



Key information at a glance
**China 12th Five-Year Plan for
Renewable Energy Development**
(2011-2015)

China National Energy Administration
China National Renewable Energy Centre

General objectives

To enlarge the scale of renewable energy applications, to promote the integration of renewable energy and conventional energy systems, to increase the proportion of renewable energy in energy mix; to improve the overall capability for innovation in renewable energy technology, to master the core technologies of renewable energy, to establish a sound and competitive renewable energy industries.

Key indicators

1. ***The proportion of renewable energy in energy consumption will significantly increase.*** By 2015, the annual renewable energy consumption will reach 478 million tons of standard coal equivalents (TCE); including 400 million TCE coming from commercialized renewable energy, representing more than 9.5% in overall energy mix.
2. ***The electricity generation from renewable energy sources will become an important part of overall power system.*** During the 12th Five-Year Plan period, the new installed renewable energy capacity will reach 160 GW, including 61 GW of hydropower (excluding pumped hydro), 70 GW of wind power, 20 GW of solar power and 7.5 GW of biomass power. The electricity generation from renewable sources would account for more than 20% of total electricity generation by 2015.
3. ***Renewable energy will significantly replace fossil energy for heating and conventional fuels.*** China will continue to enlarge the scales of solar heating utilization, promote the direct application of medium-low temperature geothermal energy and heat pump technology, promote biomass molding fuel and biomass cogeneration, and speed up the development of biogas. By 2015, around 100 million TCE of fossil energy will be replaced by renewable energies to satisfy heating and fuel demand.
4. ***Applications of distributed renewable energy will be scaled-up.*** Establishing grid supporting system and management system in favor of distributed electricity generation such as solar power; establishing 30 new energy micro-grid demonstration projects; integrating diversified renewable energy technologies, such as distributed electricity generation (solar power, etc.) and renewable energy for heating and fuel applications; Establishing 100 New-Energy City and 200 Green-Energy County for pilot. Take advantage of distributed energy to supply electricity to areas where grid can not cover. Energy supplies of more than 50% rural households will get access to renewable energies such as biogas, solar energy and biomass-gasification.

Key Indicators of 12th Five-Year Plan for Renewable Energy

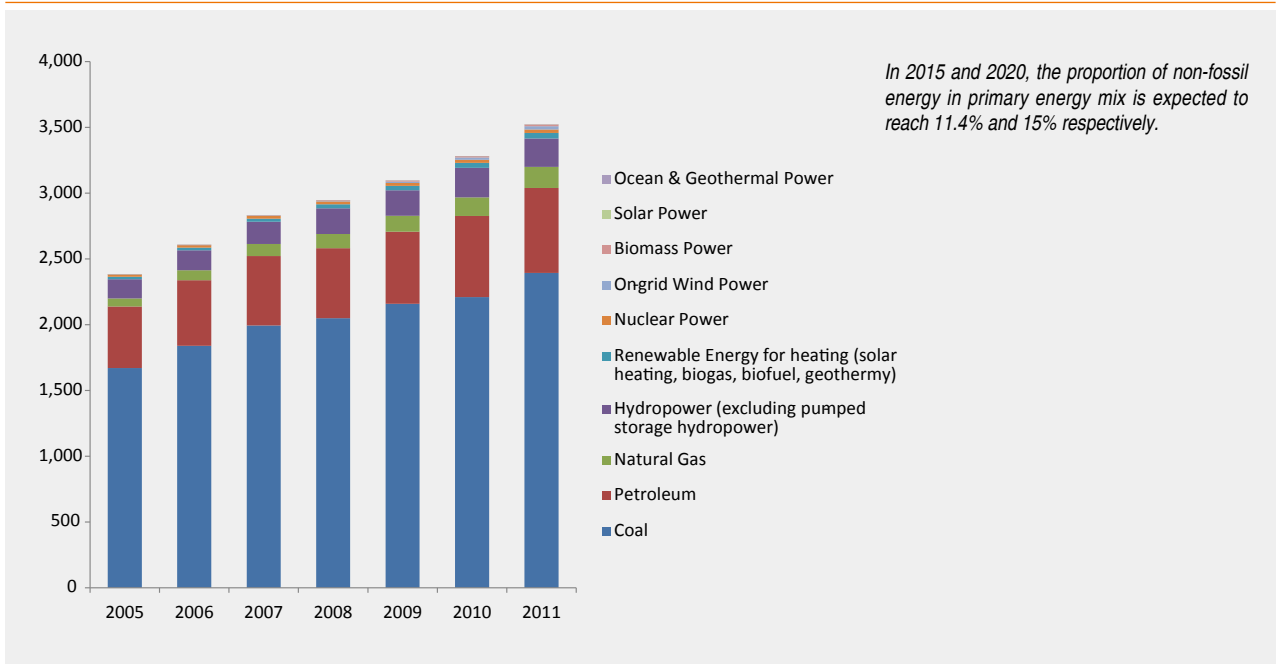
Content	Capacity		Annual production		Convert to mil. TCE
	Amount	Unit	Amount	Unit	
A. Electricity Generation	394	GW	1203	TWh	390.0
1. Hydropower (excluded pumped-storage)	260		910		295.8
2. On-grid wind power	100		190		61.8
3. Solar power	21		25		8.1
4. Biomass power	13		78		24.3
Agriculture and forest residuals	8		48		15.0
Biogas	2		12		3.7
Urban Waste	3		18		5.6
B. Biogas			22	billion cubic meter	17.5
1. Household biogas users	50	Mil. Households	21.5		17.0
2. Industrial organic wastewater treatment plants	1,000	units	0.5		0.5
C. Heating and Cooling					60.5
1. Solar water heating	400	Mil. sq.m.			45.5
2. Solar cooker	2	Mil. sets			
3. Geothermal					15.0
Heating and cooling	580	Mil. sq.m.			
Hot water	1.2	Mil. Households			
D. Fuel					10.0
1. Solid Biomass	10	Mil. tons			5.0
2. Bioethanol	4	Mil. tons			3.5
3. Biodiesel	1	Mil. tons			1.5
Total					478.0

Renewable Energy Resources

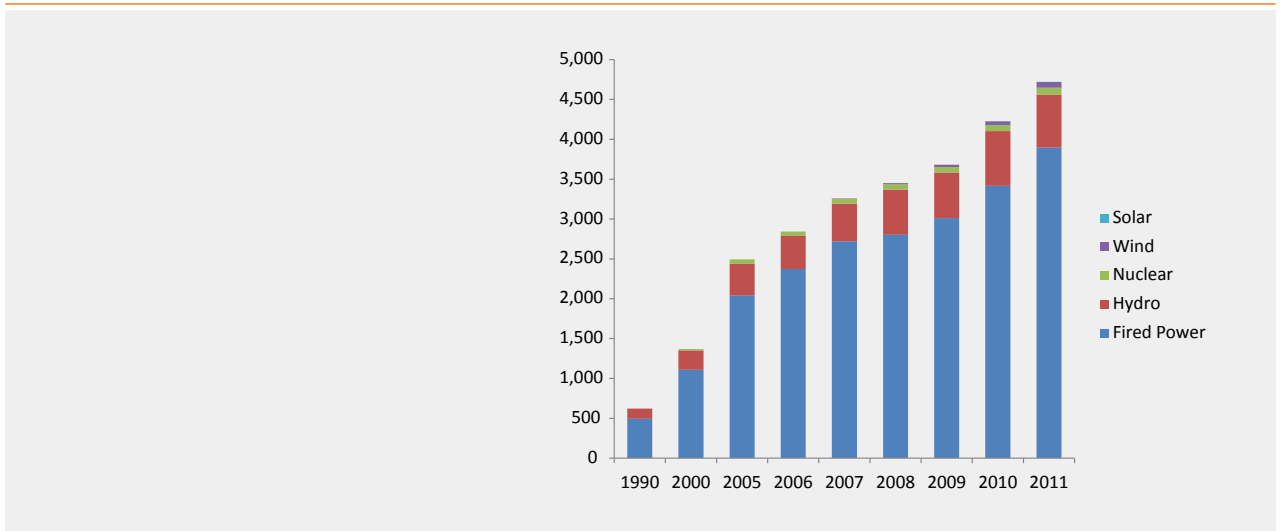
Hydropower	Theoretical Reserves		Technical Exploitation Amount		Economic Exploitable Capacity	
	Installed capacity (GW)	Annual electricity generation (TWh)	Installed capacity (GW)	Annual electricity generation (TWh)	Installed capacity (GW)	Annual electricity generation (TWh)
	694	6,083	542	2,474	402	1,753
					Resource for Energy Use	
	Index	Resources	Availability	million tons	million tons of standard Coal equivalent	
Biomass	Crop straw (million tons)	681	546	138	69	
	Forest residues (million tons)	125	125	125	63	
	Animal manure (million tons)	239	239	239	107	
	Industrial organic waste (million Cubic meters methane)	50,000	50,000	50,000	39	
	Municipal organic waste (million tons)	150	150	15	2	
	Total				280	
Solar Power	Annual radiation	Annual surface absorption heat		Exploitable capacity (see note)		
	5x10²²J	1,700 billion TCE		2,200GW		
Wind Power (GW)	2,560	Offshore		Total		
		190		2,750		
Ocean Power (GW)	Offshore reserves	Tidal	Wave	Current	Salinity	Temp.Diff.
	1,495	22	13	14	125	1,321

Note: Only rivers with theoretical reserve of hydropower resources of more than 10MW are included statistically, excluding the rivers in Hong Kong, Macao and Taiwan. The annual applicable solar power is estimated with the assumption that 20% of roof area and 2% area in Gobi desert and other remote areas are installed with solar power facilities. The wind power resources estimation is based on the latest survey from China Meteorological Administration, potential exploitable resources on land is of above 50 meters, and offshore at depth of 5-25 m, a wind scale of above 3 and wind power density of above 300 Watts per square meter. Sources: 2003 China's hydropower resources review and "Energy Databook 2011".

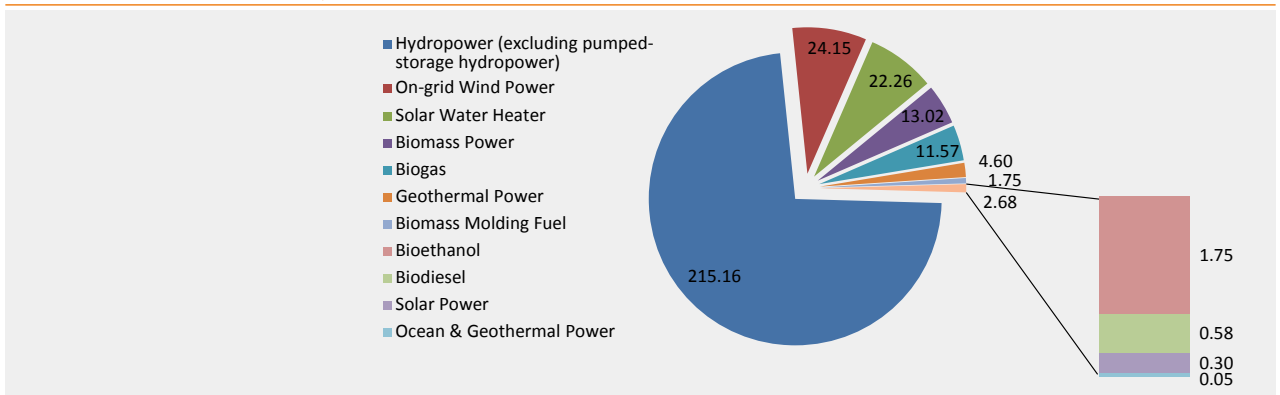
China Energy Structure (million TCE)



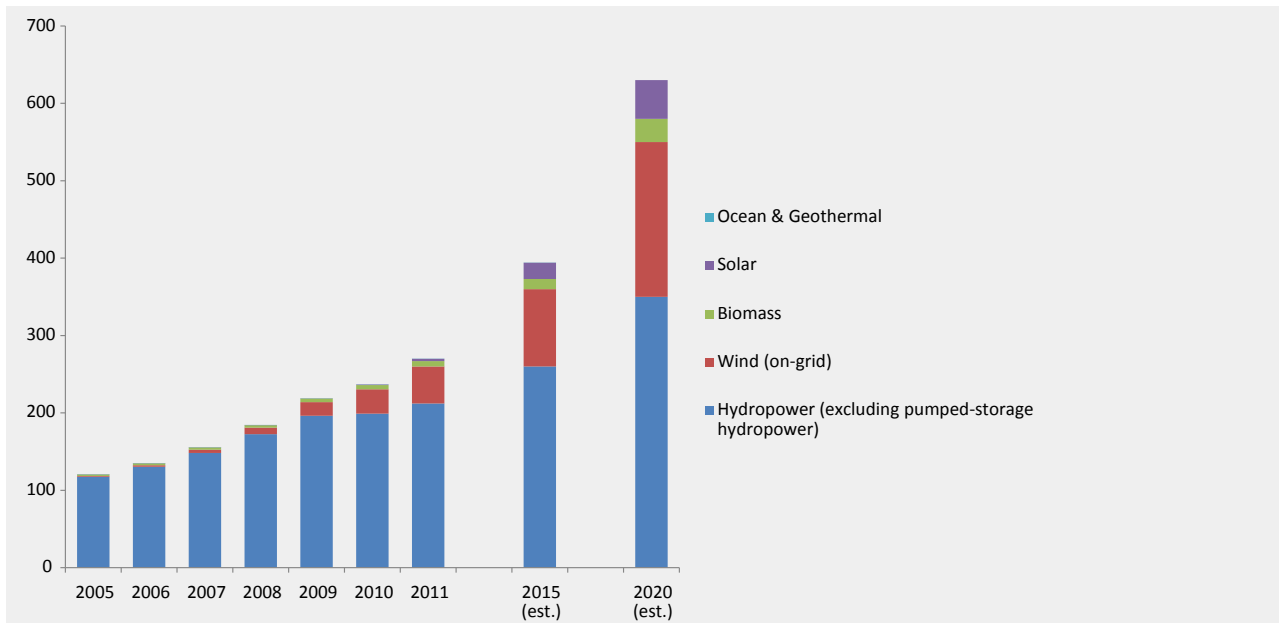
China Electricity Generation Structure (TWh)



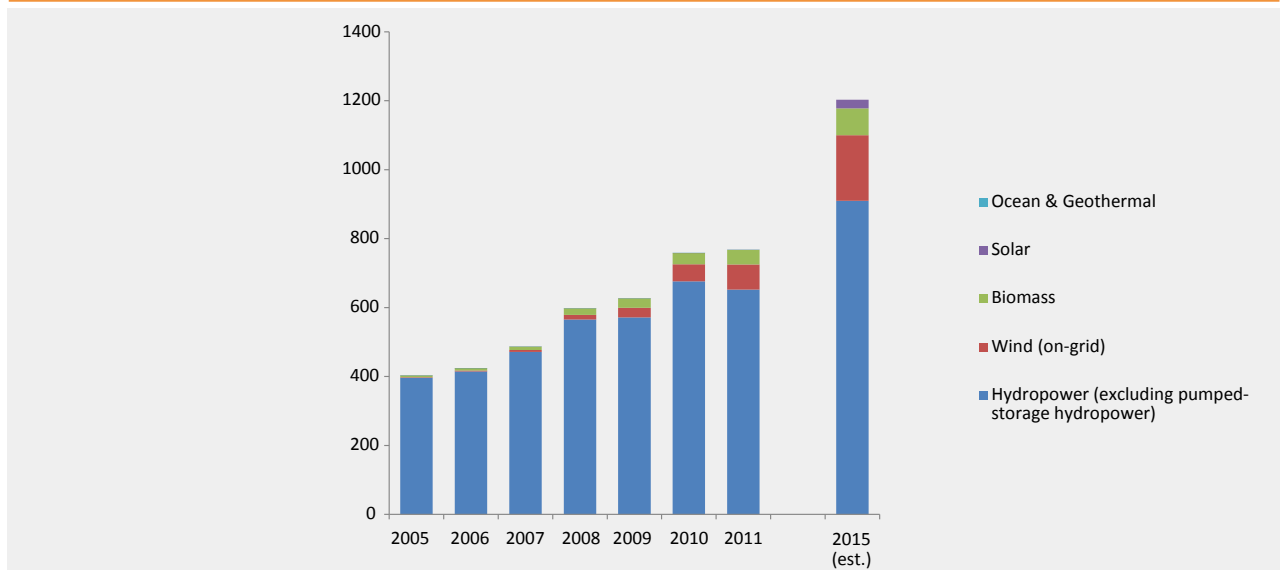
China Renewable Energy Production in 2011 (million TCE)



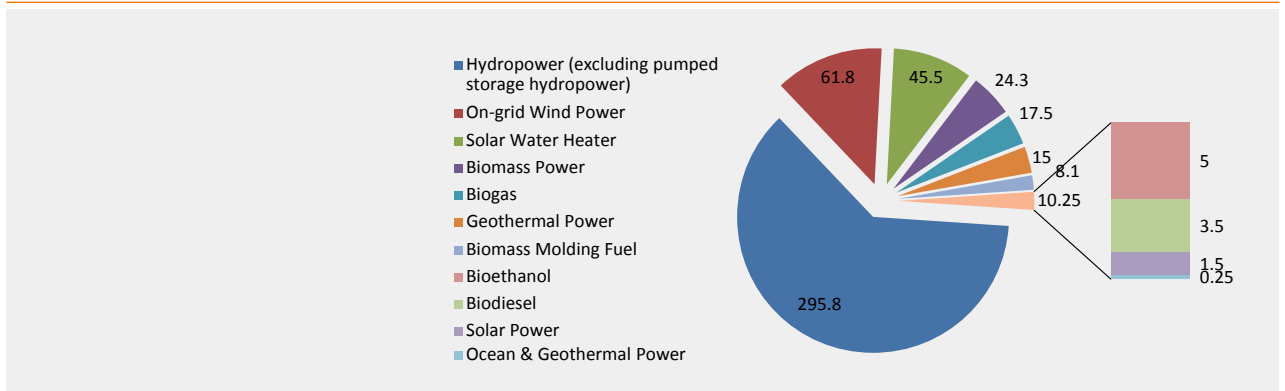
Installed Capacity of Renewable Power (GW)



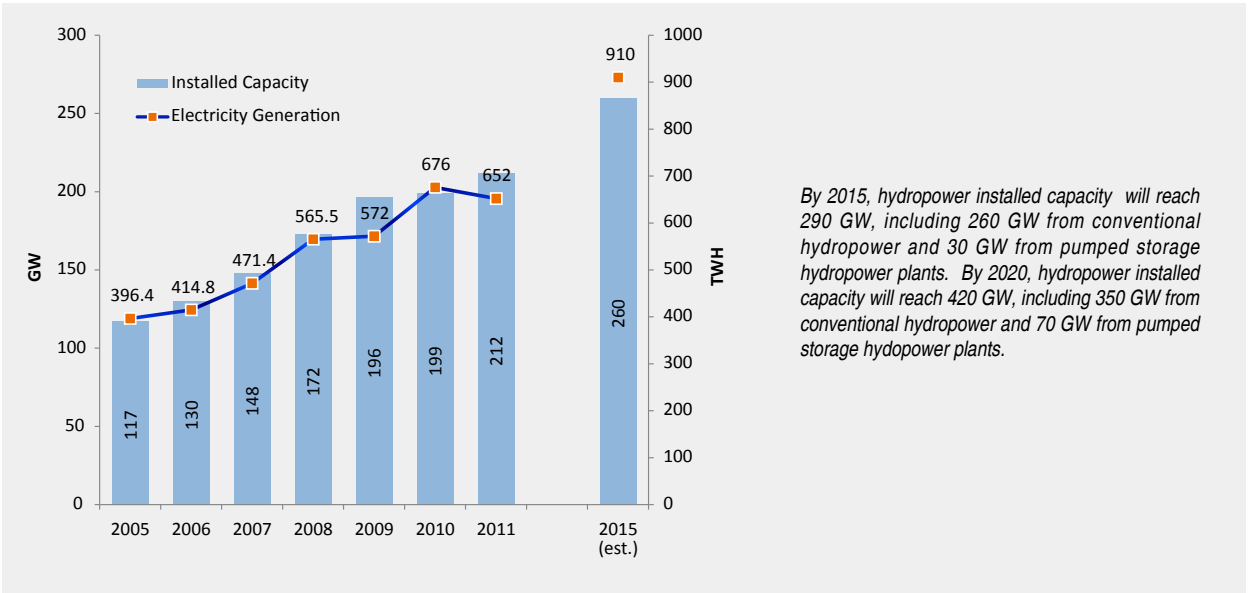
Electricity Generation of Renewable Power (TWh)



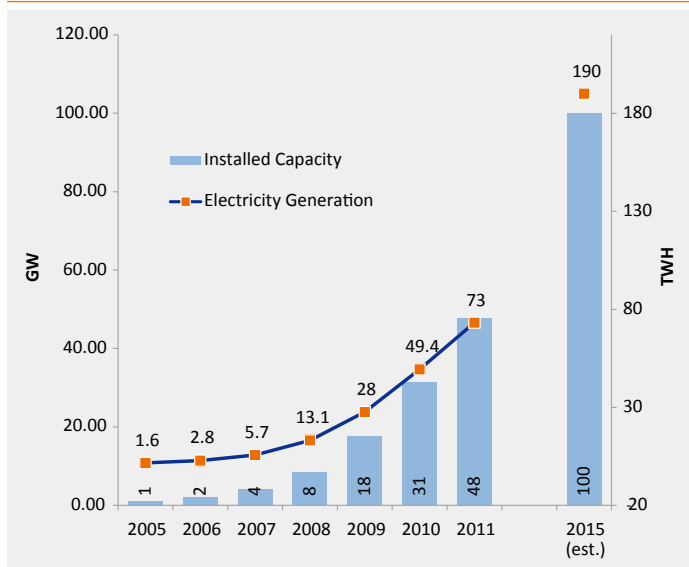
Renewable Energy Targets by 2015 (million TCE)



Hydropower Installed Capacity and Electricity Generation (excluding pumped-storage hydropower plant)



On-grid Wind Power Installed Capacity and Electricity Generation

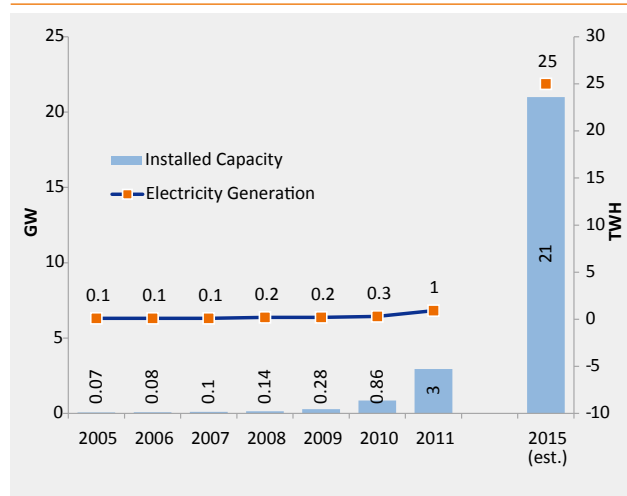


By 2015, the total on-grid wind power installed capacity will reach 100 GW and the annual electricity generation will be more than 190TWH, including 5 GW from offshore wind power installed capacity. By 2020, the total on-grid wind installed capacity will reach 30 GW, the wind power will become an important resource of the power system.

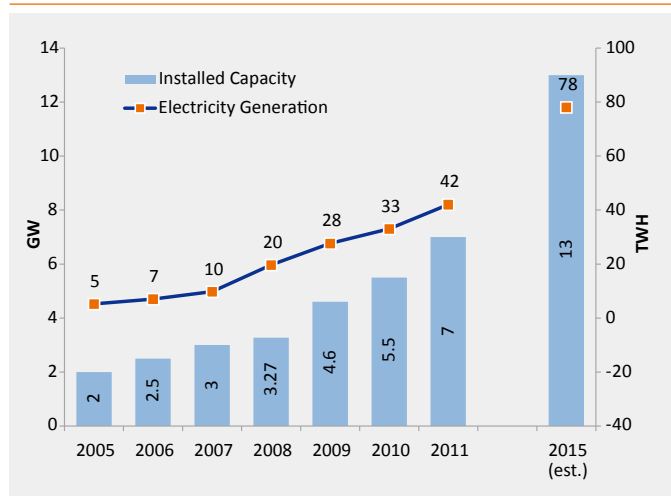
Wind Power Distribution (GW)

Item	Area	New Installed in 12 th five-year period	Total by end of 2015	2020 Goal
Large Bases Area	Hebei	7.2	11	16
	Eastern Inner Mongolia	4.2	8	20
	Western Inner Mongolia	6.7	13	38
	Gansu	9.5	11	20
	Xinjiang	9	10	20
	Jilin	4	6	15
	Coastal Jiangsu	4.5	6	10
	Coastal Shandong	6	8	15
	Heilongjiang	4	6	15
	Total		55.1	79
Key Development Area	Shanxi	4.5	5	8
	Liaoning	2.7	6	8
	Ningxia	2.3	3	4
	Others	4.2	7	11
	Total	13.7	21	31
Total		68.8	100	200

Solar Power Installed Capacity and Electricity Generation



Biomass Power Installed Capacity and Electricity Generation

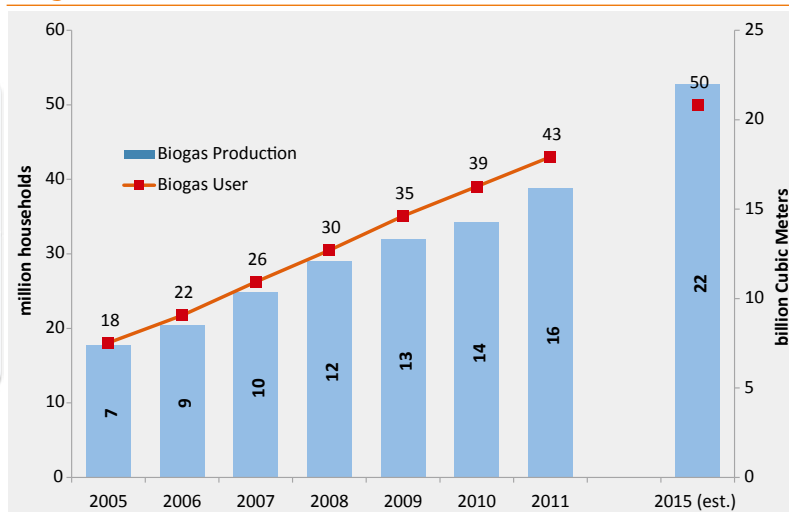


Solar Power Distribution (GW)

Category	2015		2020
	Capacity	Key Areas	Capacity
1. Solar Power Plant	11		23
Photovoltaic Plant	10	Constructing on-grid photovoltaic power plants in Qinghai, Gansu, Xinjiang, Inner Mongolia, Tibet, Ningxia, Shaanxi, Yunnan, Hainan and other places. Integration of large hydropower and wind power bases to develop photovoltaic power plants based on wind/solar and hydro/solar hybrid power supplies.	20
Solar Thermal Power	1	Develop solar thermal demonstration projects in areas with good solar radiations, large available lands and available hydro resources.	3
2. Distributed Photovoltaic Power System	10	Construction of on-grid photovoltaic power system in areas with high-density of roof-area, such as industrial parks, economic development zones, large-scale public facilities; providing access to electricity for people living in areas not covered by the grid, such as Tibet, Qinghai, Gansu, Shaanxi, Xinjiang, Yunnan, Sichuan and islands. Expansion of this system to urban lighting engineering, traffic signal, etc.	27
Total	21		50

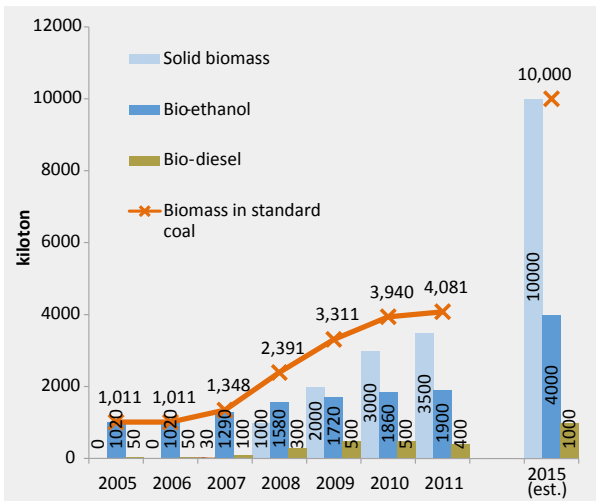
By the end of 2015, total geothermal energies development and utilization yield will reach to 15 million TCE, including 100 MW electricity from geothermal generation, 500 million sq.m. building heating and cooling application from surface geothermal. By 2015, capacity of ocean power plants will reach 50 MW.

Biogas Production and The Number of Users

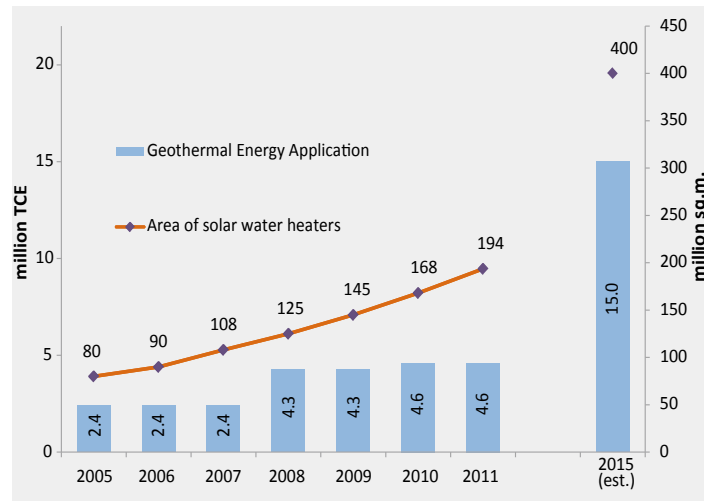


Biomass Power 13 GW	Methane Annual Utilization 22 billion cubic meters
By 2015, China biomass annual utilization amount will be 50 million TCE.	
Biomass Pellet Fuel Annual Utilization Amount 10 million tons	Bioethanol 4 million tons Biodiesel 1 million tons

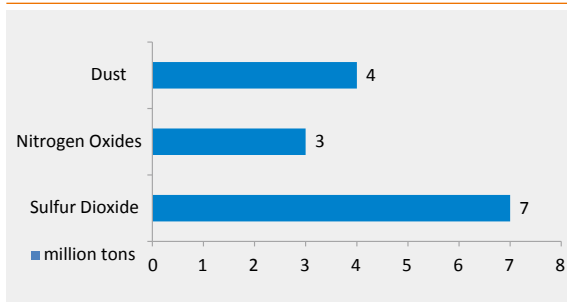
Biomass Production



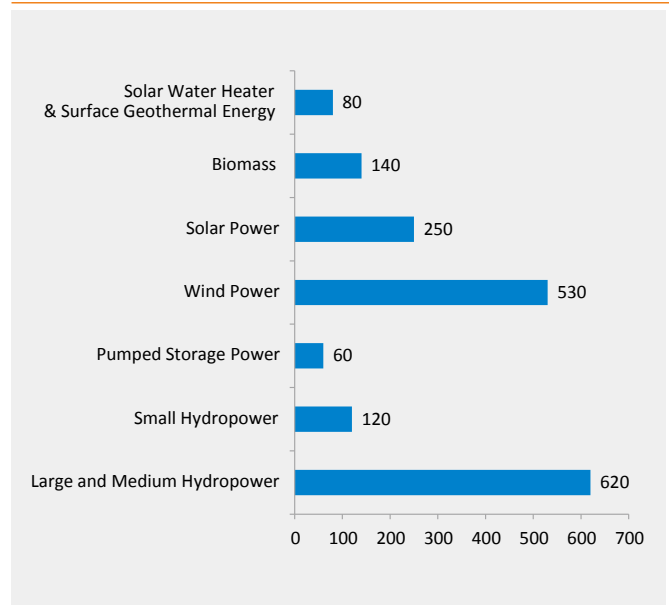
Solar Water Heaters and Geothermal Power



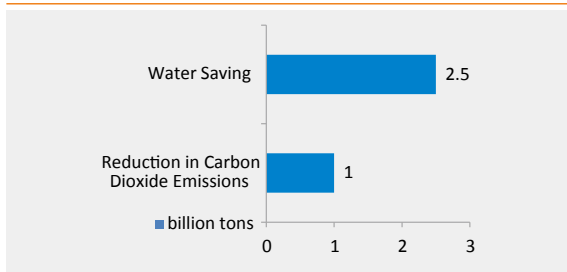
Reduced Pollution Emission in 2015



Renewable Energy Investment During The "12th Five-Year Plan" Period (billion CNY, 1US\$= 6.33 CNY)



Environmental Benefits in 2015



When reaching the targets by 2015, the annual consumption of renewable energy will result in emission reduction of 1 billion tons of carbon dioxide, 7 million tons of sulfur dioxide, 3 million tons of nitrogen oxides and 4 million tons of dust, and a saving of 2.5 billion cubic meter of water; thus the environmental benefit is obvious.



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