Circumstances surrounding the utilization of Biomass

The change after the establishment of the Fundamental Law of Promoting Usage of Biomass
1. History of Major Biomass-Related Measures
2. Overview of the Fundamental Law of Promoting Usage of Biomass
3. Promotional organization for biomass-related measures
4. Overview of biomass commercialization strategy
5. Goals of the new basic plan for biomass usage
6. Overview of the new basic plan for biomass usage promotion

Progress of the basic plan for biomass utilization promotion
7. Goals that the nation should achieve in the basic plan for biomass usage promotion
8. Expansion of biomass usage
9. Drawing on the plan for promoting biomass usage
10. Scale of biomass industries

(Archive) Examples of major activities

April, 2017
Biomass Policy Division Food Industry Affairs Bureau
MAFF
1. History of Major Biomass-Related Measures

- **Comprehensive Biomass Nippon Strategy** (decided on by the Cabinet in December 2002, revised in March 2006)
  - Agriculture, forestry and fishery biofuel law (enacted in May 2008, enforced in October 2008)
  - Basic plan for promoting usage of biomass (decided on by the Cabinet in December 2010)
  - Great East Japan Earthquake and Fukushima nuclear power plant accident (2011.3)
  - Biomass commercialization strategy (decided by the biomass utilization promotion council on September 2012)
  - Basic plan for promoting the formulation of recycling-oriented society (decided by the Cabinet on May 2013)
  - Environmental Energy Technology Innovation Plan (decided by the Council for Science and Technology Policy on September 2013)
  - Energy basic plan (decided by the Cabinet on April 2014)
  - Basic Plan for Food, Agriculture and Rural Areas (decided by the Cabinet on March 2015)
  - Long-term energy supply and demand outlook (decided by the Ministry of Economy, Trade and Industry on July 2015)
  - Draft of commitments to reduce greenhouse gasses (decided by the Global Warming Prevention Headquarters on July 2015)
  - Priority plan for social capital equipment (decided by the Cabinet on September 2015)
  - Science and technology plan (decided by the Cabinet on January 2016)
  - Global warming measures plan (decided by the Cabinet on May 2016)
  - Basic Plan for Forest and Forestry (decided by the Cabinet on May 2016)
  - New basic plan for biomass usage promotion (Decided by the Cabinet on September 2016)

**Biomass commercialization strategy**
- Drawn on "Technology roadmap" which has assessed a wide variety of biomass utilization technologies
- Promotion of the commercialization by selecting and concentrating technology and biomass
- Town and village whose main industry will be made into a biomass oriented industry (promotion of biomass industrial city)

**Long-term energy supply and demand outlook**
The target amount of biomass power generation in 2030
→ Approximately 3.7 to 4.6% of power supply (39.4 to 49.4 billion kWh)

**Draft of commitments to reduce greenhouse gasses**
Reduction of -26.0% in FY2030 compared to FY2013 (-25.4% compared to FY2005)

**Global warming measure plan**
(Mid-term goal)
In FY2030, making it the level of -26.0% compared to FY2013 (-25.4% compared to FY2005)
(Long-term goal)
Aim to reduce 80% of greenhouse gasses by 2050FY

**Basic plan for biomass usage promotion**
(Goal setting in 2025)
- Use about 26 million tons of carbon biomass per year
- Drawn on the biomass usage promotion plan in 600 municipalities
- Forming a market of 500 billion yen

**Comprehensive Biomass Nippon Strategy**
(Goal setting in 2010)
Utilization of wasted-based biomass 80% or more and unutilized biomass 25% or more, etc.

**The Fundamental Law of Promoting Usage of Biomass**
- Aims comprehensive and planned promotion of biomass utilization policy
- Drawing up the National Plan for the Promotion of Biomass Utilization
- Setting up the National Biomass Policy Council
2. Overview of the Fundamental Law of Promoting Usage of Biomass (June 12, 2009, Law No. 52)

<table>
<thead>
<tr>
<th>Basic principles</th>
<th>Legislative measures, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Comprehensive, integrated and effective promotion</td>
<td>○ Maximum utilization in accordance with the characteristics of each type of biomass</td>
</tr>
<tr>
<td>○ Promotion for the prevention of global warming</td>
<td>○ Diversifying energy supply sources</td>
</tr>
<tr>
<td>○ Promotion for the formation of a recycling-oriented society</td>
<td>○ Promoting independent-minded efforts in area</td>
</tr>
<tr>
<td>○ Contributing to strengthening of industrial development and international competitiveness</td>
<td>○ Fostering social momentum</td>
</tr>
<tr>
<td>○ Promoting contribution to the revitalization of agricultural, forestry, and fishing villages</td>
<td>○ Ensuring stable supply of food</td>
</tr>
<tr>
<td>○ Maximum utilization in accordance with the characteristics of each type of biomass</td>
<td>○ Consideration for conservation of environment</td>
</tr>
<tr>
<td>○ Diversifying energy supply sources</td>
<td>○ Promoting independent-minded efforts in area</td>
</tr>
<tr>
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<tr>
<td>○ Ensuring stable supply of food</td>
<td>○ Consideration for conservation of environment</td>
</tr>
<tr>
<td>○ Consideration for conservation of environment</td>
<td>○ Promoting independent-minded efforts in area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strengthening responsibilities and cooperation</th>
<th>National measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarifying the responsibilities of the nation, local governments, and businesses and strengthening the cooperation of each entity.</td>
<td>○ Maintaining required infrastructure</td>
</tr>
<tr>
<td></td>
<td>○ Creating businesses to supply biomass</td>
</tr>
<tr>
<td></td>
<td>○ Research &amp; development and diffusion of technology</td>
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<td></td>
<td>○ Developing and ensuring human resources</td>
</tr>
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<td></td>
<td>○ Promoting the utilization of biomass products</td>
</tr>
<tr>
<td></td>
<td>○ Promoting voluntary activities of private organizations</td>
</tr>
<tr>
<td></td>
<td>○ Promoting the activities of local governments</td>
</tr>
<tr>
<td></td>
<td>○ Promoting international coordination and cooperation</td>
</tr>
<tr>
<td></td>
<td>○ Collecting information</td>
</tr>
<tr>
<td></td>
<td>○ Increasing the nation's understanding</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drawing on the basic plan for promoting biomass usage</th>
<th>Promotion conference for biomass usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>National biomass usage Nation’s basic plans for biomass usage promotion</td>
<td>① By coordinating mutually the related administrative authorities, the government shall establish the promotion conference for biomass usage in order to carry out comprehensive, integrated and effective promotion of biomass usage.</td>
</tr>
<tr>
<td>Prefectural &amp; municipal biomass usage promotion plans</td>
<td>② The related administrative authorities shall establish the expert meeting for biomass usage promotion consisting of people who have expertise regarding biomass usage, and when coordinating ①, the authorities shall hear their opinions.</td>
</tr>
</tbody>
</table>
Based on the Fundamental Law of Promoting Usage of Biomass (June 12, 2009, Law No. 52), "Biomass usage promotion council" consisting of the government businesses of the relevant 7 ministries (Cabinet office, Ministry of Internal Affairs and Communications, Ministry of Education, Culture, Sports, Science and Technology, Ministry of Agriculture, Forestry and Fisheries, Ministry of Economy, Trade and Industry, Ministry of Land, Infrastructure, Transport and Tourism, and Ministry of the Environment) was set up, and promotes the measures contributing to biomass utilization in cooperation.

The member of Biomass utilization promotion council

State Minister of Agriculture, Forestry and Fisheries

Parliament Vice-Minister of Cabinet Office

Parliament Vice-Minister of Internal Affairs and Communications

Parliament Vice-Minister of Education, Culture, Sports, Science and Technology

Parliament Vice-Minister of Economy, Trade and Industry

Parliament Vice-Minister of Land, Infrastructure, Transport and Tourism

Parliament Vice-Minister of the Environment
4. Overview of the new basic plan for biomass usage promotion (Decided by the Cabinet Council on September 16, 2016)

- Plan to determine basic policies on measures to promote the utilization of biomass, goal to be achieved by the national government, matters concerning research and development of technology, based on the Fundamental Law of Promoting Usage of Biomass (Heisei 21, law No. 52).
- Under the previous basic plan (decided on by the Cabinet December 17, 2010), The market size of the biomass industry was expanded mainly on energy use, but the bias was seen in the activities of selling electricity leveraging the fixed price buying system, and in activities other than the selling of electricity, the challenge is to establish a continuous business model which is based in an area and about for the economy can be ensured.

1. Basic policy on measures

By leveraging the biomass existing in areas, create the businesses led by area, and promote measures which lead to the development of agricultural, forestry, and fisheries and revitalization by returning profits to areas.

2. Goals which the nation should achieve (Target: 2015)

<table>
<thead>
<tr>
<th>Sustainable society with less environmental impact</th>
<th>Revitalization of agricultural, forestry, fishery industries and agricultural, forestry, fishery villages</th>
<th>Creation of new industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use about 26 million tons of carbon of biomass per year</td>
<td>Drawing on the biomass usage promotion plan in all prefectures and 600 municipalities</td>
<td>Forming the market of 500 billion yen</td>
</tr>
</tbody>
</table>

3. Measures which the government should take comprehensively and effectively

- Support activities led by regional areas such as multi-step use and advanced utilization that generates more economic value.
- Expanding the dissemination of heat use with high energy efficiency, and promoting the proactive usage of biogas as a heat source.
- Promoting horizontal development of activities by broadly sharing knowledge of successful cases

4. Matters related to research and development of technology

- Mixture usage of various biomass according to the actual circumstances of regional area, and the establishment of the production and usage methods of hydrogen gas derived from sewage sludge.
- Establishing the usage technology of by-products such as the surplus heat accompanying power generation and the digestion liquid occurring in the producing process of biogas.
- Promoting the research and development of next-generation biofuels by micro-algae, etc in anticipation of industrialization

**Priority items**

- Strengthening the activities which secured economy
- Promoting the sustainable and self-reliant activities which return profits to regional areas

- Promoting practical use and high added value
5. Goals of the new basic plan for biomass usage

Activities to generate more economic value

- Advanced use (Generate more economic value)
  - Livestock excrement → Composting → Compost
  - Livestock excrement → Anaerobic fermentation → Biogas
  - Biogas → Electricity, Heat
  - Digestive juice → Reduction to farmland & meadow

Multi-step use (Use the limited resources thoroughly)

- Heat utilization (Promoting better energy-efficient heat use)
  - In the agricultural production sites and regional heat demand facilities, heat utilization can be expected to be alternative for fossil fuel.
  - Half of energy demand is for heat, especially about 80% of the energy consumption in agricultural production sites is heat utilization, so promote heat utilization of biomass.
  - The energy efficiency of heat utilization is better than power generation. (Heat utilization: about 60 to 90%, Power generation: about 10 to 40%)
  - Accelerate the activities of "cogeneration" that precedes the utilization of surplus heat in power generation which is not currently utilized sufficiently.

Activities in which the earned profits are returned to regional areas

① Industrial development & job creation
  - Create new industries by which biomass existing in regional areas can be transformed and utilized as energy or products.
  - The cost saving by ② & ③ can be allocated for the expansion of operation size, etc.
  - New employment opportunities can be created by the above activities.

② Reduce waste disposal costs and efforts
  - The processing costs and efforts for transportation are reduced by using the waste biomass to advanced use, such as livestock excrement and non-edible parts of farming products occurring at the agricultural livestock industry production sites where waste disposal was conducted until now.

③ Supply cheaper energy and products
  - The bearing of costs required for energy until now is reduced by providing the products and electric & heat energy at a low cost which is obtained by conversion technology of biomass to regional farmers or public facilities.

Sharing successful cases widely & horizontal deployment of businesses

- Sustainable society with less environmental impact
- Revitalization of agricultural, forestry, fishery industries and agricultural, forestry, fishery villages
- Creation of new industry
6. Overview of biomass commercialization strategy (decided by the biomass utilization promotion council on September 6, 2012)

**Strategy 1: Basic strategy**
- Prioritized promotion of commercialization by selecting and concentrating technology and biomass
- Building an integrated system from raw material production, collection, transportation, production, to utilization by stakeholders’ cooperation
- Creating regional industries by promoting commercialization by leveraging regional biomass, and strengthening autonomy & distributed energy supply system.

**Strategy 2: Technology strategy (technology development and manufacturing)**
- Organize practical use technology and biomass utilized for commercialization, based on the technology road map
  - Technology: Methane fermentation & composting, direct combustion, solid fuelification, liquid fuelization
  - Biomass: Wood, food waste, sewage sludge, livestock excrement
- Accelerate the development of technologies aiming for practical application through cooperation among research institutes of industry, academia, and government

**Strategy 3: Exit strategy (creation & expansion of demand)**
- Proactive utilization of the Fixed price purchase system
- Promote the biomass-related tax system to encourage the participation of investors and businesses
- Promote the reduction of greenhouse gasses by utilizing each Credit system
- Promote commercialization by creating high added-value products

**Strategy 4: Entry strategy (raw material procurement)**
- Improve the upriver agricultural and forestry organizations integrated with biomass utilization
- Build an effective collecting and transportation system for biomass
- Develop energy crops and plants of high biomass quantity and easy decomposability, etc.
- Mixed use of a wide variety of biomass resources and thorough use of waste

**Strategy 5: Individual priority strategy**

1. **Woody biomass**
   - Build an effective collecting and transportation system of the unused lumber from thinning, etc and promote integrally and intensively the use of energy at woody power plants

2. **Food waste**
   - Promote the thorough and strengthened classification waste dumping, bio-gasification, mixed use with other biomass, and conversion of waste to solid fuels

3. **Sewage sludge**
   - As the base for regional biomass utilization, promote bio-gasification, mixed use with food waste, and recycling by conversion of waste to solid fuels

4. **Livestock excrement**
   - Promote the utilization of recycling by methane fermentation, direct combustion, and mixed use of food waste, etc.

5. **Bio fuel**
   - Study measures to embody the possibility of regional recycle-oriented biofuel utilization integrated with regional farmers whose regions have a large production plant
   - Diffuse low-concentration utilization by the bio-diesel fuel tax system, etc. and develop a high-efficiency and low-cost production system
   - Accelerate the development of next-generation biofuel production technology through collaboration among research institutes
Progress of the basic plan for biomass utilization promotion
7. Goals that the nation should achieve in the basic plan for biomass usage promotion

- The current basic plan assumes a society with advanced biomass utilization that should be realized in the future, and as an indicator to determine the level of achievement of "global warming prevention", "development of new industry", and "revitalization of agricultural, forestry, fishery, and agricultural, forestry, fishery villages" which are pillars, it sets a target value which the nation should achieve by 2025 with the evaluation axis of the expansion of biomass utilization, the size of new biomass industries, and drawing on the biomass utilization promotion plan.

A society with advanced biomass utilization that should be realized in the future
- Sustainable society with less environmental impact
- Creation of new industries and revitalization of agricultural, forestry, fishery industries and agricultural, forestry, fishery villages
- New lifestyles centered on biomass utilization
- Biomass utilization under international cooperation

Set the required goals (2025) to achieve future image

Prevention of global warming and formation of recycling-oriented society
**Expansion of biomass usage**
- Biomass of approximately 26 million tons of carbon per year in carbon conversion amounts are utilized by substituting the energy and products produced by using fossil resources for what is derived from biomass
- Set the goal of utilization rate for each type of biomass

Revitalization of agricultural, forestry, fishery industries and agricultural, forestry, fishery villages
**Drawing on the plan for promoting biomass usage**
- Draw on the prefectural biomass utilization promotion plan in all prefectures
- Draw on the municipal biomass utilization promotion plan in 600 municipalities which are equivalent to one-third of all municipalities

Development of new industries and strengthening of international competitiveness
**Scale of biomass industries**
- Cultivate environmentally harmonious industries which utilize biomass for energy and products, and form a market of 500 billion yen with the assumption that these industries would will progress
8. Expansion of biomass usage

- The amount of generated biomass (potential quantity) tends to decline over the mid-and-long term due to activities of suppressing the occurrence of waste-based biomass.
- The carbon quantity conversion value of usage is approximately 24 million tons at present, but the aim is that approximately 26 million tons will be utilized in 2025.
- Set the goals for each type of biomass in order to promote the advanced utilization that creates more economic value, while considering the existing usage method.

### Mid-and-long term trends

<table>
<thead>
<tr>
<th>Year</th>
<th>Generated amount of biomass</th>
<th>Usage of biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 (Heisei 22)</td>
<td>Approx. 35 million tons</td>
<td>Approx. 23 million tons</td>
</tr>
<tr>
<td>2015 (Heisei 27)</td>
<td>Approx. 34 million tons</td>
<td>Approx. 24 million tons [Utility ratio] About 70.6%</td>
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<tr>
<td>2025 (Heisei 37)</td>
<td></td>
<td>[Forecast] Approx. 32 million tons</td>
</tr>
</tbody>
</table>

#### Utilization ratio

<table>
<thead>
<tr>
<th>Types of biomass</th>
<th>Generation amount</th>
<th>Utilization amount</th>
<th>Utilization ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste biomass</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Livestock excrement</td>
<td>Generation amount: 4.86 million tons</td>
<td>Utilization amount: 4.19 million tons</td>
<td>87%</td>
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<tr>
<td>Sewage sludge</td>
<td>900 thousand tons</td>
<td>660 thousand tons</td>
<td>63%</td>
</tr>
<tr>
<td>Black liquor</td>
<td>4.13 million tons</td>
<td>3 million tons</td>
<td>100%</td>
</tr>
<tr>
<td>Paper</td>
<td>8.29 million tons</td>
<td>690 thousand tons</td>
<td>81%</td>
</tr>
<tr>
<td>Food waste</td>
<td>690 thousand tons</td>
<td>170 thousand tons</td>
<td>24%</td>
</tr>
<tr>
<td>Waste materials from sawmill factories, etc.</td>
<td>3.2 million tons</td>
<td>3.1 million tons</td>
<td>97%</td>
</tr>
<tr>
<td>Wood chips derived from construction</td>
<td>2.2 million tons</td>
<td>2.07 million tons</td>
<td>94%</td>
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<tr>
<td>Unused biomass</td>
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<td></td>
</tr>
<tr>
<td>Non-edible parts of crops (except for plowed-in parts)</td>
<td>4.48 million tons</td>
<td>4.12 million tons</td>
<td>32%</td>
</tr>
<tr>
<td>Unused biomass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leftover forest wood</td>
<td>4 million tons</td>
<td>360 thousand tons</td>
<td>9%</td>
</tr>
</tbody>
</table>

*The forecast of biomass generation amount in 2025 is estimated by approximate expression from the past actual value.*
9. Drawing on the plan for promoting biomass usage

- The drawn number of the biomass utilization promotion plans is currently 16 prefecture plans and 41 municipality plans (if including similar measures, 374 municipalities excluding duplications), and the aim is to have drawn plans for all prefectures and 600 municipalities by 2025.

The drawing of a regional plan to promote biomass utilization (surveyed by the Ministry of agriculture, forestry and fishery (as of October 2016))

<table>
<thead>
<tr>
<th>Prefecture Name</th>
<th>Prefecture Planning</th>
<th>Municipalities of Japan Number of plans</th>
<th>Biomass town plan</th>
<th>Biomass Industrial city plan</th>
<th>(Reference) Similar measures Number of municipalities that have plans</th>
<th>Prefecture Name</th>
<th>Prefecture Planning</th>
<th>Municipalities of Japan Number of plans</th>
<th>Biomass town plan</th>
<th>Biomass Industrial city plan</th>
<th>(Reference) Similar measures Number of municipalities that have plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hokkaido</td>
<td>Already planned</td>
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<td>Aomori</td>
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<td>Iwate</td>
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<tr>
<td>Miyagi</td>
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<td>Fukuoka</td>
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<td>Tochigi</td>
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</tbody>
</table>
### 9. Drawing on the plan for promoting biomass usage

<table>
<thead>
<tr>
<th>Prefecture Name</th>
<th>Prefecture Planning</th>
<th>Municipalities of Japan Number of plans</th>
<th>(Reference) Similar measures Number of municipalities that have plans</th>
<th>Biomass town plan</th>
<th>Biomass Industrial city plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gunma</td>
<td>Already planned (March, 2017 revision)</td>
<td>1</td>
<td>5</td>
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<tr>
<td>Saitama</td>
<td>Already planned (April.1, 2012)</td>
<td>0</td>
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<tr>
<td>Chiba</td>
<td>Already planned (August.12, 2011)</td>
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<td>Yamanashi</td>
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<td>Shizuoka</td>
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<td>4</td>
<td>2</td>
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<tr>
<td>Osaka</td>
<td>Not planned yet</td>
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<td>Hyogo</td>
<td>Already planned (April.18, 2016)</td>
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<td>10</td>
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<tr>
<td>Nara</td>
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<tr>
<td>Wakayama</td>
<td>Not planned yet</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Tottori</td>
<td>Not planned yet</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Shimane</td>
<td>Already planned (March.29, 2013)</td>
<td>1</td>
<td>9</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Okayama</td>
<td>Not planned yet</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hiroshima</td>
<td>Not planned yet</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Kumamoto</td>
<td>Already planned (March, 30, 2012)</td>
<td>1</td>
<td>11</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Miyazaki</td>
<td>Already planned (April.12, 2013)</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Oita</td>
<td>Already planned (March.1, 2016)</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Kagoshima</td>
<td>Already planned (March, 2017 revision)</td>
<td>2</td>
<td>15</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Okinawa</td>
<td>Not planned yet</td>
<td>1</td>
<td>6</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>18</td>
<td>41</td>
<td>318</td>
<td>68</td>
<td></td>
</tr>
</tbody>
</table>

※Overlap is excluded

**Goal** 47 600
10. Scale of biomass industries

- Regarding the market size of the biomass industry, although it was about 120 billion yen including the economic ripple effect at the time of formulating the basic biomass utilization plan, it expanded mainly on the power generation efforts utilizing the fixed price acquisition system, Approximately 350 billion yen (about 70%)
- Under the new basic plan, we will aim to establish a market of 500 billion yen in 2025, while also promoting expansion of the market size for efforts other than power generation.

**Estimation of the market size of the biomass industry** (surveyed by the Ministry of Agriculture, forestry, and fisheries: preliminary version)

<table>
<thead>
<tr>
<th>Year</th>
<th>Market Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010 (Heisei 22)</td>
<td>Approximately 120 billion yen</td>
</tr>
<tr>
<td>2015 (Heisei 27)</td>
<td>Approximately 350 billion yen</td>
</tr>
<tr>
<td>2025 (Heisei 37)</td>
<td>Approximately 500 billion yen</td>
</tr>
</tbody>
</table>

Note: Fertilizers, feeds, etc., which clearly have markets since the formulation of the Basic Biomass Promotion Plan, are excluded from estimation.

Note: The economic ripple effect is calculated using a simplified calculation tool for economic ripple effect by the integrated large classification (37 divisions) based on the input-output table published by the Ministry of Internal Affairs and Communications.
A biomass industrial area is a region for building an integrated system that ensures economy and aims to develop a town/village centered biomass industry that makes use of distinctive characteristics, and that is environmentally-friendly and strong for disasters, and the related 7 ministries jointly selected.


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1. About Biomass Industrial Area

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Image
12. **Selected regions of biomass industrial area**

**FY 2013** (36 Municipalities)

Primary Selection (28 Municipalities)
1. Tokachi region, Hokkaido (19 Municipalities)
2. Shimokawa-cho, Hokkaido
3. Bekkai-cho, Hokkaido
4. HigashiMatsushima-shi, Miyagi
5. Ushiku-shi, Ibaraki
6. Niigata-shi, Niigata
7. Obu-shi, Aichi
8. Mitoyo-shi, Kagawa

Secondary Selection (8 Municipalities)
9. Kushiro-shi, Hokkaido
10. Okoppe-cho, Hokkaido
11. Minamisanriku-cho, Miyagi
12. Hamamatsu-shi, Shizuoka
13. Tsu-shi, Mie
14. Okuzumo-cho, Shimane
15. Maniwa-shi, Okayama
16. Nishiawakura-son, Okayama

**FY 2014** (6 Municipalities)
17. Imizu-shi, Toyama
18. Sumoto-shi, Hyogo
19. Okinoshima-cho, Shimane
20. Miyama-shi, Hukuoka
21. Saga-shi, Saga

**FY 2015** (12 Municipalities)

22. Hidaka-cho, Hokkaido
23. Hiratori-cho, Hokkaido
24. Osaki-shi, Miyagi
25. Mogami-machi, Ymagata
26. Motegi-machi, Tochigi
27. Kai-shi, Yamanashi
28. Kyouto-shi, Kyoto
29. Nantan-shi, Kyoto
30. Inan-cho, Shimane
31. Tsuyama-shi, Okayama
32. Munakata-shi, Hukuoka
33. Usuki-shi, Oita
34. Kobayashi-shi, Miyazaki

**FY 2016** (16 Municipalities)
35. Shiriuchi-cho, Hokkaido
36. Otoineppu-mura, Hokkaido
37. Nishiokoppe-mura, Hokkaido
38. Shibetya-cho, Hokkaido
39. Hirakawa-shi, Aomori
40. Ichinoseki-shi, Iwate
41. Kami-machi, Miyagi
42. Tokamachi-shi, Niigata
43. Nanto-shi, Toyama
44. Kakegawa-shi, Shizuoka
45. Handa-shi, Aichi
46. Kyotanba-cho, Kyoto
47. Itoshima-shi, Hukuoka
48. Kunisaki-shi, Oita
49. Satsumasendai-shi, Kagoshima
50. Nagashima-cho, Kagoshima

※ Number in ( ) is that of Municipalities selected each prefecture
## 13. Commercialization project of the selected regions

<table>
<thead>
<tr>
<th>Use/ raw material</th>
<th>Woody biomass</th>
<th>Livestock excrement</th>
<th>Food waste</th>
<th>Sewage sludge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Others</strong> (including undecided)</td>
<td>Tokachi region, Kushiro-shi, Okoppe-cho, Okinoshima-cho, Kobayashi-shi</td>
<td>Kushiro-shi, Osaki-shi, Mogami-cho, Munakata-shi, Kobayashi-shi</td>
<td>Okoppe-cho, Osaki-shi, Minamisanriku-cho, Mogami-cho, Niigata-shi, Tsu-shi, Munakata-shi, Miyama-shi,Saga-shi, Kobayashi-shi</td>
<td>Minamisanriku-cho, Mogami-cho, Niigata-shi, Munakata-shi, Miyama-shi</td>
</tr>
</tbody>
</table>
## 13. Commercialization project of the selected regions

<table>
<thead>
<tr>
<th>Use/ raw material</th>
<th>Woody biomass</th>
<th>Livestock excrement</th>
<th>Food waste</th>
<th>Sewage sludge</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fertilizer &amp; feed, etc</strong></td>
<td>Motegi-cho, Imizu-shi, Sumoto-shi, linan-cho, Tsuyama-shi, Mitoyo-shi, Munakata-shi</td>
<td>Tokachi Region, Shimokawa-cho, Kushiro-shi, Okoppe-cho, Bekkai-cho, Osaki-shi, Mogami-cho, Motegi-cho, Kai-shi, Nantan-shi, linan-cho, Munakata-shi, Saga-shi, Kobayashi-shi</td>
<td>Okoppe-cho, Higashimatsuhima-shi, Osaki-shi, Minamisanriku-cho, Mogami-cho, Motegi-cho, Niigata-shi, Kai-shi, Hamamatsu-shi, Obu-shi, Kyotango-shi, Nantan-shi, Mitoyo-shi, Okinoshima-cho, Munakata-shi, Saga-shi, Miyama-shi, Saga-shi, Usuki-shi, Kobayashi-shi</td>
<td>Minamisanriku-cho, Mogami-cho, Kyotango-shi, Nantan-shi, Munakata-shi, Miyama-shi</td>
</tr>
<tr>
<td><strong>Others (utilization of material, etc.)</strong></td>
<td>Motegi-cho, Kyotango-shi, Sumoto-shi, Okinoshima-cho, Tsuyama-shi, Maniwa-shi, Mitoyo-shi</td>
<td></td>
<td></td>
<td>Niigata-shi, Hamamatsu-shi, Kyotango-shi</td>
</tr>
</tbody>
</table>

16
14. The fixed price purchase system for renewable energy (Feed-in Tariff)

- The fixed price purchase system is the system by which electric power companies promise to purchase the electricity generated from renewable energy sources at a certain price, and the electricity derived from solar energy, wind, hydro, geothermal, and biomass.
- The purchase price (procurement price) and period (lead time) are set by the Minister of Economy, Trade and Industry every year, respecting the opinions of the procurement price calculation committee consisting of experts.
- The procurement price of electricity from biomass power generation in FY2017 - FY2019 is 13 to 40 yen / kWh (excluding tax). Distinguished procurement price of equipment of 20,000 kw or more where scale merit is confirmed in general woody biomass · agricultural residue residue in power generation efficiency etc.

Overview of the system

**Procurement price and procurement period from FY2017 to FY2019 (Biomass-related)**

<table>
<thead>
<tr>
<th>Types of biomass</th>
<th>Procurement price Per 1kWh</th>
<th>Lead Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane fermentation gas (derived from biomass)</td>
<td>39 yen + tax</td>
<td></td>
</tr>
<tr>
<td>Woody biomass derived from thinning timber, etc.*1</td>
<td>Less than 2,000kW</td>
<td>40 yen + tax</td>
</tr>
<tr>
<td></td>
<td>2,000kW or more</td>
<td>32 yen + tax</td>
</tr>
<tr>
<td>General woody biomass*2 · Agricultural residue</td>
<td>24 yen + tax</td>
<td></td>
</tr>
<tr>
<td>Construction waste material</td>
<td>13 yen + tax</td>
<td></td>
</tr>
<tr>
<td>General waste &amp; other biomass</td>
<td>17 yen + tax</td>
<td></td>
</tr>
</tbody>
</table>

*1 For those without the proof based on the "Guidelines for the proof of wood biomass used for power generation utilization", they are treated equally with construction waste materials.

*2 Including biomass caused by harvesting of crops.

*3 Until the end of September, 2017 24yen+tax
15. The introduction of biomass power generation

- For biomass power generation utilizing the fixed price purchase system, approximately 760 thousand kW was already being produced by the end of November 2016. When combining this with the facility capability of power generation introduced under the RPS system, approximately 3.07 million kW has been produced.
- Approximately 5.39 billion kWh was the amount of electricity purchased by the fixed price purchase system of biomass power generation in FY 2015.

The circumstances surrounding the introduction of biomass power generation at the end of November 2016

<table>
<thead>
<tr>
<th>Plant capacity (one that started operation)</th>
<th>Before introducing FIT (RPS system) to June 2012</th>
<th>After introducing FIT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methane fermentation gas (derived from biomass)</td>
<td>14.7 thousand kW</td>
<td>3.2 thousand kW</td>
<td>6.0 thousand kW</td>
</tr>
<tr>
<td>Woody biomass derived from thinning timber</td>
<td>14.5 thousand kW</td>
<td>12.9 thousand kW</td>
<td>55.9 thousand kW</td>
</tr>
<tr>
<td>General woody biomass Agricultural residue</td>
<td>163.4 thousand kW</td>
<td>29.8 thousand kW</td>
<td>11.8 thousand kW</td>
</tr>
<tr>
<td>Construction waste material</td>
<td>439.8 thousand kW</td>
<td>0.3 thousand kW</td>
<td>3.5 thousand kW</td>
</tr>
<tr>
<td>General waste Other biomass</td>
<td>1,681.4 thousand kW</td>
<td>76.2 thousand kW</td>
<td>24.3 thousand kW</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,313.8 thousand kW</strong></td>
<td><strong>122.8 thousand kW</strong></td>
<td><strong>101.6 thousand kW</strong></td>
</tr>
</tbody>
</table>

760.0 thousand kW

Note) - There is a case where the total value does not match due to rounding off.
- For one before FIT introduction (RPS system), it includes the facility capability switched from RPS to FIT.
- It aggregated the estimated value obtained by multiplying by the biomass ratio at the time of facility certification. (After the introduction of FIT, it does not include the facility capacity switched from RIP to FIT.)
These are the ones that have already started operation as of February 2016, and the facilities switched from RPS to FIP are not included.

(Materials) (Created by the Ministry of Agriculture, Forestry and Fisheries, based on the materials of the Agency of Natural Resources and Energy)

16. Biomass power generation using the fixed price purchase system

National total
- Methane gas 36,300 kw (114 cases)
- General waste 873,142 kw (215 cases)
- General wood 347,569 kw (28 cases)
- Construction waste material 341,216 kw (31 cases)
- Unused wood 287,449 kw (41 cases)

Output No. of introductions
16. Biomass power generation using the fixed price purchase system

Hokkaido Pref.
- 8,626 (51 cases)
- 33,983 (10 cases)
- 4,700 (1 case)
- 53,820 (2 cases)

Aomori Pref.
- 960 (2 cases)
- 6,624 (2 cases)
- 6,250 (1 case)

Iwate Pref.
- 280 (2 cases)
- 9,272 (4 cases)
- 19,600 (2 cases)
- 6,871 (3 cases)

Miyagi Pref.
- 793 (2 cases)
- 13,383 (3 cases)
- 240 (1 case)
- 800 (1 case)

Akita Pref.
- 4,760 (2 cases)
- 21,490 (2 cases)
- 3,750 (2 cases)
- 53,820 (2 cases)

Aomori Pref.
- 960 (2 cases)
- 6,624 (2 cases)
- 6,250 (1 case)

Yamagata Pref.
- 300 (1 case)
- 2,267 (2 cases)
- 3,562 (2 cases)

Niigata Pref.
- 660 (3 cases)
- 7,559 (3 cases)
- 5,750 (1 case)

Gunma Pref.
- 600 (2 cases)
- 5,395 (2 cases)
- 13,600 (1 case)

Ishikawa Pref.
- 425 (2 cases)
- 9,925 (3 cases)

Mie Pref.
- 330 (2 cases)
- 18,061 (6 cases)
- 26,800 (2 cases)
- 5,800 (1 case)

Shizuoka Pref.
- 215 (2 cases)
- 38,919 (7 cases)
- 93,594 (4 cases)

Yamanashi Pref.
- 848 (2 cases)

Nagano Pref.
- 710 (3 cases)
- 4,700 (3 cases)

Tokyo Pref.
- 1,120 (1 case)
- 153,938 (23 cases)

Chiba Pref.
- 8,932 (8 cases)
- 47,557 (3 cases)

Ibaraki Pref.
- 375 (2 cases)
- 11,161 (6 cases)
- 68,334 (2 cases)
- 5,750 (1 case)

Saitama Pref.
- 28,229 (12 cases)
- 153,938 (23 cases)

Ishikawa Pref.
- 425 (2 cases)
- 9,925 (3 cases)

* The displayed output is the one where the certified output of the power generation facility is multiplied by the biomass ratio (total output of each prefecture)
16. Biomass power generation using the fixed price purchase system

These are the ones that have already started operation as of February 2016, and the facilities switched from RPS to FIP are not included.

(Materials)
(Created by the Ministry of Agriculture, Forestry and Fisheries, based on the materials of the Agency of Natural Resources and Energy)

* The displayed output is the one where the certified output of the power generation facility is multiplied by the biomass ratio (total output of each prefecture)

These are the ones that have already started operation as of February 2016, and the facilities switched from RPS to FIP are not included.

(Materials)
17. Expansion of woody biomass usage

- The utilization of wood biomass contributes to not only the promotion of renewable energy but also the revitalization of forestry and regional economy and the assurance of employment. Especially, there is a large possibility for leftover forest wood.
- Wood biomass is processed to wood chip and wood pellet, and its utilization as energy has been increasing at sawmills, public facilities, and power stations, etc.

Transition of the number of woody biomass boilers
Over 2,000 units of wood biomass boilers are installed at places centered at sawmills, the introduction to public facilities, hot springs, and agricultural facilities has been proceeding.

The number of wood pellet manufacturing facilities and production quantity
Recently, both the number of production facilities and production amount have been increasing with the background of the growing interest in global warming and of the reduction of management risks by switching from fossil fuel to renewable energy heat.
18. The conditions of other biomass industries

- Biomass products such as bioplastic have the equivalent physical properties of those of petroleum-derived products, and they are almost comparable, but the cost tends to be slightly higher. Since the adoption of plastic bags and food containers has progressed, the market size has gradually expanded, and continuous growth can be expected from now on.
- For expanding the number of companies to adopt products, it is important to suppress production cost and to enhance the competitiveness in the market.

Identification system of bioplastic

In July 2006, the Japan BioPlastic Association (JBPA) launched the "BioPlastic Identification system" to distinguish it from plastic products of petroleum-derived plastic in order to improve and disseminate and promote the awareness of bioplastic products.

Examples of familiar bioplastics

In addition to plastic bags of retail stores, blister packs such as home appliances and batteries, window portions of windowed envelopes, the trays and packaging bags of fresh foods, egg packs, etc., the cases to be used for packaging materials for various products has been increasing.

Transition of bioplastics production quantity and market size

(Created by the Ministry of Agriculture, Forestry, and Fishery based on the survey results of JBPA)
Waste edible oil

Kobe, Hyogo
KOBE Biogas (Higashinada Sewage treatment plant)
This plant makes sewage sludge methane fermentation and utilizes it for natural gas vehicles as KOBE Biogas. It also supplies biogas that is highly purified as city gas for the first time in Japan.

Maniwa, Okayama
MEIKEN LAMWOOD CORPORATION
This company makes chips from bark generated from thinning timber, forest residues, and sawmills to utilize it as fuel for power generation within the factory.

Hita, Oita
Hita
This city generates biogas by methane fermentation of food waste and pig excreta to utilize power generation. The digestive juice generated in the process of power generation is also provided to citizens as compost and liquid fertilizer.

Suzu, Ishikawa
Suzu City Purification Center
This center installs the fermentation facility to process concentration and mixing of sewage sludge and garbage, etc. at purification center. The heat of generated biogas is utilized for warming a fermenter and for drying fermentation residues.

Shimokawa-cho, Hokkaido
Shimokawa-cho
This town utilizes wood biomass as a heat resource for regional hot springs and greenhouses, etc. Wood biomass accounts for approximately 60% of heat energy consumption of all public facilities.

Shiiboro-cho, Hokkaido
Shiiboro-cho agricultural cooperative organization
This organization produces methane gas from livestock excreta generated from adjacent farms to conduct power generation. It also utilizes generated heat as warm water to prevent freezing of fermenters, etc.

Kuzuishi-cho, Iwate
Biomass Power Shizukuishi
This company utilizes biogas generated from livestock excreta and food waste to conduct power generation business. It also sells digestive juice and compost to Koiwai farm, and the farm uses it in pastures.

Asahi, Chiba
Bright Pig Co., Ltd
This company utilizes food waste discharged from convenience stores, etc. and rice for feed produced in the region to produce liquid feed to use it at pig farms.

(Reference) Examples of major activities