Introduction of utilization of straw energy in China

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Abstract

1. Energy consumption and straw resources in China
2. Relevant policies of straw energy
3. Utilization technology of straw energy and its industrial situation
4. Outlook
5. Introduction of relevant associations and exhibitions
1. China Energy consumption 2011

The energy consumption of standard coal is about 3.48 billion tons in China in 2011 (National Bureau of Statistics of China)

- Coal: 68%
- Biomass: <1%
- Natural gas: 18%
- Oil: 5%
- Water, nuclear, wind, electricity: 8%
China straw resources in statistics

- Corn straws, 37%
- Wheat straws, 20%
- Rice straws, 28%
- Cotton straws, 3%
- Tubers, 3%
- Oil crop, 5%
- Beans straws, 4%

Total straw resources: 700 million t.
The application of straws

- Burn and discard: 29%
- Fodder: 32%
- Fuel: 18%
- Fertilizer: 16%
- Industrial raw materials: 2%
- Basic materials of domestic fungus planting: 3%

- 126 million t. for biofuel
- 800,000 t. straw pellets

Industrial raw materials for paper or man-made board
2. Relevant policies of straw energy

11 legal documents, 21 political documents and 3 national planning related to country energy

Electricity price of biomass
Legal project of agriculture and forest biomass carries out benchmarking electricity price of 0.75 Yuan/kwh (highest price of wind power is 0.61 Yuan/kwh, nuclear power is 0.46 Yuan/kwh).

"Administrative Measures for subsides of utilization of straw energy" (Interim)
- registered capital is above 10 million Yuan.
- Utilization of straw energy of enterprice shall comply to the utilization of local straw utilization planning
- Straw energy products of enterprices have alread sold into market and own stable consumers.

subsides of utilization of straw energy: 140 Yuan/ton
3. Utilization technology of straw energy and its industrial situation
Granular technology and standards (Ministry of agriculture NY/T1878-2010)

<table>
<thead>
<tr>
<th>Project</th>
<th>granular fuel</th>
<th>stick (patch) fuel</th>
<th>ENplus 14961</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>main raw materials are herbs</td>
<td>main raw materials are woody plants</td>
<td>main raw materials are herbs</td>
</tr>
<tr>
<td>max size of diameter or cross section (D), mm</td>
<td>≤25</td>
<td>&gt; 25</td>
<td>≤25mm±1.0 mm</td>
</tr>
<tr>
<td>length, mm</td>
<td>≤4D</td>
<td>≤4D</td>
<td>3.5-40mm/10-50mm</td>
</tr>
<tr>
<td>density of formed fuel, kg/m³</td>
<td>≥1000</td>
<td>≥800</td>
<td></td>
</tr>
<tr>
<td>moisture content, %</td>
<td>≤13</td>
<td>≤16</td>
<td>≤10%-15%</td>
</tr>
<tr>
<td>ash content, %</td>
<td>≤10</td>
<td>≤6</td>
<td>≤12</td>
</tr>
<tr>
<td>lower heating value, MJ/kg</td>
<td>≥13.4</td>
<td>≥16.9</td>
<td>≥13.4</td>
</tr>
<tr>
<td>break ratio</td>
<td>≤5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
subsidiary function index

sulfur content% : ≤0.2
potassium content% : ≤1
chlorine content% : ≤0.8
addictive %: nontoxic, odorless, harmless ≤2
Manufacture: more than 260
Productivity: 767,000 tons
Replace coal: 383,000 tons
Reducing greenhouse gases emission: 830,000 tons
Increasing income and reducing expenses for countryside: 230 Mio. RMB
Straw Pellets Manufacturer

BMF Devotion Corporation  www.devotiongroup.com

Aoke Ruifeng Co.,Ltd  www.bjakrf.com

Beijing Shengchang Bioenergy S&T Co.,Ltd  www.bj-sbst.com

Jinzhou LN Bioenergy Deve.Co.,Ltd  www.lnqygroup.com


Huinan Hongri Xinnengyuan Co.,Ltd  www.hrxy.com
3.1.2 Biomass Pellet Mill

Productive capacity (t/h): 1.0-1.52
Power of main generator (kw): 90/110
Pellet formation rate: ≥95%

Productive capacity (t/h): 0.6-1
Power (kw): 55
Diameter of flat die (mm): φ600
Pellet specification (mm): φ6-12
Applied raw material: various crop straws, peanut shell, wood chips etc.
3.1.2 Biomass Pellet Mill

Major processing location is City Liyang, Province Jiangsu

Powerful suppliers for Product line

Shanghai Shende Machinery Co., Ltd www.shendemach.com

Muyang Group www.muyang.com

Liyang Rongda Equipement Co., Ltd www.lyrdgj.com
Foreign enterprises

Bühler Group

Andritz Group

Sprout-Matador A/S
3.1.3 boiler and stove for Biomass/Straw

- **Cooking stove:**
  - $\eta_C \geq 35\%$
  - countryside kitchen work

- **Heating stove:**
  - $\eta_N \geq 65\%$
  - concentrated bath etc.

- **Stove for cooking and warm:**
  - $\eta_{CN} \geq 60\%$
  - countryside cooking work and getting warm

- **Industrial boiler:**
  - provide warm water or steam
4. Outlook

4.1 Mid and long-term planning of sustainable energy
(1) 2010 500 demonstration places annual utilization among 1 million tons
(2) 2020 -------------------------------------------------- 50 million tons

4.2 Development planning of agricultural biomass industry
2010/ 1000 stations/ annual production of straw gases: 365 million m³
2015/ 2000 stations/ annual production of straw gases: 730 million m³

4.3 108 green energy demonstration towns
Support every town to build biomass formation fuel manufacture with a minimum annual production of 5000 tons, and which can provide heat to at least 1000 public institutions.
Electricity-generation by biomass

- 87 projects with 2.2 million KW installed scale by the end of 2007

- "Mid and long-term planning of sustainable energy" made the developing target that 30 million kw biomass electricity generation machine will be installed by the end of 2020

- Legal project of agriculture and forest biomass carries out benchmarking electricity price of 0.75 Yuan/kwh
1. Costs issues
2. Administrative supervision issues
3. Financial issues
Restricted issues of straw energy development in China

1. Purchasing raw materials: 220 Yuan/ton
2. Production costs: 350-400 Yuan/ton
3. Transportation costs
4. Coking problems
5. Boiler improvement fees
5. Organizations and exhibitions

Government:
National Development and Reform Committee (NDRC)
Ministry of Agriculture
Ministry of Science and Technology (MOST)
Ministry of Finance and so on (MOF)

Associations:
China Low-Carbon Economy Promotion Association
China Sustainable Energy Association
China Rural Energy Industry Association and so on
5. Organizations and exhibitions

Exhibitions:

China Low-carbon Economy Forum

China Low Carbon and New Energy Industry Expo.

China International Biomass Energy Expo and Marsh Gas Forum

Thank you for your attention!

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