

Biomass in China

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Biomass supply

China's main biomass resources are agricultural wastes, scraps from the forestry and forest product industries, and municipal waste. Agricultural wastes are widely distributed. Among them, the annual production of crop stalks alone surpasses 600 million tons; and crop stalks suitable to energy production are estimated to represent a potential of 12,000 PJ annually. Wastes from the processing of agricultural products and manure from livestock farms in theory could yield nearly 80 billion cubic meters of biogas. Scraps from forestry and forest product industries represent a resource equivalent to 8,000 PJ per annum.

Biomass supply

Furthermore, with the implementation of China's *Natural Forest Protection Program* (which includes logging bans and logging reductions over much of the nation's natural forests) and its *Sloping Cropland Conversion Program* (which calls for the conversion of much of the nation's sloping cropland to trees and grasses), it is expected that the amount of scraps from forestry and forest product industries used in energy applications will increase substantially, with the potential of reaching 12,000 PJ per annum by 2020.

Biomass supply

Municipal waste in China is expected to reach 210 million tons per annum in 2020. If 60 percent of this is used in landfill methane applications, two to ten billion cubic meters of methane could be produced.

Biomass supply

Finally, “energy crops” are a biomass energy resource with the potential for commercialization. There are many types of energy crops that are suited to growing in China. Chief among these are rapeseed and other edible oil plants and some plants that grow in the wild, such as sumac, Chinese goldthread, and sweet broomcorn. By 2020, such crops could potentially yield over 50 million tons of liquid fuel annually, including over 28 million tons of ethanol and 24 million tons of bio-diesel. In sum, whether burned directly, used to produce electricity, or used as a substitute liquid fuel, biomass energy resources have the potential for playing a decisive role in China’s energy supply.

Biomass Utilization

- Traditional biomass use
- Ethanol
- Bio-diesel
- Biomass Power generation
- Biomass Gasification

Traditional biomass use

At present, biomass energy resources in China are utilized mainly through conventional combustion technologies. Before 2000 most families in rural area relied on biomass for cooking, space heating and agriculture production. It is estimated to be around 300million tce in 2000.

Recently with income increase in rural area, commercial energy are getting into higher penetration especially LPG. It is expected the use of biomass for cooking and space heating is decreasing, especially in rich area in China.

Ethanol from corn

In February 2004, exclusive use of gasoline containing 10% ethanol was initiated in all areas of Heilongjiang, Jiling, Henan, and Anhui provinces and in selected areas of Hebei, Shandong, Jiangsu, and Hubei provinces.

In 2006, ethanol from corn reached 1.36million ton. 4 factories manufacture ethanol from corn.

Cellulosic Ethanol

In 2005, China promoted the National Key R&D Program (863) for cellulosic ethanol as a step to promote technology development. The carbohydrate conversion yields in the China 863 plan were targeted to 0.77 of cellulose and 0.68 of xylan to ethanol.

There is two plants under construction for Cellulosic Ethanol with capacity 50000ton/year and 3000ton/year

Bio-diesel

Production of bio-oils in China has reached about 200,000 tons annually. It is estimated that there are totally about 40 bio-diesel production facilities which are planned and being constructed in China in 2006. Among them, only 5 facilities have processing capacity above 30000ton/year. Most of the new constructed and planned bio-diesel facilities are based on waste grease and oils such as acid oil, GTW, slop oil, animal fats etc. except for a 2000ton/year pilot plant of Sinopec is designed mainly on virgin oil.

Biomass Power generation

Biomass power generation in China, with an installed capacity of almost 2,000 megawatts (MW), consists mainly of combined heat and power (CHP) in sugar mills, power generation using rice husks and municipal solid waste. Other types of biomass power generation, such as that achieved through biomass gasification or hybrid fuel technologies, have not yet reached significant scale in China.

Biomass Power generation

On December 1, 2006, National Bio Energy Shanxian Biomass Power Plant Co., Ltd., the first biomass power plant to use straw in China. In the 11th Five-Year Period Plan, it is also made clear an objective to build up an installation capacity of 5.5 million kilowatt for the development of biomass power generation. According to the renewable energy plan, total capacity for biomass fired power capacity will reach 24GW by 2020.

Biomass Gasification

Biomass gasification is developing in China, as a way to improve rural energy use.

It is getting more and more in some cities and provinces, with government support (Government pay for fix cost).

Renewable Law : Became effective on Jan. 1, 2006

- Integration of government's responsibilities and entire citizens' obligation
- Integration of governmental promotion and market guidance
- Integration of current demand and long-term development
- Integration of domestic practice and international experience
- Renewable energy will take share of total energy demand in China: 10% by 2010, 16% by 2020

Medium- and Long-term Renewable energy development plan

Renewable energy target by 2020

Wind:	30GW
Solar Power PV:	1.8GW
Solar heater:	300million m ²
Biomass Power:	30GW
Biomass Diesel:	2Mt
Ethanol:	10Mt
Biogas:	44billion m ³
Biomass solid fuel:	50million ton
Small Hydro:	75GW
Hydro:	300GW

Price for biomass power: feed-in-tariff

- Coal fired power plant plus 0.25Yuan/kWh, the range of biomass for power will be about 0.50-0.72 RMB/kWh
- In the first 15 years, adopt the subsidy Price
- After first 15 years, RE power subsidy price will be cancelled
- Bi-fuel and multi-fuel biomass power projects

Modern Biomass Use in China, IPAC Results

