

Development of Biomass Conversion Technology and Industry in China Annual Report-2002

**Committee of Biomass Energy
Conversion Technology
of CAREI**

Annual Report - 2002

- **Biomass resource in China is characterized by many variety, huge quantity and wide distribution. In terms of technological feasibility and economics, biomass that can be used for energy purposes is divided into 5 types: energy crops, agricultural residue, forestry residue, livestock waste, industrial organic waste, and urban organic waste. In China, biomass is the major source of household fuel for rural people with a long history. Presently, technologies on biomass conversion widely used in China include: biogas, straw gasification and central supply, gasification and electricity generation, direct combustion for heating and cooking, briquetting and bio-fuel, etc.**

Biogas an important role in rural energy and environment protection construction

Biogas industry develops into a new stage

- In 2002, the central government invested 50 million \$ on rural energy construction. Local investment on rural energy also increased, more than 10 provinces, provided special fund for biogas dissemination. The total amount of local investment on small commonweal projects was 22 Million \$.
- In 2002, 1.7 million households became new biogas users, and there were 11 million biogas digesters in China, increased by 45.4% since 1999. In 2002, there were 1859 large- and medium-scale biogas plants, which is purposed on treating wastes from large livestock farms, increasing 500 compared with 2001. The total capacity was 870,000 m³, which produced biogas of 230 million m³ and treated 46.56 million tons of waste water per year. 15,000 biogas digesters for household waste water treatment were built in 2002(estimated), adding up to 111,000 in China. The total capacity was 4.34 million m³, which treated 360 million tons of waste water per year.

New features and trend of biogas industry

- Strategy of “leading enterprises and brand products” has made good achievement.
- The product is upgraded and quality improved
- Technics and engineering technology is improved
- Level and capability of after service are improved incessantly
- System of biogas industry standards is improved

Good opportunities to biogas industry development in China

The 2003-2010 Biogas Construction Plan in Rural Area of China, formulated by the Ministry of Agriculture, clearly stated that the government will actively promote the development of biogas industrialization, which provided excellent opportunities to the industry development. According to the plan, 11 million household biogas digesters will be constructed by the end of 2005, and then there will be totally 20 million in China: 1/10 of rural households will be biogas users. In 2010, 50 million rural households will use biogas as daily fuel. Meanwhile, the government will support the construction of large- and medium-scale biogas plant. 2500 biogas plants are to be constructed by 2005, which can supply biogas to 300,000 households; 5000 in 2006-2010, supplying 600,000 households. Implementation of such a great plan will strongly promote the progress of biogas technology and enable the biogas industry go to a new stage.

livestock farms Biogas plant in Guangdong Province



Wastewater treatment plant at Sugar Factory in Guangxi Province



Biomass technology made good progress

Framework of standard system has been established, and relevant standards are gradually formulated.

Biomass resource here mainly refers to crop straw. From the view of current situation of biomass utilization in China, some of the biomass technology has not been mature enough to be widely applied. The technical limitation and management problem are serious for them to be applied in large scale. Further experiments are necessary to decrease conversion cost and improve the quality of products. At present, a framework of standardization system has been established. Perfection of industrial standards ensures the biomass utilization to develop in order.

Products variety is diversified and technology advanced

Biomass conversion widely used in China include: biogas, straw gasification and central supply, gasification and electricity generation, direct combustion for heating and cooking, briquetting for fuel, etc. The straw gasification and central supply plants can normally supply fuel gas to households. The thermal conversion efficiency is more than 70%. China is researching and developing two types of biomass gasification system for electricity generation: fixed bed gasification and electricity generation system, and fluidized bed gasification and electricity generation system. Biomass direct combustion is used for heating and drying. As an effective approach to consume large amount of crop straw, this method has promising prospect. The prominent problem of biomass briquetting machine is that the press screw and sleeve do not have enough long life. Technology on biological liquid fuel from biomass is now a research project funded by the State Planning Commission and Ministry of Science and Technology. There is a new demonstration plant of Sweet sorghum bioethanol will be established in Inner Mongolia.

Industrialization process is seeking turning point

- In recent years, industrialization of biomass conversion technology in China made a good achievement, and some enterprises and institute able to conduct technology development, equipment production, and plant construction occurred.
- By the end of 2002, there were more than 400 biomass gasification and central supply plants in China, which produced 150 million m³ of fuel gas per year and involved equipment manufacturing output of 900 million RMB yuan.
- Biological liquid fuel mainly refers to bio-ethanol. Chinese Academy of Agriculture Engineering and Beijing Taitiandi Energy Technology Development Company are undertaking a National 863 Project "Fuel Ethanol from Sweet Sorghum". The technology uses sweet sorghum as raw material and produce fuel ethanol by biological conversion technology.

6 kw Biomass-fueled cooking stove



200 kw Palm husk Gasification Generation System Malaysia (Build by China)



Biomass Gasification and Electricity Generation



Project of the Fuel Ethanol from Sweat Sorghum



The Data of the System of the Fuel Ethanol from Sweet Sorghum

1 □ Retention time	8-10h
2 □ Digester temperature	34 □ ± 1 □
3 □ Juice sugar rate	Bx 10-16%
4 □ PH	4 ± 0.5
5 □ Ethanol Rate	6-9% (v/v)

**WELCOME
TO CHINA**

THANK YOU !









**Welcome to
Dalian**

Thank you !