

# **Circular of the National Development and Reform Commission on Printing and Distributing Catalogue for the Guidance of the Industrial Development of Renewable Energy**

Fa Gai Energy [2005] No. 2517 Reform and development commissions and economic and trade commissions of all provinces, autonomous region, municipalities directly under the Central Government and cities specifically designated in the state plan, Xinjiang Production and Construction Corps, all ministries of the State Council and departments directly under the State Council as well as all groups of enterprises specifically designated in the state plan: For the purpose of facilitating the industrial development of renewable energy resources in China, the Commission, in accordance with the provisions prescribed in China Renewable Energy Law, works out, prints and distributes Catalogue for the Guidance of the Industrial Development of Renewable Energy (hereinafter referred to as Catalogue) to you for a guidance of supporting policies and measures of the relevant departments, research and technological development of the relating institutions and enterprises, investment orientation. The Catalogue covers 88 renewable energy development, utilization and system device/equipment manufacture of six regions such as wind energy, solar energy, biomass energy, geothermal energy, ocean energy and water energy, where some of the industries have become matured and basically realized commercialization; some industry, technology, products, equipment, comply with the requirement of sustainable development and the development orientation of energy industry, enjoying broad development prospect and important application value in some specific regions albeit it remains in the project model or technological research and development phase. In accordance with the variation of domestic and foreign market demand as well as the technological development of renewable resource industry, the Commission will undertake timely readjustment and revision upon the Catalogue. As for the project equipped with scale development and utilization, the relevant departments of the State Council will establish and perfect preferential policies concerning technological research and development, project model, financial taxation, product price, marketing, import and export. The relevant departments, units and enterprises of all regions are required to analyze domestic and foreign market, choose technology and projects within the Catalogue which may presumably gain comparative advantages, to actively carry out technological research and development, project model as well as investment and construction. Appendix: Catalogue for the Guidance of the Industrial Development of Renewable Energy **National Development and Reform Commission November 29, 2005**

## **Appendix:**

### **Catalog for the Guidance of the Industrial Development of Renewable Energy**

Serial number	project	Instruction and technical indicator	Status quo of development
I. Wind energy			
Wind energy power generation			
1	Off-grid wind turbines generating system	It is used for residential electricity supply where the grid fails to cover, including two kinds of electricity generation/ supply, individual household plant and concentrated village plant.	Basic commercialization
2	wind power system of network-forming	It is used for grid electricity supply, including land and offshore network-forming wind power electricity generation, which can generate electricity through single machine networking and multi-machines networking electricity generation.	Land networking wind power electricity generation: offshore networking electricity generation; technological research and development
Equipment/ fitting manufacture			
3	Wind resources evaluation and analysis software	It is used for undertaking technological and economic evaluation upon regional wind energy resources so as to select the correct wind field. Its main functions include: measurement of treatment and statistical analysis of wind, formation of wind map, wind resource evaluation, wind generating set and annual electricity yield by wind field and etc.	Technology research, development or introduction
4	Wind field design and optimization software	It is used for optimized design of electricity field (i.e. micro-location selection and arrangement plan design and optimization of wind generating set). Its main functions include: confirming the influence of wake flow of wind generating set and adjusting the distributing distance between wind generating sets, undertaking analysis and prediction upon noise of wind generating set and wind field, eliminating the section failing to meet the requirement of technology, land quality and environment; optimizing the	Technology research and development

		location-selection of wind generating set automatically, providing visualized interface of the design process, undertaking technical and economic analysis and etc.	
5	Wind concentrated and remote monitoring system	It is used for concentrated and remote monitoring of wind generating set and wind field operation. Its main functions include: timely collecting, analyzing and reporting the wind situation and set and supervision data of wind field operation by means of modern information and communication technology, undertaking efficiency optimization and safety guarantee system automatically or via the feedback of instruction.	Technology research and development
6	Construction of wind field and maintenance of exclusive equipment	It is used for transport of land and offshore wind generating set, on-the-spot lift and maintenance.	Technology research and development
7	Off-grid wind turbines generating system	It is used for independent system and concentrated village electricity generation, including wind power independent electricity generation and wind-solar photovoltaic hybrid generate electricity system to ensure its system safety, economic and continuous and reliable electricity supply.	Basically commercialized
8	wind power generating set of network-forming	It is used for networking wind power generation, including land and offshore generating set. Offshore wind generating set shall be adapted to oceanic geology, hydrologic condition and climate.	Land wind generating set: above-sea wind generating set of the primary stage of commercialization; technology research and development

9	Total design software of wind generating set	It is used for the total design of structural dynamics modeling and analysis, limit load and fatigue load calculation, and wind generating set dynamic emulation.	Technology research, development or introduction
10	Wind mill blade	It is used for supporting large scale wind mill set with its capacity no less than 1,000 kw.	Technology research and development
11	Wind mill blade design software	It is used for designing large scale Wind mill blade pneumatic shape and its construction technique	Technology research and development
12	Wind mill blade material	It is used for manufacturing of high strength, low-mass, large-volume blade, including GRP and carbon fiber reinforced plastics	Technology research and development
13	Wind mill wheel hub	It is used for supporting wind generating set with its capacity no less than 1,000 kw.	Technology research and development
14	Wind mill driving system	It is used for supporting wind generating set with its capacity no less than 1,000 kw.	Technology research and development
15	Wind mill deviation system	It is used for supporting wind generating set with its capacity no less than 1,000 kw.	Technology research and development
16	Wind mill braking system / mechanic braking	It is used for supporting wind generating set with its capacity no less than 1,000 kw.	Technology research and development
17	Wind mill generator	It is used for supporting wind generating set with its capacity no less than 1,000 kw, including double- fed generator and permanent magnet generator.	At the beginning of commercialization, technology research and development (permanent magnet generator)
18	Wind generating operation control system and converter	It is used for supporting wind generating set with its capacity no less than 1,000 kw, including: off-grid wind generating controller; speed-loss wind generating controller; variable-speed constant-	technology research and development

		frequency wind-power generating controller and converter.	
19	Wind mill generating set safety guarantee system	It is used for ensuring the safety of wind generating set on occasion of extreme weather, system failure and grid failure	technology research and development
20	Testing equipment for compatibility between electricity and magnet in wind mill generating set, lighting impulse	It is used for testing the compatibility between electricity and magnet in wind mill generating set and lighting impulse in order to make the set adaptable to natural environment.	technology research and development
21	Design of Integration between Wind Power and Power Grid and grid stability analysis software	It is used for evaluating the large-scale wind field integration system and stability of the grid	technology research and development
22	Wind field electricity generating capacity prediction and grid scheduling and matching software	It is used for monitoring and collecting information about the performance and generating capacity upon the wind generating capacity, analyzing and estimating the variation of the wind field in the second day and its generating output, making scheduling plan for grid enterprise and promoting large-scale wind field development and operation.	technology research and development
23	Wind field smooth transition and controlling system	It is used for providing support for the smooth transition of large-scale wind field in case of grid integration failure.	technology research and development
II. Solar energy			
Utilization of solar energy and heat utilization			
24	Off-grid solar energy photovoltaic	It is used for supplying electricity to the resident area where the grid fails to cover, including independent household	Basic commercialization

	electricity generation	system and concentrated village.	
25	Networking solar energy photovoltaic electricity generation	It is used for supplying grid with electricity, including building integrated solar energy photovoltaic electricity generation	Technology research and development and project model
26	Solar energy for electricity generation	It is used for supplying electricity to the resident area where the grid fails to cover, including tower solar energy electricity generator, trough-shaped solar energy electricity generator, disk-shaped solar energy electricity generator and instant focal solar energy electricity generator	Technology development
27	Industrial photovoltaic electricity resources	It is used for supplying electricity to scattered meteorological station, seismic station, highway station, broadcast and television, satellite ground station, hydrometry, solar energy navigation mark, highway and railway signal and solar energy cathodic protection system.	Commercialization
28	Solar energy lighting system	Including solar energy street lamp, yard lamp, lawn lamp, billboard, solar energy LED cityscape lamp and etc.	Commercialization
29	Solar energy vehicle	Including: solar energy-driven automobile, solar energy motor-assisted bicycle and etc.	Technology research and development, project model
30	Solar energy photovoltaic sea water desalination system	It is used for providing fresh water to remote island resident area where fresh water is in scarcity.	Technology research and development, project model
31	Photovoltaic Pump	It is used for proving fresh water to the western drought-hit area, and remote and population-scattered area, to the construction and amelioration of grassland and afforestation in the desert.	Commercialization
32	Solar energy water heater for	It is used for providing life heat water to the residents, including flat-type solar	Commercialization

	household	energy water heater, vacuum solar energy water heater and etc.	
33	Solar energy concentrated heating system	It is used for providing heat water or heating to the residents or industry and commerce, including solar energy concentrated	Technology research and development, extension and application
34	Solar energy air-conditioner system	It is used for realizing heat and cold convertibility and providing cooling and air-conditioner service (via solar energy collector and absorption refrigerating machine.	Technology research and development and model project
35	zero solar energy building complex	It is used for meeting the demand of energy in building via integrating solar energy collector(realizing solar energy collecting system and air-conditioner system) in the building(roof and external wall) and solar energy photovoltaic Cell.	Technology research and development
Equipment/ outfit manufacture			
36	Off-grid solar energy photovoltaic electricity generating system	It is used in independent household system and concentrated village plant	Commercialization
37	Networking solar energy photovoltaic electricity generating system	It is used for supplying energy to grid, including building integrated solar energy photovoltaic electricity generating system.	Technology research and development, project model
38	Solar energy electricity generating system	Including: tower solar energy light and heat electricity generating system, trough-shaped solar energy light and heat electricity generating system, disk-shaped solar energy light and heat electricity generating system and instant focal solar energy generating system.	Technology development
39	Crystal silicon solar energy cell	Including:Single crystal silicon solar energy cell and multi-crystal silicon solar	Commercialization and technology amelioration

		energy cell	
40	Membrane solar energy cell	Including: multi-junction amorphous thin-film solar cell, polycrystalline thin-film solar energy cell, compound thin-film solar energy cell	Technology research and development
41	Other new type solar energy cell	Including: flexible underlay solar energy cell, spot light solar energy cell, HIT heterojunction solar energy cell, organic solar energy cell, nanometer noncrystal solar energy cell, mechanic stacking solar energy cell, thin-film noncrystal silicon/minicrystal stacking solar energy cell and etc.	Technology research and development
42	Architectural solar energy arrays	It is used in architectural integrated solar energy photovoltaic electricity generating system, including semi-translucidus photovoltaic electricity generating system, photovoltaic that can be interchanged with building units, photovoltaic glass curtain wall, photovoltaic sun-shield and etc.	Technology research and development
43	Solar energy cell and its component parts manufacture equipment	It is used for manufacturing solar energy cell and its component parts, including: solar energy silicon furnace charge outfit manufacture, multicrystal ingot casting, wire cutting machine, saw squarer, silicon slice polishing equipment, silicon slice cleaner, diffusion equipment, PECVD, hard coat equipment, screen printing, drying and sinter equipment, wafer scribe, automatic welding, component part layer press and etc.	Technology research and development or introduction
44	Solar energy cell test equipment	Including: solar energy cell separation equipment, solar analog meter, high voltage insulation test equipment and etc.	Technology research and development
45	Solar cell auxiliary material for production use	Including: low low-iron toughened glass, EVA, solar cell back packaging composite membrane, silver plasm and aluminum plasm, weld and etc.	Technology research and development



46	Photovoltaic electricity generating system, controller of electricity use and discharging	It is used for controlling intellectually the process of electricity charging and discharging	Technology research and development
47	Ac/dc inverter for photovoltaic electricity generating system,	It is used for off-grid and networking ac/dc inverter, the latter needs the function of networking invert, maximum power tracking, protection for the prevention of island effect and etc.	Technology research and development
48	Household photovoltaic and wind/light complementary control/inverter	It is used for photovoltaic and wind/light complementary electricity generating system with its volume less than 1 kw.	Technology research and development
49	(exclusive)storage cell	It is used for independent photovoltaic and wind electricity generating system, with the endurance capacity for excessive charging and discharging performance and long service life.	Technology research and development
50	Redox liquid storage cell	It is used in independent photovoltaic electricity generation and wind power electricity generation system; its storage capacity shall reach one hundred megawatts when its power is ranged from dozens to several hundred kw.	Technology research and development and project model
51	Photovoltaic silicon material	It is used for the production of solar cell crystal silicon.	Technology research and development or introduction
52	Concentrated and remote control system for the use of photovoltaic electricity generating system	It is used in the operation data in collecting, transmitting solar radiation, environmental parameters and photovoltaic electricity generation and realizing concentrated or remote control monitoring.	Technology research and development
53	Reflector for the use of solar	It is used for supporting various solar energy light and heat electricity	Technology research and development

	energy heat and light electricity generation	generating system.	
54	Automatic tracking equipment for light and heat generating reflector	It is used for supporting various solar energy light and heat electricity generating system so as to automatically track solar radiation, adjust the angle of the reflector and absorb the maximum solar energy.	Technology research and development
55	Light and heat collector	It is used for supporting various solar energy light and heat electricity generating system to absorb solar radiation from the reflector, i.e. "solar boiler" within small volume and high conversion efficiency.	Technology research and development
56	Light and heat electricity generating and heat storage equipment	It is used for supporting various solar energy light and heat electricity generating system, ensuring the relative stability of light and heat electricity generation via the heat energy absorbed by the storage collector.	Technology research and development
57	Instant Light and heat electricity generating equipment	It is used for supporting instant solar energy light and heat electricity generating system, including alkali metal thermoelectric converter, Semiconductor electricity generator, thermion electricity generator and photovoltaic electricity generator.	Technology research and development
58	Solar energy light and heat system, architectural application design, optimization, measurement and evaluation software.	It is used for the design and emulation of optimized architectural heating equipment geared to the applied solar energy light and heat system in different regions, different lighting conditions in China; for measurement and evaluation upon the solar energy light and heat system used in the processing of building.	Technology research and development and extension and application
III. Biomass energy			
biomass energy and biological fuel production			

59	Gas supply and electricity generation by large and medium-sized methane project	Including large scale livestock and poultry farm, Breeding area, urban sewage project	Commercialization, extension and application
60	Instant Electricity by Biomass fuel	Electricity generation by utilizing crop straw, and wood	Technology update and project model
61	Biomass liquefied gas supply and electricity generation	liquefied gas supply and electricity generation by utilizing crop straw, and wood	Technology research and development, extension and application
62	Electricity generation by utilizing urban solid refuse	Electricity generation by utilizing urban solid refuse, including fuel and methane.	Basic commercialization
63	Biological liquefied fuel	Production of liquefied fuel by utilizing non-grain crop and wood biomass.	Technology research and development
64	Biomass solid fuel	Transforming crop straw and wood to solid fuel as the alternative of coal.	Project model
Equipment/ component parts manufacture and raw material production			
65	Biomass direct-fired boiler	It is used for supporting biomass direct-fired boiler system, for which technological performance and specification shall be used.	Technology update
66	Biomass fuel gas combustion engine	It is used for supporting electricity generation via liquefied biomass. Its performance and specification shall be used in liquefied biomass electricity generation system.	Technology research and development
67	Liquefied biomass tar catalyzing and cracking equipment	It is used for cracking tar arisen in the process of gasification to available and disposable gas.	Technology research and development
68	Liquefied biomass fuel production outfit	It is used for producing the aforesaid various liquefied biomass fuel.	Technology research and development and project model
69	Plantation of energy plant	It is used for providing various biological fuel production with non-crop biomass	Project model, extension and application

		material such as sweet sorghum, cassava, purging-nut tree, sugar cane.	
70	Breeding of energy plant	It is used for breeding and cultivating energy crop which boasts stable and high yield and, innocuity to ecological environment and adaptability to barren mountains and waste, sandlot and alkali land.	Technology research and development and project model
71	High-efficiency, wide-range methane strain improvement	It is used for improving the yield of methane project and its usage in relatively low temperature.	Technology research and development
V. Geothermal energy			
Electricity generation by utilizing geothermal energy and heat utilization			
72	Electricity generation by utilizing geothermal energy	Including electricity generation by utilizing geothermal steam, double-circulation geothermal electricity generating system and flash geothermal electricity generating system (the latter two is adaptable to middle and low geothermal resources.	Technology research and development
73	Heat supply by utilizing geothermal energy	Including single circulation direct heating and double-circulation indirect heating.	Project model, extension and application
74	Geothermal source heat pump heating and/or air conditioner	Including underground water source, river and lake water source, sea water source, sewage sources (including urban sewage, industrial sewage, hospital sewage)and soil geothermal source heat pump.	Project model
75	Underground thermo energy storage system	The storage types include such energies as solar energy, and the cool and heat set off by air conditioners in the buildings.	Technology research and development
Equipment/ outfit manufacture			
76	Drilling equipment exclusively for geothermal well use	It is used for drilling geothermal well, which shall be adapted to its geological structure, high temperature and corrosion hydraulic conditions and the requirement	Technology research and development

		for making the well.	
77	Geothermal well pump	It is used for supporting geothermal heating and geothermal source heat pump system, which shall be adapted to its high temperature and corrosion.	Technology research and development
78	Water source thermal pump assembly	It shall be adapted to the temperature of underground water or sea water as well as their temperature.	Technology research and development and project model
79	Geothermal Energy design, optimization and evaluation system	It is used for undertaking measurement and evaluation upon the building adaptable to the geothermal energy in different regions and with different types.	Technology research and development, extension and application
80	Utilization of water heat source	The temperature difference of water is utilized to cool and heat the building, including utilizing such water sources as underground water, sewage in urban treatment sewage treatment factory.	Project model, extension and application
V. Ocean energy			
Ocean power generation			
81	Ocean power generation	Including: tidal power generation, wave power generation, marine thermoelectric power generation and ocean current power generation.	Technology research and development and project model
Equipment/ outfit manufacture			
82	Ocean power generation outfit	Including: the outfit of wave power generation, marine thermoelectric power generation and ocean current power generation.	Technology research and development
VI. Hydropower			
Waterpower			
83	Networking Waterpower	Various waterpower in line with the requirement of watershed development, and environmental protection	Commercialization
84	Small-scale off-grid waterpower	It is used for electricity and energy usage in in-place development, neighborhood electricity supply and solving the problems in remote area for electricity and energy use.	Commercialization

Equipment/outfit manufacture			
85	Water turbine-typed spectrum	It is used for manufacture and type selection of water turbine, improvement of the efficiency and quality of water turbine, reduction of construction cost and standardization of the equipment market.	Technology research and development
86	Automatic hydroelectric technology	It is used for the automatic management of hydroelectric operation, the improvement of its performance and the reduction of its operational cost.	Technology update
87	Large-scale and high-efficiency water turbine generating set	It is used for improving the capacity, performance and efficiency of water turbine generating set.	Technology research and development
88	Integration technology of small plant	It is used in small waterpower with its capacity less than 1,000 kw for realizing the control and integration of such auxiliary equipments as petroleum, water and gas and such supervision integration as speed regulation, excitation, protection and measurement, improving its credibility and reducing its equipment construction cost.	Technology update

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