

2006 International Conference on Biofuel - China



Bio-fuels Industry in China: Utilization of Ethanol and Biodiesel in Today and Future

Dr. Yuan Zhenhong
Professor, general Secretary
China Biomass Development Center
15 September, 2006, Beijing

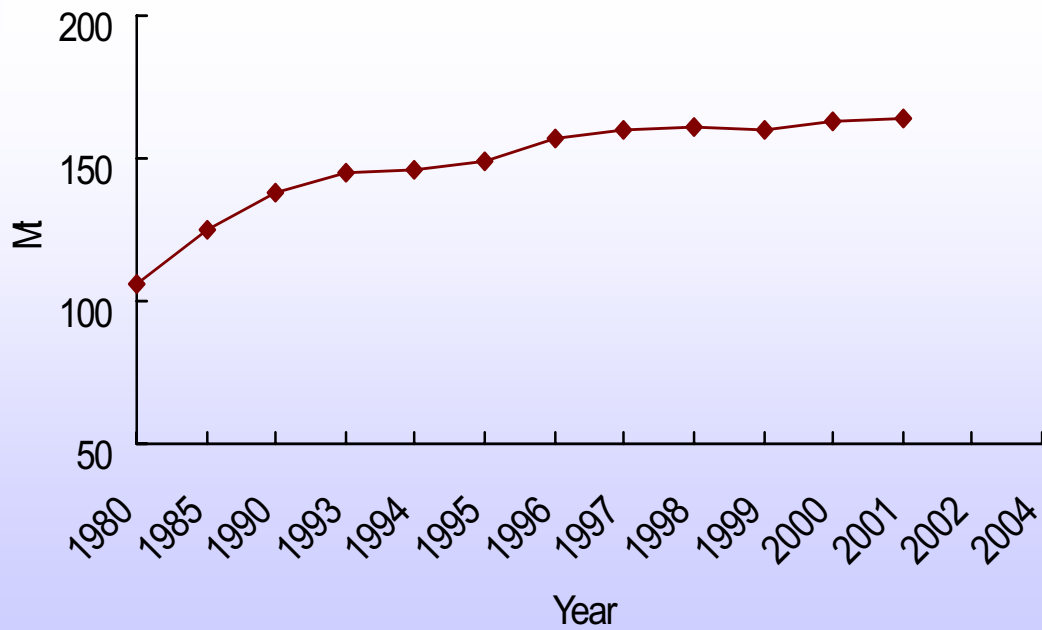
content

- ◆ Biomass resource for liquid fuel
- ◆ Biomass energy utilization technology
- ◆ Efforts of the government and other organizations.
- ◆ Main constraints

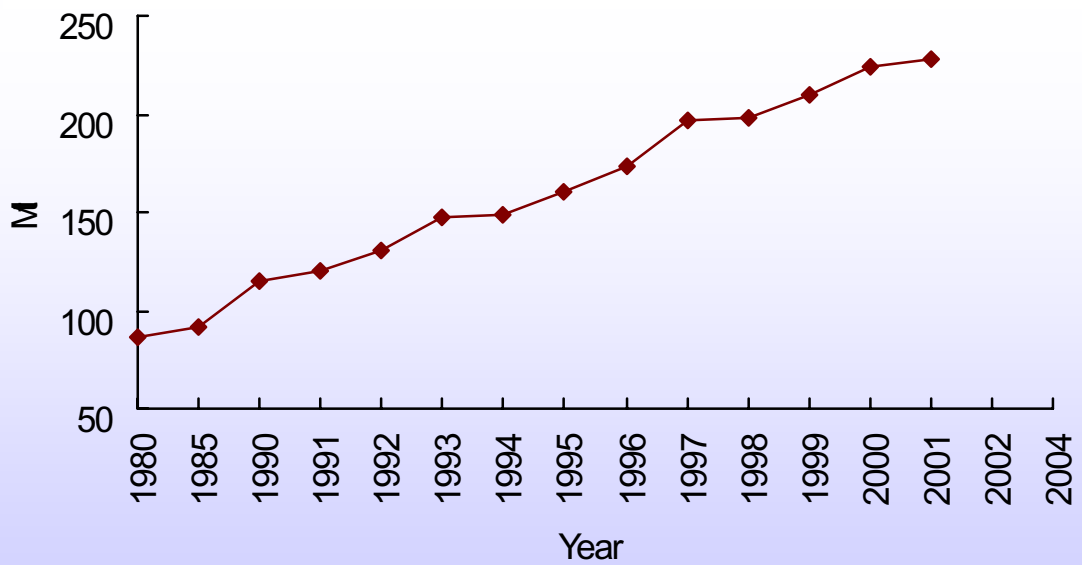




Oil Production in China (1980-2004)



Oil Consumption in China (1980-2004)

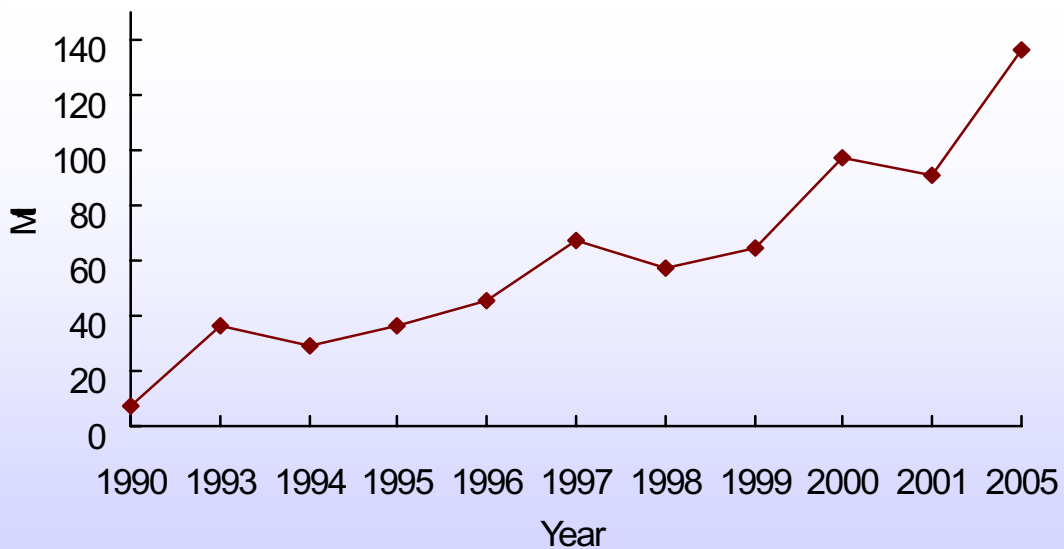


Prediction of Energy in the future

Items\Years	2000	2020	2050
Population (million)	1,256	1,380	1,550
Per Capital GNP (US\$ in 1980)	1,000	2,500	6,000
GNP (billion US\$ in 1980)	1,250	3,450	9,000
Energy Demand (Mtoe)	1,300	2,100	3,780
Oil Demand(Mt)	224	370	660
Energy / GNP (kgoe/US\$)	0.81	0.64	0.46
Energy Saving in Average (%/ year)	3.3	1.0	1.0
Elasticity of Energy Consumption	0.61	0.72	0.61

Oil reserve amount known :17 billion tons, 9.4 billion tons exploitable, 20-30 years.

Oil Import Situation (1990-2005)



2010, oil import up to 160Mt , 2020, 22 ~ 36Mt.
 2020, oil independent to import: 52% ~ 68%.



Existing Bio-ethanol in China



Existing Biodiesel in China

- ◆ Fujian Zuoyue New Energy Co.Ltd
 - 20000 t/y (in operation)
 - 50000t/y (in Construction)
- ◆ Sichuan Gusan Biodiesel Co. Ltd
 - 20000t/y(in operation)
 - 50000t/y (in construction)--fujian
- ◆ Hainan Zhenghe Biodiesel Co.Ltd
 - 10000t/y (in operation)



New conversion technology researched in China

- ◆ Alcohol from lignin-cellulose
- ◆ Alcohol from energy crops
- ◆ Bio-diesel from oil-based Plants
- ◆ Bio-DME through FT process
- ◆ Bio-oil through pyrolysis process



Bio-fuels developed in history

- ◆ **6th “ Five-year Plan” (1980-1985)**
Bio-diesel from waste by soybean oil production in laboratory
Ethanol from cellulose materials in laboratory
- ◆ **7th “ Five-year Plan” (1986-1990)**
Sweet-sorghum for producing alcohol fuel in a pilot system
- ◆ **8th “ Five-year Plan” (1991-1995)**
Biomass liquefaction by pyrolysis in laboratory
Ethanol from cellulose materials in laboratory
Wild oil plants and their uses for bio-fuels in laboratory
Strategy Study on liquid bio-fuels in China
- ◆ **9th “ Five-year Plan” (1996-2000)**
Biomass liquefaction by pyrolysis in laboratory
Ethanol from cellulose materials at a small pilot
Wild oil plant and their uses for bio-fuels in a small scale



Alcohol Production from Cellulose in Shanghai



Process: Acid and enzyme hydrolysis
Capacity: 600 tons of alcohol/year
Location: Shanghai
Material: saw dust and rice draws



Biomass liquefaction by thermal pyrolysis process



← 400 t/y pilot system
山东理工大学

100kg/h pilot system
东北林业大学





Biodiesel Production technology by Enzyme Process



Conversion system



Separation system



Oil plants for bio-diesel

Species: *Pistachia Chinesis* , *Jatrophia Curcas*

Plantation Area: 10000 ha

Location: Sichuan, Henan, Hunan, Yunnan and Hebei

Institute: 3 companies and 3 institutes/universities

Capacity for raw oil: 30000 tons/year

Investment: 45 million RMB Yuan

During: 2001-2005

A base of oil plants for energy



15 species , *camphor*, *maple*, in Hunan

Bases of oil plants for energy

Jatrophia in Sichuan



Pistacia in Sanxi



Alcohol from sweet sorghum

Process: fermentation

Capacity: 3000 tons of alcohol/year

Location: Shandong, Heilongjiang

Institute: 2 companies and 2 institutes

Material: sweet sorghum stalk

Investment: 20 million RMB Yuan

During: 2001-2005



Energy crop: Sweet sorghum



甜高粱种植，山东

中国农业工程规划设计研究院



Ethanol production from sweet sorghum



← A factory in Helongjiang



→ A pilot system in Shandong



Bio-DME through FT process

Process: gasification and FT synthesis

Scale: laboratory

Location: Guangzhou

Institute: Guangzhou institute of Energy conversion, CAS

Material: crop residues and saw dust

Investment: 400,000 RMB Yuan

During: 2003-2005



Financial Input

- ◆ GOC's funds
- ◆ GOC's loan subsidy
- ◆ Local government subsidies
- ◆ Private investments



Major Constraints

1. difficult to collect the material, for wide distribution
2. poor technology industry
3. poor competitive of production
4. policy and market



“National Plan for Renewable Energy” Principia

Bioethanol Made of Sweet Sorghum:5000T/y.

Bio fuel is a very important.It's

Bioethanol & Biodiesel

Sweet sorghum / Sugar cane / Cassava

Construct big scale Industry of bioethanol and base for energy material supply.

Development of technology for Bioethanol from Sweet sorghum / Sugar cane /Cassava.

2010 Bio liquid fuel output 2Mt/y;

2020 Bio liquid fuel output 10Mt/y.

Bio diesel for 1Mt/y.



“中华人民共和国 可再生能源法”

国家鼓励清洁、高效地开发利用生物质燃料，鼓励发展能源作物。国家鼓励生产和利用生物液体燃料。石油销售企业应当按照国务院能源主管部门或者省级人民政府规定，将符合国家标准生物液体燃料纳入其燃料销售体系。

“The Renewable Energy Law-The People's Republic of China ”

The Government encourages the production and utilization of biological liquid fuel. Gas-selling enterprises shall, on the basis of the regulations of energy authorities of the State Council or people's government at the provincial level, include biological liquid fuel conforming to the national standard into its fuel-selling system.



Requirements for Co-operation

- ◆ Cellulose hydrolysis processes
- ◆ Microbe strains for ethanol fermentation
- ◆ New technology for bio-diesel
- ◆ High efficient Energy plants
- ◆ FT synthesis technology for bio-fuels
- ◆ Advance biomass gasification processes for FT synthesis
- ◆ Biomass pyrolysis liquefaction



Thank you

Please contact us:

Address: No.3, Huayuan Road
Beijing, 100083, China

Tel/Fax: +86 10 6200-1047

Email: yuanzh@ms.giec.ac.cn

Website: www.zgswzn.com

Mobile: +86 13901230128