

生物质资源利用与中国环境保护 Biomass Utilization and Environmental Protection of China

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主要内容

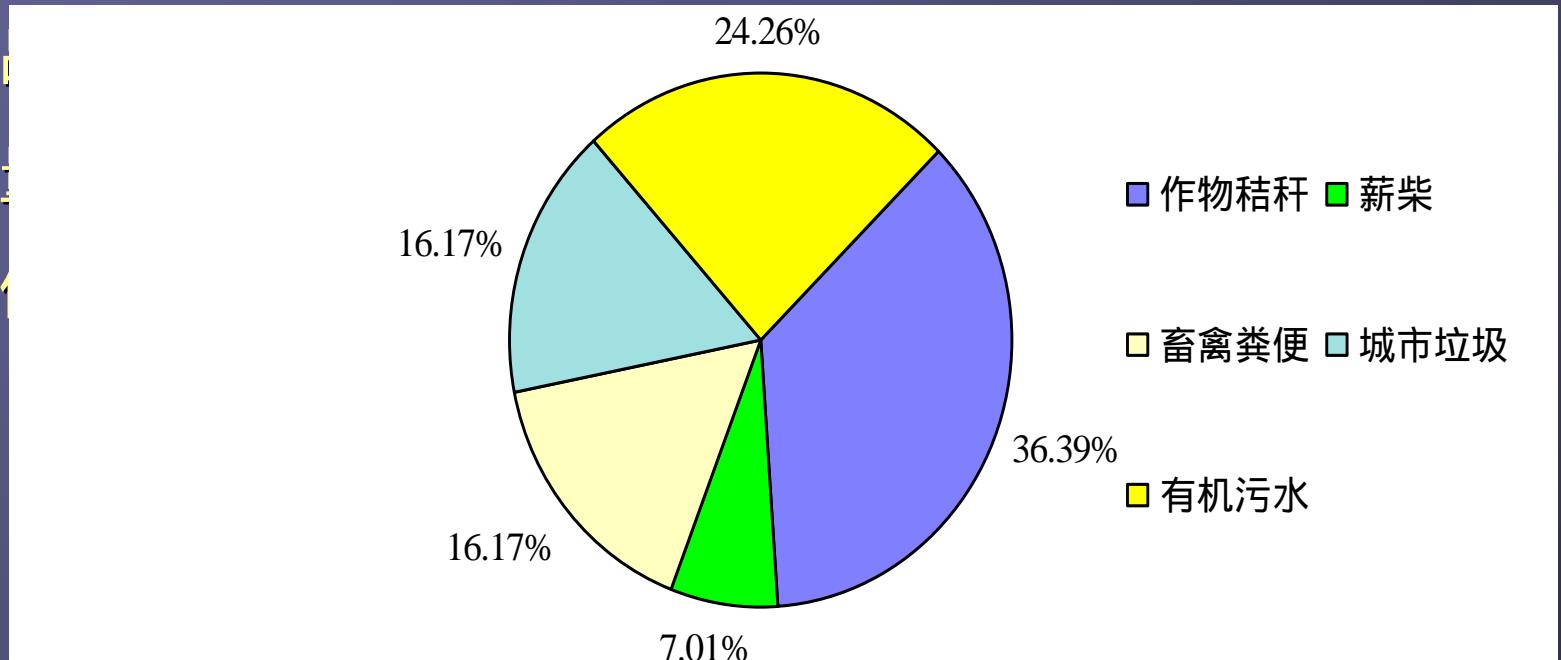
Brief

- 中国生物质资源概况 ;
Biomass resource of China;
- 中国生物质资源利用的主要形式 ;
Main ways of biomass utilization in China;
 - 秸秆利用(Straws)
 - 沼气工程(Biogas)
- 环境保护与中国生物质资源利用 ;
Biomass utilization with China environmental protection;
- 中国生物质资源利用的法律和政策 ;
Law and policy systems of biomass utilization in China;
- 环保总局的行动计划;
Action plans of us, SEPA of China.

中国拥有丰富的生物质资源

China has abundant and large amount of biomass

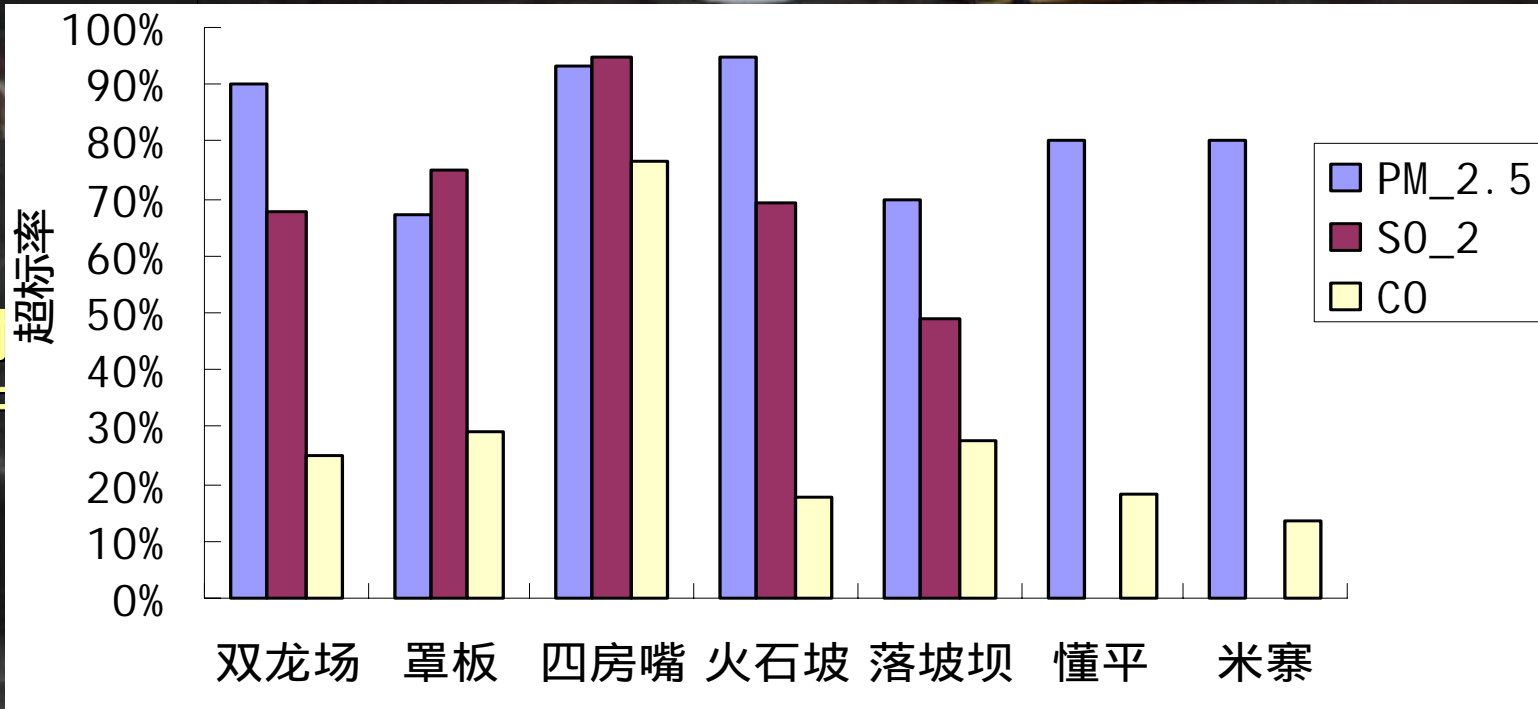
- 秸秆每年7亿吨左右；
- 畜禽粪便每年27 - 36亿吨；
- 食
- 大
- 其



秸秆直接燃烧的农村室内空气污染

Indoor Air Pollution Caused by Straw Direct Combustion in

China Rural Area



我国农村
柴草、牛

Consumptions of Straw

- 秸秆发电站 (Power Plant by Straw Consumptions) ;
- 秸秆气化 (Straw Gasification for household cooking)
 - 降低农户室内空气污染
Control Indoor Air Pollution
- 制作压缩颗粒燃料 (Made into Granule Fuel)
 - 提高秸秆生物质燃烧效率
Increase burning efficiency of straw

秸秆生物质资源的利用途径 Utilization ways of Straw Biomass

1. 秸秆氨化饲料。
Animated Straw as Animal Feed.
2. 秸秆直接还田作为有机肥料。
Straw be used as Fertilizer directly.
3. 秸秆也可以制取颗粒燃料或进行沼气或气化。
Straw Biogas or Gasification for fuel or be made into Granule Fuel.
4. 生产生物酒精。 Alcohol making from Straw.
5. 作为新型建筑材料 Used as New Structural Material.

秸秆生物质资源的利用途径 Utilization ways of Straw Biomass



北京某公司生
产的秸秆颗粒
燃料生产设备

A Straw
Granule Fuel
Instrument
made by a
company of
Beijing

几种成型生物质材料

Some types of Biomass Molding Fuel



BioEnergy From Straw Gasification (aerobic)

About 500-800 Central Gasification Plants in China;

Each has a capacity for 200-500 households gas supply



Advanced Gasification system for Straw



中国秸秆发电的潜力

Straw Electricity Potential of China

□20万吨秸秆可以发电1.2亿度，相当于10万吨标准煤。
200 kilotons of Straw can generate electricity 1200 million kwh, equal to 100 kilo-tons of standard coal.

□当前中国剩余秸秆的发电能力可以节约2亿吨标准煤，相当于产煤大省河南省的一年采煤量。
The power can be generated by available straw of China equal to 200 million tons standard coal just as one of the main coal production area such as Henan province.

□减少了对煤矿的过渡开采，而且大大保护了大气环境和人民生命财产的安全。
Decrease coal production can conserve natural resource and ecology, also can reduce air pollution and secure pepole's safety.

- In the ancient, Chinese people found gases from underground in wetland could be ignited and then the gas mixture was named as “wetland gas” which is called in English as methane or biogas.
- Mr. LUO Guorui, an engineer from Taiwan Province of China improved the Anaerobic Digester design and set up a company to popularize AD supplying heat and light in early 20 Century.
- The founder of New China, Chairman Mao Zedong (Mao Tsetung) used to use biogas in his kitchen for cooking.



The assembled AD underground



Biogas Cooking Stove



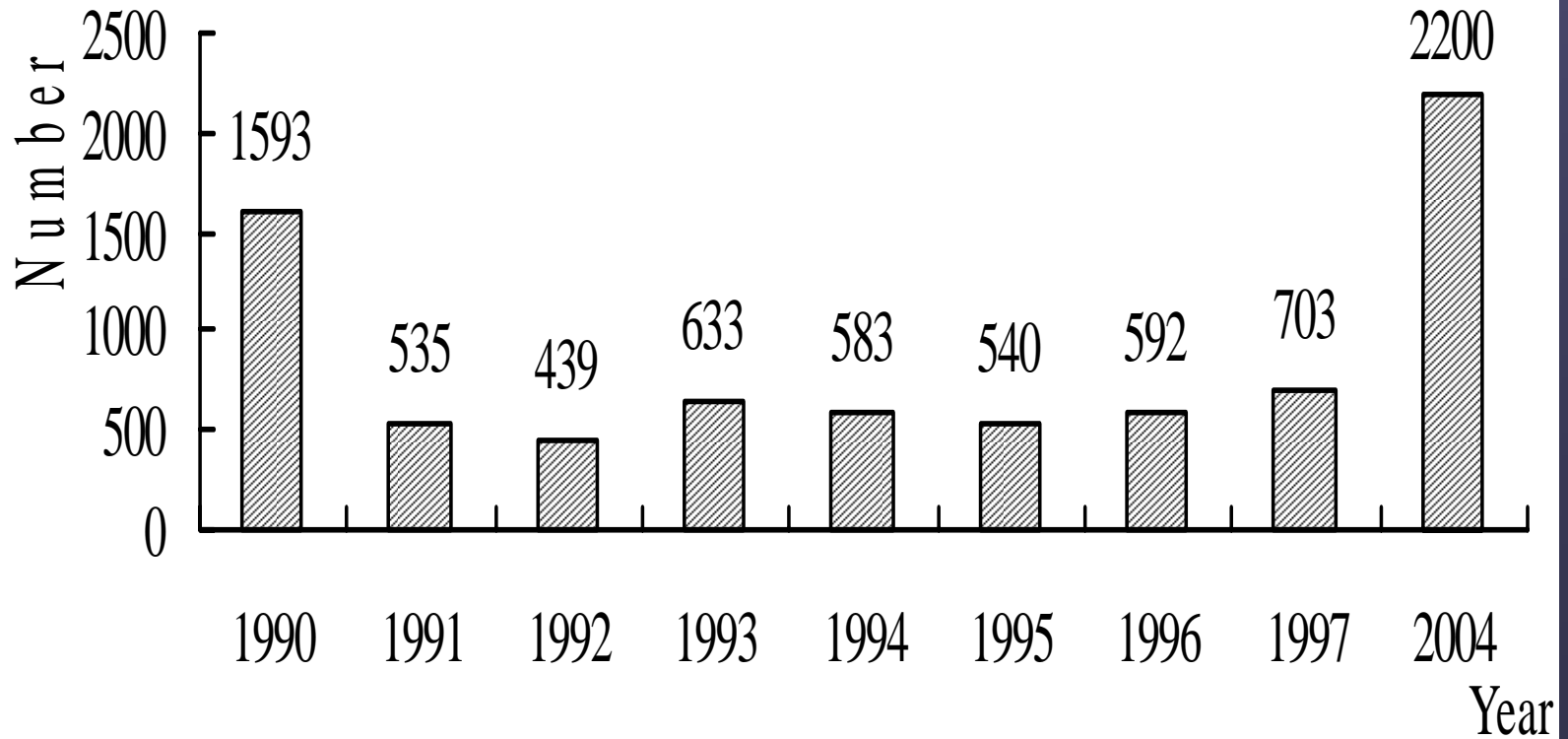
**Biogas
stove**



**The former
stove**

- Rural renewable energy development is listed in China's 21st Century Agenda and National Economic Development Plan.
- In 2002 , as one of priorities to strengthen rural small-scale infrastructure construction, rural biogas development was stressed at the State Working Conference on Rural Issues.

有机废水处理与沼气生产 Organic Waste Water and Biogas Production



酒厂废液 - 效益最高的沼气工程

Alcohol Waste Water-Excellent Source for Biogas Production

- 酒厂废液因为它是高温、高浓度的COD和BOD含量有机废水，不但适合高温厌氧处理，而且含有能量含量很高，沼气产量高。我国已经有利用大型酒厂废液生产沼气向小城市提供生活用能的例子。

Alcohol waste water is organic waste water with high temperature, high load of COD and BOD that is excellent for high temperature aerobic digesting to get large quantity biogas. There are domestic project succeed in China.

Biogas from Organic Wastewater Treatment- Biogas from Distillation Wastewater Treatment

The application of anaerobic technology in the industrial wastewater treatment initiated in Nanyang Alcohol Factory in a Plug Flow Tank in 1960s. This technology was popularly applied in 10 years since then. In 1985 a 600m³ full mixed anaerobic tank was launched in Yantai Alcohol Factory. Then in 1987 two largest 5000m³ Anaerobic Digesters were put into use in Nanyang. The COD load was increased from 2-4kg/.day by plug flow technology up to 8kg/m³.day by full mixed. In 1990s the new technology, UASB was gradually applied. This is a huge biogas production by anaerobic treatment of the effluent. Ten years ago, The Nanyang Alcohol Company produced 10 million m³ biogas per year.

青岛第一酒厂沼气工程

Biogas Project of Qingdao 1st Alcohol Works, Shandong
Province of China



Some National Standards for Biomass Project of China

- GB/T4750-2002
- Standard Design Collection of Household Biogas Plants
- GB/T4751-2002
- Methodology of Household Biogas Plants Evaluation
- GB/T4752-2002
- Standard of Household Biogas Plants Construction
- GB3606-83
- Household Biogas Stove

Some National Standards for Biomass Project of China

- GB7636-87
- Network for Household Biogas Transfer
- GB7637-87
- Household Biogas Transfer Network Construction
- GB9958-88
- Household Biogas Plants Operation
- NY/T344-1998
- Household Biogas Light

生活垃圾 Biomass in Garbage

- Direct Burning of Cities' Garbage
- 垃圾填埋场沼气(Landfill Biogas for Electricity Generating);
——北京郊区的最大的垃圾填埋场已经和韩国的公司合作收集填埋气，通过发电获得经济效益和改善环境。
The biggest landfill field in Beijing has begun generate electricity by landfill biogas and get economic benefits as well as protect the environment.

Environmental Protection Significance of Biomass Multi-utilization

- Increase resource efficiency, upgrade industry's benefits;
- Reduce environmental contamination and ecology destroys, improve environment ;
- Ensure Foods' Safety, promote sustainable development of rural area in China.

中国生物质能开发现状 Biomass Utilization Status quo of China

- 沼气45亿立方米
 - 1300多万口户用沼气
 - 2200多处大中型沼气工程
- 生物质能发电190万千瓦
 - 蔗渣发电170万千瓦
 - 20万千瓦：农林业废弃物、沼气、垃圾焚烧和填埋
- 生物液体燃料（不包括陈化粮）
 - 燃料乙醇5000吨
 - 生物柴油2万吨
- 秸秆气化500多处
- 薪炭林
 - 年产薪柴2500多万吨

National Policies on Biomass Utilization Promotion

- (Feb. 2005)
“ Law of Renewable Energies ”
- (Dec. 2002)
“ Law of Agriculture ”
- (Nov. 1997)
“ Law of Energy Conservation ”
- (Aug. 1993)
“ Regulation of Water And Soil Conservation ”
- (May 2004)
“ Management Act for Rural Biogas Projects Sustained by National Debt ”

National Policies on Biomass Utilization Promotion

- (Some Local Acts) :
 - 2005
(Act for Rural Energy Projects Management of Hunan Province)
 - 2005
(Act for Biogas Development Promotion of Zhejiang Province)

National Policies on Biomass Utilization Promotion

- “Law of Solid Wastes Pollution Prevention” (2005)
- “Act of Livestock Waste Pollution Prevention” (2002)
- “Regulations of Livestock Waste Pollution Prevention”
(Being in made by us)

Introduction of “Livestock Pollution Prevention Regulation”

- Aimed at: Promote health development of livestock.
- Approach: Strengthen managing and monitoring to prevent pollution from livestock and promote wastes multi-utilizations.
 - promote the organic fertilizer industry;
 - promote energy production based on livestock wastes;
 - accelerate multi-utilization of livestock wastes' industrilizaion

Actions of SEPA on Hand

- perfect the law-regulation-act system, set down promoting policies;
- promoting investment increasing, build demonstration projects (e.g. Rural Easy-life Environmental Protection Action Plan by SEPA).
- strengthen public monitoring, arousing public's attending.

Rural Environmental Plans for “Easy-Life” in China to be Actualized

- To Promote “Cultural and Ecology Villages” construction actions
- To Promote “Well-Environment Country (Town)” construction actions
- Rural Garbage and Waste Water Pollution Controlling

Rural Environmental Plans for “Easy-Life” in China to be Actualized

- Straw Multi-Utilization Projects
- Livestock Wastes Multi-Utilization Projects

感谢各位！ Thanks!

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