



International Conference on Bioenergy Utilization and Environment Protection

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CONFERENCE PROCEEDINGS



The International Conference on Bioenergy Utilisation and Environment Protection was held in Dalian, P.R. China, from September 24 – 26, 2003. It was organized jointly by the Latin American Thematic Network on Bioenergy (LAMNET), the Center for Energy and Environment Protection (CEEP) of the Chinese Ministry of Agriculture and the China Association of Rural Energy Industry (CAREI).

LAMNET - Latin America Thematic Network on Bioenergy

Coordination: WIP, Germany

Coordinator/ focal contact point:

Dr. Rainer Janssen (rainer.janssen@wip-munich.de)

Updated information on this workshop is available at <http://www.bioenergy-lamnet.org>.

Workshop Organisation Support

Wang Zengyuan, Beijing Nonghua Technical Development Center – Chinese Ministry of Agriculture, P.R. China

Xiao Mingsong, China Association of Rural Energy Industry (CAREI), P.R. China

Sun Hong, China Association of Rural Energy Industry (CAREI), P.R. China

Zhao Dongjian, Dalian Office of China Center of Social Economy Investigation and Research, P.R. China

Ing. Francesco Cariello, ETA-Florence, Italy

Dr. Giuliano Grassi, European Biomass Industry Association – EUBIA

Dr. Peter Grimm, WIP-Munich, Germany

Dr. Peter Helm, WIP-Munich, Germany

Editor of Workshop Proceedings

Dr. Rainer Janssen, WIP, Germany

Dr. Yao Xiangjun, Center for Energy and Environment Protection (CEEP), P.R. China

Prof. Wang Mengjie, China Association of Rural Energy Industry (CAREI), P.R. China

Published by: WIP-Munich
Sylvensteinstr. 2
81369 Munich, Germany
Phone: +49 89 720 127 35
Fax: +49 89 720 127 91
E-mail: wip@wip-munich.de
Web: www.wip-munich.de

SESSION 1: STRATEGIES AND POLICIES

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Development and Utilisation of Biomass Energy and Related Supporting Policies in China

Prof. Gu Shuhua
Tsinghua University - Energy and Environment Technology Center
Energy Science Building - Tsinghua University, 100084 Beijing, China
Email: shuhua@inet.tsinghua.edu.cn

1. Abundant and Various Biomass Energy Resources in China

Biomass resources which can be used as energy amount to 300 M Tce annually

- Among the annual production of 700 million tons of straw/stalk, 45%, or about 315 M tons (170 M Tce), can be used as energy fuel;
- The annual reasonable used amount of forestry energy is about 160 million tons, equal to 90 million Tce;
- Annual charge of industrial waste water in the whole country is about 23 billion tons, containing more than 5 million tons of BOD. By utilizing this, 9 billion m³ of biogas (about 8 million Tce) may be produced;
- Every year, 900 million tons of poultry and livestock excrement can be collected, equal to 160 million tons of dry materials.
 - 10 billion m³ of biogas (8 million Tce) can be produced in large and medium-size biogas plants
 - 5 billion m³ of biogas (4 million Tce) can be produced in household biogas digesters
- Annual volume of garbage disposal in cities is 180 million tons, from which 18 million Tce of energy can be generated;
- 10 million Tce of energy can be obtained from other resources (pasturage, energy crops, alga, waste water, etc.)

Impact factors of biomass energy development

- Biomass resources are renewable, their amount may vary from time to time;
- Biomass resources are usually used for multiple purpose
- Utilization of biomass energy has closed ties with environmental protection, e.g., returning fields to forestry;
- The level of conversion technology of the biomass energy determines that of the biomass energy utilization .

2. At present, the amount of developed biomass energy in China is about 258 million Tce, mostly used in traditional ways

Annual utilization amount of biomass energy in rural areas amounts to 255 million Tce

- Straw 330 million tons (141 million Tce)
- Firewood 200 million tons (114 million Tce)
- Key Technologies
Stoves 189 million
including 47 million improved stoves and 19 million energy conservation Kang; 2.45 million improved stoves and 0.79 coal-saving Kang are popularized every year

Annual amount of biomass energy developed by new technologies

- Family-sized Biogas Digesters
 - Family number 10.23 million
 - Annual increment 1.78 million
 - Total Output 3.7 billion m³ / 3 million Tce
- Large and Medium-size Biogas Plant
 - Pool volume / number 765.1 thousand m³ / 1570
 - agriculture 425.1 thousand m³ / 1351
 - industry 340.0 thousand m³ / 209
- Annual Biogas Production: 184 million m³ / 0.15 million Tce
- Gasification
 - Number of gas station 488
 - Family number 0.105 million
 - Volume of biogas 152 million m³ / 24,000 Tce
 - Utilized Straws 100,000 tons
- Carbonization
 - Output 3,600 tons
 - Utilized Straws 9,300 tons
- Briquette
 - Output 300 tons
 - Utilized Straws 400 tons

Biomass only occupies a small percentage in the utilization of renewable energy

- Amount : less than solar energy and small hydro power 28,000 MW small hydro power has been developed, equal to 33 million Tce per year;
Over 3.3 million Tce of solar heat and PV has been developed.
- Speed: Lower than that of small hydro power, solar energy and wind energy

3. Future Biomass Conversion Technologies with Great Potentials

- Biomass is one of the safest and most stable renewable energies, which can be converted to different kinds of energy products.

- Power generation fueled by gasified biomass
 - the technology is matured
 - from the viewpoints of environment, safety and utilization mode, power generation and heating fueled by gasified biomass should be encouraged
 - main barriers: connection to the grid, electricity price
- Liquefied Biomass Fuel
 - Liquid fuels such as ethanol and cracked oil are not only clean, but also a strategic measure to reduce our dependence on petroleum so as to guarantee the energy supply safety in China.
 - At present, many countries are paying close attention to the technologies which using lignocelluloses (such as sawdust) to produce liquid fuels.
 - Biomass cracking and liquefaction
 - Producing ethanol by hydrolyzing and ferment
 - MOST is supporting biogas cracking technologies to produce liquid fuels. Current pilot-scale experiment system can produce 600 tons of ethanol and 400 tons of cracked oil annually.
- From Biomass to Hydrogen
 - There's no CO₂ emissions if we produce hydrogen by renewable energies
 - Bio-technologies (alga and bacteria) are focused by the whole world
 - MOST has finished the research of producing hydrogen by biomass. A demonstration system using biomass to produce and metal to store hydrogen has been established, which can produce 1,200 m³ hydrogen every day.

4. Supporting Policies

- Due to the higher cost, renewable energies cannot be developed through market competition
 - Related technologies is still under development. It needs large amount of investment and 20~30 years of time.
 - The scale is too small, and an mature biomass industry has not been formed
 - Supporting policies are quite necessary
- There are already some local and regional policies, but supporting laws at macro level are absent
 - State support to the development of technology, Protective policies
 - Investment subsidies, tax deductions, and waive of customs
- Environment and Resources Committee of China Parliament has made a plan to constitute *Law on Promoting Renewable Energies*
 - Establishment of the "National Target Systems" by legal files
 - Establishment and distribution of incumbency for the renewable portfolio system
 - Green certification, a combination of the government action and the market operation, will be a valuable securities, which can embody the environmental benefits, and can be traded and cashed in the market
 - Priority to enter the grid and production permission system, Public bidding
 - Promise to subscribe by free will (government purchase, volunteer subscribe)
 - Increase investment to support the research, demonstration and development of technologies

LAMNET Project Coordination

WIP

Sylvensteinstr. 2
81369 Munich
Germany

Coordinator: **Dr. Rainer Janssen**

Phone: +49 89 720 12 743

Fax: +49 89 720 12 791

E-mail: rainer.janssen@wip-munich.de

Web: www.wip-munich.de

LAMNET Coordination Partner

ETA – Energia Trasporti Agricoltura
Piazza Savonarola, 10
50132 Florence
Italy

Contact: **Ms. Angela Grassi**

Phone: +39 055 500 2174

Fax: +39 055 573 425

E-mail: angela.grassi@etaflorence.it

Web: www.etaflorence.it

LAMNET Coordination Partner

EUBIA – European Biomass Industry Association
Rond Point Schuman, 6
1040 Brussels
Belgium

Contact: **Dr. Giuliano Grassi**

Phone: +32 2 28 28 420

Fax: +32 2 28 28 424

E-mail: eubia@eubia.org

Web: www.eubia.org

LAMNET Coordination Support Point South America

CENBIO – Centro Nacional de Referência em
Biomassa
Avenida Prof. Luciano Gualberto 1289
05508-900 São Paulo
Brazil

Contact: **Prof. Dr. José Roberto Moreira**

Phone: +55 115 531 1844

Fax: +55 115 535 3077

E-mail: Bun2@tsp.com.br

Web: www.cenbio.org.br

LAMNET Coordination Support Point Central America

Universidad Nacional Autónoma de México
Instituto de Ecología
AP 27-3 Xangari
58089 Morelia, Michoacán, México

Contact: **Dr. Omar Masera**

Phone: +52 55 5623 2709

Fax: +52 55 5623 2719

E-mail: omasera@oikos.unam.mx

Web: www.oikos.unam.mx

Steering Committee

Contact: **Dr. Peter Helm**

E-mail: peter.helm@wip-munich.de



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