DC outputs of 24V and 12V to drive the LED TV and printer, camera and other equipment, such as GPS positioning and GPRS mobile network.			
Technical Information:	The platform uses a solar powered system to generate power up to 330W. It comes with 24V and 12V DC output, and equipped with GPS positioning and GPRS mobile network.			
Commercial Application:	The product is mainly promoted to the countries with Bottom of the Pyramid (BOP) population or the region without electricity, e.g. third world country or rural areas.			
Operating conditions:	The product technology is mature. It is available in the market. User can easily refer to the technical manual on how to install, use and maintain the product.			
Commercial application contact person/contact number/email :	Indonesia			
Equipment investment:	<ol style="list-style-type: none"> 1. Test equipment for solar energy 2. Cloud server 3. Tri-motorcycle 4. Remote monitoring system/backend server 			
Operating and Maintenance Fee :	Due to wear and tear of internal battery and other components, the maintenance cost is about 15% of the system cost every year.			
Payback Period:	According to the calculation of yearly revenue, the payback period is about 2 years.			
Other benefits:				
Technology Share:				
TechnologyMarket Potential:	This product is designed based on advanced electronic circuit design concept. Fully automated production. High maturity of technology. According to nation support to the new energy, as well as the demand for green energy by 2020, the market potential is huge.			
Technical Advancement:	Integrated with green solar energy, together with mobile carrier, to address the last mile logistics. Use of advanced and reliable off-grid solar power technology to support the equipment and devices on the mobile carrier.			

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	Technical Maturity:	Off-grid solar technology, GPS positioning technology and remote monitoring technology are considered as mature technology.	
	Technical Availability:	Due to high maturity of solar energy technology, high degree of clean energy and low environmental dependence, this product is rich with source of raw materials and has no other restriction condition.	
	Technical Stability:	The company constantly updates on technology, and is actively applied for several patents. Possess of independent intellectual property rights. Product is stable and reliable.	
	Technical Safety:	For this platform, the company has established a full set of automated production lines, and equipped with supporting facilities of the solar powered system and energy storage system. Market risk is minimal.	
	Obstacle to promote the achievement:	Product cost is relatively high. Need to find ways to reduce the cost, in order to reach more general low-income Bottom-of-Pyramid population.	
	Transfer of Intellectual Property :	Is actively applying for multiple patents	
	Renewable Energy Technology Result (Application Submitted)		
	Technology Provider:	TRUE SOLAR (S) PTE. LTD. a subsidiary of TRONY	
	Contact Person:	Shengming Hu	Submission Date: 2016-07-31
	Type of Technology:	Utilization technologies of solar energy	Specific Technologies: Other utilization technologies of solar energy
	Contact number:	15989875876	Email: hu.shengming@trony.com
	Technical Name:	TGC Mobile Solar Powered Platform	
	Technology Provider:	TRUE SOLAR (S) PTE. LTD. a subsidiary of TRONY	
	Scope of Application:	It applies to the rural areas with last mile logistics problem	
	Brief Description of Technology :	TGC mobile solar powered platform, together with other off-grid solar applications, is committed to addressing last mile distribution network and logistics problems. The platform uses solar panels to charge the internal energy storage system. The energy storage system has DC output of 24V and 12V to drive the LED TV and printer, camera and other equipment, such as GPS positioning and GPRS mobile network.	
	Technical Information:	The platform uses a solar powered system to generate power up to 330W. It comes with 24V and 12V DC output, and equipped with GPS positioning and GPRS mobile network.	
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Operating conditions:	The product technology is mature. It is available in the market. User can easily refer to the technical manual on how to install, use and maintain the product.
Commercial application contact person/contact number/email :	Indonesia
Equipment investment:	1. Test equipment for solar energy 2. Cloud server 3. Tri-motorcycle 4. Remote monitoring system/backend server
Operating and Maintenance Fee :	Due to wear and tear of internal battery and other components, the maintenance cost is about 15% of the system cost every year.
Payback Period:	According to the calculation of yearly revenue, the payback period is about 2 years.
Other benefits:	
Technology Share:	
TechnologyMarket Potential:	This product is designed based on advanced electronic circuit design concept. Fully automated production.High maturity of technology. According to nation support to the new energy, as well as the demand for green energy by 2020, the market potential is huge.
Technical Advancement:	Integrated with green solar energy, together with mobile carrier, to address the last mile logistics. Use of advanced and reliable off-grid solar power technology to support the equipment and devices on the mobile carrier.
Technical Maturity:	Off-grid solar technology, GPS positioning technology and remote monitoring technology are considered as mature technology.
Technical Availability:	Due to high maturity of solar energy technology, high degree of clean energy and low environmental dependence, this product is rich with source of raw materials and has no other restriction condition.
Technical Stability:	The company constantly updates on technology, and is actively applied for several patents. Possess of independent intellectual property rights. Product is stable and reliable.
Technical Safety:	For this platform, the company has established a full set of automated production lines, and equipped with supporting facilitiesof the solar powered system and energy storage system. Market risk is minimal.
Obstacle to promote the achievement:	Product cost is relatively high. Need to find ways to reduce the cost, in order to reach more general low-income Bottom-of-Pyramid population.
Transfer of Intellectual Property :	Is actively applying for multiple patents

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Renewable Energy Technology Achievement Declaration				
Anhui Qiguang Energetech Research Institute Co., Ltd	QR code			
	Technology provision unit	Anhui Qiguang Energetech Research Institute Co., Ltd.	Submission date	June 30, 2016
	Contact person	Guo Jiahu	Technology type	Solar energy utilization technology
	Tel.	13335548869	E-mail	yaoxian610@163.com
	Technology name	3-6KW photovoltaic energy storage integrated inverter		
	Technology provider	Anhui Qiguang Energetech Research Institute Co., Ltd.		
	Scope of application	Anhui Qiguang Energetech Research Institute Co., Ltd.		
	Brief description of technology	Charge and inverter integrated design Intelligent battery management At the same time, it possesses the off-grid and grid-connected functions Battery can be flexibly configured Safer and more effective Dust-proof and waterproof grade of IP65 Full load output at 45°C Achieve local monitoring through the software Achieve remote monitoring by computer and mobile phone Integrated thermal dissipation technology without fan		
	Technical information	Discharge power (W) 4,600 3,600 Charging power (W)2,300(can be set) Dimension 516*440*184mm Weight (kg) 30 8		
	Business application situation	A villa located in Nantong City, Jiangsu Province, installed capacity is 6KW, using a total of 8 pieces of 240Wp polysilicon photovoltaic modules and 10 pieces of 230Wp polysilicon photovoltaic modules and 3 lithium batteries and a 6KW optical storage integrated inverter,		
Service conditions	None			


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Contact person of business application unit /Tel./E-mail	Private construction, the project uses our company's optical storage integrated inverter, technology maturity is high, and the market is widely used. Our company's 3-6KW optical storage integrated inverter can be conveniently operated, users do not need training, and they can operate on their own through the operation manual. The product is maintenance-free, easy to install and easy to use.
Investment on equipment	About RMB 15,000-30,000
Expense of operation maintenance	Maintenance-free
Investment payback period	The shortest period of 5 years and the longest period of 10 years (refer to payback period of photovoltaic power generation system)
Other earnings	<ol style="list-style-type: none"> 1. Obtain earnings by selling power to power companies. 2. National and local subsidies for photovoltaic power generation 3. Saving from self-used electric charge
Technology occupancy	Our company's 3-6KW optical storage integrated inverter belongs to the high-end position in the market. Market occupancy is about 2.6%
Market potential of the technology	With the national support of the photovoltaic power generation industry, the domestic photovoltaic power generation system is bound to be widely used.
Technical advancement	Highly integrated electric circuit design, the smallest volume and weight in the industry
Technical maturity	Design of Tri-level, design of highly integrated circuit board, unique power device scattering technology, fanless design and natural cooling.
Technical applicability	The product is mainly taken as the equipment converting DC to AC in domestic photovoltaic power generation system, with the suitable environmental temperature of -25-60°C; Relative humidity of 0-95%, the highest altitude of 4,000m (deloading at 3,000m)
Technical stability	Hundreds of successful cases of projects, the equipment can be stably repaired at site and maintenance-free.
Technical safety	Mature technology design, it applies mainstream electronic element on the market, and the maturity of system supporting equipment and technology is high with convenient in purchase.
Obstacle in achievement transformation and promotion	Confined by too high cost of battery pack of photovoltaic power generation system and other auxiliary materials, it results in a long term for cost payback of photovoltaic power generation system, and it is weak in competition compared with traditional power generation pattern.
Transfer of intellectual property	An insulation test system used for photovoltaic energy storage system and its test method, a photovoltaic Boost converter double closed-loop control method used in photovoltaic energy storage

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	system and other patents, a full bridge inverter three-closed-loop control method of the photovoltaic storage system islanding mode.		
Photo caption			
Renewable Energy Technology Achievement Declaration			
QR code			
Technology provision unit	Anhui Qiguang Energetech Research Institute Co., Ltd.	Submission date	June 30, 2016
Contact person	Guo Jiahu	Technology type	Others
Tel.	13335548869	E-mail	yaoxian610@163.com
Technology name	100KW bi-directional energy storage converter		
Technology provider	Anhui Qiguang Energetech Research Institute Co., Ltd.		
Scope of application	Anhui Qiguang Energetech Research Institute Co., Ltd.		
Brief description of technology	<p>Bi-directional DC/DC converter can make flexible adjustment of the voltage difference to achieve the best match battery characteristics</p> <p>With DC side voltage stability, it is conducive to the sustainable and efficient operation of the system</p> <p>Independent charge and discharge circuit and the charge-discharge depth control can effectively maintain the current balance</p> <p>Convenience to switch and maintenance of battery unit is easy to implement large-capacity storage system</p>		
Technical information	<p>Rated AC power 100kW</p> <p>Rated AC Current 152A</p> <p>Outline dimension (Width/height/depth) 1,200/2,000/850 mm</p> <p>Weight 1,300kg</p>		
Business application situation	Shanghai Jiao Tong University's 50KW energy storage power station project. Equipment is 5KWh lithium titanate energy storage system consists of: 50kW converter (PCS), battery management system (BMS), monitoring and management system, lithium titanate battery group.		
Service conditions	Shanghai Jiao Tong University's 50KW energy storage power station experimental project. Contact person: Gao Ning 13816074542		


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Contact person of business application unit /Tel./E-mail	For Local construction, the project uses the equipment with mature technologies. Our PCS converter is high technology content and needs professional training before operation. Standardized cabinet design, power unit modular design, with easy installation and maintenance.
Investment on equipment	About RMB 300, 000
Expense of operation maintenance	Considering the spare parts and equipment and failure treatment, the main device costs about RMB 15,000 during its service life
Investment payback period	The shortest period of 6-10 years (refer to payback period of photovoltaic power generation system)
Other earnings	After the energy-storage link is introduced in the system, demand side management can be effectively conducted to eliminate the valley-to-peak difference in the day and night and balance the load. The power equipment can be effectively used not only to reduce the power supply costs but also promote the application of renewable energy or be deemed as a way to improve the stability for system operation, adjust the frequency and compensate the fluctuation of load. However, the converter is one of the key equipment in the energy storage system.
Technology occupancy	5 sets of PCS of our company are available on the market with stable operation The current market share is around 8%, and there is still much room for improvement in the market share.
Market potential of the technology	As the state has increased efforts to support energy storage technology, storage technology application market prospects will reach 1 billion levels, while PCS, as one of key components of the energy storage converter, must have market blowout phenomenon inevitably.
Technical advancement	Unique power device-specific thermal dissipation technology, special circuit design, unique fire-fighting coordination technology, the model of equipment stays in the leading domestic level.
Technical maturity	Design of Tri-level, design of highly integrated circuit board, unique power device scattering technology and excellent imported power components and parts.
Technical applicability	The product is mainly used as energy storage power station system, AC and DC equipment which can mutually converted for work environment requires -25°C - +55°C, Relative humidity of 0-95%, altitude of 2,000m
Technical stability	Lots of successful cases of projects, and equipment are in stable operation on site.
Technical safety	Mature technology design, it applies mainstream electronic element on the market, and the maturity of system supporting equipment and technology is high with convenient in purchase.
Obstacle in achievement transformation and promotion	1. Energy storage technology is a new electric power technology, which is in the initial stage of electric power application. Users don't know much about the application prospect of energy storage devices, and it takes time to explain to the users about the product's market prospects and its economic benefits 2. Limited by the price of the battery, user acceptance of energy storage system is still low. With the

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		maturity of the technology being gradually improved and the drop in the prices of main equipment of energy storage system, the market prospect will be more extensive.	
Transfer of intellectual property		One kind of energy storage equipment battery damping fixed, mobile and battery energy storage systems, mobile energy storage equipment power display systems, battery management system estimation system based on dynamic SOC.	
Photo caption			
Renewable Energy Technology Achievement Declaration			
QR code			
Technology provision unit	Anhui Qiguang Energetech Research Institute Co., Ltd.	Submission date	June 29, 2016
Contact person	Guo Jiahu	Technology type	Wind energy utilization technology
Tel.	13335548869	E-mail	yaoxian610@163.com
Technology name	100KW energy storage cabinet		
Technology provider	Anhui Qiguang Energetech Research Institute Co., Ltd.		
Scope of application	Anhui Qiguang Energetech Research Institute Co., Ltd.		
Brief description of technology	Support multi-parallel cabinets, convenient to expansion of power and battery energy level, and can configure different types and capacity of batteries as required. IP65 protection level, standard container design, and constant temperature design in cabinet. The system has 59 items of fault protections and is equipped with automatic humidity control, access monitoring, sound and light alarm light, smoke alarm, making the system safe in all aspects and realizing unattended.		
Technical information	Power 100KW;Capacity 25KWH;Current AC152A;Frequency 47-51.5Hz,Efficiency 0.97;Outline dimension 2500mm *2200mm* 2250mm;weight 3.5t		
Business application situation	None		
Service conditions	None		
Contact person of business application unit /Tel./E-mail	100KW energy storage cabinet of our Company is the type of container, removable energy storage system. The product is in the initial phase of the market promotion. The energy storage cabinet is of high technical content and requires special technical training to users as to its system		
Investment on equipment	About RMB 700,000		


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Expense of operation maintenance	Considering the spare parts of the main device and equipment troubleshooting, its cost is about RMB 30,000 during the service life
Investment payback period	The shortest period of 10 years (refer to payback period of energy-storage power generation system)
Other earnings	After the energy-storage link is introduced in the system, demand side management can be effectively conducted to eliminate the peak and valley difference in the day and night and balance the load. It can not only effectively use the power equipment to reduce the power supply costs but also promote the application of renewable energy or used as a way to improve the stability of system operation, adjust the frequency and compensate the fluctuation of load. And, the converter is one of the key equipment in the energy storage system.
Technology occupancy	None
Market potential of the technology	Smart Grid is the development direction of the electric power industry. With the rapid development of smart grid, energy storage system, as the key technology, is playing an increasingly important role We focus on the application areas of energy storage products and have gathered lots of expert teams in the field of energy storage research in China. With the economic development, and the national policy support for energy storage, energy storage in the future by 2020 will be sure to have broad market. We strive to be among the top 5 places in the market share of the domestic trade as to the energy storage cabinet by 2020
Technical advancement	With the unique heat dissipation technology of the power device, special circuit design, unique harmonic elimination technique, and this type of equipment is in the leading place in China.
Technical maturity	Design of Tri-level, design of highly integrated circuit board, unique power device scattering technology and excellent imported power components and parts.
Technical applicability	Suitable environment temperature range, operating temperature -20- + 45 °C
Technical stability	Lots of successful cases of projects, and equipment are in stable operation on site.
Technical safety	Mature technology design, it applies mainstream electronic element on the market, and the maturity of system supporting equipment and technology is high with convenient in purchase.
Obstacle in achievement transformation and promotion	<ol style="list-style-type: none"> 1. Energy storage technology is a new electric power technology, which is in the initial stage of electric power application. Users don't know much about the application prospect of energy storage devices, and it takes time to explain to the users about the product's market prospects and its economic benefits 2. Limited by the price of the battery, user acceptance of energy storage system is still low. With the maturity of the technology being gradually improved and the drop in the prices of main equipment of energy storage system, the market prospect will be more extensive.


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	Transfer of intellectual property	It has obtained 25 utility modal patents, 1 software copyright and 20 patents for inventions are in the substantive trial. A communication circuit in the internal system of mobile energy storage power station, an output filtering circuit for household energy storage systems, and a fixed structure invention of vibration damping for energy storage device battery pack.		
	Photo caption			
Renewable Energy Technology Achievement Declaration				
	QR code			
	Technology provision unit	Anhui Qiguang Energetech Research Institute Co., Ltd.	Submission date	June 29, 2016
	Contact person	Guo Jiahu	Technology type	Solar energy utilization technology
	Tel.	13335548869	E-mail	yaoxian610@163.com
	Technology name	Photovoltaic inverter 1-3KW		
	Technology provider	Anhui Qiguang Energetech Research Institute Co., Ltd.		
	Scope of application	Anhui Qiguang Energetech Research Institute Co., Ltd.		
	Brief description of technology	Multiple voltage specifications, unique low-voltage protection function of electrical level, partially customizable functions, LCD display		
	Technical information	AC output power (w) 1,000/2,000/3,000; AC voltage 180-260V; MPPT efficiency 95%; Dimension (Length × width × height) mm 270*190*110 Weight 5.3Kg		
	Business application situation	The personal proprietor in certain residential community in urban area of Jinan in Shandong Province applies independently, the installed capacity of the system is 2KW, and four 240Wp and five 230Wp polycrystalline silicon photovoltaic components and one set of 2KW inverter are used in total,		
	Contact person of business application unit /Tel./E-mail	The product of this model is small-size inverter and is suitable for domestic photovoltaic power generation system, 1-3KW products of our company are easy for installation, convenient for operation and can be operated by the users without technical training basically.		
	Investment on equipment	RMB 1,500-3,000		
	Expense of operation maintenance	Maintenance-free		
	Investment payback period	The shortest period is of 5 years and the longest period of 10 years (refer to payback period of photovoltaic power generation system)		


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	Other earnings	1. Obtain earnings by selling power to power companies. 2. National and local subsidies for photovoltaic power generation 3. Saving from self-used electric charge.
	Technology occupancy	The product is the earlier equipment developed by our company and has a higher technical maturity with about 5% of market occupancy.
	Market potential of the technology	As the State pays more and more attention to the application of photovoltaic power generation technology; And the support for domestic photovoltaic power generation system has been increased gradually. The market application perspective of 1-3KW photovoltaic inverters is becoming wider and wider.
	Technical advancement	Highly integrated circuit design and the minimum volume and weight in the same industry.
	Technical maturity	Design of highly integrated circuit board, unique power device scattering technology, fanless design and natural cooling
	Technical applicability	The product is mainly taken as the equipment converting DC to AC in domestic photovoltaic power generation system, with the suitable environmental temperature of -25-70°C; Relative humidity of 0-95%, the highest altitude of 4,000m (deloading at 3,000m)
	Technical stability	Hundreds of successful cases of projects, the equipment can be stably repaired at site and maintenance-free.
	Technical safety	Mature technology design, it applies mainstream electronic element on the market, and the maturity of system supporting equipment and technology is high with convenient in purchase.
	Obstacle in achievement transformation and promotion	Confined by too high cost of battery pack of photovoltaic power generation system and other auxiliary materials, it results in a long term for cost payback of photovoltaic power generation system, and it is weak in competition compared with traditional power generation pattern.
	Transfer of intellectual property	An insulation test system used for photovoltaic energy storage system and its test method, a photovoltaic Boost converter double closed-loop control method used in photovoltaic energy storage system and other patents
	Photo caption	

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Renewable Energy Technology Achievement Declaration			
QR code			
Technology provision unit	Anhui Qiguang Energy Science & Technology Research Institute Co., Ltd.	Submission date	June 29, 2016
Contact person	Guo Jiahu	Technology type	Solar energy utilization technology
Tel.	13335548869	E-mail	yaoxian610@163.com
Technology name	photovoltaic inverter 3-6KW		
Technology provider	Anhui Qiguang Energy Science & Technology Research Institute Co., Ltd.		
Scope of application	Anhui Qiguang Energy Science & Technology Research Institute Co., Ltd.		
Brief description of technology	It applies the design principal of three-level finishing bridge, and the core components use the imported elements for 10 above of security detection, integratable DC shutdown switch, IP65 dustproof and waterproof grade, output in full load at 45°C, built-in anti-reflux function, 30% weight optimization, 20% volume optimization, wide range of MPPT voltage, and supports various communication modes and integrated fanless heat dissipation technology.		
Technical information	Access string power (W) 3900 4,680 5,460 6,500 AC output (W) 3,000 3,680 4,200 5,000 Volume 347*432*145 14g		
Business application situation	Shijiazhuang Installation Project of Solar Energy, installed capacity of 3kW. This Project is in selection of polycrystal component, Model LW250, Number of 12, 3KW of inverter.		
Service conditions	Project for 3KW Solar Power Generation of Shijiazhuang Guangheng Solar Equipment Installation Co., Ltd.		
Contact person of business application unit /Tel./E-mail	Local construction, equipment for household photovoltaic power generation system, simple equipment operation, technical training according to users' demands, maintenance-free for single set of equipment		
Investment on equipment	Solar cell module, AC lateral distribution box, photovoltaic inverter, support, cable and other accessories, one-off investment of RMB 30,000-60,000, wherein RMB 3,000-4,000 for inverter		
Expense of operation maintenance	Maintenance-free		




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Investment payback period	The shortest period of 5 years and the longest period of 10 years (refer to payback period of photovoltaic power generation system)
Other earnings	1. Obtain earnings by selling power to power companies. 2. National and local subsidies for photovoltaic power generation 3. Saving from self-used electric charge.
Technology occupancy	5%
Market potential of the technology	In recent two years, the Company has actively invested in the support to R&D projects of new products, including the talent introduction and financial support. In 2015, our Company had market occupancy of 5% in 3-6KW inverter. We will currently put more efforts in promotion of photovoltaic inverter industry aiming at the market conditions in the past year and combining with the current economic situation. Combining with the large marketing capacity of the head office, it is expected that the market occupancy in 3-6KW inverter will be 20% by 2020.
Technical advancement	Highly integrated electric circuit design, the smallest volume and weight in the industry
Technical maturity	Design of Tri-level, design of highly integrated circuit board, unique power device scattering technology, fanless design and natural cooling.
Technical applicability	The product is mainly taken as the equipment converting DC to AC in domestic photovoltaic power generation system, with the suitable environmental temperature of -25-60°C; Relative humidity of 0-95%, the highest altitude of 4,000m (deloading at 3,000m)
Technical stability	Hundreds of successful cases of projects, the equipment can be stably repaired at site and maintenance-free.
Technical safety	Mature technology design, it applies mainstream electronic element on the market, and the maturity of system supporting equipment and technology is high with convenient in purchase.
Obstacle in achievement transformation and promotion	Confined by too high cost of battery pack of photovoltaic power generation system and other auxiliary materials, it results in a long term for cost payback of photovoltaic power generation system, and it is weak in competition compared with traditional power generation pattern.
Transfer of intellectual property	An insulation test system used for photovoltaic energy storage system and its test method, a photovoltaic Boost converter double closed-loop control method used in photovoltaic energy storage system and other patents, a full bridge inverter three-closed-loop control method of the photovoltaic storage system islanding mode
Photo caption	

TECHNOLOGY: SOLAR

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Renewable Energy Technology Achievement Declaration																																																									
Poly Solar Technologies (Beijing) Co., Ltd	<table border="1"> <tr> <td>QR code</td> <td colspan="3"></td> </tr> <tr> <td>Technology provision unit</td> <td colspan="3">Poly Solar Technologies (Beijing) Co., Ltd.</td> </tr> <tr> <td>Contact person</td> <td>Zhu Xinyu</td> <td>Submission date</td> <td>June 17, 2016</td> </tr> <tr> <td>Technology type</td> <td>Solar energy utilization technology</td> <td>Specific technology</td> <td>Solar energy observation station technology</td> </tr> <tr> <td>Tel.</td> <td>13911560970</td> <td>E-mail</td> <td>chengxin@polyslar.cn</td> </tr> <tr> <td>Technology name</td> <td colspan="3">System for 3W mini household</td> </tr> <tr> <td>Technology provider:</td> <td colspan="3">Poly Solar Technologies (Beijing) Co., Ltd.</td> </tr> <tr> <td>Scope of application</td> <td colspan="3">Be suitable for solving the lighting problem of one room in a house without electricity</td> </tr> <tr> <td>Brief description of technology</td> <td colspan="3">The product consists of a solar cell module, a host and a LED light bulb, during daytime, solar power can be stored in the battery inside the host, the host can provide power to the light bulb if necessary. There are outlets of USB for power supply in host which can be used for charging for cell phone. In addition, the host volume is very small and portable, with a flashlight, which can be used alone as a flashlight.</td> </tr> <tr> <td>Technical information</td> <td colspan="3">Power of solar cell module: 3W p Battery type: lithium-ion batteries Capacity of battery: 3.7V 4400m Ah Power of light source: 2W</td> </tr> <tr> <td>Business application situation</td> <td colspan="3">African public welfare project of Poly Technologies in 2016, Tanzania, 5,000 sets of systems for 3w households are put into implementation</td> </tr> <tr> <td>Service conditions</td> <td colspan="3">Costs for market transaction, mature technology, systematic training failing to be needed, installation, use and maintenance can be ignored.</td> </tr> <tr> <td>Contact person of business application unit /Tel./E-mail</td> <td colspan="3">Poly Technologies Co., Ltd. Li Laixing 13810042713 lilaixhg@polyinc.com</td> </tr> <tr> <td>Investment on equipment</td> <td colspan="3">RMB 200,000 for mould opening, costs for raw materials and labor: USD 10</td> </tr> </table>	QR code				Technology provision unit	Poly Solar Technologies (Beijing) Co., Ltd.			Contact person	Zhu Xinyu	Submission date	June 17, 2016	Technology type	Solar energy utilization technology	Specific technology	Solar energy observation station technology	Tel.	13911560970	E-mail	chengxin@polyslar.cn	Technology name	System for 3W mini household			Technology provider:	Poly Solar Technologies (Beijing) Co., Ltd.			Scope of application	Be suitable for solving the lighting problem of one room in a house without electricity			Brief description of technology	The product consists of a solar cell module, a host and a LED light bulb, during daytime, solar power can be stored in the battery inside the host, the host can provide power to the light bulb if necessary. There are outlets of USB for power supply in host which can be used for charging for cell phone. In addition, the host volume is very small and portable, with a flashlight, which can be used alone as a flashlight.			Technical information	Power of solar cell module: 3W p Battery type: lithium-ion batteries Capacity of battery: 3.7V 4400m Ah Power of light source: 2W			Business application situation	African public welfare project of Poly Technologies in 2016, Tanzania, 5,000 sets of systems for 3w households are put into implementation			Service conditions	Costs for market transaction, mature technology, systematic training failing to be needed, installation, use and maintenance can be ignored.			Contact person of business application unit /Tel./E-mail	Poly Technologies Co., Ltd. Li Laixing 13810042713 lilaixhg@polyinc.com			Investment on equipment	RMB 200,000 for mould opening, costs for raw materials and labor: USD 10		
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	Expense of operation and maintenance	Be ignored
	Investment payback period	1 year
	Other earnings	Be ignored
	Technology occupancy	Unknown
	Market potential of technology	The market is expected to need 1,000,000 units
	Technical advancement	The mini solar household system, which has never been seen at home, integrates Charge Pal, flashlight, table lamp and others as a whole with uniqueness in the market..
	Technical maturity	Product executive standards: GB/T19064-2003 Technical conditions and test methods of domestic solar photovoltaic power system GB/T18287-2013 Li-ion storage battery used for mobile phone and general specification for storage battery GB2099.1-2008 Part 1 for domestic plugs and sockets and others with the similar purposes: General requirements GB/T191-2008 Graphic marks for package, storage and transportation GB4943.1 Part I for information technology equipment safety: General safety GB/T17626.2 Electromagnetic compatibility test and measurement technology electrostatic discharge noise immunity test YD/T1591-2009 Technical requirements and test methods of mobile communication terminal power adapter and charging/data interface UL2054 Domestic or commercial storage battery
	Technical applicability	Project process is simple, without too much technical workers to complete, having extensive sources of raw materials, negatively affected by the scale of the geographical factors, the environment, investment and other bad influence.
	Technical stability	1. Board-level inspection a) Detection opportunity: Fully inspect the finished products components during production b) For normal charging indication function, the color of indicator light of charging state is red, and it is blue when the battery is charged fully; c) Inspection of circuit board: All components and parts on the circuit board are welded properly without cold solder joint and solder skips, their locations are clear and neat with three layers of paints coated evenly and completely.

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		<p>d) Surface outside the lens is painted evenly with the chromeplate paint with smooth surface, and surface of lens that the lights come from and the holes that the lights enter into are not contaminated.</p> <p>2. Ex-factory inspection Detection opportunity: Full inspection of the product when leaving the factory</p> <p>2.1 Visual inspection of solar power</p> <p>a) The surface of solar power shell shall be subject to high light treatment, and the surface should be smooth and have no impurities, mechanical damage and rust for contact, coating damage.</p> <p>b) The upper and lower covers are required to be fit closely, and all the parts must not have flash, burrs, with strong connection among all fittings of the product;</p> <p>c) Lens is clean and free of stains, enclosure is not leaked;</p> <p>d) Product identification silk-screen does not allow any pattern, the font is not clear, not correct, not complete, ink dragging, print missing, misplaced, overlap, less ink and other undesirable phenomena.</p> <p>e) Plug smoothly from the power socket, connect stably with normal conduction and the output voltage of $5 \pm 0.25V$</p> <p>f) Charging function of power supply is normal, with solid connection, plugging smoothly, 5V input charging current is less than 900mA</p>
	Technical safety	The product has been verified in the global scope introduced by American, and such verification has a higher recognition degree in Africa.
	Obstacle in achievement transformation and promotion	Almost nothing
	Transfer of intellectual property	The Enterprise has own intellectual property rights with completely localization and transferable technology.

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	Photo captions		
Poly Solar Technologies (Beijing) Co., Ltd. (sealed)			
Renewable Energy Technology Achievement Declaration			
	QR code		
Technology provision unit	Poly Solar Technologies (Beijing) Co., Ltd.		
Contact person	Yang Jianfeng	Submission date	June 30, 2016
Technology type	Others	Specific technology	Others
Tel.	13803802566	E-mail	chengxin@polyslar.cn
Technology name	Green energy-saving preassembled buildings and renewable energy can use integrated application		
Technology provider:	Poly Solar Technologies (Beijing) Co., Ltd.		
Scope of application	It applies to the area with power shortage, building materials, house shortage area, with ability to quickly solve the housing supply		
Brief description of technology	Standardization of parts, factory production, installation assembly, rapid construction of safe, comfortable, durable, energy-saving permanent housing, the use of renewable energy and building integration		

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		technology realize houses with access to heating water and electricity. Improve the quality of people's lives.
Technical information		Heat transfer coefficient of wallboard (100mm in thickness) 1.48W/m ³ ; Sound insulation: 48db; Fire resistance: A grade, 240min; Durability: Freezing-melting circulation for more than five times; Building life: More than 50 years.
Business application situation		Angola social housing projects are located in Soyo area, Cabinda, totaling 104 square meters of 64 sets of houses. They were installed and delivered completely in 2012, which have been normally used so far.
Service conditions		Market transactions, more than 5,000 sets can be considered as factory built locally.
Contact person of business application unit /Tel./E-mail		Poly Solar Technologies (Beijing) Co., Ltd. Yang Jianfeng 13803802566 yangjianfeng1964@126.com
Investment on equipment		RMB 30,000,000.
Expense of operation and maintenance		RMB 1,000,000 per year.
Investment payback period		2--3 years.
Other earnings		Driving sale of systems for solar household.
Technology occupancy		1%
Market potential of technology		Compared with similar products from more than 60 enterprises, the cost performance of the product is highest, its market share is predicted to up to 10 times by 2020.
Technical advancement		Ingenious technology makes its leading position in the international similar technologies
Technical maturity		Simple assembly process technology, equipment and parts have the degree of integration of more than 80%.
Technical applicability		Especially be suitable for other developing countries, especially for medium, large quantity of housing projects and the areas lacking of electricity, building materials and high labor cost in Africa.
Technical stability		Technical stability, with minimal environmental impact.
Technical safety		During the technology industrialization process, China is vigorously promoting it as a green energy-saving building with complete supporting facilities, a high degree of market acceptance and risk-free.

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	Obstacle in achievement transformation and promotion	None		
	Transfer of intellectual property rights	China has independent intellectual property rights, has five utility model patents and patents for invention and has enterprises owning the technology.		
	Photo captions			
Renewable Energy Technology Achievement Declaration				
	QR code			
	Technology provision unit	Poly Solar Technologies (Beijing) Co., Ltd.		
	Contact person	Zhu Xinyu	Submission date	June 22, 2016
	Technology type	Solar energy utilization technology	Specific technology	Solar energy observation station technology
	Tel.	13911560970	E-mail	chengxin@polyslar.cn
	Technology name	AC and DC solar energy photovoltaic household power system		
	Technology provider	Poly Solar Technologies (Beijing) Co., Ltd.		

TECHNOLOGY: SOLAR

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Scope of application	It applies to solve the lighting problems of families in the area without electricity, radio, television and other living demands
Brief description of technology	The product is composed of one 80W solar module, one control host, six independent LED light bulbs, two light bulbs of 12v / 7w, four light bulbs of 12v / 2w with bulb connecting the host through wires and configuration with independent switches and lamp holder, and 12V / 150Ah lead acid batteries and DC12V / AC220V50HZ200w inverter are configured in the control box.
Technical information	Power of solar cell module: 80Wp Battery type: lead acid battery Capacity of battery: 12V150Ah Power of light source: 12V/2w*4, 12V/7w*2AC Output power: 200w
Business application situation	In 2005, 400 villages in Sudan northern Cort Van were provided with 600 sets of solar household systems with various specifications 科特范省
Service conditions	Costs for market transaction, mature technology, systematic training failing to be needed, installation, use and maintenance can be ignored.
Contact person of business application unit /Tel./E-mail	Poly Technologies Co., Ltd. Li Laixing 138100427131laixing@polyinc.com
Investment on equipment	RMB 200,000 for mould opening, costs for raw materials and labor: USD
Expense of operation and maintenance	Be ignored
Investment payback period	1 year
Other earnings	Be ignored
Technology occupancy	Unknown
Market potential of technology	It is predicted that one million sets are needed.
Technical advancement	The mini solar household system, which has never been seen at home, integrates Charge Pal, flashlight, table lamp and others as a whole with uniqueness in the market..
Technical maturity	GB/T19064-2003 Technical conditions and test methods of domestic solar photovoltaic power system GB/T18287-2013 Li-ion storage battery used for mobile phone and general specification for storage battery

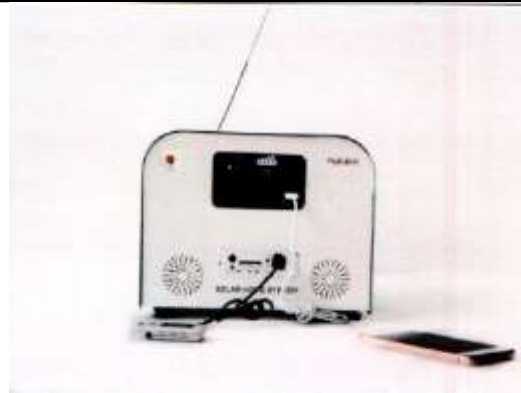

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	<p>GB2099.1-2008 Part 1 for domestic plugs and sockets and others with the similar purposes: General requirements</p> <p>GB/T191-2008 Graphic marks for package, storage and transportation</p> <p>GB4943.1 Part I for information technology equipment safety: General safety</p> <p>GB/T17626.2 Electromagnetic compatibility test and measurement technology electrostatic discharge noise immunity test</p> <p>YD/T1591-2009 Technical requirements and test methods of mobile communication terminal power adapter and charging/data interface</p> <p>UL2054 Domestic or business storage battery</p>
Technical applicability	The project has an easy process and can be completed with a small parts of technical works, and the raw materials are sourced widely which are influenced by regional scale, environment, investment and other factors in a little degree.
Technical stability	<p>1. Board-level inspection</p> <p>a) Detection opportunity: Fully inspect the finished products parts during production</p> <p>b) For normal charging indication function, the color of indicator light of charging state is red, and it is blue when the battery is charged fully;</p> <p>c) Inspection of circuit board: All components and parts on the circuit board are welded properly without cold solder joint and solder skips, their locations are clear and neat with three layers of paints coated evenly and completely.</p> <p>d) Surface outside the lens is painted evenly with the chromeplate paint with smooth surface, and surface of lens that the lights come from and the holes that the lights enter into are not contaminated.</p>
Technical safety	The product has been verified in the global scope introduced by American, and such verification has a higher recognition degree in Africa.
Obstacle in achievement transformation and promotion	Almost nothing
Transfer of intellectual property rights	The Enterprise has own intellectual property rights with completely localization and transferable technology.

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	Photo captions		
Renewable Energy Technology Achievement Declaration			
	QR code		
Technology provision unit	Poly Solar Technologies (Beijing) Co., Ltd.		
Contact person	Zhu Xinyu	Submission date	June 22, 2016
Technology type	Solar energy utilization technology	Specific technology	Solar energy observation station technology
Tel.	13911560970	E-mail	chengxin@polyslar.cn
Technology name	10W solar household system		
Technology provider:	Poly Solar Technologies (Beijing) Co., Ltd.		
Scope of application	Be suitable for solving the lighting problem of one room in a house without electricity		
Brief description of technology	The product consists of a solar cell module, a host and a LED light bulb, during daytime, LED lights will be inserted in the host to use solar energy for charging, and take the lamps to any room for lighting if necessary. There are outlets of USB for power supply in host which can be used for charging for cell phone.		
Technical information	Power of solar cell module: 10Wp Battery type: Lithium-ion batteries In the lamp: 3.7V2200mAh×3 units Light source: 120lm×3		


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Business application situation	500 sets are put into use in Sudan
Service conditions	Costs for market transaction, mature technology, systematic training failing to be needed, installation, use and maintenance can be ignored.
Contact person of business application unit /Tel./E-mail	Poly Technologies Co., Ltd. Li Laixing 13810042713 lilaixing@polyinc.com
Investment on equipment	RMB 200,000 for mould opening, costs for raw materials and labor: USD 29
Expense of operation and maintenance	Be ignored
Investment payback period	1 year
Other earnings	Be ignored
Technology occupancy	Unknown
Market potential of technology	It is predicted that one million sets are needed.
Technical advancement	The mini solar household system, which has never been seen at home, integrates Charge Pal, flashlight, table lamp and others as a whole with uniqueness in the market.
Technical maturity	1. Product executive standards: GB/T19064-2003 Technical conditions and test methods of domestic solar photovoltaic power system GB/T18287-2013 Li-ion storage battery used for mobile phone and general specification for storage battery GB2099.1-2008 Part 1 for domestic plugs and sockets and others with the similar purposes: General requirements GB/T191-2008 Graphic marks for package, storage and transportation GB4943.1 Part I for information technology equipment safety: General safety GB/T17626.2 Electromagnetic compatibility test and measurement technology electrostatic discharge noise immunity test YD/T1591-2009 Technical requirements and test methods of mobile communication terminal power adapter and charging/data interface. UL2054 Domestic or business storage battery


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	Technical applicability	The project has an easy process and can be completed with a small parts of technical works, and the raw materials are sourced widely which are influenced by regional scale, environment, investment and other factors in a little degree.
	Technical stability	<ol style="list-style-type: none"> 1. Board-level inspection <ol style="list-style-type: none"> a) Detection opportunity: Fully inspect the finished products parts during production b) For normal charging indication function, the color of indicator light of charging state is red, and it is blue when the battery is charged fully; c) Inspection of circuit board; All components and parts on the circuit board are welded properly without cold solder joint and solder skips, their locations are clear and neat with three layers of paints coated evenly and completely. d) Surface outside the lens is painted evenly with the chromeplate paint with smooth surface, and surface of lens that the lights come from and the holes that the lights enter into are not contaminated.
	Technical safety	The product has been verified in the global scope introduced by American, and such verification has a higher recognition degree in Africa.
	Obstacle in achievement transformation and promotion	Almost nothing
	Transfer of intellectual property rights	The Enterprise has own intellectual property rights with completely localization and transferable technology.
	Photo captions	

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COMPANY: BEIJING CORONA PHOTOVOLTAIC SCIENCE & TECHNOLOGY CO., LTD

RFP of Renewable Energy Technology Achievements				
Beijing Corona Photovoltaic Science & Technology Co., Ltd	QR code			
	Technology providers	Beijing Corona Science & Technology Co., Ltd.		
	Contact	Yanjiao Men	Date of Submission	2016-06-29
	Technology Type	Solar Energy Utilization	Specific Technology	distributed PV power plant technology
	TEL	13466694571	EMAIL	menyj@bjcorona.com
	Tech/Product Name	Integration technology of distributed PV power plant designation, operation & maintenance.		
	Tech/Product Provider	Beijing Corona Science & Technology Co., Ltd.		
	Application Scope	Smart grid, New energy generation, Distributed generation & Energy storage		
	Technology Debrief	Distributed PV generation system includes grid-connected, off-grid and multifunction complementary micro-electrical systems. Distributed photovoltaic system can be integrated with hydropower, wind and other clean energy sources into multifunction complementary micro-electrical systems. Integration technologies of distributed PV power plant, including pre-planning, feasibility analysis, system design, operation, maintenance and system monitoring, A number of factors such as sunlight, land use and land cover need to be considered. In case to meet safety, reliability, economic, environmental, aesthetic, easy to install and maintenance requirements.		
	Technology Information	Integration technologies of distributed PV power plant designation, operation & maintenance requires engineering equipment procurement, construction design, civil construction, equipment installation, commissioning monomer, access system programs, joint testing, commissioning and other aspects of the work of the formal application, technology or product specifications, power, operating parameters, equipment size, weight etc.		
Typical Cases of Commercial Applications	KeZhou-LianSu 10MWp photovoltaic power generation project in Shunde, Guangdong. The project construction site located in Shunde District, Foshan City, Guangdong Province and its full use of solar energy resources in this area provide good power and economic benefits.			
Usage Conditions	Beijing Corona Science & Technology Co., Ltd. engaged in the domestic photovoltaic systems engineering research projects since 2002, corona have multiple years of experience and technical strength. Majority of the projects use local investment and construction, the scale of construction			

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		with a total capacity of several tens of MW, including solar photovoltaic systems engineering, corresponding supporting Internet access and systematic training.
	Business contacts/TEL/Email	1. Mr. Chengwei Gao, Tibet Jiatian New Energy Investment Development Co., Ltd. Cell: +8618601904398 2. Mr. Lei Zhang, Guangdong Liansu Technology Co, Ltd. Cell: +8618611598578
	Equipment Investments	In case of 30MWp photovoltaic power plant design, if choose to install 250Wp polycrystalline PV modules, this power plant should install 120,006 solar panels, a total of 74 500kW inverters (over 4600 meters above sea level the AC rated output will be 450kW). The installation of major equipment investment will be about ¥269,800,900, the project's 25-year total power generation will be around 1,171,197,300 kWh and the annual average generating capacity of 46,847,900 kWh.
	Operation and Maintenance Costs	A PV power plant would leave only the usual production & equipment management personnel. Duties includes PV power plant overhaul, cleaning solar panels, PV module steel frame paint repair and maintenance, environment conservation, sanitary cleaning, etc. will be outsource to other service provider in case to reduce management costs and increase economic efficiency.
	Payback Period	Based on power plant pre-design construction investment budget analysis, the static investment will be RMB ¥80.0384 million, and RMB ¥8000 per kW / kWh for static investment, 30% of the total investment will be self-financing by investors, and the remaining of the investment could be loans from financial institutions. After the normal operations of the power plant, equal principal and interest repayment method will be used to pay off the loans within 15 years.
	Other Income	Photovoltaic power generation is encouraged by the state's use of renewable energy projects, PV power generation process doesn't include burning fuel consumption, and this process is pollution, dust, SO ₂ , greenhouse gases, waste water free. And It will not contain damage that cannot be restored due to mining process. Corona`s distributed photovoltaic systems engineering and general contracting services, operation and maintenance capabilities, is currently in the upper level in the whole industry. In case of 30MWp photovoltaic power plant project, after the completion of the grid , the power plant is expected to annually supply electricity for 46,847,900 kWh, compared to a thermal power generating capacity, equivalent to annual savings of standard coal 15178.72t (average coal consumption of coal as 324g / kWh), corresponding to reduce emissions of various air pollutants annually, the PV power generation project would reduce carbon dioxide (CO ₂) around 39 500 t, sulfur dioxide (SO ₂) around 364.29t, nitrogen oxides (NO _x) around 106.25t, and soot emissions around 645.1t.
	Technology Share	Corona undertakes several national 'Golden-Sun' engineering projects, supports national key scientific and technological issues, participate in develop a number of national and industry standards, work with local government in renewable energy development research and planning,

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		provide feasibility research solutions to business owners and partners, to meet customer needs in various consulting projects during the construction. According to the customer's environmental protection and green energy demand, with considering project location, resources, construction conditions, price and other policies, Corona provide services such as comprehensive project evaluation, PV system design, equipment selection, etc. The company has installed more than 300 photovoltaic power plants, and the system capacity nearly 702MWp, with market share of 15%.
	Technology Market Potential	By the end of 2020, solar power installed capacity reached 160 million kilowatts, the annual power generation reached 170 billion kwh and the total annual investment reached around RMB ¥ 200 billion. In construction of the project, the level of technical and technological level design is a decisive factor. To enhance the independent design capability, professional advantages, implementation of quota management, design optimization is needed to reduce the cost of the project. With using technological progress as the core, to promote key technology innovation & technological progress, follow up PV industrial upgrading and enhance competitiveness of industry would become key structure. Corona promotes various forms of technical route of industrialization, mature, and accelerates the PV production. Corona also interested in uses technology advances industry, enhance the manufacturing level, improve the conversion efficiency of solar cells, gradually reduce the cost of solar power, thus improve their market competitiveness and laid the foundation for the further large-scale development of power generation.
	Technology Advancement	Corona has abundance cases and rich experience in distributed PV power plant design and project construction. Corona also locates at the forefront of the photovoltaic renewable energy-based industries` development and promotion. Our rational process system, optimize equipment selection and configuration fulfill all reasonable backup requirements.
	Technology Maturity	With state support for distributed PV development, distributed photovoltaic technology has made amazing progress; Corona has accumulated a large number of design, construction experience in installation, operation and maintenance. Currently, photovoltaic power plant design, maintenance and operation is a mature technology, in the design process. Led the drafting of photovoltaic Station 3 standards, there's so many choices in design and integration of power plants, operation and maintenance during the program phase, switch assembly, equipment selection and proportion leading technology. In addition, the company has repeatedly commitment to more than 10 national science issues; participate in system integration, design and optimization.
	Technical Suitability	Distributed PV technology is widely used in construction and architecture combined with local rooftop photovoltaic systems, which does not occupy arable land, and it can be integrated with hydropower, wind and other clean energy sources into multifunction complementary micro-electrical systems. Like solar agricultural greenhouses and solar/ fish farming complementary


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		<p>project, it could operate either as a stand-alone micro-grids or to be linked to the grid. From initial communication with the business owners to participation in the formation, equipment selection and program adjustments, till the construction process finishes. Power plant design institution and integration technology service provider must stick together; solve the incoming issues until the completion of the project.</p>
	Technology Security	<p>The advantages of distributed PV system are: 1, can achieve the nearest power supply, to avoid the long distance losses from transmission lines; 2, solar energy without fuel, low running costs; 3, no moving parts, maintenance is simple, suitable for unattended use; 4, does not produce any waste, no pollution, ideal clean energy. 5, the construction period is short, convenient and flexible, and can easily increase or decrease the load capacity of the module. These advantages make the distributed photovoltaic power generation guaranteed for safety, reliability and easily to operate.</p> <p>Meanwhile, the construction quality of the project depends largely on the design and integrated quality, considering the selection of equipment procurement, the level of construction technology in the design process and program optimization. These methodologies can improve the quality of project design and to ensure the quality of the entire work.</p>
	Technical Stability	<p>With national and local policies which solve the dilemma of distributed photovoltaic intensive introduction come up on stage, financial, inspection, insurance and other agencies quickly enter the photovoltaic industry, distributed PV system has been grow up rapidly in various forms, Building structural safety, electrical safety paramount is considered most. The stability of the system, efficient operation, and easy maintenance will also be considered. While PV power plant system integration is a mature technology, in all aspects of the design and accordance with the relevant standards, policies, construction, distributed PV system integration plays a guiding role in moving traditional grids towards to a more integrated system.</p>
	Obstacles to the Promotion of Achievements Transformation	<p>Distributed PV system depends on residential, commercial and industry buildings, which have high population density/equipped with precision instruments/have inflammable storage, etc. Thus, distributed PV system requires a more restrictive safety performance and it is required that mounted PV system module would not affect the original production and living functions. There would also be no security risk to personnel, production and materials. In case to follow up progress of PV systems and master the design of integrated core technologies, a further exploration with integrate technology, creativity and resources will be needed.</p>
	Transfer of Intellectual Property Rights	<p>In distributed PV system develop, design and construction process, In case of expanding the market of photovoltaic industry, technology innovation and improvement of the internal reserves, and promote production technologies. Internal development of intellectual property management practices have been built up, effectively regulated applicant's intellectual property rights, and make technology transfer easier and smoother.</p>

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Achievement Declaration of Renewable Energy Technology			
QR code			
Technology providers	Beijing Corona Science & Technology Co., Ltd.		
Contact	Yanjiao Men	Date of Submission	2016-06-29
Technology Type	Solar Energy Utilization	Specific Technology	Distributed Power Plant Technology
TEL	13466694571	Email	menyj@bjcorona.com
Tech/Product Name	PV & storage Micro-grid system		
Tech/Product Provider	Beijing Corona Science & Technology Co., Ltd		
Application Scope	Smart grid, New energy generation, Distributed generation & Energy storage		
Technology Debrief	Micro-grid is a set of system unit by the distributed source, load, energy storage systems and control equipment. Depending on whether connected to the grid, the Micro-grid divided into on grid micro system and off grid micro system. Micro-grid can provide system reliability and improve the penetration of new energy. The key equipment is PCS, EMS system, Inverter and so on.		
Technology Information	Input voltage: 330-600V Current THD(on-grid): ≤3% on-grid and off-grid system within time: less than 100ms Input voltage: 330-600V Size(width, height, length):810×1810×710		
Typical Cases of Commercial Applications	Micro-grid systems in remote areas(location: Lhasa).Scale:2.5kW PV system, 3.3kW PCS . Operating results: be running.		
Usage Conditions	Market transactions and government construction are suitable. Corona Micro-grid Technical is top five, Mature technology. Equipment installation and be used is simple and has cost. Cost mainly includes		

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		bracket, cables and so on, while using ,the cost is replacement of battery. Maintenance costs are cleaning costs of PV modules.
Business contacts/TEL/Email		Tibet Demonstration Center Energy Research, contacts: jinggang Ji; tel:13008980882,Email:xmb@vip.163.com
Equipment Investments		Micro-grid system contains PV system, Energy Storage System, EMS system. PV system is RMB ¥8 /watt, Energy Storage System contain PCS and battery, PCS is RMB ¥1.5/watt, Lead-acid batteries is 0.55/watt. Hour and Lithium Battery is RMB ¥4.25/watt hour. Baoding Micro-grid project, for example, 50kW PV system is RMB ¥400 thousand, and 100kW PCS is 150 thousand, 72kW.hour Lead-acid batteries is RMB ¥40 thousand , EMS system is RMB ¥50 thousand , Project an investment RMB ¥640 thousand totally. Optical storage micro-grid projects can transform the traditional distributed photovoltaic systems, the PCS、 Battery and EMS system need to add to this system.
Operation and Maintenance Costs		Micro-grid system operation and maintenance costs include labor costs, management fees, maintenance and clean-up costs, typically an annual fee, an annual fee of 0.07 yuan / watt.
Payback Period		8-12year
Other Income		Micro-grid system is large-scale applications, not only driven by the rapid development of the storage industry, to promote new energy saving effect obvious.
Technology Share		With the rapid development of new energy sources, a large area of abandoned light wind phenomenon, new energy Development of domestic sources began to load centers in the eastern part of the development, in 2014 the national energy Source Bureau issued a photovoltaic annual total 14.05 million new construction scale of millions, its Distributed eight million kilowatts, visible national attention on distributed PV. Optical storage Micro-grid PV system comprising a distributed, energy storage systems, optical storage micro-grid system To run in the grid mode can also be run in off-grid mode, profit is distributed PV Effective use of the form, the Internet is the energy carrier. 2015 is a micro optical storage In the start of network development, optical storage micro-grid demonstration at the application stage, the micro-optical storage Network systems accounted for about 5% of the total market share. But as energy Internet, new Energy demonstration city and demonstration of renewable energy technologies, photovoltaic poverty alleviation, China


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		2050 renewable energy concepts proposed optical storage system ushered in the development of micro-network Opportunity, the next five years, micro-optical storage network system will usher in the blowout development period.
	Technology Market Potential	Currently, photovoltaic power generation system has been centralized and distributed large-scale use, The market has matured. Key equipment energy storage system mainly storage batteries And the storage converter, currently used batteries on the market are mainly VRLA Acid batteries and lithium ion batteries, two battery technology is relatively mature Made large-scale use of the new battery in Zhangbei energy demonstration base such as lead-carbon battery technology is constantly evolving, storage is expected in 2020 Pool technology has achieved great breakthrough, expected to decline in terms of cost About 50%. Storage converter is the core unit of the micro-grid system, now with Standby and off-grid smooth switching, power quality control constantly break Expected 2020 storage converter can ensure long-term stable operation and micro-grid system power quality. Optical storage system in micro-grid household level, village, region are vast Early development is expected in 2020, the country built the household level micro-grid optical storage system 10000, 100 village-level micro-network system, network system 10 micro-regions, market potential Force 50 billion or more.
	Technology Advancement	Corona micro-grid system have on-grid and off-grid mode features smooth switching , New energy power fluctuations can be suppressed, guaranteed micro-grid power quality system in International and domestic leading position.
	Technology Maturity	Corona micro-grid system comprising photovoltaic modules, PCS, Inverter, battery, more devices have been mass production Mature technology. Although micro-grid system is the emerging technologies in recent years, but Corona have mastered the sophisticated design systems integration technology.
	Technical suitability.	Micro-grid system applies both to the load center is also applicable to remote areas, Photovoltaic modules, inverters, battery technology maturity exact match by Geographical scale, the environmental impact is small.
	Technical stability	Micro-grid system is stable, the external environment, technical parameters sensitive to interference Low.
	Technology Security	With the highly valued and micro-grid PV system from power quality and energy security The body continues to mature technology, optical storage micro-grid system will usher in rapid development period. Currently, micro-grid optical storage system availability, facilities have been completed, then the market By the degree of risk is small.

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	<p>Achievements Promotion</p>	<p>Currently, micro-grid system in the transformation and promotion process, and other industries due to The presence of cross-field part of the equipment, such as high storage costs, resulting in micro-optical storage The high cost of network systems. With the development of energy storage technology maturation and storage subsidies Soon, there will be a further decline in the price of storage space, micro-grid optical storage system is not Come will show explosive growth.</p>		
	<p>Transfer of intellectual property rights</p>	<p>Corona with independent intellectual property rights in the field of domestic micro-grid, obtain the relevant special Lee seven, has a technical side to the enterprises themselves. Optical storage devices based micro-grid system all of this on domestic technology. Technology transfer of ownership in accordance with market demand enterprise strong will; technology transfer mechanism is adopt property abroad commercialization and market-based transactions, policy approaches smoothly.</p>		
	<p>Achievement Declaration of Renewable Energy Technology</p>			
	<p>QR code</p>			
	<p>Technology Supply Company</p>	<p>Beijing Corona Science & Technology Co., Ltd.</p>		
	<p>Contacts</p>	<p>Yanjiao Men</p>	<p>Date of Submission</p>	<p>2016-06-28</p>
	<p>Technology Type</p>	<p>Wind Energy Utilization Technology</p>	<p>Specific Technology</p>	<p>Key components design, manufacture and installation technology of wind power generation system</p>
	<p>TEL</p>	<p>13466694571</p>	<p>E-mail</p>	<p>menyj@bjcorona.com</p>
	<p>Tech/Product Name</p>	<p>Complete set of electric control system for wind turbine</p>		

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Tech/Product Provider	Beijing Corona Science & Technology Co., Ltd., Baoding Corona Control Equipment Co., Ltd. and Corona Wind Energy Equipment (Beijing) Co., Ltd.
Application Scope	Smart Grid, New Energy Power Generation, Distributed Generation, Energy Storage System
Technology Debrief	The complete set of electrical control system of wind turbine consists of four components, the main controller, variable pitch controller, converter and monitoring system. Due to the complexity of the operating environment and great control difficulties, control systems have become the core components of the operation of wind turbines. The main controller realizes machine operation control; variable pitch controller can adjust the pitch angle as well as the brake, the converter can achieve power control and connection to the power grid.
Technology Information	The complete set of electrical control system of wind turbine has two kinds of products: Full Power system and Doubly-fed system. Please refer to the attachment for the detailed technical parameters of all components.
Typical Cases of Commercial Applications	Classic Case: Corona 2MW Full Power Wind Turbine control system operated successfully at GEOHO Hailisu Wind Farm and connected to the power grid in May, 2015. The scale of the wind farm is 50MW; the product has been stable and performed well so far.
Usage Conditions	Wind turbine control system mainly focuses on market transactions, usually for domestic large wind farm owners or electrical power company. Corona wind power electrical control technology leads in the domestic and equipment maintenance cost is 20% lower than the peers. Before the unit is connected to the network, the staff should be trained on the remote system for the use and maintenance of the unit equipment.
Business contacts/TEL/Email	Application Company: Huayi Wind Energy Co., Ltd. Contacts: Hua Zhang Telephone: 15167476864 E-mail: zhanghua@heag.com

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Equipment Investments	Single complete set of electrical control system equipment and other ancillary equipment put an amount of investment of about 1.7 million, and the upgraded single set in the stock market of investment cost is about 250 thousand.
Operation and Maintenance Costs	Due to the bad weather conditions of the wind farm, manual on-site or remote on duty is needed when electrical control system runs normally. The maintenance cost is mainly staff wages and spare parts costs on duty at the scene.
Payback Period	5-8 Years
Other Income	Compared with foreign products, Corona's control project products decreased the cost by more than 45% in the aspect of both economic benefit and social benefit. According to the current annual installed capacity, domestic enterprises can cut cost of nearly 10 billion Yuan, achieve saving of standard coal for about 12 million tons and reduce carbon emissions by about 32 million tons every year. In addition, Corona's intelligent wind farm operation management platform is able to achieve efficient management of wind farms and the liberation of the productive forces to achieve less people on duty, or even no one on duty for its high degree of automation and intelligent.
Technology Share	Corona was in the early stage of the mass and the promotion of industrialization of medium power and high power grade wind power set in the control system in 2015. With a number of independent research and development experience as well as market reputation, the overall open market share accounted for 11%. Besides, the technical level has reached a leading position both domestically and internationally.

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	Technology Market Potential	<p>In recent years, the domestic wind power field has been facing good development opportunities: the technology of wind power is relatively mature with the most large-scale commercial development conditions and a relatively low cost, which is highly emphasized by the government in all kinds of new energy sources. The domestic wind power industry is facing greater market space and good opportunities for development, with the forward trend of intelligent and large capacity direction. After years' technological research of Corona R & D team, high power and intelligent wind power electrical system of Corona are bound to achieve promising success in the domestic and international market.</p>
	Technology Advancement	<p>After years' technological research of Corona R & D team, Corona first developed key technology of 1.5MW double fed wind power electrical control equipment in China. Since that, Corona has continued to overcome several key technical problems, such as 2MW full power and doubly fed electrical control equipment, 3MW electrical control equipment and 5MW medium voltage converter. What is more, in the domestic first hands, Corona achieved completely independent intellectual property rights of full set of 1.5MW-3MW electrical control system technology, which has been applied at wind farms and passed many products and technology certification. As a result, Corona is the only team who can provide a full set of electrical control products and solve the programs domestically. The product performance has reached the advanced level of similar products in the international, which has an important sense to the development of China's wind power industry.</p>


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	Technology Maturity	After more than a decade of experience, the company has basically formed a relatively complete technical process and operation system in order to guide the production process. On the other hand, Corona currently set up production bases and experimental center (covers an area of 85 Mu), completed construction of large trials with detection platform for more than 30 and purchased nearly 100 sets of advanced equipment. the main platform includes low voltage ride through experiment platform, simulation experiment platform for control system of wind turbine, 3MW full power converter ground experimental platform, 3.5MW double fed converter and generator ground test platform, 5MW variable pitch experimental platform and so on. All the mentioned above has provided a good platform and support for wind power control system research and development.
	Technical Suitability	During the promotion of industrialization process of Corona's complete sets of electrical control equipment, Corona has achieved cooperation with mainstream domestic machine manufacturers and product market share has increased year by year. The wind turbines installed Corona's control systems are distributed in more than 100 wind farms all over China, which showed great adaptation ability to high temperature, low temperature, high altitude and coastal environment. The product has a mature performance in wind field operation, and because of the reliable product quality, Corona has established a good reputation in the field.
	Technology Security	The complete electrical control system is strictly supervised during the production process from design, development, debugging to detection and commercial product quantization process. Each product has its corresponding test platform to carry out strict factory commissioning in pursuit of lowering the greatest degree of risk. At the same time, the equipment can be monitored by remote control system for real-time monitoring in order to get the maximum degree of reduction of all kinds of environmental risks.

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	<p>Technical Stability</p>	<p>Since 2002, the whole set of Corona electrical control equipment has been tested on wind farm in the situation of high temperature, low temperature, high altitude, humidity, high salt spray and typhoon respectively. Under such bad condition, the field operation stays stable and Corona’s production has shown a good adaptability to operating environment.</p>		
	<p>Obstacles to the Promotion of Achievements Transformation</p>	<p>Domestic wind power industry started relatively late, and a number of core technology bottlenecks and foreign key technology monopoly have to be overcome in the localization process of wind power electrical control equipment. With the continuous adjustment of the industry and the standardization of market order in recent years, the situation of R & D enterprises in the field of wind power has been improved a lot by solving many obstacles encountered before, such as poor equipment operating environment, financial strain and bad junctions between upstream and downstream. Besides, the cost of has been decreasing.</p>		
	<p>Transfer of Intellectual Property Rights</p>	<p>Corona has a complete independent intellectual property rights and patent in the domestic field of wind power control and such technology owner is the enterprise itself. Electrical control system of wind power is one of the domestic made technologies of wind power in China, with its relatively high stability, high cost effectiveness. In the meantime, the product can meet the needs of foreign countries such as Africa’s construction of wind farms. The company's technological achievements are mainly to take domestic and international trade and market transactions, the policy path is smooth.</p>		
	<p>Achievement Declaration of Renewable Energy Technology</p>			
	<p>QR code</p>			
	<p>Technology providers</p>	<p>Beijing Corona Science & Technology Co., Ltd.</p>		
	<p>Contact</p>	<p>Yanjiao Men</p>	<p>Date of Submission</p>	<p>2016-06-28</p>

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COMPANY: BEIJING CORONA PHOTOVOLTAIC SCIENCE & TECHNOLOGY CO., LTD

Type of Technology	Solar Energy Utilization	Specific Technology	Household PV Power Generation Systems
TEL	13466694571	EMAIL	menyj@bjcorona.com
Tech/Product Name	Solar PV All-In-One Home Power Supply		
Tech/Product Provider	Beijing Corona Science & Technology Co., Ltd. Beijing Corona Photovoltaic Science & Technology Co., Ltd. Baoding kezhou Photovoltaic Equipment Co., Ltd.		
Application Scope	Applicable for the family in remote areas in less electricity or without electricity power supply and backup power supply		
Technology Debrief	Solar PV all-in-one home power supply is a kind of storage to convert solar energy into electricity at the core of the control equipment. It consists of charging controller, inverter and battery. The equipment can make full use of solar radiation, converting solar energy into electrical energy, with over-current protection, can adapt to all kinds of user load demand, the use of safe and reliable.		
Technology Information	Equipment size and parameters varies with the product capacity, specification will be found in attachment.		
Typical Cases of Commercial Applications	<ol style="list-style-type: none"> 1. Since its first operation in 2012, the equipment used in Tibet 15000 sets of household system project (xigaze region), are running well. 2. Since its first operation in 2014, the equipment used in without power of Qinghai area opens with independent sets of solar PV power system project, are running well. 		
Usage Conditions	The equipment is given priority to with market transactions, delivery installation. Since 2002, our company engaged in the photovoltaic power generation equipment research and development, the current equipment is KNSCI24-15-500PTS series products. Through the user manual to guide personnel use equipment.		
Business contacts/TEL/Email	<ol style="list-style-type: none"> 1. Tibet 15000 Sets Of Household System Project Contact: LI WANG TEL:18080499995 2. Independent sets of household solar PV power system project in Haixi Mongolian and Tibetan Autonomous Prefecture, Qinghai without electricity area Contact: HE LIU TEL: 18600440531 		
Equipment Investments	From the research, development, production to installation using single sets of equipment, usually invest amount about thousands of RMB. On the basis of the existing equipment to meet the need of reforming audit change material mainly circuit devices, and can transform		


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		<p>in traditional devices, do not need new equipment, and customers can according to need to be replaced, expenses of about hundreds of RMB.</p> <p>Engineering scale-namely system total installed capacity, and the number of users, in remote areas. For example, about dozens of units, area residents need to install the equipment to dozens of units.</p>
	Operation and Maintenance Costs	Solar PV all-in-one home power supply during normal operation, do not produce maintenance costs.
	Payback Period	5-8years
	Other Income	Our company is the earliest engaged in the solar PV control, the inverter technology research enterprise, continued leading in domestic solar PV control, the development direction of inverter technology and product development. Inverse control all-in-one storage has been widely used in remote areas of the country, the running effect is good, for the remote mountain areas of light at the same time, the economic benefits. If can mass popularization and application, considerable economic benefits, will amount to hundreds of millions of RMB.
	Technology Share	In recent years, solar PV industry have been adjusted. Corona’s solar PV all-in-one home power supply has been applied in many different environment, the market share of about 7% of the market. Now, the products are upgrading technology.
	Technology Market Potential	Company is currently the earliest enterprises engaged in the solar PV control, inverter technology research. Continued leading in domestic solar PV control, the development direction of inverter technology and product development. Solar PV all-in-one home power supply has been widely used in remote areas of the country, the running effect is good. The equipment environmental adaptation, grid friendly characteristics significantly, if in Africa, Latin America and other regions to get promotion, market prospects will be good.
	Technology Advancement	This product uses the MPPT tracking technology for the battery charging, the efficiency is above 88%, higher than the same industry efficiency more than 3% at least, won five national patents, it is in the leading position in domestic. The product through CQC certification, TUV certification.
	Technology Maturity	Technology route is simple, the mainly steps are welding, assembly, wiring, testing and aging. In common use with other electrical equipment manufacturing enterprises. Charging and inverter technology to realize the integration, modularization, mass production has been realized.
	Technical Suitability	This product is mainly used in remote areas without electricity, less electricity, meet the family once. At ambient temperature - 20 °C ~ + 40 °C, humidity is less than 90% under the condition of no condensation to work properly, in high temperature, high humidity, high

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		altitude can run safely. Now This product has been passed the China quality certification center CQC certification and TUV certification. And upstream and downstream matching technology and good implementation localization, no regional restriction, can adapt to all kinds of scale production.	
	Technology Security	Products have good stability, strong anti-interference ability, low failure rate, the part of the equipment safe operation has been more than 5 years. Have passed CQC certification, TUV certification.	
	Technical Stability	The technology in the process of achievement transformation and industrialization of high degree of versatility, acceptable, production is only commonly used electrical equipment needed for production facilities.	
	Obstacles to the Promotion of Achievements Transformation	In the process of achievement transformation and promotion, the technology without any obstacles. The supporting facilities is perfect, it has better market acceptance, the product can be widely used in family, less electricity in remote areas without electricity supply.	
	Transfer of Intellectual Property Rights	In the field of domestic photovoltaic, Corona with technology and independent intellectual property rights and related patents. Solar PV all-in-one home power supply is China's bright project - either to the township of localization technology, the technology is relatively mature and stable, price advantages, at the same time conforms to the overseas, especially the application of Africa started building photovoltaic power station. To implement the technology ownership transfer according to the market demand, companies have a strong intention. Technology property right transfer mechanism mainly by commercialization and market at home and abroad, domestic policy support.	
	Achievement Declaration of Renewable Energy Technology		
	QR code		
	Technology providers	Beijing Corona Photovoltaic Science & Technology Co., Ltd.	
	Contact	Yannan Zhang	Date of Submission 2016-07-20
	Type of Technology	Solar Energy Utilization	Specific Technology Household PV Power Generation Systems
	TEL	15201180465	EMAIL zhangyannan@bjcorona.com
	Tech/Product Name	Bi-directional energy-storage inverter	
	Tech/Product Provider	Beijing Corona Photovoltaic Science & Technology Co., Ltd.	

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Application Scope	Applicable for the family in remote areas in less electricity or without electricity power supply and backup power supply.
Technology Debrief	Bi-directional energy-storage inverter can realize off-grid and grid-connected power generation function, but also can realize bidirectional flow control of electric power and have the ability of automatic and manual switch working state. During the day, photovoltaic modules power by energy storage type of photovoltaic inverter to provide local load or power grid, can also be used for energy storage devices. At night, according to the need to release energy storage equipment in electric power, power grid are also can charge the battery through the inverter to energy storage devices. System integration is high, the battery charger, inverter, grid inverter, battery management system integration. Achieve the lower costs, reduce system takes up space.
Technology Information	Equipment size and parameters varies with the product capacity, specification will be found in attachment.
Typical Cases of Commercial Applications	Solar PV energy storage system in Lhasa Tibet autonomous region, relying on plateau cold area buildings, remote intelligent micro renewable energy grid integration project design. Since its first operation in 2013,the equipment are running well.
Usage Conditions	Bi-directional energy-storage inverter is given priority to with market transactions, delivery installation. Micro network system consists of solar panels, battery, etc. Since 2002, our company engaged in the solar PV power generation equipment research and development. The equipment use process need a simple training, maintenance cost is low.
Business contacts/TEL/Email	Solar PV energy storage system in Lhasa Tibet autonomous region Contact: YUFENG WANG TEL:13810710260
Equipment Investments	Bi-directional energy-storage inverter is the main equipment of micro network system. Cooperate with solar panels, battery, such as communications equipment of micro network system. A single main equipment price of about ten thousand yuan, other form a complete set of equipment form a complete set of project. Engineering scale namely system total installed capacity, and the number of users, in remote areas, for example, a single resident a single system. Users in project area, cooperate with relevant system installation.
Operation and Maintenance Costs	When bi-directional energy-storage inverter during normal operation, The main cost including the cost of raw materials to users, depreciation cost, cost of repair, hundreds of RMB a year.
Payback Period	5years


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Other Income	Our company is the earliest engaged in the photovoltaic (PV) control, the inverter technology research enterprise, continued leading in domestic PV control, the development direction of inverter technology and product development. bi-directional energy-storage inverter has been widely used in remote areas of the country, the running effect is good, for the remote mountain areas of light at the same time, the economic benefits. If can mass popularization and application, considerable economic benefits, will amount to hundreds of millions of RMB.
Technology Share	In recent years, Photovoltaic industry have been adjusted. Corona's bi-directional energy-storage inverter has been applied in many different environment, the market share of about 7% of the market. Now, the products are upgrading technology.
Technology Market Potential	Company is currently the earliest enterprises engaged in the photovoltaic (PV) control, inverter technology research. Continued leading in domestic PV control, the development direction of inverter technology and product development. This product output from security, reliability, stability and efficiency is a world leading level, the structure is compact, simple to use, convenient installation, maintenance cost is low, can provide a better user experience and economy. Bi-directional energy-storage inverter has been widely used in remote areas of the country, the running effect is good. The equipment environmental adaptation, grid friendly characteristics significantly, if in Africa, Latin America and other regions to get promotion, market prospects will be good.
Technology Advancement	Equipment used MPPT tracking technology for battery charging, In the domestic leading position, the maximum efficiency reached 97.6%, more efficient than the same industry. Through the CE, VDE and other international certification.
Technology Maturity	Technology route is simple, the mainly steps are welding, assembly, wiring, testing and aging. In common use with other electrical equipment manufacturing enterprises. Charging and inverter technology to realize the integration, modularization, mass production has been realized.
Technical Suitability	This product is mainly used in remote areas without electricity, less electricity, meet the family once. At ambient temperature - 25 °C ~ + 45 °C, humidity is less than 95% under the condition of no condensation to work properly, in high temperature, high humidity, high altitude can run safely. Now upstream and downstream matching technology and good implementation localization, no regional restriction, can adapt to all kinds of scale production.
Technical Stability	This product stability is a world leading level, strong anti-interference ability, low failure rate.

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	Technology Security	The technology in the process of achievement transformation and industrialization of high degree of versatility, acceptable, production is only commonly used electrical equipment needed for production facilities.		
	Obstacles to the Promotion of Achievements Transformation	In the process of achievement transformation and promotion, the technology without any obstacles. The supporting facilities is perfect, it has better market acceptance, the product can be widely used in family, less electricity in remote areas without electricity supply.		
	Transfer of Intellectual Property Rights	In the field of domestic photovoltaic, Corona with technology and independent intellectual property rights and related patents. the technology is relatively mature and stable, price advantages, at the same time conforms to the overseas, especially the application of Africa started building solar PV power station. To implement the technology ownership transfer according to the market demand, companies have a strong intention. Technology property right transfer mechanism mainly by commercialization and market at home and abroad, domestic policy support.		
	Achievement Declaration of Renewable Energy Technology			
	QR code			
	Technology providers	Beijing Corona Photovoltaic Science & Technology Co., Ltd.		
	Contact	Yannan Zhang	Date of Submission	2016-07-20
	Type of Technology	Solar Energy Utilization	Specific Technology	Grid-Connected Solar PV Technology
	TEL	15201180465	EMAIL	zhangyannan@bjcorona.com
	Tech/Product Name	Grid-Connected Solar PV Inverter		
	Tech/Product Provider	Beijing Corona Photovoltaic Science & Technology Co., Ltd.		
	Application Scope	Applicable for PV power generation system located in desert, the plateau, the Gobi, etc.		
	Technology Debrief	Inverter is used to convert dc power to ac power. Inverters provided by Corona have many advantages, such as high operating efficiency, easy to installation, applicable for harsh environment (dry-hot, humid-hot, extreme cold, plateau, etc.). Corona's inverter can be used in different application scenarios.		
	Technology Information	Equipment size and parameters varies with the product capacity, specification will be found in attachment.		

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<p>Typical Cases of Commercial Applications</p>	<p>1.50MWp ground-mounted PV power generation project in Shanshan Xinjiang Autonomous Region LOCATION: Xinjiang Shanshan Since its first operation in 2014, the inverters used in the project are running well. 2.40MWp PV grid-connected power mounted on an agricultural greenhouse, Bozhou LOCATION: Bozhou Anhui Province 3.200MW grid-connected solar PV power station at the 3 phase industrial park in Gonghe city, Qinghai Province Location: Qinghai Province 4.20MW grid-connected solar PV on greenhouses in agricultural science and technology power station Location: Qingdao, Shandong Province</p>
<p>Usage Conditions</p>	<p>The equipment is given priority to with market transactions, delivery installation. Since 2002, our company engaged in the Solar PV power generation equipment research and development, the current equipment is KNGI1000-500HED series products. The equipment use process need a simple training, maintenance cost is low. Every single change sets product material need to one hundred RMB.</p>
<p>Business contacts/TEL/Email</p>	<p>1.50MWp ground-mounted PV power generation project in Shanshan Xinjiang Autonomous Region Contact: JIANWU REN TEL: 15810638619 2.40MWp PV grid-connected power mounted on an agricultural greenhouse, Bozhou Contact: QIANG ZHOU TEL: 66895601 3.200MW grid-connected solar PV power station at the 3 phase industrial park in Gonghe city, Qinghai Province Contact: BIN GU TEL: 18297178766 4.20MW grid-connected solar PV on greenhouses in agricultural science and technology power station Contact: YANG WANG TEL: 18561786106</p>
<p>Equipment Investments</p>	<p>For large-scale PV power plant applications, two 500 kw inverters and an sea-freight container are key equipment of one power generation unit, and its price are about two hundred thousand RMB.</p>


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		Engineering scale-namely system total installed capacity, related to the number of MW. For a 50MWp project, it will need 100 sets 500kW inverter. The rest can be done in the same manner.
	Operation and Maintenance Costs	When the Grid-connected solar PV inverter during normal operation, The main cost including the cost of raw materials to users, depreciation cost, cost of repair, hundreds of RMB a year.
	Payback Period	5years
	Other Income	Our company is the earliest engaged in the photovoltaic (PV) control, the inverter technology research enterprise, continued leading in domestic PV control, the development direction of inverter technology and product development. The Grid-connected solar PV inverter has been widely used in domestic desert, the gobi desert plateau, power station, etc. Running effect is good. If can mass popularization and application, considerable economic benefits, will amount to hundreds of millions of RMB.
	Technology Share	In recent years, Photovoltaic industry have been adjusted. Corona’s Grid-connected solar PV inverter has been applied in many different environment, the market share of about 10% of the market. Now, the products are upgrading technology.
	Technology Market Potential	Company is the earliest engaged in the photovoltaic (PV) control, the inverter technology research enterprise. In our country, we continue to lead the PV control, development direction of inverter technology and product development. Corona’s Grid-connected solar PV inverter has been widely used in the barren hills, the gobi desert plateau, such as large power stations and the running effect is good. The equipment environmental adaptation, grid friendly characteristics significantly, If in Africa, Latin America and other regions to get promotion, market prospects will be good.
	Technology Advancement	This product adopts advanced MPPT control strategy, to adapt to the shade, hot spot components such as accident conditions. The design of the reactor is based on the weighted weight coefficient, to achieve optimum efficiency within the scope of full power. The technology is in the leading position in our country. The products of maximum conversion efficiency is 98.87%, the efficiency in Europe is 98.5%, the average weighted total efficiency is 98.12%. The product has passed CQC certification, TUV certification, low voltage across (zero wear) certification, etc.
	Technology Maturity	Technology route is simple, the mainly steps are welding, assembly, wiring, testing and aging. In common use with other electrical equipment manufacturing enterprises. Charging and inverter technology to realize the integration, modularization, mass production has been realized.

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	<p>Technical Suitability</p>	<p>At ambient temperature - 20 °C ~ + 40 °C, humidity is less than 90% under the condition of no condensation to work properly, in high temperature, high humidity, high altitude can run safely. Now this product has been passed the China quality certification center CQC certification and TUV certification. And upstream and downstream matching technology and good implementation localization, no regional restriction, can adapt to all kinds of scale production. According to our country the characteristics of different climate area, our products according to the optimization design software and hardware, in order to realize the optimal on generating in a particular area.</p>
	<p>Technical Stability</p>	<p>The product adopts the generalization and seriation and modularization design. Strong practicability, good stability, strong anti-interference ability, low failure rate, the products have been widely used. Equipment safe operation time in more than 10 years. The product has passed CQC certification, TUV certification, low voltage across (zero wear) certification, etc.</p>
	<p>Technology Security</p>	<p>The technology in the process of achievement transformation and industrialization of high degree of versatility, acceptable, production is only commonly used electrical equipment needed for production facilities.</p>
	<p>Obstacles to the Promotion of Achievements Transformation</p>	<p>The technology without any obstacles in the process of achievement transformation and promotion, product technology mature, supporting facilities, good market acceptance, the product can be widely used in grid-connected power generation system.</p>
	<p>Transfer of Intellectual Property Rights</p>	<p>In the field of domestic photovoltaic, Corona with technology and independent intellectual property rights and related patents. The product through the CQC certification, TUV certification, low voltage across (zero wear) certification, etc. The high technical maturity, the market acceptance. The product can be widely used in grid-connected power generation system. The products meet the relevant industry standards at home and abroad, also adapted to Africa and other regions started building photovoltaic power station and other applications. To implement the technology ownership transfer according to the market demand, companies have a strong intention. Technology property right transfer mechanism mainly by commercialization and market at home and abroad, domestic policy support.</p>
	<p>Achievement Declaration of Renewable Energy Technology</p>	
	<p>QR code</p>	

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COMPANY: BEIJING CORONA PHOTOVOLTAIC SCIENCE & TECHNOLOGY CO., LTD

Technology providers	Beijing Corona Photovoltaic Science & Technology Co., Ltd.		
Contact	Yannan Zhang	Date of Submission	2016-07-20
Type of Technology	Solar Energy Utilization	Specific Technology	Household PV Power Generation Systems
TEL	15201180465	EMAIL	zhangyannan@bjcorona.com
Tech/Product Name	Solar Photovoltaic (PV) Off-Grid System		
Tech/Product Provider	Beijing Corona Photovoltaic Science & Technology Co., Ltd.		
Application Scope	Applicable for the family in remote areas in less electricity or without electricity power supply and backup power supply		
Technology Debrief	Solar PV off-grid system consists of Solar PV all-in-one home power supply, solar panels, battery, etc. Solar PV all-in-one home power supply is a kind of storage to convert solar energy into electricity at the core of the control equipment. It consists of charging controller, inverter and battery. The equipment can make full use of solar radiation, converting solar energy into electrical energy, with over-current protection, can adapt to all kinds of user load demand, the use of safe and reliable.		
Technology Information	Equipment size and parameters varies with the product capacity, specification will be found in attachment.		
Typical Cases of Commercial Applications	<ol style="list-style-type: none"> 1. Since its first operation in 2012, the equipment used in Tibet 15000 sets of household system project (xigaze region), are running well. 2. Since its first operation in 2014, the equipment used in without power of Qinghai area opens with independent sets of solar PV power system project, are running well. 		
Usage Conditions	<p>Solar PV off-grid system is given priority to with market transactions, delivery installation. Main equipment is Solar PV all-in-one home power supply, cooperate with solar panels, battery, etc.</p> <p>Since 2002, our company engaged in the solar PV power generation equipment research and development, the current equipment is KNSCI24-15-1000PTS series products. The equipment use process need a simple training, maintenance cost is low.</p>		
Business contacts/TEL/Email	<ol style="list-style-type: none"> 1. Tibet 15000 Sets Of Household System Project Contact: LI WANG TEL:18080499995 2. Independent sets of household solar PV power system project in Haixi Mongolian and Tibetan Autonomous Prefecture, Qinghai without electricity area Contact: HE LIU TEL: 18600440531 		


TECHNOLOGY: SOLAR

COMPANY: BEIJING CORONA PHOTOVOLTAIC SCIENCE & TECHNOLOGY CO., LTD

Equipment Investments	Solar PV off-grid system consists of Solar PV all-in-one home power supply, solar panels, battery, etc. A single main equipment price of about one thousand yuan, other form a complete set of equipment form a complete set of project. Engineering scale namely system total installed capacity, and the number of users, in remote areas, for example, a single resident a single system. Users in project area, cooperate with relevant system installation.
Operation and Maintenance Costs	When the Solar PV all-in-one home power supply during normal operation, The main cost including the cost of raw materials to users, depreciation cost, cost of repair, hundreds of RMB a year.
Payback Period	5years
Other Income	Our company is the earliest engaged in the solar PV control, the inverter technology research enterprise, continued leading in domestic solar PV control, the development direction of inverter technology and product development. Solar PV all-in-one home power supply has been widely used in remote areas of the country, the running effect is good, for the remote mountain areas of light at the same time, the economic benefits. If can mass popularization and application, considerable economic benefits, will amount to hundreds of millions of RMB.
Technology Share	In recent years, solar PV industry have been adjusted. Corona’s solar PV all-in-one home power supply has been applied in many different environment, the market share of about 7% of the market. Now, the products are upgrading technology.
Technology Market Potential	Company is currently the earliest enterprises engaged in the solar PV control, inverter technology research. Continued leading in domestic solar PV control, the development direction of inverter technology and product development. Solar PV all-in-one home power supply has been widely used in remote areas of the country, the running effect is good. The equipment environmental adaptation, grid friendly characteristics significantly, if in Africa, Latin America and other regions to get promotion, market prospects will be good.
Technology Advancement	This product uses the MPPT tracking technology for the battery charging, the efficiency is above 88%, higher than the same industry efficiency more than 3% at least, won five national patents, it is in the leading position in domestic. The product through CQC certification, TUV certification.
Technology Maturity	Technology route is simple, the mainly steps are welding, assembly, wiring, testing and aging. In common use with other electrical equipment manufacturing enterprises. Charging and inverter technology to realize the integration, modularization, mass production has been realized.

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	Technical Suitability	This product is mainly used in remote areas without electricity, less electricity, meet the family once. At ambient temperature - 20 °C ~ + 40 °C, humidity is less than 90% under the condition of no condensation to work properly, in high temperature, high humidity, high altitude can run safely. Now This product has been passed the China quality certification center CQC certification and TUV certification. And upstream and downstream matching technology and good implementation localization, no regional restriction, can adapt to all kinds of scale production.		
	Technical Stability	The products have good stability, strong anti-interference ability, low failure rate, the part of the equipment safe operation has been more than 5 years. Have passed CQC certification, TUV certification.		
	Technology Security	The technology in the process of achievement transformation and industrialization of high degree of versatility, acceptable, production is only commonly used electrical equipment needed for production facilities.		
	Obstacles to the Promotion of Achievements Transformation	In the process of achievement transformation and promotion, the technology without any obstacles. The supporting facilities is perfect, it has better market acceptance, the product can be widely used in family, less electricity in remote areas without electricity supply.		
	Transfer of Intellectual Property Rights	In the field of domestic photovoltaic, Corona with technology and independent intellectual property rights and related patents. Solar PV all-in-one home power supply is China's bright project - either to the township of localization technology, the technology is relatively mature and stable, price advantages, at the same time conforms to the overseas, especially the application of Africa started building solar PV power station. To implement the technology ownership transfer according to the market demand, companies have a strong intention. Technology property right transfer mechanism mainly by commercialization and market at home and abroad, domestic policy support.		
	Achievement Declaration of Renewable Energy Technology			
	QR code			
	Technology providers	Beijing Corona Photovoltaic Science & Technology Co., Ltd.		
	Contact	Yannan Zhang	Date of Submission	2016-07-20
	Type of Technology	Solar Energy Utilization	Specific Technology	Distributed PV Related Technologies

TECHNOLOGY: SOLAR

COMPANY: BEIJING CORONA PHOTOVOLTAIC SCIENCE & TECHNOLOGY CO., LTD

	TEL	15201180465	EMAIL	zhangyannan@bjcorona.com
	Tech/Product Name	String-type Solar PV Inverter		
	Tech/Product Provider	Beijing Corona Photovoltaic Science & Technology Co., Ltd.		
	Application Scope	Applied to the residential and small and medium-sized commercial roof, and the farm, etc.		
	Technology Debrief	Professional design, effectively avoid products, failures arisen from the production, operation and transport links; Easy to install, easy to operate, easy to maintain; Beautiful appearance, complete functions, grid access friendly, reliable operation, highly cost-effective, high power-generating capacity; Be able to supply clients with more professional remote maintenance and troubleshooting functions, ensuring clients gaining maximum return to their investments.		
	Technology Information	Equipment size and parameters varies with the product capacity, specification will be found in attachment.		
	Typical Cases of Commercial Applications	<p>1.30MW solar PV power generation station in Yangyi village, Damxung county of Tibet Location: Yangyi village, Damxung county of Tibet</p> <p>2.20MW ground solar PV power station in the 148 regiment Location: Shihezi city xinjiang autonomous region</p> <p>3.The 863 national science and technology plans project Location: Qinghai Province</p> <p>4.Roof solar PV power station Location: Jinan city Shandong Province</p>		
	Usage Conditions	The product is given priority to with market transactions, delivery installation. Since 2002, our company engaged in the solar PV power generation equipment research and development, the current equipment is KNGI1000-28\33\40\50 series products. The equipment use process need a simple training, maintenance cost is low.		
	Business contacts/TEL/Email	<p>1.30MW solar PV power generation station in Yangyi village, Damxung county of Tibet Contact: MIN WU TEL: 59785997</p> <p>2.20MW ground solar PV power station in the 148 regiment Contact: QING YUAN TEL: 2901468</p> <p>3.The 863 national science and technology plans project Contact: HONGLING CHEN TEL:13910288050</p> <p>4.Roof solar PV power station Contact: GENGYU HUANG</p>		

TECHNOLOGY: SOLAR

COMPANY: BEIJING CORONA PHOTOVOLTAIC SCIENCE & TECHNOLOGY CO., LTD

	TEL:18600750056
Equipment Investments	The equipment is widely used in solar PV power station, the installation is convenient, no other ancillary equipment. For example, 50kw inverter price is in 30000 RMB. Engineering scale namely system total installed capacity, related to the number of mw, for example, the 50MW project, 50kw inverter to 1000 units. And so on.
Operation and Maintenance Costs	When the string-type PV inverter during normal operation, The main cost including the cost of raw materials to users, depreciation cost, cost of repair, hundreds of RMB a year.
Payback Period	5years
Other Income	Our company is the earliest engaged in the photovoltaic (PV) control, the inverter technology research enterprise, continued leading in domestic PV control, the development direction of inverter technology and product development. String-type pv inverter has been widely used. The running effect is good, the economic benefits. If can mass popularization and application, considerable economic benefits, will amount to hundreds of millions of RMB.
Technology Share	In recent years, Photovoltaic industry have been adjusted. The product has been applied in many different environment, the market share of about 10% of the market. Now, the products are upgrading technology.
Technology Market Potential	Company is currently the earliest enterprises engaged in the photovoltaic (PV) control, inverter technology research. Continued leading in domestic PV control, the development direction of inverter technology and product development. String-type solar PV inverter has been widely used. The running effect is good, the economic benefits. The equipment environmental adaptation, grid friendly characteristics significantly, if in Africa, Latin America and other regions to get promotion, market prospects will be good.
Technology Advancement	This product adopts the domestic leading technology, grid access friendly, using DSP digital control. The current total harmonic distortion rate THD < 3%.Can realize two-way MPPT track, MPPT efficiency up to 99.5%.Maximum efficiency is 99%.The product has passed CQC certification, TUV certification, low voltage across (zero wear) certification, etc.
Technology Maturity	Technology route is simple, the mainly steps are welding, assembly, wiring, testing and aging. In common use with other electrical equipment manufacturing enterprises. Charging and inverter technology to realize the integration, modularization, mass production has been realized.
Technical Suitability	This product is mainly used in remote areas without electricity, less electricity, meet the family once. At ambient temperature - 25 °C ~ + 50 °C, in high temperature, high humidity, high altitude can run safely. Now the product has been passed the China quality

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COMPANY: BEIJING CORONA PHOTOVOLTAIC SCIENCE & TECHNOLOGY CO., LTD



		certification center CQC certification and TUV certification. And upstream and downstream matching technology and good implementation localization, no regional restriction, can adapt to all kinds of scale production. According to our country the characteristics of different climate area, our products according to the optimization design software and hardware, in order to realize the optimal on generating in a particular area.
	Technical Stability	The product adopts the generalization and seriation and modularization design. Strong practicability, good stability, strong anti-interference ability, low failure rate, the products have been widely used, reliable operation. Have passed CQC certification, TUV certification, low voltage across (zero wear) certification, etc.
	Technology Security	The technology in the process of achievements transformation and industrialization, using generalization and seriation and modularization design. Set of string type inverter is essentially distributed heat dissipation, greatly improves the product reliability. Strong practicability, high market acceptance, production facilities is perfect.
	Obstacles to the Promotion of Achievements Transformation	In the process of achievement transformation and promotion, the technology without any obstacles. The supporting facilities is perfect, it has better market acceptance, the product can be widely used in Photovoltaic (PV) grid power generation system.
	Transfer of Intellectual Property Rights	In the field of domestic photovoltaic, Corona with technology and independent intellectual property rights and related patents. The product has passed CQC certification, TUV certification, low voltage across (zero wear) certification, etc. The technology is relatively mature and stable, price advantages, at the same time conforms to the overseas, especially the application of Africa started building solar PV power station. To implement the technology ownership transfer according to the market demand, companies have a strong intention. Technology property right transfer mechanism mainly by commercialization and market at home and abroad, domestic policy support.

TECHNOLOGY: SOLAR
 COMPANY: **BEIJING KINGTECH CO., LTD**

Renewable Energy Technology Achievement (Applied already)	
Beijing Kingtech Co., Ltd	Technical provision unit: Beijing Kingtech Co., Ltd. Submission date: July 29, 2016
	Contact person: Liu Xinyue Technical type: Others
	Tel.: 18001170851 E-mail: liuxy@kctcn.com.cn
	Technical name: Energy saving service solution
	Technical provider: Beijing Kingtech Co., Ltd.
	Scope of application: Environmental protection industry, suitable for high energy-consumption enterprise and energy-scarcity area
	Brief description of technical: Overall energy saving reformation design for the enterprise (area) through analyzing present situation of energy consumption. Achieve high energy saving rate as possible while keeping capability
	Technical information: Distributed energy resource of natural gas, photovoltaic distributed generation, biochar-based fertilizer poly-generation by biomass gasification power generation, energy saving of motor system, comprehensive utilization of waste heat and pressure, transformation of architectural lighting, transformation of energy saving for street lamp and management and comprehensive utilization of carbon assets
	Business application situation: Distributed photovoltaic power generation: Jiangsu 3.3MW Plant Roofing Power Generation Project Carbon assets management and comprehensive utilization: Carbon Assets Project of Jilin Changbai Mountain Forest Industry Group Architectural lighting energy saving transformation Energy Saving Transformation of Tianyi Shopping Mall
	Service conditions: Local investment and construction and mature technology.
	Contact person of business application unit /Tel./E-mail: Wei Xing 18001321896
	Investment on equipment: Our company will invest the whole earlier stage, as the case may be
	Expense of operation maintenance: Employees of our company will maintain for free during the contract period
	Investment payback period: 8-10 years
Other earnings: Reduce corporate energy consumption, improve corporate image and realize clean development	

TECHNOLOGY: SOLAR

COMPANY: BEIJING KINGTECH CO., LTD

Technical occupancy:	Ranked the country's leading level, at top 10%.
Market potential of the Technical:	With the reducing of fossil energy, new energy-using mechanism and energy situation will replace the original non-renewable fossil energy gradually. New renewable and clean energy will become a mainstream gradually.
Technical advancement:	International energy structure transition is an irresistible trend, and its technology and technique takes the leading position in new energy field by unceasing improvement
Technical maturity:	Able to realize engineering approach, practical utilization and stable project operating.
Technical applicability:	Environmental protection industry, suitable for high energy-consumption enterprise and energy-scarcity area
Technical stability:	Technology in related field is mature and advances steadily
Technical safety:	At present, all projects are operating stably, and no accident has occurred
Obstacle in achievement transformation and promotion:	Change of local polity and corporate financial condition
Transfer of intellectual property:	
Photo caption:	<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;">Tianyi Shopping Mall</p>

TECHNOLOGY: SOLAR
COMPANY: **BEIJING KINGTECH CO., LTD**



Chengdu Sanwayao Thermal Power Co., Ltd.



Photos after retransformation

Comparison between high pressure sodium lamp and LED lamp in a same road



After transformation

Before transformation

TECHNOLOGY: SOLAR

COMPANY: **BEIJING KINGTECH CO., LTD**



Installed capacity: 1.2MW
Theoretical electric energy production for 25 years: 26,842,000KWh
Theoretical standard coals saved for 25 years: 10,700t
Theoretical carbon emission reductions for 25 years: 26,800t

Installed capacity: 800KW
Theoretical electric energy production for 25 years: 20,210,000 KWh
Theoretical standard coals saved for 25 years: 8,075t
Theoretical carbon emission reductions for 25 years: 21,000t



Installed capacity: 3.3MW
Theoretical electric energy production for 25 years: 70,724,300 KWh
Theoretical standard coals saved for 25 years: 28,200t
Theoretical carbon emission reductions for 25 years: 70,500t



Installed capacity: 200KW
Theoretical electric energy production for 25 years: 5,050,000KWh
Theoretical standard coals saved for 25 years: 2,260t
Theoretical carbon emission reductions for 25 years: 5,633t



TECHNOLOGY: SOLAR

COMPANY: BEIJING KINGTECH CO., LTD

Renewable Energy Technology Achievement (Applied already)			
Technical provision unit:	Beijing Kingtech Co., Ltd.	Submission date:	July 28, 2016
Contact person:	Liu Xinyue	Technical type:	Solar energy utilization technology
Tel.:	18001170851	E-mail:	liuxy@kctn.com.cn
Technical name:	Distributed photovoltaic power generation		
Technical provider:	Beijing Kingtech Co., Ltd.		
Scope of application:	Industrial enterprise, transportation field, communication field, petroleum, ocean, meteorological field, photovoltaic power station		
Brief description of technical:	Solar photovoltaic power generation is to convert luminous energy into electric energy by using solar cell module and electronic characteristic of semiconductor materials		
Technical information:	It is composed of three major parts of solar panel (components), controller and inverter, and the major components are constituted by electronic parts and components.		
Business application situation:	Jiangsu 3.3MW Plant Roofing Photovoltaic Power Generation Project, Jiangsu Jiurong 200KW Roofing Photovoltaic Power Generation Project, Beijing Chaoyang Chuji Ceramic Market 800KW Roofing Photovoltaic Power Generation Project, Huizhou 1.2MW Plant Roofing Photovoltaic Power Generation Project		
Service conditions:	Kingtech distributed photovoltaic power generation system adopts energy management contract model ,that is, the photovoltaic power generation project will be invested, established and maintained in local after the field investigation, calculation and design by technicians of our company, and benefits will be paid back by stage after the project goes into operation. The technology has matured at present, and has demonstration projects all over the country.		
Contact person of business application unit /Tel./E-mail:	Wei Xing Contact information: 18001321896		
Investment on equipment:	About RMB 9 /W at home (including equipment and construction cost, etc.)		
Expense of operation maintenance:	Maintenance for free within contract period (excluding waterproof construction of Party A)		
Investment payback period:	8-10 years		
Other earnings:	Reduce corporate energy consumption and discharge capacity, and improve corporate image		
Technical occupancy:	The largest photoelectricity market in China is still the communication field whose market share is about 50%, including microwave relay station, satellite communication ground station, satellite TV receiving transposer system, spc telephone exchange, troop communication station, etc. Through		

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		endeavor during the ninth Five-Year plan and with the demonstration and promotion of various cooperative projects at home and abroad, the application field of photovoltaic power generation in remote and border areas has been enlarged further. Including photovoltaic power stations and photovoltaic power systems, its market share has been increased from about 20% to 30% and above.
	Market potential of the Technical:	Photovoltaic power generation belongs to the clean renewable energy, so that the development and wide application of photovoltaic technology plays an important part in alleviating shortage of conventional energy and reducing environmental pollution. Considering either from energy or environment, photovoltaic power generation will enter into electricity market as the alternative energy finally. Once the cost of photovoltaic power generation reduces below \$2/W, it will be applied in larger scale and commercial demand of grid-connected power generation will come true.
	Technical advancement:	Electric-generation principle of photovoltaic power generation is to convert light into electron directly, with no middle process and mechanical motion, which means that there will be no combustion and pollution in the process, and it is simple to generate electricity. From this view, generating efficiency of this technology is very high.
	Technical maturity:	The relatively mature markets in China include communication field, some industrial fields, rural electrification and commercialized power supply in remote and border areas. By the end of 2000, the annual output of solar battery in China has reached up to 3MWp, and accumulated utilization to 19MWp. In the future 10 years, it will be developed greatly. It is estimated that by 2010, the annual output of solar battery in China will reach up to 30MWp, and accumulated utilization to 200MWp. The potential markets of photovoltaic power generation include roofing grid-connected generation system, large hybrid power generation system, electric car charging system, solar photovoltaic hydrogen generating system, and some special commercialized power supply.
	Technical applicability:	The application scale of distributed photovoltaic power generation: It can be built in rural area, pasturing area, mountainous area, developing cities in small, medium and large size, or nearby commercial district, to resolve the electricity demand of local users. It is unlimited by the resource distribution area, and can take advantage of building roof; for example, areas without electricity and areas with complex topography
	Technical stability:	Solar energy resource in China is very rich, and its theoretical reserve is equal to 1.7 trillion tons of standard coal annually. Development and utilization of solar energy resource has a very vast potential. Photovoltaic power generation industry of China started from 1,970s, and entered into stable development period in 1,990s. The output of solar battery and component increases steadily year by year. Through 30-year endeavors, it has ushered in a new stage of rapid development. Driven by the national programs like the pilot projects of Brightness Program, Township Electrification Program and world photovoltaic market, the photovoltaic power generation industry of China has developed rapidly.

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<p>Technical safety:</p>	<p>① Without exhaustion risk ② Safety and reliable, without noise, pollutant discharge, and public nuisance ③ It is unlimited by the resource distribution area, and can take advantage of building roof, for example, areas without electricity and areas with complex topography ④ Generate and supply power without fuel consumption and electric transmission line; ⑤ High quality of energy;</p>
<p>Obstacle in achievement transformation and promotion:</p>	<p>Problem with profit model of photovoltaic power generation, problem with electricity price subsidies differentiation of photovoltaic power generation, problem with grid connection of photovoltaic power generation</p>
<p>Transfer of intellectual property:</p>	
<p>Photo caption:</p>	<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;">  <p>Installed capacity: 800KW Theoretical electric energy production for 25 years: 20,210,000 KWh Theoretical standard coals saved for 25 years: 8,075t Theoretical carbon emission reductions for 25 years: 21,000t</p> </div> <div style="width: 50%;">  <p>Installed capacity: 1.2MW Theoretical electric energy production for 25 years: 26,842,000 KWh Theoretical standard coals saved for 25 years: 1.07t Theoretical carbon emission reductions for 25 years: 26,800t</p> </div> <div style="width: 50%;">  <p>Installed capacity: 3.3MW Theoretical electric energy production for 25 years: 70,724,300 KWh Theoretical standard coals saved for 25 years: 28,200t Theoretical carbon emission reductions for 25 years: 70,500t</p> </div> <div style="width: 50%;">  </div> </div>

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			<p>Installed capacity: 200KW Theoretical electric energy production for 25 years: 5.05million KWh Theoretical standard coals saved for 25 years: 2,260t Theoretical carbon emission reductions for 25 years: 5,633t</p>
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TECHNOLOGY: SOLAR

COMPANY: BEIJING SUNDA SOLAR ENERGY TECHNOLOGY CO., LTD

Renewable Energy Technology Achievement Declaration	
QR code	
Technology provision unit	Beijing Sunda Solar Energy Technology Co., Ltd. Submission date July 5, 2016
Contact person	Zhu Jiankun Technology type Solar energy utilization technology
Tel.	13810302706 E-mail zhujiankun@sundasolar.com
Technology name	Cloud thermal solar hot water system
Technology provider	Beijing Sunda Solar Energy Technology Co., Ltd.
Scope of application	Beijing Sunda Solar Energy Technology Co., Ltd.
Brief description of technology	The solar hot water technology mainly targets at hot water demand of middle and high rise residential or commercial buildings with household metering, solar collectors are intensively installed on the residential building roof, and 1 buffer tank with smaller volume, realizing heat exchange with heat storage water tank with function of heat exchange installed inside for each household of the building, when it is cloudy or rainy day or heat is not sufficient, open the electric heater in the water tank to carry out auxiliary heating.
Technical information	Design of solar hot water system should be based on user specific heat demand and the actual conditions of the roof installation design.
Business application situation	Solar Hot Water Project of Beijing Meilifang Residence(project value of RMB 10.5 million, with good operation) 2) Solar Hot Water Project of Tianjin Huaming Xinjiayuan Dingxiu Xinyuan (project value of RMB 10.76 million, with good operation)
Service conditions	1) Solar Hot Water Project of Beijing Meilifang Residence: Wang Shuying, 15010170621; 2) Solar Hot Water Project of Tianjin Dingxiu Xinyuan: Yan Kai, 13713470319
Contact person of business application unit /Tel. /E-mail	Mature technology and products; Marketable products (technical support) or local investment construction projects are required to build the system, to provide design, installation and maintenance training to use.
Investment on equipment	Beijing Meilifang Community has 5 buildings, 2112 households, using the cloud thermal solar hot water system, the installation of roof heat pipe vacuum tube collector of 2,320.5m ² , 80 liters and 60 liters two heat exchanger pressure tank are placed indoors, this project is installed in 2010, the initial investment of RMB 10.5 million, an average of RMB 4,972 for 2,112 households;

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	Expense of operation maintenance	The project solar hot water system can run automatically, without someone on duty, operating costs of solar hot water system primarily includes circulating pump power consumption, piping thermoelectric power consumption and water replenishing treatment reagent for roofing, the total operating cost of about RMB 37,000, and annual operation cost of each household of RMB 17.5/ (household/year) for 2,112 households on average.
	Investment payback period	Compared to electric water heaters, static payback period is 4.4 years
	Other earnings	The annual saved energy of the project is 302tce, carbon dioxide emission of 650t, 19.5t sulfur dioxide, 10.7t nitrogen oxides, economic and environmental benefit is significant.
	Technology occupancy	Cloud thermal system is very suitable for middle and high rise residential, but also the direction of development of solar hot water systems in recent years, and since 2004 when Beijing Sunda Solar Energy Technology Co., Ltd. carried out promotion, it has been successfully applied to more than 20 real estate projects in Tianjin, Shanghai, Henan, Inner Mongolia, Shandong, with total construction area of 2 million square meters and total area of solar collectors of 40,000 square meters, using the company as an example, cloud integration systems account for about 5% of the hot water system installed capacity; Combined with other peer companies not mastering the technology very well, estimated cloud thermal system installation quantity accounts for less than 1% of total market share of the project, combined with the newly added photo-thermal area in 2015 of 43.5 million square meters (including engineering market share 54.7%), the installation area in 2015 is less than 200,000 square meters;
	Market potential of technology	As China's urbanization accelerates and governmental mandatory installation policy of solar hot water system in middle and high rise buildings promotes, cloud thermal systems area are used as solar installation technology designed for middle and high rise buildings with increasing acceptance of designers and users. In the 13th Five-year Plan, by 2020, added inventory of solar thermal application is 550 million square meters, the total inventory reached 800 million square meters, total annual investment of about RMB 100 billion, the new inventory is divided into national town and urban buildings and rural area with hot water of 200 million square meters for civil purpose. Heating, refrigeration and air conditioning systems and heating stations demonstration projects of 200 million square meters; 150 million square meters industrial and agricultural applications form diversified market pattern of domestic hot water, heating and cooling, industrial and agricultural applications. At present, middle and high rise buildings have three main hot water systems in the form of: 1) Heat collection of collector, central heating is used in the buildings without sub-metering and billing issues; 2) Household balcony hot water system; 3) Cloud thermal collector systems; With the lowest proportion of cloud thermal system among three systems, if using technology promotion and transfer increases proportion of application of the system in the middle and high rise construction board, assuming that it accounted for proportion of about 200 million square meters, which also means that

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		It is to reach more than 20 million square meters installation area, the average annual installation area of 4 million square meters, which will also be over 20 times as installed quantity for 2015;
	Technical advancement	Cloud thermal solar hot water system solves several major problems of the middle and high rise buildings with using solar energy: 1) The problem for using solar energy for lower rise and northern households under the circumstance of uneven sunlight for different levels and rooms caused by diversified styles of construction body 2) Limited roof area and messy installation for households; 3) Household installation management and maintenance of complex issues; 4) Costs apportion caused by uneven water use amount Beijing Sunda Solar Energy Technology Co., Ltd., as the first company carrying out this system study, after 10 years of continuous exploration, it has accumulated a wealth of design, construction and operating experience, with technical level in the country in a leading position in the solar energy industry.
	Technical maturity	All major components of cloud thermal systems (solar collectors, heat/hot water storage tank, controller, pumps, pipes) and mounting accessories are market mature products, Beijing Sunda Solar Energy Technology Co., Ltd. has the ability of providing complete equipment and programs.
	Technical applicability	Through different products configuration and design schemes, the system has a wide applicability during transfer and promotion; The processing technology of main fine products of system is mature; Rich resources in downstream and upstream The system use is not subject to constraints such as regional, scale, environment and energy constraint, suitable for different climate conditions and areas;
	Technical stability	This system and other systems are used and verified by many systems of Beijing Sunda Solar Energy Technology Co., Ltd. for many years, with mature design, reasonable configuration, reliable operation, good technical stability.
	Technical safety	Cloud thermal solar hot water system is mature in technology and product support with higher market acceptance:
	Obstacle in achievement transformation and promotion	Promotion and use of solar energy is a global consensus, and most countries has established a relatively perfect policy to encourage the application of solar technology. For examples, the taxes are refunded for the export of domestic solar energy products, and there is no tariff for the import of most oversea solar energy products; Many African countries has made training of detection of solar energy products and professionals. In African region, as long as transfer of technical results and post-period maintenance are completed.
	Transfer of intellectual property	Beijing Sunda Solar Energy Technology Co., Ltd has the independent intellectual property rights of this technology, there is no problem about patent and technology introduction of intellectual property rights.
	Photo captions	
		Renewable Energy Technology Achievement (Applied)
	Technology provision unit	Beijing Sunda Solar Energy Technology Co., Ltd.

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COMPANY: BEIJING SUNDA SOLAR ENERGY TECHNOLOGY CO., LTD

Contact person:	Zhu Jiankun	Submission date: July 29, 2016
Technology type	Solar energy utilization technology	Specific technology: Solar hot water engineering and technology
Tel.:	13810302706	E-mail: zhujiankun@sundasolar.com
Technology name:	Solar Industry / Agricultural heating technology	
Technology provider:	Beijing Sunda Solar Energy Technology Co., Ltd.	
Scope of application:	Solar heating technology used in industrial production and agricultural processing	
Brief description of technology:	This application mainly takes advantage of solar photo-thermal conversion technology, transforms solar energy into heat energy and transfers it to a medium flowing by using efficient solar thermal collector, and rise the water temperature to the temperature for industrial and agricultural applications of temperature (such as copper requires 65 °C hot water above and agricultural drying requires medium and high-temperature water, etc.), efficient thermal collector is key equipment.	
Technical Information:	The system mainly consists of solar collectors, water tanks, control systems, pipe rack, etc., the scale can be changed (from a few hundred liters of water to millions of tons of water) according to the actual needs of the user.	
Business application situation:	For solar heating system of Beijing Print Works, the area of thermotube and vacuum tube and collector is 776 sq. m. For solar heating system of South Africa copper mine, the area of flat plate collector is 672 sq. m.; Effects are good.	
Service conditions:	Users can purchase products to design and construction on their own or we can provide EPC services. Solar photo-thermic technology is a mature, so users who use it for the first time with system trainings can quickly master installation, use and maintenance of the system that uses free solar energy with lower use cost.	
Contact person of business application unit /Tel. /E-mail:	Beijing, Liu Mingliang, 13811970560, 81366405@qq.com; South Africa copper mine Henning Holm, +27(0)828090190, hholm@holmsandfriends.co.za	
Investment on equipment:	The system is mainly composed of solar thermal collector, water tank, control system, water pump and piping rack etc., where the solar thermal collector is mainly installed the area exposed to the sun without any shield, and water tank, water pump and control cabinet can be installed in the equipment room; For the project with heating system installed, the solar system can be connected in parallel/in series to the heating system, and can use existing heating equipment as complementation when the solar energy is not sufficient For newly built system, supporting energy complementation shall be considered when the solar energy is not sufficient (generally boilers or electric heating equipment). The engineering scale can be adjusted and designed in accordance with users' final heat requirements (daily water consumption, period of water	

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	consumption and water temperature etc.) with investment ranging from RMB dozens of thousands to millions.
Expense of operation maintenance:	Solar hot-water system of the project can operate automatically without any special person on duty, and operating expense of the solar hot-water system mainly includes the expenses spent on circulating pump power consumption, control cabinet power consumption and staff and temporary patrol repairing expenses; Under reasonable design, product selection and normative system installation, annual operating expense of the system accounts for 0.5% of total investment or less. Designed service life of the system using flat-plate collector and thermotube collector is more than 10 years, without equipment repairing and replacement basically for the first 5 years.
Investment payback period:	The African area has abundant solar energy resources, and conversion efficiency of solar photo-thermal system is higher than the above value, therefore the solar energy can be used to the maximum. If electrical heating system is considered as the example, the static payback period of the system is about 6-3 years according to the electric charge of 0.05-0.1USD/kWh;
Other earnings:	Use of solar heating technology can reduce dependence on conventional source of energy and reduce expenses of project operation. It also can make sense in energy conservation and environmental protection and every kilowatt hour saved by the system can reduce 0.997kg of carbon dioxide emission with obvious environmental protection effect, and the countries with carbon transaction also can conduct transactions of carbon emission index.
Technology occupancy:	China has had good solar utilization foundation, but it is dominated by living heat water, according to the description of the Report of Development of Solar Thermal Utilization Industry in 2015, total sales of national solar thermal collector and system is about 43,500,000 m ² , where engineering market occupancy of 54.7%, including 61% for residence, 35% for commercial use, only 4% for industrial and agricultural use, which can say that industrial and agricultural application on solar energy just starts, and only few companies in China have actual project development experience.
Market potential of the technology:	By the end of 2015, Chinese solar thermal utilization industry alliance is mentioned in the exposure draft of the 13th Five-year Plan of photo-thermal application submitted by National Energy Administration, and industrial and agricultural application is the key project of 13th Five-year Plan of solar thermal utilization industry; 1) Scale index: By the end of 2020, inventory of collector area of solar thermal utilization reaches 800 million sq. m (560GWth) with total annual investment amount of RMB 10 billion. 2) Structural index: By the end of 2020, it will achieve the inventory as much as 200 million of collector area of hot-water promotion project for civil purpose in national urban construction and rural areas. Inventory of supply of heat, heating, refrigeration and air conditioning system demonstration project collector area is 200 million sq. m; For 200 large-scale demonstration projects of heat supply stations, inventory of collector area is 4 million sq. m; Collector area inventory of Industrial and agricultural heating demonstration projects is 150 million sq. m; In other words, of newly added 550 million sq. m collectors, the industrial and agricultural applications will account for 27%. According to statistics, with about 470,000 units of China's current coal-fired industrial

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	<p>boilers, the annual consumption of standard coal is about 400-million-ton accounting for about a quarter of China's total coal consumption; Carbon dioxide emission accounts for about 10% of total emissions. If national boilers can be combined with solar energy, about 40 million tons of raw coals can be saved in a year, about 80 million tons of carbon dioxide emissions are reduced, only the solar industry in China will drive new market of RMB 1.32 trillion.</p>
Technical advancement:	<p>Solar heating is used in agriculture and industry, with few demonstration cased in China, and only few companies have the installation experience in this area, Beijing Sunda Solar Energy Technology Co., Ltd. has tried to use medium temperature of solar energy since 1990s, combined with special patented products (themotubes and vacuum tubes and solar thermal collector), it has undertaken solar heating system of oil pipeline of Liaohe Field, Shanghai Print Works, Beijing Print Works and other domestic projects and hot-water heating projects of 4 copper mines in South Africa, accumulating abundant project experience and talent reserve. The products and technologies used by the Company is at the advance level among peers in domestic industry.</p>
Technical maturity:	<p>Solar Industrial / agricultural heating systems mainly using efficient collectors can be improved to the level of higher temperature than a conventional bath temperature range to meet application for industrial heating and drying and other aspects of agriculture, compared to low temperature hot water applications, its products performance, system design and control have put forward higher requirements, with years of practice for Beijing Sunda Solar Energy Technology Co., Ltd. ,the entire system has the production and integration of all components to provide the ability from product sales to system design and installation, operation and maintenance training and other aspects.</p>
Technical application:	<p>Through different products configuration and design schemes, the system has a wide applicability during transfer and promotion; Processing technology of main components of the system is mature, with rich resources in upstream and downstream; The system use is not subject to regional, scale, environment and energy constraints, such as the use of suitable for different climate conditions and area;</p>
Technical stability:	<p>The technology has been used and verified by many system of Beijing Sunda Solar Energy Technology Co., Ltd. for many years, ensuring the stable operation of the technology: 1) The company and its parent company has more than 30 years of experience in product and system development and application, and master all the advantages and disadvantages of solar energy products and systems on the market, and select the best products and systems according to the requirements of the users; 2) Company brings together a large number of technical experts, collects domestic and international numerous system operating data, masters the operation situation of system under different conditions, and prevents problems with as well as the ability to solve all kinds of unexpected situation; In addition, the solar heating system is generally independent system and has its own storage buffer device (water tank), first of all, without disturbing the surrounding grid, will not result in a power grid volatility; Secondly the existence of the water tank can ensure that the original heating system will not result in a sudden impact, the system stability is very good; Once again, there is no photovoltaic storage battery and materials in solar heating system, such as silicon,</p>

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		without any risk of contamination of surrounding environment, and will not occur in the power system such as electric shock ignition risk, there is no need to replace the battery every 3 to 5 years, completely using non-pollution water as energy carrier.
	Technical safety:	The solar energy heating technology is applied to the industrial and agricultural situation, obtaining the government's consistent approval at home and abroad, and many companies also has carried on the attempt to this aspect, with many years of application for Beijing Sunda Solar Energy Technology Co., Ltd. , it also has the ability to manufacture and integrate and design the technology integration for this technology, and system design capability, fully having transformation and industrialization ability of technology achievements and ability to accept the challenge of market risk.
	Obstacle in achievement transformation and promotion:	Promotion and use of solar energy is a global consensus, most countries has established a relatively perfect policy to encourage the application of solar technology. For examples, the taxes are refunded for the export of domestic solar products, and there is no tariff for the import of most oversea solar products; Many African countries made the detection of solar energy products, and professional talent training: In terms of technology, it can be said that the promotion of the technology has no problem, as long as the transfer of technology achievements and the late maintenance training is done; But as a result of solar heating system in the high cost investment in the earlier stage and low cost operation project in the later stage, promotion of the project in African area may greatly be restricted by the resources and capital.
	Transfer of intellectual property:	Beijing Sunda Solar Energy Technology Co., Ltd. has the technology and products of independent intellectual property rights, there is no patent and technology introduction of intellectual property rights.

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COMPANY: **BEIJING SUNDA SOLAR ENERGY TECHNOLOGY CO., LTD**

Photo caption:



TECHNOLOGY: SOLAR

COMPANY: HANERGY HOLDING GROUP CO., LTD

Renewable energy technology achievements																																													
Hanergy Holding Group Co., Ltd	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">Technical Providing company:</td> <td colspan="2">Hanergy Holding Group Co., Ltd</td> </tr> <tr> <td>Contact person:</td> <td>Xin Ke</td> <td>Date of submission:</td> <td>2016-06-27</td> </tr> <tr> <td>Technical type:</td> <td>Solar energy utilization technology</td> <td>Specific description:</td> <td>Distributed photovoltaic related technology</td> </tr> <tr> <td>Mobile phone:</td> <td>18611127598</td> <td>Email:</td> <td>xinke@hanergy.com</td> </tr> <tr> <td colspan="2">Technology name:</td> <td colspan="2">Hanergy Solibro CIGS thin film solar cell production line</td> </tr> <tr> <td colspan="2">Technology provider:</td> <td colspan="2">Hanergy Holding Group Co., Ltd</td> </tr> <tr> <td colspan="2">Applicable fields:</td> <td colspan="2">Ground-mounted solar power station, Roof-top solar power station, Household solar power systems, BIPV</td> </tr> <tr> <td colspan="2">Technical briefing:</td> <td colspan="2">Hanergy Solibro CIGS thin film solar panel production line's technology includes equipments, process and raw materials etc., and it adopts world's leading CIGS co-evaporation equipments to deposit CIGS thin film solar cell on 1580*1190mm² sized glass substrate through multiple point sources co-evaporating method, and then solar cells are encapsulated into 1190*789.5mm² panels. 16.5% of average mass production conversion efficiency is also in world leading position.</td> </tr> <tr> <td colspan="2">Technology info.:</td> <td colspan="2"> Hanergy Solibro CIGS modules' technical information: -Average conversion efficiency of mass production is 16.5% -Module power is 155Wp -Temperature coefficient is -0.37%/K -Length of core co-evaporation equipment is 34 meters; its height is 3 meters, and its total weight is 100 tons. </td> </tr> <tr> <td colspan="2">Business applications:</td> <td colspan="2"> Installed capacity 535kWp, Halle-Saale, Germany, 2011; Installed capacity 880kWp, Frankfurt airport, Germany, 2010; Installed capacity 955kWp, Thalheim, Germany, 2011; Installed capacity 7.8kWp, Landsberg, Germany, 2014. </td> </tr> <tr> <td colspan="2">Usage condition:</td> <td colspan="2">Upon the rules of market transactions, Industrialization process of this technology which means to build up 300MW new CIGS factory will be achieved combined with local investment and factory construction, for example providing construction land of the aforesaid factory.</td> </tr> </table>	Technical Providing company:		Hanergy Holding Group Co., Ltd		Contact person:	Xin Ke	Date of submission:	2016-06-27	Technical type:	Solar energy utilization technology	Specific description:	Distributed photovoltaic related technology	Mobile phone:	18611127598	Email:	xinke@hanergy.com	Technology name:		Hanergy Solibro CIGS thin film solar cell production line		Technology provider:		Hanergy Holding Group Co., Ltd		Applicable fields:		Ground-mounted solar power station, Roof-top solar power station, Household solar power systems, BIPV		Technical briefing:		Hanergy Solibro CIGS thin film solar panel production line's technology includes equipments, process and raw materials etc., and it adopts world's leading CIGS co-evaporation equipments to deposit CIGS thin film solar cell on 1580*1190mm ² sized glass substrate through multiple point sources co-evaporating method, and then solar cells are encapsulated into 1190*789.5mm ² panels. 16.5% of average mass production conversion efficiency is also in world leading position.		Technology info.:		Hanergy Solibro CIGS modules' technical information: -Average conversion efficiency of mass production is 16.5% -Module power is 155Wp -Temperature coefficient is -0.37%/K -Length of core co-evaporation equipment is 34 meters; its height is 3 meters, and its total weight is 100 tons.		Business applications:		Installed capacity 535kWp, Halle-Saale, Germany, 2011; Installed capacity 880kWp, Frankfurt airport, Germany, 2010; Installed capacity 955kWp, Thalheim, Germany, 2011; Installed capacity 7.8kWp, Landsberg, Germany, 2014.		Usage condition:		Upon the rules of market transactions, Industrialization process of this technology which means to build up 300MW new CIGS factory will be achieved combined with local investment and factory construction, for example providing construction land of the aforesaid factory.	
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Technology provider:		Hanergy Holding Group Co., Ltd																																											
Applicable fields:		Ground-mounted solar power station, Roof-top solar power station, Household solar power systems, BIPV																																											
Technical briefing:		Hanergy Solibro CIGS thin film solar panel production line's technology includes equipments, process and raw materials etc., and it adopts world's leading CIGS co-evaporation equipments to deposit CIGS thin film solar cell on 1580*1190mm ² sized glass substrate through multiple point sources co-evaporating method, and then solar cells are encapsulated into 1190*789.5mm ² panels. 16.5% of average mass production conversion efficiency is also in world leading position.																																											
Technology info.:		Hanergy Solibro CIGS modules' technical information: -Average conversion efficiency of mass production is 16.5% -Module power is 155Wp -Temperature coefficient is -0.37%/K -Length of core co-evaporation equipment is 34 meters; its height is 3 meters, and its total weight is 100 tons.																																											
Business applications:		Installed capacity 535kWp, Halle-Saale, Germany, 2011; Installed capacity 880kWp, Frankfurt airport, Germany, 2010; Installed capacity 955kWp, Thalheim, Germany, 2011; Installed capacity 7.8kWp, Landsberg, Germany, 2014.																																											
Usage condition:		Upon the rules of market transactions, Industrialization process of this technology which means to build up 300MW new CIGS factory will be achieved combined with local investment and factory construction, for example providing construction land of the aforesaid factory.																																											

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		The aforesaid factory's operation and maintenance personnel need systemic training. The aforesaid factory needs 7*24 full-time running and regular maintenance, and it has low installation, operation and maintenance costs.
	Contact person of business application company/Tel/Email:	Contact information of the power station in Frankfurt airport, Germany is +49 (0) 180 - 6 372 4636
	Equipment investment:	The investment amount of 300MW CIGS production line including all process equipments and other auxiliary equipments is \$0.87 per watt, i.e. \$261,000,000 for the total line.
	Operation and maintenance costs:	Regular operation and maintenance costs of solar modules in 300MW CIGS production line (\$/Wp), totally \$0.35/Wp: -\$0.17 for raw material; -\$0.02 for water, electricity and gas utilization; -\$0.04 for operation and management staff(manpower cost); -\$0.08 for depreciation of equipment; -\$0.02 for maintenance cost; -\$0.02 for management cost
	Payback period:	Static investment recovery period of 300MW CIGS production line project is 5 years
	Other benefits:	The annual output value of 300MW CIGS production line is about \$1,500,000,000, and it increases 700 new job opportunities, and brings annual taxation of \$1,000,000,000 to local government. Carbon gains: annual CO2 emission reductions of 300MW CIGS production line achieves 1,200,000,000 tons
	Technical occupation ratio:	In 2015, Hanergy Solibro provided a new generation of CIGS product with low cost and high efficiency, and achieved good sales performance in the domestic market. In the mean time other CIGS competitors didn't push any comparable products to the domestic market.
	Technical market potential:	As Hanergy Solibro Sweden R&D center continuously achieves breakthroughs and transfers its achievements to mass production, Hanergy Solibro product efficiency and reliability have been continuously improved, and Hanergy Solibro has also developed new products such as flexible modules and see-through BIPV modules. In the mean time, as continuously perfection and deeply excavation of raw material supply chain. Hanergy Solibro will continuously improve product efficiency and reliability, decrease production and maintenance cost, and develop multi-types differential products to meet the

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		requirements of segment market in the next few years. Market potential of Hanergy Solibro products and technology is infinite in the future.
	Technical advancement:	The technical level of Hanergy Solibro CIGS production line's equipments and process is world's leading, and the research and development capabilities is also world's leading. Hanergy Solibro is now holding two world records till Oct. 2015 in CIGS field: 21% efficiency 1 cm2 lab cell, and 5x5cm2 18.7% mini-modules efficiency. The photoelectric conversion efficiency of full-sized CIGS modules is 16.5%. According to third party Australia Alice Spring PV testing center data, Solibro module ranked No. 1 in the kWh/kWp evaluation from 2014.3-2015.2, which surpass modules from First Solar and Sanyo HIT.
	Technical maturity:	Hanergy Solibro CIGS production line's equipments and process have highly technical maturity. It has advanced equipment performance, highly systematic integration, highly automatic level, and complete information of the product process. It equipped advanced on-line and off-line metrology equipments to ensure high quality of products. Its produced products have passed many certificates such as IEC and UL, and have had high market recognition and perfect after-sales services.
	Technical applicability:	The technology has strong applicability during the entire process of technical transfer and promotion. There are no technical restrictions among upstream and downstream industries, and also no restrictions of environment, scale, location, or resources, and it only needs the requirements of domestic water and electricity.
	Technical stability:	The technology is very stable during operation, and it is insensitive to environment and technical parameters.
	Safety of technology:	The technology has no systematic risks during the entire industrialization process, and also has perfect auxiliary facilities, and high market acceptance.
	Achievements promotion barriers:	The technology has no restrictions of technology, policy, resource or capital during the industrialization process, and the technical provider will be responsible for all required personnel training which can meets all the requirements of the entire industrialization process including operation, equipments, process, maintenance, facility build-up, management and after-sales service etc.
	Assignment of Intellectual Property:	The technical provider possesses complete intellectual properties and patents which are required by the entire industrialization process, and owns domestic independent intellectual properties. The provider has intentions to technology


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		transfer, and agrees to authorize local factories to produce the patented products, and there are no policy barriers.
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COMPANY: INNER MONGOLIA HUA DE NEW TECHNOLOGY LIMITED COMPANY

Technological achievements declaration of renewable energy sources	
Inner Mongolia Hua De New Technology Limited Company	Two-dimension code  Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)
Technology providing unit	Inner Mongolia Hua De New Technology Limited Company Submission date: On June 15, 2016
Contact	Li Lingrui (凌锐) 技术类 Telephone: 18698447832 E-mail: iadz9238@163.com
Technology name	Centralized photo-voltaic power generation system (20KWp)
Technology provider	Inner Mongolia Hua De New Technology Limited Company
Scope of application	Inner Mongolia Hua De New Technology Limited Company
Technology briefing	Centralized photo-voltaic power generation system consists of 20KWp photo-voltaic cell, photo-voltaic controller, inverter and storage battery. The photovoltaic cell can change the solar energy into electric energy, which can be stored in the storage battery through the photovoltaic controller. The inversion controller can change the electric energy of the storage battery into the alternating current energy of 220V and 50 Hz .
Technical Information	System configuration is: 20KWp photo-voltaic cell, 220V system voltage Optimize the specific configuration according to the local solar energy sources and electricity load situation.
Business application conditions	The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5 MW . The system is under normal operation.
Service conditions	Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872

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	Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install the main equipments of the system, which have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, the cost of installation, usage and maintenance are relatively low.
	Equipment investment	The main equipment required for the new Centralized photo-voltaic power generation system is: 20KWp photo-voltaic cell, photo-voltaic controller, inverter and storage battery; the system also consists of system accessories such as wire, cable and standard component, etc. The investment for the system device is about RMB 11,69,400 . Carry out the specific measurement for the investment requirements of the specific equipments according the local solar sources and user load situation.
	Operation and maintenance fees	The Centralized Photovoltaic System does not consume water, electricity or any raw materials during normal operation. The main equipments of system have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost, repair charge and administration expenses consumed for the system maintenance are relatively low.
	Payback period of investment	The static payback period of the Centralized Photovoltaic System is 4 ~ 5 years.
	Other benefits	The Centralized Photovoltaic System can cut emission by about 0.997kg carbon dioxide per kilowatt hour, which will save about 344g of standard coal
	Technology share	Technology share is 15% in 2015
	Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law, Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc., the 11th Five-year Plan, the 12th Five-year Plan and the national environment protection plan have established the target of energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For Centralized photo-voltaic power generation system, it is the clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next few years, the market capacity will


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	be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.
Technology advancement	<p>Technical innovations in the Centralized Photovoltaic System include:</p> <ol style="list-style-type: none"> 1、 Improve and optimize the trace function of the maximum power for photovoltaic controller. Improve the energy utilization ratio of solar energy system obviously. 2. Improve and optimize the various protection functions of the photovoltaic controller, which further improves the stability of the system. 3、 Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Make Centralized photo-voltaic power generation system locate in the higher technology level at home and abroad through the above technology innovation.
Technology maturity	The Centralized Photovoltaic System performs system configuration according to the local solar energy resource and the total electricity load of the users. Consisting of 10kWp photovoltaic cells, photovoltaic controller, inverter and battery, the matching parameters of the devices are optimized and the system integration is improved after optimization design.
Technology applicability	The Centralized Photovoltaic System is suitable for the residents of the non-electricity area with better solar energy resources and users of enterprises and institutions away from the power grid. The system is configured according to the total power of the solar energy resource and the user's electricity load.
Technology stability	The Centralized Photovoltaic System can keep stable in the operation process. The photovoltaic battery is installed outdoors, and its stable working environment temperature is - 40°C ~ 60°C C with stable operation in the dust, cold and hot environment. Install the photovoltaic controller, the inversion controller and the storage battery in doors. The stable working environment temperature is -15°C~40°C. The system has the lower sensitivity to interference factors including environment and technology parameters. It can keep higher stability in the process of running.
Technology security	The Centralized photo-voltaic power generation system has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, It has the higher market acceptance without pollution and discharge in the process of running.


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	<p>Obstacles of results transformation promotion</p>	<p>The government needs to provide the corresponding policy guarantee and financial support for the household photovoltaic generating system in the process of results transformation and promotion. Establish the good market order gradually to make the industry in the good development state.</p>
	<p>Intellectual property transfer</p>	<p>The household photovoltaic generating system has the domestic proprietary intellectual property rights. The relevant technology has obtained the patent. The technology owner is enterprise.</p>
	<p>Picture description</p>	
<p>Technological achievements declaration of renewable energy sources</p>		

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	Two-dimension code	 Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)		
Technology providing unit	Inner Mongolia Hua De New Technology Limited Company	Submission date	On June 15, 2016	
Contact	Li Lingrui	Technology types	Wind energy utilization technology	
Telephone	18698447832	E-mail	iadz9238@163.com	
Technology name	Centralized Wind-photovoltaic Hybrid Generation System (2kW wind + 8kWp light)			
Technology provider	Inner Mongolia Hua De New Technology Limited Company			
Scope of application	Inner Mongolia Hua De New Technology Limited Company			
Technology briefing	Centralized Wind-photovoltaic Hybrid Generation System consists of 2kW wind driven generator, 8kWp photo-voltaic cell, inverter controller and storage battery. Wind turbine and photovoltaic cell respectively change the wind energy and solar energy into electric energy, which can be stored in the storage battery through the inversion controller. The inversion controller changes the electric energy of the storage cell into the electric energy of alternating current of 220V and 50 Hz .			
Technical Information	System configuration is: 2kW wind driven generator + 8kWp photo-voltaic cell, and 220V system voltage. Optimize the specific configuration according to the local wind and solar energy and electricity load situation.			
Business application conditions	The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5MW . The system is under normal operation.			
Service conditions	Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872			

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	Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install the main equipments of the system, which have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, the cost of installation, usage and maintenance are relatively low.
	Equipment investment	The main equipments required for the new established Centralized Wind-photovoltaic Hybrid Generation System are: 2kW wind driven generator, 8kWp photo-voltaic cell, inverter controller and storage battery; the system also includes the system accessories such as wire, cable and standard component, etc. Investment for the system device is about RMB 822,500 . Carry out the specific measurement according to the local wind and solar sources and user load situation.
	Operation and maintenance fees	The centralized Wind-photovoltaic Hybrid Generation System under normal operation will not consume water, electricity and any raw materials. The main equipments of system have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost, repair charge and administration expenses consumed for the system maintenance are relatively low.
	Payback period of investment	It is 4-5 years for the payback period of the static investment of the Centralized Wind-photovoltaic Hybrid Generation System
	Other benefits	It can reduce about 0.997kg carbon dioxide emission per watt of generating electricity for the Centralized Wind-photovoltaic Hybrid Generation System. Meanwhile, it can save about 344g standard coal.
	Technology share	Technology share is 15% in 2015
	Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law</i> , <i>Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc. &ldquo , the 11th Five-year Plan &rdquo ; &ldquo , the 12th Five-year Plan &rdquo and the national environment protection plan have established the target of energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For Centralized Wind-photovoltaic Hybrid Generation System, it is the clean energy generating system having the mature technology. With the gradual

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	realization of the target of energy conservation and emission reduction of our country in the next few years, the market capacity will be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.
Technology advancement	<p>The technology innovation of the Centralized Wind-photovoltaic Hybrid Generation System includes:</p> <ol style="list-style-type: none"> 1、 Improve and optimize the tail of the wind turbine and yaw structure. Improve the stable running of the wind turbine. 2、 Improve and optimize the electromagnetic brake, mechanical brake and unloading load institution of the wind turbine. Improve the running safety of the wind turbine. 3、 Improve and optimize the trace function of the maximum power for photovoltaic control module. Obviously improve the energy utilization ratio of solar energy system. 4、 Improve and optimize the protection function of the photovoltaic control module to improve the stability of the system further. 5、 Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Make Centralized Wind-photovoltaic Hybrid Generation System locate in the higher technology level at home and abroad through the above technology innovation.
Technology maturity	Centralized Wind-photovoltaic Hybrid Generation System performs the system configuration according to the local wind and light source and the valley amount of the electricity load for the user, consisting of 2KW wind driven generator, 8KWp photo-voltaic cell, inverter controller and storage battery; the matching parameter of each device is optimal after optimization design; the perfect degree for system generation is relatively high.
Technology applicability	The Centralized Wind-photovoltaic Hybrid Generation System applies to the residents of the areas without electricity having the better wind and solar energy resources and the users of enterprises and institutions off the grid. Carry out the system configuration according to the local wind and solar resources and capacity of electricity load for users.
Technology stability	The Centralized Wind-photovoltaic Hybrid Generation System can keep stable in the process of running for the project. Install the photovoltaic battery in the outdoor. The stable working environment temperature is -40°C~60°C. It can keep stable running under severe cold and hot environment with the dust. Install the inversion controller and the storage battery in the indoor.

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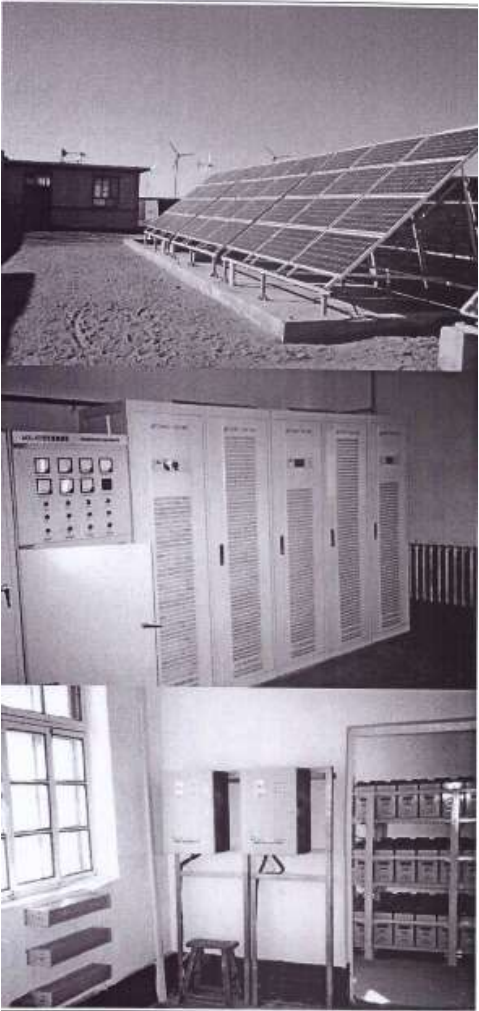
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		The stable working environment temperature is $-15^{\circ}\text{C}\sim 40^{\circ}\text{C}$. The system has the lower sensitivity to the interference factors including environment and technology parameters. It can keep higher stability in the process of running.
	Technology security	The Centralized Wind-photovoltaic Hybrid Generation System has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, It has the higher market acceptance without pollution and discharge in the process of running.
	Obstacles of results transformation and promotion	In the process of achievement transformation and promotion, the Centralized Wind-photovoltaic Hybrid Generation System needs the relevant policy support and financial support of the government, and gradually establishes a good market order to make sure that the industry is in a state of healthy development.
	Intellectual property transfer	The Centralized Wind-photovoltaic Hybrid Generation System has the domestic independent intellectual property right, and the related technology, which is owned by the enterprise, has also obtained the patent.

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Picture description



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Technological achievements declaration of renewable energy sources	
Two-dimension code	 <p>Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)</p>
Technology providing unit	<p>Inner Mongolia Hua De New Technology Limited Company</p> <p>Inner Mongolia Hua De New Technology Limited Company</p>
Submission date	On June 15, 2016
Contact	<p>凌锐 Lingrui</p> <p>8609147832</p>
Technology types	Solar energy utilization technology
Telephone	18698447832
E-mail	iadz9238@163.com
Technology name	Centralized Wind-photovoltaic Hybrid Generation System (10kWp)
Technology provider	Inner Mongolia Hua De New Technology Limited Company
Scope of application	Inner Mongolia Hua De New Technology Limited Company
Technology briefing	The Centralized Wind-photovoltaic Hybrid Generation System consists of 10kWp photo-voltaic cell, photo-voltaic controller, inverter and storage battery. The photovoltaic cell can change the solar energy into electric energy, which can be stored in the storage battery through the photovoltaic controller. The inversion controller can change the electric energy of the storage battery into the alternating current energy of 220V and 50 Hz .
Technical Information	System configuration is: 10KWp photo-voltaic cell, 220V system voltage Optimize the specific configuration according to the local solar energy sources and electricity load situation.
Business application conditions	The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5MW . The system is under normal operation.
Service conditions	Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872

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	Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install the main equipments of the system, which have the functions of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, the cost of installation, usage and maintenance are relatively low.
	Equipment investment	The main equipment required for the new Centralized Photovoltaic System is: 10kWp photo-voltaic cell, photo-voltaic controller, inverter and storage battery; the system also consists of system accessories such as wire, cable and standard component, etc. Investment for the system device is about RMB 839,400 . Carry out the specific measurement for the investment requirements of the specific equipments according the local solar sources and user load situation.
	Operation and maintenance fees	The Centralized Photovoltaic System does not consume water, electricity or any raw materials during normal operation. The main equipments of system have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost, repair charge and administration expenses consumed for the system maintenance are relatively low.
	Payback period of investment	The static payback period of the Centralized Photovoltaic System is 4 ~ 5 years.
	Other benefits	The Centralized Photovoltaic System can cut emission by about 0.997kg carbon dioxide per kilowatt hour, which will save about 344g of standard coal
	Technology share	Technology share is 15% in 2015
	Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law, Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc. &ldquo , the 11th Five-year Plan &rdquo ; &ldquo , the 12th Five-year Plan &rdquo and the national environment protection plan have established the target of energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For Centralized Wind-photovoltaic Hybrid Generation System, it is the clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next

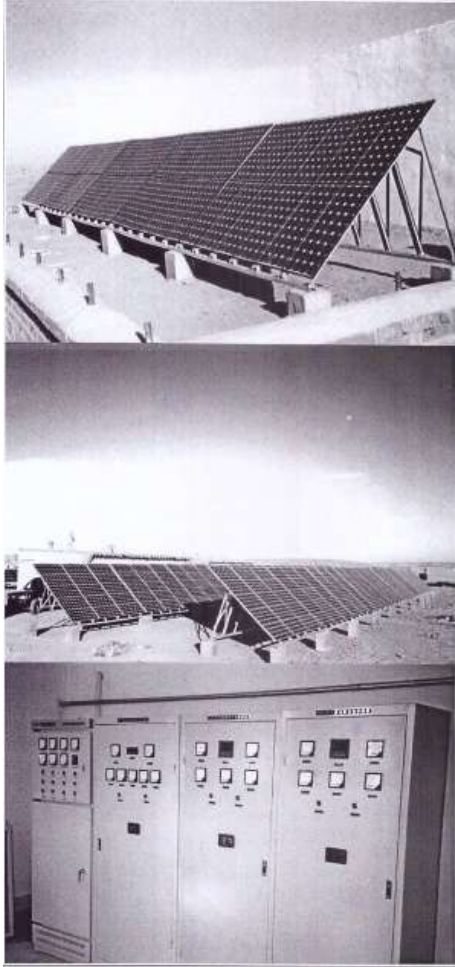
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	few years, the market capacity will be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.
Technology advancement	<p>Technical innovations in the Centralized Photovoltaic System include:</p> <ol style="list-style-type: none"> 1、 Improve and optimize the trace function of the maximum power for photovoltaic controller. Obviously improve the energy utilization ratio of solar energy system. 2. Improve and optimize the various protection functions of the photovoltaic controller, which further improves the stability of the system. 3、 Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Through the above technological innovation, the user angle type of Wind-photovoltaic Hybrid Generation System is still in a high technology level both at home and abroad.
Technology maturity	The Centralized Photovoltaic System performs system configuration according to the local solar energy resource and the total electricity load of the users. Consisting of 10kWp photovoltaic cells, photovoltaic controller, inverter and battery, the matching parameters of the devices are optimized and the system integration is improved after optimization design.
Technology applicability	The Centralized Photovoltaic System is suitable for residents of non-electricity areas with better solar energy resources and users of enterprises and institutions away from the power grid. The system is configured according to the total power of the solar energy resource and the user's electricity load.
Technology stability	The Centralized Photovoltaic System can keep stable in the operation process. The photovoltaic battery is installed outdoors, and its stable working environment temperature is - 40°C ~ 60°C with stable operation in the dust, cold and hot environment. Install the photovoltaic controller, the inversion controller and the storage battery in doors. The stable working environment temperature is -15°C~40°C. The system has the lower sensitivity to the interference factors including environment and technology parameters. It can keep higher stability in the process of running.
Technology security	The Centralized Photovoltaic System has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, It has the higher market acceptance without pollution and discharge in the process of running.


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	Obstacles of results transformation and promotion	The government needs to provide the corresponding policy guarantee and financial support for the Centralized Photovoltaic System in the process of results transformation and promotion. Establish the good market order gradually to make the industry in the good development state.
	Intellectual property transfer	The Centralized Photovoltaic System has the domestic proprietary intellectual property rights. The relevant technology has obtained the patent. The technology owner is enterprise.
	Picture description	 The image block contains three photographs. The top photograph shows a close-up of a large solar panel array tilted at an angle, supported by a metal frame. The middle photograph shows a wide view of a solar farm with many rows of panels stretching into the distance under a clear sky. The bottom photograph shows an indoor electrical control cabinet with several doors and control panels.

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Technological achievements declaration of renewable energy sources			
Two-dimension code	 <p>Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)</p>		
Technology providing unit	Inner Mongolia Hua De New Technology Limited Company	Submission date	On June 15, 2016
Contact	Li Lingrui	Technology types	Wind energy utilization technology
Telephone	18698447832	E-mail	iadz9238@163.com
Technology name	Centralized Wind-photovoltaic Hybrid Generation System (kW wind + kWp light)		
Technology provider	Inner Mongolia Hua De New Technology Limited Company		
Scope of application	Inner Mongolia Hua De New Technology Limited Company		
Technology briefing	Centralized Wind-photovoltaic Hybrid Generation System consists of 4kW wind driven generator, 16kWp photo-voltaic cell, inverter controller and storage battery. Wind turbine and photovoltaic cell respectively change the wind energy and solar energy into electric energy, which can be stored in the storage battery through the inversion controller. The inversion controller changes the electric energy of the storage cell into the electric energy of alternating current of 220V and 50 Hz .		
Technical Information	System configuration is: 4kW wind driven generator + 16kWp photo-voltaic cell, and 220V system voltage. Optimize the specific configuration according to the local wind and solar energy and electricity load situation.		
Business application conditions	The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5MW . The system is under normal operation.		

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	Service conditions	Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872
	Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install the main equipments of the system, which have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, the cost of installation, usage and maintenance are relatively low.
	Equipment investment	The main equipments required for the new established Centralized Wind-photovoltaic Hybrid Generation System are: 4kW wind driven generator, 16kWp photo-voltaic cell, inverter controller and storage battery; the system also includes the system accessories such as wire, cable and standard component, etc. Investment for the system device is about RMB 11, 656, 000 . Carry out the specific measurement according to the local wind and solar sources and user load situation.
	Operation and maintenance fees	Centralized Wind-photovoltaic Hybrid Generation System under normal operation will not consume water, electricity and any raw materials. The main equipments of system have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost, repair charge and administration expenses consumed for the system maintenance are relatively low.
	Payback period of investment	It is 4-5 years for the payback period of the static investment of the Centralized Wind-photovoltaic Hybrid Generation System
	Other benefits	It can reduce about 0.997kg carbon dioxide emission per watt of generating electricity for the Centralized Wind-photovoltaic Hybrid Generation System. Meanwhile, it can save about 344g standard coal.
	Technology share	Technology share is 15% in 2015
	Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law, Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc. &ldquo; , the 11th Five-year Plan &rdquo; ; &ldquo; , the 12th Five-year Plan &rdquo; and the national environment protection plan have established the target of energy conservation and emission reduction. These policies have promoted the application

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	of technology innovation in all fields. For Centralized Wind-photovoltaic Hybrid Generation System, it is the clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next few years, the market capacity will be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.
Technology advancement	<p>The technology innovation of Centralized Wind-photovoltaic Hybrid Generation System includes:</p> <ol style="list-style-type: none"> 1. Improve and optimize the tail of the wind turbine and yaw structure. Improve the stable running of the wind turbine. 2. Improve and optimize the electromagnetic brake, mechanical brake and unloading load institution of the wind turbine. Improve the running safety of the wind turbine. 3. Improve and optimize the trace function of the maximum power for photovoltaic control module. Obviously improve the energy utilization ratio of solar energy system. 4. Improve and optimize the protection functions of the photovoltaic control module to improve the stability of the system further. 5. Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Make Centralized Wind-photovoltaic Hybrid Generation System locate in the higher technology level at home and abroad through the above technology innovation.
Technology maturity	Centralized Wind-photovoltaic Hybrid Generation System performs the system configuration according to the local wind and light source and the valley amount of the electricity load for the user, consisting of 4KW wind driven generator, 16KWp photo-voltaic cell, inverter controller and storage battery; the matching parameter of each device is optimal after optimization design; the perfect degree for system generation is relatively high.
Technology applicability	The Centralized Wind-photovoltaic Hybrid Generation System applies to residents of areas without electricity having the better wind and solar energy resources and users of enterprises and institutions off the grid. Carry out the system configuration according to the local wind and solar resources and capacity of electricity load for users.
Technology stability	The Centralized Wind-photovoltaic Hybrid Generation System can keep stable in the process of running for the project. Install the photovoltaic battery outdoors. The stable working environment temperature is -40°C~60°C. It can keep stable running under severe cold and hot environment




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		with the dust. Install the inversion controller and the storage battery in doors. The stable working environment temperature is -15°C~40°C. The system has the lower sensitivity to interference factors including environment and technology parameters. It can keep higher stability in the process of running.
	Technology security	The Centralized Wind-photovoltaic Hybrid Generation System has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, It has the higher market acceptance without pollution and discharge in the process of running.
	Obstacles of results transformation and promotion	In the process of achievement transformation and promotion, the Centralized Wind-photovoltaic Hybrid Generation System needs the relevant policy support and financial support of the government, and gradually establishes a good market order to make sure that the industry is in a state of healthy development.
	Intellectual property transfer	The Centralized Wind-photovoltaic Hybrid Generation System has the domestic independent intellectual property right, and the related technology, which is owned by the enterprise, has also obtained the patent.

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	Picture description			
Technological achievements declaration of renewable energy sources				
	Two-dimension code			
	Technology providing unit	 <p>Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)</p>	Submission date	On June 15, 2016
	Contact	Li Lingjun	Technology types	Technology for using the solar energy

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Telephone	18698447832	E-mail	iadz9238@163.com
Technology name	Household photo-voltaic power generation system (1kWp)		
Technology provider	Inner Mongolia Hua De New Technology Limited Company		
Scope of application	Inner Mongolia Hua De New Technology Limited Company		
Technical briefing	Household photo-voltaic power generation system consists of 1kWp photo-voltaic cell, photo-voltaic controller, inverter and storage battery. The photovoltaic cell can change the solar energy into electric energy, which can be stored in the storage battery through the photovoltaic controller. The inversion controller can change the electric energy of the storage battery into the alternating current energy of 220V and 50 Hz .		
Technical Information	System configuration is: 1kWp photo-voltaic cell, 48V system voltage Optimize the specific configuration according to the local solar energy sources and electricity load situation.		
Business application conditions	The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5MW . The system is under normal operation.		
Service conditions	Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872		
Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install the main equipments of the system, which have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, the cost of installation, usage and maintenance are relatively low.		
Equipment investment	The main equipments required for the new established household photovoltaic generating system are: 1kWp photo-voltaic cell, photo-voltaic controller, inverter and storage battery; the system also consists of system accessories such as wire, cable and standard component, etc. The investment for the system device is about RMB 48,000 Carry out the specific measurement for the investment requirements of the specific equipments according to the local solar sources and user load situation.		
Operation and maintenance fees	The household photovoltaic generating system under normal operation will not consume water, electricity and any raw materials. The main equipments of system have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost,		

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	repair charge and administration expenses consumed for the system maintenance are relatively low.
Payback period of investment	It is 4-5 years for the payback period of the static investment of the household photovoltaic generating system.
Other benefits	It can reduce about 0.997kg carbon dioxide emission per watt of generating electricity for the household photovoltaic generating system. Meanwhile, it can save about 344g standard coal.
Technology share	Technology share is 15% in 2015
Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law, Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc. &ldquo , the 11th Five-year Plan &rdquo ; &ldquo , the 12th Five-year Plan &rdquo and the national environment protection plan have established the target of energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For household wind and light hybrid power system, it is the clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next few years, the market capacity will be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.
Technology advancement	The technology innovation of the household photovoltaic generating system includes <ol style="list-style-type: none"> 1、 Improve and optimize the trace function of the maximum power for photovoltaic controller. Obviously improve the energy utilization ratio of solar energy system. 2、 Improve and optimize the protection function of the photovoltaic controller to improve the stability of the system further. 3、 Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Make the complementary generating system of the household wind and solar locate in the higher technology level at home and abroad through the above technology innovation.

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	Technology maturity	Household photo-voltaic power generation system performs the system configuration according to the local wind and light source and the valley amount of the electricity load for the user, consisting of 1KWp photo-voltaic cell, photovoltaic controller, inverter controller and storage battery; the matching parameters of each device is optimal after optimization design; the perfect degree for system generation is relatively high.
	Technology applicability	The household photovoltaic generating system applies to residents of areas without electricity having the better solar energy sources and users of enterprises and institutions off the grid. Carry out the system configuration according to the local solar sources and capacity of electricity load for users.
	Technology stability	The household photovoltaic generating system can keep stable in the process of running for the project. Install the photovoltaic cell outdoors. The stable working environment temperature is -40°C ~60°C. It can keep stable running under severe cold and hot environment with the dust. Install the photovoltaic controller, the inversion controller and the storage battery in doors. The stable working environment temperature is -15°C~40°C. The system has the lower sensitivity to interference factors including environment and technology parameters. It can keep higher stability in the process of running.
	Technology security	The household photovoltaic generating system has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, It has the higher market acceptance without pollution and discharge in the process of running.
	Obstacles of results transformation and promotion	The government needs to provide the corresponding policy guarantee and financial support for the household photovoltaic generating system in the process of results transformation and promotion. Establish the good market order gradually to make the industry in the good development state.
	Intellectual property transfer	The household photovoltaic generating system has the domestic proprietary intellectual property rights. The relevant technology has obtained the patent. The technology owner is enterprise.

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COMPANY: INNER MONGOLIA HUA DE NEW TECHNOLOGY LIMITED COMPANY

	Picture description	
	Technological achievements declaration of renewable energy sources	
	Two-dimension code	  <p>Inner Mongolia Hua De New Technology Limited Company 提交日期 1501050076872 (Seal) 蒙古华德新技术有限公司 凌锐 技术类 698447832 邮箱 用型光伏发电系统 (3kW) 蒙古华德新技术有限公司</p>

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Technology providing unit	Inner Mongolia Hua De New Technology Limited Company	Submission date	On June 15, 2016
Contact	Li Lingrui	Technology types	Solar energy utilization technology
Telephone	18698447832	E-mail	iadz9238@163.com
Technology name	Household photo-voltaic power generation system (3kWp)		
Technology provider	Inner Mongolia Hua De New Technology Limited Company		
Scope of application	Inner Mongolia Hua De New Technology Limited Company		
Technology briefing	Household photo-voltaic power generation system consists of 3kWp photo-voltaic cell, photo-voltaic controller, inverter and storage battery. The photovoltaic cell can change the solar energy into electric energy, which can be stored in the storage battery through the photovoltaic controller. The inversion controller can change the electric energy of the storage battery into the alternating current energy of 220V and 50 Hz .		
Technical Information	System configuration is: 3kWp photo-voltaic cell, 48V system voltage Optimize the specific configuration according to the local solar energy sources and electricity load situation.		
Business application conditions	The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5MW . The system is under normal operation.		
Service conditions	Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872		
Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install the main equipments of the system, which have the function of automatic operation and protection.		

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		Meanwhile, they have the stable performance. Therefore, the cost of installation, usage and maintenance are relatively low.
	Equipment investment	The main equipments required for the new established household photovoltaic generating system are: 3KWp to-voltaic cell, photo-voltaic controller, inverter and storage battery; the system also consists of system accessories such as wire, cable and standard component, etc. The investment of the system equipments is about RMB 67,000 . Carry out the specific measurement for the investment requirements of the specific equipments according the local solar sources and user load situation.
	Operation and maintenance fees	The household photovoltaic generating system under normal operation will not consume water, electricity and any raw materials. The main equipments of system have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost, repair charge and administration expenses consumed for the system maintenance are relatively low.
	Payback period of investment	It is 4-5 years for the payback period of the static investment of the household photovoltaic generating system.
	Other benefits	It can reduce about 0.997kg carbon dioxide emission per watt of generating electricity for the household photovoltaic generating system. Meanwhile, it can save about 344g standard coal.
	Technology share	Technology share is 15% in 2015
	Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law</i> , <i>Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc. &ldquo; , the 11th Five-year Plan &rdquo; ; &ldquo; , the 12th Five-year Plan &rdquo; and the national environment protection plan have established the target of

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		energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For household wind and light hybrid power system, it is the clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next few years, the market capacity will be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.
	Technology advancement	<p>The technology innovation of the household photovoltaic generating system includes</p> <ol style="list-style-type: none"> 1、 Improve and optimize the trace function of the maximum power for photovoltaic controller. Obviously improve the energy utilization ratio of solar energy system obviously. 2、 Improve and optimize the protection function of the photovoltaic controller to improve the stability of the system further. 3、 Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Make the complementary generating system of the household wind and solar locate in the higher technology level at home and abroad through the above technology innovation.
	Technology maturity	Household type photo-voltaic power generation system performs the system configuration according to the local wind and light source and the valley amount of the electricity load for the user, consisting of 3KWp photo-voltaic cell, Photovoltaic controller, inverter controller and storage battery; the matching parameters of each device is optimal after optimization design; the perfect degree for system generation is relatively high.
	Technology applicability	The household photovoltaic generating system applies to residents of areas without electricity having the better solar energy sources and users of enterprises and institutions off the grid. Carry out the system

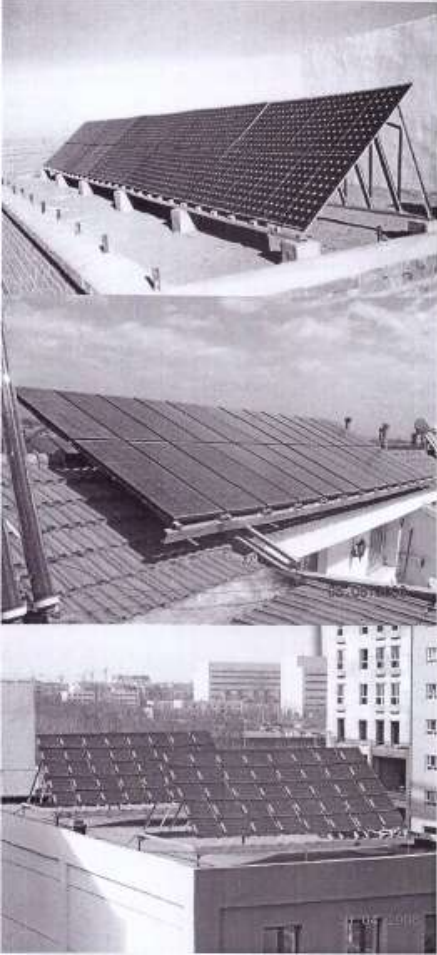
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		configuration according to the local solar sources and capacity of electricity load for users.
	Technology stability	The household photovoltaic generating system can keep stable in the process of running for the project. Install the photovoltaic cell outdoors. The stable working environment temperature is -40°C~60°C. It can keep stable running under severe cold and hot environment with the dust. Install the photovoltaic controller, the inversion controller and the storage battery in doors. The stable working environment temperature is -15°C~40°C. The system has the lower sensitivity to interference factors including environment and technology parameters. It can keep higher stability in the process of running.
	Technology security	The household photovoltaic generating system has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, It has the higher market acceptance without pollution and discharge in the process of running.
	Obstacles of results transformation and promotion	The government needs to provide the corresponding policy guarantee and financial support for the household photovoltaic generating system in the process of results transformation and promotion. Establish the good market order gradually to make the industry in the good development state.
	Intellectual property transfer	The household photovoltaic generating system has the domestic proprietary intellectual property rights. The relevant technology has obtained the patent. The technology owner is enterprise.

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Picture description



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Technological achievements declaration of renewable energy sources				
Two-dimension code	 <p>Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)</p>			
Technology providing unit	<table border="1"> <tr> <td>Inner Mongolia Hua De New Technology Limited Company</td> <td>Submission date</td> <td>On June 15, 2016</td> </tr> </table>	Inner Mongolia Hua De New Technology Limited Company	Submission date	On June 15, 2016
Inner Mongolia Hua De New Technology Limited Company	Submission date	On June 15, 2016		
Contact	<table border="1"> <tr> <td>Li Lingru</td> <td>Technology types</td> <td>Solar energy utilization technology</td> </tr> </table>	Li Lingru	Technology types	Solar energy utilization technology
Li Lingru	Technology types	Solar energy utilization technology		
Telephone	<table border="1"> <tr> <td>18698447832</td> <td>E-mail</td> <td>iadz9238@163.com</td> </tr> </table>	18698447832	E-mail	iadz9238@163.com
18698447832	E-mail	iadz9238@163.com		
Technology name	Household type photo-voltaic power generation system (2kWp)			
Technology provider	Inner Mongolia Hua De New Technology Limited Company			
Scope of application	Inner Mongolia Hua De New Technology Limited Company			
Technology briefing	Household photo-voltaic power generation system consists of 2kWp photo-voltaic cell, photo-voltaic controller, inverter and storage battery. The photovoltaic cell can change the solar energy into electric energy, which can be stored in the storage battery through the photovoltaic controller. The inversion controller can change the electric energy of the storage battery into the alternating current energy of 220V and 50 Hz .			
Technical Information	System configuration is: 2kWp photo-voltaic cell, 48V system voltage Optimize the specific configuration according to the local solar energy sources and electricity load situation.			
Business application conditions	The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5MW . The system is under normal operation.			
Service conditions	Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872			

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	Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install the main equipments of the system, which have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, the cost of installation, usage and maintenance are relatively low.
	Equipment investment	The main equipments required for the new established household photovoltaic generating system are: 2KWp to-voltaic cell, photo-voltaic controller, inverter and storage battery; the system also consists of system accessories such as wire, cable and standard component, etc. The investment of the system equipments is about RMB 56,000 . Carry out the specific measurement for the investment requirements of the specific equipments according to the local solar sources and user load situation.
	Operation and maintenance fees	The household photovoltaic generating system under normal operation will not consume water, electricity and any raw materials. The main equipments of system have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost, repair charge and administration expenses consumed for the system maintenance are relatively low.
	Payback period of investment	It is 4-5 years for the payback period of the static investment of the household photovoltaic generating system.
	Other benefits	It can reduce about 0.997kg carbon dioxide emission per watt of generating electricity for the household photovoltaic generating system. Meanwhile, it can save about 344g standard coal.
	Technology share	Technology share is 15% in 2015
	Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law</i> , <i>Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc., the 11th Five-year Plan, the 12th Five-year Plan &rdquo and the national environment protection plan have established the target of energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For household wind and light hybrid power system, it is the clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next few years, the market

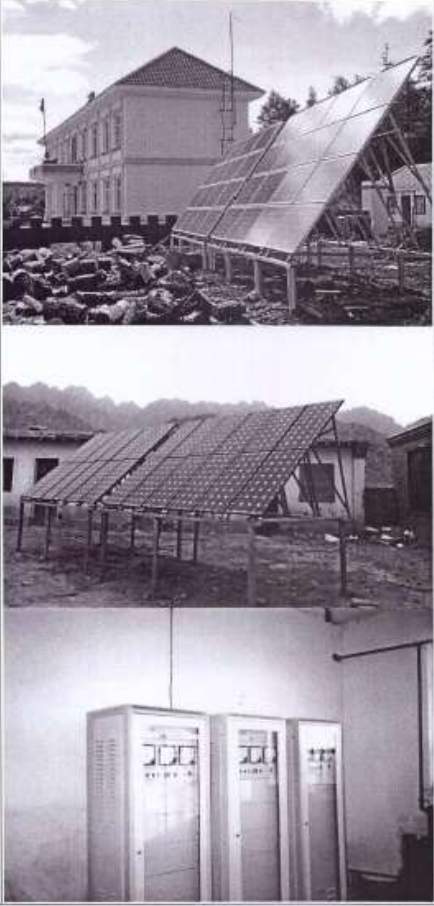
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	capacity will be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.
Technology advancement	<p>The technology innovation of the household photovoltaic generating system includes</p> <ol style="list-style-type: none"> 1、 Improve and optimize the trace function of the maximum power for photovoltaic controller. Obviously improve the energy utilization ratio of solar energy system. 2、 Improve and optimize the protection function of the photovoltaic controller to improve the stability of the system further. 3、 Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Make the complementary generating system of the household wind and solar locate in the higher technology level at home and abroad through the above technology innovation.
Technology maturity	Household photo-voltaic power generation system performs the syatem configuration according to the local wind and light source and the valley amount of the electricity load for the user, consisting of 2KWp photo-voltaic cell, photovoltaic controller, inverter controller and storage battery; the matching parameters of each device is optimal after optimization design; the perfect degree for system generation is relatively high.
Technology applicability	Household photo-voltaic power generation system is suitable for the residence with relatively good solar energy but without power, and the enterprise or unit away from the power grid. Carry out the system configuration according to the local solar sources and capacity of electricity load for users.
Technology stability	The household photovoltaic generating system can keep stable in the process of running for the project. Install the photovoltaic cell outdoors. The stable working environment temperature is 40°C ~60°C . It can keep stable running under severe cold and hot environment with the dust. Install the photovoltaic controller, the inversion controller and the storage battery in doors. The stable working environment temperature is -15°C~40°C . The system has the lower sensitivity to interference factors including environment and technology parameters. It can keep higher stability in the process of running.
Technology security	The household photovoltaic generating system has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, It has the higher market acceptance without pollution and discharge in the process of running.




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	<p>Obstacles of results transformation and promotion</p>	<p>The government needs to provide the corresponding policy guarantee and financial support for the household photovoltaic generating system in the process of results transformation and promotion. Establish the good market order gradually to make the industry in the good development state.</p>
	<p>Intellectual property transfer</p>	<p>The household photovoltaic generating system has the domestic proprietary intellectual property rights. The relevant technology has obtained the patent. The technology owner is enterprise.</p>
	<p>Picture description</p>	 <p>The 'Picture description' cell contains three vertically stacked photographs. The top photograph shows a large array of solar panels mounted on a metal frame on a flat roof of a multi-story building. The middle photograph shows a smaller array of solar panels mounted on a ground-mounted metal frame in an outdoor setting. The bottom photograph shows an indoor view of several electrical control cabinets or inverters, likely part of the solar power system's infrastructure.</p>

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Technological achievements declaration of renewable energy sources			
Two-dimension code	   <p>提交日 技术类 邮箱 Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)</p>		
Technology providing unit	Inner Mongolia Hua De New Technology Limited Company	Submission date	On June 15, 2016
Contact	Li Lingrui	Technology types	Wind energy utilization technology
Telephone	18698447832	E-mail	iadz9238@163.com
Technology name	Household wind and light hybrid power system (300W wind + 300Wp light)		
Technology provider	Inner Mongolia Hua De New Technology Limited Company		
Scope of application	Inner Mongolia Hua De New Technology Limited Company		
Technical briefing	The household wind and light hybrid power system consists of 300W wind driven generator, 300Wp photo-voltaic cell, inverter controller and storage battery. Wind turbine and photovoltaic cell change the wind energy and solar energy into electric energy respectively, which can be stored in the storage battery through the inversion controller. The inversion controller changes the electric energy of the storage cell into the electric energy of alternating current of 220V and 50Hz.		
Technical Information	System configuration is: 300W wind driven generator + 300Wp photo-voltaic cell, 24V system voltage. Optimize the specific configuration according to the local wind and solar energy and electricity load situation.		
Business application conditions	The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5 MW. The system is under normal operation.		
Service conditions	Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872		

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	Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install for the main equipments of the system, which have the functions of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, the costs of installation, usage and maintenance are relatively low.
	Equipment investment	The main equipments required for the new established household wind and light hybrid power system are: 300W wind driven generator, 300Wp photo-voltaic cell, inverter controller and storage battery; the system also includes the system accessories such as wire, cable and standard component, etc. The investment for the system device is about RMB 16,200 . Carry out the specific measurement according to the local wind and solar sources and user load situation.
	Operation and maintenance fees	Household wind and light hybrid power system under normal operation will not consume water, electricity and any raw materials. The main equipments of system have the functions of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost, repair charge and administration expenses consumed for the system maintenance are relatively low.
	Payback period of investment	It is 4-5 years for the payback period of the static investment of household wind and light hybrid power system.
	Other benefits	It can reduce about 0.997kg carbon dioxide emission per watt of generating electricity for household wind and light hybrid power system. Meanwhile, it can save about 344g standard coal.
	Technology share	Technology share is 15% in 2015
	Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment condition that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law</i> , <i>Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc, the 11th Five-year Plan, the 12th Five-year Plan and the national environment protection plan have established the target of energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For household wind and light hybrid power system, it is the clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next few years, the market capacity will be enlarged


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COMPANY: INNER MONGOLIA HUA DE NEW TECHNOLOGY LIMITED COMPANY

		further. The technology will have the large market potential in industry or promotion in the field until 2020.
	Technology advancement	<p>The technology innovation of the household wind and light hybrid power system includes:</p> <ol style="list-style-type: none"> 1、 Improve and optimize the tail of the wind turbine and yaw structure. Improve the stable running of the wind turbine. 2、 Improve and optimize the electromagnetic brake, mechanical brake and unloading load institution of the wind turbine. Improve the running safety of the wind turbine. 3、 Improve and optimize the trace function of the maximum power for photovoltaic control module. Obviously improve the energy utilization ratio of solar energy system. 4、 Improve and optimize the protection function of the photovoltaic control module to improve the stability of the system further. 5、 Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Make the complementary generating system of the household wind and solar locate in the higher technology level at home and abroad through the above technology innovation.
	Technology maturity	The household wind and light hybrid power system performs the system configuration according to the local wind and light source and the valley amount of the electricity load for the user, consisting of 300W wind driven generator, 300Wp photo-voltaic cell, inverter controller and storage battery; the matching parameter of each device is optimal after optimization design; the perfect degree for system generation is relatively high.
	Technology applicability	The household wind and light hybrid power system applies to residents of areas without electricity having the better wind energy and solar energy resources and users of enterprises and institutions off the grid. Carry out the system configuration according to the local wind and solar resources and capacity of electricity load for users.
	Technology stability	The household wind and light hybrid power system can keep stable in the process of running for the project. Install the wind turbine and photovoltaic battery outdoors. The stable working environment temperature is -40°C~60°C. They can keep stable running under severe cold and hot environment with the dust. Install the inversion controller and the storage battery in doors. The stable working environment temperature is -15°C~40°C. The system has the lower sensitivity to

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		interference factors including environment and technology parameters. It can keep higher stability in the process of running.
Technology security		The household wind and light hybrid power system has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, It has the higher market acceptance without pollution and discharge in the process of running.
Obstacles of results transformation and promotion		The government needs to provide the corresponding policy guarantee and financial support for the household wind and light hybrid power system in the process of results transformation and promotion. Establish the good market order gradually to make the industry in the good development state.
Intellectual property transfer		The household wind and light hybrid power system has the domestic proprietary intellectual property rights. The relevant technology has obtained the patent. The technology owner is enterprise.
Picture description		

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Technological achievements declaration of renewable energy sources

Two-dimension code



Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)

Technology providing unit

Inner Mongolia Hua De New Technology Limited Company

Submission date

On June 15, 2016

Contact

Li Lingrui

Technology types

Wind energy utilization technology

Telephone

18698447832

E-mail

iadz9238@163.com

Technology name

Household wind and light hybrid power system (500W wind + 1.5kWp light)

Technology provider

Inner Mongolia Hua De New Technology Limited Company

Scope of application

Inner Mongolia Hua De New Technology Limited Company

Technology Briefing

Household wind and light hybrid power system consists of 500W wind driven generator, 1.5KWp photo-voltaic cell, inverter controller and storage battery. Wind turbine and photovoltaic cell respectively change the wind energy and solar energy into electric energy, which can be stored in

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		the storage battery through the inversion controller. The inversion controller changes the electric energy of the storage cell into the electric energy of alternating current of 220V and 50 Hz .
Technical Information		System configuration is: 500w wind driven generator + 1.5KWp photo-voltaic cell, 48V system voltage. Optimize the specific configuration according to the local wind and solar energy and electricity load situation.
Business application conditions		The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5MW . The system is under normal operation.
Service conditions		Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872
Business application unit contact/telephone/E-mail		The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install the main equipments of the system, which have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, the cost of installation, usage and maintenance are relatively low.
Equipment investment		The main equipments required for the new established household wind and light hybrid power system are: 500W wind driven generator, 1.5KWp photo-voltaic cell, inverter controller and storage battery; the system also includes the system accessories such as wire, cable and standard component, etc. The investment for the system device is about RMB 56,000 . Carry out the specific measurement according to the local wind and solar sources and user load situation.
Operation and maintenance fees		The household wind and light hybrid power system under normal operation will not consume water, electricity and any raw materials. The main equipments of system have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost, repair charge and administration expenses consumed for the system maintenance are relatively low.
Payback period of investment		It is 4-5 years for the payback period of the static investment of household wind and light hybrid power system.
Other benefits		It can reduce about 0.997kg carbon dioxide emission per watt of generating electricity for the household wind and light hybrid power system. Meanwhile, it can save about 344g standard coal.
Technology share		Technology share is 15% in 2015

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	Technology market potential	<p>In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law</i>, <i>Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc, the 11th Five-year Plan, the 12th Five-year Plan and the national environment protection plan have established the target of energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For the household wind and light hybrid power system, it is the clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next few years, the market capacity will be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.</p>
	Technology advancement	<p>The technology innovation of the household wind and light hybrid power system includes:</p> <ol style="list-style-type: none"> 1、 Improve and optimize the tail of the wind turbine and yaw structure. Improve the stable running of the wind turbine. 2、 Improve and optimize the electromagnetic brake, mechanical brake and unloading load institution of the wind turbine. Improve the running safety of the wind turbine. 3、 Improve and optimize the trace function of the maximum power for photovoltaic control module. Obviously improve the energy utilization ratio of solar energy system. 4、 Improve and optimize the protection function of the photovoltaic control module to improve the stability of the system further. 5、 Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Make the complementary generating system of the household wind and solar locate in the higher technology level at home and abroad through the above technology innovation.
	Technology maturity	<p>Household wind and light hybrid power system performs the system configuration according to the local wind and light source and the valley amount of the electricity load for the user, consisting of wind driven generator, photo-voltaic cell, inverter controller and storage battery; the matching</p>

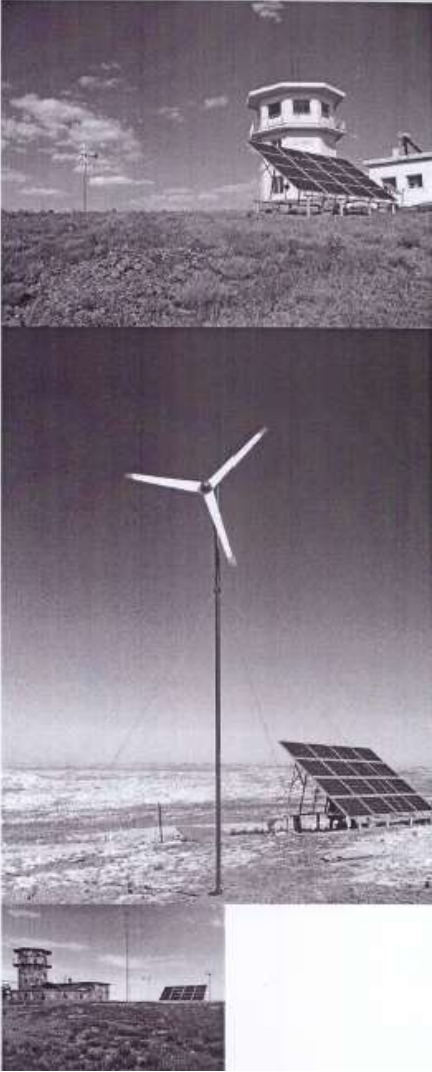
TECHNOLOGY: SOLAR**COMPANY: INNER MONGOLIA HUA DE NEW TECHNOLOGY LIMITED COMPANY**

		parameter of each device is optimal after the optimization design; the perfect degree for system generation is relatively high.
	Technology applicability	The household wind and light hybrid power system applies to residents of areas without electricity having the better wind energy and solar energy resources and users of enterprises and institutions off the grid. Carry out the system configuration according to the local wind and solar resources and capacity of electricity load for users.
	Technology stability	The household wind and light hybrid power system can keep stable in the process of running for the project. Install the wind turbine and photovoltaic battery outdoors. The stable working environment temperature is -40°C~60°C. They can keep stable running under severe cold and hot environment with the dust. Install the inversion controller and the storage battery in doors. The stable working environment temperature is -15°C~40°C. The system has the lower sensitivity to interference factors including environment and technology parameters. It can keep higher stability in the process of running.
	Technology security	The household wind and light hybrid power system has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, It has the higher market acceptance without pollution and discharge in the process of running.
	Obstacles of results transformation and promotion	The government needs to provide the corresponding policy guarantee and financial support for the household wind and light hybrid power system in the process of results transformation and promotion. Establish the good market order gradually to make the industry in the good development state.
	Intellectual property transfer	The household wind and light hybrid power system has the domestic proprietary intellectual property rights. The relevant technology has obtained the patent. The technology owner is enterprise.

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Picture description



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Technological achievements declaration of renewable energy sources			
Two-dimension code	  Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)		
Technology providing unit	Inner Mongolia Hua De New Technology Limited Company	Submission date	On June 15, 2016
Contact	Li Lingrui	Technology types	Wind energy utilization technology
Telephone	18698447832	E-mail	iadz9238@163.com
Technology name	Household wind and light hybrid power system (500W wind + 500Wp light)		
Technology provider	Inner Mongolia Hua De New Technology Limited Company		
Scope of application	Inner Mongolia Hua De New Technology Limited Company		
Technology briefing	Household wind and light hybrid power system consists of 500W wind driven generator, 500Wp photo-voltaic cell, inverter controller and storage battery. Wind turbine and photovoltaic cell respectively change the wind energy and solar energy into electric energy, which can be stored in the storage battery through the inversion controller. The inversion controller changes the electric energy of the storage cell into the electric energy of alternating current of 220V and 50 Hz.		
Technical Information	System configuration is: 500W wind driven generator + 500Wp photo-voltaic cell, 48V system voltage. Optimize the specific configuration according to the local wind and solar energy and electricity load situation.		
Business application conditions	The construction place of the energized engineering of Inner Mongolia new energy is located in the league cities of Inner Mongolia. The total capacity of construction system reaches 27.5 MW. The system is under normal operation.		

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	Service conditions	Application unit: Inner Mongolia Power (Group) Co., Ltd, Contact number: 0471-6947872
	Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; It is easy to install the main equipments of the system, which have the functions of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, the cost of installation, usage and maintenance are relatively low.
	Equipment investment	The main equipments required for the new established household wind and light hybrid power system are: 500W wind driven generator, 500Wp photo-voltaic cell, inverter controller and storage battery; the system also includes the system accessories such as wire, cable and standard component, etc. The investment for the system device is about RMB 27,000 . Carry out the specific measurement according to the local wind and solar sources and user load situation.
	Operation and maintenance fees	The household wind and light hybrid power system under normal operation will not consume water, electricity and any raw materials. The main equipments of system have the function of automatic operation and protection. Meanwhile, they have the stable performance. Therefore, labor cost, repair charge and administration expenses consumed for the system maintenance are relatively low.
	Payback period of investment	It is 4-5 years for the payback period of the static investment of household wind and light hybrid power system.
	Other benefits	It can reduce about 0.997kg carbon dioxide emission per watt of generating electricity for the household wind and light hybrid power system. Meanwhile, it can save about 344g standard coal.
	Technology share	Technology share is 15% in 2015
	Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law, Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc. &ldquo , the 11th Five-year Plan &rdquo ; &ldquo , the 12th Five-year Plan &rdquo and the national environment protection plan have established the target of energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For household wind and light hybrid power system, it is the


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	clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next few years, the market capacity will be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.
Technology advancement	<p>The technology innovation of the household wind and light hybrid power system includes:</p> <ol style="list-style-type: none"> 1、 Improve and optimize the tail of the wind turbine and yaw structure. Improve the stable running of the wind turbine. 2、 Improve and optimize the electromagnetic brake, mechanical brake and unloading load institution of the wind turbine. Improve the running safety of the wind turbine. 3、 Improve and optimize the trace function of the maximum power for photovoltaic control module. Obviously Improve the energy utilization ratio of solar energy system. 4、 Improve and optimize the protection function of the photovoltaic control module to improve the stability of the system further. 5、 Improve and optimize three-way MPPT of strong charging, equalization charging and floating charging to ensure that the storage battery is in the optimal state to extend the service life of the storage battery. Make the complementary generating system of the household wind and solar locate in the higher technology level at home and abroad through the above technology innovation.
Technology maturity	Household wind and light hybrid power system performs the system configuration according to the local wind and light source and the valley amount of the electricity load for the user, consisting of 500W wind driven generator, 500Wp photo-voltaic cell, inverter controller and storage battery; the matching parameter of each device is optimal after the optimization design; the perfect degree for system generation is relatively high.
Technology applicability	The household wind and light hybrid power system applies to residents of areas without electricity having the better wind energy and solar energy resources and users of enterprises and institutions off the grid. Carry out the system configuration according to the local wind and solar resources and capacity of electricity load for users.
Technology stability	The household wind and light hybrid power system can keep stable in the process of running for the project. Install the wind turbine and photovoltaic battery outdoors. The stable working environment temperature is -40°C~60°C. They can keep stable running under severe cold and hot environment with the dust. Install the inversion controller and the storage battery in doors. The

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		stable working environment temperature is -15°C~40°C. The system has the lower sensitivity to interference factors including environment and technology parameters. It can keep higher stability in the process of running.	
Technology security		The household wind and light hybrid power system has the stronger practicability in the process of results transformation and industrialization. Meanwhile, it has the complete supporting facilities. Due to the easy installation, operation and maintenance, it has the higher market acceptance without pollution and discharge in the process of running.	
Obstacles of results transformation and promotion		The government needs to provide the corresponding policy guarantee and financial support for the household wind and light hybrid power system in the process of results transformation and promotion. Establish the good market order gradually to make the industry in the good development state.	
Intellectual property transfer		The household wind and light hybrid power system has the domestic proprietary intellectual property rights. The relevant technology has obtained the patent. The technology owner is enterprise.	
Picture description			
Technological achievements declaration of renewable energy sources			
Two-dimension code		 Inner Mongolia Hua De New Technology Limited Company 1501050076872 (Seal)	
Technology providing unit	Inner Mongolia Hua De New Technology Limited Company	Submission date	On June 15, 2016
Contact	李凌锐 Li Lingrui	Technology types	Solar energy utilization technology
Telephone	18698447832	E-mail	iadz9238@163.com

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COMPANY: INNER MONGOLIA HUA DE NEW TECHNOLOGY LIMITED COMPANY

Technology name	Solar street lamp
Technology provider	Inner Mongolia Hua De New Technology Limited Company
Scope of application	Inner Mongolia Hua De New Technology Limited Company
Technology briefing	The solar street lamp consists of the photo-voltaic cell, controller, LED lamp cap, lamp pole and storage battery. The photo-voltaic cell converts the solar energy to the electric energy, which can be stored in the storage battery via the controller. The LED light source in the lamp cap is brightened via the electric energy in the storage battery through the controller.
Technical Information	Photo-voltaic cell 240Wp , storage battery 100Ah/2 , LED lamp 80W , controller 24V/10A and lamp pole 10m .
Business application conditions	With regard to the wind and light supplement street light project executed by BEIJING ZHONGLI HEFENG COMPANY, 610 wind and light supplement street lights are constructed totally, and the system is operated normally.
Service conditions	Application unit: BEIJING ZHONGLI HEFENG INVESTMENT CO, LTD, contact number: 010-64842839
Business application unit contact/telephone/E-mail	The local established projects; It is mature technology; Require the system training. Its content includes the fundamental principles, usage and maintenance methods; The cost of installation, use and maintenance is determined according to the project size.
Equipment investment	Main parts constituting the solar energy street light are: Photo-voltaic cell, controller, LED lamp cap, lamp pole and storage battery; the lamp also comprises the power cabinet, embedded part, wire and foundation, etc. The expense for one solar energy street light is about RMB 11,700 , including the construction and installation expense.
Operation and maintenance fees	Under the normal operation, the solar energy street lamp doesn't consume any water, power and raw material. The main equipment of system features automatic operation and protection, stable performance, so the labor cost, repair cost, management and depreciation cost for system maintenance, depend on the project size. Normally the main components of solar street lamp have automatic protection function, with low failure rate, so the system maintenance cost is low.
Payback period of investment	The static investment payback period of Solar street light project is 4 ~ 5 years.

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	Other benefits	Solar street lamps use clean energy for road lighting, reducing the power supply cost compared with traditional street lamp lighting, saving energy, reducing carbon emissions. The implementation of this project can achieve good economic and social benefits.
	Technology share	Technology share is 15% in 2015
	Technology market potential	In recent years, the improvement speed of resource efficiency of our country has slowed down, which made resource environment conditions that our country will face in the future become more serious. At present, we have the rough economic growth mode. Under this premise, the potential of energy conservation and emission reduction is very large occurred by management innovation and strengthening the institutional constraints. Our country has enacted the relevant policies of improving the resource efficiency, such as <i>Cleaner Production Promotion Law, Circular Economy Promotion Law</i> and <i>Renewable Energy Law</i> etc., the 11th Five-year Plan, the 12th Five-year Plan and the national environment protection plan have established the targets of energy conservation and emission reduction. These policies have promoted the application of technology innovation in all fields. For household wind and light hybrid power system, it is the clean energy generating system having the mature technology. With the gradual realization of the target of energy conservation and emission reduction of our country in the next few years, the market capacity will be enlarged further. The technology will have the large market potential in industry or promotion in the field until 2020.
	Technology advancement	<p>the solar energy technology innovation includes:</p> <ol style="list-style-type: none"> 1、 Improvement and optimization of the maximum power tracking controller function significantly improves the system energy utilization. 2. Improvement and optimization of the controller light control function make the intelligent lighting control function of the system further improved. <p>Through the above technological innovation, the solar street light is at a higher technology level at home and abroad.</p>
	Technology maturity	With system configuration, according to the needs of road lighting ,solar street lamp is composed of photovoltaic cells, LED lamp holder, light pole, controller and battery. After optimization design ,the equipment achieves the optimal matching parameters, with perfect system integration.
	Technology applicability	Solar street lamps are suitable for cities with good solar energy resources

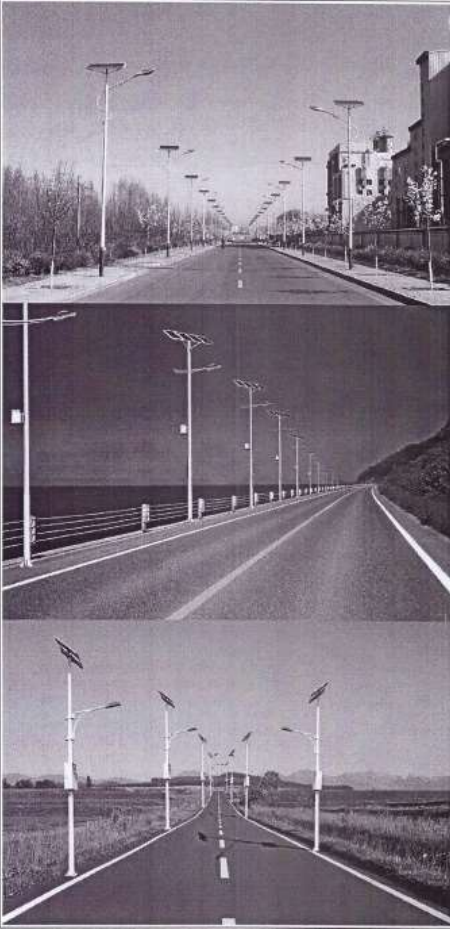
TECHNOLOGY: SOLAR**COMPANY: INNER MONGOLIA HUA DE NEW TECHNOLOGY LIMITED COMPANY**

	Technology stability	Solar street lamps can remain stable in the process of project operation. Its stable working environment temperature is -20 °~40 ° C. The system has low sensitiveness to interference factors such as environment, technical parameters, and it can maintain high stability in the running process.
	Technology security	Solar street lamp has stronger practicability in the process of achievements transformation and industrialization, with perfect supporting facilities. It has high market acceptance because of its easy installation, operation ,simple maintenance, no pollution and emissions in the process of operation.
	Obstacles of results transformation and promotion	The government should provide corresponding policy support and financial support for solar street lamps in the process of achievements transformation and promotion, to gradually establish a good market order and realized good development of the industry.
	Intellectual property transfer	Solar street lamps enjoy domestic proprietary intellectual property right. The patent for the related technology owned by the enterprise has been obtained.

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COMPANY: INNER MONGOLIA HUA DE NEW TECHNOLOGY LIMITED COMPANY

Picture description



TECHNOLOGY: SOLAR

COMPANY: YUNNAN ZHUOYE ENERGY CO., LTD

Renewable Energy Technology Achievement Declaration																																													
Yunnan Zhuoye Energy Co., Ltd - solar water pump	<table border="1"> <tr> <td>QR code</td> <td colspan="3"></td> </tr> <tr> <td>Technology provision unit</td> <td>Yunnan Zhuoye Energy Co., Ltd.</td> <td>Submission date</td> <td>August 3, 2016</td> </tr> <tr> <td>Contact person</td> <td>Liu Zuming</td> <td>Technology type</td> <td>Other solar energy utilization technology</td> </tr> <tr> <td>Tel.</td> <td>13608875405</td> <td>E-mail</td> <td>zmliupv@126.com</td> </tr> <tr> <td>Technology name</td> <td colspan="3">Photovoltaic pump system technology</td> </tr> <tr> <td>Technology provider</td> <td colspan="3">The photovoltaic pump system technology that Yunnan Zhuoye Energy Co., Ltd owns independent intellectual property has stronger design, customization equipment manufacture and engineering construction capacity.</td> </tr> <tr> <td>Scope of application</td> <td colspan="3">The photovoltaic pump technology is used for water lifting situation with water source without power grid.</td> </tr> <tr> <td>Brief description of technology</td> <td colspan="3">Adopt photovoltaic power generation to directly supply power to water pump, and apply frequency conversion technology to regulate and control working condition of pump to adapt the change of sunlight. The photovoltaic pump system can be generally used for various water lifting situations, completely automatic operation, and is the cost-optimal water lifting technology. The key equipment is the controller inverter of photovoltaic pump, and the support equipment includes conventional photovoltaic modules, AC water pump, pipeline and valve.</td> </tr> <tr> <td>Technical information</td> <td colspan="3">System lift, pipeline distance, daily amount of water lifting, power of water pump, power of water pump controller inverter and power of photovoltaic array. The volume of water pump is in direct proportion to the power of water pump, greater power, greater volume</td> </tr> <tr> <td>Business application situation</td> <td colspan="3">1. Shangri-La development zone water pump of 74kW. 2. Chijiu Town in Fumin County, water pump of 7.5kW. 3. Deju Town in Midu County, water pump of 48.5kW. 4. Tacheng Town in Weixi County, water pump of 82kW.</td> </tr> <tr> <td>Service conditions</td> <td colspan="3">Combine the market transactions with local investment. The photovoltaic pump system technology is comparative maturity, though the improvement space is still large; Currently, the technology is mature and safe. It needs system training to satisfy system installation requirements. Compare to new erection of power grid, the cost of installation, use and maintenance is lower.</td> </tr> </table>	QR code				Technology provision unit	Yunnan Zhuoye Energy Co., Ltd.	Submission date	August 3, 2016	Contact person	Liu Zuming	Technology type	Other solar energy utilization technology	Tel.	13608875405	E-mail	zmliupv@126.com	Technology name	Photovoltaic pump system technology			Technology provider	The photovoltaic pump system technology that Yunnan Zhuoye Energy Co., Ltd owns independent intellectual property has stronger design, customization equipment manufacture and engineering construction capacity.			Scope of application	The photovoltaic pump technology is used for water lifting situation with water source without power grid.			Brief description of technology	Adopt photovoltaic power generation to directly supply power to water pump, and apply frequency conversion technology to regulate and control working condition of pump to adapt the change of sunlight. The photovoltaic pump system can be generally used for various water lifting situations, completely automatic operation, and is the cost-optimal water lifting technology. The key equipment is the controller inverter of photovoltaic pump, and the support equipment includes conventional photovoltaic modules, AC water pump, pipeline and valve.			Technical information	System lift, pipeline distance, daily amount of water lifting, power of water pump, power of water pump controller inverter and power of photovoltaic array. The volume of water pump is in direct proportion to the power of water pump, greater power, greater volume			Business application situation	1. Shangri-La development zone water pump of 74kW. 2. Chijiu Town in Fumin County, water pump of 7.5kW. 3. Deju Town in Midu County, water pump of 48.5kW. 4. Tacheng Town in Weixi County, water pump of 82kW.			Service conditions	Combine the market transactions with local investment. The photovoltaic pump system technology is comparative maturity, though the improvement space is still large; Currently, the technology is mature and safe. It needs system training to satisfy system installation requirements. Compare to new erection of power grid, the cost of installation, use and maintenance is lower.		
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TECHNOLOGY: SOLAR

COMPANY: YUNNAN ZHUOYE ENERGY CO., LTD

	Contact person of business application unit /Tel. /E-mail	1. Shangri-la Li Xuezhong, 13988709970. 2. Fumin County Yan Daokui, 13529239897. 3. Midu County Liu Jiqiang, 13987274708. 4. Weixi County Li Weiguo, 13988749866.
	Investment on equipment	Investment of the newly increased equipment and other accessory equipment necessary to reform the existing engineering. Indicate engineering scale (within 500 words) The investment scale of photovoltaic pump system depends on system scale. For equipment investment, generally, the investment amount for 1kW photovoltaic module system is 10,000-13,000 Yuan, and changes of pipeline and pool machine are great, specifically depends on construction conditions and scale. Small scale system only needs several ten thousand Yuan, general scale system needs over one hundred thousand Yuan, and large scale system needs over ten million Yuan. The new system needs to include water pump, photovoltaic pump controller inverter, photovoltaic array, machine room, pipeline, pool, etc.. Reforming of existing pump station usually needs to input water pump, photovoltaic pump controller inverter, photovoltaic array and other original facilities available.
	Operation maintenance cost	Once the photovoltaic pump system established, there will be no electric charges, completely automatic operation. The operation maintenance cost is the minimum. Only need one person to manage, but the workload is only equivalent to work one day a week, and the wage level depends on local wage level. The main task is to clean the surface of photovoltaic module (if necessary) or array site, and check whether the water pump, valve, etc. work normally. Equipment depreciation cost, repair cost, management cost, etc.; The service life of water pump depends on the type, and the service life of common immersible pump is 3-5 years, routine non-immersible multiple-stage centrifugal pump is 20-30 years, and change blade when necessary; The design of water pump configuration is very important, and it needs to design a technical scheme with minimum subsequent operation and maintenance costs. The service life of photovoltaic pump controller inverter is 10 years, and the electrolytic capacitor needs to be changed; Sometimes, there may be some minor flaws, and the maintenance cost is very low. The service life of qualified photovoltaic module is over 25 years, without repair costs, in addition to damage.
	Investment payback period	Compared to conventional power grid water pump system, if costs for erection of power grid exceed the investment of photovoltaic power, then there is no payback period. Generally, the power grid erection costs plus electric costs for 3-6 years will exceed the investment in photovoltaic power, and specific circumstances depend on electricity price and costs of power grid erection. Compared to conventional diesel pump, it has overwhelming advantages, and usually it can withdraw the investment within 3 years. If consider economic benefits of planting and breeding, usually it can withdraw the investment within 1-2 years. The photovoltaic pump, with remarkable economical benefits, is the key technological means to overcome poverty and achieve prosperity in rural area.

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	Other earnings	The photovoltaic pump uses renewable energy power to generate electricity, which reduce carbon emission, not only with the benefit of power generation to save cost, but also with irrigation guarantee due to generation of water; Obviously increase the output value of agricultural and sideline products, enhance the value of land, promote local employment and development of local agricultural and sideline products processing industry, accelerate increase of local revenue, and it is a good technology to promote local comprehensive development.
	Technology occupancy	Currently, there are about over 120 photovoltaic pump systems has been established in Yunnan, among which, 75 systems are established by Yunnan Zhuoye Energy Co., Ltd., market occupancy in Yunnan about 60%, in domestic market about 40%. It is the enterprise that completes most actual engineering at present, and compared to counterparts at home and abroad, it possesses stronger design capacity, equipment customized production and construction capacity, with international advanced level of core control technology.
	Technology market potential	The output value of photovoltaic pump system of Yunnan Zhuoye Energy Co., Ltd was over 3 million Yuan in 2014, 10 million Yuan in 2015, and may exceed 20 million Yuan in this year. It can be seen for rapid development. As the above scale is obtained only under the development of Yunnan market, it will rapidly develop and expects that the output value in 2020 is to be up to 0.2b Yuan above in the event of development of overseas market.
	Technology advancement	<p>Having to tail after the changes of the sun and maximize the efficiency therein is the core to control of photovoltaic pump.</p> <ol style="list-style-type: none"> (1) It can realize perfect design and manufacturing equipment in customization for actual system. (2) It is higher for the efficiency of maximum dynamic power tracing 20% than that of the routine variable voltage tracing at home and abroad. (3) It has a higher capability to answer the sun cataclysm, significantly reducing the danger to water hammer effect. (4) Intelligent control technology for multi-pump: It is in variable frequency operation by switching single pump, double pump or multi-pump in the light of light intensity, significantly increase the system efficiency. (5) Remote monitoring technology (6) The application of more types of pump is carried out in the photovoltaic pump system, and creatively solves the issues on certain special pumps to be applied therein. High-pressure plunger pump with high power is, first at home and abroad, applied in photovoltaic pump system. (7) It has realized the photocrosslinking parallel for photovoltaic pump first at home and abroad. <p>The paper issued by the Company was rated as excellent in the 13th China Photovoltaic Conference in September 2013, as key new product of Yunnan in 2013, and as the top 10 progresses of science and technology of Yunnan in 2013 by Yunnan Provincial Science and Technology Department and Yunnan Branch Office of Xinhua News Agency in February 2014. In June 2014, it got the “2014 Leading Technology Bluesky Award with Most Investment Value in the Global Renewable Energy” issued by UNIDO.</p>

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	Technology maturity	<p>The most advanced method is to first determine whether the local solar energy resources are abundant, water sources are suitable, requiring in no way dry up in dry season; net lift (elevation difference); Pipeline distance daily water demand; is there any place to install photovoltaic array in the vicinity of water source? (No sun shield); the local conditions to construct high-level pool, stable geology or not, etc. Obtaining the above parameters is available to design a complete technical scheme, thus manufacturing equipment in customization, according to the scheme, then installing and commissioning equipment as part of the whole works. It can also sell standardized products, and the users can complete the design and installation and commissioning of equipment and supporting facilities.</p> <p>However, as the design capacity is important, it will waste the investment for large designed system; and fail to meet the application and pump water possibly for small designed system. Yunnan Zhuoye Energy Co., Ltd. has been in capability to production and R&D of key units for photovoltaic components and photovoltaic pump control inverter, as the one is unique in photovoltaic pump manufacturing enterprises at home and abroad.</p> <p>The photovoltaic pump is as a mature technology although having the space to technology development. The development in the combination of pump and photovoltaic power generation, all as mature technology, has been for 20 years internationally and 11 years in China. Our country has started to research and develop the technology since 2011, obtained a series of breakthrough in the core control technology, and still been in progress. It currently has built 75 actual engineering systems, repeatedly refreshes the world records of pump lift and scale for photovoltaic pump, with the advanced world level in technology, which make the foreign experts impressed upon their field visit in good effect on actual system operation.</p>
	Technology applicability	<p>The photovoltaic pump applies to the areas with good solar energy resources, water source while higher extension costs in water lifting, no electricity or power grid. The restricted conditions seeing from this are: solar energy resources, water source and power grid condition. Additionally, it is required to construct the site of photovoltaic array in the vicinity of water source point. Construction can be carried out after meeting these conditions. As the scale has an effect on the investment benefits, it is good generally to the benefit of small scale, and the greater distance required for the larger scale, the better economic benefit. The upstream and downstream technologies have no significantly effect on photovoltaic pump.</p>
	Technology stability	<p>In running, photovoltaic pump technologies are stable, not sensitive to the environment, technical parameters and other interferences. Of course, it is required that the systems must be constructed in the areas with stable geology when carrying out site selection for construction.</p>
	Technology safety	<p>The photovoltaic pump technologies are very practical, safe and the most economical water lifting technology on the premise of power grid erecting as required currently. The supporting water conservancy facilities are routine technologies, and the various regions have been in good capability to construct, perfectly. The multiplicative output value of Yunnan Zhuoye Energy Co., Ltd. in Yunnan market in the recent two years is obtained from the spontaneous market environment without special government support, which fully describes the good market acceptability with small risks. Multiple photovoltaic pump systems currently built</p>

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		<p>in Sichuan adjacent to Yunnan do not meet the acceptance standards due to the limits in their design level and manufacturing capacity, which is under suspicions of customers. This attributes to technical level rather than market risk. For the booming market demands of Yunnan, it fully describes the maturity and smaller market risk of this technology.</p>
	<p>Obstacle in achievement transformation and promotion</p>	<p>The promotion of photovoltaic pump technology is mainly limited by fund and people’s awareness. Generally, the one-off investment of photovoltaic pump is slightly large but economic under the conditions of greater distance from the power grid, paying for electricity upon its completion and having lower operation and maintenance cost. One important limitation for the Owner with financial strain is the higher funds. In the awareness, people are concerned if photovoltaic pump as the high technology is reliable and not mature; has a higher operation and maintenance cost, etc. For another limitation, photovoltaic pump has a special design with a certain difference from the routine pump. It seems not to involve how to design a qualified photovoltaic pump system for both current domestic and foreign standards, and such knowledge is obtained gradually from the practices in continuous 6 years and not yet universal, thus the talent cultivation is essential as well. As more constructions of actual photovoltaic pump systems, people's cognition will be gradually improved. The people in Yunnan currently start to request actively for construction of photovoltaic pump, but in misunderstanding and even rejection when we promoted, absolutely different from 3 years ago. They find us actively and hope to construct photovoltaic pump systems as soon as possible with our assistance.</p>
	<p>Transfer of intellectual property</p>	<p>Yunnan Zhuoye Energy Co., Ltd. has the proprietary intellectual property in photovoltaic pump technologies, currently having a utility model patent, applying for two invention patents, and having 6 technical know-hows. All the technologies are own and equipment is domestic. At present, it mainly carries out product sales but not technical transformation.</p>


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 COMPANY: YUNNAN ZHUOYE ENERGY CO., LTD

Photo
 Caption



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Declaration of renewable energy technology achievement				
CCE Oasis Technology Corporation	二维码 QR code			
	技术提供单位 Unit provided technology	中清能绿洲科技股份有限公司 CCE Oasis Technology Corporation	提交日期 Submit date	2016-07-29
	联系人 Contact person	任美洁 Ren Meijie	技术类型 Technology type	太阳能利用技术 Solar energy utilization technology
	电话 Telephone	18910177397	邮箱 Mail box	Renmeijie@cecsolar.com
	技术名称 Technology name	光伏农业大棚技术 Photovoltaic agricultural greenhouse technology		
	技术提供方 Technology provider	中清能绿洲科技股份有限公司 CCE Oasis Technology Corporation		
	适用范围 Scope of application	中清能绿洲科技股份有限公司 CCE Oasis Technology Corporation		
	技术简要说明 Brief description of technology	农业光伏连栋玻璃温室技术，将光伏技术与农业技术相结合，温室顶部铺设太阳能光板，下部空间从事农业生产。在不改变原有土地农业属性的前提下，进行土地综合利用。		

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		The multi-span glass greenhouse technology of photovoltaic agriculture combines the photovoltaic technology with the agricultural technology, with the top greenhouse laying solar panels, and the lower part space engaging in agricultural production. Under the premise of without changing the original agricultural land property, realize the comprehensive utilization of land.
技术信息 Technology information		四周檐高4.0米, 跨度9.6米*4跨=38.4米, 间距4米*8间=32米, 面积: 1228.8平米 The eaves height all around is 4.0 m, with the span of 9.6 m × 4 spans = 38.4 m, the spacing 4 m × 8 rooms = 32 m, the area:1228.8 m ²
商业应用情况 Situation of business application		山东省聊城莘县20兆瓦农业科技示范园·地址: 山东省聊城市莘县王家庄镇·建设面积937平米, 经济效益与社会效益显著 20MW agricultural science and technology demonstration garden in Shen County, Liaocheng, Shandong, and address: Wangjiazhuang Town, Shen County, Liaocheng, Shandong, with the construction area of 937 m ² , and the economic benefit and social benefit is remarkable.
使用条件 Service conditions		中清能农业投资股份有限公司/马志强/18910177390/mazhiqiang@ccesolar.com.cn CCE Agricultural Investment Limited Liability Company/Ma Zhiqiang/18910177390/mazhiqiang@ccesolar.com.cn
商业应用单位联系人 /电话/邮箱 The contact person/telephone/mail box of business application unit		使用范围广泛·日照充足地区均可使用。确定一片地势平坦土地·按照施工建设图纸进行建设·本技术已广泛用于中国大部分地区·无需系统培训·安装建设成本1000元/平米, 使用和维护成本低·200元/平米。 It can be used in areas with a wide using range and abundant sunshine. Determine a flat land and build according to the construction drawings; this technology has been widely used in most areas of China, without system training, with the installation construction cost of 1000 Yuan/m ² ; the use and maintenance cost is low, 200 Yuan/m ² .
设备投资 Equipment investment		安装建设成本1000元/平米, 使用和维护成本低·200元/平米 Installation and construction cost is 1000 Yuan/m ² , and the use and maintenance cost is low, 200 Yuan/m ²
运行维护费用		设备正常进行维护费用一年20万元。

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Operating maintenance charge	The cost for normal equipment maintenance is 200,000 Yuan/year.
投资回收期 Investment recovery period	投资回收期8年 The investment recovery period is 8 years.
其它收益 Other revenues	农业观光旅游可以作为额外经济收益，包含养老、保健、素质拓展、农业观光、农业培训和高科技展示等 Agricultural tourism can be used as additional economic benefits, which includes pension, health care, quality development, agricultural tourism, agricultural training, and high-tech display and so on.
技术占有率 Occupancy of technology	光伏农业同行业使用占有总市场份额的10% Photovoltaic agriculture employ occupies 10% of the total market share of the same industry
技术市场潜力 Technology market potential	该项技术，从10年前已经开始使用，并逐步走向成熟，市场的占有率逐年增长，技术的应用越发广泛，具有引领同行十年以上的优势 The technology has been started to use from 10 years ago, and gradually mature, the market share increases year after year, the technology is more widely used, with the leading peer advantage of more than ten years
技术先进性 Technology advancement	由于我国是农业大国，光伏与农业相结合，与玻璃温室相结合，已成为我国独特的光伏发展模式，并已具有很广阔的市场前景，并在国内发电行业处于领跑者地位。 Since China is a large agricultural country, the combinations of photovoltaic and agriculture, photovoltaic and glass greenhouse have has become our unique photovoltaic development mode, has a very broad market prospects, and is in the leader position of the domestic power generation industry
技术成熟度 Technology maturity	光伏发电行业技术已经趋于完善，农业温室大棚技术也获得广泛应用，二者技术结合在一起已经有十年时间，共同使用技术趋于完善。 Photovoltaic power generation industry technology has become more and more complete, agricultural greenhouse technology has also been widely used, the combination of the two technologies has been for ten years, and the common use of technology approached perfection.

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	<p>技术适用性 Technology applicability</p>	<p>该技术在国内·转化成实用技术已经成功·推广面越来越大·几乎涵盖中国所有省份·工艺技术可以满足大部分地区的要求, 只需地势平坦·光照条件好的地区均可使用。</p> <p>The transformation into practical technology of this technology has made a success in domestic, the promotion area is getting more and more large, almost covering all provinces in China, the process technology can meet the requirements of the most areas, as long as the land is flat, the light condition is good, it can be used.</p>
	<p>技术稳定性 Technology stability</p>	<p>此技术在工程运行过程中基本保持稳定状态, 此技术自身属于一套成熟的系统·基本不会因外界的干扰破坏系统架构。</p> <p>This technology can basically keep stable state in the process of project operation; this technology itself belongs to a set of mature system, which won't basically damage the system architecture because of outside interference.</p>
	<p>技术安全性 Technology security</p>	<p>本技术在国内已经实现产业化·无需再转化·得到市场广泛认可和使用。</p> <p>This technology has realized industrial in domestic, needs not to be transform, to be widely recognized and used in the market.</p>
	<p>成果转化推广障碍 Obstacle on achievement transformation and promotion</p>	<p>该项技术对于在国内表现来年, 对于个人来说·投资成本高, 效益回收期长是最大障碍。</p> <p>Based on the domestic performance of this technology, high investment cost and long payback period for individuals is the biggest obstacle.</p>
	<p>知识产权转让 Transfer of intellectual property</p>	<p>无国内自主知识产权·全部实现国产化·无技术产权转让风险。</p> <p>No domestic independent intellectual property rights, all to achieve domestication, without transfer risk of technical property.</p>
<p>Declaration of renewable energy technology achievement</p>		

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二维码 QR code			
技术提供单位 Unit provided technology	中清能绿洲科技股份有限公司 CCE Oasis Technology Corporation	提交日期 Submit date	2016-07-29
联系人 Contact person	任美洁 Ren Meijie	技术类型 Technology type	太阳能利用技术 Solar energy utilization technology
电话 Telephone	18910177397	邮箱 Mail box	Renmeijie@cecsolar.com
技术名称 Technology name	光柴互补发电系统 Solar-diesel complementary power supply system		
技术提供方 Technology provider	中清能绿洲科技股份有限公司 CCE Oasis Technology Corporation		
适用范围 Scope of application	中清能绿洲科技股份有限公司 CCE Oasis Technology Corporation		
技术简要说明 Brief description of technology	光柴系统由三部分组成：光伏发电部分，柴油机组和微电网智能控制系统。光伏电站和1柴油发电机组联合供电，采用先进的智能化复合能源供给控制系统实时动态调节太阳能光伏系统和柴油机同步输出，支持光伏发电优先输出，最大能解决能源供给问题。 The photovoltaic diesel system consists of three parts: Photovoltaic power parts, diesel engine set and micro-grid intelligent control system. Power is supplied by photovoltaic power station together with		

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		diesel generating set 1. Use advanced and intelligent multiple energy sources supply and control system to real-timely and dynamically adjust the sync output of solar photovoltaic system and diesel engine, which supports PV power's preferential output to better solve energy problem.
技术信息 Technology information		1MW项目占地约20亩，1块光伏电池电压36V，电流8A。 1 MW project covers an area of 20 mu, with one photovoltaic battery voltage of 36 V, current of 8 A.
商业应用情况 Situation of business application		马尔代夫Thinadhoo岛558kW光柴互补微网示范工程 Maldives Thinadhoo Island 558kW solar-diesel complementary micro-grid project
使用条件 Service conditions		
商业应用单位联系人 /电话/邮箱 The contact person/telephone/ mail box of business application unit		项目条件为当地投建，建设周期短、建设难度低、&ldquo寿命&rdquo；长，此技术成果属于国内领先，使用者需要简单的培训，维护成本低。 Project conditions are local investment and construction with short construction period, less construction difficulty and long "operating life", this technological achievement is the leader in domestic, users need a simple training, low maintenance costs.
设备投资 Equipment investment		单瓦造价约为RMB18元 Single watt costs about RMB 18 Yuan
运行维护费用 Operating and maintenance charge		后期运维费用约占总投资额的1.5% The late operation and maintenance cost accounts for about 1.5% of the total investment amount.
投资回收期 Investment recovery period		投资回收期6年 The investment recovery period is 6 years.

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<p>其它收益 Other revenues</p>	<p>此项目技术针对降低碳排放、当地节能减排指标及碳交易都起到相当重要的作用。 The project technology has played a quite important role in reducing carbon emission, local energy conservation and emission reduction indexes as well as the carbon trading.</p>
<p>技术占有率 Occupancy of technology</p>	<p>在国内行业同类技术市场占有率50% Accounting 50% of the similar technology in domestic industry</p>
<p>技术市场潜力 Technology market potential</p>	<p>海岛等远离大电网地区普遍采用柴油发电机组供电的方式，然而油价日趋走高，外加其运输成本，使得越来越多经济性更好的供电方式被考虑加入其中来减少燃油成本。尤其以光伏发电为代表的供电方式，因其具有可分布式安装的特点，而且设备成本日趋下降，近能越来越多的太阳能发电系统通过并网到岛屿电网的方式提供部分电能。 Diesel generating sets are widely used for power supply in places which is far away from bulk power systems area, such as island. But with oil prices going high besides its transportation cost, more and more economical power supply mode are being considered about to reduce fuel cost. Especially the power supply method which is takes photovoltaic power generation as the representative. Because of it feature of distributed installation and gradually decreasing equipment cost, in recent years, more and more solar power systems can provide part of power by connecting to island distribution network.</p>
<p>技术先进性 Technology advancement</p>	<p>在实际示范工程中，依靠扎实的工程实践经验设计光柴互补系统。在国内外我们有多处示范项目，处于国内领先水平。 In the actual demonstration project, design the light and diesel complementary power generation system based on solid engineering practical experiences. We have a number of demonstration projects in domestic and foreign country, and in the leading position.</p>
<p>技术成熟度 Technology maturity</p>	<p>光柴系统由三部分组成：光伏发电部分，柴油机组和微电网智能控制系统。光伏电站和I柴油发电机组联合供电，采用先进的智能化复合能源供给控制系统实时动态调节太阳能光伏系统和柴油机同步输出，支持光伏发电优先输出，最大能解决能源供给问题。现阶段项目技术已经非常成熟。 The photovoltaic diesel system consists of three parts: Photovoltaic power parts, diesel engine set and micro-grid intelligent control system. Power is supplied by photovoltaic power station together with diesel generating set 1. Use advanced and intelligent multiple energy sources supply and control system</p>

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		to real-timely and dynamically adjust the sync output of solar photovoltaic system and diesel engine, which supports PV power's preferential output to better solve energy problem. The project technology is very mature at the present stage.
技术适用性 Technology applicability	该技术推广过程中适用于远离电网、用电量需求大及能源匮乏的地域。基本不受地域、规模、环境等因素限制。 This technology is suitable to areas that are far away from the power grid, with large demand for power consumption and lack of energy promotion in the process of promotion. Basically free of territory, scale, environment and other factors.	
技术稳定性 Technology stability	此技术在工程运行过程中基本保持稳定状态，此技术自身属于一套成熟的系统，基本不会因外界的干扰破坏系统架构。 This technology can basically keep stable state in the process of project operation; this technology itself belongs to a set of mature system, which won't basically damage the system architecture because of outside interference.	
技术安全性 Technology security	近三年，此项技术运用在不同国家、不同地区、不同环境内，都带来了良好社会效益、经济效益。现阶段项目技术成熟、配套设施完善、市场反响良好。 In recent three years, the technology has been used in different countries, different regions and different environment, which has brought good social benefits and economic benefits. At this stage, the project technology is mature, supporting facilities are perfect and market response is good.	
成果转化推广障碍 Obstacle on achievement transformation and promotion	1. 项目实施地政府时候有财政补贴 2. 前期投资额度较大 1. The government has financial subsidies when the project implements. 2. Larger early investment quota	
知识产权转让 Transfer of intellectual property	有相关知识产权，可以通过合作模式进行项目实施 With the related intellectual property, the cooperation pattern can be adopted for the project implementation.	电优先输出 术已经非常成 需求大及能源 因素限制。 此技术自身 破坏系统架



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	<p>图片说明 Photo caption</p>	
	<p>技术先进性: Technology advancement :</p>	<p>在实际示范工程中，依靠扎实的工程实践经验设计水光储互补发电系统。在国内外我们有多处示范项目，处于国内领先水平。</p> <p>In the actual demonstration project, design the water and light storage complementary power generation system based on solid engineering practical experiences. We have a number of demonstration projects in domestic and in the leading position.</p>
	<p>技术成熟度: Technology maturity:</p>	<p>水光储互补系统的电池组连接双向储能逆变器，光伏方阵通过光伏并网逆变器连接在储能逆变器的交流母线上，实现系统的交流母接。在储能逆变器（储能变流器）正常工作，输出交流频率与电压，建立交流电网后，光伏阵列所产生的能量将通过光伏并网逆变器输送到交流电网上，或为蓄电池组充电或为系统负载供应电能。光伏储能电站与水电站联网并网，实现水光互补电站的并网运行。光伏电站与水电站均可独立运行，亦可并网运行。实行并网后，通过系统EMS能源管理系统的控制，可以合理地发电、储电及负荷管理。</p> <p>The battery set of water and light storage complementary system connected with bidirectional energy storage inverter, the photovoltaic array connected with AC bus of energy storage inverter through photovoltaic grid-connected inverter to realize the system bus connection. After the energy storage inverter (energy storage converter) works normally, exports AC frequency and voltage, establishes AC network, the energy produced by the photovoltaic array will be transported to AC network through photovoltaic grid-connected inverter, or charge the storage battery or supply power for the system load. The photovoltaic energy storage power station and hydraulic power station can interconnect and merge with each other, which can realize the parallel operation of water-optical complementary power station. The photovoltaic power station and hydropower station can operate independently, and can be parallel operation as well. After the implementation of grid connection, it can reasonably generate power, storage power and manage load through the control of the system EMS energy management system.</p>
	<p>技术适用性： Technology applicability:</p>	<p>该技术推广过程中适用于远离电网、用电量需求大及能源匮乏的地域。基本不受地域、规模、环境等因素限制。</p>

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		This technology is suitable to areas that are far away from the power grid, with large demand for power consumption and lack of energy promotion in the process of promotion. Basically free of territory, scale, environment and other factors.
技术稳定性： Technology stability:		此技术在工程运行过程中基本保持稳定状态，此技术自身属于一套成熟的系统，基本不会因外界干扰破坏系统架构。 This technology can basically keep stable state in the process of project operation; this technology itself belongs to a set of mature system, which won't basically damage the system architecture because of outside interference.
技术安全性： Technology security:		近三年，此项技术运用在不同国家、不同地区、不同环境内，都带来了良好社会效益、经济效益。现阶段项目技术成熟、配套设施完善、市场反响良好。 In recent three years, the technology has been used in different countries, different regions and different environment, which has brought good social benefits and economic benefits. At this stage, the project technology is mature, supporting facilities are perfect and market response is good.
成果转化推广障碍： Promotion obstacles of achievements transformation:		1. 项目实施地政府时候有财政补贴 2. 前期投资额度较大 1. The government has financial subsidies when the project implements. 2. Larger early investment quota
知识产权转让： Transfer of intellectual property		有相关知识产权，可以通过合作模式进行项目实施 With the related intellectual property, the cooperation pattern can be adopted for the project implementation.
图片说明： Photo caption:		
上传附件： Uploading appendix:		



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技术提供单位：	中清能绿洲科技股份有限公司
Technology supply unit:	CCE Oasis Technology Corporation
联系人：	任美洁 提交日期：2016-07-29
Contact person:	Ren Meijie Submission date: July 29, 2016
技术类型：	太阳能利用技术 具体技术：分布式光伏相关技术
Technology type:	Solar energy utilization technology Specific technology :Distributed photovoltaic related technologies
电话：	18910177397 邮箱： renmeijie@cecsolar.com
Telephone:	18910177397 Email:renmeijie@cecsolar.com
技术名称：	水/光/储多能互补发电系统
Name of technology：	Water / light / storage multi energy complementary power generation system
技术提供方：	中清能绿洲科技股份有限公司
Technology provider:	CCE Oasis Technology Corporation
适用范围：	光伏发电领域
Range of application:	Photovoltaic power generation sector
技术简要说明：	<p>光伏储能电站与水电站联网并网，实现水光互补电站的并网运行。光伏电站与水电站均可独立运行，亦可并网运行。实行并网后，通过系统EMS能源管理系统的控制，可以合理地发电、储电及负荷管理</p> <p>The photovoltaic energy storage power station and hydraulic power station can interconnect and merge with each other, which can realize the parallel operation of water-optical complementary power station. The photovoltaic power station and hydropower station can operate independently, and can be parallel operation as well. After the implementation of connecting, it can reasonably generate power, storage power and manage load through the control of the system EMS energy management system.</p>
Brief description of technology:	

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<p>技术信息： Technology information:</p>	<p>1MW项目占地约20亩，1块光伏电池电压36V，电流8A。 1 MW project covers an area of 20 mu, with one photovoltaic battery voltage of 36 V, current of 8 A.</p>
<p>商业应用情况： Commercial application:</p>	<p>青海玉树治多2.4MW水/光/储多能互补微网示范工程 2.4MW water / light / storage multi energy complementary microgrid demonstration project (Zhiduo, Yushu, Qinghai)</p>
<p>使用条件： Use conditions:</p>	<p>项目条件为当地投建，建设周期短、建设难度低、“寿命”长，此技术成果属于国内领先，使用者需要简单的培训，维护成本低。 Project conditions are local investment and construction, short construction period, less construction difficulty and long “operating life”, this technology is the leader in domestic, users need a simple training, low maintenance costs.</p>
<p>商业应用单位联系人/电话/ 邮箱： Business application unit contact / phone / email:</p>	
<p>设备投资： Equipment investment:</p>	<p>单瓦造价约为RMB 18元 Single watt costs about RMB 18 Yuan</p>
<p>运行维护费用： Operating and maintenance charge:</p>	<p>后期运维费用约占总投资额的1.5% The late operation and maintenance cost accounts for about 1.5% of the total investment amount.</p>
<p>投资回收期： Investment recovery period:</p>	<p>投资回收期6年 The investment recovery period is 6 years.</p>
<p>其它收益： Other earnings:</p>	<p>此项目技术针对降低碳排放、当地节能减排指标及碳交易都起到相当重要的作用。</p>

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		The project technology has played a quite important role in reducing carbon emission, local energy conservation and emission reduction indexes as well as the carbon trading.
技术占有率： Technology share:		在国内行业同类技术占有率40% Accounting 40% of the similar technology in domestic industry
技术市场潜力： Technology market potential:		以光伏发电为代表的供电方式，因其具有可分布式安装的特点，而且设备成本日趋下降，近年越来越多的太阳能发电系统通过并网到岛屿电网的方式提供部分电能。 Use photovoltaic power generation to supply power. Because of it feature of distributed installation and gradually decreasing equipment cost, in recent years, more and more solar power systems can provide part of power by connecting to island distribution network.
企业供给信息 注：带*的为必填项 Enterprise supply information note: With * is required		
供应技术名称： Supplied technology name:		*水/光/储多能互补发电系统
供应技术名称(英文)： Supplied technology name (English):		* Water / light / storage multi energy complementary power generation system
所属领域： Subordinate territory:		*新能源与节能技术
所属领域(英文)： Subordinate territory (English):		*New energy and energy-saving technology
研发方式： Research and development approaches:		*自主研发 Independent research and development
知识产权状态：		申请或获得的专利名称 *一种基于光储逆变器的家庭能效管理系统及方法

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<p>State of the intellectual property</p>	<p>Applied or obtained patent name *A family energy efficiency management system and method based on optical record inverter.</p>
<p>合作方式 : Ways of cooperation:</p>	<p>合作研究 * Cooperative study *</p>
<p>技术产品描述 : Description of technology product:</p>	<p>建设光伏储能电站，建成后联合水电站一起为缺电地区供电，解决该地区的生活用电不足问题。在电网覆盖后该系统还将继续并入电网。</p>
<p>技术产品描述(英文) : Description of technology product (English):</p>	<p>Build a photovoltaic energy storage power station. After its completion, it will supply power-deficient regions with hydropower station to solve their electricity-lacking problem. The system will be continually connected to power grid after the grid is covered.</p>
<p>简要说明 : Brief description:</p>	<p>光伏电站系统采用智能监控设计，以满足光伏电站与水电站通过EMS能源管理平台进行互补联网供电的模式，系统通过智能电网建设，进行负载分级，根据电站的发电情况及储能情况，可以分级控制各支路的电力供应，保证关键负载的长时间运行，将有效地解决缺电地区的电力供应紧张的局面。</p>
<p>简要说明(英文) :</p>	<p>Intelligent monitoring is used in photovoltaic power station system to meet complementary interconnected power supply mode of photovoltaic power station and hydropower station through EMS energy management platform. Smart power grids are built for step load, the system can control the power supply of every branch according to generation and storage condition to effectively improve the tense situation of power lacking.</p>
<p>企业供给信息 注：带*的为必填项 Enterprise supply information note: With * is required</p>	
<p>供应技术名称 : Supplied technology name:</p>	<p>*光柴互补发电系统</p>
<p>供应技术名称(英文) :</p>	<p>* Solar-diesel complementary power supply system</p>

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	<p>Supplied technology name (English):</p>	
<p>所属领域:</p> <p>Subordinate territory:</p>	<p>*新能源与节能技术</p>	
<p>所属领域(英文):</p> <p>Subordinate territory (English):</p>	<p>* New energy and energy-saving technology</p>	
<p>研发方式:</p> <p>Research and development approaches:</p>	<p>*自主研发</p> <p>Independent research and development</p>	
<p>知识产权状态:</p> <p>State of the intellectual property</p>	<p>申请或获得的专利名称 *一种微网型光伏柴油混合供电系统的运行调度方法</p> <p>Applied or obtained patent name * Operation of a micro-grid photovoltaic diesel power generation station</p>	
<p>合作方式:</p> <p>Ways of cooperation:</p>	<p>合作研究 *</p> <p>Cooperative study *</p>	
<p>技术产品描述:</p> <p>Description of technology product:</p>	<p>光柴系统由三部分组成：光伏发电部分，柴油机组和微电网智能控制系统。</p>	
<p>技术产品描述(英文):</p> <p>Description of technology product (English):</p>	<p>The photovoltaic diesel system consists of three parts: Photovoltaic power parts, diesel engine set and micro-grid intelligent control system.</p>	
<p>简要说明:</p> <p>Brief description:</p>	<p>光柴互补微网整体架构为交流母线设计，光伏发电部分每个单元分别配备一台光伏输出功率控制器，用于控制光伏端的逆变器输出功率，同时每个地点的光伏单元、柴油发电机单元配备一个数据采集器，用于采集各个发电单元的实时功率、电压频率和相位等参数，最后将数据汇总于微电网中央控制器处，微电网中央控制器将汇总的信息按照特定逻辑计算</p>	


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		<p>出结果后将所发指令反馈至光伏输出功率控制器，光伏输出功率控制器对逆变器进行调节·从而达到保证微电网稳定和延长柴油机组寿命前提下最大化减小柴油的消耗量。</p>
	<p>简要说明(英文) : Brief description (English):</p>	<p>The overall structure of solar-diesel complementary micro-grid is AC bus. Equip every unit of photovoltaic power generation with a photovoltaic output power controller to control inverter's output power on photovoltaic end; at the same time equip PV cells and diesel generator cells of every place with a data acquisition unit to collect the parameters such as real-time power, voltage frequency and phase position of every generation unit and gather those data at micro-grid central control unit; micro-grid central control unit will calculate the gathered information and get a result and feedback the command to photovoltaic output power controller to adjust the inverter. In this way, diesel consumption is minimized on the premise of ensuring stability of micro-grid and prolonging the life of diesel engine set.</p>

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Rayspower Energy Group Co., Ltd	Renewable energy technological achievement declaration			
	Two-dimensional code			
	Company provided	Rayspower Energy Group Co., Ltd.	Submitted date	June 28, 2016
	Contact	Fu lu	Type of technology	Solar energy utilization
	Tel.	13439901118	Email	lucia.fu@rayspower.com
	Name of technology	Large-scale photovoltaic power generation technology		
	Company provided technology	Rayspower Energy Group Co., Ltd.		
	Application	Rayspower Energy Group Co., Ltd.		
	Brief introduction of technology	The photovoltaic power generation technology used solar batteries to directly transform solar energy to electric energy. The photovoltaic power generation system mainly consists of solar panel (component), controller and inverter. These three parts are made up of electric components and no mechanical parts are involved. Therefore, the photovoltaic power generation equipment is truly concise, reliable, stable and of long work life & easy installation and maintenance.		
	Technology information	The 1MW photovoltaic power station, covering an area of 40 mu (=0.0667 hectares), needs 25,152 photovoltaic modules; after completion, its annual power generation will be 1,523,060 kwh.		

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Business application status	<p>The project has been put into service and has received general consent from clients.</p> <ol style="list-style-type: none"> 1. CECEP Leping 20 MWP Photovoltaic Agricultural Science Greenhouse Power Station Project; 2. CECEP Dunhuang 50 MWP Grid Connection Photovoltaic Power Generation Project.
Working conditions	<p>CECEP (Leping) Photovoltaic Agricultural Science Co, Ltd.: 010-62277153; CECEP Solar Energy (Jiuquan) Power Generation Co., Ltd.: 010-62277153;</p>
Business application company contact person/tel./em	<p>The cooperation is made through market transaction, in which this company supplies technology, equipment, construction support and later maintenance; the whole service system has mature technology; system training needs to be done for power station management personnel after construction; installation of 1MWP needs 1.3-1.5million yuan, while cost of use and of simple cleaning and maintenance takes up 1%-3% of the total investment.</p>
Equipment investment	<p>When applying this technology to build a new project: if the total installed capacity of grid connection power generation project is 1MW, the total investment is around 9.8-11.2 million yuan, among which the one-off investment amount of main equipment and other auxiliary equipment takes up 6.06-6.93 million yuan. The detailed analysis is listed as below:</p> <p>The photovoltaic power station investment is made up of five parts, i.e., constructional engineering cost (19%), equipment procurement cost (62%), installation work cost (13%) and other costs (6%).</p> <ol style="list-style-type: none"> 1. Equipment procurement cost The equipment procurement cost mainly covers expenses for polycrystalline silicon battery pack, DC bus equipment, inverter, above-grounding engineering equipment, cables, transformer, substation equipment, communication & control equipment and other power generation equipment. 2. Constructional engineering cost The constructional engineering is mainly determined by factors such as local building material price, geology, terrain and ease of construction. 3. Installation work cost Mainly aims at installation cost for purchased equipment. 4. Other costs Other costs include survey design cost (20%), commissioning and operation cost (15%), spare parts cost (4%), construction period interest (16%) and circulating found (45%). <p>From above analysis, we can conclude that the largest investment of photovoltaic power station is equipment procurement cost, in which polycrystalline silicon battery pack takes the highest ratio.</p>

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	Operation & maintenance cost	Operation & maintenance of large scale photovoltaic grid connection power generation station mainly aims at routine inspection of mechanical installation and electrical connection, cleaning of photovoltaic parts and replacement of some parts. The annual operation & maintenance cost of the power station takes up 2% of the total investment.
	Pay back period	The total installed capacity of the photovoltaic grid connection power generation station project is 1MW, and its expected annual average line capacity in operation period is 15,230,600 kwh. With the line electricity price of 1 yuan, the direct economic benefit will be 1.5 million yuan. And the total investment of 1MW project is around 9.8-11.2 million yuan. Therefore it is concluded that the investment cost can be recovered in 7-8 years. Calculated by the 25-year operation period of the photovoltaic project, there will be 15-17 years of benefit period.
	Other benefits	Solar energy is both primary energy and renewable energy. With rich resource, it can be used free of charge and no transmission is needed. Moreover, photovoltaic power generation, as a clean energy, does not consume resource and does not discharge pollutants, waste material or greenhouse gas which damages atmosphere environment, nor create problems like waste residue stacking or waste water discharge, which is beneficial to protection of surrounding environment and improvement of ecotope. To complete the 1MW photovoltaic power station with this technology, around 397.912t standard coal is saved every year, which means discharge for several types of air pollutants is lessened, in which discharge of SO2 discharge is reduced by 15.3t, nitric oxide (calculated by NO2) by 3.28t, CO2 by 1260t, fume dust (calculated by PM10) by 0.5t and ash residue by around 138.72t.
	Technology occupation rate	Rayspower is the EPC leading role in photovoltaic power station, and will, based on development tendency of this industry, focus on expanding distributed field while keeping its advantage in above-ground power station in the future. The company has an overriding advantage in photovoltaic EPC industry and a leading comprehensive energy efficiency in power station. Moreover, it keeps stable cooperation with large state owned companies such as CECEP. Up to the end of 2015, the installed capacity of solar energy grid connection and offline power station which the company had an EPC contract or participated in construction has been around 1,200 MWP, taking up 10% of market share. It has been among the top ten of photovoltaic EPC in China from 2012 to 2015, and has become a leading role in national photovoltaic EPC field. Its projects have covered over ten areas such as Beijing, Zhejiang, Shandong, Fujian, Anhui, Yunnan, Xinjiang, Inner Mongolia and Guangxi.

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	Potential for technical market	<p>According to the scale development indicators provided by National Energy Administration, it is expected for solar energy, by the end of 2020 the installed capacity will be 0.16 billion kw, the annual power generation will be 170 billion kw, and in the 0.16 billion kw installed capacity, the total installed capacity of photovoltaic power generation covers 0.15 billion kw, taking up 94% of installed capacity of solar energy power station. That proves the photovoltaic power generation has a huge market potential.</p> <p>Current clients of Rayspower include China Energy Conservation and Environment Protection Group Solar Energy Company, China Three Gorges New Energy Co., Ltd., China Power Investment Corporation, China Huaneng Corporation, China Datang Corporation New Energy Co, Ltd. and CGN Solar Energy Development Co., Ltd. These clients have good cooperation with the company. In the future, the target market is to further develop new clients based on current clients, and to make photovoltaic power generation cover the whole country in order to increase its market share. It is expected that by 2020, our installed capacity will increase from 10% in market share to 15%.</p>
	Technical advancement	<p>Technical innovation:</p> <p>Its course transitions from traditional centralization to group pattern, accumulating data and innovation development experience for large scale photovoltaic power station.</p> <p>Adopt wireless base station communication management advantage as well as intelligent UAV inspection on photovoltaic power station;</p> <p>Adopt centralized control management system scheme, which is capable of adapting to various poor working conditions in different power grids all over the world, and of improving the grid connection performance of photovoltaic power station and of better safety and stability.</p> <p>Position and level:</p> <p>In terms of photovoltaic power station construction, Rayspower has a leading role in the same industry at home and abroad. Rayspower has been the 10th in "Top 20 of Photovoltaic Power Station in China in 2014", and has been awarded with honorary titles such as "Photovoltaic Power Station with China characteristics in 2014". In the ranking list presentation of global photovoltaic power stations in 2016 which was just finished, Rayspower was among the list of "Top 20 of China's Photovoltaic Power Station EPC Enterprise in 2016".</p>

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	Technical maturity	<p>Rayspower has its own sophisticated system integration solution in terms of large scale photovoltaic grid connection power generation station construction:</p> <p>Firstly, its course transitions from traditional concentration to group pattern. In power station construction, there is a professional design team, who designs power station based on natural conditions of construction site and client requirements, and achieves expected construction result through computer simulation.</p> <p>Secondly, fine management is adopted during power station construction. No matter it is power station scheme design or construction, the fine management can reduce as many as possible problems which may damage the power station after occurring in power station construction. And these factors also guarantee Rayspower's leading position in system integration field in the industry.</p> <p>Lastly, adopt wireless base station communication management advantage as well as intelligent UAV inspection on photovoltaic power station; In the mean time better apply centralized control management system scheme to the power station, which is capable of adapting to various poor working conditions in different power grids all over the world, and of improving the grid connection performance of photovoltaic power station and of better safety and stability.</p> <p>In a sum, the technology support system and fine service system which the company has together build the perfect power station solution, providing solutions which satisfy clients' needs.</p>
	Technical applicability	<p>The large scale photovoltaic grid connection power generation station technology from Rayspower is widely applicable to power station construction in various environments. Currently the upstream and downstream of process technology it related to has formed a complete industrial chain, providing powerful technical support for power station construction.</p> <p>The promotion of large scale photovoltaic grid connection power generation station construction are mainly influenced by climate conditions, policy and grid connection condition of the power station construction place. The climate condition in construction place determines whether the power station has construction value, which affects quantity of future power generations and amount of power station benefit; policy effect mainly reflects on support and planning which the government has for photovoltaic power station and a complete set of policy support and long term strategic planning is the guarantee of power station construction and operation; grid connection conditions mainly refer to maturity of local power system. The unstable power system makes solar energy power generation unable to connect to the grid. Therefore the electric energy transformed from solar energy cannot be made use of and the constructed power station cannot be fully utilized.</p>

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	<p>Technical stability</p>	<p>Rayspower is a professional leading enterprise in domestic solar energy power generation system integration service with mature construction service system in large scale photovoltaic grid connection power generation station. The large scale photovoltaic above-ground power stations it contracted to build cover various geological landforms such as karst landform, mud flat, desert and uncultured mountains. The distributed generation has covered business types such as photovoltaic agricultural greenhouse, combination of fishing and solar energy power generation and photo-electricity building integration . By the end of 2015, the accumulated installed capacity has been over 1,200 MW.</p> <p>For power stations which have been built, Rayspower is the first to build a photovoltaic power station in a tributary of Yangtze river. It contracts to construct the CECEP Jiaying 30 MW photovoltaic power generation “common treatment of five waters” comprehensive demonstration project, which is the first case in China. The “CGN Shanxi Datong 100 MW photovoltaic power generation project” the company constructed is the first planned project of “national advanced technology photovoltaic demonstration base photovoltaic pacemaker in mining subsidence area”; the photovoltaic power station project the company invested in Gaoyou is in stable operation with good power generation and has achieved grid connection generation and electricity charge income. The company also created the construction record of 30 MW large scale photovoltaic mud flat above-ground power station completed in 30 days. Its high-class power station performance and generation amount beyond expectation are well and unanimously received by clients such as CECEP, CGN, China Power Investment Group and Three Gorges New Energy.</p> <p>In the incoming cooperation, Rayspower large scale photovoltaic grid connection generation technology will keep its current stability and play its advantage in future power station construction.</p>
	<p>Technical safety</p>	<p>1. Technical risk It is mainly related to grid connection difficulty, system complexity and numerous procedures during photovoltaic power station construction. To control risks in the largest extent, the enterprise has designed backup schemes to be adopted. In the mean time, the company has development experience of many years and has established extensive scientific research cooperation with powerful expert support team. These advantages have lowered technical development risks for new product development.</p> <p>2. Technical application and market risk The overseas photovoltaic product producing companies and suppliers enter China market more frequently and lower cost and product price through industrial chain management strategy, which has a bad influence on profit rate of the whole photovoltaic industry. In the mean time, this also means fiercer competition for Rayspower when further expanding market share.</p> <p>3. Other risks 1) Management risk This project has a higher requirement in needed technical personnel. Therefore, there is certain risk in intellectual property and talent management. Thus, the company built a special leading group, and hired specialized project management personnel and patent management personnel to conduct full life circle management for project implementation.</p>

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		<p>2) Policy risk The photovoltaic product development which the project is related to belongs to the development research field the state fully supports, and the technology chiefly comes from self-dependent innovation from the enterprise. The project construction is in accordance with relevant policies in our new energy industry and is in favor of improving China's photovoltaic industry technology research level and is in compliance with national self-dependent innovation development strategy. Therefore, there is no policy risk.</p>		
	<p>Achievement application & promotion obstacles</p>	<p>Main problems China face in photovoltaic development are listed as below: 1. There is no national authoritative research institute and no long-term development strategy and planning, and relevant policies and specific measures are missing. 2. Lack of scientific research talents and engineering technology talents, poor and scattered research strength and poor experiment conditions; 3. The photovoltaic physics subject is in poor development, and photovoltaic material & appliances, key production equipment and testing machine rely on exporting. In order to solve above-mentioned problems effectively, on one hand, capital input and policy support needs to be enhanced, and on the other hand, develop and innovate technology actively is the key of our photovoltaic industry development, for example, focusing on developing "the third generation" photovoltaic power generation technology to lower photovoltaic system cost. But the main obstacles directly affect comprehensive application of photovoltaic technology are low transformation rate from light to electricity of solar energy batteries and high cost of system manufacturing. Therefore, the key issue for current photovoltaic technology is to improve battery efficiency and to lower cost.</p>		
	<p>Transfer of intellectual property</p>	<p>Rayspower Energy Co, Ltd. has proprietary intellectual property right in China and has obtained 265 patents with another 37 in application process. Around 60 in these patents are core patent technologies such as solar energy power station DCS and these patents have provided powerful technical support for construction of photovoltaic grid connection power generation station.</p>		
<p>Technology achievement application of renewable energy resource</p>				
	<p>Two dimension code</p>			
	<p>Technology provide company</p>	<p>Rayspower Energy Group Co., Ltd.</p>	<p>Submittal date</p>	<p>2016-06-28</p>

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Contact person	Fu Lu	Technology type	Solar energy utilization technology
Telephone	13439901118	Email	lucia.fu@rayspower.com
Technology name	Trough solar energy power generation technology		
Technology supplier	Rayspower Energy Group		
Applicable scope	Rayspower Energy Group		
Brief technology description	Take advantage of the parabolic trough mirror with spotlight characteristic to collect heat, select the device which can automatically trace the sun to receive solar energy, apply the heat tube type vacuum heat collection pipe to transmit the absorbed heat, and complete the process of solar energy power generation. The system consists of the spotlight and heat collection system, the heat transmission system, the heat storage and heat exchange system etc. Main equipments include the heat collector, the evaporator, the condenser and the cooling tower etc.		
Technology information	Trace control accuracy of the system is $\pm 0.1^\circ$; the whole optical efficiency of the beam condenser is $\geq 78\%$, the conversion efficiency from solar energy to heat is 50%, the conversion efficiency from heat to electricity is 10-15%		
Commercial application condition	<p>Demonstration effect is obvious.</p> <ol style="list-style-type: none"> 1. Research and demonstration project of state class 863 solar energy trough type heat collection and power generation technology 2. Research and demonstration project of Tianjin university "focusing solar energy distribution type composition power supply system" 		
Application conditions	None		
Contact person/telephone/e mail of commercial application company	This technology is mainly realized through trading in the market; the whole service system owns the mature technology; the management person of the power station shall be systematically trained after establishment; installation of 50MWP power station shares about 10% total investment, annual operation and maintenance cost is about 26.80 million Yuan.		
Equipment investment	When total installation capacity of the power generation project is 50MW, the total investment is about 0.1456 billion Yuan, one time investment amount of all necessary main equipments and other auxiliary equipments share 90% of the total investment, i.e., 0.131 billion Yuan. Proportion of every part in total investment as following: cost of the heat collection field shares 50%, the heat storage system and the heat transmission oil system share 22%. Engineering design and construction cost share about 10%. The turbo-generator and other power section share about 4% of the total cost.		
Operation and maintenance cost	Operation and maintenance of the power generation system mainly include cost under normal condition and unforeseen operation and maintenance cost within one year, including replacement of the reflection mirror and the HCE tube, cost of nature gas for pre-heating of the HTF system, insurance cost of the power station and cleaning cost of the reflection mirror etc. Annual operation and maintenance cost of a 50MW power station is about 26.80 million Yuan. Following calculation		

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		<p>takes 50MW as an example, annual operation and maintenance fee is:</p> <ol style="list-style-type: none"> 1. Water: 25 thousand Yuan. 2. Nature gas: 8.208 million Yuan; 3. Labor cost: 5.40 million Yuan; 4. Material cost: 7.00 million Yuan; 5. Unforeseen cost: 1.80 million Yuan; 6. Others: 4.142 million Yuan.
	<p>Investment payback period</p>	<p>If total installation capacity of the synchronization and power generation project is 50MW, the annual average on-grid electricity during operation period is forecasted as 138.70 million kwh, price of on-grid electricity is 1 Yuan/kwh, direct economical benefit is 138.70 million Yuan. Total investment of the 50MW power station is about 0.145600 billion Yuan, investment cost can be paid back within 10 to 11 years. If operation period is calculated as 25 years, it can realize benefit period of 14-15 years.</p>
	<p>Other benefit</p>	<p>Solar energy is not only one time energy source but also renewable energy source. Its resource is rich. It can be used free of charge, and it is not necessary to transport. As one clean energy source, photovoltaic power generation not only doesn't consume resource but also doesn't release pollutant and waste, it will not generate greenhouse gas to destroy atmosphere environment, it will not generate waste slag stacking, waste water drainage etc issues, it is beneficial for protection of the surroundings and improvement of ecological environment.</p> <p>For the 1MW trough type solar energy power station, this project can save standard coal about 397.912t each year, emission of several atmosphere pollutants are reduced correspondingly every year, in which emission of SO₂ is reduced 15.3 t, nitrogen oxide (calculated as NO₂) is reduced 3.28t, carbon dioxide is reduced 1.26 thousand tons, sooty (calculated as PM₁₀) is reduced 0.5t, slag discharge is also reduced about 138.72t.</p>

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	Technology occupation rate	<p>In the integration field of the solar energy trough solar thermal power station system, the large trough type solar thermal power station project which is put into operation has not built up until now, Rayspower Energy Group as the system integration company has participated in the constructions of several trough type solar heat power station demonstration projects, such as research and demonstration project of national class 863 solar energy trough type heat collection power generation technology, first solar energy solar thermal power generation comprehensive power station project in Xinjiang area, Tianjin Binhai university testing project, test project of Institute of Engineering Thermophysical, Chinese Academy of Sciences etc, which has accumulated rich construction experience and built up solid market basement for the coming national class large solar and thermal power station demonstration project. It will occupy great share during continuous development in future.</p>
	Market potential of technology	<p>According to scale development index provided by National Energy Administration of China, total installation capacity for solar energy power generation will reach 10 million kwh by end of 2020, Holding capacity of solar energy heat utilization and heat collection area will reach 0.8 billion square meter, in which share of the trough type installation capacity will share more than 80% of total heat power generation installation capacity. Construction of the trough type power station is at demonstration and popularization phase at present, several small demonstration projects have been built up, a part of scale commercial projects are also under construction.</p> <p>Rayspower Energy Group as the system integration company has participated into constructions of several trough type solar heat power station test projects, such as research and demonstration project of national class 863 solar energy trough type heat collection power generation technology, first solar energy solar heat power generation comprehensive power station project in Xinjiang area, Tianjin Binhai university testing project, test project of Institute of Engineering Thermophysical, Chinese Academy of Sciences etc, which has accumulated rich construction experience and built up solid market basement for the coming national class large solar and heat power station demonstration project.</p> <p>It is forecasted that market share of installation capacity of the trough type power station of our company will reach 15% by 2020.</p>
	Technology advantage	<p>Innovation:</p> <p>Apply the unique flexible reflection mirror of Rayspower, with the first class profile, reflection rate and endurance.</p> <p>Molten salt is applied as heat transmission and heat storage working medium, working temperature can reach 560°C. It can generate power stably for long time, which has low cost, long life and good heat exchange performance etc advantages.</p>

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		<p>The automatic sun tracing device is applied, which can trace direction of the sun accurately, and improve utilization rate of sunlight.</p> <p>The HCE tube applies the direct melt sealing connection way between metal and glass, which is equipped with the internal reflection shield protection sealing interface, and ensure life of the vacuum heat collection tube.</p> <p>Position and level:</p> <p>When no large trough solar thermal power station project has not been built up in the country, Rayspower Energy Group as the system integration company has participated into constructions of several trough type solar thermal power station test projects, which has accumulated rich construction experience during construction, its trough type power station technology has reached leading level in the similar technology in the country.</p>
	<p>Technology mature</p>	<p>Perfect process route:</p> <p>The trough type solar energy thermal power generation system mainly consists of the spotlight and heat collection system, the heat transmission system, the heat accumulation and heat exchange system, the power generation system and the auxiliary energy source systems etc.</p> <p>The trough type heat collector can heat up heat transmission liquid to about 400 °C, heat transmission liquid heat up water to steam about 300°C through the heat exchanger, water steam drives the steam turbine to rotate and drives the generator to generate electricity, water drained from the steam turbine is converted into water through the condenser, and then deliver to the heat exchanger via the water pump, it generates steam and drives the steam turbine again.</p> <p>Possess own production line:</p> <p>The company has established the unique production line in Asia, which can manufacture the trough type RP1 to RP4 whole series flexible solar energy spotlight heat power generation reflection mirror; its product performance and technical parameters have reached international advanced technology level, which has been successfully applied in the domestic and foreign solar thermal power station projects.</p> <p>Perfectness degree of system integration:</p> <p>Rayspower Energy Group can provide system service for construction of the trough type power station, including design, construction and commissioning works of the power station; its wholly owned subsidiary company Sundhy(Chengdu) can provide equipment supply and series solution scheme of the trough type reflection mirror (solar heat power station and solar heat middle temperature and high temperature utilization system) and the spotlight photovoltaic reflection mirror.</p> <p>On basis of continuous innovation and accumulation of technology and demonstration projects, Rayspower Energy Group has system integration capability of the trough type solar heat power station, which can provide high quality system integration service to the customer.</p>

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	Technology adaptability	<p>Technology application scope: Rayspower Energy Group popularizes and develops solar energy power generation technology in China and the world market. The company can provide whole set of solution plan of the solar energy heat power generation technology to the customer according to different demand of the customer, including system design, supply of the key equipment and engineering construction etc, it also provides operation and maintenance, technical training and other technical services.</p> <p>Development limitation conditions: At present, construction of the trough type power station shall consider several factors. First is sunlight resource; second is grounding condition, including geological condition, flatness degree of land, terrain condition etc; third is grid condition; fourth is water source condition; fifth is construction investment condition, including nationality issue, policy issue of local government etc.</p>
	Technology stability	<p>Through continuous validation of demonstration process, operation of the trough type power station technology of Rayspower Energy Group is stable, anti-interference capability is strong, which can realize expected effect and obtains consistent affirmation in the industry.</p>
	Technology safety	<p>1. Technology risk It mainly relates to difficult synchronization, enormous system, complicated procedure etc technical risks during construction process of the power station. In order to control risk at maximum degree, the enterprise has designed the optional plan for selection. At the same time, the company possesses development experience for several years, established brand science and research cooperation relationship, which has strong and forced expert support team. These will reduce technology development risk for research and development of the new product.</p> <p>2. Technology application and market risk Speed of the foreign product manufacturing enterprise and manufacturer entering into Chinese market is continuously sped up, cost and product price are reduced through the industry chain management policy, which creates certain negative influence on the whole profit rate of the industry; at same time, it makes the company face more intense competition during further market share expansion.</p> <p>3. other risks 1) Management risk This project has high requirement on comprehensive capability of the technician, therefore there are certain risk at intellectual right and talent management. Therefore the company establishes the special leading team, and establishes the special project management person and patent management person, who will carry out whole life period management during implementation of the project.</p> <p>2) Policy risk</p>


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		<p>The solar heat power generation technology related in this project belongs to research direction which is supported by the country as the key. Research and development technology mainly come from own innovation of the company, construction of the project complies with relevant policies of the new energy source industry of our country, which is beneficial to improve research level of the photovoltaic industry in our country. It is in accordance with own innovation development strategy of our country, and there is no policy risk.</p>
	<p>Achievement conversion and popularization obstacle</p>	<p>Popularization mainly faces two problems at present: technology and environment advantage of solar heat power generation shall be furtherly popularized; secondly electricity price, solar heat power generation has no cost advantage when it is compared to traditional fossil fired power generation, it needs supports from the industry and the government etc aspects, each party shall cooperate mutually and interact mutually.</p>
	<p>Transfer of intellectual property right</p>	<p>Intellectual property right system: As the professional solar energy power station supplier, Rayspower Energy Group inhibits the green energy source technology idea, always strives to research, development and market application of the solar energy heat power generation technology. The company possesses several patent technology of the solar energy heat power generation system with large scale heat storage function, and master the solar energy heat power generation core technology and intellectual property right. This technology has applied 44 patents at present, in which 16 inventions and 28 utility models.</p> <p>Talent team construction: The company possesses many professional technician talents in the heat power generation field, which has established strategic cooperation relationship with the world famous science and research institute, the excellent enterprise. On basis of the excellent technology and talent advantage, Rayspower Energy Group is becoming one of the enterprise with influence force in the solar heat power generation field in China.</p> <p>Export of advanced equipment: The company has established the unique production line in Asia which can manufacture the trough type RP1 to RP4 whole series flexible solar energy spotlight heat power generation reflection mirror; its product performance and technical parameters have reached international advanced level, they are successfully applied in the domestic and foreign solar heat power station project; furthermore, the first domestic solar energy solar heat power generation and heat collection system assembly and detection line has entered into final testing phase.</p> <p>Total localization degree of the equipment has reached 90%.</p>


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COMPANY: POLY NEW ENERGY TECHNOLOGIES (BEIJING) CO., LTD.

Renewable Energy Technology Achievement Declaration	
Poly New Energy Technologies (Beijing) Co., Ltd.	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">QR code</div> <div style="width: 65%; text-align: center;">  </div> </div>
Technical provision unit	Poly New Energy Technologies (Beijing) Co., Ltd.
Contact person	Zhu Xinyu
Submission date	June 30, 2016
Technical type	Solar energy utilization technology
Specific technology	Solar energy observation station technology
Tel.	13911560970
E-mail	chengxin@polysolar.cn
Technical name	Solar traffic light
Technical provider	Poly New Energy Technologies (Beijing) Co., Ltd.
Scope of application	Applicable to urban, rural and residential district roads as well as the illumination in parks and squares..
Brief description of Technology	The product is comprised of solar cell panel, storage battery, solar controller (including constant current stabilizer), traffic signal controller, wireless communication module, and LED indicator lights. In the daytime, the solar cell panel converts illumination received to electric energy and reserves it in battery through controller, and meanwhile, the electric energy reserved in battery provides power for traffic signal lights.
Technical information	Capacity of battery: Plumbic acid battery 600Wh-2,880Wh, lithium-ion battery: 250Wh-1,200Wh, light source: 12W-60W, road surface illumination: 10-15lux (meet the secondary main road lighting standard)
Business application situation	
Service conditions	
Contact person of business application unit /Tel./E-mail	


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COMPANY: POLY NEW ENERGY TECHNOLOGIES (BEIJING) CO., LTD.

Renewable Energy Technology Achievement Declaration			
QR code			
Technical provision unit	Poly New Energy Technologies (Beijing) Co., Ltd.		
Contact person	Zhu Xinyu	Submission date	June 30, 2016
Technical type	Solar energy utilization technology	Specific technology	Solar energy observation station technology
Tel.	13911560970	E-mail	chengxin@polysolar.cn
Technical name	Solar traffic light		
Technical provider	Poly New Energy Technologies (Beijing) Co., Ltd.		
Scope of application	Suitable for command and control of traffic intersection		
Brief description of Technology	The product is comprised of solar cell panel, storage battery, solar controller (including constant current stabilizer), traffic signal controller, wireless communication module and LED indicator lights. In daytime, the solar cell panel converts illumination received to electric energy and reserves it in battery through controller, and meanwhile, the electric energy reserved in battery provides power for traffic signal lights.		
Technical information	Applicable intersections: Crossroads, complex intersection; Signal type: Round signal lamp, straight / turn / combined arrow lamp, pedestrian and non-motor vehicle indicator light, countdown board: Power of solar cell module: 75WD-320WD		
Business application situation	According to the solar traffic lights project to aid Nigeria , 300 solar traffic lights are supplied and installed at 74 intersections in Abuja, capital of Nigeria, and they are currently running well.		
Photo caption			

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Technological Achievements Declaration Of The Reproducible Energy			
Chengdu Xushuang Solar Technology	 QR code		
	Provide unit of technolog	Cheng Du Xu Shuang solar technology Co.,ltd	Submit date 29th, July, 2016
	Contacts	Huang Yuan	technologic al type usage of solar technology
	cellphone	8615828365553	Email 605871523@qq.com
	Technology name	The solar battery of high light type building amorphous silicon thin film can produce 10MW a year.	
		Our comany now has 58 ones associated with the technology patents,	
	Technology provider	including 10 invention patents, and 48 utility model patents. We have our own department of construction and design . What's more, we can undertake assignments in design, construction and installation.	
	Scope	New energy,Building integrated glass curtain wall,Agricultural greenhouses,Small system.	
	Brief introduction of technology	Our battery's positive and negative electrode use the TCO, whose average light transmittance can research to 85% in visible light scope.	
	Technological information	1. size of product:1300mm*1100mm*8mm 2. conversion rate(after attenuation)≥ 6% 3. light transmittance:10-30%	
Commercial usage	88.32kw photovoltaic curtain wall grid project of Mudan Jiang 4. University. The address: No 60, West Di Ming street, Ai Ming aera of Mudan Jiang.		

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	Use conditions	Market trade; mature technology; It also needs training and guidance in design, installation, debugging and production trials on site. After the technical side accepts training, they maintain it by themselves, and the maintenance should be under professional engineer's guidance.
	Contact of the unit of commercial usage	Jin Wu, vice president of Mudan Jiang University. Tel:0453--6598053
	Investment of equipment	The reconstruction of the equipment of this project should be in original factory, and it has a new laser system and a vacuum coating system, whose total investment reaches to 60,000,000yuan. It will build a new 1100*1300high light amorphous silicon thin film production line to produce the solar battery modules, which is expected to produce 10MW a year.
	Operational maintenance expense	The normal operation of the system is analyzed by all transmittance products materials: raw material 2.96 yuan/w; hydropower fee 0.05yuan/w; wage and benefit 0.15yuan/w; depreciation and amortization and factory overhead 0.4yuan/w; unit costs 3.56yuan/w; management and repairment fee and the sharing of other products of one kind fee 0.1yuan/w.
	Payback time	It's estimated that the annual sales revenue of this product can reach to 45,000,000yuan, the annual selling cost is 38,250,000 yuan, the annual total profit is 6,750,000 yuan, the annual net profit is 5,062,500yuan, the annual average net rate of investment is 33.75%, the average net profit rate of selling is 15% and the static payback period is 2.22years.
	Other profits	<p>1.This project conforms to our country's industrial policy and local development plan, and the implementation of it has positive effect on the development of local economy.</p> <p>2.Through the implementation of it, it will stimulate the technological reform of enterprise,reduce the cost and it conforms to the trend of saving energy and developing low carbon economy.</p> <p>3. It has positive effect on stimulating employment.</p> <p>It has obvious finance and tax effect and will enhance the income oflocal finance and tax.</p>
	Technological share	With our group's industrial experience and accumulation in technology, we employ hundreds of experts from home and abroad to set up solar battery research institute. Meanwhile, we unites many advanced enterprises of this industry to make a deep research on manufacturing

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		<p>technology of thin film and whole equipment technology of production line. We have mature manufacturing technology to produce solar battery, and we are in the leading role. In 2015, global output of them reaches to 144MW and its global market reaches to 0.7%.</p>
	<p>Potential of technological market</p>	<p>Compared with other photovoltaic battery, amorphous silicon has advantages as follows: its technology is mature, low cost, less pollution etc. But its photovoltaic conversion efficiency is low and has stable attenuation effect. Therefore, so many solar modules which are worse than monocrystalline&multicrystalline silicon lead to the limitation even bankruptcy of a number of companies from home and abroad. Under this circumstances, our company chooses photovoltaic architectural glass curtain wall and conducts a series of technological reform, which lead to the breakthrough of this kind of solar battery. Because of this market segment, the amorphous silicon solar battery components are better than other types. EPIA has prediction of photovoltaic power generation, that is, in 2020, the worldwide annual production of photovoltaic modules will reach to 40GWP, the total PV generation installed capacity will be 195GWP, and total generation capacity will be 2747W/h, and the cost of the components of solar battery will decrease to \$1/wp; in 2040, PV generation capacity can reach to 7368w/h, which holds 21% of the world's.</p>
	<p>Technological advance</p>	<ol style="list-style-type: none"> 1. By using device structure and improvement of materials, we can realize the high light transmittance and high power density of the components of photovoltaic architectural glass curtain wall. What's more, they are better than traditional products. The latter ones sacrifice device's effective area to get components' transmittance, it also use means of laser scribing to get ride of some areas of the battery. So the components' power density is low and its technique is complicated and it has high cost. 2. The 1300mm*1100mm photovoltaic architectural glass curtain wall researched, designed and made by ourselves is the pioneer in our country. We haven't seen such reports of this kind of product with same area and efficiency.



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	Technical maturity	Our products' industrialization relies on their advanced manufacturing equipment, integration of the materials researched by ourselves and improvement of technique of the components. We establish a large-scale independent intellectual property production line. And we develop products' large-scale production and marketing stage by stage. After the technique is widely admitted by the market, we manufacture the product in a large scale and enhance their diversity.
	Technical applicability	There's strong light and long sunshine in African areas, and it has drought and less rain all the year round. So it's suitable for application of photovoltaic cells. They have less effect on environment and can save electricity power, generate electricity by themselves, and form wind solar hybrid system which will not affect architectures and give supply to electricity.
	Technical stability	Cheng Du Xu Shuang solar technology Co., Ltd has a production line which can make 60MW amorphous silicon thin film solar cells. High-transparency materials are the main products of this company, they have mature technique, stable production and their quality meets TUV certification. And their architecture uses are forced to use CCC
	Technical security	Using solar power will not reduce the source of our earth and will not have pollution. And solar power industry is obviously a millennium one. Our country has so many natural disasters, eg, earthquakes, typhoons, etc. Therefore, the photovoltaic system which is made of by solar battery has better safe reliability and mature technique should give priority to develop solar technique.
	Obstacles in commercialization and achievements	Technical barrier is how to enhance the photoelectric conversion efficiency. As photovoltaic industry is a comprehensive subject of optics, electromagnetism, semiconductor, vacuum, chemical, machinery and so on, it has high requirements of product, design and professional quality of the managers. Each university from home and abroad doesn't have relative courses, and the explosive growth photovoltaic industry is far more than the speed of talent development. So seeking professional talent becomes one of the difficulties faced by new enterprises of this industry.

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	<p>Transfer of intellectual property rights</p>	<p>Our company has 10 invention patents, using 48 utility model patents, and these patents belong to our only permission. We introduce key technical role as meteorological precipitation and vacuum coating. And our equipments are from famous domestic manufactures. We have strong willing of technology transfer and the way is a paid monetization deal. By real docking negotiations transfer between enterprise and enterprise, or between enterprise and government, we make technical transfer promotion according to <i>the China's Africa policy documents</i> which was published in Johannesburg in Dec,2015</p>
	<p>图片说明 :</p>	 

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COMPANY: BEIJING WARMLAND ENERGY SERVICE CO., LTD.

Renewable energy technology achievement declaration				
Beijing Warmland Energy Service Co., Ltd	Technology providers	Beijing Warmland Energy Service Co., Ltd.	Date of submission	2016-07-07
	contact	Annie Hou	Technology type	Solar energy utilization
	Tel.	(+86) 13520646735	Email	annie@ti-solar.com
	Technical name	Solar water heating systems based on energy-saving intelligent control platform		
	Technology providers	Beijing Warmland Energy Service Co., Ltd.		
	Application scope	Architecture (hotels, schools, hospitals, etc.)		
	Technology Brief description	1、 using dry type solar energy to collect solar heat and heat water, to put hot water into the water tank thermostat 2、 using air source heat pump to heat water in the water tank thermostat 3、 using electric auxiliary heat system as emergency standby heater 4、 using Intelligent remote management and control platform for the management		
	Technical Information	1、 per unit of hot water to reduce energy consumption by more than 50% 2、 energy efficiency management platform for public service capacity to reach 1000 sets of capacity 3、 the system failure rate to maintain a low level, the average failure rate of less than 3 times / year		
	Commercial applications	all over the country more than 30 cities hundreds of projects,such as holiday inn express Beijing shangdi, transforming energy saving 75%; Holiday inn express dongzhimen, the original wash bath for gas heating, transforming energy saving 70%;		

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	Using Condition	The project provides hot water energy-saving outsourcing services to clients instead of the traditional hot water production mode; This project not only provides a full set of hot water production equipment, but also provides longterm, real-time operation and management services and run the management; the clients only in accordance with the agreement to pay the company to pay the service fee.
	Commercial applications unit contacts /phone/email	holiday inn express Beijing shangdi,sam Li,82709999, 13701281344 Home Inn group Xueqing Road Hotel,mr Zhao, 13811801271
	Equipment investment	350,000 yuan (including solar collectors, air source heat pumps, water tanks, pumps, control systems, etc.), all provided by Technology provider- Warmland, With the clients zero investment
	Run maintenance cost	Run maintenance cost is provided by the technology provider, without additional cost during the contract period
	Payback	38 months

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发明名称	燃烧器装置		
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TECHNOLOGY: SOLAR

COMPANY: BEIJING WARMLAND ENERGY SERVICE CO., LTD.

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2016. 2. 22.


Biofuel

- Sino-US Bio-Fuel Technology Joint Research Centre of Tsinghua University



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COMPANY: SINO-US BIO-FUEL TECHNOLOGY JOINT RESEARCH CENTRE OF TSINGHUA UNIVERSITY

Institution Company Supplier	Details				
Sino-US Bio-Fuel Technology Joint Research Centre of Tsinghua University	Renewable Energy Technology Achievement Declaration				
	QR code				
	Technical provision unit	Sino-US Bio-Fuel Technology Joint Research Centre of Tsinghua University	Submission date	June 28, 2016	
	Contact person	Zhang Lei	Technical type	Biomass energy utilization technology	
	Tel.	13661099951	E-mail	Leizhangxny@tsinghua.edu.cn	
	Technical name	Technology and equipment of Advanced Solid State Fermentation (ASSF) generation of sweet sorghum stalk ethyl alcohol			
	Technical provider	Sino-US Bio-Fuel Technology Joint Research Centre of Tsinghua University			
	Scope of application	Biological energy source field, suitable for countries from tropic to temperate zone			
	Brief description of technology	For technical bottleneck blocking the development of bio-fuel ethanol, Tsinghua University has developed technology and equipment of Advanced Solid State Fermentation (ASSF) generation of sweet sorghum stalk ethyl alcohol and ruminant feeds. Tsinghua University has developed the largest continuous solid biological reactor with 555m ³ in the world at present. It has firstly realized continuous and automatic production of sweet sorghum stalk ethyl alcohol in the world without waste water being produced, which has remarkable environmental and economic benefits.			
	Technical information	Annual production of absolute ethyl alcohol of the production line is 1,500t, power consumption per ton 433kwh, steam 6.2t Main equipment: Pulverizer 5t/h, 30kW Fermentation tank 555m ³ , Total weight of 141t Crude distillation tower 52m ³ , The total weight of 27 tons.			
Business application situation	In the early 2014, Tsinghua University and Dongying Hongli Biotechnology Co., Ltd. jointly built the ASSF sweet sorghum ethanol plant with the output of 10,000tons, which was equipped with the world's largest continuous solid biological reactor of 555m ³ . It is running now.				
Service conditions	Shandong Dongying Hongli Bioenergy Technology Co., Ltd. Zhou Huandong 18678630111, 1777696@qq.com				

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Contact person of business application unit /Tel./E-mail	Tsinghua University patent equipment is adopted for the main process, and the super gravity patent equipment from Zhejiang University of Technology is adopted for rectification and dehydration. Main equipment: Rotary fermentation tank with the drive power of 30kW, the drive motor of crude distillation tower with 7.5kW, and rectification equipment with the power of 120kW .Operating time 300days per year. Train operators Normal equipment maintenance and repair shall be carried out annually.
Investment on equipment	The plant with an annual output of ten thousand tons, RMB sixty million as one-time investment, including RMB 30 million for equipment investment (including the installation of subsidiary pipelines and utilities equipment and installation), and RMB 30 million for plant and civil construction costs.
Expense of operation maintenance	16 tons of sweet sorghum with the sugar content of 14% is consumed for one ton of fuel ethanol, a-Diastase 2L, Glucoamylase 1.2L, Corn meal 85kg, Sterile air 107m ³ , Cooling circulating water 264t, Primary water 0t, Power Investment 433kW, Steam 6.2t. Labor cost RMB 200, Equipment depreciation RMB 278.86, Repair expenses RMB 55
Investment payback period	Payback period of investment for project 5.8 years before income tax, 6.7 years after the income tax (including the construction period of 2 years)
Other earnings	<p>Sorghum stalk can be used to produce fuel ethanol, and the main method is liquid state method and solid state method. Compared with the liquid state method, both methods can produce the byproduct of lees feed. For the lees feed produced by means of the solid state, through fermentation and high temperature distillation process, distiller's grains are rich in nutrients with fermented aroma. It is easy to digest and the nutrient composition is equivalent to silage corn. It can be used as coarse fodder for cattle and sheep. The sugar content of sorghum residue squeezed by means of the liquid state is high. If fed to cattle and sheep for a long term, it can easily cause acidosis. And the feed value is far lower than the byproduct distiller's grains produced by means of the solid state. 13.8 tons of distiller's grains feed as byproduct can be produced from per ton of finished fuel ethanol by means of solid state, and the feed per ton is between RMB 190 and 210.</p> <p>In Africa or Southeast Asia Islands where the power shortage is severe, distiller's grains left after ethanol is produced by solid fermentation can generate electricity. The problem of electricity can be solved through the distributed power grid of small-scale. Especially for more than 90% of rural Africa without access to electricity, it is more suitable to use the sweet sorghum-ethanol power mode, and the ethanol factory with output of 10,000tons can match 2.5MW biomass power plant for power generation.</p>
Technical occupancy	At present, the domestic ethanol production is mostly grain ethanol, non-grain ethanol market has not yet been formed due to technical bottlenecks. ASSF sweet sorghum ethanol technology, as the most competitive non-grain ethanol technology, has great potential for development.

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	Market potential of the Technical	<p>Bio fuel is the only alternative fuel to replace oil in large scale, and the market prospect is broad. Bio-fuels are in the first place in renewable energy, accounting for 3% of the world. At present, bio fuels that are used are mainly fuel ethanol and bio diesel, of which the fuel ethanol accounts for more than 80%. The Organization for Economic Cooperation and Development (OECD) and Food and Agriculture Organization of the United Nations (FAO) expect that the global ethanol production will be 125.6 million tons in 2023 and biodiesels will be 34 million tons, which will provide a broad space for future development of bio-fuels. China implements the preferential policies of exempting product consumption tax and return after collection of value-added tax for the fuel ethanol industry; However, the fiscal subsidy of grain ethanol was stopped in 2015, but the development of non-grain ethanol has still been encouraged. National finance gives the subsidy of RMB 200 per mu for planting sweet sorghum and other energy crops on the uncultivated land. At the same time, it gives the non-grain fuel ethanol plant the interest subsidies during the construction period and the reward of 20-40% of the total investment after the completion.</p> <p>On April 26, 2016, Xinhua News Agency issued the <i>Opinions on the Overall Revitalization of Northeast China and Other Old Industrial Bases by Central Committee of the Communist Party of China and State Council</i>. The fuel ethanol will expand the scale of production and research the layout of the new production base. The new pilot program will undoubtedly play a role in promoting the development of new technology research and market development of enterprises. In this context, ASSF technology takes low energy consumption and no waste water as the concept of technology development, and strives to build green substitution industries of renewable fossil energy. It vigorously promotes the recycling energy agriculture and the bio based industry cluster development with the biomass energy as the core.</p>
	Technical advancement	<p>ASSF sweet sorghum ethanol technology has no squeezing process in the traditional liquid fermentation, which directly ferments the crushed sweet sorghum grain. It significantly reduces the energy consumption for squeezing juice and there is no problem like waste disposal. Through amplification of a series of engineering, the technology solves the theory and engineering problems in the production process of sweet sorghum ethanol. It shows characteristics that are obviously better than those of liquid fermentation and reaches the international advanced level (J.ZI [JQ P2015] No. 003), which realizes the industrialization of sweet sorghum ethanol for the first time. Economic and technical indexes 1. During the solid fermentation process, the residence time for the material in the tank is 20-24 hours. It doubles the efficiency of corn ethanol. 2. Ethanol yield; 91%; 3. In the production process of ethanol, no waste water is discharged (6 tons of wastewater is produced for per corn ethanol); 4. Distillers' grains are used as the boiler fuel, with no foreign fossil fuels being used. The input-output ratio of energy is 1:2.72 (corn ethanol is 1:1.3 at best). 5. 1 ton of ethanol can be produced from 16 tons of sweet sorghum stalk (the content of sugar is 14.1%), and the distiller's grains, except as the boiler fuel, can be used to feed one cattle. 6. Ethanol costs about RMB 4,257.7 / ton (calculated on the base that the</p>

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		<p>price of sweet sorghum is RMB 250 / ton and the price of distillers' grains is RMB 200 /ton). 7. If the alcohol and power cogeneration mode is used, the distiller's grains that produces 1 ton of ethanol can produce 2,500kWh power. Besides for own use, it can be used to surf the Internet for 1500 KWh. Ethanol costs about RMB 4,558.4 / ton (calculated on the base that the price of sweet sorghum stalk is RMB 250 / ton, the price of power is RMB 0.75 / kWh and the cost is RMB 0.4 / kWh).</p>
	<p>Technical maturity</p>	<p>Through 10 years, the technique of ASSF sweet sorghum ethanol is gradually enlarged and improved to be mature by Tsinghua University. It started with the flask experiments on the laboratory level, through 10 liters, 50 liters, 250 liters, 5 cubic meters, 40 cubic meters, 127 cubic meters up to the world's largest continuous solid biological reactor of 555m³. And the theory and engineering problems in the production process of sweet sorghum ethanol have been solved. The inherent shortcomings in the biological solid reaction process have been overcome as far as possible, and characteristics that are significantly better than those of liquid fermentation are shown in the production of sweet sorghum ethanol. During the engineering enlargement, the low carbon agro-industrial chain whose core is ASSF sweet sorghum ethanol has gradually formed. It has integrated with the bio-energy, agricultural planting, equipment manufacturing and cultivation. It forms the relatively complete equipment manufacturing system and industry alliance with the capacity of the complete technique and equipment output. Such development pattern plays an obviously promoting role on the economic development, national stability and people's living standard especially for the underdeveloped area such as Africa.</p>
	<p>Technical applicability</p>	<p>After 10 years of optimization of the SSSF sweet sorghum ethanol technique, its main process and equipment have been greatly improved, and the steady industry alliance in the fields of breeding, agricultural machinery, equipment manufacturing and universal equipment has been established initially. On the other hand, the sweet sorghum is native to Africa, which has a strong stress resistance to the salt and alkali, drought and heavy metal contaminated soils and can be planted in the marginal and contaminated soils which are not suitable for cultivation. Its growth cycle is short (it can be planted for more than 3 times each year in most countries in Africa. According to the report issued by Food and Agriculture Organization of the United Nations FAO, there are 69.49million hectares of land suitable for sweet sorghum in Tanzania, while that suitable for planting sugarcane is only 0.9million hectares) with high biomass. It can grow in the most areas from the tropic to the temperate belt, thus accepted as the most competitive non-grain raw ethanol material. In addition, the sweet sorghum has excellent economic characteristics. It is the best poverty alleviation method to plant barren-resistance sweet sorghum. The peasants' income is more than double compared with other crops such as corn, wheat, cotton and sugarcane. Therefore, it can bring about more benefits to the peasants in comparison with other crops, which can guarantee the stable supply of sweet sorghum. In general, ASSF sweet sorghum ethanol technique is the new bio-fuel technique that can be promoted worldwide.</p>

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	Technical stability	ASSF technique has gone through the 500ml shake flask, 10L solid fermentation tank, 50L tank, 250L tank experiments and 5m ³ tank, 127 m ³ tank middle tests in the lab, until operated in the 555m ³ industrial device for 2 years. It constantly improves the production equipment centering on the ethanol production from sweet sorghum stalks and formulates relevant process document, which makes the equipment stable during the engineering operation and become resistant to the environmental and technical parameters and other interference factors.
	Technical safety	The supporting agricultural machinery remains to be developed, and the industry needs the seeds with better regional adaptability. Currently, the fuel ethanol market is affected by international oil price and is in the valley phase yet. Although the sweet sorghum ethanol produced with the ASSF technique can compete with the \$50 oil price, it still requires the government's policy support and the constantly improved technique to achieve cost reduction and further improvement of enterprise's economic benefits.
	Obstacle in achievement transformation and promotion	According to the provisions in <i>Notice of Fuel Ethanol Subsidy Policy of the Ministry of Finance</i> , the losses happened to the manufacturing enterprise on the denatured fuel ethanol production and denatured fuel ethanol allocation and sales are to be subsidized at some ration by the national finance. In 2012, the Generation 1 grain ethanol and Generation 1.5 fuel ethanol are respectively subsidized at RMB 500/t and RMB 750/t. In 2015, the nation lowers down the fuel ethanol subsidy to RMB 300/t and RMB 500/t respectively, which increases the pressure of ethanol industry.
	Transfer of intellectual property	The technique owns the domestic and international intellectual property rights and can be cooperated through technology license manner.

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Photo caption






Biogas

- Beijing Sanyi Energy Environmental Protection Development Co., Ltd
- Henan Tianguan Group Co., Ltd
- Liuyang Jian°Øan Renewable Energy Service Co., Ltd
- Chinese Academy of Agricultural Engineering



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Renewable Energy Technology Achievement Declaration																																																	
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	unit /Tel. /E-mail	mature and reliable, simple to use training to operate, easy to install, repair and maintenance costs of 30,000 m ³ only RMB 331,200 per year
	Investment on equipment	<p>For example: Shandong Weifang project: Weifang Yingxuan biomass nature gas project (30,000 m³ for phase I);</p> <p>Project investment: Total investment: RMB 18,118,200 (Including civil engineering and gas desulfurization);</p> <p>Main contents and scale of Shandong Weifang Project:</p> <p>Processing capacity 10,950,000 m³/a</p> <p>Specification of equipment 30,000 m³/d</p> <p>Gas production 6,396,990 m³/a</p> <p>Exhaust output 4,553,010 m³/a</p> <p>Total installed power 593.29 kw</p> <p>The entire project covers an area of 9,973m². Operating rooms, offices set above the ground outside the ground 600mm, each equipment basic settings above ground 200mm. Various types of circulating pumps, pipeline pumps, compressors, chillers and other large equipment to produce noise and vibration are arranged on the shop floor for the purpose of damping and fixing</p> <p>Various pipelines for transporting materials fail to pass through air or underground of the places for labor staying, rest area and control rooms.</p> <p>Shandong Weifang major equipment projects:</p> <p>Desulfurization process: Circulating pumps, measuring pumps, sludge pump sulfur, nutrient pumps, dosing pumps, air blowers along, plate and frame filter press, fans</p> <p>Decarburization engineering: Gas compressors, co₂ separation membranes, nature gas compressors, biogas cold and dry</p> <p>Utilities: Air compressors, circulating pumps, cooling towers, micro-oil screw compressor, fire facilities</p>
	Expense of operation maintenance	<p>Expense of operation maintenance for Shandong Weifang project:</p> <ol style="list-style-type: none"> 1. Expenses for purchasing materials: RMB 5,475,000 2. Power fees and water fees: RMB 1,946, 900 3. Expenses of consumables: RMB 792,500 4. Depreciation of fixed assets: RMB 1,457,800 5. Salary and welfare expenses RMB 761,000 6. Office fees: RMB 228,300 7. Maintenance and repair fees: RMB 331,200 <p>Overall costs and expenses of the project (including depreciation): RMB 11, 016,800</p> <p>Overall costs and expenses of the project (not including depreciation): RMB 9,559,000</p>
	Investment payback period	<p>The project's total investment is RMB 18,118,200, the annual operating costs (including depreciation of RMB 11,016,800, project's annual sales revenue is RMB 19,191,000. Internal rate of return is 33.77%, investment payback period is 2.96 years.</p>

	Other earnings	<ol style="list-style-type: none"> 1. To promote environmental protection and circular economy industry. This project is the supporting project of light industry enterprise, is the by-product biogas industry chain extension, increasing the income of the environmental protection facilities, and promoting sustainable development of environmental protection and circular economy industry construction and building beautiful home. 2. Renewable energy utilization reduces the consumption of fossil energy. Biogas is a kind of renewable energy, and biogas utilization slows down the consumption of fossil energy in our country to ensure the stable and sustainable development of the economy in our country. 3. It relieves contradiction between supply and demand caused by far distance from nature gas transportation and high cost. Natural gas market is in short supply in our country, especially contradiction between supply and demand becomes more obvious in the winter, biogas purification and preparation as nature gas can relieve contradiction between supply and demand of natural gas in Nanning 4. Investment projects contribute to energy conservation and emissions reduction, and at the same time promote the good image of environmental protection.
	Technical occupancy	<p>Commonly used biogas purification technologies include high pressure water washing, variable pressure adsorption, chemical absorption, physical absorption, membrane method, cryogenic separation. Among them pressure variable pressure adsorption method, pressure water washing method, chemical absorption and membrane separation are widely applied in terms of biogas purification. According to early estimates (IEA), by 2012, 229 biogas purification works had been built in the world, with all kinds of technical market occupancy as illustrated</p>
	Market potential of the technology	<p>In the face of the increasingly serious energy resources and the environment, must take effective measures to cope with the situation, development and utilization of biological gas such as renewable energy, protecting the ecological environment, is the inexorable selection of achieving sustainable development. Biogas utilization at present is mainly used in cooking, heating and power generation, etc., in this use of for the purpose of burning gas, a large amount of carbon dioxide (30%-40%) have fire retardant effect, the combustion would reduce the utilization of heat of combustion, reduce the utilization rate of flame temperature, reduce the volume of the combustion chamber, and rise in the cost of combustion heat release process, this way of biogas utilization has low energy efficiency, economic benefit is poor.</p> <p>Biogas purification refining production into biomass fuel gas is a way with a higher value. After biogas purification into biomass fuel gas, methane content up to 97% above can realize strong firepower and higher energy grade and higher utilization ratio after it is burnt, in addition, the biomass gas after purification has less discharge of pollutants, flexible and wide application for industry and civil, automotive use), and with the advantages of replace fossil natural gas and other. Therefore, biogas purification into biomass gas can realize efficient utilization of biogas, which is one of the most promising usage method</p>
	Technical advancement	<p>Membrane separation used for biogas purification biological methane is a hot spot in recent research at home and abroad, being considered as an important development direction for the process of using high value of biogas. Membrane separation is the method of using a polymer thin film materials, relying on different gas on</p>

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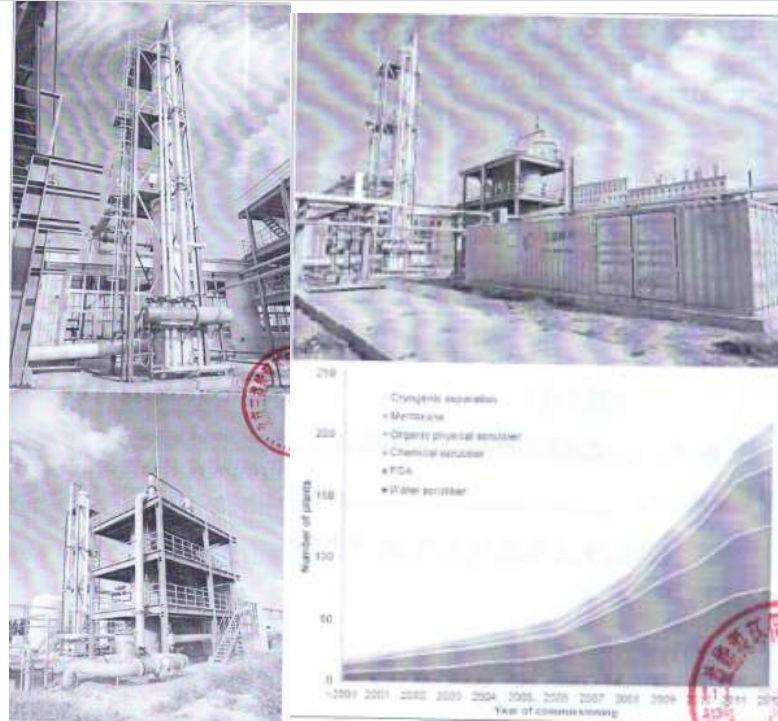
	<p>the affinity of membrane differences resulting in selective diffusion phenomenon, and achieving the purpose of separation by generally selecting & filtering feed gas component. The research shows that, membrane filtration method to biogas calorific value up to the gas quality grade is feasible. Compared with more traditional separation methods such as variable pressure adsorption, chemical absorption, high pressure water washing, membrane separation method has high separation efficiency, small volume, low energy consumption investment, convenient operation and maintenance, and many other advantages. Purified biogas using membrane technology has carried out some fruitful research, including two stage and multistage membrane series purification technology, and estimates the use of membrane filtration method each cubic for production & biological gas; In about 0.3 kWh of energy consumption, the energy consumption is low, and a very promising biogas purification technology.</p>
Technical maturity	<p>The technology at home and abroad has construction of multiple projects, daily capacity from 1,000 m³ to 3,000 m³, and technology maturity is higher.</p>
Technical applicability	<p>Biogas purification and refining is a way of using high value of biogas containing gas such as CH₄, CO₂, H₂S, H₂O, biogas purification process for the purification of the main tasks include: Removal of CO₂, H₂S and water improves the relative amounts of methane and increases the heat of combustion. The purified biomass gas obtained by purification usually contains 95%-97% methane and 1%-3% carbon dioxide, which can be used as an alternative to natural gas to be consolidated into gas pipeline network or to be pressurized as fuel gas for automobiles.</p> <p>Main components of low-quality natural gas, landfill gas, coal bed gas are similar to the biogas, membrane purification technology is also applicable to low-quality natural gas, landfill gas, coal bed gas purification.</p>
Technical stability	<p>There are a number of projects at home and abroad under the stable operation.</p>
Technical safety	<p>The technology has security safeguards in key links, including safety valves, emergency relief and other facilities. In addition, the membrane purification technology does not use chemicals, the purification process will not cause harm to the environment and human body.</p>
Obstacle in achievement transformation and promotion	<p>The achievement transformation is a high risk, high investment, high-yield work, a longer cycle, requiring having a strong capital base, and there are some obstacles in the promotion of the transformation of the capital.</p>
Transfer of intellectual property	<p>The company has its own intellectual property rights, patents of invention, <i>Purified Membrane Biogas Heating System</i>, patent number ZL201410112064.0. This technology provides a membrane biogas purification heating temperature control system, including a compressor heat recovery circulating system, external heat source system, heat exchange system and control regulation system; The circulating system of compressor heat recovery recovers heat generated during compressor compression through the thermal storage tank; External heat source system shall be compensated in case of insufficient heat recovered from the compressor; Heat</p>

TECHNOLOGY: BIOGAS

COMPANY: **BEIJING SANYI ENERGY ENVIRONMENTAL PROTECTION DEVELOPMENT CO., LTD**


exchange system shall be heat exchanging site for hot water for recovering heat by biogas and compressor; Control and regulation systems are connected to described compressor heat recovery circulating system, external heat source system and a heat exchange system to make more energy consumed for existing heating technology, especially the case that heat production and the system cannot be used sufficiently, be reused by subsequent biogas heating compressed gas generated by heat recovery to the subsequent methane gas heating, thereby reducing energy of system and making the system energy efficiency can be improved with less energy waste.

Photo caption



TECHNOLOGY: BIOGAS

COMPANY: HENAN TIANGUAN GROUP CO., LTD

Renewable Energy Technology Achievement Declaration				
Henan Tianguan Group Co., Ltd	QR code			
	Technology provision unit	Henan Tianguan Group Co., Ltd.	Submission date	June 30, 2016
	Contact person	Ma Ming	Technology type	Biomass energy utilization technology
	Tel.	13838906959	E-mail	tgmmaming@163.com
	Technology name	Cassava fuel ethyl alcohol project with annual output of 100-300 thousand tons		
	Technology provider	Henan Tianguan Group Co., Ltd.		
	Scope of application	Henan Tianguan Group Co., Ltd.		
	Brief description of technology	With raw material pretreatment, liquefying-saccharification, in fermentation, distillation dehydration and other processes, the project realizes conversion from raw material of cassava to absolute ethyl alcohol, has support of professional technology and patent technology, and is able to effectively utilize resources, save resources and reduce consumption.		
	Technical information	Refer to GB18350-2013 <i>Denatured Fuel Ethyl Alcohol</i> for product standard		
	Business application situation	The technology has realized industrialization, and has been applied in Henan Tianguan Fuel Ethyl Alcohol Co., Ltd. and Henan Tianguan Biological Engineering Co., Ltd., and the operation is currently in good condition.		
	Service conditions	Ma Ming 0377-61606339 tgmmaming@163.com		
	Contact person of business application unit /Tel./E-mail	It is applicable to areas with abundant cassava resources and poor fossil energy.		
	Investment on equipment	RMB 0.65 billion		
	Expense of operation maintenance	It is under normal operation with current market price, absolute ethyl alcohol consumption in ton: Consumption of raw material of RMB 5,622.71, machine material and auxiliary material of RMB 90.23, water of RMB 80.14, electricity of RMB 88.64, steam of RMB 180.79, labor cost of RMB 35.06, equipment		


TECHNOLOGY: BIOGAS

COMPANY: HENAN TIANGUAN GROUP CO., LTD

		depreciation of RMB 133.94, maintenance cost of 54.7, other management cost of 102.88, total of RMB 6,389.09.
	Investment payback period	8 years
	Other earnings	Application of this product not only obtains fuel ethyl alcohol product, but also optimizes energy structure and improves air quality.
	Technology occupancy	Henan Tianguan Group Co., Ltd. is entitled with proprietary intellectual property rights of this technology.
	Market potential of the technology	
	Technical advancement	Aiming at features of cassava raw materials, the technology has researched and developed a package of advanced technology of unloading, purification, dedusting, transmission, screening of liquid saccharification, fermentation and distillation, which belongs to advanced technology in our country.
	Technical maturity	The technology belongs to absolutely mature technology, which has realized industrialization and prepares absolute ethyl alcohol through the processes such as raw material pretreatment, grinding, liquid saccharification, fermentation and distillation; the technology has complete equipment and special integration system to realize automatic control, and has complete maintenance mechanism.
	Technical applicability	The technology is mainly applicable to cassava raw material, and meanwhile, it is available to apply corn, wheat and other raw materials for production, which requires supporting facilities such as electricity and steam.
	Technical stability	The technology realizes stable operation during operation and suffers little interference from outside.
	Technical safety	The technology has complete supporting facilities, has much market acceptability, and there is no obstruction factors
	Obstacle in achievement transformation and promotion	The achievement of the technology is mainly realized by independent research and development, and technical problem has been totally solved; it mainly suffers from market influence, while the influence of capital and cultivation of talents is little
	Transfer of intellectual property	It has 36 authorized patents, including 7 patents for invention, with proprietary intellectual property rights. The technology is owned by Henan Tianguan Group Co., Ltd.. This technology enjoys higher localization degree and technology transfer intention.
	Photo caption	

TECHNOLOGY: BIOGAS

COMPANY: HENAN TIANGUAN GROUP CO., LTD

Renewable Energy Technology Achievement Declaration			
QR code			
Technology provision unit	Henan Tianguan Group Co., Ltd.	Submission date	June 30, 2016
Contact person	Ma Ming	Technology type	Biomass energy utilization technology
Tel.	13838906959	E-mail	tgmaming@163.com
Technology name	Straw biogas project with daily output of 5000-20000m3		
Technology provider:	Henan Tianguan Group Co., Ltd.		
Scope of application	Henan Tianguan Group Co., Ltd.		
Brief description of technology	With the two-phase process fermentation technology, convert all kinds of organic waste substance; into biogas, and produce organic biogas residue at the same time. It not only produces renewable energy, but also solves the problem of environmental and soil pollution. The main technical characteristics include high fermentation efficiency, high concentration of methane, high level of automation and raw material wide adaptability.		
Technical information	Biogas, concentration of methane 5%; biogas residue Solid Matters 5%, organic matter 70%, nitrogen phosphorus and potassium 3.5%;		
Business application situation	The technology has been successfully applied in Henan Nanyang Wolong Agricultural Science and Technology Park, with daily output of biogas of 6000m3, and the project is in good operation currently.		
Service conditions	Ma Ming 0377-61606339 tgmaming@163.com		
Contact person of business application unit /Tel./E-mail	Suitable for areas with rich agricultural straw resource and poor natural gas resource.		

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Investment on equipment	RMB 25 million
Expense of operation maintenance	RMB 470,000
Investment payback period	8.37 years
Other earnings	In electric power, a part of electric energy from the generator is used for the own production, and another part is incorporated into the state grid; In organic fertilizer, the biogas residues separated by solid liquid separator are made into organic fertilizer after subsequent processing, and used in organic farming.
Technology occupancy	Henan Tianguan Group Co., Ltd. is entitled with proprietary intellectual property rights of this technology.
Market potential of the technology	With intensification of modern agriculture, Scale and industrialization development, and the increasing number of agricultural products, agricultural production waste emission is increased. The improper use of agricultural waste will not only cause a waste of resources, but also bring the atmosphere, soil and other environmental pollution problems. This project converts renewable biomass waste into biogas and electric power, at the same time produces organic fertilizer beneficial to agriculture, with mature and reliable technology, and broad prospects.
Technical advancement	With two-phase biomass biogas fermentation technology, the biogas production rate reaches 2m ³ /m ³ volume. Adopting unattended automation control, it is in a leading level at home and abroad.
Technical maturity	Raw materials are hydrolyzed in hydrolysis tank after removing impurity by grinding, and then fermented. Biogas dedicated equipment is adopted for all equipment, which is reliable and mature and has passed long-term production test. The automatic remote monitoring technology is adopted for the whole system, which can realize the unattended automatic operation, with high reliability.
Technical applicability	This technology is mainly applied to distributed renewable energy, with certain requirement for number of crop straw; It has corresponding requirements for the straw collecting conditions; Biogas residue and biogas slurry can be returned to farmland and used as organic fertilizer; Electric products can be transmitted into the nearby grid; It is better that there are biogas users near the project field, including industrial and residential users.
Technical stability	This technology is mature and stable. In addition to certain requirements for the quantity of straw materials, it has no demand for energy, and can run independently; The project has very small water consumption, and can be satisfied by the daily water consumption; Electricity is provided by its own generator; It has no any pollution to the environment, and does not produce any waste water and residue.


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	Technical safety	The technology promotion needs to ensure the stability of the raw materials; Biogas slurry and residue can be returned to farmland; Power and biogas products enjoy certain subsidy and support policy.
	Obstacle in achievement transformation and promotion	Raw material collection is difficult. The biogas slurry returning to farmland needs appropriate propaganda, and the initial operation of the project needs appropriate government subsidies.
	Transfer of intellectual property	It has 5 authorized patents, including 2 patents for invention, with proprietary intellectual property rights. The technology is owned by Henan Tianguan Group Co., Ltd.. This technology enjoys higher localization degree and technology transfer intention.
	Photo caption	

TECHNOLOGY: BIOGAS

COMPANY: LIUYANG JIAN'AN RENEWABLE ENERGY SERVICE CO., LTD

Renewable Energy Technology Achievement Declaration			
Liuyang Jian'an Renewable Energy Service Co., Ltd	QR code		
	Technology provision unit	Liuyang Jian'an Renewable Energy Service Co., Ltd.	Submission date June 27, 2016
	Contact person	Song Changgeng	Technology type Biomass energy utilization technology
	Tel.	15388043581	E-mail 67643022@qq.com
	Technology name	A process device for pollutants of livestock breeding industry	
	Technology provider	Liuyang Jian'an Renewable Energy Service Co., Ltd.	
	Scope of application	Liuyang Jian'an Renewable Energy Service Co., Ltd.	
	Brief description of technology	Biogas anaerobic reaction tank-biogas storage vault- desulfurization process device - central gas supply-biogas internal combustion engine generator unit-organic fertilizer production from biogas residue - biogas slurry transported to rice field, fruit tree and vegetables. Self-heating catalytic reaction in the biogas digester solves the big problem of no biogas production at low temperature	
	Technical information	2 1000 cubic meter biogas fermentation pools, 1 500 cubic meter biogas storage vault, 180KW biogas generator unit, separator for biogas slurry and biogas residue	
	Business application situation	The large biogas digester with biogas slurry heating automatically started to be built in Liuyang Hongtoulung Pig Farm in August 2013 and is currently under normal operation recycles all excrement and urine from the farm, which solves big problem of the direct discharge of sewage, and effectively utilizes the renewable energy.	
	Service conditions	Hongtoulung Pig Farm in Liuyang City, Hunan Province Deng Xiaoyu Tel.: 13349606888 Jinpenshan Pig Breeding Farm in Liuyang City, Hunan Province Zhu Huatang Tel.: 13487319795	
	Contact person of business application unit/Tel./E-mail	The device is constructed for the local use with operation personnel trained, which has good effect, environmental protection and safety, and the cost for four personnel carrying out maintenance and operation is about RMB 14,000 per month.	
	Investment on equipment	Four 1000 cubic meter biogas fermentation pool, cost of RMB 720,000 for each Subtotal amount RMB 2,880,000 Two 500 cubic meter biogas storage vaults, cost of RMB 690,000 for each Subtotal amount: RMB 1,380,000	

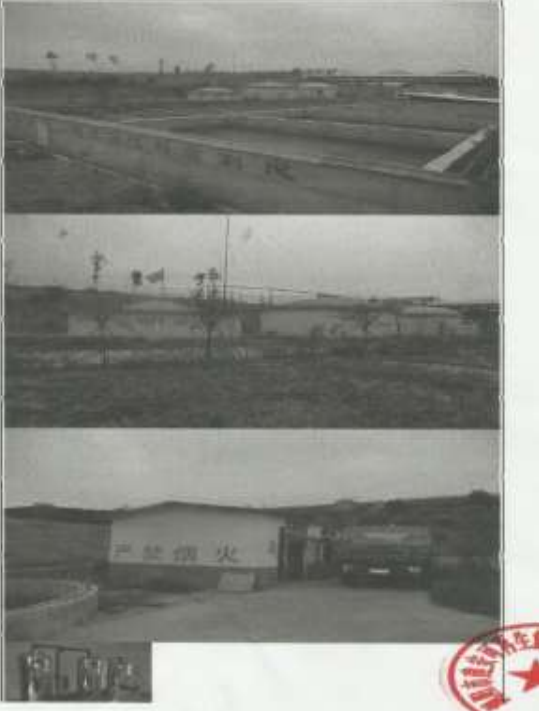
TECHNOLOGY: BIOGAS

COMPANY: LIUYANG JIAN'ØAN RENEWABLE ENERGY SERVICE CO., LTD

	<p>One 180KW biogas generator unit, cost of RMB 520,000, one 150KW biogas generator unit, cost of RMB 490,000 Subtotal amount: RMB 1,010,000 Two sets of heater for biogas fermentation pool, cost of RMB 135,000 for each Subtotal amount: RMB 270,000 Amount in total: RMB 5,540,000</p>
Expense of operation maintenance	<p>The electricity consumption of the two sets of 20KW dry-wet separator is 28000. Annual cost of electricity consumption is RMB 20,000 Salary for the 3 operators and 1 maintenance personnel is RMB 168,000 Equipment maintenance expense RMB 120,000 per year Depreciation expense RMB 180,000 per year</p>
Investment payback period	<p>The total investment of two sets of equipment is RMB 5,540,000 Total cost for each year is about RMB 500,000 The total cost for the two sets of equipment should be recovered in four years.</p>
Other earnings	<p>Annual power generation income of two sets of equipment is RMB 1,800,000 Annual income from biogas residue acquisition by organic fertilizer plant is RMB 500,000 Biogas slurry transportation expense is RMB 200,000 per year Total: RMB 2,500,000</p>
Technology occupancy	<p>No abnormality appears during the last two and a half years usage. It should be widely promoted to be used in large-scale pig farms from 2020. Environmental pollution can be reduced and it effectively utilizes renewable energy</p>
Technical advancement	<p>At present, the heater inside biogas digester is rare, but with the use of this device, the gas production can be greatly improved, which solves the problem of no biogas production at low temperature.</p>
Technical maturity	<p>Biogas anaerobic reaction tank-biogas storage vault- desulfurization process device - central gas supply-biogas internal combustion engine generator unit-organic fertilizer production from biogas residue -biogas slurry transported to rice field, fruit tree and vegetables.</p>
Technical applicability	<p>The device in use thoroughly solves the environmental pollution caused by urine or excrement direct discharge and makes renewable energy effectively used, the toxins in pig excrement eliminated, and the fertilizer effect improved.</p>
Technical stability	<p>No abnormality appears after almost three years usage of the device, which runs functionally and stably, and it solves the environmental pollution caused by urine or excrement direct discharge and makes renewable energy effectively used, the toxins in pig excrement eliminated, and the fertilizer effect improved, without having any influence on the environment.</p>


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	Technical safety	The success rate of the device operation through repeated experiments is 100%, and it is with good stability and good safety. It is widely praised by users.
	Obstacle in achievement transformation and promotion	There is no negative impact of the device by putting into use. It promotes and supports national policy, the renewable energy is effectively used, its promotion and application should be as soon as possible, and more technical personnel should be trained.
	Transfer of intellectual property	The State Intellectual Property Office issues a patent certificate (Patent No.: ZL2013204554680) to this disposal device of pollutants in the breeding industry in July 2013, and the owner of the technology has agreed to transfer the technology and to train technical personnel.
	Photo caption	

TECHNOLOGY: BIOGAS

COMPANY: **CHINESE ACADEMY OF AGRICULTURAL ENGINEERING**

Renewable Energy Technology Achievement Declaration				
Chinese Academy of Agricultural Engineering	QR code			
	Technology provision unit	Chinese Academy of Agricultural Engineering	Submission date	June 28, 2016
	Contact person	Zhao Lixin	Technology type	Biomass energy utilization technology
	Tel.	13501008372	E-mail	Zhaolixin5092@163.com
	Technology name	Key CTP and STP high-efficient anaerobic conversion technology		
	Technology provider	Chinese Academy of Agricultural Engineering		
	Scope of application	Chinese Academy of Agricultural Engineering		
	Brief description of technology	According to the phase separation and the coupling mechanism as well as the lightweight characteristic of cellulosic raw materials, integrated two-phase anaerobic fermentation technology (CTP) achieves the purposes of cycle dynamic inoculation and two-phase coupling. According to the development of two-phase match coordinative mechanism, separated two-phase anaerobic digestion technology (STP) takes advantages of quenching and tempering acidified liquid ingredients at different solid-phase fermentation stages to ensure the stability and continuity of liquid-phase feed ingredients.		
	Technical information	CTP technology volumetric gas production rate of 1.0-1.5m ³ /m ³ , solid-phase reactor feed concentration of STP technology of 15-40%, volumetric gas production rate of 0.8-1.2m ³ /m ³ . Unlimited volume of fermentation tank.		
	Business application situation	Biogas Project of Xuanhua County Wofeng Technology LLC., STP Technology, total capacity of fermentation tank of 1500m ³ . Hebei Qing County Straw Biogas Project, CTP Technology, total capacity of fermentation tank of 2000m ³ .		
	Service conditions	Hebei Gengzhong Biomass Energy Development Co., Ltd. 13931783091 Tianjin Deshengyuan Environmental Engineering Co., Ltd. 022-60751318 Hebei Guorun Modern Agriculture Co., Ltd. 15116942967		
	Contact person of business application unit /Tel./E-mail	Market transaction. The project researched and developed mature CTP and STP technologies suitable for straw, excrement of livestock, organic waste and other raw materials for fermentation. Work time is longer than 8,000 hours/year. Systematic training is required in the process of project implementation, including equipment operation, routine operation and maintenance and so on.		

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Investment on equipment	Take biogas project at the scale of 1,000m ³ as an example, major equipment includes fermentation tank with a total volume of 1,000m ³ , screw pump, gas storage cabinet, stirrer, warming and thermal insulation systems, positive and negative pressure protector, desulfurization tower, dehydrator, flame arrestor, biogas flow gauge, generator (or other biogas utilization equipment), boiler, emergency burner, biogas slurry and residue pump, solid-liquid separator, etc. with a total investment on equipment of about RMB 2.6 million, civil construction investment (aggregate pool, fermentation tank foundation, biogas slurry pool, boiler room, generator room, office, workshop, roads and greening, etc.) of about RMB 0.9 million, other investment of about RMB 0.5 million and total investment of about RMB 4 million.
Expense of operation maintenance	Take biogas project at the scale of 1,000m ³ as an example: Raw material cost: The annual consumption of straw is 1,800 tons, RMB 200 per ton, and the annual cost is RMB 360,000 Labor expense: It is required of about RMB 100,000 for 3 persons with an average annual salary of RMB 33,000; Water fee: 7,300tons water required, RMB 2.5 per ton, and the total cost is of RMB 18,300 Electric charge: 43,600 kilowatt hour per year required, RMB 0.6 per kilowatt hour, and the total cost is of RMB 27,700 Depreciation expense of fixed assets is of RMB 200,000; Maintenance expense of RMB 41,000, sales expense of RMB 25,000, administrative expense of RMB 12,000 , and total maintenance cost is of RMB 78,000
Investment payback period	Static payback time is 6-8 years
Other earnings	Compared with similar technologies, the technology can improve more than 20% of gas production, take biogas project at the scale of 1000m ³ as an example, it can increase gas production of more than 200m ³ daily, can increase gas production of more than 70000 m ³ yearly, and calculate according to the price of RMB 1.5 per cubic meter biogas, it can increase income of RMB 105,000, can replace 49.98 tons of standard coal with 98.88 tons of carbon dioxide emissions, and can reduce 1027.1 tons of carbon dioxide emitted by the full combustion of methane, with 1125.98 tons of total carbon dioxide emission reduction.
Technology occupancy	
Market potential of the technology	Compared with similar technologies and products, in addition to having a wide adaptability of raw materials, high feed concentration, continuous and balanced gas production, and high conversion efficiency, it can increase 4-6 years of operating life than conventional modes, saving 20% of the investment, saving 30% of land, shortening 50% of construction period, greatly enhancing engineering economy and the level of equipment, and realizing strong market competitiveness and broad application prospects.

	Technical advancement	Based on the hard degradable characteristic of straw, CTP technology uses ensiling method to carry out preliminary treatment of fiber, then collects the leachate, and separates it from raw materials to realize the separation of methane and acid produced. A sprayer is used to evenly arrange the filtrate in the upper layer of materials, and filtrate permeates gradually from the upper layer to the lower layer by action of gravity, which leads to the coupling of methane and acid produced by diffusion process. Regulate and control filtrate spray volume, intensity and frequency to achieve high efficient matching of two phases of fiber materials with acidification rate increased by 20%, solving the hard anaerobic digestion problem of cellulose. Based on the easy acidification characteristic of high concentration organic waste and excrement, STP technology connects multiple anaerobic reactors in parallel, and enables them to be at different stages by activating them in batches, then collects leachate in the reactor, uniformly mixes and then sprays them to achieve two-phase matching and coordination of high solid materials by mixing leachate at different reaction stages. Meanwhile, spraying makes the reactor environment homogeneity, heat and mass transfer and material inoculation uniform, STP and CTP process gas production rate at 1.25m ³ /m ³ , which reaches the international advanced level.
	Technical maturity	With the help of market forces and corporate's commercial operation mode and fund guarantee, the Company and leading technology companies in the industry, agricultural technology promotion agencies, etc. build a sound promotion network targeting at the government, promote the popularization and application of technology by using the project proposals, planning and feasibility study preparation, engineering design and other consultancy activities, and conduct wide technology promotion in Beijing, Tianjin, Chongqing, Gansu, Henan, Heilongjiang, Hubei, Xinjiang, Yunnan, Hebei, Inner Mongolia, Zhejiang, Shandong and other 28 provinces (municipalities and autonomous regions); By showing the project results through the demonstration project, the demonstration projects are established in Hebei, Tianjin, Shanxi, Shandong and other places; Present new technologies to farmers, grassroots technology extension workers directly through technical manuals, demonstration projects, conferences, trainings and other forms, with a total of nearly 20000 people trained.
	Technical applicability	Expand the raw material from excrement of livestock to over 20 kinds of organic raw materials such as straw to guarantee stability, wide adaptability of raw materials, which are suitable for comprehensive promotion for biogas projects. For difficult charging/ discharging and high energy consumption problems of treating expanding solid raw materials by existing biogas process, it proposes anaerobic split-phase regulation mechanism, develops integrated and separated two-phase anaerobic split-phase regulation and high efficient conversion technology, and solves problems of difficult charging/ discharging, low efficiency of gas production, large output of biogas slurry, higher risk of secondary pollution, etc. during the digestion process of solid raw materials, greatly improving the anaerobic gas production rate.
	Technical stability	CTP technology is mainly suitable for the biomass materials with high cellulose content, such as straw, STP technology is suitable for excrement of livestock, straw, organic waste and other mixed raw materials,



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		and the two technologies can keep stable during engineering operation, with low sensitivity to environment, technical parameters and other external disturbance, and strong adaptability.
	Technical safety	After many years of development, CTP technology and STP technology have become mature, they have a complete set of key equipment and systems, and can operate stably in many demonstration projects. Promotion throughout the nation has been carried out, and the practice proves that the two technologies have strong practicability, complete supporting facilities, good market acceptance and are almost without any risk.
	Obstacle in achievement transformation and promotion	Currently, for achievement transformation and promotion of this technology, main promotion obstacles possibly come from policy barrier, guarantee of raw materials (resources restriction) and influence of engineering use and operation personnel quality.
	Transfer of intellectual property	It has multiple domestic independent intellectual properties, specifically including: Authentication of scientific and technical achievement by Ministry of Agriculture: Study on integrated two-phase anaerobic fermentation process technology (NKGJ ZI (2009) No. 034); Authentication of scientific and technical achievement by Ministry of Agriculture: Solid material separated two-phase anaerobic digestion process technology (NKGJ ZI (2011) No. 027) Booster-type automatic straw charging/discharging system ZL201120225975.6 Integrated two-phase anaerobic fermentation device for straw ZL200920175524.9 Two-phase inoculation anaerobic dry fermentation device ZL200820133043.7 Solid-liquid two-phase separated anaerobic digestion device ZL201120001463.1 Split mounting type concrete anaerobic digester ZL201120412745.0 A sealed gas storage device for solid fermentation with spraying ZL201120412742.7 A completely mixed anaerobic filter in series suitable for high concentration raw materials Integrated reactor ZL 201220594106.5 An airtight technology and device for hydraulic compensation type solid fermentation ZL 201220578167.2 A kind of internal heating solid garage anaerobic fermentation device ZL 201320531315.x

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COMPANY: **CHINESE ACADEMY OF AGRICULTURAL ENGINEERING**

	<p>Photo caption</p>		
Renewable Energy Technology Achievement Declaration			
	<p>QR code</p>		
<p>Technology provision unit</p>	<p>Chinese Academy of Agricultural Engineering.</p>	<p>Submission date</p>	<p>July 4, 2016</p>
<p>Contact person</p>	<p>Zhao Lixin</p>	<p>Technology type</p>	<p>Biomass energy utilization technology</p>
<p>Tel.</p>	<p>13501008372</p>	<p>E-mail</p>	<p>Zhaolixin5092@qq.com</p>
<p>Technology name</p>	<p>The application of the technology of continuous biomass pyrolysis carbonization and carbon base fertilizer</p>		
<p>Technology provider:</p>	<p>Chinese Academy of Agricultural Engineering.</p>		

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COMPANY: **CHINESE ACADEMY OF AGRICULTURAL ENGINEERING**

Scope of application	Chinese Academy of Agricultural Engineering.
Brief description of technology	The poly-generation technology of biomass pyrolysis carbonization takes the modern biomass carbonization technology as a core, and produces biochar, biomass gas, wood tar and wood vinegar liquid and a variety of products by separation and purification of the pyrolysis gas-liquid, besides the technology has many advantages including high resources utilization rate, diversified products and less secondary pollution, from which can further improve the comprehensive utilization benefit from the development of biomass resources. The key equipment is the continuous biological carbonization equipment and the system of oil and gas purification separation.
Technical information	Outline dimension Length; Width; Height) 2000; 2000;8000;Matched power /KW14.25
Business application situation	Bazhou Hongda biomass carbonization demonstration engineering, in Bazhou City, Hebei Province, with annual processing capacity of 1,000 tons straw
Service conditions	Hebei Bazhou Hongda Hardware Molding Factory, Shang Shuntang, 13803164511
Contact person of business application unit /Tel./E-mail	Market trade. In this project, the continuous pyrolysis carbonization technology and equipment characterized by technical maturity are researched and developed, which is suitable for crop straws, and the system training needs to be carried out in the process of project implementation, including equipment operation, daily operation and maintenance.
Investment on equipment	The main equipment includes the vertical inner-heating carbonization pyrolyzing furnace of RMB 400,000, and the pulverizer costs RMB 50,000, and other ancillary equipment cost RMB 100,000. The equipment covers an area of about 300 square meters, 300 square meters for raw materials storage site.
Expense of operation and maintenance	Take the engineering with annual processing capacity of 1,000 tons straw as an example: Raw materials cost: The annual consumption of 1,000 tons straw, with RMB 200 per ton and the annual demand of RMB 200,000; Labor cost: It is required of about RMB 100,000 for 3 persons with an average annual salary of RMB 33,000; Including equipment depreciation charges, fuel power costs, the production cost of one-ton biomass carbon is about RMB 800.
Investment payback period	Static investment payback period is 7-9 years
Other earnings	Comparing to other similar technologies, this technology has a continuity for production; Continuous pyrolysis in segment can produce continuously, to make the products stable.
Technology occupancy	
Market potential of technology	With the advantages of high resource utilization ratio, product variety, less secondary pollution etc., the technology can further improve the development utilization and comprehensive benefit of the biomass

		resources, coincide with the strategy of the crop straw resource utilization, with good prospect of popularization and application.
Technology advancement		On the base of the technology of inner-heating straw segment continuous pyrolysis carbonization, breaking through the key technologies of material force variable compaction, material ordered disturbance, gas recycling, high efficiency heat exchanging and other straw pyrolysis carbonization, developing the feeding mechanism combining with active compaction and air shut-off , cross distributed biochar agitation mechanism and gas recycling heating system etc., developing vertically flow inner-heating continuously straw carbonizing equipment, to provide the support equipment for the suitable clean and efficient cogeneration engineering of large-scale straw carbon gas in the natural villages
Technical maturity		Mature technology, stable and reliable operation.
Technology applicability		The raw material adaptability of continuous straw pyrolysis carbonization cogeneration system is strong, by using crop straws, corn cobs, peanut shells and various biomass briquettes fuel to produce biochar, with broadly market prospect.
Technical stability		The technology of continuous straw pyrolysis carbonization divides the entire production process into the preparation of materials, materials drying, oxidation and pyrolysis, insulated carbonization and gas recycling etc., with the advantages of continuous production, stable product and low-energy consumption.
Technical safety		Practice has proved that the technology is rarely risky with high practicality, perfect supporting facilities, good market acceptance.
Obstacle in achievements transformation and promotion		At present, the main obstacles to transform and promote the achievements of technology are the guarantee of raw materials (the high cost of purchasing and storage) and biochar promotion and application.
Transfer of intellectual property		The following contents are relevant patents involved by the technology, which intellectual property rights belonging to Chinese Academy of Agricultural Engineering. <ol style="list-style-type: none"> 1. The processing method of biomass solid briquettes fuel, as a patent for invention, ZL200910136263.4 2. The inner-heating continuous biochar complete equipment, as a patent for invention, ZL201210516644 3. A kind of active compaction device for biomass carbonization equipment, as a new practical patent, ZL201220682395.4 4. A kind of inner-heating continuous biomass carbonization equipment drying drum, as a new practical patent, L201320245403.3 5. A kind of continuous biomass carbonization equipment perturbator, as a new patent, ZL201220682391.6

TECHNOLOGY: BIOGAS

COMPANY: **CHINESE ACADEMY OF AGRICULTURAL ENGINEERING**

	<p>Photo captions</p>	<p>6. A kind of inner-heating continuous biomass carbonization equipment furnace body, as a new patent, ZL201320245424.5</p> <p>7. Ring die molding machine for biomass solid fuel, as a new patent, ZL200920153756.4</p>  <p>The image contains three photographs of industrial equipment. The top photo shows a large, complex structure with a tall vertical pipe and a horizontal conveyor system, situated in an outdoor industrial yard. The middle photo shows a similar structure from a different angle, with a person visible near the base. The bottom photo shows a different piece of equipment, a ring die molding machine, which is a large, cylindrical structure with a complex internal framework and a tall vertical pipe, also in an outdoor industrial setting.</p>
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BIOMASS COOKER -ICS AND OTHERS



- Anhui Xi Yang Yang New Energy Technology Co., Ltd
- Beijing Shenwu Environment & Energy Technology Corp
- Changzhou Zhengyi
- Dezhou Dahe Biofuel Machinery Co., Ltd
- Hangzhou Oil Burning Boiler Co., Ltd
- Henan Jufeng Bioenergy Development Co., Ltd
- Xunda Science & Technology Group Co., Ltd

TECHNOLOGY: BIOMASS COOKER -ICS AND OTHERS

COMPANY: ANHUI XI YANG YANG NEW ENERGY TECHNOLOGY CO., LTD

可再生能源技术成果申报																																	
Technical achievement declaration of renewable energy																																	
Anhui Xi Yang Yang New Energy Technology Co., Ltd	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;"> 二维码 two-dimensional barcodes </td> <td colspan="3"></td> </tr> <tr> <td> 技术提供单位 Technology Provider </td> <td> 安徽喜阳阳新能源 科技有限公司 Anhui Xi Yang Yang New Energy Technology Co., Ltd. </td> <td> 提交日期 Submission Date </td> <td> 26 July 2016 </td> </tr> <tr> <td> 联系人 Contacts </td> <td> 陈攀 Pan Chen </td> <td> 技术类型 Technology Type </td> <td> 生物质能利用技术 Utilization technology of biomass energy </td> </tr> <tr> <td> 电话 Telephone </td> <td> 15256077876 </td> <td> 邮箱 E-mail </td> <td> xyyxny@sina.com </td> </tr> <tr> <td> 技术名称 Technical name </td> <td colspan="3"> 生物质气化燃烧炉在谷物干燥机中的应用 Application of biomass gasification combustion stove in grain dryer </td> </tr> <tr> <td> 技术提供方 Technology Provider </td> <td colspan="3"> 安徽喜阳阳新能源科技有限公司 Anhui Xi Yang Yang New Energy Technology Co., Ltd. </td> </tr> <tr> <td> 适用范围 Scope of application </td> <td colspan="3"> 安徽喜阳阳新能源科技有限公司 Anhui Xi Yang Yang New Energy Technology Co., Ltd. </td> </tr> <tr> <td> 技术简要说明 Technical brief description </td> <td colspan="3"> 原理：利用高温热解气化实现生物质的高效、清洁燃烧，为谷物干燥提供烘干热源。 特点：优化气化炉结构，强化放热传热，实现生物质的高温高效气化，提高气化效率和燃气热值， 降低焦油，提高干燥效率，污染气体0排放。 </td> </tr> </table>	二维码 two-dimensional barcodes				技术提供单位 Technology Provider	安徽喜阳阳新能源 科技有限公司 Anhui Xi Yang Yang New Energy Technology Co., Ltd.	提交日期 Submission Date	26 July 2016	联系人 Contacts	陈攀 Pan Chen	技术类型 Technology Type	生物质能利用技术 Utilization technology of biomass energy	电话 Telephone	15256077876	邮箱 E-mail	xyyxny@sina.com	技术名称 Technical name	生物质气化燃烧炉在谷物干燥机中的应用 Application of biomass gasification combustion stove in grain dryer			技术提供方 Technology Provider	安徽喜阳阳新能源科技有限公司 Anhui Xi Yang Yang New Energy Technology Co., Ltd.			适用范围 Scope of application	安徽喜阳阳新能源科技有限公司 Anhui Xi Yang Yang New Energy Technology Co., Ltd.			技术简要说明 Technical brief description	原理：利用高温热解气化实现生物质的 高效、清洁燃烧 ，为谷物干燥提供烘干热源。 特点：优化气化炉结构，强化放热传热，实现生物质的 高温高效气化 ，提高气化效率和燃气热值， 降低焦油，提高干燥效率， 污染气体0排放 。		
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TECHNOLOGY: BIOMASS COOKER -ICS AND OTHERS

COMPANY: ANHUI XI YANG YANG NEW ENERGY TECHNOLOGY CO., LTD

	<p>关键设备：生物质气化燃烧炉、谷物干燥机</p> <p>Principle: Efficient and clean combustion of biomass by high temperature pyrolysis and gasification, which provides the drying heat source for grain dryer.</p> <p>Trait: Optimizing the structure of gasifier, intensifying heat transfer, achieving the high temperature and efficient gasification of biomass, improving gasification efficiency and calorific value of gas, reducing tar, Improving drying efficiency, No polluting gas emissions.</p> <p>Key equipment: biomass gasification combustion furnace, grain dryer</p>
<p>技术信息</p> <p>Technical information</p>	<p>产气率80%，碳转化率近100%、燃气焦油低于10 mg/N m；</p> <p>Gas production rate of 80%, The carbon conversion rate is close to 100%, Gas tar less than 10 mg/N m</p> <p>气化炉体积 (mm) : 3000*1500*2250</p> <p>Volume of gasifier: 3000*1500*2250</p>
<p>商业应用情况</p> <p>Commercial application</p>	<p>宣城市大冲米厂：45万大卡气化炉两台，谷物干燥机6台。</p> <p>Xuancheng city Dachong rice mill: Two 450 thousand calories gasifier, Six grain dryers</p> <p>桐城市龙友种植专业合作社：45万大卡气化炉两台，谷物干燥机6台。</p> <p>Tongcheng city Longyou Planting professional cooperatives: Two 450 thousand calories gasifier, Six grain dryers</p>
<p>商业应用单位联系人/电话/邮箱</p> <p>Commercial application unit contact/telephone/E-mail</p>	<p>(1) 安徽省宣城市大冲米厂：姓名：钟志强；电话：13856312807</p> <p>Anhui Xuancheng city Dachong rice mill: Name: Zhiqiang Zhong; Telephone: 13856312807</p> <p>(2) 桐城市龙友种植专业合作社：姓名：吴向连；电话：18909663421</p> <p>Tongcheng city Longyou Planting professional cooperatives: Name: Xianglian Wu Telephone: 18909663421</p>
<p>使用条件</p> <p>Use conditions</p>	<p>市场交易·无需设备投建；</p> <p>Market transaction, No equipment required</p> <p>成熟技术；</p>

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		<p>Mature technology 在实施中需系统培训·安装成本低(人员工资及差旅费用)。使用成本为每公斤谷物6分钱人民币。基本上处于无维修状态。维护成本每年约为总投资的1% (每套投资约为4万美元)。</p> <p>System training is needed in the implementation, low cost(Staff salaries and travel expenses). The cost is 6 cents per kilogram of grain. Basic don't need maintenance. Maintenance costs are about 1% of the total investment per year(approximately \$40 thousand per set).</p>
	<p>设备投资 Equipment investment</p>	<p>采用环保型生物质气化炉和谷物干燥机一套联合设备·按年干燥3000吨谷物计算·购置设备费用约为7万美元, 其厂房置办费约为1万美元, 附属设备如清杂设备、提升设备等约为1万美元, 其一次性投入约为9万美元 (这是按照1台20吨干燥机和一台环保型生物质气化炉作为一套计算)。次投入费用不包含出口产品时国外出口费用。</p> <p>Combined equipment of environmental protection biomass gasifier and grain dryer, drying 3000 tons of grain per year, Purchase of equipment is about \$70 thousand, rent a factory cost about \$10 thousand, ancillary equipment such as miscellaneous equipment, lifting equipment cost about \$10 thousand, One-time investment cost about \$90 thousand. Foreign export costs is not included in the export product.</p>
	<p>运行维护费用 Operating and maintenance costs</p>	<p>设备在运行过程中·一般单位产品耗费的原材料、水、电、人工设备折旧、管理费用等根据规格的不同分别如下：</p> <p>(1) 15吨干燥谷物机 (单位：美元)：原材料88；电费11；人工费：68；设备折旧费0.27；管理费用0.14；合计：167.41；</p> <p>(2) 20吨干燥谷物机 (单位：美元)：原材料128；电费11；人工费：68；设备折旧费0.3；管理费用0.15；合计：207.45；</p> <p>(3) 30吨干燥谷物机 (单位：美元)：原材料193；电费22；人工费：68；设备折旧费0.48；管理费用0.24；合计：283.72；</p>

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		<p>(4) 60吨干燥谷物机 (单位: 美元) : 原材料352; 电费36; 人工费: 68; 设备折旧费0.86; 管理费用0.43; 合计: 457.11;</p> <p>以上计算是按照生物质颗粒1.2元/KG, 电费按1KW价格1元, 人工费按每人150元, 共计三人, 设备折旧费按设备投资的3%, 管理费按设备投资的1.5%, 人民币对美元的汇率为1: 6.7为参考值。</p> <p>During the equipment operation, according to the different specifications, unit product cost of raw materials, water, electricity, equipment depreciation, management costs, which are follows:</p> <p>(1) 15 ton grain dryer(Unit : dollar): raw materials 88; electricity 11; labor cost 68; equipment depreciation 0.27; management costs 0.14; Total: 167.41;</p> <p>(2) 20 ton grain dryer(Unit : dollar): raw materials 128; electricity 11; labor cost 68; equipment depreciation 0.3; management costs 0.15; Total: 207.45;</p> <p>(3) 30 ton grain dryer(Unit : dollar): raw materials 193; electricity 22; labor cost 68; equipment depreciation 0.48; management costs 0.24; Total: 283.72;</p> <p>(4) 60 ton grain dryer(Unit : dollar): raw materials 352; electricity 36; labor cost 68; equipment depreciation 0.86; management costs 0.43; Total: 457.11;</p> <p>The above calculation is in accordance with the biomass 1.2 yuan / kg, electricity 1 yuan /kW, labor costs 150 yuan per person, a total of three people, equipment depreciation according to 3% of investment in equipment, management costs according to 1.5% of investment in equipment, the exchange rate of RMB against the U.S. dollar is 1:6.7.</p>
<p>投资回收期 Payback period</p>		<p>若用户购置一套20吨的干燥机和1台环保型生物质气化炉, 其总投资为9万美元, 则在生产使用过程中每干燥一吨谷物则需用去10.37美元。那么按国内谷物收购和售出比价计算如下:</p> <p>以水稻为例: 当水稻在25%水分时, 一般收购价为0.80元/斤, 干燥后售价为1.16元/斤, 其差价约为0.36元/斤, 则干燥前20吨 (即20000公斤=40000斤) *0.8元/斤=32000元</p> <p>干燥后: 35200斤*1.16元/斤=40832元</p> <p>收入为: 40832-32000-1389.92=7442.08元, 约合1110.75美元</p>

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		<p>所以：90000美元/1110.75美元=81次，再乘以20吨得出1620吨</p> <p>按照以上理论计算，若谷物含水量从25%降到15%时，每天干燥20吨谷物则在81天既可收回设备投资。</p> <p>If the user to purchase a set of 20 tons of dryer and a environmental protection biomass gasifier, which total investment is \$90 thousand, Drying a ton of grain requires 10.37 dollars in the process of production. According to the domestic grain purchase and sale price , calculation is as follows: Taking rice as an example: When the water content of rice is 25%, purchasing price is 0.8 yuan/Jin, when it is drying, sale price is 1.16 yuan /Jin, The difference is 0.36 yuan/Jin.</p> <p>Before drying: 20 ton(20000 kilograms = 40000 Jin)*0.8 yuan/Jin=32000 yuan</p> <p>After drying: 35200 Jin*1.16 yuan/Jin =40832 yuan</p> <p>Income: 40832-32000-1389.92=7442.08 yuan about \$ 1110.75</p> <p>So: \$ 90000/\$ 1110.75=81; 81*20 ton=1620 ton. Recovery of equipment investment needs 81 days.</p>
	<p>其它收益 Other proceeds</p>	<p>环保型生物质炉和谷物干燥机技术结合后，</p> <p>(1) 除去生物质燃料后，其固体残余物可作保温材料增加收入；</p> <p>(2) 由于CO等污染气体零排放，确保了环境的清洁无污染，节省了购置环保过滤设备的费用。</p> <p>After the combination of the environmental protection biomass stoves and the grain dryer,</p> <p>(1) After removal of biomass fuel, the residual solid can be used as thermal insulation materials to increase revenue</p> <p>(2) Because CO and other polluting gas zero emissions, to ensure that the environment is clean, saving the cost of the environmental protection filter equipment.</p>
	<p>技术占有率 Technology share</p>	<p>2015年该项技术和产品处于市场初入阶段，但由于当前市场上谷物干燥热源主要的提供燃料为煤炭、燃油以及无法进行清洁高效燃烧的各种固体废弃物，存在要么污染大，要么燃烧值低等种种问题，当前我国处于能源和产业升级转型期，未来生物质气化燃烧炉必将因其高效清洁的燃烧性能在市场上占据绝对优势份额。</p> <p>The technology and products is in the early stage of the market in 2015. However, the main heating supply source of grain dryer is coal,fuel, and the residual solid in the current market,</p>

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		<p>There is either a big pollution, or low combustion value of all kinds of problems. At present, China is in the transition period of energy and industrial upgrading, the future of biomass gasifier is bound to occupy an absolute advantage in the market due to its high efficiency and clean combustion performance.</p>
	<p>技术市场潜力 Technology market potential</p>	<p>我国粮食作物产量已经十二年连增·2015年全年粮食产量超过1.2万亿斤·但全国实际粮食机械化烘干总量约占当年全国粮食总产量的10.13%。而美国、日本的粮食机械化烘干率均在95%以上,我国粮食烘干加工产业的差距还相当大·仍有相当大的发展空间。而目前国内烘干机设备生产企业达150余家,市场销售额超过30亿元·年销售规模近15000台,年均增幅达18.9%;且烘干机的保有量也达到10万台。我公司生产的节能环保型热风炉作为烘干机必备的配套热能设备·具有与目前市场上的常规供热设备不具备的高效、清洁、环保等技术特性·市场前景巨大;以平均3台烘干机配套一台热风炉计算·粗略计算每年伴随新增销售的烘干机的热风炉需求量就在5000-6000台;而目前市场上已保有的10万台烘干机对原热风炉的更换将带来热风炉需求30000到40000台。</p> <p>Grain crops production has been increased for twelve years in our country. The grain output is more than 1.2 trillion Jin in 2015, but the actual grain drying of the country accounts for about 10.13% of the total grain output. But the United States, Japan, which the grain drying rates are more than 95%, there is still considerable room for development in grain drying processing industry. At present, the domestic drying machine equipment provider is more than 150, the market sales is more than 3 billion yuan, the annual sales is nearly 15000 units, Average annual increase of 18.9%; And the amount of drying machine also reached 100 thousand units. Energy saving and environmental protection hot-blast stove in our company is the necessary equipment for drying machine, with efficient, clean ,environmental protection and other technology characteristics, that has a huge market prospects. The calculation of a hot-blast stove with 3 sets of drying machines, so with the new sales of the drying machine, the demand for hot-blast stove in 5000-6000 every year. And the market has maintained 100 thousand drying machine for the replacement of the original hot-blast stove will bring 30000 to 40000 units of hot-blast stove at present.</p>

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	<p>技术先进性 Advanced technology</p>	<p>本次基数申报中：谷物干燥机采用六粮道横流式干燥方式，其热源利用环保型生物质炉，其原理的创新如下：</p> <p>(1) 利用超焓气体燃烧理论，供炉内能达到大于900°C，利用高温充分裂解焦油，在有效提高生物质气化效率的同时，降低焦油的产出。</p> <p>(2) 设备具有导热性能的燃气导热流管，可将炉内氧化后的热量导至热解区域，可有效防止氧化区域温度过高，生成氮氧化合物，另一方面可提高热解后的反应强度，避免焦油生成，经安徽省科技情报研究所查新表明，以上创新在国内相关文献及产品是尚未出现的。</p> <p>In the declaration of the base: the grain dryer adopt six route for providing foodstuff cross-flow drying methods and the heat source use environmental protection biomass stove, the principle of innovation are as follows:</p> <p>(1) Using the excess enthalpy gas combustion theory, the furnace can reach more than 900°C, and the pyrolysis tar is fully cracked at high temperature, which can effectively improve the efficiency of biomass gasification and reduce the production of tar.</p> <p>(2) The device has a gas thermal flow pipe with heat-conducting property. It can lead to the heat of oxidation in the furnace to the pyrolysis area, which can effectively prevent the oxidation temperature is too high and to prevent the nitrogen oxides generated. On the other hand, it can improve the strength of the reaction after pyrolysis and avoid the formation of tar. By the Anhui provincial science and Technology Information Research Institute survey shows that the above innovation in the domestic literature and products are not yet appeared.</p>
	<p>技术成熟度 Technology maturity</p>	<p>环保型生物质气化炉已通过生物质特征及气化特征的实验室试验，在试验过程中主要是寻找焦油裂解段气化室来实现清洁高效气体的实现条件，通过实验室试验的结论进行优化设计，投入生产制作。</p> <p>目前已通过批式制作试验和检测，各项性能指标均达到或超过NY/T1417-2007《秸秆气化炉质量评价技术规范》所规定的数值。</p>

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		<p>生物质气化燃烧炉主要由：炉体、进料器、焦油裂解段、气化室、排渣装置等组成</p> <p>其核心装备生产工艺流程如下：炉体加工、零部件加工、管材加工、标准件加工-质量检查-管线连接、电气安装-整机装配-清洁涂装-检测-包装。</p> <p>Environmental protection biomass gasifier has been characterized by biomass and gasification characteristics of laboratory tests.</p> <p>In the course of this experiment, it is mainly to find the tar cracking section of the gasification chamber to achieve the clean and efficient gas conditions, through the laboratory experiment to optimize the design and then put it into production.</p> <p>Has passed batch production test and detection, the performance indicators have reached or exceeded the specified value provisions by NY/T1417-2007 "Technical Specification of Quality Evaluation for Straw Gasification Furnace " .</p> <p>Biomass gasifier mainly comprises by furnace body, feeder, tar cracking section, the gasification chamber, discharging device etc.</p> <p>The core equipment manufacturing process is as follows: furnace body processing, parts processing, pipe processing, standard parts processing - quality inspection - pipeline connection, electrical installation - machine assembly - cleaning coating - testing - packaging.</p>
	<p>技术适用性</p> <p>Technical applicability</p>	<p>目前生物质气化燃烧炉的试用范围除与谷物干燥机结合作为热能外，还可作为蔬菜大棚采暖工程、农村地区家庭采暖炊事、城镇餐饮、城镇锅炉等的能源供给装置。</p> <p>其生产工艺不受地域、环境等限制，在广大农业地区均可广泛使用，热能输出功率等可根据不同地域的气候和环境条件进行微调。</p> <p>The biomass gasifier trial range n in combination with grain dryer as heat, but also as a vegetable greenhouse thermal engineering, rural area household heating and cooking, urban catering, urban boiler energy supply device.</p> <p>Its production process is not restricted by region, environment and so on. It can be widely used in agricultural areas, and the output power of heat energy can be adjusted according to the climate and environment conditions in different regions.</p>

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	<p>技术稳定性 Technical stability</p>	<p>该技术在工程运行中非常稳定，对于环境等其他外界因素具有强抗干扰性，可根据项目推广地区的实际情况，如气候等，对设备进行运行前的微调，使其适应所在地域的特殊环境，保持各项运行指标不变。</p> <p>The techniques are very stable in the operation of the project. It has strong anti-jamming for the environment and other external factors. And according to the actual situation for the promotion of the project area, such as climate, the equipment has fine-tuning before running. In this way, it can adapt to the special environment of the region, and keep the running index unchanged.</p>
	<p>技术安全性 Technology security</p>	<p>就以生物质气化燃烧炉作为谷物干燥机的热源配套设备此一用途来看，其市场实用性，接受度，相关配套均已成熟；因为谷物干燥机作为目前农业机械化设备的重要一环，经过数年的发展，本身技术和市场运行已经相当成熟，而生物质气化燃烧炉作为其热源设备，仅对目前市场上其他以化石能源或秸秆直燃来产热的谷物干燥机配套设备进行技术替换和升级，对热输出功率和燃烧排放指标进行优化，并没有改变谷物机械干燥本身的原理和市场运作模式，因此技术安全性高。</p> <p>As biomass gasifier as heat source equipment of grain dryer, the market availability, acceptance, related have been mature; because the grain dryer is an important part at the agricultural mechanization equipment, after several years of development, technology and operation of the market is already quite mature, and biomass gasifier as its heat source equipment, in order to optimize the heat output power and combustion emissions by replacing and upgrading the other equipment of the grain dryer which is produced by the direct combustion of fossil fuels or straw. does not change the grain dryer principle and the operation mode of market, therefore, it has high technology security</p>
	<p>成果转化推广障碍 Obstacles to the promotion of</p>	<p>政策：在15年之前的十二五期间，国家对于生物质综合利用，秸秆综合利用等领域提出了非常多的扶持政策，2016年作为国家十三五规划首年，希望给予更多的具有针对性的定向扶持；</p>

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	<p>achievements transformation</p>	<p>资本：作为环保产业，新兴技术要占领市场除了政策扶持和本身技术过硬外，还需要国家和资本市场给予更多的资本倾斜，使新技术在开发前期有足够的资本进行运作和推广；</p> <p>人才培养：希望能有更多机会与相关科研院所以及高校热能和机械专业广泛接触，引入高科技专业人才。</p> <p>Policy: During the 12th Five Year Plan, the comprehensive utilization of biomass, straw comprehensive utilization and other areas have been put forward a lot of support policies in our country, The national plan for 13th Five-Year began in 2016, I hope give more targeted support;</p> <p>Capital: As the environmental protection industry, emerging technology to occupy the market not only in addition to policy support and excellent technology, but also need to countries and capital market give more capital tilt, that make the new technology in the development of early enough capital for the operation and promotion;</p> <p>Personnel training: I hope to have more opportunities to make extensive contact with related research institutes and the heat and mechanical professional of universities, I can know more high-tech professionals.</p>
	<p>知识产权转让 Transfer of intellectual property rights</p>	<p>本项技术具有自主知识产权，已经取得多项相关发明和实用新型专利；</p> <p>技术拥有方和专利权方均为安徽喜阳阳新能源科技有限公司，性质为企业；</p> <p>目前该项技术及相关产品均由技术拥有方安徽喜阳阳新能源科技有限公司自行开发，未对第三方进行授权或转让。</p> <p>This technology has proprietary intellectual property rights. And it has made a number of related inventions and patent for utility models;</p> <p>The owner of the technology and the patent right shall be the Xi Yang Yang in Anhui new energy technology co., LTD, the nature of the enterprise;</p> <p>At present, the technology and related products are developed by the owner of Xi Yang Yang in Anhui new energy technology co., LTD, not on the third party to authorize or transfer.</p>

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Achievement Declaration for Renewable Resources Technology				
Beijing Shenwu Environment & Energy Technology Corp	Two-dimensional/QR code			
	Company providing the technology	Beijing Shenwu Environment & Energy Technology Corp	Date of submission	2016-7-29
	Contact person	Ms. Zhang Nannan	Type of technology	Biomass energy utilization technology
	Telephone no.	15201560622	Email	zhangnannan@shenwu.com.cn
	Description of technology	No heat carrier regenerative rotating bed biomass pyrolysis new technology		
	Company providing the technology	Beijing Shenwu Environment & Energy Technology Corp		
	Application scope	Beijing Shenwu Environment & Energy Technology Corp		
	Technology brief description	This technology adopts no heat carrier regenerative radiant tube rotating bed pyrolysis device, which is Shenwu's independent intellectual property right, to pyrolyze the biomass under anaerobic condition so that the biomass can be effectively converted to biochar, bio-oil which is easy to store and with high energy density and combustible gas. During process there is no inhalable particle including smoke & dust and PM2.5 etc to be generated and no pollution which achieves successfully bio-oil & bio-gas (electricity) & biochar combined production and with flexible single furnace handling capacity.		
	Technical information	Temperature range 0-1000°C; Furnace chamber pressure range & plusmn: 2000Pa; The CV of the fuel of regenerative radiant tube for heating & ge; 700kcal/m3.; The diameter of equipment is ranged from 11m to 65m.		
	Commercial application situation	200t/d organic solid waste comprehensive pyrolysis treatment project which is located in Bazhou, Hebei province. This project is to carry out resource recovery treatment for organic solid waste and with area of 50 mu. In the first stage the pyrolysis gas can be sold and in the second stage the electricity can be sold. The diameter of pyrolysis equipment is 26m.		
	Contact person/tel/email of commercial reference plant	Hebei Bazhou Changlong New Energy Co.,Ltd Zhanghongda 13752515046 zhhongda@126.com		
	Application condition	Available with market dealing and establishment locally; The technology is mature; Before application of this technology, the system training is necessary. Module installation and maintenance can be realized for pyrolysis device with low maintenance cost.		
	Equipment investment	Taking 500t/d straw biomass pyrolysis project as example, the equipment investment is 134,220,000 Yuan, including two sections. The first section is involved with main equipment investment of 98,880,000 Yuan, comprising of straw pre-treatment unit of 1,161,000 Yuan, pyrolysis unit of 3,340,000 Yuan, oil & gas separation& purification unit of 15,370,000 Yuan		

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	and power generation of 38,500,000 Yuan. The second section is involved with auxiliary equipment investment of 35,340,000 Yuan, comprising of plant common pipe network of 1,596,000 Yuan, air compressed nitrogen station of 6,069,000 Yuan, circulation water plant of 2,723,000 Yuan, sewage treatment station of 2,562,000 Yuan, fire protection of 1,260,000 Yuan, telecommunication of 8,211,000 Yuan, heat exchanging station and plant heating supply of 1,064,000 Yuan, plant pipe gallery of 1,050,000 Yuan, manufacturing management and administration office of 3,836,000 Yuan, analysis & testing of 5,117,000 Yuan.
Operation & maintenance cost	Taking 500t/d straw biomass pyrolysis project as example, when the system is under normal operation, the operation cost per ton using the technology includes water cost of 5.97 Yuan, waste water treatment of 1.47 Yuan, electricity consumption of 58.66 Yuan, chemical reagent cost of 3.29 Yuan, salary & welfare cost of 24.41 Yuan, maintenance cost of 23.53 Yuan, straw raw material cost of 300 Yuan and depreciation cost of 104.6 Yuan.
Payback period	The larger the capacity is, the shorter the project payback period is. Under the same process condition, for the project with treatment capacity of 200-400t/d, the payback period is ranged from 3 to 6 years. For the project with treatment of 600-1000t/d, the payback period is ranged from 2 to 4 years.
Other income	The technology can generate the power and byproducts with high economic added value including biochar, wood vinegar liquid and bio-oil. These by-products can produce profit. The market price of biochar is ranged from 1000 to 3000Yuan/ton, the price of wood vinegar liquid is ranged from 300 to 500 Yuan/ton and the price of bio-oil is ranged from 1000 to 1500 Yuan/ton.
Technology share ratio	Most of researches in biomass pyrolysis technology is under pilot testing phase in China, while, the technology using no heat carrier regenerative radiant tube rotating bed pyrolysis device can pyrolyze the biomass under anoxic condition and realize industrialization promotion which is exclusively owned by Shenwu Group.
Technology market potential	The total annual output of various crop straw came to 0.6 billion tones in China, however, the utilization ratio only came to 33% and most of the same is not be treated. According to the estimate from the national energy office, annual utilization amount of agricultural and forestry residues came to 75,000,000 tones and annual utilization amount of various energy crop came to 25,000,000 tones, which can replace fossil energy equivalent of 50,000,000 tones standard coal per year. & ldquo; The 12th Five-Year Plan & rdquo; stated that the installed capacity of power generation of biomass energy will reach 13,000,000kwa in the future 5 years and the market potential of this technology is huge.

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		<p>Compared with biomass incineration power generation project, the payback period of this technology is shorter. Meanwhile, using this technology there is byproducts including biochar, bio-oil and wood vinegar liquid etc to get high profit.</p> <p>According to the 13th Five-year Plan, the state encourages green circulation agriculture, and request to increase the agriculture soil organic matter by 0.8% and reduce the pesticide usage; meanwhile, soil ten policy says more than 97% of contaminated farmland soil should be recovered and utilized by 2020, which brings opportunity and market for biomass pyrolysis projects with two aspects of advantages. One is that the biochar can improve and recover soil and two is that the wood vinegar liquid can replace some of pesticide as nature insecticide and antiseptic. This technology can realize high efficiency resource utilization.</p> <p>At present, this technology has been strongly promoted and demonstrated in organic solid waste area. The reference plant located in Bahou has been putting into continuous production nearly 8000 hours with well operation condition. 300t/d waste pyrolysis treatment project located in Yangling, Shanxi province has been started in 2016. As execution of various projects, the commercial industry application of this technology has been mature.</p>
	Progressiveness of technology	<p>The retorting device adopted for this technology is non-heat carrier regenerative rotary bed biomass retorting device and passed technical evaluation organized by NEA (National Energy Administration) in 2012, the conclusion is international advanced level.</p> <p>In this technology, the regenerative radiant tube heating technology is applied, it can use low calorific fuel gas, fuel gas with calorific value 700Kcal/m³ will be sufficient.</p> <p>The applicability of raw material is wide for this technology.</p> <p>The product (oil & gas quality) is good and calorific value is high.</p> <p>The treatment capacity is flexible, from 50 to 1500t/d is feasible.</p>
	Maturity of technology	<p>The non-heat carrier regenerative rotary bed biomass retorting new technology of Beijing Shenwu Group, the system is mainly consist of biomass pretreatment system, retorting system, oil & gas separation system, power generation system, wastewater treatment system etc, which can convert the biomass into charcoal, biomass gas, biomass tar and pyrolytic oil four kinds of products in one production line, the utilization through biomass retorting is high.</p> <p>The application of this technology has achieved significant result. As a global first and international leading technology, this patent technology has been highly recognized by Beijing Municipal Science & Technology Commission. At present, a 200 t/d organic solid waste retorting resource utilization demonstration project has been built in Shengfang Town, Bazhou city, Hebei Province (Bazhou Changlong New Energy Co., Ltd), which has been continuously operated for 8000 hours in good running condition, besides, as a Beijing-</p>

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		<p>Tianjin-Hebei collaborative innovation major science & technology demonstration project, it has been accepted by Beijing Municipal Science & Technology Commission, this technology is advanced and stable.</p> <p>All the equipments of this technology are domestically made and supplied, among which, rotary bed technology, regenerative (radiant tube) high efficiency combustion technology etc are proprietary technologies developed by Beijing Shenwu Group, which has been applied in mutiple industrial devices in domestic and abroad, both the technology and equipments are mature and reliable. The biomass pretreatment equipment in this technology has went through years of development & industrial practice of domestic production industry and has becoming mature and without risk. The power generation unit of this project such as boiler, steam turbine, electric generator etc the main equioment all belong to regular, mature and systematic equipments.</p>
	Applicability of technology	<p>This Technology can be applied into organic riched all kinds of organic wastes in agriculture and forestry, breeding industry. The biomass matreials souces is wide but scattered, the key issues lies how to collect the argriculture and forestry waste such as straw in farmers' land etc. Thretherefore, the biomass retorting treatment project shall be built in the area with abundant biomass resources which is also easy for colletion.</p>
	Technical stablility	<p>With the biomass retorting technology developed by Beijing Shenwu Group, the company has built 24t/d pilot test facility which realized multiple continuous and stable operation, the technology is mature. At present, a 200t/day organic solid waste pyrolysis resource recycling demostraton project(Bazhou Changlong New Energy Co.,Ltd) was bulit in Shengfang town, Bazhou, Hebei Porvice, it has been continuously operated around 8000 hours in good condition.</p> <p>All the equipments of this project are locally supplied, among which, rotary bed technology, regenerative (radiant tube) high efficiency combustion technology etc are proprietary technology developed by Shenwu Group and have been applied into several industrial devices in domestci and overseas. Both the technology and equipments are mature and reliable, the technical requirement is not subject to the influence of other factor.</p> <p>The the raw materials of this project, i.e. biomass has a seasonal change, thus most of the agricultural biomass are owned by farmers and may have a price fluctuation problem, however, the influnence of which can be under control by proper raw material stock and purchasing.</p>
	Technolgy safety	<p>(1) Technology practicability</p> <p>The total annual production of various crop straw in China is around 600million tons, but the utlization rate is only 33%, most of which have never been processed, therefore this technology has an huge potential. Compared with other biomass treament technology, this</p>

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	<p>technology can not only convert the biomass into energy to generate electricity but also turned into resources to utilize as by-product such charcoal, bio-oil as well as pyroligneous which may bring higher earnings, so this technology is more practical.</p> <p>(2) Auxliary facility condition Beijing Shenwu Group’s non-heat carrier regenerative rotary bed biomass retorting new technology can be used to bulit complete set of devices in different scales, pyrolysis oil and gas can be digested inside the project and product can be converted into electricity. According to the related national policy, the electricity can be connected with electrical power grid and obtaine proce subsidy, power network should be safe. Charcoal as fertilizer, is a type of technology strongly promoted by the country. Pyroligneous has been used as bactericide and pesticide in agriculture, thoesse by-product has been accepted by market, it enables the project to realize commercial operation. Besides, the axulilairy public utilities only need basic condtion required by common construction project.</p> <p>(3) Acceptability by public society The project adopt domestic advanced biomass treatment technology and cause less environmental polution. In particular, it can avoid the problem of inhalable particle such as smoke dust and PM2.5 etc produced by conventional incineration method and contribute to neighbouring residents’ health and social harmony, so it is more commonly accepted by the public.</p>
Obstacles in achievement transformation & promotion	During the process of technological achievements transformation and promotion, as a mature technology, the country has supportive national policy and also the capital market has given strong support. However, the main obstacle comes from biomass raw materials’s garthering, due to most of the biomass materials is scattered, seasonal and mainly owned by farmers, there are certain risks and difficulty to collect timely as needed.
Assignment of interllectual property	This technology has domestic independent interllectual property rights, it has applied for 27 patents, obtained 16 authorized patents, among which, thre are 2 inventive patent, equipment localization are 100%.
Illustration	Pictures

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Changzhou Zhengyi	Market potential of technology	The biomass particle burner and its matching products (boiler) will be a kind of updated products replacing primary energy resource in the future, and with the exhaustion of primary energy resource, a considerable portion of civilian energy will be biomass energy. Today's solar energy will replace the solar energy of yesterday. It is estimated that the primary energy resource products used in China and sold every year (mainly coal) is about 10 million sets, and annual market demand is over a million sets (in recent years, sales volume in coal-boiler market is over 2 million sets every year). Now, annual market demand of biomass particle fuel boiler could be more than ten thousand sets; With the maturity of products and matching of fuel production, annual demands will also continuously increase. The original air heating furnace market is huge, mainly taking coal, firewood, natural gas and electricity as energy to process tea and grain, and coal and firewood cannot control the temperature; The cost of natural gas and electricity is higher, with potential safety hazard, and electricity utilization is restricted by power grid; Biomass energy is a kind of green clean energy, taking forestry and agricultural residues as raw materials, both environmentally friendly and renewable. It has wide sources, with the title of green coal. The air heating furnace taking biomass particle as fuel is not common. Though biomass particle fuel has been brought to the forefront, it is still a new project, with broad market.
	Technical advancement	The biomass particle air heating furnace possesses domestic advanced level of originality. The social benefit of popularization and application of biomass energy is obvious. 1. Adjust industrial structure to develop manufacturing industry of fuel moulding equipment, fuel processing industry and manufacturing industry of combustion equipment to increase the employment; 2. Relieve the shortage of coal, oil, gas, electricity and other energy resources supply, expand the use of renewable energy resources, save primary energy resources. 3. Reduce discharge of CO ₂ to reduce pollution to the air. Currently, in domestic market, there is the similar boiler but in small quantity.
	Technical maturity	The comparative advantage of technical characteristic of the product is: (1) High combustion efficiency and thermal efficiency: The product combustion efficiency of the competitor is about 80%, thermal efficiency about 80%. The product combustion efficiency of this project is about 90%. Boiler efficiency (service efficiency) about 80%, the overall energy efficiency is higher than the competitor's (2) Dust content in flue gas: The product adopts efficient numerical control combustion technology and underfeed type clean combustion technology, which save fuels and reduce pollution to the air, and the concentration of sulfur dioxide is <3mg/Nm; (Industrial standard is 1,200mg/Nm), the dust concentration is 2mg/m; (Industrial standard is 10mg/m). Namely, environmental protection index is better than the competitor's. (3) Combustion stability is better than the competitor's.

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COMPANY: **CHANGZHOU ZHENGYI**

	Technical applicability	<p>The use of biomass particle air heating furnace is very wide, used to replace traditional fire coal and electric heating furnace, used to dry, supply heat, etc.. Main industries involved are:</p> <ul style="list-style-type: none"> • Industrial aspect. Heat supply for grain drying, greenhouse, fruitwood and floriculture greenhouse, modern rooms for raising chickens or pigs and other facility agriculture. • Industrial aspect. Heat supply for plant, spraying plastics to the surface of metal products, baking finish, electroplating drying, drying of other materials, etc.. • Forestry aspect. Drying of tea, medicinal materials, timber, wood flour, etc.. Livelihood aspect. Warm air heating, clothes drying, etc.. <p>It is qualified approved by Jiangsu Test and Evaluation Station of Agricultural Machinery.</p>
	Technical stability	Use stably, safely and reliably, with low failure rate.
	Technical safety	For electric appliance, use small capacity control power supply, without pressure or dust, and specify specific sites for combustion.
	Obstacle in achievement transformation and promotion	New energy application is an emerging market, not mature, with high cost, low user acceptability, and it is better to be popularized by the government.
	Transfer of intellectual property	<p>1 patent for invention (technology of Beijing Suyang Pellet Burner Ltd. originally), 2 patents for utility models 29 products for five series have been developed in matching, and popularized and applied in Eastern China, with broad development prospect. Patent for invention: Rotational hydro cooling spray combustion type biomass particle burner: (Patent No. ZL201210055967.0); Patent for utility models: New type biomass particle high temperature hot-air furnace: (Patent No. ZL201420646274.3); Patent for utility models: A kind of biomass particle fuel low temperature hot-air furnace: (Patent No. ZL201520409753.8)</p>
	Photo caption	

TECHNOLOGY: BIOMASS COOKER -ICS AND OTHERS
COMPANY: DEZHOU DAHE BIOFUEL MACHINERY CO., LTD


Renewable Energy Technology Achievement Declaration			
Dezhou Dahe Biofuel Machinery Co., Ltd	QR code		
	Technology provision unit	Dezhou Dahe Biofuel Machinery Co., Ltd.	Submission date July 15, 2016
	Contact person	Xiao Anxun	Technology type Biomass energy utilization technology
	Tel.	13605349182	E-mail 879180105@qq.com
	Technology name	Biomass compression technology	
	Technology provider	Dezhou Dahe Biofuel Machinery Co., Ltd.	
	Scope of application	Dezhou Dahe Biofuel Machinery Co., Ltd.	
	Brief description of technology	One biomass curing forming machine, mainly composed of the body, the crankshaft connecting rods, piston stamping and other mechanisms attached to the body. The feed silo is installed above the body, and discharge mode of discharge hole is installed in the body When used, the biomass feedstocks are fed into the hopper and vertically and freely access to the machine body. Motor drives the crankshaft connecting rod rotation so that the piston rod reciprocating punching motion will squeeze biomass feedstocks out of the discharge mode of discharge hole in order to complete the biomass curing forming.	
	Technical information	Technical parameters: Power: 55KW, Yield: 1,500kg/h, Energy consumption: 35kwh/t Equipment size 3,300*1,500*1,460(7.5t)	
	Business application situation	1. Jiangsu Yangzhou Biomass Energy Co., Ltd.: Wooden furniture factory dust, sawdust and waste, curing and forming into fuel briquettes. 2. Taicang Xinrui Energy-saving Equipment Company: Agricultural and forestry waste and straws are cured and formed into fuels.	
Service conditions	1. Jiangsu Yangzhou Biomass Energy Co., Ltd.: Gu gang 13817127588 2. Taicang Xinrui Energy-saving Equipment Company: Wang Jianxin 13862275077		
Contact person of business	It can be traded in the market, and it can also be invested on construction in the local place; The technology is mature, so the installation and debugging process needs training for customers. With low installation cost, power consumption is less than 40% of the ring mold machine, lubricating oil		

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COMPANY: DEZHOU DAHE BIOFUEL MACHINERY CO., LTD

application unit /Tel./E-mail	consumption may not be taken into account, machine failure rate is very low, tooling and maintenance cost is low. The total power is about 250KW.
Investment on equipment	The technical production processes: Biomass feedstocks Smash; Drying (dry in the sun); Molding and ex-factory Using this new technology, daily production of 50 tons of equipment necessary for the project: 1 pulverizer, 1 drying machine, 2 molding machine and the conveyor In total: RMB 900,000
Expense of operation maintenance	4 persons are required to follow 2 production line of curing and forming machines with 40 tons for calculation daily Press molding machine energy consumption per ton: Electricity of 35kwh, lubricating oil RMB 1.5; Labor cost of RMB 15, tooling costs of RMB 7 and other maintenance costs of RMB 3, total about RMB 60.
Investment payback period	Payback period of 4-6 months
Other earnings	Biomass curing forming ring mold machines currently on the market: Large quantity, large electricity consumption, large lubricating oil consumption, high failure rate, high equipment depreciation and maintenance costs. The power consumption of our ram-type biomass curing forming machine is less than 40% of the ring mold machine, lubricating oil consumption may not be taken into account, machine failure rate is very low, tooling and maintenance cost is low.
Technology occupancy	Ram-type biomass curing machine is a new curing forming technology, with total market share of products accounting for about 10% during promotion process.
Market potential of technology	Due to the traditional ring mold forming machines, strong market reaction in high failure rate, high energy consumption, and low yield, then the expected type machine emerges Ram-type forming machine solves the above problems of ring mold forming machine; With huge market potential, it is estimated that by 2020 the total market share will be around 60%.
Technical advancement	The advanced technology in the domestic and foreign similar technology is in a leading position.
Technical maturity	The technical production processes: Biomass thick material; Smash; Drying (dry in the sun); Curing forming; Finished products. Pulverizer, dryer, curing and forming machine integration is complete.
Technical applicability	The promotion scope of the technology transferring and promotion is wide: Agriculture, forestry waste, furniture, wood company, and household waste disposal. It is not limited by geographical restrictions, size, environment, energy resources and other factors.
Technical stability	This technology can keep stable in the production operation, with lower sensitivity to interference of environment, technical parameters, etc..
Technical safety	During the transformation and industrialization of outcomes, practicality, facilities are complete, without risk in market acceptance.
Obstacle in achievement	Policy barriers. 1. Take more efforts on environmental protection, ban on coal; 2. Promotion of biomass renewable energy, there is policy support.

TECHNOLOGY: BIOMASS COOKER -ICS AND OTHERS
COMPANY: DEZHOU DAHE BIOFUEL MACHINERY CO., LTD

	<p>transformation and promotion</p> <p>Transfer of intellectual property</p> <p>Photo Captions</p>	<p>The product of our company has realized a number of utility patents, patent owner of Dezhou Dahe biofuels Machinery Co. Ltd.. All devices are complete such as localization and technology transfer will, without understanding mechanism, policy and approach of the technology and ownership transfer.</p> 	
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TECHNOLOGY: BIOMASS COOKER -ICS AND OTHERS
COMPANY: HANGZHOU OIL BURNING BOILER CO., LTD

Renewable Energy Technology Achievement Declaration																																																	
Hangzhou Oil Burning Boiler Co., Ltd	<table border="1"> <tr> <td>QR code</td> <td colspan="3"></td> </tr> <tr> <td>Technology provision unit</td> <td>Hangzhou Oil Burning Boiler Co., Ltd.</td> <td>Submission date</td> <td>June 29, 2016</td> </tr> <tr> <td>Contact person</td> <td>Wu Juan</td> <td>Technology type</td> <td>Biomass energy utilization technology</td> </tr> <tr> <td>Tel.</td> <td>13777864906</td> <td>E-mail</td> <td>juneng@vip.163.com</td> </tr> <tr> <td>Technology name</td> <td colspan="3">Circulating fluidized bed biomass gasifier</td> </tr> <tr> <td>Technology provider</td> <td colspan="3">Hangzhou Oil Burning Boiler Co., Ltd. Guodian Changyuan Hubei Biomass Gasification Science & Technology Co., Ltd.</td> </tr> <tr> <td>Scope of application</td> <td colspan="3">Hangzhou Oil Burning Boiler Co., Ltd.</td> </tr> <tr> <td>Brief description of technology</td> <td colspan="3">Adopting design guidelines of circulating fluidized bed, there is a hot sand bed in the lower part of hearth of gasifier, and the combustion and gasifying take place on hot sand bed. Under the function of gasifying agent blown in, biomass materials, bed materials and gasifying agent are fully contacted to generate reduction reaction under high temperature oxidation environment within the furnace and produce carbon monoxide, hydrogen, methane and other combustible gases, with characteristics of rapid reaction speed, high gas generation rate, low abrasion, high operational reliability, rapid start, etc..</td> </tr> <tr> <td>Technical information</td> <td colspan="3">The design output of the project is 10.8MW, and consumption of biomass fuel is 8t/h, input thermal power: 31.49MW;Biomass carbon conversion rate 96%;Thermal efficiency 85%; Gas production 18,105Nm³/h</td> </tr> <tr> <td>Business application situation</td> <td colspan="3">10.8MW biomass gasification and fuel coal power generator coupling power generation demonstration project of Guodian Changyuan Jingmen Power Generation Co., Ltd. is located in Guodian Changyuan Jingmen Power Generation Co., Ltd., Jiangshan Village, Pailou Town, Duodao District, Jingmen City, Hubei Province, and the gasification equipment operates in stable condition currently.</td> </tr> <tr> <td>Service conditions</td> <td colspan="3">Guodian Changyuan Hubei Biomass Gasification Science & Technology Co., Ltd. /General Manager of He Peihong A5826523758/heph@cydlcom.cn</td> </tr> <tr> <td>Contact person of business application unit /Tel. /E-mail</td> <td colspan="3">The project applies coupling of 10.8MW biomass gasification equipment and 640MW fuel coal unit, invested and constructed by Guodian Changyuan Power Co., Ltd. and operated and managed by Guodian Changyuan Hubei Biomass Gasification Science & Technology Co., Ltd.; the project realizes</td> </tr> </table>	QR code				Technology provision unit	Hangzhou Oil Burning Boiler Co., Ltd.	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		utilization of 17558 hours, networking power amount of 179450 KWH, and comprehensive utilization of straw resources of 123481 tons.
Investment on equipment		<p>The project applies power generation by coupling of 10.8MW straw gasification and 640MW fuel coal unit, with total construction investment of RMB 40 million and utilization of land of fuel coal thermal power plant; there is no need to levy new land, and the project can be completed for power generation in one year.</p> <p>Steam system for factory use, water cooling system, air compression system and power for factory use can be supplied by thermal power plant; especially for the fuel gas after straw gasification sent to boiler of fuel coal unit for co-firing with braize, there is no need to otherwise match corresponding boiler, steam turbine, generator and power distribution equipment, which is the key for substantial reduction of project cost while saving investment and land occupation, and substantial shortening of construction period.</p>
Expense of operation maintenance		<ol style="list-style-type: none"> 1. Fuel consumption per unit time: 8.00t/h 2. Number of utilization hours 17,558.00h 3. Design of the fuel: straw 4. Unit price of biomass raw materials: RMB 400.00/t 5. Heat efficiency of gasification furnace 86.11% 6. Carbon conversion rate: 96.72% 7. Gasification efficiency 73.41% 8. Gas volume per unit time 17,500 Nm³/h 9. Annual gas volume: 105,138,500 Nm³ 10. Consumption of raw materials per unit time: 8.00 t/h 11. Fuel gas and fuel cost per unit: RMB 0.18 /Nm³ 12. Comprehensive unit price of water supply (Including water treatment cost, agent cost, etc.) RMB 0.33 /t 13. Gas consumption per unit of water cost: RMB 0.000094 /Nm³ 14. Electricity consumption per unit time 600.00 KWH 15. Gas consumption per unit of electricity cost: RMB 0.02 /Nm³ 16. Gas unit of labor cost: RMB 0.03 /Nm³ 17. Maintenance cost of unit fuel gas: RMB 0.01/Nm³ 18. Equipment depreciation period: Ten years 19. Residual value ratio of fixed asset: 5.00% 20. Shared depreciation cost of each unit of fuel gas of investment on equipment and installation: RMB 0.03/Nm³
Investment payback period		The project has a stable production and operation after putting into operation, and the company realized a accumulated net profit of RMB 5.34 million in book value in 2013-2015. If taking the income

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		of renewable energy electricity rate subsidy of RMB 7.92 million (including tax, the subsidy was in place in March 2016) in 2013 into account, and it realized total profit of RMB 14.64 million and net profit of RMB 10.98 million in 2013-2015, and annual return rate of investment in 2013, 2014 and 2015 was 12.04%, 12.32% and 14.86% respectively. Investment payback period is 6-7 years.
	Other earnings	The tar generated in gasification has no influence on power station boiler furnace and consequent equipment, and is burned timely during 1,200-1,300°C in boiler furnace; Solid waste generated is biomass dust after fuel gas dedusting with an annual output of 5,000 tons, and it is sent to silo by application of pneumatic transmission for reutilization by the society. The project belongs to energy conservation and environmental protection project, as it reduces coal combustion quantity of the unit after implementation, the existing discharge of smoke, sulfur dioxide and nitric oxide of power plant can be decreased in a certain degree, and it has a positive effect on improvement of air environment quality in the area of factory address. Meanwhile, carbon sink index and green electricity index can be obtained.
	Technology occupancy	With authentication by famous experts such as Zhang Qisheng, an academican of the Chinese Academy of Engineering, the project technology is the first one in our country; our company and Guodian Changyuan Hubei Biomass Gasification Science & Technology Co., Ltd. entered into patent implementation permission contract in January 2016, and our company owns right of use, manufacture right and promoting right via exclusive authorization of 9 pieces patent technologies of Guodian Changyuan Hubei Biomass Gasification Science & Technology Co., Ltd. such as biomass gasification, coupling power generation of gasification and power plant, and any third party shall not use it without consent of both parties; Hence, current market occupancy is 100%
	Market potential of the technology	Biomass energy conversion technology has been widely recognized as a renewable energy utilization technology with long-term development prospect, the significance of its existence and development is not only confined to one point of provision of liquid fuel with high utilization value, and as this process enables high level utilization of renewable resource, slight pollution of ecological environment and sustainable supply of green energy have been organically combined together, which realizes effective unity of resource, energy and environment. As the state growingly pays attention to utilization of energy and strengthens environmental protection awareness, utilization of biomass gas for power generation not only saves energy, but also utilizes waste, reduces pollution, and has an optimistic market prospect. Our country has abundant biomass resource, the straw output of agricultural products only reaches over 0.6 billion ton, and residue resource of forestry is of 0.12 ton. To improve the comprehensive utilization rate of biomass with this technology, not only generates power and provides gas, hot, cool and industrial gas, but also improves the environment and increases the income of the farmer. Our country has a huge potential in development and utilization of biomass energy resource.

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	Technical advancement	<p>Biomass gasification equipment of the project applies high-speed circulating fluidized bed biomass gasification process, which realizes large-scale industrial utilization of biomass; it can process 8 tons of biomass each hour, and it is the largest biomass gasification equipment in our country. Compared with biomass bubbling bed and fixed bed for gasification, it has a higher gasification efficiency, higher gasification strength and more economic unit investment. The high-temperature gas state tar accompanying fuel gas is totally burned, sensible heat in high-temperature fuel gas brought into power generation boiler realizes sufficient utilization, only a small amount of fly ash is discharged, average carbon content is low, and incomplete mechanic heat loss is few. Through joint power generation with high-parameter large-volume thermal power unit, it improves biomass energy utilization efficiency to more than 34%, which is much higher than that of biomass direct-fired power plant. In July 2013, China Electricity Council organizes Zhang Qisheng, academician of the Chinese Academy of Engineering, and Qin Shiping, researcher of National Development and Reform Commission Energy Research Institute, and other famous experts in total of 11 to constitute authentication committee, and has conducted project achievement authentication. With verification of authentication committee, project technology is the first one in our country which ranks in international advanced level, and meanwhile, it is recommended to relevant national department to offer policy support to facilitate promotion and application of the achievement.</p>
	Technical maturity	<p>Process flow of biomass gasification coupling power generation project: After simple pretreatment, the biomass completes effective gasification in high-speed circulating fluidized bed gasification furnace, the fuel gas generated is directly sent into large-scale power station boiler for co-firing with braize in the form of hot fuel gas after dedusting in clarification system, and it utilizes original power generation system to realize effective power generation.</p> <p>Through in-depth research of biomass straw utilization technology, biomass gasification coupling power generation technology currently obtains breakthrough in many aspects, and biomass gasification demonstration project of Guodian Changyuan Jingmen Power Generation Co., Ltd. has been successfully constructed and operated; currently, the project has a high operation efficiency, its scale has been the maximum in similar kinds in Asia, processing technology is advanced, simple and effective, the complete equipment has a high reliability, commercial operation period has been four years with stable, safe and reliable operation and no occurrence of furnace shut down due to failure, and the project has obtained good benefit so far; successful operation of the project has opened up a shining path for effective utilization of China's biomass.</p> <p>In the production course of the entire project, it has many advantages such as high heat conversion efficiency, little loss, zero discharge of carbon dioxide and no generation of pollutant and waste.</p>
	Technical stability	<p>1. As of March 31, 2016, the project has had a continuous safe production for 1,339 days, realized utilization of 17,558 hours in accumulation, networking power amount of 17,945 KWH, and comprehensive utilization of straw resources of 123,481 tons.</p>

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		<p>2. Matching of fuel gas supply parameters and boiler parameters: Compared with 600MW large-scale supercritical power generation fuel coal boiler, biomass fuel gas only accounts for less than 2%, and the parameter of fuel gas entering boiler has slight influence on boiler parameters, which will not has negative influence on the boiler, according to <i>Test Report of Optimization and Adjustment After Blending Combustion of Material and Fuel Gas in No. 7 Boiler of Guodian Changyuan Jingmen Power Generation Co., Ltd.</i> completed by Xi'an Thermal Engineering Institute under invitation of Jingmen Power Plant: Through collection and analysis of large amount of testing data, optimum operation way has obtained after coupling of boiler and biomass fuel gas. The test result indicates that:</p> <ul style="list-style-type: none"> a) After coupling of No. 7 boiler and biomass fuel gas, fly ash combustible has decreased. b) CO at outlet of air pre-heater has significantly decreased, which has great benefit in mitigation of high temperature corrosion on water wall; c) Smoke discharge temperature after coupling with biomass fuel gas has little change; Heat efficiency of the boiler after coupling with biomass fuel gas is of 92.57%, which has increase with 0.26% compared with that prior to coupling; d) NOx at inlet of SCR has decreased with about 10% after coupling with biomass fuel gas.
	<p>Technical safety</p>	<p>Set evacuation of fuel gas and rapid cut-off valve group, and relate with MFT of power station boiler. For example, disappearance of power supply of disperse control system, communication interruption, function failure of all operator station and the emergency situation such as loss of control and protective function of important control station, the operations have been constantly perfected an optimized; currently, it has passed the examination in operation practices of three-year' business operation in demonstration project, it has been proved that various safety protection measures with equipment and chain protection setting and operational specification applied in appropriate, and they can exert effect properly in case of emergency to protect equipment, system and personal safety. Meanwhile, our company carefully implements the policy of safety first and prevention first, adheres the principle of people's interests first, absorbs lessons of relevant domestic accidents, strengthens management in safe production, actually puts various safety measures in to practice, ensures people's life and property safety and equipment safety, and combines the experience of 4-year's commercial operation; in the whole course of project approval of biomass gasification coupling power generation project to putting into commercial operation, achieve safety management, conduct various works especially aiming at key points of fire and explosion precautions, and ensure perfect safety of safety work.</p>
	<p>Obstacle in achievement transformation and promotion</p>	<p>It is recommended that the state puts more efforts in promotion of technology application, and gives play to the advantage of effectiveness, green and low-carbon and environment protection of the technology.</p>

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		<ol style="list-style-type: none"> 1. Specify in the level of national policy that biomass gasification coupling power generation project implements the same networking power price and relevant preferential tax policy with biomass direct-firing power generation project. 2. When the state makes relevant industrialized planning of biomass energy utilization, include biomass gasification-re-combustion power generation technology (also referred to as fuel coal and biomass coupling power generation technology) into one direction for promotion. 3. Regarding the project has no individual installed capacity, for biomass gasification and re-combustion power generation project to obtain local approval or handle filing, and other approvals such as power rate reply and permission of power business, there exist different opinions and divergence. It is recommended to specify in a level of national policy the project as an individual biomass coupling power generation project (different from direct-firing power generation) to declare and perform filing procedure, which is convenient for approval of relevant formalities; meanwhile, declare the capacity of the project 10.8MW to replace coal power according to biomass power generation capacity and make statistics in the same way, while generating capacity of large unit for coupling shall not be decreased. 4. The solution to the problem of collection and storage of biomass is the key for successful operation of the project; it requires the government to issue relevant collection and storage policy, establish an organization to collect and store biomass and assist the project to build biomass collection and storage system.
	Transfer of intellectual property	The project belongs to independent research and development, obtains nine pieces of patents in total, wherein, efficient combination power generation method of biomass gasification and fuel coal power generation boiler obtaining one invention patent and biomass high-speed circulating fluidized bed gasification boiler and other achievement of eight in total obtaining utility model patent. Our company and Guodian Changyuan Hubei Biomass Gasification Science & Technology Co., Ltd. entered into patent implementation permission contract in January 2016, and our company owns right of use, manufacture right and promoting right via exclusive authorization of 9 pieces patent technologies of Guodian Changyuan Hubei Biomass Gasification Science & Technology Co., Ltd. such as biomass gasification, coupling power generation of gasification and power plant, and any third party shall not use it without consent of both parties;
	Photo caption	

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Renewable Energy Technical Achievement Declaration	
QR code	
Technical provision unit	Henan Jufeng Bioenergy Development Co., Ltd.
Contact person	Guan Yongwei
Submission date	June 15, 2016
Technical type	Biomass energy utilization technical
Specific technical	Biomass Energy-saving Stove
Tel.	18539305501
E-mail	Guanlil618@163.com
Technical name	Biomass Granular Cauldron Stove
Technical provider	Henan Jufeng Bioenergy Development Co., Ltd.
Scope of application	Apply to the catering industry, urban and rural residents, farmhouse, restaurants and canteens of enterprises and institutions, etc.
Brief description of technology	Apply to Φ6mm-8mm wooden-pellet fuel, with the sealed combustion design, thoroughly fuel combustion and good gasification, having a device for automatic ignition, feeding, and the device of multi-air supply and oxygen addition, achieving the environmental effect of having no smoke, dust and smell. Be complete with steaming, boiling, stewing and frying, thick stainless steel for stove panel, the design of side bunker fully uses space, powder injection treatment to the overall stove, and the liner has adopted the technology of compression moulding using special refractory materials
Technical information	Heat rating 3.1-11KW Fuel consumption 0.7-2.5kg/h Appearance 1065×740×720mm Net weight of product 115kg
Business application situation	Beijing North Locomotive Technology Co., Ltd. - No. 799, Chuangyigu Street, Jingdong Yanjiao Development Zone, Beijing - 10 units - For 1,000 persons/meal
Service conditions	The product owns mature technology, automatic design, easy operation and adopts market transaction. No need of system training with the attached detailed Instructions;; High reliability, and lower installation, use and maintenance costs
Contact person of business application unit /Tel./E-mail /Tel. /E-mail	Beijing North Locomotive Technology Co., Ltd./ Tang Zhaogang/13370175828

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Investment on equipment	The equipment, whose price is RMB 5,000, can be directly used with no need of other accessory equipment.
Expense of operation and maintenance	Electric charge: The power of the equipment motor is 70W; If calculated at operating 5 hours per day and 300 days per year, and electricity price is RMB 1/kwh: $0.07*5*300*1=RMB 105$ fuel cost The fuel consumption of the equipment is 0.7-2.5kg/h, and average price of biomass granular fuel in China is RMB 700/ton: $0.7-2.5kg/h*5*300*0.7=RMB 735-2,625$; Total annual maintenance cost is: RMB 840-2,730
Investment payback period	One equipment can supply 100 persons/ meal. Meal fee of 1 person/ day is calculated at RMB 20, raw material is calculated at RMB 10/day, annual profit: $100*3*20*300=RMB 1,800,000$, cost: $100*3*10*300+2730=RMB 902,730$; It is shown that the investment can be taken back in the same year.
Other earnings	Except for small amount of electricity, main fuel of the equipment is biomass granule; Environmental benefits: Energy saving and emission reduction, promote low-carbon economic development. The project products are for the development and utilization of biomass, great at digesting crop straws, saving coal, petroleum, electricity and other energy sources for the purpose of energy conservation and emission reduction, eco-environment protection, promotion of sustainable living process and development of low carbon economy. By the designed productivity, the biomass molding equipment is available to digest biomass fuel of about 3,000t, substitute standard coal of 1,500t, and reduce emission per year in CO ₂ of about 3,900t, SO ₂ of about 12t, and NOX of about 11t to protect the ecological environment. Good social benefit With the corn stalks, cotton straws, bean straws, wheat bran, rice straws, millet straws, peanut vines (shells), alfalfas, furfural residues, ginger residues, barks and other agriculture and forestry residues of primary processing and part of industrial residues as the production materials, the normal production of products needs to purchase biomass materials from the surrounding farmers, through which, income of native farmers can be increased and the local economic development and new rural construction can benefit from this.
Technical share	Domestic market share in 2015 was 2%, which ranked forefront in the same trade.
Potential of Technical market	In the National <i>Middle and Long-term Development Planning of Renewable Energy Sources</i> , it indicates that: According to the current needs of economic and social development as well as biomass energy utilization technology in China, the biomass energy utilization focuses on biomass power generation, methane, biomass solid molding fuel and biomass fluid fuel. Wherein, biomass solid molding fuel refers to the fuel, that is the compression molding of biomass by special device for the purpose of storage, transportation and use convenience, clean and environmentally friendly characteristics and high combustion efficiency, which can be used as cooking and heating fuels for rural residents, as well as the fuels for decentralized heat supply in cities. The plan proposes development goal and key points of construction of biomass solid fuels By 2020, the biomass solid molding fuel will become a superior fuel widely used. The annual consumption of biomass solid

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		<p>molding fuel in China will be 50,000,000 tons. It means that the utilization amount of biomass granular fuel will increase over 3 million tons annually in average in the next 15 years, which will provide great space for the development of biomass energy molding equipment and biomass energy stoves. Meanwhile, the equipment may replace rural firewood stove, and it can also be used in happy farmhouses, restaurants, canteens of enterprise and public institutions. It can meet supply of hot water or steam while cooking, and it has a wide market space.</p>
	<p>Technical advancement</p>	<p>The equipment is of simplicity and applicability, achieves automatic feeding during usage, and is convenient to make movement, with even fire behavior and little ash, high heat efficiency and no smoke or dust; it has fully utilized the one time recycling of waste heat energy and conversion heating technology, and has significantly reduced fuel cost. Combustion chamber inside the furnace is optimized and designed with whole sealing combustion, and combustion of fuel is complete and gasification is good. It has automatic ignition, automatic feeding and multiple air distribution and oxygen-adding equipment, and via configuration of bottom air inlet and adjustment and coordination of air volume between secondary air distribution outlet and fuel air inlet, it has effectively increase effective combustion efficiency of internal biomass fuel. It is equipped with heat insulation and fire-resistance materials outside the furnace core, which has effectively improved safe configuration of labor and extended service life of the equipment, and further enhanced safety performance of large cooking range during operation. The cooking stove realizes automatic control and feeding through electronic control operating panel and packing dragon feeding mechanism, and it has effectively reduced labor intensity of the worker, increased economic benefits of the enterprise, and realized overall automatic safe production process.</p>
	<p>Technical maturity</p>	<p>Large biomass granule cooking range includes frame body, and a furnace stage is equipped with on the upper end of frame body 1. It is equipped with pot body on the furnace stage, and it is equipped with core at the bottom of the pot body. It is connected with secondary oxygen-adding system at bottom of the core, and fireproofing material is equipped with in the outside of secondary oxygen-adding system. It is also connected with secondary air distribution outlet at the bottom of secondary oxygenation system, and it is respectively equipped with fuel air inlet and bottom air inlet at right and left side of secondary air distribution outlet. It is respectively equipped with igniter and grate board in the upside of bottom air inlet, and it is equipped with air blower at left side of frame body. Air blower is connected with the bottom of frame body via air inlet channel, and it is equipped with heat insulation material in the periphery of core. It is equipped with heat insulation board in the connecting part between heat insulation material and core and frame body, electronic control operating panel is equipped with on air blower, and the left side of frame body is equipped with packing dragon feeding equipment. The equipment system is mature and reliable, and there is no need of supporting equipment and can be used independently</p>

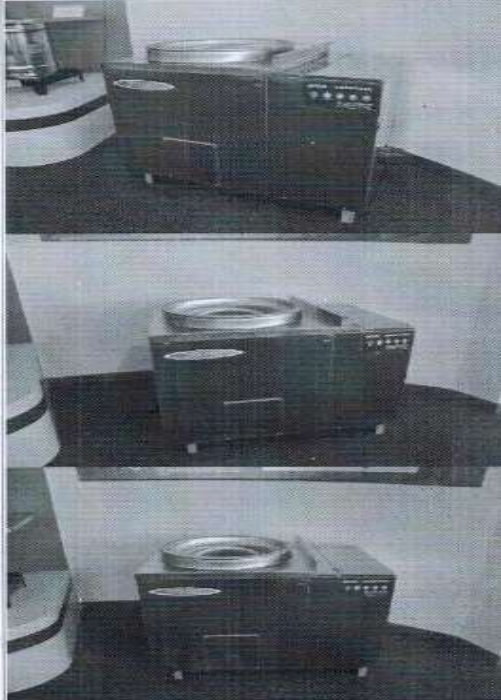

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	Technical applicability	The equipment technology is mature and reliable, and oral surface diameter of the product is about 600mm. It is integrated with the functions of frying, steaming and boiling. This product is one of the best sellers in companies and institutions, canteens and restaurants and can supply hot water or steam at the same time when the user is cooking. That is: Boiling soup or frying dishes on one hand, and steaming rice or steaming dishes on the other hand. During supply of hot water, similarly, on one hand, boiling soup or frying dishes is available, and on the other hand, supply of hot water showering is available. 3. Usage Target of product Urban and rural residents, happy farmhouse, restaurant, enterprise and institution canteen, etc. One oven can meet the use of a canteen with about 100 people.
	Technical stability	It is integrated with advanced automatic control technology and biomass fuel combustion technology, and intelligent electronic system operation is adopted; it realizes intelligent adjustment of fire, random control of firepower size, automatic feeding, convenient movement, large volume of kitchen work, even fire behavior and little ash, high heat efficiency and no smoke or dust. It has fully utilized the one time recycling and conversion heating technology of waste heat energy, and has significantly reduced fuel cost. Apply to $\Phi 6\text{mm}-8\text{mm}$ wooden-pellet fuel, with the sealed combustion design, thoroughly fuel combustion and good gasification, having a device for automatic ignition, feeding, and multi-air supply and oxygen addition, having the environmental effect of no smoke, dust and smell. The functions of steaming, boiling, stewing and frying are complete, panel of cooking range applies thickened stainless steel material with high temperature resistance and corrosion protection, and the design of side bunker fully utilizes the space. Long-term usage of the spraying powder part of overall cooking range will cause no black coating, and it is easy to be cleaned and it is clean and sanitary. The material of liner directly determines service life of cooking range. Liner adopts compression molding of special fireproofing material, and service life is several times of that of traditional cooking range.
	Technical safety	The safety of control system is in multiple protection, which ensures the quality and service life of the product. The appearance design is bright and fashionable. It is equipped with stainless water tank at the upside. It can heat the cold water in the bucket by utilization of waste heat in cooking. The temperature of hot water can reach to about 90°C at maximum, and it can be used for making soup, soup dishes, washing dishes and washings, etc. It gets flamed in 1- 2 minutes and saves energy of about 30-40% compared with natural gas, the maximum firepower is faster than natural gas about 50%, and it has the function of low carbon and energy conservation, economy and environmental protection.
	Obstacles in achievement transformation and promotion	Supporting motor of the equipment applies 220V alternating voltage, and it uses biomass granular fuel as fuel.

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	Transfer of intellectual property	The equipment technology provider possesses intact domestic proprietary intellectual property, and the provider is a domestic private enterprise and can offer technology transfer. Intellectual properties hold; Application for domestic invention patents to be authorized: A kind of large biomass granule cooking range, Application No.: 2015 1 0887U2.8. Authorized domestic patents. A large biomass granule cooking range, Application No.: ZL2015 2 1001002.9; An automatic feeding equipment of large biomass cooking range, Authorization No.: 2L 2015 2 1000641.3; An automatic feeding device of large biomass cooking range, Authorization No.: ZL 2015 2 1001063.5.
	Photo captions	
Renewable Energy Technical Achievement Declaration		
	QR code	
	Technical provision unit	Henan Jufeng Bioenergy Development Co., Ltd.

TECHNOLOGY: BIOMASS COOKER -ICS AND OTHERS

COMPANY: HENAN JUFENG BIOENERGY DEVELOPMENT CO., LTD

Contact person	Guan Yongwei	Submission date	June 15, 2016
Technical type	Biomass energy utilization technical	Specific technical	Biomass Compression and Carbonization Technologies
Tel.	18539305501	E-mail	guan li1618@163.com
Technical name	Biomass solid fuel Densifying equipment		
Technical provider	Henan Jufeng Bioenergy Development Co., Ltd.		
Scope of application	Comprehensive utilization of rural agricultural and forestry residues		
Brief description of technical	It makes agricultural and forestry residues and other biomass materials to be pressed cut or rub with the length of 30mm below and moisture content in 15-25%, of which, being feed into conveyor, forcibly squeezed out in block or granule from the hole of model through the rotation of spindle to power the compression roller and through the automatic rotation of compression roller, falling down from the outlet and being packed into the bags after cooling off.		
Technical information	Productivity 1200-1800kg/h, Dimension (L × W × H) 2600 × 2200 × 1800mm, Weight 3000kg		
Business application situation	Huzhuang Biomass Fuel Production Base -Huangcun West Road, Huzhuang Township, No.106 National Highway, Puyang County, Henan, with the annual comprehensive utilization capacity of 6000 tons and annual comprehensive utilization value of RMB 3,570,000		
Service conditions	With mature technical, the product uses market transaction, with detailed operation instruction attached along with the product and the system training provided at the same time; High reliability, and lower installation, use and maintenance costs		
Contact person of business application unit /Tel./E-mail	Puyang Lvtao Huinong Technical Co., Ltd./Han Haoyi/13525645999		
Investment on equipment	One set of equipment with the annual output of biomass solid fuel of 3,600 tons。 It requires a set of biomass solid fuel densifying equipment (including feeding machine) of RMB 120,000, a pulverizer of RMB 10,000, a receiving machine of RMB 5,000, a grass grasper of RMB 30,000, and a transformer of RMB 50,000, in total of RMB 215,000.		

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	Expense of operation maintenance	1. Labor cost: 3 persons * RMB 60/d * 300d = RMB 54,000; 2. Electric charge: Electric charge is by the integral electricity price of RMB 1/kWh and working hours per day of 8h, ① pulverizer: 1*25*8*300=RMB 60,000; ②briquetting machine: 1*55*8*300=RMB 132,000; 3. Oil consumption to grab grass and raw materials: RMB 100 for 8h/d oil consumption of grass grasper vehicle, 300*100=RMB 30,000; 4. Cost of raw materials: RMB 300 per ton in the average of straw materials, 300*3600=RMB 1,080,000; 5. Depreciation cost of the equipment The designed service life of biomass solid fuel densifying equipment of 10 years, other equipment of 5 years, $12/10+(1+5000+30000+50000)/5=RMB 31,000$; Total annual maintenance cost is: $54,000+60,000+132,000+30,000+1,080,000+31,000=RMB 1,387,000$
	Investment payback period	By the designed productivity, the biomass solid fuel densifying equipment is annually averaged of 3600 tons, which is calculated by multiplying of 1.5t each hour, 8 work hours each day, and 300 days each year, for biomass densifying fuel. At present, the densifying fuel is RMB 700/t in the market price and RMB 2.52m per year in the economic income. Each set of equipment is RMB 1,387,000 in the maintenance per year and RMB 215,000 in the investment cost, thus the investment outlay recouped in the year can be clear.
	Other earnings	Environmental benefit; Energy saving and emission reduction promotes low-carbon economic development. The project products are for the development and utilization of biomass, great at digesting crop straw, saving coal, petroleum, electricity and other energy sources for the purpose of energy conservation and emission reduction, eco-environment protection, promotion of process in green living and of development in low carbon economy. By the designed productivity, the biomass solid fuel densifying equipment is available to digest biomass fuel of 3600 tons, fungible to standard coal of 1800t, to emission reduction per year in CO ₂ of c. 4680t, SO ₂ of c. 15t, and NO _X of c. 13t to protect the ecological environment. Good social benefit With the corn straws, cotton straws, bean straws, wheat bran, rice straws, millet straws, peanut vines (shells), alfalfas, furfural residues, ginger residues, barks and other agriculture and forestry residues for primary processing and part of industrial residues as the production materials, the normal production of products is needed to purchase biomass materials from the surrounding farmers, of which, increasing their income thus benefiting the local economic development and new rural construction.
	Technical occupancy	Domestic market occupancy of 1% in 2015, ranking the forefront of the same industry.

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	Market potential of the technical	<p>For the purpose of national <i>Middle and Long-term Development Planning of Renewable Energy Sources</i>, it indicates that: According to the current needs of economic and social development as well as biomass energy utilization technical in China, the biomass energy utilization focus on biomass power generation, methane, biomass densifying solid fuel and biomass fluid fuel. Where, biomass solid densifying fuel shall refer to the fuel for compression molding of biomass by special device with storage, transportation and use convenience, clean and environmentally friendly characteristics and high combustion efficiently, which can be used as cooking and heating fuels for residents in rural area, as well as the fuels for decentralized heat supply in cities. The plan proposes development goal and key points of construction of biomass solid densifying fuel By 2020, the biomass solid densifying fuel will become a superior fuel widely used. The annual consumption of biomass densifying solid fuel in China is 50 million tons. It means that the utilization amount of biomass granular fuel will be averaged to annually increase over 3 million tons in the next 15 years, benefiting the development of biomass energy densifying equipment and biomass energy stoves. By 2020, it will need 11,000-18,000 biomass solid fuel densifying equipment with its productivity of 1.2-1.8t/h under the prediction of the annual consumption of biomass densifying solid fuel of 50 million tons in China. Thus, there is a large space in the application market of biomass fuel densifying equipment.</p>
	Technical advancement	<p>The special innovative design of equipment is characterized by raw materials with higher lignin and larger compression density, changing the vertical into horizontal mode production and using multi-seal design to avoid the dust into lubrication part of bearing. In the principal of its rotating centrifugal force, the biomass solid fuel densifying equipment makes the materials uniformly dispatched into all the densifying molds for the avoidance of the boring due to excess concentration of local materials. The unique mold densifying angle makes the discharge smooth and production efficiency higher under the premise in 100% densifying rate, remaining its excellent performance highlighting out of other types of machines. (1) It uses the dual-roller synchronous symmetrical mechanics design, making the productivity higher and stability increased, equipment failure rate reduced. (2) The improvement of design mold synchronizes with the roller abrasion to facilitate the gap adjustment, effectively extend the service life of core components, and meet the demands of long-time continuous production, significantly reducing the maintenance cost. (3) Simple structure is convenient to maintenance; The maintenance support is designed in center to facilitate the maintenance of complete machine. (4) Increasing the effective balance weight makes the operation stable, safe, anti-boring and noiseless. (5) There is a full improvement in the core components of this machine, strengthening the load intensity, especially having a more safety to the efficiency of materials to produce</p>

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		cotton straws and branches and other materials with higher hard lignin. (6) For the core components, they are forged and formed using the special materials with high abrasion proof,intensity and tenacity, and in a special treatment process, it is of longer service life, lower maintenance cost, be repeatedly used upon repair in no need of replacement.
	Technical maturity	1. Its fundamental is to smash and transport the agricultural and forestry residues and other biomass materials to the biomass solid fuel densifying equipment, squeeze them into blocky and granular biomass fuel by rotation as the biomass boiler fuel replacing coal. 2. It makes agricultural and forestry residues and other biomass materials to be pressed cut or rub with the length of 30mm below and moisture content in 15-25%, of which, being feed into conveyor, forcibly squeezed out in block or granule from the hole of model through the rotation of spindle to power the compression roller and through the automatic rotation of compression roller, falling down from the outlet and being packed into the bags. The integration of system of the equipment is mature and perfect.
	Technical applicability	The processing scope of biomass solid fuel densifying equipment: Corn straws, cotton straws, bean straws, wheat bran, rice straws, millet straws, peanut vines (shells), alfalfas, furfural residues, ginger residues, barks, agriculture and forestry residues for primary processing, etc. Especially, it is heavier to the materials themselves, for example: more prominent role in the productivity of cotton straws, peanut shells, furfural residues, etc. The equipment is of mature and reliable technical but needs to be equipped with a transformer and corresponding voltage source as designed to apply AC voltage of 380V.
	Technical stability	(1) The roller of biomass solid fuel densifying equipment can be vortically installed on the roller shaft to make the roller automatically rotated, thus reducing the roller edge abrasion, extending the service life, increasing the briquetting density, improving the smoothness of briquetting surface; Furthermore, a roller body is set between the roller and its shaft, and connection of the body and roller is by welding, improving the roller load capacity, extending its service life and increasing its working reliability. (2) The roller shaft of the equipment is of eccentric shaft, and the gap between roller and module can be adjusted according to the processing requirements, which can be readjusted by the adjustment of position of roller shaft after increasing the gap through a uniform abrasion of roller circumference, thus reusing it in no need of replacing the roller, increasing the working reliability of biomass solid fuel densifying equipment, reducing the times of maintenance and replacement and production cost. (3) The feed divider of biomass solid fuel densifying equipment makes the materials uniformly spread in the module opening, benefiting roller formation, increasing the briquetting density and densifying rate, improving the smoothness of briquetting surface while making the materials not huddled, blocked or bored. (4) The heating unit of biomass solid fuel densifying equipment can

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		heat the module, thus raising the temperature of materials with a certain humidity to increase its viscosity and softness in order to easily form, save energy consumption, and reduce production cost.
	Technical safety	(1) The dual-class screw press dehydrator for the equipment contains a feed plug and its fastener. When the materials in the high-pressure compression bin reaches a certain dryness and the pressure of materials is greater than that of fastener, it can control the materials processing dryness, increase the effect to squeeze and dehydration, easy to use and operate. (2) With the rational structure and easy operation, the equipment is to power the spindle and roller by a motor, cut or crush the materials in the operation of roller to avoid the module opening to be blocked by the bulk biomass. It is available to add lubricant oil to the oil filler hole on the spindle of biomass solid fuel densifying equipment. As the welding structure of roller and its body, the roller shaft can be rotated to adjust the gap between roller and module, making work efficiency higher, service life longer and operation reliable
	Obstacle in achievement transformation and promotion	The equipment is of mature and reliable technical and easy to operate but needs to be equipped with a transformer and corresponding voltage source as designed to apply AC voltage of 380V.
	Transfer of intellectual property	Technical provider: Henan Jufeng Bioenergy Development Co., Ltd. is a private enterprise, with all domestic proprietary intellectual property of the equipment, so it can provide technical transfer. Authorized country Application for domestic invention patents to be authorized: Biomass Briquetting Machine, Publication Patent No.: CN 10-1085127A; Biomass Fuel for High-efficiency Combustion and its Preparation Methods, Publication Patent No.: CN 104119978 A; Environmental Biomass Fuel Substituting for Coal and its Preparation Methods, Publication Patent No.: CN 104119978A; other authorized domestic patents: Autofeed Device of Biomass Briquetting, Patent No.: ZL 201020187702.2; Biomass Solid Densifying Shear Briquetting Machine, Patent No.: ZL 201020666148.6.; Heating Device for Cut-type Biomass Briquetting Machine, Patent No.: ZL 201420331516.X; Heating Device for Shear-type Biomass Briquetting Machine, Patent No.: ZL 201420331261.7; Adjustable Eccentric Biomass Briquetting Machine Roller Component, Patent No.: ZL 201420331097.X; Combined Densifying Module of Biomass Shear-type Biomass Briquetting Machine, Patent ZL 201420330899.9; A Sealing Device for Granulator Extrusion Wheel, Patent No.: ZL 201520529778.1.

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	Photo caption			
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COMPANY: XUNDA SCIENCE & TECHNOLOGY GROUP CO., LTD

		Annex 2 Central Africa Renewable Energy Technology Achievement Declaration Table		
		Technology provision unit: <u>Xunda Science & Technology Group Co., Ltd.</u>		Submission date: <u>June 29, 2016</u>
Xunda Science & Technology Group Co., Ltd		Xunda Science & Technology Group Co., Ltd. (sealed)		
		Contact person: <u>Wen Feng</u>	Tel.: <u>0731-55188811</u>	E-mail: <u>fay@xundaco.com</u>
		Technical type selected: <u>D. Biomass energy utilization technology</u>		
		A. Hydropower technology B. Solar energy utilization technology C. Wind energy utilization technology D. Biomass energy utilization technology		
		Item	Specific description	Filling instruction
(I) Brief introduction of technical introduction	1	Name of technology or product	Biomass clean combustion technology	The name that can be specifically and directly to be promoted with outstanding features.
	2	Provider of technology or product	Xunda Science & Technology Group Co., Ltd.	Please offer the full name of specific unit that has intellectual property rights or possesses the ability for engineering design and construction
	3	Whether it has foreign cooperation experience	Biomass cooking furnace project for aiding Myanmar	Whether it has experience of overseas marketing and application in terms of this technology, and please gives a brief introduction of main contents.
	4	The situation of technical intellectual property rights	With completely independent intellectual property rights, possess multiple biomass stove patents.	In case the intellectual property rights are in inconformity with that of technology provider, please list the full name of owner of intellectual property rights.
	5	Scope of application	Renewable energy, biomass fuel clean combustion, use of forestry and agricultural residues, rural energy	Restrictions in respective industry and technology application (within 20 words)
	6	Brief introduction of technology or product	According to combustion characteristics including low heat value of biomass fuel, rapid volatile component release, apply segmented combustion-supporting air supply in designed and manufactured	Principle, function, technical features and key equipment (within 500 words).

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				furnace, and optimize the burner to make biomass fuel burn abundantly by reasonable mixing device of the primary and secondary air, according to different structures configuration, to reach the effects of high efficiency, low discharge and clean combustion. The produced stove can adapt the needs of cooking energy in rural area and resolve abundant forestry and agricultural residues fuels, with characteristics of high thermal efficiency, low emission, good adaptability to fuel, etc., be helpful to energy conservation and emission reduction in rural area, improve living and health level of farmers and health level of kitchen staff.	
	7	Main technical indicator		The produced stoves are mainly for cooking with series of products, cooking power is mainly divided into 1.5kW and 2.0kW, the furnace adopts ventilation patterns of natural ventilation and forced ventilation, and small stoves mainly focus on natural ventilation, the volume generally is 300mmX 300mm X400mm, the power is 1.5kW, cooking thermal efficiency is more than 30%, the weight is lower than 10kg; The volume of large-scale stoves is about 350mmX 450mmX700mm, the power of 2.0kW, cooking thermal efficiency is not less than 35%, the weight is about 22kg.	Specification, power, service parameters of technology or product, volume and weight of equipment, etc. (within 500 words)
	8	Business application situation		National Development and Reform Commission and Environmental Protection and Forestry Department of Union of Myanmar entered into an	Describe application content and provide the name, location, engineering scale and operation

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				agreement regarding the project of climate change materials presentation in November 2014, and National Development and Reform Commission would present a batch of cleaning stoves to Environmental Protection and Forestry Department of Union Of Myanmar, to assist Union Of Myanmar to enhance its ability of handling climate change in its country.	situation of 1-4 demonstration engineering (within 500 words)
		9	Contact person/ phone number/ mail box of business application unit	Contact number: 010-68781496 Contact person: Hou Fang	Provide contact information of 1-4 application units to verify the data
	(II) Index data of technology quantification (for a certain specific demonstration project)	10	Basic information of the project	National Development and Reform Commission and Environmental Protection and Forestry Department of Union Of Myanmar entered into an agreement regarding the project of climate change materials presentation in November 2014, and National Development and Reform Commission would present a batch of cleaning stoves to Environmental Protection and Forestry Department of Union Of Myanmar, to assist Union Of Myanmar to enhance its ability of handling climate change in its country. Conduct domestic open tendering to the project and Xunda Science & Technology Group Co., Ltd. is selected as implementation unit of the project.	Describe the background of project (selection of technology and product), is the investment a market transaction or investment and construction locally? Main equipment, power, quantity and working time, etc. applied. Whether the systematic training is required in the process of implementation? The situation of installation, use and maintenance costs? (100 words)
		11	Investment on equipment	Input assembly line, bending cutting machine, oil press, shaking cutting machine, punching machine, intelligent	Describe the amount of one-off investment for necessary main equipment and other auxiliary

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				electric welding machine, etc., of products	equipment in new engineering in application of the technology, or investment of other newly-added equipment and other auxiliary equipment necessary for transformation of existing engineering. Engineering scale is required to be described.
	12	Expense of operation and maintenance		Collect raw materials, water and electricity costs and other fees according to output quota	Describe the costs of raw materials, water and electricity consumed by the unit product during normal operation of system, and the labor cost (salary), equipment depreciation cost, repair expense, management fee and other maintenance costs consumed.
	13	Investment payback period		2 years	Describe static investment payback period of the project which refers to the period required for accumulated economic benefits being equivalent with initial investment cost under the condition without considering time value of funds.
	14	Other earnings		Derive other similar new energy products, and increase total output value of the company, etc.	Describe the additional economic benefits (such as increase of output value, benefit of by-product, carbon benefit) that occur when this technology is compared with similar technology or after this technology is applied.
(III) Qualitative indicator	15	Technology advancement		The combustion technology adopted is at advanced level in the industry with characteristics of high efficiency and low	Describe innovation of the technology, the position and level

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				emission, and related products pass through new products and new techniques sci-tech achievements appraisal organized by Rural Energy Industry Association. The technical level is in advanced level of domestic similar products, called as the global cleanest stoves by Global Alliance for Clean Cookstoves Aprovecho Test Center.	in similarly international and domestic technology.
	16	Technical maturity	IS09001 international quality management system certification, IS014001 international environment management system and SA8000 social responsibility management system certification, with perfect production management system and production equipment, it has formed scale production.	Describe the technology route and completion degree of equipment and system integration.	
	17	Technical applicability	The products promoted can adapt to most forestry and agricultural residues, including fuel wood, tree branch and straw, wide geographical adaptability to the region, without other restricted conditions.	Describe the applicable range of the technology during transformation and promotion, the matching degree with upstream and downstream process and technology and the restrictions of region, scale, environment, resources and energy and other factors.	
	18	Technical stability	With good technical stability of the product, users can increase or decrease fuel accordingly, with simple and easy operation according to their own requirements on cooking power	Describe whether the technology can keep stable during engineering operation and the sensitivity to interference of environment, technical parameters, etc.	

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		19	Technical safety	The technology is safe and reliable, simple and efficient without special training.	Describe the system risks of practicability, whether supporting facilities are complete and market acceptability that the technology is faced with during transformation and industrialization of achievement.	
		20	Obstacle in achievement transformation and promotion	Less centralized procurement projects of government	Describe the barriers scale of the restricted conditions, such as the technical problems needing to be solved during achievement transformation and promotion, policy barriers, resource or capital restrictions, talent cultivation and others.	
		21	Transfer of intellectual property	It has complete independent intellectual property rights, with multiple patents for invention and utility model patents.	Whether it has domestic proprietary intellectual property right, whether it has obtained patent, and nature (enterprise, university, individual, etc.) of the owner of the technology; Localization of key links of technology, process and equipment introduced: Transfer intention of the owner of the technology, transfer mechanism of technology property rights, whether policy pathway is smooth, etc.	
<p>Note: Symbols and units of measurement should be normatively written, and English abbreviation shall be noted with the full name.</p>						
	7-19-2009	200910043963.9	Biomass direct-fired furnace		5-30-2012	Patent for invention
	7-19-2009	200910043965.8	Secondary air distributor of biomass direct-fired furnace		4-18-2012	Patent for invention

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	7-19-2009	200920065360.4	Rotary air valve	9-22-2010	Utility model
	10-3-2009	200910044515.0	Direct-fired furnace combustion efficiency device	11-9-2011	Patent for invention
	5-18-2010	201020194013.4	Water supply and drainage device of the water heater	12-22-2010	Utility model
	6-22-2010	201020240490.X	Heater piping system	5-4-2011	Utility model
	6-22-2010	201020240480.6	Biomass fuel furnace with drinking hot water	1-19-2011	Utility model
	6-30-2010	201020242024.5	Biomass cooking furnace	1-19-2011	Utility model
	3-13-2012	201220092415.2	Secondary air distribution system of biomass furnace	10-3-2012	Utility model
	4-13-2012	201220155849.2	Biomass furnace burners	11-14-2012	Utility model
	4-17-2012	201220161486.3	Biomass cooker air distribution valve	12-19-2012	Utility model
	10-20-2012	201210400109.5	Civil cooking and heating furnace with solid fuel	3-25-2015	Patent for invention
	10-20-2012	201220537550.3	Civil cooking and heating stove with solid fuel	5-8-2013	Utility model
	11-17-2012	201210463328.8	Biomass portable cooking furnace	2-11-2015	Patent for invention
	12-9-2013	201320801041.1	One type bioenergy oven	6-4-2014	Utility model
	12-17-2013	201320832170.7	Normal pressure hot water boiler for biomass semi-gasification combustion	6-4-2014	Utility model
	12-17-2013	201320832169.4	Intake system for biomass semi-gasification boiler	6-4-2014	Utility model
	12-17-2013	201320832141.0	The cooling system to prevent overheating of normal pressure hot water boiler	6-4-2014	Utility model
	10-28-2014	201420629004.1	Biomass stoves	3-25-2015	Utility model

ENERGY EFFICIENCY

- Beijing Pioneer Energy Science and Technology Development Co.,Ltd
- Beijing Kingtech Co., Ltd
- China Shipbuilding IT Co., Ltd.
- Chengdu Tunghsu Lighting Technology Co., Ltd
- Sichuan Zhongbaoli Science & Technology Co., Ltd



TECHNOLOGY: ENERGY EFFICIENCY

COMPANY: BEIJING PIONEER ENERGY SCIENCE AND TECHNOLOGY DEVELOPMENT CO.,LTD

可再生能源技术成果 (已申请)																																													
Beijing Pioneer Energy Science and Technology Development Co.,Ltd	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">技术提供单位：</td> <td colspan="3">Beijing Pioneer Energy Science and Technology Development Co.,Ltd</td> </tr> <tr> <td>联系人：</td> <td>Zhanghonghong</td> <td>提交日期：</td> <td>July 27, 2016</td> </tr> <tr> <td>技术类型：</td> <td>other</td> <td>具体技术：</td> <td>other</td> </tr> <tr> <td>电话：</td> <td>13811793606</td> <td>邮箱：</td> <td>qnkj@qinengkeji.com</td> </tr> <tr> <td>技术名称：</td> <td colspan="3">The central air-conditioning energy saving control system</td> </tr> <tr> <td>技术提供方：</td> <td colspan="3">Beijing Pioneer Energy Science and Technology Development Co.,Ltd</td> </tr> <tr> <td>适用范围：</td> <td colspan="3">Used in public buildings, industrial park, transportation hub energy monitoring and control of energy conservation</td> </tr> <tr> <td>技术简要说明：</td> <td colspan="3">Energy saving control system dynamic simulation by using DeST simulation means of central air conditioning working conditions and performance of each part, join energy consumption monitoring data acquisition + via the Internet and cloud computing technology, to realize central air conditioning system energy saving. Key equipment: the energy management of the central control platform, cold standing intelligence group control system, intelligent control system intelligent control system of pump, air conditioning, cooling tower fan intelligent control system.</td> </tr> <tr> <td>技术信息：</td> <td colspan="3">voltage: 220 V Current:10 A frequency :50HZ equipment specification: 800 mm * 600 mm * 2000 mm</td> </tr> <tr> <td>商业应用情况：</td> <td colspan="3">Guangdong jiangmen palace international hotel, covers an area of 65000m², energy-saving 23.3% ; Hebei langfang shengfang furniture expo city, covers an area of 220000m², energy-saving 38.5% ; Shijiazhuang, hebei hotel, covers an area of 89000m², energy-saving 25%</td> </tr> <tr> <td>使用条件：</td> <td colspan="3">Local dwellings or by rev can science and technology investment and is responsible for the diagnosis of energy saving, custom development, construction project design, system installation, debugging and whole life cycle of energy saving index verification, technical training, the remote on-line service and after-sale service work.Both sides project acceptance or third appraisal to achieve energy saving effect of the contract, the energy-saving benefit created by the customer to pay the cost of energy-saving renovation project or share.</td> </tr> </table>	技术提供单位：	Beijing Pioneer Energy Science and Technology Development Co.,Ltd			联系人：	Zhanghonghong	提交日期：	July 27, 2016	技术类型：	other	具体技术：	other	电话：	13811793606	邮箱：	qnkj@qinengkeji.com	技术名称：	The central air-conditioning energy saving control system			技术提供方：	Beijing Pioneer Energy Science and Technology Development Co.,Ltd			适用范围：	Used in public buildings, industrial park, transportation hub energy monitoring and control of energy conservation			技术简要说明：	Energy saving control system dynamic simulation by using DeST simulation means of central air conditioning working conditions and performance of each part, join energy consumption monitoring data acquisition + via the Internet and cloud computing technology, to realize central air conditioning system energy saving. Key equipment: the energy management of the central control platform, cold standing intelligence group control system, intelligent control system intelligent control system of pump, air conditioning, cooling tower fan intelligent control system.			技术信息：	voltage: 220 V Current:10 A frequency :50HZ equipment specification: 800 mm * 600 mm * 2000 mm			商业应用情况：	Guangdong jiangmen palace international hotel, covers an area of 65000m ² , energy-saving 23.3% ; Hebei langfang shengfang furniture expo city, covers an area of 220000m ² , energy-saving 38.5% ; Shijiazhuang, hebei hotel, covers an area of 89000m ² , energy-saving 25%			使用条件：	Local dwellings or by rev can science and technology investment and is responsible for the diagnosis of energy saving, custom development, construction project design, system installation, debugging and whole life cycle of energy saving index verification, technical training, the remote on-line service and after-sale service work.Both sides project acceptance or third appraisal to achieve energy saving effect of the contract, the energy-saving benefit created by the customer to pay the cost of energy-saving renovation project or share.		
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技术提供方：	Beijing Pioneer Energy Science and Technology Development Co.,Ltd																																												
适用范围：	Used in public buildings, industrial park, transportation hub energy monitoring and control of energy conservation																																												
技术简要说明：	Energy saving control system dynamic simulation by using DeST simulation means of central air conditioning working conditions and performance of each part, join energy consumption monitoring data acquisition + via the Internet and cloud computing technology, to realize central air conditioning system energy saving. Key equipment: the energy management of the central control platform, cold standing intelligence group control system, intelligent control system intelligent control system of pump, air conditioning, cooling tower fan intelligent control system.																																												
技术信息：	voltage: 220 V Current:10 A frequency :50HZ equipment specification: 800 mm * 600 mm * 2000 mm																																												
商业应用情况：	Guangdong jiangmen palace international hotel, covers an area of 65000m ² , energy-saving 23.3% ; Hebei langfang shengfang furniture expo city, covers an area of 220000m ² , energy-saving 38.5% ; Shijiazhuang, hebei hotel, covers an area of 89000m ² , energy-saving 25%																																												
使用条件：	Local dwellings or by rev can science and technology investment and is responsible for the diagnosis of energy saving, custom development, construction project design, system installation, debugging and whole life cycle of energy saving index verification, technical training, the remote on-line service and after-sale service work.Both sides project acceptance or third appraisal to achieve energy saving effect of the contract, the energy-saving benefit created by the customer to pay the cost of energy-saving renovation project or share.																																												

TECHNOLOGY: ENERGY EFFICIENCY

COMPANY: BEIJING PIONEER ENERGY SCIENCE AND TECHNOLOGY DEVELOPMENT CO.,LTD

商业应用单位联系人/ 电话/邮箱 :	Shengfang furniture expo city : FengTao 18631680008 Jiangmen palace international hotel : LaiZhaobo 0750-8233388 Hebei hotel : MengXiangrui 13910330149
设备投资 :	Major equipment: energy management of the central control platform, cold standing intelligence group control system, intelligent control system intelligent control system of pump, air conditioning, cooling tower fan intelligent control system, intelligent electric meter data acquisition system, environment of intelligent data collection system ; Accessories: frequency converter, sensors, electric meter. Engineering scale in more than 3 square meters, equipment investment 10-35 yuan/square meters, the specific investment according to project actual situation.
运行维护费用 :	And the full cost to energy-saving reform of the science and technology investment clients. Through with the customer on a regular basis to share project after the implementation of energy-saving benefit back your investment.Energy-saving equipment ownership to the customer after the project contract, after the energy saving benefits all belong to the customer.
投资回收期 :	The static payback period of 1.8 to 2.5 years
其它收益 :	According to my company for all kinds of building the central air conditioning system of the sorting of data statistics, for building energy costs RMB 5 million per year, set the price for 1 yuan/KWH. Can use rev energy-saving control system of building energy consumption situation of science and technology as shown below : Medical institutions: power consumption is 5 million yuan, saving electricity is about RMB 1.5 million per year, saving BiaoMei, 606 tons of CO2 emissions of 1509 tons, energy-saving rate of 20% to 40%. Government offices: power consumption is 5 million yuan, saving electricity is about RMB 1.075 million per year, saving BiaoMei, 434 tons of CO2 emissions of 1081 tons, energy-saving rate of 18% to 25% ; Mall shopping centers: power consumption is 5 million yuan, the annual power savings of about 1.75 million yuan, save BiaoMei, 707 tons of CO2 emissions of 1760 tons, energy-saving rate of 20% to 50% ; Hotel and conference center: power consumption is 5 million yuan, saving electricity is about RMB 1.15 million per year, saving BiaoMei, 465 tons of CO2 emissions of 1157 tons, energy-saving rate of 18% to 28% ; Industrial park: the annual consumption of 5 million yuan, saving electricity is about RMB 1.375 million per year, saving BiaoMei, 556 tons of CO2 emissions of 1383 tons, energy-saving rate of 20% to 35% ; Transport hub, annual power consumption of 5 million yuan, saving electricity is about RMB 1.45 million per year, saving BiaoMei, 585 tons of CO2 emissions of 1459 tons, energy-saving rate of 18% to 40%.
技术占有率 :	2% - 4%.
技术市场潜力 :	At present, the construction industry accounts for the proportion of energy consumption by 30%, according to the forecast analysis, to 2020, the building energy consumption in China will account for 35% of the energy consumption of the whole society, will become the first big energy consumption beyond industrial fields. The central air conditioning system accounts for 50% -70% of building

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		<p>energy consumption, thus reduce building energy consumption of central air conditioning system, will greatly reduce building energy consumption. According to statistics, China's large public buildings power consumption alone for 90 billion KWH each year, the total area of about 500 million square meters, is the power consumption per unit area was 180 KWH per year, the control system even save 1 KWH/m², can save a year 500 million KWH. The technology is expected to invest 25 billion yuan to 2020, can form the energy saving of 8 million tce and 18.75 million metric tons of CO₂ emission reduction ability.</p>
	<p>技术先进性 :</p>	<p>Technology innovation points: the device is based on the load forecasting of frozen water flow dynamic energy-saving control system and the traditional constant voltage or constant temperature control, Its innovation points: 1. The constant pressure difference control and temperature difference control is "fixed value control", setting a constant constants as control target. Load forecasting control is "dynamic control", have no fixed value and dynamic prediction as control target, and real-time correction adjustment, therefore, can achieve the best energy-saving effect.2. The constant pressure difference control and temperature difference control belong to "follow" control, only when the differential pressure or temperature deviation signal, the control system will have a control signal output. Control and load forecasting is a kind of "control" in advance, to predict the load of air conditioning system "in the future time" (cold) and adjust the chilled water flow in advance, effectively solves the large delay, large inertia system control lag issues, eliminate the cold quantity difference between supply and demand and the amount of time, the realization energy output and demand matching.</p>
	<p>技术成熟度 :</p>	<p>System consists of monitoring cloud services platform, controls the cloud service platform, terminal acquisition system and PC (or APP).Terminal acquisition system is installed in the client on various equipment, central air conditioning equipment room including central air conditioning host, frozen water pump, cooling water pump, cooling tower fan and so on with various measurement devices, for operation of all equipments, especially the energy consumption situation, and through the remote transmission and software, transmitted to the monitoring of cloud services platform, realize the real-time display on the computer or mobile phone client.By monitoring service platform can fully understand and grasp the air conditioning room operation of all equipments and the energy consumption situation, at the same time can through these data, the energy consumption of central air conditioning system of the whole energy consumption in a comprehensive and objective analysis and understanding.Controls the cloud service platform based on the monitoring platform of data simulation, combined with the expert opinion, formulate corresponding operation strategy, realize the energy saving of central air-conditioning control.</p>
	<p>技术适用性 :</p>	<p>Technology is applicable to: international and domestic chain enterprises (such as shopping malls, star hotel), large and medium-sized public buildings, industrial park, transportation hub and other individual or group of buildings energy consumption monitoring, statistics, analysis, and system</p>

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		control. This technique is applied to construction, central air conditioning equipment room is not subject to regional and environmental restrictions. Construction scale in more than 3 square meters.
	技术稳定性 :	This technical system for hardware equipment and system for independence, strong anti-interference ability. Main system through professional detection at the same time, has the very high stability.
	技术安全性 :	The technology has realized industrialization, and enter the product promotion period. Products with high practicability and form a complete set of equipment is perfect, high market acceptance. Through multiple projects running situation analysis, no customer feedback for technology and equipment.
	成果转化推广障碍 :	Obstacles technology popularization and Suggestions: after the reform and opening to the outside countries taking economic construction as the center, about energy consumption can cause can use the customer value. Now as the world in the face of climate change calls for the state on energy conservation and environmental protection policies of stage, and all levels of government attaches great importance to the energy-using enterprises have gradually realize the importance of energy saving and the proportion of energy consumption in the operation and production cost, the importance of the obstacles in improving step by step. Suggestion: standard industry standards and behavior
	知识产权转让 :	The central air-conditioning energy saving control system of Pioneer Energy Science and Technology can get five science and technology energy-saving control technology has been the patent for utility model with six technology with software copyright nature: enterprise key technology, process, equipment, implement localization; The introduction of international famous brand components

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图片说明：



TECHNOLOGY: ENERGY EFFICIENCY
COMPANY: BEIJING KINGTECH CO., LTD

Beijing Kingtech Co., Ltd		Renewable Energy Technology Achievement (Applied already)	
Technical provision unit:	Beijing Kingtech Co., Ltd.	Submission date:	July 29, 2016
Contact person:	Liu Xinyue	Technical type:	Others
Tel.:	18001170851	E-mail:	liuxy@kctcn.com.cn
Technical name:	Energy saving service solution		
Technical provider:	Beijing Kingtech Co., Ltd.		
Scope of application:	Environmental protection industry, suitable for high energy-consumption enterprise and energy-scarcity area		
Brief description of technical:	Overall energy saving reformation design for the enterprise (area) through analyzing present situation of energy consumption. Achieve high energy saving rate as possible while keeping capability		
Technical information:	Distributed energy resource of natural gas, photovoltaic distributed generation, biochar-based fertilizer poly-generation by biomass gasification power generation, energy saving of motor system, comprehensive utilization of waste heat and pressure, transformation of architectural lighting, transformation of energy saving for street lamp and management and comprehensive utilization of carbon assets		
Business application situation:	Distributed photovoltaic power generation: Jiangsu 3.3MW Plant Roofing Power Generation Project Carbon assets management and comprehensive utilization: Carbon Assets Project of Jilin Changbai Mountain Forest Industry Group Architectural lighting energy saving transformation Energy Saving Transformation of Tianyi Shopping Mall		
Service conditions:	Local investment and construction and mature technology.		
Contact person of business application unit /Tel./E-mail:	Wei Xing 18001321896		
Investment on equipment:	Our company will invest the whole earlier stage, as the case may be		
Expense of operation maintenance:	Employees of our company will maintain for free during the contract period		
Investment payback period:	8-10 years		
Other earnings:	Reduce corporate energy consumption, improve corporate image and realize clean development		

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	Technical occupancy:	Ranked the country's leading level, at top 10%.
	Market potential of the Technical:	With the reducing of fossil energy, new energy-using mechanism and energy situation will replace the original non-renewable fossil energy gradually. New renewable and clean energy will become a mainstream gradually.
	Technical advancement:	International energy structure transition is an irresistible trend, and its technology and technique takes the leading position in new energy field by unceasing improvement
	Technical maturity:	Able to realize engineering approach, practical utilization and stable project operating.
	Technical applicability:	Environmental protection industry, suitable for high energy-consumption enterprise and energy-scarcity area
	Technical stability:	Technology in related field is mature and advances steadily
	Technical safety:	At present, all projects are operating stably, and no accident has occurred
	Obstacle in achievement transformation and promotion:	Change of local polity and corporate financial condition
	Transfer of intellectual property:	
	Photo caption:	<div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;">Tianyi Shopping Mall</p>

TECHNOLOGY: ENERGY EFFICIENCY
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Chengdu Sanwayao Thermal Power Co., Ltd.



Photos after retransformation

Comparison between high pressure sodium lamp and LED lamp in a same road



After transformation



Before transformation



Installed capacity: 800KW
Theoretical electric energy production
for 25 years: 20,210,000 KWh
Theoretical standard coals saved for 25
years: 8,075t
Theoretical carbon emission reductions
for 25 years: 21,000t

TECHNOLOGY: ENERGY EFFICIENCY
COMPANY: BEIJING KINGTECH CO., LTD

		<p>Installed capacity: 1.2MW Theoretical electric energy production for 25 years: 26,842,000KWh Theoretical standard coals saved for 25 years: 10,700t Theoretical carbon emission reductions for 25 years: 26,800t</p>  	 <p>Installed capacity: 3.3MW Theoretical electric energy production for 25 years: 70,724,300 KWh Theoretical standard coals saved for 25 years: 28,200t Theoretical carbon emission reductions for 25 years: 70,500t</p> <p>Installed capacity: 200KW Theoretical electric energy production for 25 years: 5,050,000KWh Theoretical standard coals saved for 25 years: 2,260t Theoretical carbon emission reductions for 25 years: 5,633t</p>
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Renewable Energy Technology Achievement (Applied already)			
Technical provision unit:	Beijing Kingtech Co., Ltd.	Submission date:	July 28, 2016
Contact person:	Liu Xinyue	Technical type:	Solar energy utilization technology
Tel.:	18001170851	E-mail:	liuxy@kctn.com.cn
Technical name:	Distributed photovoltaic power generation		
Technical provider:	Beijing Kingtech Co., Ltd.		
Scope of application:	Industrial enterprise, transportation field, communication field, petroleum, ocean, meteorological field, photovoltaic power station		

TECHNOLOGY: ENERGY EFFICIENCY
COMPANY: BEIJING KINGTECH CO., LTD

Brief description of technical:	Solar photovoltaic power generation is to convert luminous energy into electric energy by using solar cell module and electronic characteristic of semiconductor materials
Technical information:	It is composed of three major parts of solar panel (components), controller and inverter, and the major components are constituted by electronic parts and components.
Business application situation:	Jiangsu 3.3MW Plant Roofing Photovoltaic Power Generation Project, Jiangsu Jiurong 200KW Roofing Photovoltaic Power Generation Project, Beijing Chaoyang Chuji Ceramic Market 800KW Roofing Photovoltaic Power Generation Project, Huizhou 1.2MW Plant Roofing Photovoltaic Power Generation Project
Service conditions:	Kingtech distributed photovoltaic power generation system adopts energy management contract model ,that is, the photovoltaic power generation project will be invested, established and maintained in local after the field investigation, calculation and design by technicians of our company, and benefits will be paid back by stage after the project goes into operation. The technology has matured at present, and has demonstration projects all over the country.
Contact person of business application unit /Tel./E-mail:	Wei Xing Contact information: 18001321896
Investment on equipment:	About RMB 9 /W at home (including equipment and construction cost, etc.)
Expense of operation maintenance:	Maintenance for free within contract period (excluding waterproof construction of Party A)
Investment payback period:	8-10 years
Other earnings:	Reduce corporate energy consumption and discharge capacity, and improve corporate image
Technical occupancy:	The largest photoelectricity market in China is still the communication field whose market share is about 50%, including microwave relay station, satellite communication ground station, satellite TV receiving transposer system, spc telephone exchange, troop communication station, etc. Through endeavor during the ninth Five-Year plan and with the demonstration and promotion of various cooperative projects at home and abroad, the application field of photovoltaic power generation in remote and border areas has been enlarged further. Including photovoltaic power stations and photovoltaic power systems, its market share has been increased from about 20% to 30% and above.
Market potential of the Technical:	Photovoltaic power generation belongs to the clean renewable energy, so that the development and wide application of photovoltaic technology plays an important part in alleviating shortage of conventional energy and reducing environmental pollution. Considering either from energy or environment, photovoltaic power generation will enter into electricity market as the alternative energy finally. Once the cost of photovoltaic power generation reduces below \$2/W, it will be applied in larger scale and commercial demand of grid-connected power generation will come true.

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Technical advancement:	Electric-generation principle of photovoltaic power generation is to convert light into electron directly, with no middle process and mechanical motion, which means that there will be no combustion and population in the process, and it is simple to generate electricity. From this view, generating efficiency of this technology is very high.
Technical maturity:	The relatively mature markets in China include communication field, some industrial fields, rural electrification and commercialized power supply in remote and border areas. By the end of 2000, the annual output of solar battery in China has reached up to 3MWp, and accumulated utilization to 19MWp. In the future 10 years, it will be developed greatly. It is estimated that by 2010, the annual output of solar battery in China will reach up to 30MWp, and accumulated utilization to 200MWp. The potential markets of photovoltaic power generation include roofing grid-connected generation system, large hybrid power generation system, electric car charging system, solar photovoltaic hydrogen generating system, and some special commercialized power supply.
Technical applicability:	The application scale of distributed photovoltaic power generation: It can be built in rural area, pasturing area, mountainous area, developing cities in small, medium and large size, or nearby commercial district, to resolve the electricity demand of local users. It is unlimited by the resource distribution area, and can take advantage of building roof; for example, areas without electricity and areas with complex topography
Technical stability:	Solar energy resource in China is very rich, and its theoretical reserve is equal to 1.7 trillion tons of standard coal annually. Development and utilization of solar energy resource has a very vast potential. Photovoltaic power generation industry of China started form 1,970s, and entered into stable development period in 1,990s. The output of solar battery and component increases steadily year by year. Through 30-year endeavors, it has ushered in a new stage of rapid development. Driven by the national programs like the pilot projects of Brightness Program, Township Electrification Program and world photovoltaic market, the photovoltaic power generation industry of China has developed rapidly.
Technical safety:	① Without exhaustion risk ② Safety and reliable, without noise, pollutant discharge, and public nuisance ③ It is unlimited by the resource distribution area, and can take advantage of building roof, for example, areas without electricity and areas with complex topography ④ Generate and supply power without fuel consumption and electric transmission line; ⑤ High quality of energy;
Obstacle in achievement transformation and promotion:	Problem with profit model of photovoltaic power generation, problem with electricity price subsidies differentiation of photovoltaic power generation, problem with grid connection of photovoltaic power generation
Transfer of intellectual property:	
Photo caption:	

TECHNOLOGY: ENERGY EFFICIENCY
COMPANY: BEIJING KINGTECH CO., LTD



Installed capacity: 1.2MW
 Theoretical electric energy production for 25 years: 26,842,000 KWh
 Theoretical standard coals saved for 25 years: 1.07t
 Theoretical carbon emission reductions for 25 years: 26,800t




Installed capacity: 800KW
 Theoretical electric energy production for 25 years: 20,210,000 KWh
 Theoretical standard coals saved for 25 years: 8,075t
 Theoretical carbon emission reductions for 25 years: 21,000t



Installed capacity: 3.3MW
 Theoretical electric energy production for 25 years: 70,724,300 KWh
 Theoretical standard coals saved for 25 years: 28,200t
 Theoretical carbon emission reductions for 25 years: 70,500t

Installed capacity: 200KW
 Theoretical electric energy production for 25 years: 5.05million KWh
 Theoretical standard coals saved for 25 years: 2,260t
 Theoretical carbon emission reductions for 25 years: 5,633t


TECHNOLOGY: ENERGY EFFICIENCY
COMPANY: CHINA SHIPBUILDING IT CO., LTD.

Renewable Energy Technology Achievement Declaration	
China Shipbuilding IT Co., Ltd.	<div style="display: flex; justify-content: space-between;"> <div>QR code</div> <div style="text-align: center;">  </div> </div>
Technical provision unit	China Shipbuilding IT Co., Ltd.
Contact person	Liu Yan
Tel.	18721508258
Technical name	Intelligent building energy comprehensive management and control system
Technical provider	China Shipbuilding IT Co., Ltd.
Scope of application	China Shipbuilding IT Co., Ltd.
Brief description of technical	It mainly aims at the state organ office building and large public building energy consumption monitoring system construction, realizing the separate measurement, real-time monitoring, statistics and dynamic analysis of the public institution energy resource (water, electricity, gas, heat, cool and renewable resource) consumption; Improve informatization and refinement level in terms of energy saving management in public institutions, practically reduce resources consumption, and achieve the comprehensive management goal of cost reduction, efficiency increase, energy saving and emission reduction.
Technical information	Energy consumption data collector configuration: CPU 700 MHZ, onboard memory 512M, SD card 8G, 2 USB 2.0 interfaces, 8 COM ports, 10W power, size 270*135*43.6mm
Business application situation	Beijing Governmental Affairs Center, Beijing Liuliqiao, water, heating power, gas, electric power, environmental monitoring, intelligent lighting control, collection monitoring for over 500 collecting points
Service conditions	Beijing Governmental Affairs Center Du Zhibin 010-83734390
Contact person of business application unit /Tel./E-mail	Market trade, it is a mature technology; for newly built building, system installation and commissioning shall be done together with general contractor for light-current system; for reconstructed project, integrated design, construction and installation shall be implemented. Based on B/S structure, easy application, low maintenance cost during later period
Investment on equipment	Depending on scale of project investment, newly built building requires instrument, collector, equipment, system software, 485 cables and other cables and installation accessories etc. Scale-based building uses the product investment for about RMB 1 million. Reconstruction of existing equipment investment of building will increase construction reconstruction cost of existing building, and investment scale shall be confirmed based on current condition of building.
Expense of operation maintenance	The information-based system has extremely low consumption; in terms of labor cost, it only requires addition of one system energy administrator with monthly salary of RMB 8,000, which

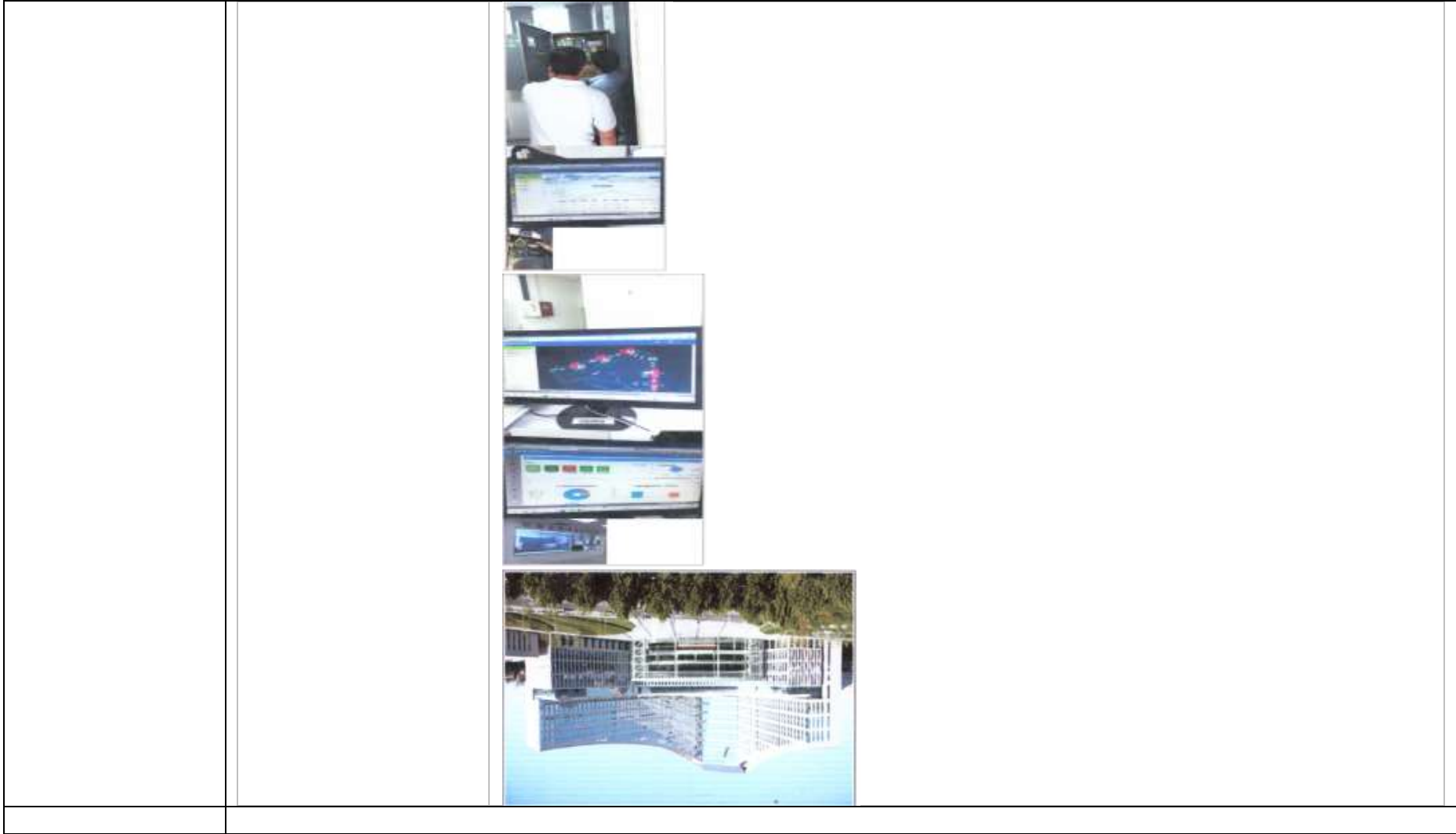
TECHNOLOGY: ENERGY EFFICIENCY
COMPANY: CHINA SHIPBUILDING IT CO., LTD.

	excludes the labor investment such as meter reading and inspection; calculated based on RMB 5,000 per person, it can at least save working cost for 10 persons and in general, it can save labor cost of over RMB 40,000. Information-based system equipment shall be used based on 10-year depreciation, and repair cost as well as administration cost is extremely low.
Investment payback period	Energy using efficiency of the building can be improved through energy-saving management, building energy consumption can be saved, and investment payback period is about 3-5 years.
Other earnings	It conducts energy using analysis through energy consumption management and control system. In case of unreasonable energy using equipment, it shall improve equipment using management, monitor equipment, increase refinement management of energy using equipment, adjust energy using structure of building, increase equipment utilization rate, optimize composite structure, and achieve peak shaving and load shifting in respect to energy load.
Technical occupancy	It has wide using prospect in building industry, especially the shipping industry, for example, Longxue Shipyard, Huangpu Shipyard, Hudong Shipyard. In energy consumption management and management and control system in ship making industry, market share reaches over 80%, and meanwhile, it is also used in public building field (Beijing Governmental Affairs Center).
Market potential of the Technical	The technique is promoted in industry or filed until 2020, and market scale can reach RMB 100 million; meanwhile, market drives auxiliary solution, and relevant product's market scale can reach RMB 1 billion.
Technical advancement	For energy consumption management and control system, our advanced energy management and control technique is used so as to manage energy consumption of each equipment inside the building in a centralized manner through information integration treatment; the technique used has applied for multiple national patents and software copyrights, and energy consumption management and control system technology has been among advanced level in China.
Technical maturity	Various energy metering equipment (metering equipment for water, electricity, gas, cold resource, hot resource or renewable resource), wireless network technology, wired network technology, database technology, industrial control technology and computer software technology. Summarize energy information, calculate, analyze and figure out in scientific mode the energy-saving operation and guidance report. Exploit energy-saving potential in scientific mode; comprehensive energy management and control system will achieve energy in subjective and objective control mode according to analysis data, to finally help enterprise reach energy management, energy saving, emission reduction and reduced cost.
Technical applicability	The technology considers the universality of building energy consumption, and during system design, modular design is adopted, as well as multiple information integration technology is used; in terms of system use, it is little affected by factors like region, scale, environment and resources, etc.

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	Technical stability	The technology can keep stable during running process, and is little affected, uses domestically advanced server, and meet domestic environmental protection requirements; during its usage, interference is little.
	Technical safety	<p>Building stocks of China are 50-60 billion m², and quite a number of stocks are high-energy-consumption building; as area of newly built building each year is 2 billion m², energy consumption of building accounts for nearly 40% of total energy consumption. Energy, as basis of human existence and development, is more and more used as rare resources, along with high-speed development of social economy.</p> <p>As clearly mentioned in <i>12th Five-Year Building Energy-saving Special Planning</i>, By the end of 12th Five-year plan, in terms of building energy saving, it can form 116 million tons of standard coal energy-saving capacity. Hence, energy consumption faces unprecedented pressure and challenge in the issue of energy using. So it has great practicability in accordance with national policy, perfect supporting facilities, high acceptability in market and lower risk.</p>
	Obstacle in achievement transformation and promotion	It needs to deal with rapid deployment implemented in site, reduce implement cost, and improve efficiency. No policy barrier, no capital constraint.
	Transfer of intellectual property	With proprietary intellectual property rights in China, distributed real-time data collection and monitoring system own the patent. Technology-owner is enterprise. Equipment made in China with 100% is the enterprise's own technology with diversified flexible access.
	Photo caption	

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COMPANY: CHINA SHIPBUILDING IT CO., LTD.



TECHNOLOGY: ENERGY EFFICIENCY

COMPANY: CHENGDU TUNGHSU LIGHTING TECHNOLOGY CO., LTD

Project Application of Renewable Energy Technology				
Chengdu Tunghsu Lighting Technology Co., Ltd	Technical Term:	Lighting Technology of Electrodeless Lamp	Company: Chengdu Tunghsu Lighting Technology Co., Ltd	
	Contact:	Mei He	Date: 2016.7.29	
	Technology Type:	Energy-saving	Technology: smart system, high efficiency and energy saving	
	Mob:	15982386834	Email: -	
	Patent and capacity of engineering design and construction	32 Patents, and the R&D department has the ability to do research and development, design, production, and installation.		
	Applications	It's suitable for the illumination of major roadway, highway, parking lot, factory, tunnel , construction, office and commercial.		
	Technical Notes: Principle,function,features & key equipment	<p>The electrodeless induction fluorescent lamp, more commonly known as an "induction lamp", is based on Faraday's principle of electromagnetic induction and possesses a structure similar to a transformer.The energy is coupled from the primary coils to the secondary ring formed by plasma, resulting in a high luminous efficient lighting source with a long lifespan.The innovation is that there is no electrode while the energy is coupled to the lamp through a high frequency induction magnetic field.The buffer gas inside the lamp is excited by the magnetic field and turned into plasma.When the excited plasma atoms return to their ground state, they radiate 254nm UV light, which is converted into visible light by a tri-phosphor coating on the inner glass surface, much in the same manner as fluorescent lamps.This new technology solves the problems associated with electrode-aging, resulting in a maintenance free lamp with a long lifespan.</p> <p>Features:</p> <ol style="list-style-type: none"> 1、 Long lifetime: Average lifetime 100,000 hours, maintenance free, suitable for long term usage. 2、 Energy-saving and environment protection. 3、 High-frequency operating: Comfortable, flickering free lighting for eyesight protection 4、 High color rendering index: ≥80 		

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COMPANY: CHENGDU TUNGHSU LIGHTING TECHNOLOGY CO., LTD

	5、High cost performance. Key Equipment: AI PANASERT、AOI、Reflow Soldering Equipment
Technical Information: technical parameters and equipment volume	Power: from 10w-400w; Product Series: internal induction lamp, external induction lamp, self-ballast; Main Shape: circular, rectangular, olive. All production equipment are in large volume.
Commercial Applications	Mamaya Project: Guizhou Beipanjiang Electricity Co., Ltd / Contract Amount 1.92 million yuan. The project works well. Sichuan New Energy Car Production Base project: Sichuan Fuling Industrial Group Co., Ltd - Commodity Trade Branch / Contract Amount 2.6 million yuan. The project works well.
Brief Outline for Service	Market transactions; Mature technology; Training-free; Easy installation, convenient use, low maintenance cost.
Customers:	Enya Mao/085189218953/18911072159@163.com Duoshu Wen/ 0816-2537900/jt@fulingroup.cn
Equipment Investment	Phase 1 project has been finished with 550 million yuan investment, built 7 production lines with annual capacity of 100 million sets induction lamps.
Maintenance Cost	Energy Consumption Analysis: Material cost 600 yuan / pc; water and electricity cost 30 yuan / pc, wages and welfare cost 100 yuan / pc; depreciation, amortization, and manufacturing expense 60 yuan / pc. Unit cost 790 yuan. Management and repair cost 10 yuan / pc.
Payback Period	It will take 6 years to repay the original investment by the net income produced with the technology of inductively coupled electrodeless fluorescent lighting from year 2011.

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COMPANY: CHENGDU TUNGHSU LIGHTING TECHNOLOGY CO., LTD

	Extra Income	<p>As far as conventional lighting is concerned, induction lamps have incomparable advantages on performance and price. At present, the induction lamps are mainly used in engineering lighting area, which can completely replace conventional mercury lamps, sodium lamps, and metal halide lamps.</p> <p>Using a 150W induction lamp (system power watt: 150W) to replace a 250W high pressure sodium lamp (system power watt: 300W), and lighting for 10 hours per day, the electricity can be saved by 50%. With life span of 60000 hours, each induction lamp can save 9000 KWhs,RMB 7200 yuan (base on 0.8 yuan / KWh). If we promote 30 million pcs induction lamps per year, we can save electricity 16.4 billion KWhs and reduce emission of carbon dioxide 16.4 million tons, sulphur dioxide 164000 tons.</p>
	Technology Occupancy	<p>In year 2010, there were 63 million metal halide lamps, 54.41 million high pressure sodium lamps, and 56.24 million high pressure mercury lamps. It's total about 1.7365 trillion pcs of high pressure gas discharge lamps in domestic market. Even if 20% institute, 30 million pcs induction lamps will be needed. The market will finally become occupied by only three lamps, the hight pressure discharge lamps, LED lamps and induction lamps.</p> <p>Actually, by the end of year 2012, the production of induction lamps has been reached 10 million pcs in domestic market, in which, 45% has been exported overseas, saving electricity 5.4 billion KWhs, reducing emissions of carbon dioxide 5.4 million tons, sulfur dioxide 54 thousand tons.</p> <p>If estimated by annual growth rate of 40%, the production of induction lamps will be 27 million pcs in domestic market in year 2015, which will save electricity 14.8 billion KWhs, reduce emissions of carbon dioxide 14.8 million tons, sulfur dioxide 148 thousand tons.</p>


TECHNOLOGY: ENERGY EFFICIENCY

COMPANY: CHENGDU TUNGHSU LIGHTING TECHNOLOGY CO., LTD

	Market Potential	<p>In year 2011, China's general lighting market was about 81.4 billion yuan, accounted for about 17.5% of global market. By year 2016, the market will reach about 127.4 billion yuan, account for 20.8% of global market. The compound growth rate from year 2010 to 2016 was 13%.</p> <p>China's general lighting market covers various categories. According to date, fluorescent lamp shared 42%, energy-saving lamp shared 18%, and high pressure gas discharge lamp shared 17%, the rest was filled by LED lamps, halogen lamps, incandescent lamps, induction lamps and etc.</p> <p>Currently, the lighting accounts for 19% of global electricity consumption, and 13% of China's electricity consumption, so it's quite possible to achieve the goal of energy conservation and emissions reduction. In year 2012, China consumed total 4.9591 trillion KWWhs of electricity, in which, 644.7 billion KWWhs was consumed by lighting, exceeded the total power generation of 7 times of the Three Gorges Hydropower Station, equal to standard coal of 225.645 billion tons, carbon emissions of 169.233 billion tons.</p>
	Technology Advantages	<ol style="list-style-type: none"> 1、 Long lifespan due to the lack of electrodes 2、 The induction light is a gas discharge lamp in which the power required to generate light is transferred from outside the lamp envelope to the gas inside via an electric or magnetic field, in contrast with a typical gas discharge lamp that uses internal electrodes connected to the power supply by conductors that pass through the lamp envelope. More energy-saving 3、 Very high energy conversion efficiency of between 62 and 90 Lumens/Watt [higher power lamps are more energy efficient]; 4、 No EMI 5、 No EMC, can meet GB17743 – – 2007.
	Technical Maturity	<p>The Induction lighting technology takes the lead in the world, with with mature product structure and process and stable product quality. A sound knowledge of induction lamp technology and manufacturing process is mandatory. All production equipment are maed in China. And the we can source all raw material in China.The induction lighting technolgy got the world wild recognition. Induction lamps are accepted by the world.</p>

TECHNOLOGY: ENERGY EFFICIENCY

COMPANY: CHENGDU TUNGHSU LIGHTING TECHNOLOGY CO., LTD

	Technology Security	<p>1. According to the the working principle of induction lamp, the basic condition of light generation was to stimulate mercury atomic to energy level transition by resonance. If high voltage start design was not good, induction lamp may not work in abnormal or bad working environment. We use one frequency scan technology to find the best resonance to motivate high enough voltage by one or more times, so as to solve the problem of lighting start failure.</p> <p>2. Induction lamp can not be 0-100% linear dimming, because the luminance and power are depend on the frequency and voltage caused by resonant circuit. But we could do linear dimming at a certain brightness by intermittent PWM mode, and the depth of dimmer can reach 50%. It has a large prospect in applications of high bay, road, tunnel, landscape, and etc.</p> <p>3. The R&D of induction lamp involves a very wide range of fields, such as electronic power, magnetism, plasma science, microelectronics, optical, etc that requires the corresponding experts to join together to complete. Our company has sufficient technological resources, and invests a lot of human resources to do deeply research, and we also combine Electronic Science and Technology University to sign Production-Study-Research cooperation agreement to make induction lamps more and more energy efficient.</p>
	IPR	<p>1. We already got 32 patents for induction lamp.</p> <p>2. Baoshi Group lightened the first induction lamp in China, in 1998. Tunghsu Group acquired Baoshi Group and kept the induction lamp production. Tunghs group improve and develop the induction technology, and right now we already have been a large-scale and multiple high-tech industry group which has proprietary intellectual property rights and core technology.</p>
	Pictures/Project	
	Attachments	TUV、CCC

TECHNOLOGY: ENERGY EFFICIENCY

COMPANY: SICHUAN ZHONGBAOLI SCIENCE & TECHNOLOGY CO., LTD

Renewable Energy Technology Achievement (Applied already)	
Sichuan Zhongbaoli Science & Technology Co., Ltd	Sichuan Zhongbaoli Science & Technology Co., Ltd.
Technology provision unit	Sichuan Zhongbaoli Science & Technology Co., Ltd.
Contact person	Tian Huaihui
Submission date:	July 29, 2016
Technology type	Others
Specific technology:	Others
Tel.	13688011519
E-mail	1060941999@qq.com
Technology name	Zhongbaoli energy-efficient LED lamp (the latest)
Technology provider:	Sichuan Zhongbaoli Science & Technology Co., Ltd.
Scope of application	The transformation of the traditional sodium-vapor streetlamps, residential lighting, industrial lighting
Brief description of technology	The integrating application of the many patents of fluid circuit heating dissipation, ensure that the LED products achieve 75% - 85% of high efficiency and energy saving, more than 10 years of service life, the dissipation materials only equivalent to about 30% of other similar LED lamps, hence a lot of material are saved for the country, pushing to promote energy-saving emission reduction.
Technical information	1,000 hours luminous decay is less than 0.1%, and the luminous efficiency has reached up to 160LM/W
Business application situation	1. For the energy-saving transformation of 80 sodium-vapor lamps on Jiudu Road, Renhuai City, Guizhou, replace traditional sodium-vapor lamp (400W) with Zhongbaoli LED lamp (170W) and traditional sodium - vapor lamp (250W) with Zhongbaoli LED lamp (120W), by which the energy-saving rate has reached up to 76%.
Service conditions	With the capital, technology, package installation and maintenance from our company, the technology is mature.
Contact person of business application unit /Tel./E-mail	Renhuai Urban Administrative Bureau, contact person: Bureau Head Li, Tel.: 13985649193 Dongshan Hongfan Photoelectric Technology Co., Ltd, Kunming Changshui International Airport Project, contact person Li Changxing, Tel.: 15922926788
Investment on equipment	The amount of investment for ten thousand streetlamps is RMB 100 million.
Expense of operation and maintenance	Expense of operation and maintenance only accounts for 5%-10% of the annual electricity consumption.
Investment payback period	The investment payback period of 12-year contract energy management is 3-5 years.
Other earnings	Reduce the power consumption, thereby reduce carbon dioxide emissions, as well as the use of coal, the weight of the streetlamp is light, and the use of aluminum is saved.
Technology occupancy	There is almost no other LED streetlamps with the same power abroad that can achieve light efficiency, light weight, temperature rise and life as the products of the company, but due to local

TECHNOLOGY: ENERGY EFFICIENCY

COMPANY: SICHUAN ZHONGBAOLI SCIENCE & TECHNOLOGY CO., LTD

		protection in the past in different regions, xenophobia, good and bad mix of products of so-called "big enterprises" and other reasons, they failed to achieve 50% of the expected China's market share, but this goal will gradually be realized.
	Market potential of technology	Because the product is in the leading position at home and abroad, the market potential will be close to 50%.
	Technical advancement	One of the problems of LED application is heat dissipation and ensure that the operating temperature of the chip is below 75°C, due to the company's patente technology, the fluid circuits on the surface of the radiator, so that the operating temperature of the chip is lower than 65°C; And at the same time, we use the power supply with efficiency up to 95%, safe voltage differential, unique technology system of differential lightning, and division of power supply and electric control, so that the products can achieve high luminous efficiency of 160LM/W, a long life for 10 - 15 years, ultralight (the consumption of aluminum per W is only 20g-30g) and ultralow operating temperature (temperature rise is less than 18°C).
	Technical maturity	100%
	Technical applicability	Be widely used in public lighting, industrial lighting and civil lighting.
	Technical stability	100%
	Technical safety	100%
	Obstacle in achievement transformation and promotion	Local protection, good and bad mix of products of "big enterprises" in the market
	Transfer of intellectual property	Li Changxing, chief engineer of the shareholders has more than 100 patents, of which the technologies of two practical patents have been put in the company.

TECHNOLOGY: ENERGY EFFICIENCY
COMPANY: SICHUAN ZHONGBAOLI SCIENCE & TECHNOLOGY CO., LTD

	<p>Photo captions</p>	
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GASIFICATION

- Hefei Debo Bioenergy Science & Technology Co., Ltd
- Liaoning Institute of Energy Resources
- Shengli Oilfield Shengli Power Machinery Group Co., Ltd.
- Tianjin University
- Wuhan Wushui Electric Technology Co., Ltd
- Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences



TECHNOLOGY: GASIFICATION

COMPANY: HEFEI DEBO BIOENERGY SCIENCE & TECHNOLOGY CO., LTD

Renewable Energy Technology Achievement Declaration																													
Hefei Debo Bioenergy Science & Technology Co., Ltd	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">QR code</td> <td style="text-align: center;"></td> </tr> <tr> <td>Technology provision unit</td> <td>Hefei Debo Bioenergy Science & Technology Co., Ltd.</td> </tr> <tr> <td>Contact person</td> <td>Wu Yinlong</td> </tr> <tr> <td>Tel.</td> <td>15856905896</td> </tr> <tr> <td>Technology name</td> <td>Biomass gasification power generation</td> </tr> <tr> <td>Technology provider</td> <td>Hefei Debo Bioenergy Science & Technology Co., Ltd.</td> </tr> <tr> <td>Scope of application</td> <td>Hefei Debo Bioenergy Science & Technology Co., Ltd.</td> </tr> <tr> <td>Brief description of technology</td> <td>Biomass generates gas in the gasification furnace, and gas goes into the internal combustion engine to generate power after purification. Use a variety of biomasses, including rice husk, straw, wood chips, wood, and shell. Key equipment is: The raw material pretreatment equipment, gasification furnace, purification equipment, internal combustion engine generating unit.</td> </tr> <tr> <td>Technical information</td> <td>1.2kg biomass raw material is needed for each KWh, and 1,000kW unit takes up the area of 500m².</td> </tr> <tr> <td>Business application situation</td> <td>Gasification power generation of 1MW rice husk (2011 Burma) Gasification power generation of Guodian Changyuan 10MW biomass (2011 Jingmen, Hubei) Gasification power generation of 2MW rice husk (2009 Shanggao, Jiangxi)</td> </tr> <tr> <td>Service conditions</td> <td>Debo Company assists the demand party for contacting, contact person Zhao Chengwu, tel. 18656157987.</td> </tr> <tr> <td>Contact person of business application unit /Tel/E-mail</td> <td>Market trade: Mature technology, more than 80 sets have been domestically and internationally run; The operation training shall be conducted at the initial stage of use, accompanied by a complete operating procedures for study; 1,000kW equipment costs RMB 6.5 million, and the domestic installation costs; 10% of equipment price, annual use and maintenance costs; 8% of equipment price;</td> </tr> <tr> <td>Investment on equipment</td> <td>1,000kW gasification power generation system (from the stokehole silo to the outlet cabinet of the generator), the investment of the equipment is RMB 6.5 million.</td> </tr> <tr> <td>Expense of operation and maintenance</td> <td>1,000kW rice husk gasification power generation project Numerical values of projects in the following serial numbers Remarks 1 Raw materials cost RMB 2 million /a Integrated price of furnace entry RMB 200 /t</td> </tr> </table>	QR code		Technology provision unit	Hefei Debo Bioenergy Science & Technology Co., Ltd.	Contact person	Wu Yinlong	Tel.	15856905896	Technology name	Biomass gasification power generation	Technology provider	Hefei Debo Bioenergy Science & Technology Co., Ltd.	Scope of application	Hefei Debo Bioenergy Science & Technology Co., Ltd.	Brief description of technology	Biomass generates gas in the gasification furnace, and gas goes into the internal combustion engine to generate power after purification. Use a variety of biomasses, including rice husk, straw, wood chips, wood, and shell. Key equipment is: The raw material pretreatment equipment, gasification furnace, purification equipment, internal combustion engine generating unit.	Technical information	1.2kg biomass raw material is needed for each KWh, and 1,000kW unit takes up the area of 500m ² .	Business application situation	Gasification power generation of 1MW rice husk (2011 Burma) Gasification power generation of Guodian Changyuan 10MW biomass (2011 Jingmen, Hubei) Gasification power generation of 2MW rice husk (2009 Shanggao, Jiangxi)	Service conditions	Debo Company assists the demand party for contacting, contact person Zhao Chengwu, tel. 18656157987.	Contact person of business application unit /Tel/E-mail	Market trade: Mature technology, more than 80 sets have been domestically and internationally run; The operation training shall be conducted at the initial stage of use, accompanied by a complete operating procedures for study; 1,000kW equipment costs RMB 6.5 million, and the domestic installation costs; 10% of equipment price, annual use and maintenance costs; 8% of equipment price;	Investment on equipment	1,000kW gasification power generation system (from the stokehole silo to the outlet cabinet of the generator), the investment of the equipment is RMB 6.5 million.	Expense of operation and maintenance	1,000kW rice husk gasification power generation project Numerical values of projects in the following serial numbers Remarks 1 Raw materials cost RMB 2 million /a Integrated price of furnace entry RMB 200 /t
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TECHNOLOGY: GASIFICATION

COMPANY: HEFEI DEBO BIOENERGY SCIENCE & TECHNOLOGY CO., LTD

	<p>2 Water charge RMB 30,000 /a</p> <p>3 Labor cost RMB ten thousand / Per capita wage RMB 3,500 / month</p> <p>4 Depreciation and maintenance cost RMB ten thousand /a60</p> <p>6 Management fee RMB 200,000 /a</p> <p>7 Electricity revenue RMB 6.3 million /a Power for personal use is deducted</p> <p>8 Extracting solution income RMB 300,000 /a</p> <p>9 Biomass carbon income RMB 200,000 /a</p> <p>9 Total earnings RMB 3.55 million /a</p>
Investment payback period	Investment payback period: 24 months
Other earnings	Through the gasification power generation technology, the additional hot water, steam, biomass carbon, extracting solution and so on can be obtained; Hot water of RMB 20 / ton, steam of RMB 120 / ton, biomass carbon of RMB 1,200 & 3,500 / ton and extracting solution of RMB 500 / ton.
Technical occupancy	Gasification power generation occupies 30% of the market share of domestic gasification power generation.
Market potential of technology	With the demand on energy from social development, the use of biomass energy is gradually increased, and biomass gasification power generation will double based on the original base in 2020.
Technical advancement	Gasification furnace designed and produced by Debo Company: Be suitable for a variety of biomasses, including rice husk, straw, wood chips, wood, and shell. The water content of the biomass is required to be low, and the water content of the biomass can reach up to 35%; The gasification process is environmentally friendly, and no waste is produced. Design and produce the largest biomass gasification hybrid power generation equipment in Asia, which belongs to the leading level in the international and domestic field of gasification power generation.
Technical maturity	Raw materials enters into the gasification furnace through the feed system to undergo pyrolysis and gasification reaction to generate biomass gas, and after purification, the gas goes into internal combustion generator for generating electricity; Equipment model shall be determined according to the process and equipment selection calculation; The gasification and power generation system is controlled by PLC or DCS, with high integration and improvement.
Technical applicability	Technology promotion requires rich biomass resources; The demand for the market of gasification furnace products (electricity, biomass carbon, extracting solution, hot water, steam) is large, which is convenient for sales; Technology is not limited by region, scale and environment.
Technical stability	Technology in the engineering runs stably, and there are more than 80 sets of projects running at home and abroad; The water content of biomass has a great influence on the quality of the gas, and the unit capacity needs more biomass with high water content.
Technical safety	Gasification power generation: Power is used for autonomous power supply of the factory or grid connection; Perfect supporting facilities (gasification equipment, purification equipment, power

TECHNOLOGY: GASIFICATION

COMPANY: HEFEI DEBO BIOENERGY SCIENCE & TECHNOLOGY CO., LTD

		generation equipment, and power grid equipment); With the requirements of the energy policy and environmental policy, gasification power generation is rapidly being accepted by the market.
	Obstacle in achievement transformation and promotion	Debo Company solves the problems encountered in gasification power generation technology; National policy supports biomass gasification power generation, and advocates the use of renewable energy; The running of this project is based on rich biomass resources; Compared with other power generation equipment, there is less capital investment and shorter recovery cycle; The integration of gasification power generation equipment is high, the operation is simple, maintenance is convenient and the cultivation of talent is very fast.
	Transfer of intellectual property	Debo Company has more than 50 patents, more than 10 patents for invention (those that have been available and have been substantively reviewed) and more than 40 new practical patents; Technology is owned by Hefei Debo Bioenergy Co., Ltd.; Gasification furnace equipment is completely made in China, and supporting valves, motors, electrical components and other parts are imported. Technology is owned by the company which can authorize for use and the authorized channel is smooth.

TECHNOLOGY: GASIFICATION

COMPANY: HEFEI DEBO BIOENERGY SCIENCE & TECHNOLOGY CO., LTD

Photo captions



TECHNOLOGY: GASIFICATION

COMPANY: LIAONING INSTITUTE OF ENERGY RESOURCES

Liaoning Institute of Energy Resources	Renewable energy technology achievement declaration			
	QR code			
Technology providers	Liaoning Institute of Energy Resources	Submission date	2016-06-23	
Contact	Jiankun Liu	Technology type	Biomass energy utilization technology	
Telephone	18804176616	E-mail	nmgljk@163.com	
Technical name	Distributed biomass gasification power generation technology			
Technology provider	Liaoning Institute of Energy Resources			
Applicable scope	Liaoning Institute of Energy Resources			
Technology brief description	The processed biomass (natural drying, truncation) produced crude gas by gasification reactions in the gasifier. Remove the tar, particulate matter, dust and water of the crude gas in the purification system. After purification the gas was gone into the gas tank by the Roots blower. The gas which was in the gas tank was sent to the gas generator to generate electricity.			
Technical information	Raw material consumption: 50kg/h-1500kg/h; Generating capacity: 100kWe-1000kWe; Produced gas tar and ash content: >20mg/Nm ³ ; Equipment size: 6m*6m*12m.			
Business applications	A 300kWe biomass gasification power generation projects is normal operation in the Shichang group in Phnom Penh, Cambodia.			
Business applications company the contact/Tel/E-mail	Shichang Group Cambodia Development Co., Ltd. Changwu Yang; Tel: 012496563			
Conditions of Use	Construction can be built locally, and also can be market transactions. Technology and equipment have reached the international advanced level and technology is mature. The project managers and operator need to be trained when using it. System installation, use and maintenance costs account for 10% of the total project cost.			
Equipment investment	The generating capacity of biomass gasification power generation project is 500kWe as an example. Major equipment includes a truncated equipment, gas equipment (Including gasification, gas purification equipment), gas tank, generator sets, and pipeline and auxiliary attachments which is needed by the operation of the project. The total investment is about 4 million.			
Operation and maintenance costs	During normal operation, raw materials, water, electricity and other costs per unit of product consumed and the cost of labor charges (wage) required to calculate the actual local situation. Equipment maintenance costs, including depreciation, repairs, management fees, etc. accounts for about 10% of total equipment investment, under normal circumstances.			
Payback period	Payback period is generally about 8 years.			

TECHNOLOGY: GASIFICATION

COMPANY: LIAONING INSTITUTE OF ENERGY RESOURCES

	Other income	With this technology, the biomass was translated into clean bio-gas for power generation. And the tar can be recycled.
	Technology share	Biomass gasification power generation technology research started late at home. It compared with foreign countries is still lagging behind. Present biomass power generation is mainly direct combustion and large-scale. On the whole, domestic biomass power generation field, distributed biomass gasification power generation system developed by my company accounted for 30% of the total market share.
	Technology market potential	As the fossil energy shortages and environmental problems highlight, to seek and use of clean renewable energy resources is a global issue of common concern. Biomass resources as the only renewable carbon resources, more and more attention has been paid. Distributed biomass gasification power generation technology has some features, as small, flexible, and mature technology. And it can be not restricted by the power grid, and can be produced for own use. Especially in the area where the biomass resources are rich and the electricity is lack, its market potential is huge.
	Technology advancement	The technology was developed cooperatively by the China and Italy international cooperation project which our company undertook during "the ninth five-year". After years of market applications and testing, it has formed a biomass gasification power generation technology and key equipment, which is suitable for China's raw materials and regional characteristics and has independent intellectual property rights. As one of the company, which carries out the biomass energy utilization technology firstly at home, we have been committed to the research and promotion and development work in this field over the years. Through years of technological improvements and product optimization, the technology and key equipment has reached the international level of similar technology and has been the leading position in the domestic similar technology.
	Technology maturity	The processed raw material (natural drying, truncation) is fed into the downdraft gasifier by the lift bucket feeder and transformed into crude gas by gasification reactions. Firstly, remove the large particles of dust from this crude gas in the cyclone. Secondly, remove tar and fine ash from gas and make gas temperature drop below 35 °C in the dual role of spray washing and indirect cooling in the spray purifier. Thirdly, further remove the residual tar and water through the biomass filter. After purification, the tar and ash content of the gas is less than 20mg/Nm ³ , and the heat value is about 5000 kJ/Nm ³ . Finally, the gas is passed through the blower into the storage tank. Through Regular feeding and continuous ash removal system to ensure continuous operation. Biomass gasification gas has a certain fluctuation. Balancing role of gas storage tank ensures the consistency and uniformity of the gas inlet side of the gas generator. At the same time, gas cabinet's constant counterweight ensures constant air sending pressure and gas generator inlet pressure. The stable gas composition and pressure ensures gas generator stable and reliable operation.
	The suitability of technical	Distributed biomass gasification power generation technology with a wide range of application, it can be applied to countries and regions which has adequate feed stocks and it also can be used to replace the

TECHNOLOGY: GASIFICATION

COMPANY: LIAONING INSTITUTE OF ENERGY RESOURCES

	<p>use of fossil fuels and use with a large power grid. The use of this technology can be mitigated to a large extent to environmental problems from fossil fuels and it also can be used to remote countries and areas of resource-poor for power. We can through the situation of distributed power generation to solve the problem that the use of electricity for residents for and production .The technology is not influenced by region and environmental, but we decide the size of its construction must be based on the local resources of biomass.</p>
The stability of technical	<p>The most important parts of this technology is manufacturing gas, purification and the production of power. The gasification technology of fixed bed has a long time and the technology is mature. The gas from air gasification has calorific value basic around 5000kJ/Nm³, when the gas through the system of cyclone dust, water washing and filtering, the tar and ash in gas less than 20mg/Nm³, that will be satisfied with the demand of feed gas for gas generator. It is mature for the production technology of generator both in foreign and domestic and it can be fully guaranteed the normal and stable operation of system.</p>
The security of technology	<p>The power generation technology of distributed biomass gasification is mature, especially practical in the countries and regions of resource-rich and power scarcity; through the development and improvement in dozens of years for the field of biomass, facilities have been gradually improved and even mature. The use of biomass utilization has zero pollution to the environment, and it also can be used to replace the use of fossil energy, years of experience can prove that the market has been accepted and we can vigorously promote the development of biomass energy technology in the future.</p>
The obstacles of achievements promotion	<p>The application and promotion of the power generation technology of distributed biomass gasification has been improved in technical level. The main problem is the affecting of material properties, collection, transport, storage and so on. This is the reason why relatively high production is cost, so it needs the support of some policy and financial from government.</p>
The transfer of intellectual property rights	<p>The technology with independent intellectual property rights, and obtain one relevant patents and two practical new type patents, the owner of this technology is state-owned enterprise: The key link, process and equipment of this technique has been realized the localization of completely. Technology has side and demand side has been able to transfer of technology through rational negotiation.</p>
The picture shows	

TECHNOLOGY: GASIFICATION

COMPANY: SHENGLI OILFIELD SHENGLI POWER MACHINERY GROUP CO., LTD.

Shengli Oilfield Shengli Power Machinery Group Co., Ltd.	Annex 2 Central Africa Renewable Energy Technology Achievement Declaration Table			
	Technology provision unit: <u>Shengli Oilfield Shengli Power Machinery Group Co., Ltd.</u> Submission date: <u>June 20, 2016</u> Contact person: <u>Xing Kai</u> Tel.: <u>15105462769</u> E-mail: <u>15105462769@163.com</u> Selection of technology type: <u>D. Biomass energy utilization technology</u> A. Hydropower technology B. Solar energy utilization technology C. Wind energy utilization technology D. Biomass energy utilization technology			
	Item	Specific description	Filling Instruction	
(I) Brief introduction of technology achievement	1	Name of technology or product	Biomass dry distillation gasification engineering	The name can be specifically and directly to be promoted with outstanding features.
	2	Provider of technology or product	Shengli Oilfield Shengli Power Machinery Group Co., Ltd.	Please offer the name of specific unit that has intellectual property or possesses the ability for engineering design and construction
	3	Whether of foreign cooperation experience		Whether this technology is of experience of overseas marketing and application, and please gives a brief introduction of main content.
	4	The situation of technical intellectual property	Shengli Oilfield Shengli Power Machinery Group Co., Ltd.	In case the technology intellectual property is in inconformity with technology provider, please list the whole name of owner of intellectual property.
	5	Scope of application	Utilization of waste from agriculture, forestry and animal husbandry meeting requirement of certain water content and granularity	Restrictions in respective industry and technology application (within 20 words)
	6	Brief introduction of technology or product	Biomass gasification and power generation technology of Shengdong Group applies fold-back rotational gasification process and equipment via independent research and development of	Principle, function, technology features and key equipment (within 500 words).

TECHNOLOGY: GASIFICATION

COMPANY: SHENGLI OILFIELD SHENGLI POWER MACHINERY GROUP CO., LTD.

			<p>the company. It is designed to convert rice hull, wood chip, nutshell, methane residue, animal dung and other waste biomass from agriculture, forestry and animal husbandry meeting requirement of certain water content and granularity into clean flammable biomass gas without tar and power energy The process applies dry distillation first and gasification later. The introduction of specific process is as follows:</p> <p>1) The stage of dry distillation: The material enters dry distiller, the tar and volatile substance generated in dry distillation have been totally burned, the heat energy released from complete combustion can absolutely meet the consumption required in dry distillation, and there is no need of provision of additional heat energy from outside, which realizes the maximum effective utilization of energy.</p> <p>2) The gasification stage The material after dry distillation enters fold-back rotational gasifier for gasification, the tar is completely separated out in distillation stage, and there will be no tar in the gasified gas. It is available to utilize waste value in the process to produce mixture of water vapour and air as gasifying agent to increase heat value of gasified gas.</p> <p>3) Purification process As the high temperature gasified gas generated in the process contains no tar, so it can form clean flammable gas energy</p>	
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				for civil use or entering the consequent fuel gas power generation system after dedusting, cooling and further fine filtration.	
		7	Main technical index	Heat value of gasified gas: $\geq 5.5 \text{ MJ/m}^3$ Power generation rate: Biomass of 1.5kg is required for generation of 1kW h Specification and model: 200kW, 60 kW, 1MW	Specification, power, service parameters of technology or product, volume and weight of equipment, etc. (within 500 words)
		8	Business application situation	1. A set of 200kW biomass power generation system is under operation 2. It has entered into business cooperation contract with 3 domestic customers.	Describe application content and provide the name, location, engineering scale and operation situation of 1-4 demonstration engineering (within 500 words)
		9	Contact person of business application unit / Tel. / E-mail	Liu Ruigang: 13406145715	Provide contact information of 1-4 application units to verify the data
	(II) Index data of technology quantification (for a certain specific demonstration project)	10	Basic information	Main equipment: Shengdong biomass dry distillation gasification process and equipment, Shengdong gas engine, power is optional according to project scale.	Describe the background of project (selection of technology and product) is the investment a market transaction or investment and construction by locality? Main equipment, power, quantity and working time, etc. applied. Whether is systematic training required in the process of implementation? The cost of installation, use and maintenance. (a hundred words)
		11	Investment on equipment	The cost of equipment per kW h is RMB 8,000. (Domestic price, excluding biomass pretreatment equipment).	Describe the amount of one-off investment for necessary main equipment and other auxiliary equipment in new construction in application of the technology, or investment of other newly added

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				equipment and other auxiliary equipment in transformation of existing works. Engineering scale is required to be described.	
	12	Expense of operation maintenance	<p>1. Gasification equipment will have an annual operation period of 7500h, and it will be overhauled once in each year with servicing period of about 20d;</p> <p>2. Normal overhaul cost and cost for accessories change of each time is about RMB 30,000- 50,000.</p> <p>3. Normal service life of the equipment is over 10 years;</p> <p>4. Consumption of softened water Consumption of biomass each ton: 50kg-70kg</p>	Describe the costs of raw materials, water and electricity consumed by a unit of product during normal operation of system, and the labor cost (salary), equipment depreciation, repair expense, management fee and other maintenance costs.	
	13	Investment payback period	Projects in different scales have different investment payback periods, the larger of the scale is, the shorter of the payback period is, and 0.2-5MW power generation project is generally suitable.	Describe static investment payback period of the project which refers to the period required for accumulated economic benefits being equivalent with initial investment cost under the condition without considering time value of the fund.	
	14	Other earnings	By-product of gasification is plant ash: Ash output accounts 15% of biomass treatment quantity (mass percentage)	Describe the additional economic benefits (such as increase of output value, benefit of by-product, carbon benefit) that occur meanwhile when this technology is compared with similar technology or after this technology is applied.	
	(III) Description of qualitative index	15	Technical advancement	<p>Compared with normal straw gasification, the process and equipment have the following advantages:</p> <p>1) Gasification without tar: The course of normal pyrolysis and gasification will inevitably generates large</p>	Describe innovation of the technology, the position and level in similarly international and domestic technology.

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			<p>quantity of tar, which is a big problem in application of gas, as tar deposits on the pipe, valve, instrument and stove after condensation, which will seriously affect normal operation of the system. There are many ways to remove tar, but it is not solved perfectly. Removal of tar not only wastes the energy contained in the tar, but also brings secondary pollution.</p> <p>The biomass of process applies dry distillation first and gasification later. The dry distillation stage completely burns the tar separated out in the process of biomass pyrolysis when it is still not cooling-off and in gaseous state, recovers and utilized the energy contained in the tar, biomass after dry distillation is then gasified, and there will no generation of tar during gasification.</p> <p>2) Energy saving and environmental protection</p> <p>The technology doesn't study how to clear away tar in gasifies gas, but innovatively study how to avoid tar in gasification process, and tar generated during dry distillation process and volatile substance are burned in high temperature to recycle heat utilization. Therefore, the whole set of technology doesn't discharge any tar, sewage, phenolic water or harmful gas, both energy conservation and environmental protection.</p> <p>3) High heat value of gas</p> <p>When use waste heat in the technology to generate water vapor, mixing with the air as gasifying agent, not only increase</p>	
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			<p>gasification reaction temperature and reaction rate, but also reduce the content of N2 in gasified gas in general gasifier, increase the content of H2 in gasified gas and increase the heat value of gasified gas, with heat value over 5.5MJ/m3, due to partial water gas reaction by accession of steam gasifying agent within fold-back rotation gasifier.</p> <p>4) Wide adaptability of raw materials</p> <p>Because complete combustion of dry distillation gas generated at stage of dry distillations and concomitant tar may generate a lot of heat, and it can conduct dry distillation of biomass with water content within 15% by heat from self-burning without heat supplied by the outside. So the adaptability of gasification process to various biomass materials is wide, large operational flexibility.</p>	
	16	Technical maturity	Conduct site operation verification, and the process technology is mature	Describe the technology process route and completion degree of equipment and system integration.
	17	Technical applicability	Biomass gasification and power generation technology of Shengdong Group applies fold-back rotational gasification process and equipment via independent research and development of the company. It is suitable for rice hull, wood chip, nutshell, biogas residue, animal dung, etc., all agriculture, forestry and animal husbandry wastes satisfying certain water content and granularity requirements. Not affected by region, environment and resource factors. But the	Describe the applicable range of the technology during transformation and promotion, the matching degree with upstream and downstream process and technology and the restrictions of region, scale, environment, resources and energy and other factors.

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			scale shall not exceed 5 (within 5 power of crops zone radius)	
	18	Technical stability	No secondary pollution to the environment.	Whether the technology can keep stable in the operation of engineering, the sensitivity to interference of environment, technical parameters, etc..
	19	Technical safety	Safety problems of supporting facility are basically considered, possessing perfect safe operation regulations.	Describe the system risk of practicability, whether supporting facilities are complete and market acceptability that the technology is faced with during transformation and industrialization of achievement.
	20	Obstacle in achievement transformation and promotion	Temporarily, there is no popularization obstacles through investigation and communication at the earlier stage	Describe the obstacles that need to be solved in the process of achievement transformation and promotion process of the technology, such as technical issues, policy barriers, resource or capital restrictions, talent training and other restricted conditions.
	21	Transfer of intellectual property	Gasification process and device of biomass two-segment dry distillation, China, patent for invention, patent No.: ZL201510098185, date: March 6, 2015 Applicant (Patentee): Shengli Oilfield Shengli Power Machinery Group Co., Ltd.	Whether it has domestic proprietary intellectual property, whether it has obtained patent, and nature (enterprise, college, individual, etc.) of the owner of the technology Localization of key links of technology, process and equipment introduced: Transfer intention of the owner of the technology, transfer mechanism of technology property, whether policy pathway is smooth, etc.

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Renewable Energy Technology Achievement Declaration	
Tianjin University	<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">QR code</div> <div style="width: 60%; text-align: center;">  </div> </div>
Technology provider	Tianjin University
Submission date	July 31, 2016
Contact person	Ma Wenchao
Technology type	Biomass energy utilization technology
Tel.	18202268127
E-mail	mawc0916@tji.edu.cn
Technology name	Energy processing technology from household garbage solid waste under high temperature environment
Technology provider	Tianjin University
Scope of application	Tianjin University
Brief description of technology	<p>Schematic diagram of pyrolysis gasifier is shown in Diagram 1.</p> <p>Functions: Treatment of flammable solid waste.</p> <p>Technical features: Emission up to standard. Secondary pollution is strictly controlled; No need of addition of auxiliary fuel; Integrated design, compact and small-size, convenient for installation and operation; Intensive range of medium and small scale treatment, low operation cost. The fuel gas and heating power produced can meet the requirement for cooking and hot water. Benefit is significant.</p>
Technical information	Treatment capacity of 10t/d, power consumption less than 135kwh/day, water consumption of 10m ³ /day, RMB 1000 in total, labor of 1-2/shift, quantity of heating production of 4t/h calculated by hot water at 70°C, and equipment land occupation of 1700m ² .
Business application situation	Tianjin Taida Environmental Protection Co., Ltd., located in No. 1 Taixin Road, Jinnan District, Tianjin, project scale of 10t/d, converts solid waste to treasure, realizes economic benefit of RMB 5 million/year.
Service conditions	Contact person: Lv Yuan Tel.: 18622407096 E-mail: 18622407096@163.com
Contact person of business application	Local investment and construction and mature technology. Simple training is required before operation of equipment, and compact equipment is convenient for installation and operation with low maintenance cost.

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	unit /Tel. /E-mail	
	Investment on equipment	<p>Project scale is of 10t/d, and investment amount is RMB 3 million. Main equipment:</p> <p>(1) Pretreatment device. It is constituted of crusher and magnetic separator. The crusher breaks the bag of the garbage, disperses and smashes it, makes the garbage better dried in inclined drum-type pre-drying equipment, and reduces the possibility of plugging by garbage feeding; Magnetic separator picks up ferrous metal for recovery and utilization. (2) Feed mechanism. It is comprised of belt conveyor and feed box, and it realizes automatic control or manual control over charging rate and time through mechanical operation. (3) Inclined drum-type pre-drying equipment. It is comprised of smoke jacket, drying cylinder and drive mechanism, preheats and preliminarily dries the garbage into the furnace by utilizing heat of smoke of waste heat boiler and so increases heat value of garbage into the furnace. (4) Pyrolysis gasifier body. It adopts new two-section combustion chamber structure, which is mainly constituted by the vertical cylinder combustion chamber one and unique combustion chamber two with multiple-cavity. (5) Ventilation System. It is comprised of primary air fan, induced draft fan and corresponding air and flue gas duct and valve and meter and other accessories. (6) Deslagging equipment It includes rotational fire grate and transmission structure. The material and unique structure adopted in this equipment realizes mechanical deslagging and continuous operation of incinerator; (7) Heat recovery boiler It includes water jacket covered externally on smoke pipe and horizontal water tank (or steam separator), and the water in the boiler performs natural circulation relying on density contrast. (8) Electrical and automatic control system It includes electric control cabinet and industrial controller and other equipment. Operation condition and relevant process parameters of the entire system can be displayed on computer screen for timely control.</p>
	Expense of operation maintenance	<p>Operation consumption and cost of pyrolysis gasification technology is low, and equipment structure is compact, and maintenance quantity is small, and therefore, maintenance cost is low. First ignition of the equipment requires the help of auxiliary fuel, and there is no need of any auxiliary fuel after stable operation, so the cost of auxiliary fuel can be ignored; Power consumption per day is calculated at 35 kwh, and power generation of operation for a year is 12,250 kwh, power price is calculated at RMB 0.8, and power charge of operation for a year is RMB 9,800; The labor is calculated as 3 shifts per day, 2 persons per shift, 6 persons in total and salary of RMB 3000/month each person, and annual salary is RMB 216,000; Service life of the equipment are 20 years, and depreciation cost is RMB 100,000/year; Maintenance cost and management cost is RMB 80,000/year. In conclusion, operation maintenance cost of the system under normal operation is RMB 405,800/year.</p>
	Investment payback period	<p>Without consideration of time value of money, static investment payback period of the project are 2 years. Method to calculate is shown as follows:</p> <p>Project scale is 10t/d, and quantity of heating production is 4t/h calculated by hot water at 70°C or saturated vapor at 0.1MPa. Specific heat capacity of water is 4.2, the heat required for 1L water from 20°C to</p>

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		70°C is 210, so electric quantity consumed for 1L water from 20°C to 70°C is of 0.058kW, and the heat quantity generated in the project per day is equivalent to the electric quantity of 5,568kW. Calculated at power price of RMB 0.6, the benefit of one day is RMB 3,340, it operates for 350 days a year, and annual benefit is RMB 1.17 million. Without consideration of time value of money, static investment payback period of the project is 2.56 years.
	Other earnings	Household garbage treatment belongs to environmental project and public welfare project. Charging of garbage treatment cost is required, and in addition, there is still other environmental benefit and carbon emission benefit, which can be converted into a benefit of RMB 0.5 million /year.
	Technology share	As shown in current market investigation, the market share of pyrolysis gasification technology in solid waste processing field is less than 5%. However in several future years, that application of the pyrolysis gasification technology in the treatment of medium and small scale garbage of county, town and village will increase rapidly.
	Market potential of the technology	By statistics, urban household garbage is mainly treated by landfill, incineration and compost in our country. Landfill is the main treatment method currently, which accounts for nearly a half; incineration accounts for about 12%, compost accounts for less than 10%, and there is still 30% of household garbage failing to be processed. Especially processing rate of urban and rural garbage is extremely low, and large amount of garbage surrounds the city, which has resulted in serious environment pollution. Pyrolysis gasification technology is mature, has good environmental protection performance, and is easy to realize automatic control. Its operation consumption and cost is low, and has little land occupation, low investment and significant economic benefit and other features. Currently, there has been the example of applying pyrolysis gasification technology processing village garbage, which opens up the precedent of china's garbage processing equipment being exported overseas: The city of Teheran of Iran constructs 2 vertical-rotation pyrolysis gasification incinerators of 100t/d, and the project has successfully been connected to the grid and generates electricity in February 2015. Therefore, aiming at our national conditions and the current situation of solid waste generation, pyrolysis gasification technology will have tremendous development potential in solid waste processing field by 2020, especially the small-size, distributed pyrolysis gasification technology in the treatment of village household garbage. Large amount of solid waste such as garbage of small cities and villages and forestry and agricultural residues in Africa is required to be processed in urgent need, so market prospect of this technology is huge.
	Technical advancement	The technology is advanced. The advancement of the technology embodies in environmental protection performance. The fundamental distinction between this technology and direct incineration technology of garbage lies in, under the condition of small investment cost, pyrolysis gasification technology solves smoke pollution problem without secondary pollution, and the smoke can be discharged while meeting the standard. Especially, it has significant effect in inhibition of Dioxin generation. As direct incineration in grate is a course of strong oxidation, large amount of SO ₂ , HCl and NO _x will be generated during

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		<p>incineration; meanwhile, as grate fails to stand high temperature higher than 1000°C, it makes operation temperature of incineration restricted, while incineration temperature lower than 1000°C is hard to completely resolve Dioxin. Meanwhile, pyrolysis gasification technology can reduce the emission of NOX and SO2, which is because anoxycausis in combustion chamber one belongs to reducing atmosphere, N and S are rarely oxidized to remain in the slag. While unique design of combustion chamber two can ensure smoke forming turbulence and fully blending with oxygen in the air, the degree of air excess required is low, and it correspondingly reduces the N source from the air and realizes emission reduction of NOx. Furthermore, three is research showing that, after pyrolysis gasification reaction, the vast majority of chlorine element contained in the garbage has been transferred into solid phase product (bottom slag), which makes H C1 content in smoke far less than standard limits of conventional household garbage incinerator. Pyrolysis gasification technology has good environmental protection performance, is easy to realize automatic control, operation consumption and cost is low, and it has little land occupation, low investment and significant economic benefit and other features.</p>	
	<p>Technical maturity</p>	<p>The technology is mature. The complete pyrolysis gasification equipment is comprised of pretreatment equipment, feeding equipment, inclined drum-type pre-drying equipment, combustion chamber one, combustion chamber two, rotational grate, waste heat boiler, induced draft fan, chimney, automatic control system, etc. After smashing and magnetic separation, the garbage is transmitted to feed inlet of inclined drum-type pre-drying equipment through belt conveyor, and combustion course of the pyrolysis gasification furnace is divided into two phases. The first phase is pyrolysis gasification and combustion without oxygen, which is made in combustion chamber one. Operation temperature is controlled at around 750°C, which makes non-volatile combustibles in the garbage totally burned, while flammable volatile gas enters combustion chamber two; The second phase is oxygen-excess combustion made inside combustion chamber two. Operation temperature is controlled at 900-1100°C, which makes flammable gas from combustion chamber one fully blended with sufficient high temperature air and turbulence is formed. Sufficient combustion generates high temperature smoke which goes through multiple baffling and enters into Class 1 and Class 2 settling chamber for dedusting, and then it is sent to waste heat boiler to recover its heat quantity for heat supply, and its process is shown as Diagram 2.</p>	
	<p>Technical applicability</p>	<p>Pyrolysis gasification equipment has strong applicability and intensive application range, which can process not only garbage with high heat value but also garbage with low heat value. It's applicable not only for pyrolysis gasification processing of urban (especially villages and towns) household garbage, but also pyrolysis gasification processing of medical garbage and forestry and agricultural residues and other solid waste. Except that the first ignition requires the help of external energy, there is no need to add any auxiliary fuel in processing course and continuous and stable operation can be made. Low power consumption, low operation cost and no consumption of water. Processing scale is determined by processing quantity of solid waste, the scale in villages and towns is in accordance with 1- 10t/d in variety, and scale in counties or cities is in accordance with 10- 100t/d in variety.</p>	

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	<p>Technical stability</p>	<p>The technology has good stability. Pyrolysis gasification equipment has a relatively stable operation condition, feeding and discharging can be controlled, automatic control is easily to be realized, and it has low operation consumption and cost. There is no need of pretreatment for the materials, as the garbage is crushed and broken during feeding. Compact furnace type, strong heat intensity and layered furnace temperature is in favor of combustion; The adaptability of fuel is good. Stable combustion and the temperature control are easy to achieve. The overall unit is divided into primary chamber and secondary chamber, with compact structure, small amount of equipment maintenance, and it needs to equip waste heat boiler additionally. Combination of layer combustion and chamber combustion, graded combustion, reasonably allocate the release of chemical energy through control of air amount and control of furnace combustion conditions to achieve more superior combustion status. The rubbish almost doesn't need to preheat. The pyrolysis temperature in primary chamber is under 700°C. The temperature in secondary combustion chamber is over 850°C. And the combustible components decompose completely. Sufficient fuel. Ash ignition reduction of 3%. No disturbance of furnace charge, low dust discharge, the content of incinerator outlet is 3500m g/m3. Realize graded combustion, easy to reach the standard. 850°C in primary chamber, over 850°C in secondary combustion chamber, toxic substances decompose completely, with full combustion, the retention time of exhaust gas in secondary combustion chamber exceeds private incinerator outlet, and the discharge of dioxin is nearly zero. The ash content in exhaust gas is little, and the heavy metal is very little.</p>
	<p>Technical safety</p>	<p>The pyrolysis gasification technology has good practicability in achievement transformation and industrialization process, with complete supporting facility, and the unit needs electricity in operation process. So the continuous supply and safety of electricity shall be ensured to ensure normal operation of the unit.</p>
	<p>Obstacle in achievement transformation and promotion</p>	<p>With the appearance of garbage-surrounded city, garbage-surrounded village and other phenomena, each country is actively seeking for different, more efficient way and technique to dispose solid wastes. Currently, domestic waste treatment modes mainly are landfill, incineration and compost. But there are restrictions for landfill, incineration and compost respectively: For landfill, the disadvantages are waste of land resources, more hazards generated, high cost of leachate treatment in landfill area, long subsequent management time, etc.; For incineration, the disadvantages are large investment scale, high operation cost, production of heavy metal pollution and dioxin-like pollutants, etc.; For compost, the disadvantages are high requirements of garbage classification, leakage of aerobic decomposition and gas contamination, outlet of compost products, etc.. Compared to incineration technology, the pyrolysis gasification technology, with compact equipment and low investment, is convenient for installation and operation, and meanwhile with low operation cost, it has significant effects on inhibition of generation of dioxin. Therefore, there is no barrier in technical issues, resources or capital as well as personel training aspects.</p>

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Transfer of intellectual property
 Photo Caption

This technique possesses domestic independent intellectual property right. The owner are colleges and universities and obtains related patents and the first and the second prize of Provincial Science and Technology Progress Award. Complete localization of technology and equipment.

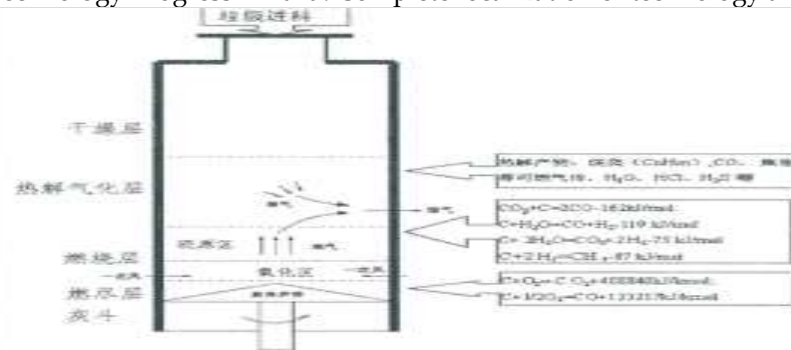


图1 工作原理示意图

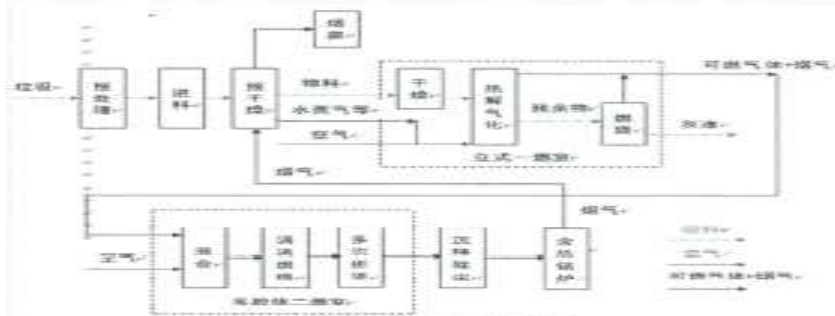


图2 热解气化装置工艺流程图



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	<p>Name of technology: Technologies of gas, power and fertilizer production by gasification of agricultural and forestry residues Technology provider: Tianjin University Contacts: Guanyi Chen Type of technology: Biomass energy Specific technology: Gasification Cell-phone: 13512208049 E-mail: chen@tju.edu.cn</p> <p>√Technology provider Tianjin University</p> <p>√Application scope This technology belongs to the field of renewable energy and environmental protection. There are no limitation for this technology application, as long as the area is abundant with agricultural and forestry residues.</p> <p>√Brief introduction of technology Basic theory: Biomass reduction reaction which utilized the exothermic effect of partial oxidation is employed to produce syngas, char-based fertilizer as well as power generation. Function: Agricultural and forestry residue are converted into energy following the principle of minimization and resources. Syngas as well as char-based fertilizer are produced, and they could meet the requirement of electricity, energy, and agricultural ecological fertilizer. Features of technology: Clean and efficient, polygeneration. Key equipment: Gasifier; Tar-clean device.</p> <p>√Information of the technology Gasification and pyrolysis technologies are employed to convert agricultural and forestry residue into high/moderate heat value syngas. Necessary equipment is listed below: feeding equipment, gasifier (700-900°C, normal pressure), tar clean device, flexible tank, other equipment such as motor, pump, fan, and pipeline. Equipment occupies 5 acres approximately.</p> <p>√Commercial applications Some technology demonstration projects have been put into set up and operating in China. One of the projects of biomass gasification and pyrolysis for gas, heating and power supply has been built in Jinghai District, Tianjin. 3 tons raw biomass materials are treated per day, and it provides gas and heating for kindergarten, primary school, middle school and other 500 families in the country. The equipment runs well so far.</p> <p>√Service conditions</p>
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As a result of the abundant agricultural and forestry biomass resource in Africa, biomass gasification and pyrolysis process has easy approach to get raw material. The technology is economic and efficient, and it is perfectly suitable for the actual situation in Africa. Besides, this technology is relatively mature, and some demonstration projects have already applied in China. People only need short time for training to ensure the security of personnel and equipments. The installation cost of this process is 150 000 RMB, and use and maintenance cost is 100 000 RMB per year.

√**Contact person of commercial application company**

Yanbo Li, 137-5253-0279、 lmswzn@163.com

√**Equipment investment**

A biomass gasifier (500 Nm³/h), a flexible tank, a tar clean device, and some other equipment (such as motor, pump, fan, and pipeline) are needed for this process. Initial investment amount is about 4 000 000 ~ 5 000 000 RMB. Biomass residue treatment amount is set at 10 t per day, and it is enough to provide energy for a natural village (500~800 people) to coke, heat water, power generation, as well as ecological fertilizer production.

√**Cost of running and maintenance**

Normally, the amount of biomass consumption is 10 t per day, that is 3 650 t per year. The price of raw biomass material is about 300 RMB per ton, so the annual consumption of raw biomass material costs 1 000 000 RMB. Power consumption is 250 000 kW/h per year, and it costs 125 000 RMB (the unit price of power is 0.5 RMB per kW/h). Tap water consumption is 3822 tons per year, and it costs 30 000 RMB per year (the unit price of tap water is 7.85 RMB per ton). Salary and welfare of the staff is 4080 RMB per month per person, and it costs 560 000 RMB per year (10 staff in total). The maintenance costs of equipment is 780 000 per year, and other cost is 530 000 RMB per year. Totally the cost of running and maintenance is about 2 320 000 per year.

√**Investment recovery period**

The static investment recovery period of this technology is about 4 years, regardless of time value of fund.

√**Other benefit**

The consumption of raw biomass material is 3650 tons per year, and it equates to 1825 tons standard coal. That is to say, it can obtain 4544 tons reduction of CO₂ emission per year, 1241 tons reduction of smoke dust emission per year, 137 tons reduction of SO₂ emission per year, and 68.5 tons reduction of NO_x emission per year.

√**Rate of technology share**

According to the results of market research, this technology occupied 20% domestic market in 2015.

√**Market potential of the technology**

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There are some shortcomings in current biomass gasification station, such as low efficiency of gasifier, unstable quality of combustible gas, low heating value of the products, problems of gas cleaning technology, high content of tar in gaseous product and bad economic effect. However this technology could overcome these obstacles mentioned above. It can obtain much higher heating value gas and low tar emission through innovative design of gasifier and new cleaning technology. Besides it can operate stable and consecutive with auto control system for production of gas, power and fertilizer. It is expected that in 2020 the technology in the field occupying the market potential can reach 30%.

√Advancement of the technology

The innovations of this technology are listed below. Firstly, a catalytic plate is set inside the gasifier. As a result, the online catalytic upgrade of syngas can be achieved. Secondly, PID system is used for controlling the temperature of gasifier. In order to achieve the optimal condition of gasification, programmed temperature technology is employed to adjust temperature. Thirdly, a gas-liquid separator and cryogenic condensation system are employed to get a rapid condensation process. Fourthly, an independent designed online monitoring device is used for measurement of tar content in syngas, and this device is portable, efficient, accurate and in-situ detection. All the technology mentioned above are advanced in the world.

√Technology readiness level

A comprehensive pyrolysis and gasification process has already applied. First, the agricultural and forestry residue is grounded into fine particles. Then they are put into the gasifier from the feed port. Raw materials get through multivariate classification of the reaction chamber, and the primary, middle and senior tar removal process are completed at char-based nickel catalytic device. Syngas is piped into the storage compartment, and finally pass through the pressure controller. Syngas can be used for heating supply and power generation. This technology has already achieved successful utilization in Jinghai District, Tianjin. It has provided cooking gas for villagers(500-800 person) for two years. Besides, all the data of the gas-combustion generator such as load and emission are meet the National standard and the current power can afford for station self-use. Therefore, no matter in the aspect of process route, equipment, and application of syngas, this technology is mature and integrated.

√Applicability of the technology

This technology is more suitable for area where agricultural and forestry residue can be collected easily, especially somewhere traditional energy (such as oil, coal, natural gas) is relatively scarce, and it can also achieve efficient use of waste resources. Since the tar yield of this technology is relatively low, in addition tar online monitoring device is used for detection of tar, so it can guarantee clean gas product would not block downstream equipment. The produced syngas can be stored in the flexible tanks. Through the pressure controller, syngas can achieve full and efficient use depending on the flexible requirement by local residents. Meanwhile, this technology has full of strong flexibility and adaptability, because boilers can be added to this process to produce hot water and meet residents' requirement. In addition, the remaining residue can produce eco-fertilizer, and this is very helpful for the urban and rural agricultural work.

√Stability of the technology


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Pyrolysis gasification reactions of this technology mainly take place in the gasifier, so it is good technical stability and environment friendly. According to operating situation of demonstration project in Tianjin, China, this technology can maintain long-term stability in the operation.

√**Requirement of the technology**
 This process has a demand for electricity, thus the transformation and industrialization of process requests guarantee of continuous supply of electricity, in order to ensure the normal operation.

√**Obstacle of achievement transformation and extension**
 Nowadays, renewable energy technology has become more and more sophisticated. Agriculture and forestry residue gasification and pyrolysis technology prepared for syngas and power received strong support from many countries and regions, so it has great potential for further popularization in industry. As for raw material supply, agricultural residue is very abundant, so there is no resource risk, especially in Africa.

√**Assignment of intellectual property**
 Tianjin University as technology provider has got a number of related patents with independent intellectual property rights: a new type of equipment for biomass pyrolysis, a method of biomass pyrolysis prepared for bio-oil, an equipment of biomass gasification produced for syngas, a method and equipment for preparation of bio-syngas, and fast measurement method and instrument of biomass gasification tar. Besides, we won the National Science and Technology Progress Award, and other provincial and ministerial level scientific and technological progress awards. We are willing to transfer technology to Africa. And hopefully policies of transferring technology between university and industry are supportive.

Application of renewable energy technology			
QR Code			
Institutes	Tianjin University	Date	2016-07-31
Contacts	Beibei Yan	Technology Type	Biomass energy utilization technology
Telephone	13902190625	E-mail	yanbeibei@tju.edu.cn
Technology name	The efficient and clean production technology of biodiesel and high-value products		
Provider	Tianjin university		
Scope of application	The efficient and clean production technology of biodiesel and high-value products		
Concise description of technology	Prior to transesterification, the impurities and odors should be separated from waste oil via centrifugation; the free fatty acids should be removed from esterification tank. Then the crude		

TECHNOLOGY: GASIFICATION
COMPANY: TIANJIN UNIVERSITY

		biodiesel produced by transesterification reaction should be esterified, separated, condensed and rectified to obtain the wanted biodiesel and high-value products. Besides, the recovery system was used for excess methanol collection.
	Information of technology	Major equipment includes oil storage tanks (200m ³), esterification reactor (20m ³), neutralization tank (20m ³), methanol storage tank (200m ³), rectification tower, pumps, etc.
	Commercial application	The 1,0000ton/y demonstration project of biodiesel production based on waste oil was built in dagang of Tianjin, which could be run continuously and environmental with the minimum biodiesel yield of 90%.
	Service conditions	The technology is applicable to the local investment and construction. Operation trainings should be launched before the application of this mature technology. And the installation cost, annual operating cost and annual maintenance cost of this technology are about 50,000 CNY, 100,000 CNY/y and 100,000 CNY/y, respectively.
	Contacts of Commercial application company	Contact of demonstration project: Yan Li; Telephone: 18622407060; E-mail: 2009liyan-2009@163.com.
	Equipment investment	Take the 1,0000ton/y biodiesel production demonstration project for example: 1) Storage facilities: Material oil storage tanks (20×200m ³): 400,000 CNY; Methanol storage tanks (10×200m ³): 600,000 CNY; Gas product storage tanks (20×100m ³): 900,000 CNY; Process storage tanks (10×20m ³): 200,000 CNY; Pumps to/from storage tanks (22): 90,000 CNY; Total cost: 2190,000 CNY. 2) Process units: Oil transesterification unit: 2800,000 CNY; Pumps (36): 160,000 CNY; Total cost: 2960,000 CNY. 3) Utility equipment (Pipelines, Vacuum system, etc.): 2000,000 CNY. 4) Other costs (Road Construction, Workshop construction, etc.): 1000,000 CNY. Total fixed capital cost: 8050,000 CNY.
	Operating cost	At normal runtime, the conversion ratios of esterification and transesterification were 95% and 90%, respectively. The total annual materials cost was approximately 2500,000 CNY, which included waste oil cost, methanol cost, catalysts cost, etc. The annual operation cost of electricity was approximately 259,000 CNY with 2.88GWh power consumption. The annual operation cost of cooling water was approximately 1,000 CNY with 150m ³ water consumption. The above total operating cost added up to approximately 2760,000 CNY. Besides, the annual labor cost was 500,000 CNY, the annual depreciation cost was 520,000 CNY with a depreciation life of 15 years, the annual repair cost was 10,000 CNY, and the annual management cost was 50,000 CNY. The above total maintenance costs added up to approximately 3930,000 CNY.

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	<p>Payback period of investment</p>	<p>According to the calculation, the annual cumulative economic income was 50,000,000 CNY, the annual net benefit was 4,720,000 CNY, and the annual fixed capital cost was 8,050,000 CNY. So the payback period is about 1.2 years.</p>
	<p>Other benefits</p>	<p>If the benefit from 700t/y glycerol byproduct of 1,360,000 CNY was considered, the extra total net benefit was 1,360,000 CNY. Combined with environmental benefits and carbon reduction benefits, the annual total net benefits would up to 2,080,000 CNY.</p>
	<p>Technology share</p>	<p>The annual animal oil and vegetable oil consumption were about 25 million tons in China. At present, in the process of biodiesel production catalyzed by acid and alkali chemicals, the largest production line based on waste oil could be reached an annual output of 200,000 tons. In the domestic industry, the market share of similar technology was higher than 70%.</p>
	<p>Market potential of technology</p>	<p>Currently, the homogeneous acid catalytic technique has been basically mature, which occupies large amount of market share. This technology was carried out using sulfuric acid as esterification pretreatment reaction catalyst and using waste solid bases as transesterification catalyst, which significantly reduced the production cost and improved the technical and economic feasibility. Furthermore, it was estimated that the annual animal oil and vegetable oil consumption were about 25,000,000 tons in China with a growing trend. And the annual amount of waste edible oil was about 375,000,000~625,000,000 tons. Therefore, the biodiesel production technology, which based on waste oil with the chemical catalysis method, has a tremendous market potential. It is estimated that the market share is expected to reach 90% in 2020. Besides, Africa is rich in oil resources, there are a large number of undeveloped mountains and marginal land, suitable for oil crops plantation. So this technology has a great market share potential in Africa.</p>
	<p>Advance of technology</p>	<p>1) There are large amounts of free fatty acids contained in waste oil, which led to higher acid value of 150mg KOH/g. In order to ensure the reaction conducted smoothly, the acid value of waste oil must be decreased by esterification at the present of sulfur acids. Then the transesterification reaction occurs to obtain the crude product. 2) The obtained crude product is further esterified. The obtained crude product is further esterified at the present of solid basic catalyst under the reaction conditions of 68°C~72°C at 2h. 3) Methanol reflux. The obtained product not only contains biodiesel, but also accompanied with a large number of by-products like glycerol and methanol. So the methanol reflux device could greatly save the consumption of methanol. 4) Variety of novel solid base catalyst such as K₂CO₃/RHA, rice husk ash supported egg shell and CaO-SiO₂ synthesized by biomimetic silicification were prepared for biodiesel and high-value products production. The whole preparation stage is in line with the environmental friendly characteristics. Therefore, this biodiesel production technique is advanced and innovative both in China and abroad.</p>

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	Maturity of technology	The technical route including five processes: Waste oil pre-treatment (deimpurity, dehydration, degumming and bleaching) process: to remove the mechanical impurities and odors of waste oil; Esterification reaction process: to remove the free fatty acids of waste oil; Transesterification reaction process: to obtain product of biodiesel and byproduct of glycerol; Further esterification process: to obtain desired biodiesel conformed to the national standard; Neutralization reaction process: to neutralize acid and base in the neutralization tank; Methanol distillation process: to recycle methanol through exploitation mechanics of different boiling point distillation. The main equipment includes oil tank, esterification reactor, neutralization tank, condensing unit, methanol storage tank, distillation tower and pumps. The whole equipment and systems was integrated and consecutive.
	Applicability of technology	Although the initial raw material of the technology is waste oil, it also applies to animal oil and vegetable oil which the main components is triglycerides. African is rich in animal and plant resources, there are more than 40,000 kinds of plant species, and even the forest-covering area accounted for 21% of the total area of Africa. Furthermore, palm as the main plant of Africa, has a great output, which fully satisfied with the requirement of material. Besides, the pretreatment process could be omitted based on vegetable oil, thus simplified the whole process. Combined with the vast undeveloped territory of Africa, the scale of this technology can be expanded to plant oil crops. Therefore, this technology has a potential market share to facilitate the promotion and application for biodiesel production in Africa.
	Stability of technology	At present, the 1,0000ton/y demonstration project of biodiesel production has been built and run normally, which indicated that the operation process is stable and consecutive.
	Security of technology	The technology has been granted 3 invention patents in the field of biodiesel production. Oil storage tanks, high-pressure reactor, neutralization tank, distillation tower, pumps, control box and other technical supporting facilities are relatively integrated, which can be accepted by the market.
	Obstacles of technology promotion	Acid catalysts have a corrosive effect on equipment, lead to reduction of service lifetime. So further development of new materials and equipment were required for energy loss reduction; Further reduction of material cost was necessary via increasing national policy supporting; Operation talent training for biodiesel and high-value products manufacture is still under development.
	Assignment of Intellectual Property	Tianjin University, as the technology owner, has obtained a number of independent intellectual property rights related patents and provincial-level Science and Technology Progress Award. Technology provider has the intention of transferring supported by sound mechanism of the technology industry in Colleges and powerful national policy.

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COMPANY: TIANJIN UNIVERSITY

Captions



TECHNOLOGY: GASIFICATION

COMPANY: WUHAN WUSHUI ELECTRIC TECHNOLOGY CO., LTD

Technological achievements declaration of renewable energy sources	
Wuhan Wushui Electric Technology Co., Ltd	Two-dimension code 
Technology providing unit	Wuhan Wushui Electric Technology Co., Ltd. WUHAN WUSHUI ELECTRICAL TECHNOLOGY CO, LTD (seal)
Contact	Sima Pingping
Submission date	2016-08-04
Technology types	Small hydropower technology
Specific technology	And other technologies related to small hydropower
Telephone	13807196853
E-mail	sn ppll26@ 126.com
Technology name	Intelligent control device with low pressure generator set
Technology provider	Wuhan Wushui Electric Technology Co., Ltd.
Scope of application	Automatic control of medium and small hydropower stations
Technology briefing	Intelligent control device with low pressure generator set,integrated the speed governing, excitation control, protection, temperature measurement and automatic quasi-synchronization of the water - wheel generator set with low pressure as a whole, realize the one click starting/ closing function. Key components :Electric control cabinet, main switch of electric generator, etc.
Technical Information	Voltage-regulating precision <0.5%;Range 10 - 125%; 5% phase step index; Overshooting <30%; Vibration <3; Accommodation time < 5s; Volume 2200 X 800 X 800mm
Business application conditions	Xionghe power station, Xiangfan, Hubei; Dongshan power station, Yichang, Hebei; Jinqiao power station, Yidu Hubei; Huang Jia Ju power station, Hubei Dangyang
Service conditions	Mature technology; Require training; Simple installation, easy to use, low maintenance costs.
Business application unit contact/telephone/E-mail	Contact information: Xionghe power station: 18062239328; Dongshan power station: 13872664448; Jinqiao power station: 13872684992; HUANGJIAJU power station: 1599580983



TECHNOLOGY: GASIFICATION

COMPANY: WUHAN WUSHUI ELECTRIC TECHNOLOGY CO., LTD

Equipment investment	<p>According to the technology and equipment provided in the implementation of the new project, it would be the best for the users to be equipped with the following tools and equipments:</p> <ol style="list-style-type: none"> 1. Example of electrical tools: Multimeter, screwdriver, wrench, pliers, electric iron, etc.. 2. Three phase voltage regulator (preferably 10KVA) 3. Micromputer-based relay protection testing device(0 ~ 10A three-phase alternating current, 0 ~ 150V three-phase voltage) 4. Two load resistance ZX9~8/800 (7.396Ω24A) <p>Estimated the total cost is no more than 25 thousand Yuan, if the user want further maintenance, inspection equipment. Or commissioning and maintenance of other devices, this is also useful.</p>
Operation and maintenance fees	<p>Cost of equipment required for the operation of the device at constant pressure: Except for the electric energy (output from the generator) required for the generator excitation output, the power consumption of the apparatus < 100W;There aren't other consumed raw materials for the apparatus. The service life of the devices is above 10 years Statistics of repair cost: Suggested the user purchases part of the device in my company's recommendation to prepare for maintenance and replacement in advance, this will greatly reduce maintenance costs. The cost is about 10% of the total cost of the equipment. The original power station is not required for adding new staff for these devices in maintenance and management, so there will be no additional wage cost.</p>
Payback period of investment	To recover the cost in two months.
Other benefits	By using this technology, the higher additional economic benefits can be produced at the same time.
Technology share	In 2015, in the domestic industry with the similar technology (including the case did not use any technology) production or processing, it accounted for about 20% of the total market share.
Technology market potential	By 2020, the market potential of this technology which can be developed and promoted is over 50% in this industry or field
Technology advancement	Highly Integrated equipment and highly centralized control provide the widespread possibility for the unattended water - wheel generator set with low pressure and full automatic operation and management of the few personnel on duty. Unified electric generator could remedy the various "gaps" and disharmonious "fold" occurred in the original devices effectively.
Technology maturity	The technology has completely reached maturity.
Technology applicability	Automatic control of small and medium sized hydropower station
Technology stability	Each component of the operating parameter of microcomputer excitation, microcomputer governor and low voltage unit integrated intelligent control of the device has sufficient margin. All the electronic components use industrial grade even military products, and all have the electrical aging screening of over 72 hours; Design and installation for secondary circuit, and the anti-



TECHNOLOGY: GASIFICATION

COMPANY: WUHAN WUSHUI ELECTRIC TECHNOLOGY CO., LTD

		<p>electromagnetic interference measures fulfilling GB/T3797, GB14285, G B/T 14598.9 and G B/T4064 with the standard and specifications, can exclude the interference of the general environment and technical parameter.</p> <p>Serving as the microprocessor-based product, the above control apparatus are suitable for the control parameter setting of various water-turbine generator sets with convenient and wide method and means, therefore the control water-turbine generator set can constantly operates stably, safely and reliably.</p>
	Technology security	Reliably
	Obstacles of results transformation and promotion	There isn't any obstacle for this technology in the process of the result conversion and promotion
	Intellectual property transfer	The enterprise possesses this technology which has the national proprietary intellectual property rights
	<p>Picture description</p> <p>WUHAN WUSHUI ELECTRICAL TECHNOLOGY CO, LTD (seal)</p> 	

TECHNOLOGY: GASIFICATION

COMPANY: WUHAN WUSHUI ELECTRIC TECHNOLOGY CO., LTD

Technological achievements declaration of renewable energy sources			
Two-dimension code	  <p style="text-align: center;">WUHAN WUSHUI ELECTRICAL TECHNOLOGY CO, LTD (seal)</p>		
Technology providing unit	Wuhan Wushui Electric Technology Co., Ltd.		
Contact	Sima Pingping	Submission date	2016-08-04
Technology types	Small hydropower technology	Specific technology	And other technologies related to small hydropower
Telephone	13807196853	E-mail	sn ppll26@ 126.com
Technology name	Microcomputer excitation device		
Technology provider	Wuhan Wushui Electric Technology Co., Ltd.		
Scope of application	Automatic control of medium and small hydropower stations		
Technology briefing	Closed-loop control of PID which is conducted by the current feedback quantity is outputted by the output voltage or reactive or excitation device of the electric generator. Critical components have microcomputer excitation controller, exciting transformer, power rectifier and deexcitation formation.		
Technical Information	Voltage-regulating precision <0.5%; Range 10 - 125%; 5% phase step index; Overshooting <30%; Accommodation time < 5s; Volume: 2200 X 800 X 800mm		
Business application conditions	Xionghe power station, Xiangfan, Hubei; Dongshan power station, Yichang, Hebei; Jinqiao power station, Yidu Hubei; Huang Jia Ju power station, Hubei Dangyang		
Service conditions	Mature technology; Require training; Simple installation, easy to use, low maintenance costs.		
Business application unit contact/telephone/E-mail	Contact information: Xionghe power station: 18062239328; Dongshan power station: 13872664448; Jinqiao power station: 13872684992; HUANGJIAJU power station: 1599580983		


TECHNOLOGY: GASIFICATION

COMPANY: WUHAN WUSHUI ELECTRIC TECHNOLOGY CO., LTD

Equipment investment	<p>According to the technology and equipment provided in the implementation of the new project, it would be the best for the users to be equipped with the following tools and equipments:</p> <ol style="list-style-type: none"> 1. Example of electrical tools: Multimeter, screwdriver, wrench, pliers, electric iron, etc.. 2. Three phase voltage regulator (preferably 10KVA) 3. Micromputer-based relay protection testing device(0 ~ 10A three-phase alternating current, 0 ~ 150V three-phase voltage) 4. Two load resistance ZX9~8/800 (7.396Ω24A) <p>Estimated the total cost is no more than 25 thousand Yuan, if the user want further maintenance, inspection equipment. Or commissioning and maintenance of other devices, this is also useful.</p>
Operation and maintenance fees	<p>Cost of equipment required for the operation of the device at constant pressure: Computer excitation adjusting mechanism except for the electric energy (output from the the generator) required for the generator excitation output, the power consumption of the apparatus < 100W; There aren't other consumed raw materials for the apparatus.</p> <p>Statistics of repair cost: Suggest the user purchases part of the device in my company's recommendation to prepare for maintenance and replacement in advance, this will greatly reduce maintenance costs. The cost is about 10% of the total cost of the equipment. The original power station is not required for adding new staff for these devices in maintenance and management, so there will be no additional wage cost.</p>
Payback period of investment	To recover the cost in two months.
Other benefits	By using this technology, the higher additional economic benefits can be produced at the same time.
Technology share	In 2015, in the domestic industry with the similar technology (including the case did not use any technology) production or processing, it accounted for about 20% of the total market share.
Technology market potential	By 2020, the market potential of this technology which can be developed and promoted is over 50% in this industry or field
Technology advancement	Adopt binary channels double-chick operating mode with the STD bus structure; And the software and hardware adopt modular design. Complete functions and liable to extend; Adopt preset tracing technology, the fault operating status of the electric generator which caused by the wrong tracing of the main equipment control carbine during switching would not occur in the double-chick operion. Such devices of the Company have been experienced the operating certificate for over two decade years, and have advanced technology, reliable craft with great influence in the period of excitation in foreign and domestic.
Technology maturity	The technology has completely reached maturity.
Technology applicability	Automatic control of small and medium sized hydropower station

TECHNOLOGY: GASIFICATION

COMPANY: WUHAN WUSHUI ELECTRIC TECHNOLOGY CO., LTD

	Technology stability	Each component of the operating parameter of microcomputer excitation, microcomputer governor and low voltage unit integrated intelligent control of the device has sufficient margin. All the electronic components use industrial grade even military products, and all have the electrical aging screening of over 72 hours; Design and installation for secondary circuit, and the anti-electromagnetic interference measures fulfilling GB/T3797, GB14285, G B/T 14598.9 and G B/T4064 with the standard and specifications, can exclude the interference of the general environment and technical parameter. Serving as the microprocessor-based product, the above control apparatus are suitable for the control parameter setting of various water-turbine generator sets with convenient and wide methods and means, therefore the control water-turbine generator set can constantly operates stably, safely and reliably.		
	Technology security	Reliably		
	Obstacles of results transformation and promotion	There isn't any obstacle for this technology in the process of the result conversion and promotion		
	Intellectual property transfer	The enterprise possesses this technology which has the national proprietary intellectual property rights		
	Technological achievements declaration of renewable energy sources			
	Two-dimensional code			
	Technology providing unit	Wuhan Wushui Electric Technology Co., Ltd. WUHAN WUSHUI ELECTRICAL TECHNOLOGY CO, LTD (seal)		
	Contact	Sima Pingping	Submission date	2016-08-04
	Technology types	Small hydropower technology	Specific technology	And other technologies related to small hydropower
	Telephone	13807196853	E-mail	sn ppll26@ 126.com
	Technology name	Microcomputer turbine speed control device		
	Technology provider	Wuhan Wushui Electric Technology Co., Ltd.		
	Scope of application	Automatic control of medium and small hydropower stations		

TECHNOLOGY: GASIFICATION

COMPANY: WUHAN WUSHUI ELECTRIC TECHNOLOGY CO., LTD

Technology briefing	Conduct PID closed-loop control with the turbine speed or active output or guide vane opening as the amount of feedback, in order to achieve optimal dynamic and static operation of water turbine. Key components include the electric control cabinet, mechanical hydraulic servo system, etc. with PLC as the main body.
Technical Information	Speed dead band $\leq 0.08\%$; permanent difference coefficient $bp = 0 \sim 10\%$; 100% load shedding, overshoot 3% wave does not exceed twice; Approximate volume: 700X 600 X 1700mm
Business application situation	Xionghe power station, Xiangfan, Hubei; Dongshan power station, Yichang, Hebei; Jinqiao power station, Yidu Hubei; Huang Jia Ju power station, Hubei Dangyang
Service conditions	Mature technology; Require training; Simple installation, easy to use, low maintenance cost.
Business application unit contact/telephone/E-mail	Contact information: Xionghe power station: 18062239328; Dongshan power station: 13872664448; Jinqiao power station: 13872684992; Huangjiaju power station: 1599580983
Equipment investment	According to the technology and equipment provided in the implementation of the new project, it would be the best for the users to be equipped with the following tools and equipment: 1. Example of electrical tools: Multimeter, screwdriver, wrench, pliers, electric iron, etc.. 2. Three phase voltage regulator (preferably 10KVA) 3. Micromputer-based relay protection testing device(0 ~ 10A three-phase alternating current, 0 ~ 150V three-phase voltage) 4. Two load resistance ZX9~8/800 (7.396 Ω 24A) Estimated the total cost is no more than 25 thousand Yuan, if the user want further maintenance, inspection equipment. Or commissioning and maintenance of other devices, this is also useful.
Operation and maintenance fees	Cost of equipment required for the operation of the device at constant pressure: Its consumption in electricity < 100W: Statistics of repair cost: Suggest the user purchases part of the device in my company's recommendation to prepare for maintenance and replacement in advance, this will greatly reduce maintenance cost. The cost is about 10% of the total cost of the equipment. The original power station is not required for adding new staff for these devices in maintenance and management, so there will be no additional wage cost.
Payback period of investment	To recover the cost in two months.
Other benefits	By using this technology, the higher additional economic benefits can be produced at the same time.

TECHNOLOGY: GASIFICATION

COMPANY: WUHAN WUSHUI ELECTRIC TECHNOLOGY CO., LTD

Technology share	In 2015, in the domestic industry with the similar technology (including the case did not use any technology) production or processing, it accounted for about 20% of the total market share.
Technology market potential	The technology will be promoted within the industry or field in 2020, which can explore the market potential of more than 50%
Technology advancement	The advanced digital technology and modern hydraulic technology are adopted, the original conventional oil pressure is replaced with high oil pressure, making the structure of whole speed controller more concise; Mechanical hydraulic system is constitute of standard industrial hydraulic components with high reliability, strong standard and more convenience for maintenance.
Technology maturity	The technology has completely reached maturity.
Technology applicability	Automatic control of small and medium sized hydropower station
Technology stability	Each component of the operating parameter of microcomputer excitation, microcomputer governor and low voltage unit integrated intelligent control of the device has sufficient margin. All the electronic components use industrial grade even military products, and all have the electrical aging screening of over 72 hours; Design and installation for secondary circuit, and the anti-electromagnetic interference measures fulfilling GB/T3797, GB14285, G B/T 14598.9 and G B/T4064 with the standard and specifications, can exclude the interference of the general environment and technical parameter. Serving as the microprocessor-based product, the above control apparatus are suitable for the control parameter setting of various water-turbine generator sets with convenient and wide method and means, therefore the control water-turbine generator set can constantly operates stably, safely and reliably.
Technology security	Reliably
Obstacles of results transformation and promotion	There isn't any obstacle for this technology in the process of the result conversion and promotion
Intellectual property transfer	The enterprise possesses this technology which has the national proprietary intellectual property rights

TECHNOLOGY: GASIFICATION

COMPANY: GUANGZHOU INSTITUTE OF ENERGY CONVERSION, CHINESE ACADEMY OF SCIENCES

Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences		Technological achievements declaration of renewable energy sources			
		Technology supplier	Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences	Date of submission	2016-06-29
Contacts	Xiuli Yin	Technology type	Biomass Energy		
Telephone	86-20-87057737	E-mail	xlyin@ms.giec.ac.cn		
Technology	Biomass gasification and power generation				
Scope of application	Renewable electricity with scales of 200-6000 kW.				
Brief introduction	<p>1. Biomass gasification and power generation system mainly consists of feeding device, gasifier, gas cleaning, generator sets, recirculating cooling water system and electric control device.</p> <p>2. Either fixed-bed gasifier or fluidized-bed gasifier can be used, depending on client's requirement.</p> <p>3. The fuel gas after cleaning has a tar content of 5-10 mg/Nm³, which can meet the needs of internal-combustion gas engine.</p> <p>4. The output of a gas engine generator set is in the range of 200-500 kW, which is specifically designed for low-heating-value fuel gas.</p>				
Major technical parameters		Units	2 MW	6 MW	
	Gasification efficiency	%	75	78	
	Electricity for self-consumption	%	10	10	
	Electric efficiency	%	18	28	
	Annual operation time	hour/yr	6000	6500	
	Biomass consumption	kg(dry)/kWh	1.35	1.10	
Status of commercial utilization	Location	Year	Scale	Technology	
	Laos	2002	200 kW	Fixed-bed gasification.	
	Thailand	2003	1200 kW	Circulating fluidized-bed.	
	Hainan, China	1998	1200 kW	Circulating fluidized-bed.	
	Jiangsu, China	2005	5500 kW	Circulating fluidized-bed.	
Contacts for more details	Zibo Diesel Engine Parent Company, Jiehui Liang, 86-13573365268				

TECHNOLOGY: GASIFICATION

COMPANY: GUANGZHOU INSTITUTE OF ENERGY CONVERSION, CHINESE ACADEMY OF SCIENCES

	about commercial projects					
	Capital investment (RMB 10⁴ Yuan)	2MW biomass gasification and power generation system				
		Items	Price			
		1. Major device (gasifier, generator, etc.)	610			
		2. Material and fixings for installation	30			
		3. Infrastructure	120			
		4. Installation and test operation	75			
		5. Auxiliary	65			
		6. Unpredictables	100			
		7. Total investment	1000			
		8. Capital cost (Yuan/kW)	5000			
		Operation costs	Items	Units	2 MW	6 MW
			Electric output	10 ⁴ kWh/yr	1080	3510
			Depreciation	10 ⁴ Yuan/yr	56.67	221
			Maintenance	10 ⁴ Yuan/yr	17	66.3
			Labour	10 ⁴ Yuan/yr	85.96	184.2
			Management	10 ⁴ Yuan/yr	12	24
			Distribution	10 ⁴ Yuan/yr	12	18
			Wastewater treatment	10 ⁴ Yuan/yr	6	19.5
			Auxiliary material	10 ⁴ Yuan/yr	24	78
		Biomass feedstock	10 ⁴ Yuan/yr	324	858	
		Total	10 ⁴ Yuan/yr	513.63	1488.5	
		Notes: The annual consumption of biomass is 16200 t and 42900 t for 2MW and 6 MW, respectively.				
	Payback period	About 6-8 year.				
	Other profit	Profit may be made from carbon emission trading.				
	Technical share in market	No data available.				



TECHNOLOGY: GASIFICATION

COMPANY: GUANGZHOU INSTITUTE OF ENERGY CONVERSION, CHINESE ACADEMY OF SCIENCES

	<p>Potential market</p>	<p>This application of technology depends strongly on feedstock price, access to grid and market acceptance.</p>
	<p>Technical advantages</p>	<p>The technology of small- and medium-scale biomass gasification and power generation can be ranked in the first class all over the world.</p>
	<p>Technical maturity</p>	<p>This technology has been utilization commercially.</p>
	<p>Technical feasibility</p>	<p>This technology is suitable for electricity supply for small- and medium-sized enterprises or off-grid areas.</p>
	<p>Technical stability</p>	<p>The annual operation time is larger than 6000 hours in existed projects.</p>
	<p>Technical safty</p>	<p>High.</p>
	<p>Technical transformation and promotion</p>	<p>No barrier for technical transformation and promotion.</p>
	<p>Intellectual property rights</p>	<p>We have independent intellectual property rights, which makes various forms of cooperation possible.</p>
	<p>Figures</p>	<div> </div> <p style="text-align: center;">a. power plant</p>

TECHNOLOGY: GASIFICATION

COMPANY: GUANGZHOU INSTITUTE OF ENERGY CONVERSION, CHINESE ACADEMY OF SCIENCES

				
		b. control room	c. generator sets	
Technological achievements declaration of renewable energy sources				
Technology supplier	Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences	Date of submission	2016-06-29	
Contacts	Xiuli Yin	Technology type	Biomass Energy	
Telephone	86-20-87057737	E-mail	xlyin@ms.giec.ac.cn	
Technology	Production and application of fuel gas from biomass gasification			
Scope of application	Fuel gas derived from biomass gasification is used as a substitute of fossil fuels such as coal, heavy oil and natural gas.			
Brief introduction	<ol style="list-style-type: none"> 1. Novel mixed-current fixed-bed gasifier, which combines advantages of updraft and downdraft gasifier. 2. Hot gas filtration for dust removal. 3. High-efficiency combustion of low-heating-value fuel gas, with limited air pollutant emission. 4. Systematic combination of biomass gasification and industrial kiln. 			
Major technical parameters	<ol style="list-style-type: none"> 1. Capacity of gasifier: 0.5-3.0 tons biomass/h; 2. Lower heating value of fuel gas: 1350 kcal/ Nm³. 3. Content of impurity in fuel gas: ≤ 50 mg/Nm³; 4. Hot gas efficiency: ≥ 85%. 			
Status of commercial utilization	<p>This technology has been used in many industries, including steel rolling, metal smelting, pharmacy, food processing and clothing industry.</p> <ol style="list-style-type: none"> 1. Project of Foshan Jinlan aluminium profile plant. <p>The annual consumption of biomass for aluminium melting is 540,000 tons. The heavy oil being replaced is equivalent to 210,000 tons tce. The capital investment is about 20 million RMB Yuan while the payback period is 2.6 year. A total of 50,000 tons CO₂ emission can be avoided.</p>			

TECHNOLOGY: GASIFICATION

COMPANY: GUANGZHOU INSTITUTE OF ENERGY CONVERSION, CHINESE ACADEMY OF SCIENCES

		2. Project of Livzon New North River Pharmaceutical Co.,Ltd The annual consumption of biomass for steam production is 10,000 tons. The heavy oil being replaced is equivalent to 7,000 tons tce. The capital investment is about 5 million RMB Yuan while the payback period is 1.5 year.				
	Contacts for more details about commercial projects	1. Yangshan Carbon Neutral Biofuels Development Co.,Ltd, Guifeng Liu, 86-15602338420 2. Guangdong Zhengpeng Biomass Energy Technology Co., Ltd, Jiaping Zhang, 86-13783789065				
	Capital investment (RMB 10⁴ Yuan)	Items	6 t/h	10 t/h	15 t/h	
		Construction	20	50	75	
		Storage and feeding	50	70	120	
		Gasifier	100	150	180	
		Auxiliary	10	20	30	
		Electric control	10	10	15	
		Installation	30	45	60	
		Boiler	80	100	150	
		Total	300	445	630	
	Operation costs	Items	Units	6 t/h	10 t/h	15 t/h
		Steam production	10 ⁴ t/yr	3	5	8
		Biomass consumption	10 ⁴ t/yr	0.72	1.2	1.92
		Number of gasifiers		1	2	3
		Total investment	10 ⁴ Yuan	300	445	630
		Purchase price of fuel	Yuan/t	750	750	750
		Cost of fuel	10 ⁴ Yuan/yr	540	900	1440
		Cost of labour	10 ⁴ Yuan/yr	75	100	125
		Cost of maintenance	10 ⁴ Yuan/yr	15	22.25	31.5
		Depreciation of equipment	10 ⁴ Yuan/yr	37.5	55.63	78.75
		Water and power	10 ⁴ Yuan/yr	60	100	160
	Others	10 ⁴ Yuan/yr	18	27	36	

TECHNOLOGY: GASIFICATION

COMPANY: GUANGZHOU INSTITUTE OF ENERGY CONVERSION, CHINESE ACADEMY OF SCIENCES

	Total operation cost	10 ⁴ Yuan/yr	745.5	1204.88	1871.25
	Selling price of steam	Yuan/t	310	300	290
	Gross income	10 ⁴ Yuan/yr	930	1500	2320
	Gross profit	10 ⁴ Yuan/yr	184.5	295.13	448.75
	Tax	10 ⁴ Yuan/yr	46.5	75	116
	Notes: The above data is estimated based on full load of boiler, with an annual operation time of 7920 h. The cost of steam will increase by 25-30 Yuan/t when the purchase price of biomass fuel increase by 100 Yuan/t.				
	Payback period	About 1.5 year			
	Other profit	1. The cost of fuel will decrease by 25%, 32% and 15% when replacing natural gas, diesel and heavy oil with biomass. 2. The reduction of C emission is estimated to be in the range of 6500-18000 t, which can make profit from carbon emission trading.			
	Technical share in market	About 40%.			
	Potential market	Annual consumption of biomass fuel gas may reach 50 billion m ³ , which can replace 10 billion m ³ natural gas. Annual consumption of biomass pellet may reach 50 million tons, which can replace 30 million coal.			
	Technical advantages	The novel mixed-current fixed-bed gasifier, which combines advantages of updraft and downdraft gasifier, is an advanced technology. With the specific design of gasifier structure, high gasification efficiency, low content of tar/dust in fuel gas, high fuel flexibility, simple operation and long-term stable operation can be guaranteed.			
	Technical maturity	This technology has been utilization commercially.			
	Technical feasibility	This technology is suitable for heat supply for small- and medium-sized enterprises.			
	Technical stability	The annual operation time is larger than 6000 hours in existed projects.			
	Technical safty	High			
	Technical transformation and promotion	No barrier for technical transformation and promotion.			
	Intellectual property rights	We have independent intellectual property rights, which makes various forms of cooperation possible.			

TECHNOLOGY: GASIFICATION

COMPANY: GUANGZHOU INSTITUTE OF ENERGY CONVERSION, CHINESE ACADEMY OF SCIENCES

Figures



a. steel rolling



b. aluminum melting



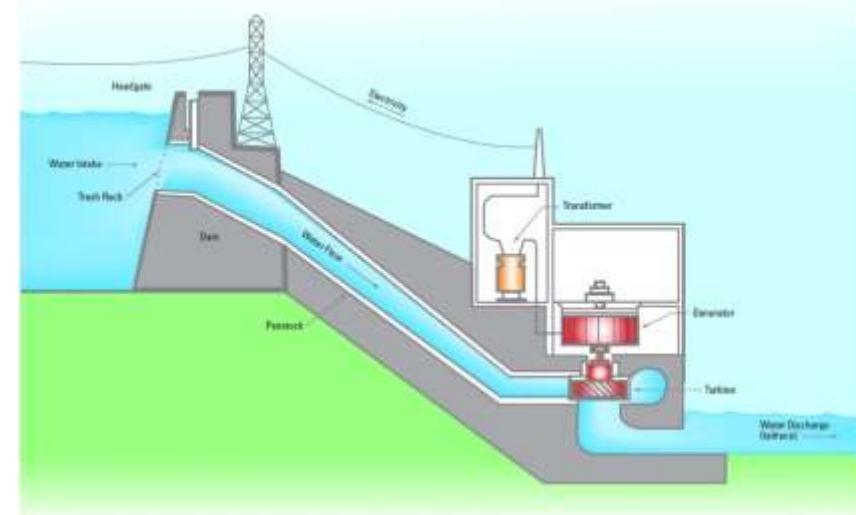
c. aluminum melting



d. steam boiler

HYDRO

- Fuzhou Fangyuan Electric Machinery Co., Ltd
- Zhejiang Jinlun Electromechanic Co., Ltd
- Hangzhou Guowang Technical Co., Ltd
- NARI Group Corporation
- HNAC Technology Co., Ltd



TECHNOLOGY: HYDRO

COMPANY: FUZHOU FANGYUAN ELECTRIC MACHINERY CO., LTD

<p>Fuzhou Fangyuan Electric Machinery Co., Ltd</p>	<p style="text-align: center;">Annex 2 Central Africa Renewable Energy Technology Achievement Declaration Table</p> <p>Technology provision unit: <u>Fuzhou Fangyuan Electric Machinery Co., Ltd.</u> Submission date: <u>August 5, 2016</u></p> <p>Contact person: <u>Chen Junyuan</u> Tel.: <u>15859087576</u> E-mail: <u>paladincjy@fangyuanelectric.com</u></p> <p>Technical type selected: <u>A hydropower technology</u></p> <p>Brief introduction of technical achievements:</p> <ol style="list-style-type: none"> 1. Name of technology or product: Assembled vertical-axis impulse type water-turbine generator set 2. Technical or product provider: Fuzhou Fangyuan Electric Machinery Co., Ltd. 3. Whether it has the foreign cooperation experience: It has the foreign cooperation experience, France trading company declared that there are three power stations in France using this type of unit. 4. Technical intellectual property situation: The technical intellectual property of such type of product is owned by Fuzhou Fangyuan Electrical Machinery Co., Ltd. for declaration of national patents. 5. Applicable scope: It is suitable for the hydropower station with high water head (over 90m and less than 400m) and low flow and belongs to hydropower electromechanical equipment product. 6. Brief description of technology or product; <p>The unit converts the pressure potential energy of water flow to free jet flow with kinetic energy and transfers the hydroenergy to the turning wheel and rotor taking advantage of nozzle for generating the electric energy.. It is suitable for the unit characterized by high water head, small flow, excellent hydraulic performance, compact structure and easy installation. Water turbine adopts DC effuser and improves about 2% of efficiency compared to the conventional elbow effuser. The generator is installed on the casing of water turbine to greatly reduce the axial length of horizontal unit, improve the rigidity of principal axis and increase the stability of the unit. The unit is installed vertically with the multi-nozzle structure to improve the specific speed of the water turbine, reduce the diameter of turning wheel, improve the rotate speed of the unit and reduce the investment costs of power station. Because the distribution pipe and casing of unit are buried in the concrete, the unit has the low noise and the plant is beautiful. The unit has an assembled structure with easy installation for</p>
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TECHNOLOGY: HYDRO

COMPANY: FUZHOU FANGYUAN ELECTRIC MACHINERY CO., LTD

	<p>power station and is free of horizontal and upright adjustment for the horizontal unit. The key equipment is streamline distribution pipe with DC effuser which can effectively reduce the bydropower loss and improve the efficiency of unit.</p> <p>7. Main technical indicators:</p> <ul style="list-style-type: none">a) For the specification of the product, the diameters of the turning wheel are t60, 70, 80, 890, 100cm respectivelyb) Number of nozzles: One, two or fourc) Power range: $\leq 2000\text{kW}$d) Working water head: 80-400me) Size of the product: 1600×1600×2600 mm, 1800×1800×2800 mm, 2000×2000×3000 mm, 2200×2200×3200 mm, 2400×2400×3400 mm <p>8. Business application situation:</p> <ul style="list-style-type: none">a) Minqing Antai power station: It is located at the side of Minqing County, Fuzhou, Fujian and is installed with one double-nozzle water-turbine generator set with the model of CJA475-L-62/2×6, the capacity of generator is 630KW, operation situation is better and it has been put into operation for power generation for three years.b) Liuwuhe Power Station, Yangbi County, Dali, Yunnan: It is located at Yangbi County, Dali, Yunnan and is installed with three sets of four-nozzle water-turbine generator sets with model of CJA475-L-86/4X8.6, the capacity of generator is 1,700KW, total installed capacity is 5,100KW, the operation situation is better at present and it has been put into operation for power generation for half a year. <p>9. Contact person of business application unit /Tel. /E-mail</p> <ul style="list-style-type: none">a) Minqing Antai Power Station: Lin Ling, 15559581861b) Liuwuhe Power Station, Yangbi County, Dali, Yunnan: Lei Chuntao, 13887210168 <p>10. Basic information of the project</p> <ul style="list-style-type: none">a) Minqing Antai Power Station: The power station is transformed by the old units, original unit is 400KW horizontal impulse-type water-turbine generator set with single-nozzle structure, upon repeated measurement and calculation of experts of our company, the capacity of original unit can be increased by 630KW without changing
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TECHNOLOGY: HYDRO

COMPANY: FUZHOU FANGYUAN ELECTRIC MACHINERY CO., LTD

	<p>the channel and pressure pipeline and the assembled vertical-axis double-nozzle impulse type water-turbine generator set with compact and reasonable structure is adopted. The power station is personal power station locally, the model of water turbine is CJA475-L-62/2x6, the generator is a vertical water-turbine generator with 630KW, the quantity of one and operation period of more than three years.</p> <p>b) Liuwuhe Power Station, Yangbi County, Dali, Yunnan: The power station is a newly-built one, upon field investigation and analysis, the professional technicians of our company decide to adopt assembled four-nozzle vertical-axis impulse water-turbine generator set. Due to the four-nozzle vertical-axis structure adopted, the size of its turning wheel and comprehensive efficiency are superior to those of the conventional horizontal double-nozzle structure, thus, such type of unit is adopted. The model of the water turbine is CJA475-L-86/4X8.6, the generators are three sets of low-voltage units of 1,700KW, the voltage grade is 690V and the operation period is half a year.</p> <p>11. Investment on equipment: The investment on hydropower has great differences in different regions due to scale size, advantages and disadvantages of resources, local labor costs, materials price, and generally it is RMB (7,000-12,000) /kW at home. The host equipment generally is RMB (800-1,000) /kW at home, and the main influence factors are advantages and disadvantages of resources.</p> <p>12. Operation and maintenance costs: For operation and maintenance costs, generally each power station involves 1-2 persons labor cost and 1-2 persons water and electricity costs, after improve the automation investment, it can realize unattended operation. The equipment overhauling usually is conducted every 5-6 years, and the equipment amortization and maintenance costs usually are RMB (20-25) /kW per year.</p> <p>13. Investment payback period At home, according to advantages and disadvantages of resources, total investment is generally withdrawn in 8-10 years.</p> <p>14. Other earnings: For the assembled structure of the equipment, convenient installation, simple plant, little investment, compared to same type of equipment, one-time investment is reduced at least 12%.</p>
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TECHNOLOGY: HYDRO

COMPANY: FUZHOU FANGYUAN ELECTRIC MACHINERY CO., LTD

15. Technical advancement: The innovation is mainly reflected on vertical axis and assembly. The unit is installed by vertical axis, helpful to the spatial arrangement of bearing, distribution pipe and effuser to improve unit efficiency and reduce noise; It is convenient to set multi-nozzle to improve discharge capacity, increase unit capacity and reduce power station investment cost. The unit adopts assembly type and more compact structure, to increase rigidity of the unit, be convenient for beautiful arrangement, installation and maintenance of the plant. The product is pioneered at home, achieving to international advanced level
16. Technical maturity: All components and parts are refined within plant, qualified in preassembly, debugging and inspection, assembled into a whole to be delivered, and the unit is highly integrated.
17. Technology applicability: It is suitable for hydropower station characterized by small flow with medium and high water heads, especially suitable for power station with too high rotation speed among mixed-flow type water-turbine generator set and power station with water flow in dry season.
18. Technology stability: The complete unit is preassembled within the plant, and dynamic balance test shall be conducted for the rotatable parts within the plant, which greatly improve the stability of the unit, since the distribution pipe and enclosure are embedded in concrete, so the unit has low noise with high stability, no effect on the surrounding environment.
19. Technology safety: The equipment with assembled structure, safe and reliable technology, has been used for multiple power stations, and some stations have operated safely for many years, with support equipment of inlet valve, speed controller, all belonging to conventional products. The investors generally accept and satisfy them.
20. Obstacle in achievement transformation and promotion: The key technology in the design of this equipment is compact structure, difficult to manufacture. Currently, the recognition degree of the market to this equipment is low, ignoring development. It may need to go abroad.
21. Transfer of intellectual property: Our company has obtained the national patent on such achievement, and the patent belongs to Fuzhou Fangyuan Electric Machinery Co., Ltd.
Fuzhou Fangyuan Electric Machinery Co., Ltd. (sealed)

TECHNOLOGY: HYDRO

COMPANY: ZHEJIANG JINLUN ELECTROMECHANIC CO., LTD

Renewable Energy Technology Achievement Declaration				
Zhejiang Jinlun Electromechanic Co., Ltd	QR code			
	Technology provision unit	Zhejiang Jinlun Electromechanic Co., Ltd.		
	Contact person	Zhang Liansheng	Submission date	August 4, 2016
	Technology type	Small hydropower technology	Specific technology	Design, manufacture, installation and maintenance technologies of small hydropower station main engine and auxiliary engine
	Tel.	13957960510	E-mail	hslt@126.com
	Technology name	Axial flow water turbine		
	Technology provider	<p>Provider: Zhejiang Jinlun Electromechanic Co., Ltd. is a professional enterprise for production of hydropower equipment, which is also an international small hydropower center and hydropower equipment manufacture base of UN, national high-tech enterprise, key high-tech enterprise of National Torch Plan and provincial patent demonstration enterprise, and the company owns provincial research and development center and provincial technology center. "Jinlun Brand" water turbine has won "China Machinery Industry Famous-brand Product", "Zhejiang Famous Brand", "Zhejiang Famous Trademark", "Zhejiang Famous Export Brand", "China Electrical Appliance Industry Quality Trustable Product" and other titles. The company passed international quality standard certification of ISO9001 in 1998, environmental system certification of ISO14001 in 2008 and occupational health and safety system certification of O H SA S18001 in 2010. The company owns qualification for contracting international project, has implemented enterprise resource planning (ERP) management system and has effective and complete quality assurance system. At present, it owns 1 national invention patent and 30 national utility model patents.</p>		
	Scope of application	It belongs to manufacturing industry with applicative water head of 2-30 meters.		
	Brief description of technology	The model is a vertical shaft device with open-channel, pressured open-channel and closed channel (that is, concrete volute), in total of three forms. Runner structure is generally fixed runner blade (or manually adjustable blade). There are two types of tail pipe, which are direct push pipe and elbow pipe. Runner with diameter of less than 1000 mm is direct push pipe. The model applies to the power station with small change in water head and load.		
	Technical information			
Business application situation				


TECHNOLOGY: HYDRO

COMPANY: ZHEJIANG JINLUN ELECTROMECHANIC CO., LTD

	Service conditions	The company can provide power station site investigation, analysis of hydrogeology materials, overall planning and design of power station, irrigation works of power station, electromechanical equipment design and package of service. Water turbine technology has been standing in the leading position in the country. In the ranking of national small hydropower equipment manufacture industry statement, its comprehensive index has been No.1 for more than ten consecutive years.
	Contact person of business application unit / Tel. / E-mail	
	Investment on equipment	
	Expense of operation maintenance	
	Investment payback period	
	Other earnings	
	Technology occupancy	
	Market potential of technology	
	Technical advancement	The dominant product of water turbine has enjoyed a higher reputation and awareness in the same industry in the country, "Jinlun" brand water turbine is one of two enterprises nationwide in water turbine industry with the title of "China Machinery Industry Famous-brand Product", and it has won the titles of "Zhejiang Famous Brand" and Zhejiang "Famous Trademark" in 2005 and 2007 respectively. It won the titles of "Zhejiang Famous Export Brand" and China Electrical Appliance Industry "Quality Trustable Product" in 2009. The company has abilities for independent R&D and self-dependent innovation, adopts computer aided design and analysis, namely CAD, CAM and CAE, and adopts CFE and FE software to design, research and develop hydropower equipment with self-dependent intellectual property, and its hydropower equipment reaches domestic and international advanced technical level. At present, the company has designed, researched and developed hundreds of various types of new machines, among which more than 30 types have obtained the national patent technologies.
Renewable Energy Technology Achievement Declaration		


TECHNOLOGY: HYDRO

COMPANY: ZHEJIANG JINLUN ELECTROMECHANIC CO., LTD

	QR code			
	Technology provision unit	Zhejiang Jinlun Electromechanic Co., Ltd.		
	Contact person	Zhang Liansheng	Submission date	August 4, 2016
	Technology type	Small hydropower technology	Specific technology	Design, manufacture, installation and maintenance technologies of small hydropower station main engine and auxiliary engine
	Tel.	13957960510	E-mail	hslt@126.com
	Technology name	Impulse water turbine		
	Technology provider	<p>Provider: Zhejiang Jinlun Electromechanic Co., Ltd. is a professional enterprise for production of hydropower equipment, which is also an international small hydropower center and hydropower equipment manufacture base of UN, national high-tech enterprise, key high-tech enterprise of National Torch Plan and provincial patent demonstration enterprise, and the company owns provincial research and development center and provincial technology center. "Jinlun Brand" water turbine has won "China Machinery Industry Famous-brand Product", "Zhejiang Famous Brand", "Zhejiang Famous Trademark", "Zhejiang Famous Export Brand", "China Electrical Appliance Industry Quality Trustable Product" and other titles. The company passed international quality standard certification of ISO9001 in 1998, environmental system certification of ISO14001 in 2008 and occupational health and safety system certification of O H SA S18001 in 2010. The company owns qualification for contracting international project has implemented enterprise resource planning (ERP) management system and has effective and complete quality assurance system. At present, it owns 1 national invention patent and 30 national utility model patents.</p>		
	Scope of application	It belongs to manufacturing industry with applicative water head of 100-1,000 meters.		
	Brief description of technology	Water forms jet flow from penstock through nozzle to force the turbine runner to rotate for work Impulse water turbine has compact structure, stable operation, easy operation and other characteristics It is applicable to water head and hydropower station with small flow.		
	Technical information			
	Business application situation			
	Service conditions	The company can provide power station site investigation, analysis of hydrogeology materials, overall planning and design of power station, irrigation works of power station, electromechanical equipment design and package of service. Water turbine technology has been standing in the		

TECHNOLOGY: HYDRO

COMPANY: ZHEJIANG JINLUN ELECTROMECHANIC CO., LTD

		leading position in the country. In the ranking of national small hydropower equipment manufacture industry statement, its comprehensive index has been No.1 for more than ten consecutive years.		
	Contact person of business application unit / Tel. / E-mail			
	Investment on equipment			
	Expense of operation maintenance			
	Investment payback period			
	Other earnings			
	Technology occupancy			
	Market potential of the technology			
	Technical advancement	The dominant product of water turbine has enjoyed a higher reputation and awareness in the same industry in the country, "Jinlun" brand water turbine is one of two enterprises nationwide in water turbine industry with the title of "China Machinery Industry Famous-brand Product", and it has won the titles of "Zhejiang Famous Brand" and Zhejiang "Famous Trademark" in 2005 and 2007 respectively. It won the titles of "Zhejiang Famous Export Brand" and China Electrical Appliance Industry "Quality Trustable Product" in 2009. The company has abilities for independent R&D and self-dependent innovation, adopts computer aided design and analysis, namely CAD, CAM and CAE, and adopts CFE and FE software to design, research and develop hydropower equipment with self-dependent intellectual property, and its hydropower equipment reaches domestic and international advanced technical level. At present, the company has designed, researched and developed hundreds of various types of new machines, among which more than 30 types have obtained the national patent technologies.		
	Renewable Energy Technology Achievement Declaration			
	QR code			
	Technology provision unit	Zhejiang Jinlun Electromechanic Co., Ltd.		
	Contact person	Zhang Liansheng	Submission date	August 4, 2016


TECHNOLOGY: HYDRO

COMPANY: ZHEJIANG JINLUN ELECTROMECHANIC CO., LTD

Technology type	Small hydropower technology	Specific technology	Design, manufacture, installation and maintenance technologies of small hydropower station main engine and auxiliary engine
Tel.	13957960510	E-mail	hslt@126.com
Technology name	Mixed flow water turbine		
Technology provider	<p>Provider: Zhejiang Jinlun Electromechanic Co., Ltd. is a professional enterprise for production of hydropower equipment, which is also an international small hydropower center and hydropower equipment manufacture base of UN, national high-tech enterprise, key high-tech enterprise of National Torch Plan and provincial patent demonstration enterprise, and the company owns provincial research and development center and provincial technology center. "Jinlun Brand" water turbine has won "China Machinery Industry Famous-brand Product", "Zhejiang Famous Brand", "Zhejiang Famous Trademark", "Zhejiang Famous Export Brand", "China Electrical Appliance Industry Quality Trustable Product" and other titles. The company passed international quality standard certification of ISO9001 in 1998, environmental system certification of ISO14001 in 2008 and occupational health and safety system certification of O H SA S18001 in 2010. The company owns qualification for contracting international project, has implemented enterprise resource planning (ERP) management system and has effective and complete quality assurance system. At present, it owns 1 national invention patent and 30 national utility model patents.</p>		
Scope of application	It belongs to manufacturing industry with applicative water head of 20-300 meters.		
Brief description of technology	The model has a volute device to make water flow move in the volute in good flow state. It is with high efficiency, simple structure, reliable operation, and is suitable for medium and high water head and larger hydropower station.		
Technical information			
Business application situation			
Service conditions	The company can provide power station site investigation, analysis of hydrogeology materials, overall planning and design of power station, irrigation works of power station, electromechanical equipment design and package of service. Water turbine technology has been standing in the leading position in the country. In the ranking of national small hydropower equipment manufacture industry statement, its comprehensive index has been No.1 for more than ten consecutive years.		
Contact person of business application unit / Tel. / E-mail			

TECHNOLOGY: HYDRO

COMPANY: ZHEJIANG JINLUN ELECTROMECHANIC CO., LTD

	Investment on equipment	
	Expense of operation maintenance	
	Investment payback period	
	Other earnings	
	Technology occupancy	
	Market potential of the technology	
	Technical advancement	The dominant product of water turbine has enjoyed a higher reputation and awareness in the same industry in the country, "Jinlun" brand water turbine is one of two enterprises nationwide in water turbine industry with the title of "China Machinery Industry Famous-brand Product", and it has won the titles of "Zhejiang Famous Brand" and Zhejiang "Famous Trademark" in 2005 and 2007 respectively. It won the titles of "Zhejiang Famous Export Brand" and China Electrical Appliance Industry "Quality Trustable Product" in 2009. The company has abilities for independent R&D and self-dependent innovation, adopts computer aided design and analysis, namely CAD, CAM and CAE, and adopts CFE and FE software to design, research and develop hydropower equipment with self-dependent intellectual property, and its hydropower equipment reaches domestic and international advanced technical level. At present, the company has designed, researched and developed hundreds of various types of new machines, among which more than 30 types have obtained the national patent technologies.
	Renewable Energy Technology Achievement Declaration	
	QR code	
	Technology provision unit	Zhejiang Jinlun Electromechanic Co., Ltd.
	Contact person	Zhang Liansheng Submission date August 4, 2016
	Technology type	Small hydropower technology Specific technology Design, manufacture, installation and maintenance technologies of small hydropower station main engine and auxiliary engine
	Tel.	13957960510 E-mail hslt@126.com
	Technology name	Through-flow turbine

TECHNOLOGY: HYDRO

COMPANY: ZHEJIANG JINLUN ELECTROMECHANIC CO., LTD


Technology provider	Provider: Zhejiang Jinlun Electromechanic Co., Ltd. is a professional enterprise for production of hydropower equipment, which is also an international small hydropower center and hydropower equipment manufacture base of UN, national high-tech enterprise, key high-tech enterprise of National Torch Plan and provincial patent demonstration enterprise, and the company owns provincial research and development center and provincial technology center. "Jinlun Brand" water turbine has won "China Machinery Industry Famous-brand Product", "Zhejiang Famous Brand", "Zhejiang Famous Trademark", "Zhejiang Famous Export Brand", "China Electrical Appliance Industry Quality Trustable Product" and other titles. The company passed international quality standard certification of ISO9001 in 1998, environmental system certification of ISO14001 in 2008 and occupational health and safety system certification of O H SA S18001 in 2010. The company owns qualification for contracting international project, has implemented enterprise resource planning (ERP) management system and has effective and complete quality assurance system. At present, it owns 1 national invention patent and 30 national utility model patents.
Scope of application	It belongs to manufacturing industry with applicative water head of 2-30 meters.
Brief description of technology	Rotary blade is fixed or manually adjustable, with large discharge flow, high specific speed, large discharge capacity, good flow characteristic, high efficiency and other characteristics, which is a good model for the development of power station with low water head and high flow.
Technical information	
Business application situation	
Service conditions	The company can provide power station site investigation, analysis of hydrogeology materials, overall planning and design of power station, irrigation works of power station, electromechanical equipment design and package of service. Water turbine technology has been standing in the leading position in the country. In the ranking of national small hydropower equipment manufacture industry statement, its comprehensive index has been No.1 for more than ten consecutive years.
Contact person of business application unit / Tel. / E-mail	
Investment on equipment	
Expense of operation maintenance	

TECHNOLOGY: HYDRO**COMPANY: ZHEJIANG JINLUN ELECTROMECHANIC CO., LTD**

	Investment payback period	
	Other earnings	
	Technology occupancy	
	Market potential of the technology	
	Technical advancement	The dominant product of water turbine has enjoyed a higher reputation and awareness in the same industry in the country, "Jinlun" brand water turbine is one of two enterprises nationwide in water turbine industry with the title of "China Machinery Industry Famous-brand Product", and it has won the titles of "Zhejiang Famous Brand" and Zhejiang "Famous Trademark" in 2005 and 2007 respectively. It won the titles of "Zhejiang Famous Export Brand" and China Electrical Appliance Industry "Quality Trustable Product" in 2009. The company has abilities for independent R&D and self-dependent innovation, adopts computer aided design and analysis, namely CAD, CAM and CAE, and adopts CFE and FE software to design, research and develop hydropower equipment with self-dependent intellectual property, and its hydropower equipment reaches domestic and international advanced technical level. At present, the company has designed, researched and developed hundreds of various types of new machines, among which more than 30 types have obtained the national patent technologies.

TECHNOLOGY: HYDRO

COMPANY: HANGZHOU GUOWANG TECHNICAL CO., LTD

Hangzhou Guowang Technical Co., Ltd		Renewable Energy Technical Achievement Declaration	
QR code			
Technical provision unit	Hangzhou Guowang Technical Co., Ltd.		
Contact person	Sun Li	Submission date	August 11, 2016
Technical type	The technical of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower stations
Tel.	13605712310	E-mail	13605712310@163.com
Technical name	NDK-2001 Intelligent Control System for L.V. Generator Set		
Technical provider:	Hangzhou Guowang Technical Co., Ltd.		
Scope of application	Anhui Qiguang Energy Science & Technical Research Institute Co., Ltd.		
Brief description of technical	NDK-2001 Intelligent Control System for L.V. Generator Set applies to L.V. water-turbine generator set with the generator outlet voltage of 400V Intelligent Control System for L.V. Generator Set is centered by industrial grade microprocessor, using various artificial intelligence technologies (AIT) for automatic control, frequency adjustment, synchronization parallel grid connection, measurement and generator protection, etc. for the set. Human-computer interface is LCD touch screen		
Technical information	Automatic power on and shutdown, emergency shutdown, automatic frequency modulation, etc.. Control cabinet size for 2260mm(H) × 1200mm(W) × 800mm(D)		
Business application situation	SHIWANG' ANDU Hydroelectric Station, Zambia, 2×500kW, good. Shenfan Grade I Hydroelectric Station, Jinhua, Zhejiang, 3×400kW, good.		
Service conditions	NDK-2001 Intelligent Control System for L.V. Generator Set has mature technologies, over 14 years to put into operation first, with the constant improvement and perfect of technologies. Operators can apply the control equipment only after a simple training as it is used in the Hydroelectric Station, which has a high integration and is combined in a control cabinet with one-off switchgear of generator, easy to install and with lower cost of use and maintenance.		
Contact person of business application unit/ Tel. / E-mail	Contact person of SHIWANG' ANDU Hydroelectric Station: Mr. Mwape, Tel.: +260 974378130 Contact person of Shenfan Grade I Hydroelectric Station: Liu Weixing, Tel.: 13757986933		
Investment on equipment	The cost of single combined control cabinet per set is generally c. RMB 150,000, and others such as speed governor and excitation system can be complete with the control system for a certain		

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		corresponding adjustment according to different sets. It can be used only with the generator voltage of 400V, and the generator breaker in the control cabinet needs to be changed in case of different set capacity.
Expense of operation and maintenance		Equipment in normal operation has a very small power consumption itself, with the overall system of c. 300-400W, ignoring when used in the Hydroelectric Station, without consumption for other materials and water and in no need of special person to watch and under the management of its watchkeeper. With the lower expense of maintenance and management, most of devices operating for several years are in no need of replacing their accessories.
Investment payback period		The application in the Hydroelectric Station of NDK-2001 Intelligent Control System for L.V. Generator Set is able to reduce the operators on duty and even to be non-attended upon the increase of mobile remote control. After 2-3 years, the cost to reduce the operators can cover that in equipment investment.
Other earnings		The application of intelligent control system increases the reliability and safety in the operation of Hydroelectric Station and reduces its downtime, and the Hydroelectric Station can achieve the functions such as operation optimization according to water level of forebay, increasing generating capacity and its economic benefit.
Technical occupancy		Domestic and foreign hydroelectric stations for L.V. generator sets are subjected to the manual control but automatic control has not yet been widely used.
Market potential of technical		The technologies of NDK-2001 Intelligent Control System for L.V. Generator Set are currently in full maturity, and the small hydroelectric stations for L.V. generator sets in villages have the operators for the most of over 50-year-old rural rear personnel due to remoteness. Above 80% rural hydroelectric stations in China are the L.V. generator sets with the generator voltage of 400V in urgent need of automatic control technologies for non-attended. As there will thus be a large demand by 2020, small hydroelectric stations are also the superior renewable energy resources in the global energy markets, of which, their construction having a small effect on the environment, great significance to reduce carbon emission, and importance to solve the lack of and no electricity in Africa regions.
Technical advancement		Small as the automatic control systems of L.V. generator sets in rural hydroelectric stations, they are complete and request much technical with its difficulty even higher than that of H.V. generator set. Few as the products suitable for L.V. generator sets, they are in poor functions, lower reliability although similar ones in China while the foreign products have higher price and fail to fully meet the L.V. generator sets in technical performance, unacclimatization, not timely in aftersales, and higher cost. Based on the above, our Company has developed NDK-2001 Intelligent Control System for L.V. Generator Set suitable for L.V. generator sets..
Technical maturity		NDK-2001 Intelligent Control System for L.V. Generator Set is centered by industrial grade microprocessor, using various artificial intelligence technologies (AIT) for automatic control,

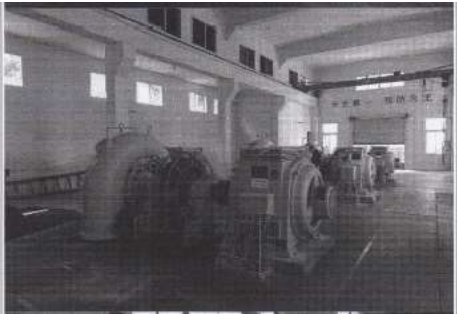
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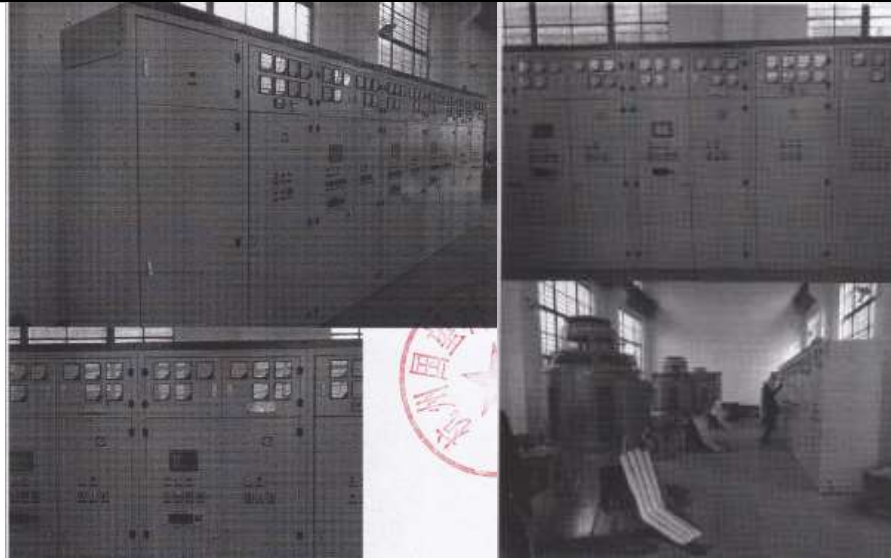
	frequency adjustment, synchronization parallel grid connection, measurement and generator protection, etc. for the set. Human-computer interface is LCD touch screen It can be available to connect with the upper set by communication interface. The control system is characterized by mature technical.
Technical applicability	NDK-2001 Intelligent Control System for L.V. Generator Set applies to the control of L.V. generator set with the generator voltage of 400V, matching in technical with upstream and downstream altitudes without the restrictions of territory, scale, environment, resource and energy.
Technical stability	NDK-2001 Intelligent Control System Equipment for L.V. Generator Set is stable and reliable, with the longest operating time for over 14 years, and has strong adaptive capacity to environment and resistance to interference.
Technical safety	NDK-2001 Intelligent Control System for L.V. Generator Set has higher technical safety and perfect corresponding supporting facilities in the course of technological achievement transformation and industrialization, higher market recognition to transfer to Africa. It is available to set up assembly plant therein (such as Zambia) for local assembly and realization of localization production, of which, not only increasing the local technical level and manufacturing capacity, but solving the product marketing and promotion, installation, commissioning, aftersales, etc..
Obstacle in achievements transformation and promotion	In the course of achievement transformation, the places receiving transformation are required for assembly site, equipment, personnel and funding, wherein the last two are the key. Our Company is available to provide the core components and train the personnel of receiving country. In the course of achievement transformation and promotion, it is required to obtain the support from the policy and finance at the level of Technical exporting and receiving countries and their government.
Transfer of intellectual property	For NDK-2001 Intelligent Control System for L.V. Generator Set, our Company has all the independent intellectual property rights, obtaining multiple patent certificates and software copyright certificates, and is willing to transfer the technical to African counties such as Zambia, without barrier to that inside the Company.

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COMPANY: HANGZHOU GUOWANG TECHNICAL CO., LTD




TECHNOLOGY: HYDRO
COMPANY: NARI GROUP CORPORATION

NARI Group Corporation		Renewable Energy Technical Achievement Declaration			
		QR code			
Technical provision unit	NARI Group Corporation				
Contact person	Pan Meiting	Submission date	August 17, 2016		
Technical type	The technical of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower station.		
Tel.	15950566319	E-mail	panmeiting@sgepri.sgcc.com.cn		
Technical name	Analytic system of condition monitoring for SI-9000 hydroelectric generating set.				
Technical provider	NARI Group Corporation				
Scope of application	Condition monitoring and analysis for hydroelectric generating set.				
Brief description of technical	By gathering vibration, throw, macroaxis displacement, air gap, magnetic flux, generator's partial discharge and other sensor of hydroelectric generating set, the system has realized the condition monitoring and fault diagnosis for hydroelectric generating set with characteristics of high integration, standardization and modularity, and includes computer, local LCU, monitoring sensor and other key equipment.				
Technical information	Cabinet: 2260×800×800; The largest fast analog quantity count is 84, and the largest slow analog quantity count is 112. Sample in a timing and regular term, the highest sampling rate of single channel reaches 10Hz/s.				
Business application situation	Huanggou pumped storage hydropower station (1200MW), Xiaowan hydroelectric station (4200MW), Ethiopia Jibu III hydroelectric station (1870MW) Zambia Itezhi hydropower station (120MW)				
Service conditions	The supplying party should invest and construct at local with mature techniques, and needs systematical training so that users can use and maintain it automatically.				
Contact person of business application unit/Tel. /E-mail	Three Gorges Hydropower Plant, Li Youping,15997651833; Zambia Itezhi Hydropower Station: Hou Changqing, 13523053085				
Investment on equipment	Units below 50MW, RMB 200,000 per unit Units between 50MW-300MW, RMB 500,000 per unit Units between 300MW-1000MW, RMB 1,000,000 per unit				

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	Expense of operation maintenance	If the system operation rating is below 1kw, it needs some labor maintenance costs. It has a depreciation period of 10 years, and needs operation maintenance cost is about RMB 20,000-50,000 a year.
	Investment payback period	2-3 years
	Other earnings	Optimize repair schedule, increase the hour amount in a year of unit, maintenance security of equipment operation in power plant, decrease operation and maintenance staffs.
	Technical occupancy	25%
	Market potential of the technical	It is predicted that the market standard are 150 sets by 2020, market occupancy is 55% with a production value of RMB 50,000,000.
	Technical advancement	Realize visualization for operation state of hydroelectric generating set, and become the leading place in similar technical.
	Technical maturity	Products reach in high integration with high completion.
	Technical applicability	Applied in large and medium hydroelectric generating set and pump storage unit without the limit of geographical location.
	Technical stability	Ambient temperature requirements: -40°C-70°C Main technical parameters: The largest slow analog quantity count is 84, and the largest slow analog quantity count is 112. Fault-free time MTBF: >50,000h Levels of anti-electromagnetic interference Grade 3
	Technical safety	In maintenance-free mold, The product is simple and easy to handle with high reliability, maintenance and change in convenience, complete function, and lower cost effectively.
	Obstacle in achievement transformation and promotion	None
	Transfer of intellectual property	Owning proprietary intellectual property rights, Copyright No.: 02457Q7, Type Examination Certificate DBA15008, etc..
	Photo caption	
	Renewable Energy Technical Achievement Declaration	
	QR code	
	Technical provision unit	Nanjing Nari Group Corporation

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COMPANY: NARI GROUP CORPORATION

Contact person	Pan Meiting	Submission date	August 17, 2016
Technical type	The technical of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies
Tel.	15950566319	E-mail	panmeiting@sgepri.sgcc.com.cn
Technical name	Automatic system of water regimen and water dispatching. (Finally)		
Technical provider	Nari Group Corporation		
Scope of application	Be suitable for power rigid, hydroelectric station, centralized control in drainage basin and prevention and control of flood.		
Brief description of technical	Based on advanced data sensor, network communication, hydrological and hydraulic theory, the system has realized the information management, analysis and prediction trend towards hydrology, weather and reservoir operation, provided hydrological forecast and reservoir regulation policy to support model. With the characteristics of intense integration, layering, standardization and modularization. Including the functions of collection and analysis for water and rainfall information, auto calculation for water affairs, timing alarm, mobile browse, duty management, flood prediction, power generation dispatching, and so on.		
Technical information	Operate steadily and reliably in long term, response with fast speed and good security. With wide openness and flexible connect type, the system has access to various congruence angle system from the third party. Can be accessed into 2,000 remote control stations, 8,000 data points.		
Business application situation	Laos Nam Lik 1-2 Hydroelectric Station (100MW), Sudan national dispatching center Gradin Chengdu area of Jinsha River downstream dispatching center (65000MW), Yalong River Drainage Basin centralized control center. (26258MW)		
Service conditions	For the supplier's local investment and construction, with mature technologies, users can use and maintain on their own through simple system training.		
Contact person of business application unit / Tel. / E-mail	Centralized control center of Yalong River Drainage Basin He Guochun,028-82907333;Changheba Hydroelectric Station Wang Guohua,0836-8903692		
Investment on equipment	The investment of one-unit plant system is RMB 2,000,000-5,000,000 per unit. (as per the practical application demand).		
Expense of operation and maintenance	The service life of system is over 8 years, and the operation maintenance expense is RMB 50,000-80,000 per year. (adjust according to practical scale of system)		
Investment payback period	2-3 years		


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	Other earnings	Water saving for generation, utilization of floodwater, decrease of loss in flood. Realize the automation of monitoring condition for water and rainfall and reduce operation and maintenance staff.
	Technical occupancy	80%
	Market potential of technical	It is predicted that the market scale are 150 sets by 2020, market share is 90% with a production value of RMB 1.6 billion.
	Technical advancement	With the intelligent functions of hydrologic forecasting, power generation dispatching, flood dispatching, business process recommendations, etc., a leader in the world.
	Technical maturity	The product technologies use originally mature technologies to integrate and realize high integration, with higher extent of perfection.
	Technical applicability	Apply to the power grid, centralized drainage basin control, hydroelectric station, water rainfall regimen monitoring and reservoir dispatching for water conservancy flood prevention, not restricted by geographic locations.
	Technical stability	Service life≥8 years; Annual available rate≥99.5%; Database available rate≥99.5%; Mean time between failures≥1 year; Response time of real time picture≤3s; Response time of non-real-time picture≤30s; Normal operation rate for monthly communication≥95%; On-time rate for monthly data≥90%; Percent of pass for monthly data≥98%;
	Technical safety	Products for high reliability and easy to use, load balancing, automatic backup, perfect authority management, easy to maintain, complete function, and lower cost effectively.
	Obstacle in achievements transformation and promotion	None
	Transfer of intellectual property	Having domestic independent intellectual property right, Software product registration certificate No. SDGY-2015-A0640, Copyright registration No. 2010SR026695 etc.
	Photo captions	

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COMPANY: NARI GROUP CORPORATION

Renewable Energy Technical Achievement Declaration			
QR code			
Technical provision unit	NARI Group Corporation		
Contact person	Pan Meiting	Submission date	August 17, 2016
Technical type	The technologies of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower stations
Tel.	15950566319	E-mail	panmeiting@sgepri.sgcc.com.cn
Technical name	Computer monitoring system of SSI-3000 hydropower plant V1.0		
Technical provider	NARI Group Corporation		
Scope of application	Hydropower plant, watershed centralized control center, pumped storage power station, photovoltaic power station		
Brief description of technical	System uses multi-level design including power plant local LCU, central control room and superior dispatching management department, achieves functions of equipment operation monitor and control adjustment in conventional hydropower plants of different sizes, pumped storage power station, PV power station and cascade hydropower station centralized control center, with characteristics of highly reliable, and its partial failure does not affect the normal operation of site equipment, mainly including host system, local control unit LCU and other key equipment.		
Technical information	Cabinet body: 2260×800×800 standard equipment cabinet The utilization rate of final acceptance is not less than 99.99%; MTTR<0.5h; MTBF>30000h;		
Business application situation	Zambia Kariba hydropower station (360MW), Sichuan Yalong River centralized control center. (The total capacity of cascade 26258MW), Liaoning Pushi River pumped storage power station (1,200MW), Qinghai Longyangxia water-light complementary (531MW)		
Service conditions	For the supplier's local investment and construction, with mature technologies, users can use and maintain on their own through simple system training.		
Contact person of business application unit /Tel./E-mail / Tel. / E-mail	Kariba, Zambia, Li Shunqi 0371-86019195; Yalongjiang Drainage Basin centralized control center of, Zhang Junbo 13888358002; Pushi River pumped storage power station, Dong Xingshun,18741507119; Qinghai Longyangxia water-light complementary, Zhu Xiangjia 18997078281		


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Investment on equipment	The units below 100MW, 1,500,000/per unit 100MW-300MW units, 2,000,000/per unit The units above 300MW, 2,500,000 /per unit
Expense of operation maintenance	It needs a little labor maintenance cost. It has depreciation period of 10 years, its operation maintenance cost is about 20,000-100,000 a year.
Investment payback period	2-3 years
Other earnings	If increasing the hour amount in a year of unit, no one needs to be on duty, and operation maintenance staff can be decreased.
Technical occupancy	70%
Market potential of the technical	It is predicted that the market standard are 300 sets by 2020, market occupancy is 70% with a production value of RMB 500,000,000.
Technical advancement	System configuration and equipment selection follows the advanced product in the computer field, and the system reaches the international advanced level. It is designed according to the principle of "None on duty" (few people on duty), and carry out the overall design and configuration in accordance with the guiding ideology of achieving monitor and control at all levels including power plant local LCU, central control room of power plant and superior dispatching management departments.
Technical maturity	Products have been widely applied into a great amount of engineering at home and abroad, with a high degree of maturity.
Technical applicability	IEEE802.3 standard design for compute monitoring system; It is a fully distributed and open system, not only convenient for the expansion of the function and hardware, but also can fully protect the application resources and investment, the distributed database and software modular, structured design allow the system to adapt to the increase of function and the expansion of scale, and has self-diagnostic capability. This series of products are mainly applicable to plant operation monitoring and control regulation and the operation and management automation and dispatching control of cascade hydropower stations, the dispatch center of large, medium and small hydropower plants, pumped storage power stations, and photovoltaic power stations.
Technical stability	Based on more than 20 years of development of hydropower plant computer monitoring system of NARI Group Corporation, the technical fully absorbs the latest technical in the field of the international computer science, can effectively meet the needs of monitoring and management of production process in the water conservancy and hydroelectric power, photovoltaic field, has been widely applied in more than 700 large and medium-sized projects, and it is a very mature technical products.
Technical safety	In maintenance-free mold, The product is simple and easy to handle with high reliability, maintenance and change in convenience, complete function, and lower cost effectively.

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	Obstacle in achievement transformation and promotion	None		
	Transfer of intellectual property	Has the domestic proprietary intellectual property rights, and the registration number of the computer software copyright is: 2001SR1776		
	Photo caption			
	Renewable Energy Technical Achievement Declaration			
	QR code			
	Technical provision unit	NARI Group Corporation		
	Contact person	Pan Meiting	Submission date	August 17, 2016
	Technical type	The technical of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower stations
	Tel.	15950566319	E-mail	panmeiting@sgepri.sgcc.com.cn
	Technical name	Hydrogovernor (Final version)		
	Technical provider	NARI Group Corporation		
	Scope of application	Be appropriate for single unit of water-turbine generator set between 100,000kw-1,000,000kw.		
	Brief description of technical	By gathering auto control, electric-hydraulic conversion and hydraulic manifold technical, the system has realized automatic function of rotate speed and active power of water turbine with characteristics of high reliability, standardization and integration. It includes electric control cabinet, hydraulic operation cabinet, main control valve, oil pressure installation, as well as control equipment, emergency distributing valve, subsection and closed installation and mechanical plastic protection installation.		
	Technical information	Size of main control valve, emergency distributing valve, etc.. DN50-DN250, pressure rating 2.5MPa-16MPa, oil pressure installation 0.6m ³ -60m ³		
	Business application situation	Yunnan Xiaowan hydroelectric station (700MW), Anhui Xiangshuijian hydropower station (250MW), The north costal of Zambia Kariba expanding units (360MW), The south coast of Kariba in Zimbabwe (150MW)		
	Service conditions	The supplying party should invest and construct at local with mature techniques, and needs systematical training so that users can use and maintain it automatically.		


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Contact person of business application unit/Tel./E-mail	Xiaowan hydropower station, Ji Zhengtang, 18987247538 Xiangshuijian hydropower station, Xing Hongchao, 15255380893; Kariba, Zambia: Hou Changqing, 13523053058
Investment on equipment	Units below 10MW, RMB 300,000 per unit; Units between 10MW-300MW, RMB 1,000,000 per unit Units between 300MW-1000MW, RMB 2,000,000 per unit
Expense of operation maintenance	It needs some labor maintenance costs. It has a depreciation period of 10 years, and needs operation maintenance cost is about RMB 10,000-100,000 a year.
Investment payback period	2-3 years
Other earnings	If increasing the hour amount in a year of unit, no one needs to be on duty, and operation and maintenance staff can be decreased.
Technical occupancy	20%-30%
Market potential of the technical	It is predicted that the market standard are 1,000 sets by 2020, market occupancy is 25%-35% with a production value of RMB 300,000,000.
Technical advancement	The technical standard of NARI hydrogovernor is international advanced level and in leading place in china.
Technical maturity	Hydrogovernor is a highly mature technical product. NARI has more than 30-year experience in governor production, debug, and commission.
Technical applicability	Hydrogovernor can be applied in various water-turbine generator set.
Technical stability	Ambient temperature requirements: 0°C-40°C Main technical parameters: Proportional gain KP: 0.01-20; Integral gain KI: 0-20 1/s; Differential gain KD: 0-20s; The eternal slip ratio Bp: 0-10%, Adjustment range of artificial dead zone: 0-0.75Hz Fault-free time MTBF: 63,782 hours Levels of anti-electromagnetic interference: IEC61000 Grade 3 m ³
Technical safety	This product has high security of technique which guarantees the safe and stable operation of hydroelectric generating set.
Obstacle in achievement transformation and promotion	None
Transfer of intellectual property	Owning proprietary intellectual property rights, Patent No.: ZL200810243848.1, ZL200820215291.6, ZL200910184028.4, ZL200920282821.3, ZL200920282820.9, ZL201020156584.9, ZL201010566574.7, ZL201110437743.1 Copyright No.: RZD ZI No. 0274778

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	Type Examination Certificate: DZ142192, DZ142192-EMC, DZ150022, DZ150022-EMC, DZ150021, DZ150021-EMC		
Photo caption			
Renewable Energy Technical Achievement Declaration			
QR code			
Technology provision unit	NARI Group Corporation		
Contact person	Pan Meiting	Submission date	August 17, 2016
Technical type	The technologies of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower stations
Tel.	15950566319	E-mail	panmeiting@sgepri.sgcc.com.cn
Technical name	IMS2000 intelligent agricultural water saving irrigation integrated management and control system (Finally)		
Technical provider	NARI Group Corporation		
Scope of application	Water saving irrigation of the reservoir, canal system and field of agricultural water conservancy		
Brief description of technical	System integrates functions of sluice pump station, water level and flow, soil moisture, video surveillance, water-saving irrigation and wells control, realizes the water dispatching, wisdom agricultural irrigation, automatic monitoring of sluice pump station and others, with characteristics of high integration, standardization and modularization, mainly consists of small PLC, water-saving irrigation electromagnetic valve, network transmission, water level flow M collection, soil moisture collection, meteorological data collection, integration platform and other key equipment.		
Technical information	Field water-saving irrigation, electromagnetic valve: ZIGBEE wireless automatic control; The soil moisture monitoring and control: Wireless automatic monitoring. The integration irrigation of water and fertilizer; Water and fertilizer automatic ratio intelligent irrigation		
Business application situation	Water source of Yanqi County, Xinjiang, Ten thousand acres of walnut forest of Yuncheng, Shanxi, Irrigation district of Yumen, Gansu, Trunk canal in Kuta, Xinjiang		
Service conditions	For the supplier's local investment and construction, with mature technologies, users can use and maintain on their own through simple systematic training.		
Contact person of business application unit / Tel. / E-mail	Automatic monitoring of water source in Yanqi, Xinjiang, Liu Guojun, 13565060698, 297395425@qq.com		


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Investment on equipment	Make a budget estimate according to the agricultural irrigation area, and about RMB 400,000 is invested for every 1,000 acres of basic hardware equipment. The basic investment in software and data center is RMB 2,000,000-5,000,000.
Expense of operation and maintenance	If the system operating power is 30-75Kw, it needs some manual maintenance costs. It has a depreciation period of 10 years, and needs operation and maintenance expense is about RMB 5,000 a year.
Investment payback period	2-3 years
Other earnings	Save irrigation water and save labor cost.
Technical occupancy	5%
Market potential of Technical	It is predicted that the market standard are 12,000 sets by 2020, market share is 5% with production value of RMB 30,000,000.
Technical advancement	Integration of computer technical, modern communication technical, automatic control Technical, sensor technical, automatic irrigation Technical, artificial intelligence technical, database technical, carry out automatic collection, transmission and processing of information about water resource in the irrigation area, and realize the integration of measuring, monitoring, management and control.
Technical maturity	The product technologies use originally mature technologies to integrate and realize high integration, with higher extent of perfection.
Technical applicability	Water saving irrigation of the reservoir, canal system and field of agricultural water conservancy.
Technical stability	Ambient temperature requirements -20-50°C Main technical parameters: MTBF>8760h; Alarm time for the occurrence of failure <10 minutes; WEBGIS response speed: <5 seconds; Complex report response speed: <5 seconds; General query response speed: <3 seconds.
Technical safety	In maintenance-free mold, The product is simple and easy to handle with high reliability, maintenance and change in convenience, complete function, and lower cost effectively.
Obstacle in achievements transformation and promotion	None
Transfer of intellectual property	Having domestic independent intellectual property, Patent number: 201521072098.8, Copyright No.: 2015SR217855, Certificate of inspection report 151222134, Software product certificate: S-RC-2016-A0271 etc.
Photo captions	

TECHNOLOGY: HYDRO

COMPANY: NARI GROUP CORPORATION

Renewable Energy Technical Achievement Declaration			
QR code			
Technical provision unit	NARI Group Corporation		
Contact person	Pan Meiting	Submission date	August 17, 2016
Technical type	The technologies of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower stations
Tel.	15950566319	E-mail	panmeiting@sgepri.sgcc.com.cn
Technical name	Integration control technical of low pressure units at small hydropower station s		
Technical provider	NARI Group Corporation		
Scope of application	Applicable for low pressure water turbine generating unit with single unit of 1000kW or less than 1000kW		
Brief description of technical	The system has integrated low pressure unit intelligent controller (generator circuit breaker, excitation major loop, instruments and operation button, etc. The primary and secondary equipment of water-turbine generator set shall be configured in one screen cabinet by optimization; It has realized automatic startingup and shutdown with one button, excitation and building pressure, synchronization and disaggregation, generator protection, remote control and other functions, and it has the features of high integration, standardization and modularization.		
Technical information	Cabinet body 2260×800×800; Input precision of temperature range 5%;Analog quantity input precision 3%;Pressure adjustment precision of excitation parameter <0.5%;		
Business application situation	Zhejiang Zhengtao Hydropower Station (2×160kW) \ Fujian Xiaoneng Hydropower Station (2×400kW), Ventanas Hydropower Station in COSTA RICA (11MW)		
Service conditions	For the investment and construction in the supplier's local place, the technical is mature. Only simple system training is needed and users can use and maintain by themselves.		
Contact person of business application unit /Tel./E-mail / Tel. / E-mail	Zhejiang Zhengtao Hydropower Station, Zhou Xiaojun,15869038398		


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Investment on equipment	Unit less than 1000kW, RMB80,000/single unit
Expense of operation maintenance	If the system service rating is below 2kw, it needs some maintenance costs. It has a depreciation period of 10 years and needs about RMB 2,000-5,000/ year as operation maintenance cost.
Investment payback period	2-3 years
Other earnings	Add power generation hours of units for the year, with possibility of no man on duty, reducing quantity of operation and maintenance personnel
Technical occupancy	10%
Market potential of the technical	It is predicted that the market size are 150 sets by 2020. Market share of our company is 10% with a production value of RMB 16,000,000
Technical advancement	Primary and secondary function of high integration hydropower low pressure unit has achieved integrated control of hydropower unit, which is in leading position in similar technical.
Technical maturity	The product technical adopts original mature technical for fusion to achieve high integration of the product with high perfection.
Technical applicability	It is applicable for new construction of small hydropower plant or transformation of small hydropower with weak foundation in automatic control, without limitation of geographical location.
Technical stability	Ambient temperature requirements -10°C-+50°C, The average temperature within 24h does not exceed 35°C Rated AC current; 5A. Rated AC voltage, Un 57.74V or 220V Rated frequency: 50Hz Working power supply: DC/ AC220V, Allowable change range: 80%-110%。 Level of anti-electromagnetic interference In accordance with the regulation of the International GB/T14598.9
Technical safety	In maintenance-free mold, The product is simple and easy to handle with high reliability, maintenance and change in convenience, complete function, and lower cost effectively.
Obstacle in achievement transformation and promotion	None
Transfer of intellectual property	Possession of domestic proprietary intellectual property
Photo caption	

TECHNOLOGY: HYDRO

COMPANY: NARI GROUP CORPORATION

Renewable Energy Technical Achievement Declaration			
QR code			
Technical provision unit	Nanjing Nanrui Group		
Contact person	Pan Meiting	Submission date	August 17, 2016
Technical type	The technologies of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower station.
Tel.	15950566319	E-mail	panmeiting@sgepri.sgcc.com.cn
Technical name	Intelligent distributed project safe monitoring automatic system (Final)		
Technical provider	NARI Group Corporation		
Scope of application	Reservoir dam, underground plant, tunnel, channel, high slope, wind power plant and other projects		
Brief description of technical	The system applies advanced sensor, network communication and computer technical to complete automatic monitoring and off-line analysis function on transformation, porous flow, osmotic pressure, temperature, stress-stain, water level and other items of building and rock project with technical features such as reliable structure, flexible system configuration and high operation efficiency. It mainly includes modular structure data collection unit, monitoring host, management computer, etc.		
Technical information	Interviewee capacitance-type sensor, resistance-type sensor, vibrating wire type sensor, potentiometer-type sensor and other sensors; In addition, it is also available to collect sensor with transmitter and output of current and voltage, etc.		
Business application situation	Imboulou hydropower station, Congo (The Republic of Congo) (120MW), Guinea Kaleta Hydropower Station (240MW), Guizhou Sanbanxi Hydropower Station (100MW), Jiangsu Yixing Pumped Storage Power Station (1,000MW)		
Service conditions	The supplier should construct and commission at local with mature techniques, and it needs simple systematical training so that users can use and maintain it by themselves.		
Contact person of business application unit / Tel. / E-mail	Kaleta, Wang Yourui, 18709218852; Jinping Project I and II, Luo Hao, 13882479799; Sanbanxi Zhou Xiaolu, 18692219287; Yixing Pumped Storage, Zhang Lei, 0510-80763702		


TECHNOLOGY: HYDRO

COMPANY: NARI GROUP CORPORATION

Investment on equipment	According to the scale of the project from RMB 500,000 to RMB 5,000,000, determine by depending on the number of monitoring points.
Expense of operation and maintenance	It needs a little artificial maintenance cost. It's depreciation period is 10 years, operation and maintenance cost is about RMB 100,000 /year.
Investment payback period	2-3 years
Other earnings	The on-line data collection of safety monitoring data of reservoir dam is realized, which provides data support for analysis of safety and stability of dam.
Technical occupancy	40%
Market potential of Technical	Market size is expected to reach 200 units in 2020, the market share of the products of our company will account for 50%, and the output value will be RMB 100,000,000.
Technical advancement	System combines with the latest achievements of modern microelectronic technical and network communication technical with more reliable system structure, more flexible system configuration and more efficient operation, so it is a distributed system with intelligence analysis capabilities, reached the international advanced level of technical, and fully meeting all real requirements of users.
Technical maturity	The system has been applied in more than 100 hydropower station projects in China, including the Three Gorges, Xiaowan, Jinping and other mega projects, and mostly the system has continuously operated more than three years, with high mature technical.
Technical applicability	The system is designed, manufactured according to the requirements of China "technical specification for automation of dam safety monitoring", it is of distributed modular design, flexible system configuration, flexible expansion, and it can well adapt to various small and medium-sized hydropower stations, reservoirs, wind farms, pumping storage and other engineering.
Technical stability	The system is a professional product oriented to application in the hydropower industry, the application environment of hydropower industry has been fully considered for design and manufacture, it can be deployed in the dam corridor, crest, slope, tunnel, F room and slope surface area. The application results of a plurality of projects show that the operation of system is stable and reliable.
Technical safety	The system is a mature and reliable product, adopting distributed and modularized design, so that fault of single equipment does not affect the running of the whole system; it has been widely applied in the market, the facilities of system is highly perfect, accessories are complete, maintenance is convenient, and the success rate of system construction is high.
Obstacle in achievements transformation and promotion	None

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COMPANY: NARI GROUP CORPORATION

	Transfer of intellectual property Caption	Possession of domestic proprietary intellectual property		
Renewable Energy Technical Achievement Declaration				
	QR code			
	Technical provision unit	NARI Group Corporation		
	Contact person	Pan Meiting	Submission date	August 17, 2016
	Technical type	The technologies of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower stations
	Tel.	15950566319	E-mail	panmeiting@sgepri.sgcc.com.cn
	Technical name	MB80 series PLC		
	Technical provider	NARI Group Corporation		
	Scope of application	Hydroelectric station, photovoltaic, wind power station, thermal power plant, railway transportation, sluice and pump station and sewage treatment plant		
	Brief description of technical	MB80 series PLC applies the most advanced design idea, elements and processing craft in the industry, realizes the function of measurement control, network communication, four remote controls, process control and information alarm at industrial control site, possesses the features such as attractive appearance, convenience and utility, dust prevention, moistureproof, quakeproof and against electromagnetic interference protection, and mainly includes CPU controller, I/O module and other key equipment.		
	Technical information	Switch quantity signal DC24V, Resolution 1ms; Analog signal 0-20mA/0-5V, Measurement/output precision <2‰; Ethernet communication interface 10M/100M self-adaptation		
	Business application situation	Democratic Republic of the Congo ZONGO2 Hydropower Station (150MW), Laos Houay Lamphan Gnai Hydropower Station (88MW), Liaoning Pushihe Pumped Storage Power Station (1200MW), Burqin Shankou Hydropower Station (220MW).		
	Service conditions	For the supplier's local investment and construction, with mature technologies, uses can use and maintain on their own through simple system training.		
	Contact person of business application unit /Tel. /E-mail	Democratic Republic of the Congo ZONGO2, Li Shunqi 0371-86019195; Laos Houay Lamphan Gnai Hydropower Station, Liu Tiepei, 15196666312; Pushihe Pumped Storage Power Station, Dong Xingshun, 1874150711; Burqin Shankou Hydropower Station, Li Xiaobing, 15999107228		


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Investment on equipment	The units below 100MW, 1.5 million/single unit 100MW-300MW units, 2 million/single unit The units above 300MW, 2.5 million/single unit
Expense of operation and maintenance	It needs a little artificial maintenance cost. Its depreciation period is 10 years, its operation and maintenance cost is about RMB500, 000 a year.
Investment payback period	2-3 years
Other earnings	Improve control safety, increase adjustment speed and precision, no-man on duty is available, and reduces operation and maintenance personnel.
Technical occupancy	As it still applies imported PLC in domestic large and medium hydroelectric station automatic control field, market share of NARI MB series PLC is about 10%, and it takes about 60% in utilization of domestic PLC.
Market potential of technical	It is predicted that the market standard are 500 sets by 2020, market share is 55% with a production value of RMB 250,000,000.
Technical advancement	MB series intelligent PLC is specially designed for safe and stable operation under complex and severe environment in hydroelectric plant, it has passed various electromagnetic compatibility test certifications of the national highest class, EU CE certification and China classification society certification, etc., and it can operate under stable condition in dusty workshop of hydroelectric plant with highfield and strong vibration.
Technical maturity	MB series intelligent PLC is an product of high performance and high reliability with independent intellectual property, developed by NARI Group on the basis of systematic automatic research and development and project application for several decades, absorbing previous successful experience, fully blending advantages of DCS and PLC in other brands, aiming at current latest development direction of PLC, applying the technologies such as site bus technical, embedded technical and intelligence and combined with the latest technical in industrial control field. Since it has been placed on the market, research and development team analyzes and summarizes plentiful project cases, concludes control features in hydroelectric monitoring field, aiming at industrial requirement, persistently updates and optimizes configuration of software and hardware, constantly makes improvement and intensification, and conducts customized development according to the user's requirement and fully meets different demands of the customer. According to statistics, failure rate of MB series PLC products has constantly been kept under 0.2%, which is far less than PLC product of imported brand.
Technical applicability	It possesses Modbus/TCP and other open and standard communication interface, it can be effectively integrated with various automatic components and automatic measurement control equipment of international mainstream manufactures, and forms complete plant computer monitoring system.

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	<p>Technical stability</p>	<p>Electromagnetic compatibility design of MB80 series PLC runs through the overall process from principle design, circuit board design and system structure design, and it has passed various electromagnetic compatibility test certifications of the national highest class; it is of high reliability and strong capacity of resisting disturbance, which is higher than foreign high-end PLC index.</p> <ul style="list-style-type: none"> ■ Surge immunity: 4kV (Common mode) /2kV (Differential mode), Level 4 (IEC61000-4-5) ■ Damped oscillation noise immunity: 2.5kV (Common mode) /1kV (Differential mode), Level 3 (IEC61000-4-12) ■ Fast transient: ±4kV (power supply) /±2kV (I/O), Level 4 (IEC61000-4-4) ■ Electrostatic discharge: ±15kV (air) /±8kV (contact), Level 4 (IEC61000-4-2) ■ Radiated electromagnetic field anti-interference: 10V/m, Frequency 80MHz-1GHz, Level 3 (IEC61000-4-3) 		
	<p>Technical safety</p>	<p>MB80PLC has passed standard and strict CE certification and classification society certification with strict environment; It totally possesses certification qualifications for exporting to EU and other countries and regions, in the hydroelectric plant computer monitoring system completed by NARI Group, there are more than 120 power stations that apply MB80 series intelligent PLC as in-place LCU core controller, and it accounts for more than 20% in overall performance.</p>		
	<p>Obstacle in achievements transformation and promotion</p>	<p>None</p>		
	<p>Transfer of intellectual property</p>	<p>Having domestic independent intellectual property, Patent No.: ZL200820038734.9, ZL200910025039.8, ZL200920234197.X, ZL200820038735.3, ZL200820184987.7, ZL20103CL25512.3, Type Test Certificate No. DZ131341, DZ131341-EMC etc.</p>		
	<p>Photo captions</p>			
	<p>Renewable Energy Technical Achievement Declaration</p>			
	<p>QR code</p>			
	<p>Technical provision unit</p>	<p>NARI Group Corporation</p>		
	<p>Contact person</p>	<p>Pan Meiting</p>	<p>Submission date</p>	<p>August 17, 2016</p>
	<p>Technical type</p>	<p>The technologies of small hydropower stations</p>	<p>Specific technical</p>	<p>Computer monitoring, power grid automatic scheduling and power transmission and</p>

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			distribution technologies of small hydropower stations
Tel.	15950566319	E-mail	panmeiting@sgepri.sgcc.com.cn
Technical name	UF-911 multi-path ultrasonic flowmeter (Finally)		
Technical provider	Nari Group Corporation		
Scope of application	It is applicable for mass flow online measurement and unit efficiency monitoring over water conservancy and hydropower, large water supply engineering		
Brief description of technical	The product applies multi-path ultrasonic time-difference method flow gaging, all control, measurement, display and communication are configured in a wall-hanging cabinet with IP65 protection level, it can realize the measurement over flow velocity and flow of pipe, open channel, square-shaped culvert and many other cross sections via externally connected energy converter, and in addition, it can conduct efficiency monitoring over hydroelectric unit. It has the feature of being moistureproof, dust prevention and strong capacity of rejecting disturbance.		
Technical information	Measurement over the diameter of the pipeline. 0.5-15m; Measurement over width of channel: 1-100m; Measurement error: Round pipe or square-shaped culvert in pressure: $\pm 0.5\%$, pipe or open channel without pressure: $\pm 1.0-2\%$		
Business application situation	East route of the south-to-north water transfer project (7 pipes *8meters in diameter), Yunnan Manwan Hydropower Plant (300MW), Taishan Nuclear Power Station (4X900MW), Itezhi Hydropower Station of Zambia (130MW)		
Service conditions	The supplying party should invest and construct at local with mature technologies in no need of training so that users can use and maintain it automatically.		
Contact person of business application unit / Tel. / E-mail	Itezhi Hydropower Station of Zambia; Hou Changqing,13523053085		
Investment on equipment	It has nothing to do with unit capacity, and it is calculated according to 1 set of each pipe/ channel, with RMB 200,000/single set		
Expense of operation and maintenance	System operation power is less than 30W, it is required of little manual maintenance cost, and depreciation period of equipment is 10 years		
Investment payback period	2-3 years		
Other earnings	It provides decision foundation for optimized distribution of hydroelectric unit load and water conservancy and power generation increase, and provides important basis for assessment of unit transformation effect.		
Technical occupancy	20%		


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	Market potential of Technical	It is predicted that the market standard are 200 sets by 2020, market share is 20% with a production value of RMB 10,000,000.
	Technical advancement	Mass flow ultrasonic measurement technical is in leading position in similar technical.
	Technical maturity	This kind of technical has been used for more than 30 years with high complete degree.
	Technical applicability	This product is applicable for mass flow measurement and monitoring of hydroelectric station efficiency, and to ensure measurement precision, it is recommended to be used in pipe and open channel with diameter or width of over 1meter.
	Technical stability	Ambient temperature requirements Water temperature: 0-50°C;Host temperature-10°C+56°C Levels of anti-electromagnetic interference Electrostatic discharge immunity, level 3 Electrical fast transient, level 3; Surge immunity, level 3; Power frequency magnetic field immunity, level 5 Degree of host box protection IP65
	Technical safety	1. In maintenance-free mold, the product is simple and easy to handle with high reliability, maintenance and change in convenience, complete function, and lower cost effectively. 2. Energy converter shall be installed according to specific circumstance, installation being not in place will affect measurement effect or even being unmeasurable, and it is required of professional to direct installation.
	Obstacle in achievements transformation and promotion	None
	Transfer of intellectual property	Having domestic independent intellectual property Patent number: 200910181630.2, 201310256511.5 CE certification: E8N151277437017; N8151277437016.
	Photo captions	

TECHNOLOGY: HYDRO

COMPANY: HNAC TECHNOLOGY CO., LTD

HNAC Technology Co., Ltd		Renewable Energy Technology Achievement Declaration		
QR code				
Technical provision unit	HNAC Technology Co., Ltd			
Contact person	Tan Qin	Submission date	August 24, 2016	
Technical type	The technologies of small hydropower stations	Specific technical	Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower stations	
Tel.	13755182914	E-mail	Overseas@cshnac.com	
Technical name	Excitation system of generator			
Technical provider	HNAC Technology Co., Ltd			
Scope of application	Generation set in various types.			
Brief description of Technical	Excitation regulator of PWL-4A generator has 32 trunks of DSP (Digital Signal Processor) and EDA (CPLD) technologies as the control center, applies redundancy structure of binary channels and multi channels in cordwood system equipped with LCD and touch screen. Based on above hardware and our years of experience in software programming, PWL-4A possesses characteristics of high reliability, simple operation, convenient maintenance, flexible use, etc.			
Technical information	Parallel operation with direct current and alternating current. Voltage-stabilized power supply The power supply of A kit and B kit are independent from each other. Power dissipation: Below 400W.			
Business application situation	VERTIENTES Hydropower station(1*9MW)			
Service conditions	1. Market trade 2. Mature technology 3. Need simple training. 4. Low operation and maintenance costs			
Contact person of business application unit /Tel/E-mail	ELECTRICAL PUNTILLA S.A, Add: CALLE NUEVA DE LYON072,PISO014 COMUNA DE PROVIDENCIA Santiago, Chile			
Investment on equipment	As the case may be			
Expense of operation maintenance	Low operation and maintenance costs			


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	Investment payback period	As the case may be
	Other earnings	As the case may be
	Technical occupancy	High technical occupancy
	Market potential of the Technical	Great market potential
	Technical advancement	Excitation regulator of PWL-4A generator, a microcomputer excitation regulator combining classic and modern control theory with technology of digital signal processor (DSP), is the fourth generation of excitation product of our company. It heritages the whole regulatory, control, limit and protective functions of the previous three-generation microcomputer excitation regulator, meanwhile, gains great progress in aspects of computation speed, anti-electromagnetic interference, reliability and so on, is the ideal excitation regulation equipment for synchronization generator set in small, medium and large. PWL-4A is suitable for silicon controlled excitation in various form, is a excitation regulation equipment with high universality.
	Technical maturity	Excitation regulator of PWL-4A generator has 32 trunks of DSP (Digital Signal Processor TMS320F2812) and EDA (CPLD) technologies as the control center, applies redundancy structure of binary channels and multi channels in cordwood system equipped with LCD and touch screen. Based on above hardware and our years of experience in software programming, PWL-4A possesses characteristics of high reliability, simple operation, convenient maintenance, flexible use, etc.
	Technical applicability	1. The altitude shall not exceed 4,000m. 2. The temperature of ambient air is +40C in the highest level, and -20C in the lowest level. 3. The relative air humidity and the relative air humidity in average of the minimum month is 90%, at the same time, the average lowest temperature of this month is +25C. 4. In clear environment without explosion risk. Not in corrosion metal or damaging insulating air or in conducive dirt, as well as not in shake or jolt place. 5. If any special requirements, it should be conformed through consultation by us and user.
	Technical stability	1. Advanced Surface Mount Technology (SMT) process. Excitation regulator of PWL-4A electric generator applies in advanced surface mounting integrated chip with totally-enclosed mechanical structure without fan forming the triple protection of cabinet, intubation tube and plug-in board of shield earth, improves the reliability of integration of equipment. 2. Advanced measurement method: Within one period (20ms), multi-point AC sampling shall be carried out for three-phase voltage and three-phase stator current, active power, reactive power and stator voltage and valid current value shall be calculated by software in real-time way, so response speed is fast and measurement will not be affected by waveform. 3. Highly integrated interface circuit: With a large-scale programmable device (CPLD) as outside interface circuit, excitation regulator of PWL-4A generator will make pulse form a large-scale programmable device with integration of detection,


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		frequency and phase detection, A/B sleeve switching and other functions. It improves overall reliability of the equipment.
	Technical safety	<p>1. Distributed isolating power supply: Excitation regulator of PWL-4A generator uses distributed isolating power supply. Overall equipment power supply is distributed into host power supply (+5V), analog power supply (+12V and -12V); Pulse power supply, pulse detection power supply, switch quantity output power supply, switch quantity input power supply (2-way), each regulator outputs three pulses, can drive three bridges to automatically realize stream technology. Each part of the mutual isolation. It improves overall reliability of the equipment.</p> <p>2. Electromagnetic compatibility technology: To strengthen its ability of the electromagnetic compatibility, excitation regulator of PWL-4A generator shall take more measures in general and local design. It is able to withstand $\pm 2500V$ transient conduction disturbances, $\pm 8000V$ static discharge interference and 10V/M space electromagnetic radiation.</p>
	Obstacle in achievement transformation and promotion	Unknown
	Transfer of intellectual property	With proprietary property rights
	Photo caption	

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Renewable Energy Technology Achievement Declaration			
QR code			
Technical provision unit	HNAC Technology Co., Ltd.		
Contact person	Tan Qin	Submission date	August 23, 2016
Technical type	The technologies of small hydropower stations	Specific technical	Survey and evaluation technologies of hydropower resources
Tel.	13755182914	E-mail	overseas@cshnac.com
Technical name	High and low voltage switchgears of small and medium hydropower stations		
Technical provider	HNAC Technology Co., Ltd.		
Scope of application	Power transmission and distribution of small and medium hydropower stations, substations, residences, factories and mines		
Brief description of Technical	High and low voltage switchgear is mainly used for power control, protection, measurement, conversion and distribution		
Technical information	Taking small and medium hydropower station with 6.3KV typical generator unit as an example, booster station equipment adopts outdoor equipment, and generator switch cabinet adopts KYN28A-12 type, and switch cabinet for house supply adopts HNMNS type.		
Business application situation	Chile Robleria hydropower station		
Service conditions	It has been put into operation in good condition for four years		
Contact person of business application unit /Tel/E-mail	Inversiones Talavera Limitada, Add: Catedral N 4547 Santiago-Chile, Tel: +56229515513		
Investment on equipment	According to primary main electrical connection schemes and wiring scheme for house supply, taking a hydropower station (with 2 generators, 1 main transformer) as an example, the main equipment configurations are as follows: 2 generator-terminal PTs and excitation PT cabinet, 2 generators outgoing cabinet, 1 generator bus PT cabinet, 1 transformer cabinet for house service, 1 main transformer outgoing cabinet, which are all KYN28A-12 type; 1 incoming cabinet for house supply (dual power incoming line, using the ATS switch), 2 feeder cabinet for house supply, which are all HNMNS type; General applications are some parts easy to wear and tear within the above switchgears with configuration of a certain number of spare parts.		



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	Expense of operation maintenance	Low operation maintenance costs
	Investment payback period	Short payback period
	Other earnings	High and low voltage cabinets are electromechanical equipment in hydropower station, and by adopting this program, it can reduce operation maintenance difficulty, improve repairing efficiency, and provide better guarantee for stable operation and grid-connection of units.
	Technical occupancy	Leading position in domestic small and medium hydropower stations
	Market potential of the Technical	Great market potential
	Technical advancement	<p>High voltage switch cabinet adopts metal armored draw-out type with main elements installed in trolley, and is equipped with corresponding transit trolley for examination and maintenance of the equipment. with function cells sealed and separated by metal partition, independent channel for pressure release, as well as simple and reliable mechanical interlock, fully meeting the requirements of "five-prevention".</p> <p>Low voltage switch cabinet uses drawer type, with convenient examination for drawer unit. Steel plates are used to separate horizontal bus room, function unit room and cable room, with all rooms independent with each other. High-strength inflaming retarding engineering plastic components is widely used to strengthen its safety effectively. Standard modular design is used to make good interchangeability between functional units</p> <p>Compared to fixed cabinet used in original hydropower station, these two drawer-out type cabinets can realize main wiring functions of hydropower station, better and more conveniently and more safely.</p>
	Technical maturity	Mature technology
	Technical applicability	High and low voltage equipment adopts drawer-out type, which has appropriate requirements for size and foundation of electricity room that the operation maintenance and examination channel shall be larger than that of fixed cabinet The feed mechanism and operating mechanism for some draw-out components require corresponding professional suppliers.
	Technical stability	High stability
	Technical safety	Every functional cell of high-tension switch cabinet is sealed and separated by metal partitions and equipped with pressure-release channel as well as simple and reliable mechanical interlock, which can meet the requirements of "five-prevention". Steel plates are used to separate horizontal bus room, function unit room and cable room, with all rooms independent with each other. High-strength inflaming retarding engineering plastic components are widely used to effectively strengthen its safety

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	<p>Obstacle in achievement transformation and promotion</p>	<p>Unknown</p>		
	<p>Transfer of intellectual property</p>	<p>For the KYN28 cabinet, the company possesses two utility patents on the cabinet structure. Overhaul of explosion-proof equipment of lightings and explosion-proof inspection window</p>		
	<p>Photo caption</p>			
<p>Renewable Energy Technology Achievement Declaration</p>				
	<p>QR code</p>			
	<p>Technical provision unit</p>	<p>HNAC Technology Co., Ltd.</p>		
	<p>Contact person</p>	<p>Tan Qin</p>	<p>Submission date</p>	<p>August 23, 2016</p>
	<p>Technical type</p>	<p>The technologies of small hydropower stations</p>	<p>Specific technical</p>	<p>Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower stations</p>
	<p>Tel.</p>	<p>13755182914</p>	<p>E-mail</p>	<p>overseas@cshnac.com</p>
	<p>Technical name</p>	<p>Hydro-turbine governor</p>		

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Technical provider	HNAC Technology Co., Ltd.
Scope of application	Hydro-turbine governor and electro-hydraulic governor and oil pressure unit
Brief description of Technical	Digital microcomputer-based regulator with regulating rule of proportion, integration, differentiation(PID) regulates the guide vane opening (and beater blade angle) and change the water inflow into the water turbine by adopting digital valve, proportional valve, servo motor and other electro-hydraulic conversion devices to receive and convert the electric signal sent by the microcomputer-based regulator into mechanical displacement, and finally controls the rotating speed and output power of water turbine power unit.
Technical information	1. Governor model: Parallel PID digital regulator; 2. Speed measurement method: Residual pressure, toothed disc;
Business application situation	Albania Fetterly -1 hydropower project (2*1MW), has been put into operation for 4 years
Service conditions	1. Market transaction; 2. Reliable and mature technology; 3. Requiring short-answer training; 4. Low cost for operation and maintenance
Contact person of business application unit /Tel/E-mail	Hydroborsh sh.p.k Add.: Twin Towers, Tower No.2, Fourth Floor, 2A, Tirana, Albania
Investment on equipment	1. The necessary main equipment: Hydro-turbine governor 2. Other accessory equipment: hydro generator, excitation equipment, integrated automation system, high and low voltage switchgears, transmission / distribution lines, oil, gas, water and other auxiliary equipment.
Expense of operation maintenance	Operation and maintenance is simple, and the cost is low
Investment payback period	Short payback period
Other earnings	1. With 16MPa high oil pressure, the oil pressure device and the control device are integrated into one cabinet, which can not only be conducive to reducing the loss of oil in the pipeline, but also prevent the leakage of the pipeline from polluting the environment; the amount of hydraulic oil needed by the system is greatly reduced, so the use of hydraulic oil is saved; The amount of hydraulic oil needed by the system is greatly reduced, so the volume of the hydraulic component, servomotor and other devices can also be reduced. 2. The use of high oil pressure solves components, rust, corrosion, vibration, air turbidity and other problems in the hydraulic system caused by the mixing of oil / water and the mixing of gas / liquid. 3. Oil pressure device adopts the bladder type accumulator that can not only free the power station from the air-supplying in the operation, also not free the power station form need for high

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	<p>pressure air system and corresponding plant, so that a considerable sum of investment can be saved from the power station construction, at the same time, the management and maintenance of high pressure air system in the future can be eliminated.</p> <p>4. AC servo motor adopted as the electro hydraulic conversion device, can realize the oil-free conversion, as a result of which, the workload of oil management by the staff can be reduced, and the service life of components and oil is prolonged.</p> <p>5. The cartridge valve is used as the distributing valve; the static oil consumption is close to zero; the hydraulic oil is saved, the pollution of the oil to the plant is reduced, the starting times for the oil pump motor to pump oil and the loss of the electric energy are also reduced because of reduction of the loss of the pressure oil,</p>
Technical occupancy	Technical occupancy is above the average
Market potential of the Technical	Great market potential
Technical advancement	<p>1. 16MPa high oil pressure is adopted in Kaplan turbine control system, so that the oil consumption and the volume of the system is reduced, and the high-pressure air supplement device of the low oil pressure is canceled; This maturity technology is applied in hydraulic industry, and the system reliability is increased.</p> <p>2. AC servo motor, which has realized the oil-free conversion to improve the oil resistance of the hydraulic system, is used to control the cartridge valve; The application of the cartridge valve simplifies the system structure, improve the response speed, and static oil consumption of the system is close to zero.</p> <p>3. For the rotary seal of the existing oil receiver can only accept the pressure oil below 6.3MPa, it is difficult to bear high working pressure. This technology has realized the application of the 16MPa high oil pressure technology to the Kaplan turbine.</p> <p>4. By controlling pilot valve, it can realize the connection between the AC servo motor and the cartridge valve, thereby controlling the corresponding cartridge valve and realizing the corresponding control function.</p>
Technical maturity	<p>Technical route</p> <p>1. 32 bit PLC is selected as the controller to realize the fully digital control;</p> <p>2. High oil pressure hydraulic components are selected to meet the use of 16MPa oil pressure;</p> <p>3. Research and development of high oil pressure blade control device;</p> <p>4. The implementation of electro-hydraulic conversion device with digital valve, proportional valve, servo motor and so on as the core.</p>
Technical applicability	<p>1. Suitable for regulating small, medium and large mixed-flow, axial-flow (fixed blade or rotary blade) and tubular (fixed blade or rotary blade) turbine;</p>

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		<p>2. All the components are standardized components in the international and domestic electrical industry and hydraulic industry, with high standardization and good universal compatibility;</p> <p>3. Altitude is not more than 4000m, the maximum air temperature is 40°C, and the minimum air temperature is 5°C; The average maximum relative humidity in the most wet month is 90% and the average temperature in this month is 25°C; The oil quality shall be consistent with the provisions of No. 46 steam turbine oil or oil of the same type with similar viscosity in GB11120, and the temperature range for oil use is 10°C-50°C. In order to obtain the high reliability of the hydraulic control system, the cleanliness of the oil shall be ensured, and the filter accuracy should be in accordance with the requirements of the product. (If the above working environment cannot be met, the relevant indexes shall be negotiated by supplier and demander.)</p>
	<p>Technical stability</p>	<p>1. The static characteristic curve should be similar to the night line (<5%);</p> <p>2. Dead zone of revolving speed: Large adjustment 0.02%, Medium adjustment 0.06%, Small adjustment 0.1%, Extra small adjustment 0.2%</p> <p>3. The swing value of servomotor: Large adjustment 0.1%, Medium adjustment 0.25%, Small adjustment 0.4%, Extra small adjustment 0.8%</p> <p>4. For the speed governing system of Kaplan turbine, the inaccuracy is of the blade servo system is not greater than 0.8%. The deviation between the measured combination curve and the theoretical combination curve is not more than 1% of the total stroke of the blade servomotor.</p> <p>5. Under the steady-state condition, the position deviation of the two spray needles of the multi-nozzle impulse turbine is not more than 1% within the whole range; The deviation between the position of each spray needle and the average value of the position of all spray needles is not more than 0.5%.</p> <p>6. Stability of the unit under various working conditions and operating modes. The relative value of the revolving speed swing is not more than ±0.15% for large electric speed governors, not more than ± 0.25% for medium and small speed governors, and not more than ±0.3% extra-small governors.</p> <p>7. Dead time of servomotor: Not more than 0.2S</p>
	<p>Technical safety</p>	<p>1. The latest achievements in programmable technology, modern hydraulic technology and digital technology are adopted.</p> <p>The governor not only has advanced technical indexes, complete functions, but also has a more concise structure more compared with the hydro turbine governor of the conventional oil pressure. The hydraulic mechanical parts are composed of standard industrial hydraulic components, with high reliability and simple maintenance. Because the technology of the governor that is composed of standard hydraulic parts is mature, it is replacing the small and medium-sized hydro turbine governor in the conventional oil pressure series.</p>

TECHNOLOGY: HYDRO

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		<p>2. Relevant qualification and quality management system:</p> <p>① Having design, manufacture, supply and service ability of regulator;</p> <p>② Have manufacturing equipment, technical strength and production capacity that can match manufacturing qualification, and sufficient design, manufacturing, processing and testing equipment;</p> <p>③ Having the corresponding equipment, laboratory facilities and manufacturing process;</p> <p>④ Be equipped with testing equipment that can be used for nondestructive inspection by means of X - ray, ultrasound;</p> <p>⑤ Be equipped with facilities that can be used for plant testing on various parts / components of contract equipment;</p> <p>⑥ Having standard quality assurance system of ISO9000 series of to ensure the quality of design, manufacture and installation;</p> <p>⑦ Be equipped with equipment and instruments required to conduct on-site testing according to technical specifications;</p>
	<p>Obstacle in achievement transformation and promotion</p>	<p>For the power station in the isolated network operation, due to parameters of the capacity of the user load, the variation of the mutational load and the structure of the power grid have no clear uniform standard, it needs to be adjusted according to the actual working conditions.</p>
	<p>Transfer of intellectual property</p>	<p>Having domestic independent intellectual property</p>

TECHNOLOGY: HYDRO
COMPANY: HNAC TECHNOLOGY CO., LTD

	<p>Photo caption</p>			
Renewable Energy Technology Achievement Declaration				
	<p>QR code</p>			
	<p>Technical provision unit</p>	<p>HNAC technology Co., Ltd.</p>		
	<p>Contact person</p>	<p>Tan Qin</p>	<p>Submission date</p>	<p>August 23, 2016</p>
	<p>Technical type</p>	<p>The technologies of small hydropower stations</p>	<p>Specific technology</p>	<p>Computer monitoring, power grid automatic scheduling and power</p>

TECHNOLOGY: HYDRO

COMPANY: HNAC TECHNOLOGY CO., LTD

			transmission and distribution technologies of small hydropower stations
Tel.	13755182914	E-mail	overseas@cshnac.com
Technical name	Protection, measure and control for power station, substation and distribution station with voltage class of 110kV and below		
Technical provider	HNAC technology Co., Ltd		
Scope of application	Protection, measure and control for power station, substation and distribution station		
Brief description of Technical	<p>High-performance and high-reliability platform, with dual-CPU framework and embedded real time multi-task operation system</p> <p>Anti-interference design, back-plug and unplug composite structure, and completely independent sampling channel for analogy quantity protection and measurement</p> <p>Functional modular design of software and hardware, easy for maintenance</p> <p>Adopt 16-bit high-speed A/D to realize data sampling, and 32-bit DSP to realize calculation protection and other main functions.</p> <ul style="list-style-type: none"> • Provide dual-Ethernet and dual-RS-485 communication interface 		
Technical information	Measurement inaccuracy $\pm 0.2\%$; Error of fixed value for current and voltage $\pm 3\%$;		
Business application situation	Baiziqiao power station of Sandu in Guizhou situates in river bank of Duliujiang in the form of barrage with 8-kilometer distance of county. The power station is equipped with 2 sets of 5000kW mixed flow vertical units. The operation effect of the power station is good, with high power generation benefits.		
Service conditions	<p>Market trade, which is configured with equipment depending on the circumstances;</p> <p>Mature technology, which has run in the network for more than 3 years;</p> <p>It needs training in some degree while using with 3-5 days.</p> <p>Low cost of installation and use that the maximum cost is 1% of total cost;</p> <p>Average maintenance cost is 5% of the total cost;</p>		
Contact person of business application unit /Tel./E-mail	<p>Jin Xinsheng</p> <p>Tel.: 13765463302</p>		
Investment on equipment	<p>For relay protection products, new project and reconstruction project need be configured with relay protection tester for the verification and test of protection function, and the equipment investment is about 80,000 to 200,000 (depending on the complexity of the protection function configuration, select appropriate tester)</p> <p>The product can be in installed in group panel mode or on the switch cabinet, requiring to be configured with micro air switch (configured as one to one and controlled by the supply of working</p>		

TECHNOLOGY: HYDRO

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		power) and corresponding connecting cable (including the cable linking with other equipment of power station) The product is suitable for the power station and substation and distribution station with voltage class of 110kV and below, unlimited by the project scale
	Expense of operation maintenance	With low power dissipation, the maximum power consumed by a single unit of the product will not exceed 30W per hour; The equipment requires no manual intervention as it is micro-processor based automation equipment; The annual depreciation cost, repair charge and management cost are relatively low as the operating life of the equipment is relatively long;
	Investment payback period	For the power station, investment payback period, from using of the product to generating electricity or producing operation benefit, is less than one year;
	Other earnings	The equipment is designed and transformed to meet the requirements of unattended operation and remote monitoring, which can reduce about 10%-20% human resources cost and management cost
	Technical occupancy	45%
	Market potential of the Technical	Good market prospect
	Technical advancement	Upper and middle level in China
	Technical maturity	Protection function modularization, which can be clipped depending on the demand of practical application, is flexible and easy to configure and highly practical. User can define on line the operating mode for inputs/outputs to satisfy the application in different occasions. Self-checking function of the equipment is perfect The protection function is designed for the objects like electric generator, transformer, circuit, electromotor, with complete function and high integration level
	Technical applicability	<ul style="list-style-type: none"> • Suitable for protection, measurement and control of power station and substation and distribution station with voltage class of 110kV and below at home and abroad, and components and parts selected for the product are the universal components in international and domestic market, without no special customized components. • Overload capacity of the product: Current circuit: Two times of the rated current can provide continuous operation Ten times of rated current, 10s is allowable Ten times of rated current, 1s is allowable Voltage circuit: 1.2 times of rated voltage, continuous working • Limit of working temperature: -10-50°C

TECHNOLOGY: HYDRO

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		<p>Relative humidity: 5%-90%, no condensation of moisture</p> <ul style="list-style-type: none"> Contact rating of tripping output Allowable long-term through-current 5A(8A maximum) Rupturing current 0.3A (DC 220V,V/R 1ms) <p>The voltage of working power is defaulted as DC or AC 220V. The other voltage classed need to be specified with order.</p> <p>Nominal parameters of several-day signals: AC 100V, AC 5A, other classes need to be specified with order.</p> <p>Provide 32-channel inputs signal and 16-channel outputs relay</p>
	<p>Technical stability</p>	<p>The algorithm and technology of protection function applied to the product, proved by long-term practice, are reliable and stable, conforming to the requirements of relevant standards of national relay protection industry;</p> <p>Electromagnetic compatibility indexes of the equipment conform to the requirements of national standard. Details are as follows:</p> <p>Radiofrequency electromagnetic filed radiated immunity test conforms to national standard: Provisions of Grade IV test in GB/T 14598.14 - 1998 Standard;</p> <p>Electrical fast transient pulse immunity test conforms to national standards: Provisions of Grade III test in GB/T 14598.9 - 2002 Standard;</p> <p>Radiofrequency electromagnetic field radiated immunity test conforms to the provisions of Grade A (IV) test in GB/T 14598.10-2007 Standard;</p> <p>Pulse interference test conforms to the national standard; Provisions of Grade III test in GB/T 14598.18 - 2007 Standard;</p> <p>Radiofrequency field disturbance test conforms to the national standard; Provisions of Grade III test in GB/T 14598.17 - 2005 Standard;</p> <p>Power frequency magnetic field immunity test conforms to the national standard; Provisions of Grade A test in GB/T 14598.19 - 2007 Standard;</p> <p>Oscillatory wave immunity test conforms to the national standard: Provisions of Grade III test in GB/T 14598.13 - 2008 Standard;</p> <p>Limiting value test of conducted emission conforms to the national standard: Provisions of emission limiting value in GB/T 14598.16-2002 Standard;</p> <p>Limiting value test of radiated emission conforms to the national standard: Provisions of emission limiting value in GB/T 14598.16-2002 Standard;</p>
	<p>Technical safety</p>	<ul style="list-style-type: none"> By adopting mature dual-CPU framework and modularized protection function and applying DSP (digital signal processor) as core component, with fast-response protective action, highly reliable operation and interface of humanized design, it is easy to use and maintain <p>Supporting facility or qualification requirement</p> <p>With capability to design, produce and serve on relay protection profession of power industry;</p>

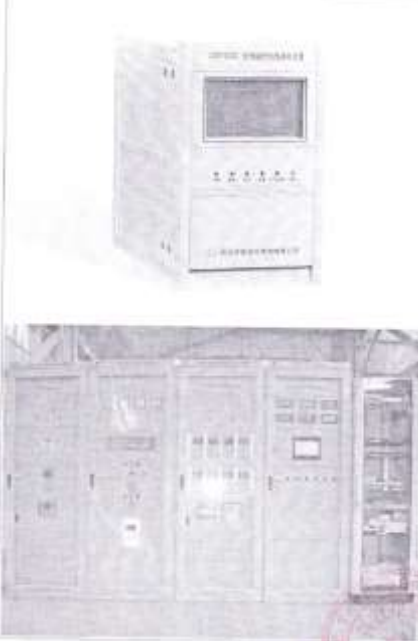

TECHNOLOGY: HYDRO

COMPANY: HNAC TECHNOLOGY CO., LTD

		<p>With corresponding testing equipment and laboratory facilities for relay protection function, including static and dynamic testing equipment</p> <p>The product has passed the inspection test of national relay protection product standard, and runs on the network for more than 3 years, with stable protection function</p>
	<p>Obstacle in achievement transformation and promotion</p>	<p>Relay protection production conforms to the current national standard in China, While it, in practical application of some area, might exist special technical requirements or other technical standard, which should be treated with discriminatory in concrete execution.</p> <p>Whether the third-party system or equipment communication interface, communication protocol is standard, whether can timely provide corresponding technical support for joint debugging;</p> <p>In policy, whether restrict to have local operational performance, whether require to have the third party certification;</p> <p>While in talent cultivation, it is mainly limited by familiar degree of relevant professional knowledge in application field for user.</p>
	<p>Transfer of intellectual property</p>	<p>The product possesses domestic proprietary intellectual property right;</p> <p>Having obtained 2 patents for invention, which are owned by the technology enterprise;</p> <p>Technology is developed independently instead of introduced or transferred from the third party.</p> <p>Relay protection product as the core product of technology owner, only provide product application and technology transfer.</p>

TECHNOLOGY: HYDRO

COMPANY: HNAC TECHNOLOGY CO., LTD

	<p>Photo caption</p>		
<p>Renewable Energy Technology Achievement Declaration</p>			
	<p>QR code</p>		
	<p>Technical provision unit</p>	<p>HNAC Technology Co., Ltd.</p>	
	<p>Contact person</p>	<p>Tan Qin</p>	<p>Submission date August 23, 2016</p>
	<p>Technical type</p>	<p>The technologies of small hydropower stations</p>	<p>Specific technical Computer monitoring, power grid automatic scheduling and power transmission and distribution technologies of small hydropower stations</p>
	<p>Tel.</p>	<p>13755182914</p>	<p>E-mail overseas@cshnac.com</p>
	<p>Technical name</p>	<p>Small and medium-sized hydropower plant or heat-engine plant with automatically monitored system SCADA.</p>	

TECHNOLOGY: HYDRO

COMPANY: HNAC TECHNOLOGY CO., LTD

	Technical provider	HNAC Technology Co., Ltd.
	Scope of application	Small and medium-sized hydropower plant or heat-engine plant with automatic monitoring
	Brief description of Technical	<ul style="list-style-type: none"> • Apply layered and distributed structure, and divide into data communication, data processing and data application. • Using network middleware technology and multithreading technology and other technologies to support the platform of cross-operating system (windows and linux) to deploy. • Functional modularity of the program; With multi machine and multi configuration with network, it can be deployed easily, operate steadily and dependently and support upgrade of one button publishing. • Provide second development interface, support ActiveX control widget and JavaScript.
	Technical information	Distinguishability of Sequence of Event (SOE) is $\leq 5\text{ms}$; Refresh cycle of real-time data is $\leq 1\text{s}$; time without failure in average of system is $\geq 50000\text{h}$.
	Business application situation	Guizhou Sandu Baiziqiao power station. It situates in river bank of Duliujiang in the form of barrage with 8-kilometer distance of county. The power station is equipped with 2 sets of 5000kW mixed flow vertical units. The operation effect of the power station is good, with high power generation benefits.
	Service conditions	Market trade; Mature technology It needs training in some degree while using with 3-5 days; Low cost of installation and use
	Contact person of business application unit /Tel./E-mail	Jin Xinsheng, Tel.: 13765463302
	Investment on equipment	Software product. For new construction, purchasing computer hardware on which software operating depends, operating system software, interchanger, and so on is enough. The investment amount is related to system scale. Engineering scale: Installed gross capability of small and medium-sized hydropower station is below 25MW.
	Expense of operation maintenance	Monitoring products operating on computer equipped with operating system consume mainly resource of electricity. While the system is in normal operation, platform-computer product consumes less than 0.3kW per hour. If consumed electric quantity for maintenance of operating ambient temperature is included in, then the power may reach to 3kw. The concrete cost need to be converted into the local electrovalence. Software product does not refer to depreciation cost, repair charge of equipment or other costs, its cost of labor and administrative fee occupy less than 0.5% of total cost.

TECHNOLOGY: HYDRO

COMPANY: HNAC TECHNOLOGY CO., LTD

	Investment payback period	From putting into use of the product to producing benefits by generating electricity, the investment payback period is less than one year.
	Other earnings	By using HZ3000 monitoring software to upgrade free, no more cost will be charged. Power station monitoring can achieve the aim of unattended on duty, remote monitoring, and reduce about 10% to 20% of human resource cost and administrative cost.
	Technical occupancy	Small and medium-sized hydropower plant in China hold a leading place in application market share.
	Market potential of the Technical	Good market prospect
	Technical advancement	Domestic advanced level
	Technical maturity	<p>Aiming at configuration software developed in water conservancy and hydropower industries, and based on data collection of client/servicer(C/S) setup and monitoring platform, its basic function includes real-time data, monitoring picture, real-time warning, historical data, report query and so on, provide powerful picture or graphic configuration with diversified and flexible second development interface used in cross platform.</p> <p>Under the cooperation of intelligent equipment in power station, the system can automatically power on or power off with one button. Auto trouble removal can help no one on duty in site and remote control. With perfect system function, it can provide high-rank functional application, such as automatic generation control (AGC) and automatic voltage control (AVC), optimize operation and instream flow monitoring and fully satisfy the need of practical application. High openness of system and protocol library plug-in interface provided expediently expands the system communication with the third-party equipment, substation or child business.</p>
	Technical applicability	<p>System can be regarded as an independent software product to service all kinds of hydropower plant, heat-engine plant without geographic restrictions and supported by multilingual visions. With high openness of system, use the form of protocol library plug-in to access equipment with the third-party intelligent equipment or system, support serial port, Ethernet, CAN and other communication ways.</p> <p>The system provides data forwarding service, supports several primary stations, business system, and guarantee communication performance and concurrent access performance. Operating environment and resources of system follow the standard of DL/T578.</p>
	Technical stability	<p>Stable and reliable system operation It is in accordance with all relevant national standards. The equipment and facilities that system relies on require suitable operating environment (for example, surrounding environment is between 18-25°C), and ±10% of fluctuation range for power source and correspondence with the standard of DL/T578 for electromagnetic compatibility.</p>

TECHNOLOGY: HYDRO

COMPANY: HNAC TECHNOLOGY CO., LTD

	<p>Technical safety</p>	<p>Monitoring software products should be no special equipment invested in. And supporting facilities should be complete. With high acceptability in home market, it is widely applied in hydropower monitoring filed. Most functions of products are developed according to domestic application, and part of customized functions is applied on specific occasions. Overseas application is mainly limited by different using behavior and focus area. Function need to be modified while practical application. There will be the procedure of cognition and acceptance for special configuration software from China</p>
	<p>Obstacle in achievement transformation and promotion</p>	<p>1) Products follow the current national standard in China, while it's practical application in some area might exists special technical requirements or other technical standard, which should be treated with discriminatory in concrete execution. 2) Whether the third-party system or equipment communication interface, communication protocol is standard, whether can timely provide corresponding technical support for joint debugging; 3) In policy, whether restrict to have local operational performance, whether require to have the third-party certification; 4) The popularization of monitoring software products has no special request over resources or capital. 5) While in talent cultivation, it is mainly limited by software user and knowledge structure of secondary development and familiar degree of relevant professional knowledge in application field.</p>
	<p>Transfer of intellectual property</p>	<p>The product possesses domestic proprietary intellectual property right; Develop technology independently As the core product of technology owner, monitoring software provides product application and technology transfer.</p>




TECHNOLOGY: HYDRO
COMPANY: HNAC TECHNOLOGY CO., LTD

	Photo caption	
		

MEASURING EQUIPMENT AND OTHERS

- Beijing Gas Energy Development Co., Ltd
- Beijing Zhong Rui Water Treatment Environmental Technology Co., Ltd
- Shanghai Anjie Environmental Protection Science & Technology Co., Ltd

TECHNOLOGY: MEASURING EQUIPMENT AND OTHERS
COMPANY: BEIJING GAS ENERGY DEVELOPMENT CO., LTD

Renewable Energy Technology Achievement Declaration																																					
Beijing Gas Energy Development Co., Ltd	<table border="1"> <tr> <td>QR code</td> <td></td> </tr> <tr> <td>Technology provision unit</td> <td>Beijing Gas Energy Development Co., Ltd.</td> </tr> <tr> <td>Submission date</td> <td>July 28, 2016</td> </tr> <tr> <td>Contact person</td> <td>Liang Chen</td> </tr> <tr> <td>Technology type</td> <td>Others</td> </tr> <tr> <td>Tel.</td> <td>13581677348</td> </tr> <tr> <td>E-mail</td> <td>Liangchen01@bgas.com</td> </tr> <tr> <td>Technology name</td> <td>CCHP technology for gas</td> </tr> <tr> <td>Technology provider</td> <td>Beijing Gas Energy Development Co., Ltd.</td> </tr> <tr> <td>Scope of application</td> <td>Beijing Gas Energy Development Co., Ltd.</td> </tr> <tr> <td>Brief description of technology</td> <td>Combined cooling heating and power supply for gas, a type of distributed energy, is the heat (cold) distributed energy supply system that is arranged in the vicinity of the user, with gas as primary energy for power generation, and use waste heat after generation.</td> </tr> <tr> <td>Technical information</td> <td>Use mature equipment: Power generation assembly, waste heat utilization equipment are mature products; Gas power generation, gas cooling, gas heating, electric cooling, cogeneration, power supply and distribution technologies are mature technologies.</td> </tr> <tr> <td>Business application situation</td> <td>Innovation base project: National demonstration project Jinyan Hotel Project: Beijing demonstration projects.</td> </tr> <tr> <td>Service conditions</td> <td>Contact person of innovation base project: Mou Guang 18101209600</td> </tr> <tr> <td>Contact person of business application unit /Tel. /E-mail</td> <td>Built in local place, with mature and reliable technology. Technical training is needed for the operation. Installation and maintenance costs are controllable</td> </tr> <tr> <td>Investment on equipment</td> <td>Major equipment are generators, direct gas turbine, boiler, electrical refrigeration and other main equipment, with various pumps, plate heat exchanger, the pressure tank, and cooling towers. The investment amount is less than of routine energy supply means, and it saves energy and increase energy utilization rate.</td> </tr> <tr> <td>Expense of operation maintenance</td> <td>The repair of equipment is divided into heavy, medium and minor one, operators conduct maintenance in case of medium and minor repair and the equipment manufacturer conduct maintenance in case of heavy repair. Labor cost of each person per year is of RMB 80,000.</td> </tr> <tr> <td>Investment payback period</td> <td>Investment payback period of project is 8-10 years.</td> </tr> </table>	QR code		Technology provision unit	Beijing Gas Energy Development Co., Ltd.	Submission date	July 28, 2016	Contact person	Liang Chen	Technology type	Others	Tel.	13581677348	E-mail	Liangchen01@bgas.com	Technology name	CCHP technology for gas	Technology provider	Beijing Gas Energy Development Co., Ltd.	Scope of application	Beijing Gas Energy Development Co., Ltd.	Brief description of technology	Combined cooling heating and power supply for gas, a type of distributed energy, is the heat (cold) distributed energy supply system that is arranged in the vicinity of the user, with gas as primary energy for power generation, and use waste heat after generation.	Technical information	Use mature equipment: Power generation assembly, waste heat utilization equipment are mature products; Gas power generation, gas cooling, gas heating, electric cooling, cogeneration, power supply and distribution technologies are mature technologies.	Business application situation	Innovation base project: National demonstration project Jinyan Hotel Project: Beijing demonstration projects.	Service conditions	Contact person of innovation base project: Mou Guang 18101209600	Contact person of business application unit /Tel. /E-mail	Built in local place, with mature and reliable technology. Technical training is needed for the operation. Installation and maintenance costs are controllable	Investment on equipment	Major equipment are generators, direct gas turbine, boiler, electrical refrigeration and other main equipment, with various pumps, plate heat exchanger, the pressure tank, and cooling towers. The investment amount is less than of routine energy supply means, and it saves energy and increase energy utilization rate.	Expense of operation maintenance	The repair of equipment is divided into heavy, medium and minor one, operators conduct maintenance in case of medium and minor repair and the equipment manufacturer conduct maintenance in case of heavy repair. Labor cost of each person per year is of RMB 80,000.	Investment payback period	Investment payback period of project is 8-10 years.
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TECHNOLOGY: MEASURING EQUIPMENT AND OTHERS
COMPANY: BEIJING GAS ENERGY DEVELOPMENT CO., LTD

	Other earnings	Energy conservation and emission reduction, it realizes coupling of distributed photovoltaic and biomass and other clean energies. Participate in voluntary emission reduction transaction.
	Technology occupancy	Market share of fuel gas triple generation technology is not high, and it is required of a professional energy company to implement investment, construction and operation. Currently, natural gas distributed market accounts for about 5%.
	Market potential of the technology	Fuel gas triple generation technology is mature and advanced, and the technology is of good economy with energy conservation and emission reduction. As of 2020, natural distributed energy will account for 30% of total energy utilization rate. As requirement for environmental protection is stricter and stricter, natural gas will gradually replace fuel coal, and there is tremendous market prospect in the future.
	Technical advancement	Beijing Gas Energy Development Co., Ltd. is a professional company for investment, construction and operation, and has experience for many years in fuel gas triple generation in Beijing, and it has operated 8 projects. Coupling multiple clean energies and provision of regional function scheme for the user. Relevant technologies are in leading position across the country.
	Technical maturity	Fuel gas triple generation technology has matured, and relevant equipment and facilities are advanced and reliable. Relevant national policies Strongly support the development of relevant industry.
	Technical applicability	Fuel gas triple generation technology is well matched with relevant equipment and integrated with process, automatic control and electrics. Linkage between various systems is made by automatic control convertible component, which realize combination of automatic control and manual control. Land occupation for energy is little and it has little influence on the environment. Conservation of primary energy cost
	Technical stability	Relevant technologies are stable, and it has experience in construction, operation and management for many years. Operators are mature and reliable.

TECHNOLOGY: MEASURING EQUIPMENT AND OTHERS

COMPANY: BEIJING ZHONG RUI WATER TREATMENT ENVIRONMENTAL TECHNOLOGY CO., LTD

Beijing Zhong Rui Water Treatment Environmental Technology Co., Ltd	可再生能源技术成果申报			
	技术提供单位	北京中睿水研环保科技有限公司 有限公司	提交日期	2016-07-26
	联系人	周雷	技术类型	其他
	电话	13641009081	邮箱	zhoulei@chnemc.com
	技术名称	全效电化学水处理设		
	技术提供方	北京中睿水研环保科技有限公司 (原属于北京中预华腾能源科技有限公司 , 现已完成技术转让)		
	适用范围	中央空调、工业等循环冷却水处理		
	技术简要说明	主要原理可分为电解氧化、电解还原、酸碱中和、离子平衡及极性水分子反应。采用电化学原理，在设备阴极区形成一个碱性环境，使水中的钙、镁离子结晶析出，保持水的硬度平衡，有效防止结垢；在设备阳极区形成一个酸性环境，把水中的氯离子转变成具有杀菌、灭藻作用的余氯，避免了细菌及军团菌的滋生。		
	技术信息	根据工程规模，可选用不同型号设备。设备长度为3500mm，高度2000mm，根据不同的循环水量，设备宽度可分为650mm、800mm、900mm。		
	商业应用情况	北京大学第三医院中央空调冷却水处理项目，安装一台； 秦皇岛明阳耀华余热发电冷却循环水处理项目，安装四台。 处理效果均满意。		

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COMPANY: BEIJING ZHONG RUI WATER TREATMENT ENVIRONMENTAL TECHNOLOGY CO., LTD

	使用条件	采取灵活多样的合作模式，可做设备销售，也可作EMC合作。技术成熟稳定，项目完成后会负责工作人员使用培训等工作。设备运行使用及维护成本较低，可为企业节省大量的运行维护成本。
	商业应用单位联系人/电话/	北京大学第三医院：15611963322 邓超
	邮箱	秦皇岛明阳耀华余热发电有限公司：15100918663 王艳辉
	设备投资	以秦皇岛明阳耀华余热发电项目水处理工程为例，项目分为两个厂区，装机容量分别为4.5MW,5MW。两个厂区各安装两套ATCH-1900设备，工程项目的投资主要包括四台全效电化学水处理设备，远传模块，房屋基础及活动板房建设，水泵水表及其他零配件安装。工程总体投资1800000元人民币。
	运行维护费用	根据设备的技术原理，设备主要能耗为电能。由于设备有显著的除垢作用，可有效去除原有设备管路积存的老垢，减少设备生产运行过程中产生的能耗，可以有效的抵除电化学反应设备产生的电耗，甚至可节省电能消耗。设备采用全自动智能操作，无需专业人员值守，节省人力开支。设备组件使用年限较长，半透膜2年更换一次，电极板3-5年更换一次即可。
	投资回收期	由于设备的技术原理，可节省100%的药剂，80%以上的水，10%的能耗，且可做到零排污。因此，项目的投资回收期由企业的药剂费用，补水费用，排污处理费用，能耗费用决定。根据以往的项目经验，项目运行后1-3年即可收回成本。

TECHNOLOGY: MEASURING EQUIPMENT AND OTHERS

COMPANY: BEIJING ZHONG RUI WATER TREATMENT ENVIRONMENTAL TECHNOLOGY CO., LTD

Renewable energy technology to declare			
Technology provides the unit	Beijing Zhong rui water treatment environmental technology co., LTD.	Submission date	2016-07-26
The contact	Wang Yang	Technical types	other
The phone	13611277908	Email	wangyang@chnemc.com
Technical name	Circulating cooling water Electrochemical water treatment for full effect		
Technology provider	Beijing Zhong rui water treatment environmental technology co., LTD. (former Beijing Zhongyu hua teng energy technology co., LTD., is now complete technology transfer)		
Scope of application	The central air conditioning, industrial circulating cooling water treatment, etc		
Technology brief description	Main principle can be divided into electrolytic oxidation, reduction, acid and alkali neutralization, ion balance reaction and polarity of water molecules. Using electrochemical principle, the device cathode area form an alkaline environment, make the water crystallization precipitation of calcium and magnesium ions, keep the balance of water hardness, effectively prevent the scale; In equipment anode area form an acidic environment, transform the chloride ions in the water into the residual chlorine, sterilization, algae has avoided and legionella bacteria breeding.		
Technical information	According to the project scale, can choose different type equipment. Equipment length is 3500 mm, 2000 mm, depending on the circulation of water, width of equipment can be divided into 650 mm, 800 mm and 900 mm.		
The commercial application of	Peking University third hospital central air conditioning cooling water treatment project, installing a;		

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		<p>Qinhuangdao MingYang yao hua waste heat power generation cooling circulating water treatment projects, installation of four.</p> <p>Treatment effects were satisfied.</p>
Conditions of use		<p>Adopt flexible mode of cooperation, can do equipment sales, also can make EMC cooperation. Technology mature and stable, after the completion of the project will be responsible for staff use training, etc. Used equipment operation and maintenance cost is low, the operation of the save a lot of maintenance costs for the enterprise.</p>
Commercial application unit contact/phone/email		<p>Peking University third hospital: 15611963322 deng chao</p> <p>Waste heat power generation co., LTD. Qinhuangdao MingYang yao hua: 15100918663 wang</p>
Investment in equipment		<p>Waste heat power generation project in qinhuangdao MingYang yao hua water treatment project as an example, the project is divided into two factory, the installed capacity of 4.5 MW respectively, 5 MW. Install two copies each of the two factory ATCH - 1900 equipment, the investment of the project mainly includes four full effect electrochemical water treatment equipment, remote transmission module, basis of their houses and prefabricated housing construction, pump water meter installation and other spare parts. The project total investment of 1800000 yuan.</p>
Run maintenance cost		<p>According to the principle of the equipment technology, equipment, the main energy into electrical energy. Due to equipment descaling effect significantly, can effectively remove the old scale of original equipment line stored up, reduce energy consumption, produced by the equipment in the process of production can be effective against electrochemical device result in power consumption, even can save power consumption. Device using automatic intelligent operation, no need professional, save manpower expenses. Equipment components use fixed number of year is longer, a semipermeable membrane replaced every 2 years, electrical plate can be replaced every 3 to 5 years.</p>




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	The payback period of investment	Due to the technological principle of the equipment, can save 100% of potions, more than 80% water, 10% of energy consumption, and can achieve the zero emission. Project investment payback period by the enterprise, therefore, agents fees, cost of filling water, sewage treatment costs, energy costs. Based on past experience in project, the project can recover the cost of 1-3 years after operation.
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TECHNOLOGY: MEASURING EQUIPMENT AND OTHERS

COMPANY: SHANGHAI ANJIE ENVIRONMENTAL PROTECTION SCIENCE & TECHNOLOGY CO., LTD

Renewable Energy Technology Achievement Declaration																																																	
Shanghai Anjie Environmental Protection Science & Technology Co., Ltd	<table border="1"> <tr> <td>QR code</td> <td colspan="3"></td> </tr> <tr> <td>Technology provision unit</td> <td>Shanghai Anjie Environmental Protection Science & Technology Co., Ltd.</td> <td>Submission date</td> <td>July 15, 2016</td> </tr> <tr> <td>Contact person</td> <td>Zeng Xiangli</td> <td>Technology type</td> <td>Others</td> </tr> <tr> <td>Tel.</td> <td>13357726798</td> <td>E-mail</td> <td>13357726798@163.com</td> </tr> <tr> <td>Technology name</td> <td colspan="3">Gas phase molecular absorption spectrometer for detection and analysis of water quality</td> </tr> <tr> <td>Technology provider</td> <td colspan="3">Shanghai Anjie Environmental Protection Science & Technology Co., Ltd.</td> </tr> <tr> <td>Scope of application</td> <td colspan="3">Shanghai Anjie Environmental Protection Science & Technology Co., Ltd.</td> </tr> <tr> <td>Brief description of technology</td> <td colspan="3">Principle is to quantitatively decompose the measured composition into gas through the chemical reaction, turn the reaction gas into the absorption tube of gas phase by means of the gas-liquid separation device, and determine the amount of the component based on Bill Longbow's law. The instrument has strong anti-interference ability, detection is quick and convenient, and can be used for detecting the ammonia nitrogen, total nitrogen, sulfur and other projects in various water quality, so as to quickly understand the situation of water pollution.</td> </tr> <tr> <td>Technical information</td> <td colspan="3">Instrument can work more than 8 hours in a continuous and stable way, the instrument measurement data display 4 absorbance value after the decimal point in real time, and the determining speed of each item is not more than 2.5 minutes / sample and so on; The size of device is 60cm long * 50cm wide * 22cm high.</td> </tr> <tr> <td>Business application situation</td> <td colspan="3">1. Beijing Center for Physical & Chemical Analysis (Beijing); 2. Detection Center of Institute of Environment and Sustainable Development in Agricultural, CAAS; 3. Zhejiang Academy of Agricultural Sciences; 4. 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application unit /Tel./E-mail	shall maintain it for free within 1 year; the maintenance cost is very low for more than 1 year, about RMB one thousand.
Investment on equipment	The instrument has no auxiliary equipment, and one-time investment is about RMB 300-600 thousand.
Expense of operation maintenance	When the system is in normal operation, the monthly consumption cost of water and electricity is about RMB 100, the expenses of labor are one employee's wages, equipment depreciation expenses are about RMB 30-60 thousand/year, material fee is about RMB 1000/year, repair fee is about RMB 3000/year, and the management fee is not required.
Investment payback period	Static investment payback period is about 3-5 years.
Other earnings	Through the detection and analysis of water quality, the water quality problems of biogas engineering and other projects can be timely found, so as to ensure the smooth progress of the project.
Technology occupancy	This instrument was awarded the excellent new product award for scientific instrument in instrument industry in 2015; Technology is domestically leading, with about 30% of the segment market share.
Market potential of the technology	The technology has a high maturity and has been widely used in 33 national and local standards, covering environmental protection, agriculture, water conservancy, ocean, various large enterprises and many other customer groups; there are about 3000 domestic environment monitoring units, 2000 agriculture monitoring units, 10,000 water conservancy monitoring units, 30,000 enterprises and units in various kinds, many colleges and scientific research institutions in various kinds and about 440,000 target customers; the technology will have a market potential of 16 billion or so within industry field as of 2020.
Technical advancement	It is confirmed in Science and Technology Novelty Search Consultation Report of 2016 issued by Chinese Academy of Sciences Shanghai Science and Technology Novelty Search Consultation Center that: AJ-3000plus gas phase molecules absorption spectrometer produced by Shanghai Anjie Environmental Protection Science & Technology Co., Ltd. is a full automatic gas phase molecules absorption spectrometer, with single built-in ultraviolet source, and all items such as ammonia nitrogen, nitrate nitrogen, nitrite nitrogen, Kjeldahl nitrogen, total nitrogen and sulfide can be accurately measured; it has on-line oxidation system of ammonia nitrogen, ammonia nitrogen can convert to nitrite through auto-oxidation, and there is no need for manual addition of oxidizing agent; It is equipped with built-in air purification carrier gas system with gas supply under ordinary pressure by air, and there is no need to apply high pressure (nitrogen) air source; Sample injector is arranged with homogeneity blowing equipment, and the samples with sediment or muddy matter can be blended during sample injecting, which makes sampling is representative and result measured is reliable; It is equipped with built-in cry drying equipment, dehydration effect is good, and there is no any need to apply desiccant, which saves test cost and decreases interference. It is not seen of coverage that is

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		absolutely same as the project method home and abroad, therefore, the project is of novelty. After analysis, the project comprehensive technology has reached leading level in our country.
	Technical maturity	The equipment has single standard calibration function, on-line attenuation function, on-line oxidative system, on-line dehumidification system, air purification carrier gas system, precise constant temperature control system, ammonia nitrogen on-line decomposition module and other functions; the instrument realizes one-button operation, and it realizes convenient operation of obtaining data in 45 seconds without the need of any pretreatment,
	Technical applicability	The technology can be applied in methane engineering detection, agricultural environment monitoring, environment monitoring, hydrologic monitoring, ocean monitoring, aquaculture, food processing, petrochemical engineering and other fields, free of any limitation of time and space.
	Technical stability	The technology can maintain stable operation in the laboratory under normal temperature, stability zero drift of 0.0003A bs, and it can operate for over 8 hours continuously and stably.
	Technical safety	The technology has been widely used in various fields since 2000 and included in standard of national Ministry of Environmental Protection in 2005; with an application accumulation of 16 years, it has been applied in 33 standards and taken as national measurement standard, and it has high market acceptability.
	Obstacle in achievement transformation and promotion	Currently, the technology is still required to solve capital shortages by financing, to further improve instrument technology, enlarge production scale, increase productivity and meet market demand.
	Transfer of intellectual property	The company currently has 2 patents for invention (substantive examination), 14 utility model patents, 27 software copyright registrations, and patents under declaration include 1 patent for invention, 3 utility model patents, and there are 47 patents and software copyrights in total.
	Photo caption	

WASTE-TO-ENERGY

- Zhejiang ECO-WASTE Technology Co., Ltd



Zhejiang ECO-WASTE Technology Co., Ltd	可再生能源技术成果申报 Application of Renewable Energy Technological Achievement			
	技术提供单位 Technology provider	浙江泰来环保科技有限公司 Zhejiang ECO-WASTE Technology Co.,Ltd.	提交日期 Date Submitted	2016-06-20
	联系人 Contact	范婷婷 FAN Tingting	技术类型 Technical type	生物质能利用技术 Biomass energy utilization technology
	电话 Tel	18968259188	邮箱 Email	gma@eco-waste.cn
	技术名称 Technical Name	固体废弃物立式旋转热解气化技术 Solid Waste Vertical Rotary Gasification Technology		
	技术提供方 Technology provider	浙江泰来环保科技有限公司 Zhejiang ECO-WASTE Technology Co.,Ltd.		
	适用范围 Scope of application	中小规模生活垃圾、医疗垃圾、危险废弃物 small and medium scale of municipal solid waste, medical waste, and hazardous waste		
	技术简要说明： Brief description of the technology	<p>该技术采用热解气化原理对固体废弃物处理，主要由热解气化室和可燃气体燃烧室组成，通过先热解气化、后富氧燃烧的二段式焚烧处理方式，无需任何辅助燃料的条件下，具有“热效率高、一燃室温度高、热灼减率低、飞灰排放量小、二噁英排放浓度低”等技术优势。</p> <p>The technology applies the principle of gasification to disposal the solid waste. The gasification system mainly consists of the gasification chamber and the combustible gas burning chamber. The two-stage manner first gasifier the solid waste and then burn the syngas. This technology does not need any additional fuel during the operation. It also has technical advantages like “high thermal efficiency, high temperature in first combustion chamber, low loss on ignition, low emission of fly ash & dioxin”.</p>		
	技术信息 Technical information	一燃室燃烧层温度：950°C-1050°C，二燃室温度950°C-1100°C、烟气停留时间≥2s，残渣热灼减量≤3%，单炉处理能力5-150t/d。		

		Temperature of burning zone in first combustion chamber: 950°C-1050°C; Temperature of secondary combustion chamber: 950°C-1100°C; Flue gas retention time≥2s; Loss on ignition of residue ≤3%; Capacity of each gasifier 5-150t/d.
商业应用情况 Commercial application		已在国内外十几个城市各类固废处理工程中得到成功应用，如伊朗德黑兰2×100t/d生活垃圾热解气化发电厂、安徽省阜阳市5t/d医疗垃圾处理工程。 The technology has been applied in several cities both in China and abroad. For instance, Iran Tehran 2×100t/d MSW Gasification Power Plant, Anhui Fuyang 5t/d Medical Waste Disposal Project.
使用条件 Instruction		公司可提供成套热解气化处理线技术装备，需要在当地投建。技术成熟可靠，运行时需系统的培训。由于其结构简单、占地面积小、操作便捷、维护方便、运营能耗低，垃圾处理时无需任何辅助燃料，投资和运行成本较低。 ECO-WASTE can provide complete sets of gasification disposal equipment which need to invest & construct in local area. The technology is mature and reliable. Employees should have a systematic training before the operation. The system has compact structure which requires less room. It also has long service life and easier to carry the operation and maintenance. Therefore, both the investment and cost of the system is relative low than the other technology.
商业应用单位联系人 /电话/邮箱 Relative Contacts		(1) 洪洞县民生垃圾综合处理有限公司，卢为民/18635766600。 (2) 伊朗德黑兰2×100t/d生活垃圾焚烧发电厂，Esmaili (伊思马力) /0098-21-88368077-8。 1) Shanxi Hongdong MSW Comprehensive Treatment Co. Ltd. LU Weimin/18635766600 2) Iran Tehran 2×100t/d MSW Gasification Power Plant, Esmaili /0098-21-88368077-8
设备投资 Equipment Investment		以日处理生活垃圾300吨项目为例，配置两条150t/d热解气化处理线，一台4.5MW汽轮发电机组，主要设备包括：步进式给料机、垃圾抓斗等收储给料系统；立式旋转热解气化炉、二燃室等热解气化焚烧系统；余热锅炉及其附属设备等余热利用系统、除酸塔、布袋除尘器等烟气净化系统；汽轮发电机组及其辅助设备；灰渣处理系统；垃圾渗滤液处理系统；自动控制系统及其他附属设备等。该项目总投资约1.4亿元，其中设备购置及安装费为8660万元。 Take the 300t/d MSW gasification power plant project for example, there will be two 150t/d gasification disposal lines, and one 4.5WM steam turbine-generator set. Main equipments include: the waste feeding system such as step-by-step feeding machine, grab type elevator; the gasification system such as vertical rotary gasifier and secondary combustion chamber; the waste heat utilization system such as the waste heat boiler and its accessory equipment; the flue gas purification system such as

		<p>deacidification tower and bag filter; the steam turbine-generator set and its accessory equipment; slag disposal system; the leachate treatment system; automatic control system and its accessory equipment. Total investment of this project is about RMB 140 million, which includes equipment purchase and installation costs RMB 86.6 million.</p>
	<p>运行维护费用 Operating and maintenance costs</p>	<p>以日处理生活垃圾300吨发电项目为例，年处理垃圾10.95万吨，除财务成本外，吨垃圾处理成本为131元/吨（含发电成本），其中原材料费用14.81元、水电等燃料及动力费8.84元、人工费46.03元、设备折旧费44.45元、设备维修费7.61元、管理费9.20元。</p> <p>Take the 300t/d MSW gasification power plant project for example, the project will disposal MSW 109.5 thousand ton each year. Except the financial cost, the waste disposal cost is 131 RMB /t (includes the generation cost). The cost includes raw material cost (RMB 14.81); cost of water, electricity, fuel and energy (RMB 8.84); labour costs (RMB 46.03); depreciation expense of equipment (RMB 44.45); maintenance cost (RMB 7.61); management cost (RMB 9.20).</p>
	<p>投资回收期 Investment recovery period</p>	<p>以日处理生活垃圾300吨项目为例，经营收入包括售电收入和垃圾处理费收入两部分。项目年处理垃圾10.95万吨，垃圾补贴单价按100元/吨算，年垃圾处理费收入1095万元。项目年上网电量2963.07万度，上网电价为0.65元/度，年均上网售电收入1646.15万元。静态投资回收期（含建设期）10.48年。</p> <p>Take the 300t/d MSW gasification power plant project for example, the operating revenue includes electricity sales revenue and the waste disposal fee revenue. The project will disposal MSW 109.5 thousand ton each year, at waste disposal fee RMB 100 per ton, the waste disposal fee revenue will be RMB 10.95 million. On-grid energy of the project is 29,630,700 KWh, at feed-in tariffs RMB 0.65/KWh, the electricity sales revenue will be RMB 16,461,500. Payback period of static investment (includes construction period) is 10.48 years.</p>
	<p>其它收益 Other income</p>	<p>垃圾通过热解气化焚烧，实现垃圾处理无害化、减量化、资源化目标。以日处理生活垃圾300t/d项目为例，每年可上网电量约3000万度，折合标煤约22172.86t/a，可减少CO₂排放8.07万吨，减少SO₂排放22.7吨，减少NO_x排放45.5吨。另外，焚烧系统采用灰、渣分排系统，热解气化炉产生的炉渣由于不属于危险废弃物，因此可以综合利用，用于铺路或运至制砖厂制砖。除渣系统设有除铁器，由除铁器分离出的废金属打包后装车送到有关物资回收部门，综合利用。</p> <p>The waste disposal will realize the reducing, recycling and reusing through the gasification technology. Take the 300t/d MSW gasification power plant project for example, on-grid energy of the project is about 29 million KWh, which equals to standard coal 22172.86t/a. This will reduce CO₂ emission 80.7 thousand ton, reduce SO₂ emission 22.7 ton, and reduce NO_x emission 45.5 ton. Besides, the gasification system discharges the ash and slag separately. Slag after gasification does not belong to</p>

		<p>hazardous waste, so it can make comprehensive utilization such as paving or brick making. Slag removal system also has magnetic separator to remove the waste metals from slag. These waste metals can also be recycled.</p>
	<p>技术占有率 Technology Share</p>	<p>目前全国垃圾热解气化焚烧厂中，泰来环保占其中60%以上的比例；同时在全国的医疗垃圾焚烧领域，泰来环保的热解气化焚烧装置市场占省会城市的50%以上。</p> <p>ECO-WASTE now accounts over 60% of waste gasification plant in China. Meanwhile, in Chinese medical waste gasification filed, ECO-WASTE also accounts over 50% in the market of capital city.</p>
	<p>技术市场潜力 Market potential of the technology</p>	<p>中小城市在选择焚烧炉型中最关心两个问题是投资金额和环保，相比较而言，以泰来环保立式旋转热解气化技术建设的焚烧工程建设成本比同吨位目前主流的炉排炉低20-30%左右，其主要成本节省的地方是由于占地面积小，用钢量和土建成本较少，同时热解气化技术运行费用也是三种技术中最低的。在环保问题上，由于立式旋转热解气化技术燃烧充分，在环保排放指标上是三种技术中最低的。因此，对于日处理垃圾吨位较低的中小型城市、县级城市、乡镇、岛屿等地区，该技术的低成本和环保性具有很大的竞争力。</p> <p>The most two concerns of small-medium cities in choosing the type of incinerator are investment and environmental protection. Project construction investment of ECO-WASTE's "Vertical rotary gasification technology" is 20-30% lower than the investment of grate furnace technology. This is because of the gasification technology requires less room, less steel during the construction, it also requires less costs during the operation. On the environmental protection, ECO-WASTE's technology has great environmental emissions targets. Therefore, the economy and Environmental Protection of the technology has great competitiveness in the field of small-medium citie, town, island area's waste disposal where the waste quantity is relative low.</p> <p>在2014年11月18日召开的全国农村生活垃圾治理工作电视电话会议上，住房和城乡建设部部长陈政高提出，全面启动农村生活垃圾5年专项治理，即到2020年，使全国90%村庄的生活垃圾得到处理，并形成农村生活垃圾治理的长效机制。因此，公司热解气化焚烧技术将迎来巨大的市场契机。</p> <p>During the National rural household waste management work meeting on Nov.18, 2014, minister of Ministry of Housing and Urban-Rural Development said the rural household waste 5-year special management will begin overthrough the country. Household waste of 90% rural area will be treated by 2020. Market potential of ECO-WASTE's gasification technology is great.</p>
	<p>技术先进性 Advantages</p>	<p>本产品通过中国机械工业联合会科学技术成果鉴定，专家组一致认为：针对我国固体废弃物处置领域突出的环境问题，开发了两段式热解气化焚烧炉。该炉采用分级燃烧、叠片式旋转炉排、固定炉盖、</p>

	<p>旋转炉体等关键技术和装备，克服了立式炉进料均匀性和连续排渣两大技术难题，使进、出料均匀，保持了运行工况的相对稳定。该技术装备具有处理效率高、运行能耗低、操作便捷、维护方便、使用寿命长、设备占地面积小、造价低等特点；本装备焚烧机理先进，有利于控制焚烧产生的二次污染。工程应用表明运行工况及污染物排放值均符合《生活垃圾焚烧污染控制标准》（GB18485-2014）及《危险废物焚烧控制标准》（GB18484-2001）要求，实现了生活垃圾、医疗垃圾等固体废弃物的无害化、减量化和资源化处理。鉴定委员会认为，该项成果总体达到了国内领先、国际先进水平。</p> <p>The product has been passed the scientific & technological achievement identification from China Machinery Industry Federation. The gasifier applys some key technology & equipment such as staged combustion, rotating grate, fixed furnace cover, rotating grate furnace. These realize evenly feeding in vertical furnace and continous slag discharging which make the operation condition more stable. The equipment has the advantages of high disposal efficiency, low operation energy consumption, easy operation and maintenance, long service life, small land occupation area and low investment. The system can also control the secondary pollution, and the emission meets national standard “Standard for pollution control on the municipal solid waste incineration” (GB18485-2014) and “Pollution control standard for hazardous wastes incineration” (GB18484-2001). It realize the reducing, recycling and reusing of MSW and medical waste.</p>
<p>技术成熟度 Technological maturity</p>	<p>立式旋转热解气化系统主要由行车抓斗、立式旋转热解气化焚烧炉、出渣机、余热锅炉、烟气除酸塔、布袋除尘器、引风机、烟囱组成。该技术改变了传统的直接焚烧处理工艺，实现垃圾先热解气化，后富氧燃烧的二段式焚烧处理工艺，使垃圾焚烧产生的大气污染物、粉尘、二噁英类物质显著减少；并独创立式旋转设计，巧妙地解决了布料的均匀性和连续排渣的技术难题，填补国内外中小吨位生活垃圾焚烧处理的空白，以满足国内县级城市、乡镇、海岛等地区规模的生活垃圾、医疗垃圾等固体废弃物的无害化、减量化、资源化处理需求。产品本身是自动化水平较高的成套装置，配备有电气自控系统（由DCS自控系统和手动备用操作系统组成）、烟气在线监测系统。</p> <p>The whole system includes grab-crane, vertical rotary gasifier, slag remover, waste heat boiler, deacidification tower, bag filter, induced draft fan, and chimney. Different from traditional incineration technolody, ECO-WASTE’s gasification technology first gasifier the solid waste and then burn the syngas, which significantly reduce the fly ash and dioxin during the combustion. The vertical rotary desigh realize evenly feeding in vertical furnace and continous slag discharging. This technology fills the technological gaps in medium and small size garbage disposal of China. It also meets the processing demand of MSW & medical waste in small-medium citie, town, island area. With electric automatic</p>

		control system (DCS Control System & manually backup operating system) and CEMS, the system has relative high automatic level.
	<p>技术适用性 Technical applicability</p>	<p>本技术产品主要适用于中小规模生活垃圾、医疗垃圾、危险废弃物焚烧处置及利用水泥窑生产过程协同资源化处理城市及产业废弃物。</p> <p>This technology is mainly applied in small and medium tonnage of MSW, medical waste, hazardous waste disposal as well as cement MSW coprocessing.</p> <p>垃圾焚烧处理设备行业是一个由多个行业交叉融合的行业，与上下游存在较高的联动性。上游行业的主要影响体现在企业采购成本的变化上。若上游产品供应趋紧则公司原材料价格上升，可能降低本公司的毛利率；若上游产品供应趋稳，则原材料价格回落，公司垃圾焚烧处理系统设备毛利率可能提高。随着国内上游行业的不断发展和设备国产率的不断提高，垃圾焚烧处理系统所需的大多数原材料都可以从国内得到充足的供应。下游行业对垃圾焚烧处理行业的发展具有较大的牵引和驱动作用，它们的需求变化直接决定了行业未来的发展状况以及行业市场容量、消费需求和消费力。</p> <p>Industry of waste incineration treatment equipment spans multiple industries. Upstream industry will influence the purchasing costs. When price of raw material increasing, gross margin of the company may be decreased. On the contrary, gross margin may be increased if price of raw material decreased. Now most raw materials of ECO-WASTE's gasification equipments have enough supplies in China. Demand of downstream industry influences the future development, market capacity and consumption of this industry.</p> <p>垃圾处理设施的建设和普及也受地方经济发展程度的影响，根据《“十二五”全国城镇生活垃圾无害化处理设施建设规划》，到2015年，全国城镇生活垃圾焚烧处理设施能力达到无害化处理总能力35%以上，其中东部地区达到48%以上。因此，前期阶段东部沿海地区会是小吨位垃圾焚烧处理设施建设的主市场。</p> <p>Construction and popularization of the waste disposal equipments are also influenced by local economic development degree. According to "Twelve-Five" national construction planning of urban household garbage treatment facilities, capacity of urban household garbage incineration treatment facilities occupy 35% in household garbage treatment in China, and eastern region takes for more than 48%. Therefore, main market of small size waste incineration facilities will be Chinese eastern coastal region in early stage.</p>
	<p>技术稳定性 Technical stability</p>	<p>该技术在工程运行过程中受到客户的一致好评，项目运行稳定，操作便捷，维护方便，投资和运行成本较低。</p>

		<p>The project operates steady. With easy operation and maintenance as well as low investment and operation costs; this system has won high praise from customers.</p> <p>济南2×100t/d生活垃圾焚烧项目至今已稳定运行近8年，年资源化处理生活垃圾7.2万吨，污染物排放经权威检测机构测试，均低于国家标准排放要求。伊朗德黑兰市200t/d生活垃圾焚烧发电项目已建成投运，伊朗副总统Ebtekar、德黑兰省省长、德黑兰市市长及其他内阁成员一起参加了2015年2月9日的点火落成仪式，在中东地区引起很大反响，该项目稳定运行至今一年多。</p> <p>Jinan 2×100t/d MSW gasification project runs stably for 8 years, with MSW disposal capacity 72 thousand each year. After testing, all the pollutant emission indexes are better than the national standard. Iran Tehran 200t/d MSW gasification power plant project has successfully launched on Feb. 9th 2015. A number of city and state officials, including Iranian Vice-President, Tehran's Mayor attended the completion ceremony. The project has been stably operating more than one year.</p>
	<p>技术安全性 Technical Security</p>	<p>泰来环保是目前国内固体废弃物热解气化焚烧领域规模最大、技术最优的环保公司，公司拥有一支非常完整的产品研发、设计、销售、工程实施、安装调试、运营管理及售后服务的高素质队伍。同时公司垃圾处理产业链条完整，除涉及垃圾焚烧炉外，还涉足后续布袋除尘、二噁英净化、垃圾渗滤液处理，产品可相互配套，技术可相互支持，服务更加完善齐全，尤其在整体工程方案解决中优势明显；另外，望春工业园区占地50亩的产业基地不仅是焚烧系统设备的加工基地，也是焚烧系统备品备件等的加工、服务基地，可保证售后服务所需物品的及时供应及质量。</p> <p>ECO-WASTE is the leading environmental protection company with the best technology of solid waste gasification technology in China. The company engaged in core equipment and technologies R&D, engineering design, selling, project implementation, as well as operation & maintenance. ECO-WASTE has complete industrial chain on waste disposal, besides the waste gasifier, it involves the bag filter, dioxin purification, leachate treatment. All the products and technology can mutual support to provide more complete service. The 8.3 acres of R&D center in Ningbo Wangchun Industrial Zone is not only manufacturing base of gasification equipments, but also manufacturing and service base of relative spare parts. These will ensure the after sales service.</p>
	<p>成果转化推广障碍 Prometing barriers in achievement transformation</p>	<p>技术实力、资金实力和融资能力是从事垃圾焚烧处理企业迅速抢占市场的制胜关键。在政策层面，政府对环境保护的重视程度不断提升，国家电价政策的发布将有利于保障生活垃圾焚烧行业的长期和健康发展，各地陆续发布的生态环境补偿等举措有望缓解生活垃圾焚烧厂的选址矛盾，因此不存在政策壁垒。国有固废处理企业在地级市的固废处理项目的争夺中，凭借其较强的股东背景和较强的政企合作关系占据有利地位；而对于财力有限的县级市项目，规模相对较小的民营企业凭借其较强的技术实力和成</p>

		<p>本控制能力“脱颖而出”。泰来环保的立式旋转热解气化技术填补了国内中小规模垃圾焚烧处置的技术空白，由于该技术具有独特的环保优势和经济优势，现已荣获国家环保部科学技术二等奖、中国机械工业科学技术二等奖、国内装备制造业重点领域首台（套）产品、并入选国家工信部、科技部、环保部《国家鼓励发展的重大环保技术装备目录（2014版）》。目前，公司的市场订单已经达到13.5亿元，且已出口海外。因此，该技术现已获得行业、专家和市场的普遍认可，具有国内外广阔的市场空间。</p> <p>Technology strength, financial strength, and financing capability are three key points for waste incineration disposal company to seize the market. In policy terms, government pays more attention to environmental protection. National electrovalence policies will be helpful to the long-term and healthy development of MSW incineration industry. More regions issue relative policies to ease the contradiction of MSW incineration power plant location selection. For the projects in prefectural-level cities, the company can get favorable position in competition with its long-term accumulated experience and resources. For those projects in county-level city, the company is more competitive because of its technical strength and cost control ability. ECO-WASTE independently researched and developed "Vertical Rotary Thermal Gasification Incineration Technology" of the company fills the technological gaps in medium and small size garbage incineration disposal of China. With environmental and economic advantages, this technology has been awarded several national awards such as the "2nd prize of Science& Technology" by National Ministry of Environmental Protection and "2nd prize of Scientific and Technological Progress" by China Machinery Industry Federation. It has also been endorsed among the three most advanced Chinese equipment & machine list which enjoy the highest recommendation from Chinese government. For now, the order has reached RMB 1350 million, and the products have been exported to overseas. The technology has been widely recognized by the, experts, market and industry. It has a broad market space</p>
	<p>知识产权转让 Intellectual property rights conveyance</p>	<p>该技术由浙江泰来环保科技有限公司自主研发，拥有该产品技术的绝对所有权，目前已申请国家专利23项，其中发明专利8项（4项已授权），实用新型专利15项（均已授权）。目前无转让意愿。</p> <p>This technology is independently R & D and owned by Zhejiang ECO-WASTE Technology Co.,Ltd.. ECO-WASTE has applied 23 national patents, which include 8 invention patents (4 patents have been granted), 15 utility model patents (all of 15 patents have been granted). With no willingness to transfer.</p>




WIND

- Shanghai Ghrepower Green Energy Co., Ltd
- CSIC Chongqing Haizhuang Windpower Equipment Co., Ltd



TECHNOLOGY: WIND

COMPANY: SHANGHAI GHREPOWER GREEN ENERGY CO., LTD

Renewable Energy Technology Achievement Declaration																																																	
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Brief description of Technical	- Principle: Use natural wind to drive the generator to generate electric power - Functions: Solve the problem of power supply in the area without electricity - Technical features: Long service life (20 years), low wind speed start-up, high power capacity and protective measures - Key equipment: Wind power generator, controller, inverter																																																
Technical information	- Zhiyuan wind power generator unit product line is 5KW-100KW, and divided into FD5/FD8/FD16/FD21/FD25 - The height of the conventional tower: 9 meters -36 meters																																																
Business application situation	-1. Harbin Power Jiangsu Dafeng New Energy Oceanographic Engineering Domestically initial -2. Italy 60kW Business Grid Connected Project (a total of 50) -3. China Mobile Base Station Power Supply Project (a total of 8,000+)																																																
Service conditions	- The market transactions and local investment and construction are the current business models - For installation and use, our company will provide the instruction and be responsible for training. - Annual maintenance costs account for 1-3% of the total input, depending on the local labor level																																																

TECHNOLOGY: WIND

COMPANY: SHANGHAI GHREPOWER GREEN ENERGY CO., LTD

Contact person of business application unit /Tel/E-mail	- China Mobile Fang Yun 15000395706 - Italy Business Grid Connected Project Wang Hailin 18602112864
Investment on equipment	- Revenue includes: 1. Equipment funds 2. Project construction funds 3. Land grant and lease funds 4. Interest on bank loans (if any) - As the wind power project has personalized, customized features, the equipment investment funds shall be determined according to the demand of the project and the program.
Expense of operation maintenance	- Water and electricity is not used while the system is running. - Labor cost, repair cost, management fee shall be calculated in routine maintenance, which has been explained as the above - Depreciation expense
Investment payback period	-10 5-6 years
Other earnings	-11 Environmental protection and low pollution income
Technical occupancy	-12 /
Market potential of the Technical	-13 /
Technical advancement	-14 Permanent magnetic direct-drive, gearless box
Technical maturity	-15 Technology is mature, safe and reliable
Technical applicability	-16 /
Technical stability	Shipments in bulk in Japan, Europe and North America
Technical safety	-18 Get SWCC, IEC, class NK and other certificates
Obstacle in achievement transformation and promotion	1. The type of the equipment needs to be equipped with national or industry certification. Hence, Shanghai Zhiyuan products have passed a number of certifications from many countries and the industry. 2. The type of equipment requires the import license from local government, and some government requires wind turbine products to be localized.
Transfer of intellectual property	-19
Photo caption	

TECHNOLOGY: WIND

COMPANY: CSIC CHONGQING HAIZHUANG WINDPOWER EQUIPMENT CO., LTD.

<p>CSIC Chongqing Haizhuang Windpower Equipment Co., Ltd.</p>	<p style="text-align: center;">可再生能源技术成果申报</p> <p>1、 技术提供方（拥有知识产权或具备工程设计建造能力，列出具体单位全称）</p> <p>CSIC（Chongqing）Haizhuang Windpower Equipment Co.,Ltd.</p> <p>2、 适用范围（所属行业、技术适用的限定条件，限30字）</p> <p>Renewable Energy, suitable for remote and isolated areas where are rich of renewable energy resource.</p> <p>3、 技术简要说明（原理、功能、技术特点及关键设备，限150字）</p> <p>HZ(HaiZhuang) Smart Micro-Grid, designed for renewable energy utilization, features in integrated DC-bus structure. The energy supply and storage is taken place in DC-bus side. The HZ Smart Micro-Grid is compatible with most of renewable energies and fossil energies. The structure of this micro-grid provides great stability to the users. The grid remains stable in case of full load cut in and cut out, and it can shift between energy supplies seamlessly. The energy manage controller of HZ Smart Micro-Grid maximizes the utilization of renewable energy and maintains the stability of the system.</p> <p>4、 技术信息（技术参数和设备体积，限60字）</p> <p>The maximum capability of a single unit is 2MW. Multiple units can be grouped parallel. The voltage of DC bus is 560V-750V, and 200V to 400V on AC bus, between 3 phases lines. Frequency 50/60Hz. This Micro-Grid is designed in modularization method and compressed in container. Multiple energy resources provide power simultaneously.</p> <p>5、 商业应用情况（1~4家示范工程名称、所在地、工程规模及效果，限60字）</p> <p>The demonstration project of HZ Smart Micro-Grid is located in Yadan international geopark, Dunhuang, Gansu, China, used as an isolated island grid. The user includes the management office of the park, several restaurants, the police office, and an in-building hotel. The total load is about 400kW/500kVA in around 1km distance.</p> <p>6、 使用条件（市场交易还是当地投建？是否成熟技术？使用是否需要系统培训？安装、使用和维护成本情况？限120字）</p> <p>This micro-grid system is stable and reliable, easy to use. Only the workers on duty need a basic operation and maintenance train. The cost of installation, usage, and maintenance is based on the proportion of different energy sources. We can provide</p>
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TECHNOLOGY: WIND

COMPANY: CSIC CHONGQING HAIZHUANG WINDPOWER EQUIPMENT CO., LTD.

the following services: 1 A whole solution to meet user need; 2 Technology transfer; 3 Devices producing; 4 Investing to building and running a micro-grid.

7、商业应用单位联系人/电话/邮箱

Contact : Ye Wang

Tel : 18696661305

e-mail : wangye_hzfd@aliyun.com

8、设备投资

The main devices of HZ Smart Micro-Grid include power generating devices, power distributing devices and storages. The price of power distributing devices is about \$4,000 USD per kW; the price of storage is about \$800 USD per kWh; the price of power generation devices is about \$2,000 USD per kW for wind turbines and \$2,200 USD per kW for PV w/o batteries. All the prices above cover construction costs.

Take the demonstration project in Yadan as an example. Total load 400 kW, design life 20 years, the system consists of three 200kW wind turbines, 100kW PV, lead-acid battery 1440kWh. The total cost of this system is about \$4million USD, of which \$1.19m USD for three wind turbines including blades, nacelle and tower, \$0.21m USD for PV unit, \$1m USD for storage and \$1.6m for power distributing devices. Maintain cost is about \$0.16m each year. The system generates 1.6 million kWh (which depends on the renewable energy resource) each year. Suppose the power price is \$0.43 USD per kWh, it's 7 years to recover the cost.

9、运行维护费用

The maintenance cost for wind turbines is about 4% of the total price of wind turbines. For PV unit excluding batteries, the maintenance cost is mainly consisted of labor cost.

10、投资回收期

The investment payback period depends on the resources of wind and sunlight, construction costs, electricity price, Load saturation level, etc. Stable investment recovery period is about 8 to 10 years.

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	<p>11、 其它收益</p> <p>HZ Smart Micro-Grid produces stable and reliable power supply 24 hours by renewable energies controlled by a central monitoring and controlling system, cutting off 50% costs comparing with diesel power generator.</p> <p>12、 技术占有率（指该技术2015年在国内行业同类技术，包括未采用任何技术的情况，生产的产品或处理规模中所占市场总量份额百分比）</p> <p>HZ Smart Micro-Grid is the only high-power commercial pure isolated micro-grid system around China, which can fit various harsh environments such as sea island, desert and prairie.</p> <p>13、 技术市场潜力（指在结合技术成熟度、市场容量、技术经济性、资源和能源约束条件下，分析该技术到2020年在产业或领域内推广可挖掘的市场潜力，或达到的规模）</p> <p>It's an important technology to improve the life quality of the inhabitants lived in low grid-cover-rate areas such as sea island and some remote areas in Africa.</p> <p>14、 技术先进性（描述技术的创新性，在国际和国内同类技术中所处的地位、水平）</p> <p>HZ Smart Micro-Grid is the first integrated DC-bus micro grid that is commercially used. The demonstration project in Yadan is the first isolated micro-grid that using wind power as the main power supply. The main feature of this system is stability and compatibility. We have got two patents, and four utility model patents. The innovation points are shown below:</p> <p>1 Integrated DC-bus structure; 2 Inverters to separate power generating devices and loads, for safety reason; 3 Storage that connected to DC-bus directly, affording a rapid adjustment to the DC-bus voltage; 4 Inverters that working parallel to provide reliability; 5 Smart Controlling Algorithm that give high priority to renewable energies to reduce pollution; 6 modularized and compatible design, which makes the system easy to expand capability.</p> <p>15、 技术成熟度（描述技术工艺路线、设备及系统集成的完善程度）</p> <p>The demonstration project in Yadan has ran for 2 years stably. The technology is mature.</p> <p>16、 技术适用性（描述该技术在转化推广过程的适用范围、与工艺技术上下游匹配程度、受地域、规模、环境、资源能源等因素的限制条件）</p>
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TECHNOLOGY: WIND

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	<p>1. Haizhuang co. Ltd is a subsidiary company of CSIC. The technical specifications, human resource, manufacturing ability and inspection technology of CSIC is competitive over China. Therefore, the main devices of HZ Smart Micro-grid can be supplied through the stable supply chain in CSIC.</p> <p>2. HZ Smart Micro-grid can be used in various environment including island and desert. The system configuration is depending on the renewable resources such as wind, sunlight, water, biomass, etc.</p> <p>17、 技术稳定性（描述该技术在工程运行过程中能否保持稳定，对环境、技术参数等干扰的敏感程度）</p> <p>The demonstration project in Yadan has ran for 2 years stably. During this period, the highest temperature reaches 50°C , and the lowest temperature gets to -20°C. The extreme wind velocity is up to 30m/s and more than 20 sand storm days.</p> <p>18、 技术安全性（描述该技术在成果转化和产业化过程中面临的实用性、配套设施是否完善、市场接受度等系统风险）</p> <p>The system fit for various environments and different resource conditions due to compatibility and stability. It has a wide market. The main devices of the system are mature products which can be all supplied by CSIC supply chain. This system is easy to use, improving the life quality of the residents lived in remote areas.</p> <p>19、 成果转化推广障碍（描述该技术在成果转化和推广过程中需解决的技术问题、政策壁垒、资源或资本制约、人才培养、其他限制条件等障碍大小等）</p> <p>The major limitations for Africa usage are short of fund, imperfect law and policy, instable politics.</p> <p>20、 知识产权转让（是否具有国内自主知识产权，是否取得的专利等，技术拥有方性质；引进技术关键环节、工艺、设备的国产化程度；技术拥有方的转让意愿、技术产权转让机制、政策途径是否顺畅等）</p> <p>Haizhuang Co. Ltd reserves independent intellectual property rights of this technology. All the key parts of the system can be manufactured domestically. We have got two patents, and four utility model patents. To support underdevelopment areas, we are willing to transfer the IP right. There's no constrain nor obstacle in policy for transferring.</p>
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