Reference 6

Biomass Policies and Assistance Measures in Japan

Reference 6
Biomass Policies and Assistance Measures in Japan

(1) Major Developments of Biomass Policy in Japan

- Biomass utilization promotion was incorporated in basic national strategy in 2002, and the Basic Act was established in 2009. After the Great East Japan Earthquake and subsequent nuclear accident happened, the biomass industrialization strategy was drawn as principle to create regional green industry and fortify an independent and distributed energy supply system.

Year	Policies	Outline
2002	Biomass Nippon Strategy	• Providing basic national strategy to realize sustainable society with full biomass utilization • Begins to create Biomass Town in 2004
2005	Kyoto Protocol Target Achievement Plan	• Promoting widespread use of biofuels including fuel for transportation (500,000 kL by 2010) • Building Biomass Towns and developing biomass energy conversion technologies
2006	Biomass Nippon Strategy (Revised)	• Aims to use biomass energy, including fuel for transportation • Fortifying Biomass Town creating. (Goal: 300 Biomass Towns by 2010)
2009	Basic Act for the Promotion of Biomass Utilization	• 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
2010	Basic Energy Plan	• Introducing renewable energy in 10% primary energy supply by 2020 • Increasing biofuel at a volume equivalent to 3% cut of gasoline demand nationwide by 2020
2010	Act Concerning Sophisticated Methods of Energy Supply Structure	• Requiring oil refiners to produce a certain amount of biofuels (FY2011: 210,000kl → FY2017: 500,000kl (crude oil equivalent))
2010	National Plan for the Promotion of Biomass Utilization	• Setting targets for 2020 • Setting basic policies on the development of technologies for biomass utilization
Great East Japan Earthquake and Fukushima nuclear power plant accident (2011.3)		
2012	Biomass Industrialization Strategy	• Specifying the targeted conversion technologies and biomass for realizing biomass industrialization • Setting principles and policies for realizing biomass industrialization

(2) Basic Act for the Promotion of Biomass Utilization (2009) (1/4)

- The Basic Act for the Promotion of Biomass Utilization was enacted in 2009, and it sets up the principles for biomass utilization, “the Basic Biomass Utilization Promotion Plans”, duties of related persons, basic national measures, and “the National Biomass Policy Council” .

Purpose of the Act

It contributes to realize sustainable economic society by determining principles and basic national measures regarding biomass utilization and promoting comprehensive biomass utilization actions as planned.

Summary of the Act

○ Principles for the promotion of biomass utilization

○ Duties of the national government and other parties

○ Draw up “the Biomass Utilization Promotion Plans” (on the national, prefectural and municipal levels)

○ Basic measures taken by the national government

Develop the necessary foundation for biomass utilization; create the projects that will supply biomass products; technological research/development and their dissemination; secure and train personnel; promote biomass products; promote voluntary activities by private organizations; promote activities by local public bodies; secure international partnerships; collect information from both domestic and international sources; enhance the understanding of the public, etc.

○ Set up “the National Biomass Policy Council”

(2) Basic Act for the Promotion of Biomass Utilization (2009) (2/4)

- The principles for promotion of biomass utilization is comprised of the items below.

1. Principles for the promotion of biomass utilization

- Comprehensive, Uniform and Effective Utilization of Biomass
- Mitigation of Global Warming
- Development of Recycling-based Society
- Promotion of industrial Development and International Competitiveness
- Revitalization of Rural Areas
- Fully Utilization of Different Types of Biomass
- Diversification of Energy Sources
- Promotion of Community-based Voluntary Actions
- Raise of Social Awareness for Biomass
- Consistency between Stable Food Supplies and Biomass Utilization
- Considerations for Environment Preservation

(2) Basic Act for the Promotion of Biomass Utilization (2009) (3/4)

- The Act provides establishment of the basic biomass utilization promotion plans at each level: national, prefectural, and municipal.

2. Formulation of a plan to promote biomass utilization

- **National level**:

  National government formulates “The National Plan for the Promotion of Biomass Utilization” in order to promote comprehensive and planned policies.

  The Master Plan sets;

  - Basic policy on Biomass utilization promotion
  - National targets for utilization of different types of biomass
  - Basic policy on the development of technologies for effective biomass utilization

- **Prefectural level**:

  Prefectures formulate “The Prefectural Biomass Utilization Promotion Plans”, considering in the National Plan.

- **Municipal level**:

  Municipalities formulate “The Municipal Biomass Utilization Promotion Plans”, considering in the National and Prefectural Plans

(2) Basic Act for the Promotion of Biomass Utilization (2009) (4/4)

- The Act sets up a council comprised of related government bodies (seven ministries in Japan) to promote of comprehensive, uniform, and effective biomass utilization.

3. Set up the National Biomass Policy Council

- Role:
  Promote comprehensive, uniform and effective biomass utilization by coordinating the related ministries

- Members:
  Vice-ministers or Parliamentary State Secretaries ministerial aids from the seven ministries

- Seven ministries involved in biomass policy
  - Cabinet Office, Government of Japan(National Strategy)
  - Ministry of Agriculture, Forestry and Fisheries (Agricultural and Forest Policy)
  - Ministry of Internal Affairs and Communications (Regional Development)
  - Ministry of Education, Culture, Sports, Science and Technology (R&D)
  - Ministry of Economy, Trade and Industry (Energy and Industrial Policy)
  - Ministry of Land, Infrastructure, Transport and Tourism (Infrastructural Policy)
  - Ministry of the Environment (GHG Reduction Policy)

(3) The National Plan for the Promotion of Biomass Utilization(2010)

- Based upon the Basic Act for the Promotion of Biomass Utilization, the basic policies to are set up.

Summary of the National Plan

○ Basic policy regarding measures to promote biomass utilization

Promote effective utilization of biomass among biomass suppliers in the agricultural, forestry and fishing industries, manufacturers of biomass products, local government and municipalities, and related ministries.

○ National goals (For 2020)

Set goals from three perspectives: revitalization of rural areas, creation of industry, and prevention of global warming.

○ Comprehensive and effective government measures

Provide the necessary foundation to use biomass, and create industry to supply biomass-derived products based on collaboration of primary & secondary & tertiary industry (the sixth industry in total), research/development, and personnel training.

○ Research and development of technology

Set the mid-term technological challenges and long-term policies as well as basic technological development.

(a) Three National targets (2020)

- The National Plan for the Promotion of Biomass Utilization sets up three numerical targets for biomass utilization by the year 2020.

1. Expand the Use of Biomass

- Expand the use of biomass resources equal to 26 million carbon tons per annum
- Set the targets for usage rates of different types of biomass (see next page)

2. Formulate the 600 Municipal Biomass Utilization Promotion Plans

- Draw up “The Municipal Biomass Utilization Promotion Plans” in 600 municipalities (equal to 1/3 of all municipalities nationwide)
- Draw up “The Prefectural Biomass Utilization Promotion Plans” in all 47 prefectures

3. Create the Biomass Industries for 500 billion JPY

- Create the new Biomass industries worth around 500 billion Japanese Yen.

(b) Target of biomass utilization by type (2020)

- National target of average utilization ratio is set for each type of biomass to promote high utilization biomass based on their types and to clarify the necessary measures to be taken on the national level.

Type of biomass	Amount generated annually	Present and target utilization ratio 2009 → 2020
1 Animal waste	Approx. 88 million tones	90% → 90%
2 Sewage sludge	Approx. 78 million tones	77% → 85%
3 Black liquor	Approx. 14 million tones	100% → 100%
4 Waste paper	Approx. 27 million tones	80% → 85%
5 Food waste	Approx. 19million tones	27% → 40%
6 Sawmill wood residue	Approx. 3.4 million tones	95% → 95%
7 Wood waste from construction	Approx. 4.1 million tones	90% → 95%
8 Non-edible parts of food crops	Approx. 14 million tones	85% → 90%
9 Forest off-cuts	Approx. 8 million tones	0% → 30%

Note: 1 Black liquor, saw mill wood residue, forest off-cuts are dry-weight, all others are wet weight.
2 Target for energy crops is 400,000 carbon tones produced by 2020.

(c) Basic policies to the research and development for effective biomass utilization (1/2)

- The policies below are designed to develop effective utilization technologies, and promote establishment of comprehensive technology system encompassing each process from biomass collection and transportation to conversion and use.

1. Waste biomass	(1) Animal waste • Development of technologies to use digestive liquids as liquid fertilizer after bio-gasification and technologies to adjust composition of digestive juices (2) Sewage sludge • Development of technologies to ensure efficient bio-gasification and conversion into solid fuel (3) Waste paper • Advancement of energy collection technologies, including ethanolization and bio-gasification (4) Food waste • Promotion of ethanolization and bio-gasification technologies (5) Wood waste from construction • Development of technologies for efficient wood waste sorting by type after demolishment
2. Unused biomass	(1) Non-edible parts of crops • Establishment of efficient collection and transportation systems (2) Forest off cut • Development of high performance forestry machine • Establishment of low-cost, efficient collection and transportation systems

(c) Basic policies to the research and development for effective biomass utilization (2/2)

- In addition, the policies aim to promote long-term research and development of new biomass resources expected to be future use, such as algae with high production efficiency .

3. Mid-term technical issues	(1) Cellulosic biomass glycolysis and fermentation • Development of technologies for effective glycolysis of celluosic biomass, including non-edible parts of crops, grasses, and woody biomass • Development of fermentation technologies to produce a variety of materials other than ethanol (2) Next-generation biofuels • Development of next-generation biofuel technologies, such as BTL,i.e. (3) Thermal reaction-driven gasification • Development of technologies to efficient use by-product (tar) generated during gasification (4) Biomass plastic • Development of technologies to reduce production costs and improve heat resistance and durability (5) High value-added products • Development of technologies to manufacture a variety of high value-added products, such as carbon fiber and highly-functional resin (6) Remove of hazardous substances during thermal reaction • Development of technologies to remove hazardous substances in a low-cost and efficient manner (7) Effective collection and storage systems of biomass • Establishment of collection systems and storage networks integrated into agriculture and forestry
4. Long-term technical issues	(1) Generation of new biomass resources • Development of technologies for breeding, growing and extraction of usable substances for new and promising biomass, such as microalgae and perennial grasses (2) Development of biomass refineries • Development of technologies to refine and convert biomass into usable chemical ingredients

(4)The Biomass Industrialization Strategy (2012)

(a) Basic concept

- Strengthening of independent and distributed energy supply system has become an important issue after the Great East Japan Earthquake and Fukushima nuclear power plant accident happened. The Biomass Industrialization Strategy was drawn up as principles to achieve the targets of the National Plan by creating regional green industry and fortifying, independent and distributed energy supply system.

Background

- Achieve the National Targets of Biomass Utilization stipulated in the National Plan
- Expanding the renewable energy using biomass resources after the Great East Japan Earthquake and Fukushima nuclear power plant accident
- Increase the importance of creating green industries and diversified strengthening renewable energy using biomass resources

Draw up the Biomass Industrialization Strategy

(Adopted by the National Biomass Policy Council on September 6, 2012)

- Industrialization using biomass resources with the targeted biomass and technologies
- Creation of green industries and enhancement of renewable energy in the regions

(b) Biomass energy potential

- The table below shows biomass energy potential in two cases: 1) if the ratio targets on pg.167 are achieved and total biomass is used as energy, and 2) if all unused domestic biomass is used as energy.

Annual (Sustainability is not considered)	Case 1 where 2020 targets is achieved by energy use	Case 2 where all unused biomass are utilized for energy.
Electricity potential	About 13 billion kWh (equivalent to the needs of 2.8 million households)	About 22 billion kWh (equivalent to the needs of 4.6 million households)
Fuel potential (crude oil equivalent)	About 11.8 million kl (equivalent to the needs of 13.2 million gasoline cars)	About 18.5 million kl (equivalent to the needs of 20.8 million gasoline cars)
Greenhouse gas reduction	About 40.7million t-CO_2 (equivalent to 3.2% of total greenhouse gas emission in Japan)	About 63.4million t-CO_2 (equivalent to 5.0% of total greenhouse gas emission in Japan)

Note: Japanese greenhouse gas emissions are calculated at 1.256 billion tones (2010 estimate) with electrical power consumption per household of 4,734 kWh/year, and gasoline consumption per vehicle of 1000 L/year

(c) The biomass conversion technology roadmap

- Attained level, technical issues, and practicality of biomass conversion technologies were evaluated by related ministries, research institutions, businesses. Then, the biomass conversion technology road map was developed.
- Because there are a wide variety of biomass conversion technologies and types of biomass, the biomass conversion technology road map was developed. And the practical technologies and biomass types associated with the practical technologies for biomass industrialization have been targeted.

Targeted conversion technologies and biomass for industrialization	
Technologies	● Methane fermentation & composting ● Combustion ● Solid fuel conversion (pellet, bio-coke, RPF, etc.) ● Liquid fuel conversion (First generation technologies for ethanol and biodiesel)
Biomass	● Woody biomass, food waste, sewage sludge, animal waste, etc.

(d) Biomass Industrialization Strategy (1/4)

- The industrialization strategy has seven different initiatives: basic strategy, technological strategy, entrance (colleting) strategy, exit (selling) strategy, specific strategies, comprehensive support strategy, and overseas strategy. The basic principles of the strategy are shown below.

Principles for biomass industrialization

1. Biomass-used Industrialization with the targeted Biomass and commercialized technologies
2. Establishment of the integrated and coordinated system from raw material collection to transportation, manufacturing and selling goods on biomass
3. Creation of green industries and enhancement of renewable energy supply in the regions
4. Providing the stable policy framework to attract investors and business owners into biomass related market

(d) The Biomass Industrialization Strategy (2/4)

- Technological, exit, and entrance strategies are summarized below.

1 Technological Strategy (Technological development)
● Acceleration of development of Next-generation technologies such as cellulosic ethanol fermentation and microalgae extraction
2 Exit Strategy (Creation of demand & market)
● Utilization of Feed-in Tariff scheme introduced in July first, 2012 ● Tax reduction such as property and corporation tax related biomass industrialization ● Utilization of carbon credit system ● Biomass-used industrialization by manufacturing high-value added goods such as carbon fiber and highly-functional resin
3 Entrance Strategy (Procurement of raw materials)
● Securing a stable raw material supply by mixing a wide range of biomass varieties. ● Fully utilization of waste biomass by existing collection and transportation systems ● Establishment of agricultural and forest management system to supply biomass resources to manufacturers in a stable manner ● Build of efficient collection and transportation systems for biomass resources ● Development of high-productive and easily-degradable energy crops and plants

(d) The Biomass Industrialization Strategy (3/4)

- Specific strategies are shown below.

4 Specific strategies for the targeted biomass
(1) Woody biomass ➢ Establishment of a woody biomass (forest off-cuts) energy utilization system is biomass power plant, associated with their efficient collection and transportation system, as well as application of feed-in tariff (FIT) scheme. ➢ Promotion of recycling wood waste from construction to produce the raw material for wood board, paper, and wooden chips for energy.
(2) Food waste ➢ Establishment of food waste collection system by type, and promotion of recycling through methane gasification, solid fuel conversion and combined utilization with sewage sludge and animal waste, as well as application of FIT scheme.
(3) Sewage sludge ➢ Not only FIT scheme application, but also promotion of recycling through, bio-gasification, mixing use with other biomass such as food waste, and solid fuel production in the sewage plants as a regional biomass utilization center.
(4) Animal waste ➢ Not only FIT scheme application, but also promotion of recycling through methane fermentation, direct combustion, and mixing use with other biomass such as food waste.
(5) Biofuel ➢ Examination of the establishment of an efficient local-produce & local-consume system of domestic bioethanol ➢ Develop dissemination of low-concentrates biodiesel fuel (BDF) use or development of high-efficiency and low-cost production system and encourage more widespread use of biodiesel through tax reductions, etc.

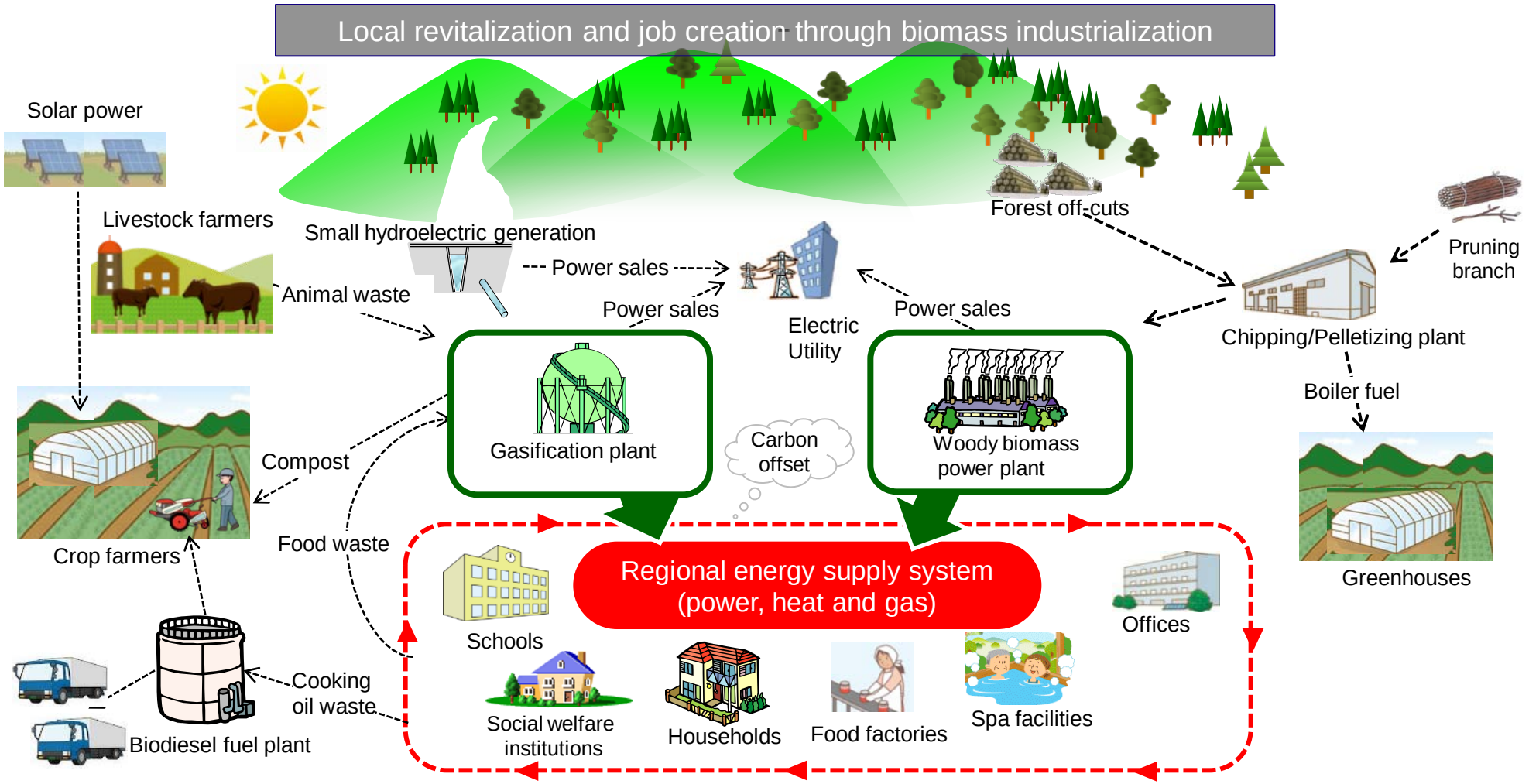
(d) The Biomass Industrialization Strategy (4/4)

- Creation of the Biomass Industrial Community is presented to realize the Biomass Industrialization strategy. The Biomass Industrial Community develops the Biomass Town Concept further and promotes biomass industrialization by creating an environmental-friendly and disaster-resistant community centered on the biomass business (industry).

5 Comprehensive support strategy
➢ Establishment of Biomass Industrial Communities with green industry and regional sustainable utilization system. ➢ Consideration of necessary system for promoting industrialization through cooperation among business operators – from the production of raw material, collection, transport, production and use.
6 Overseas strategy
➢ Development of next generation technologies and business models, and promote them overseas with a focus on Asia.

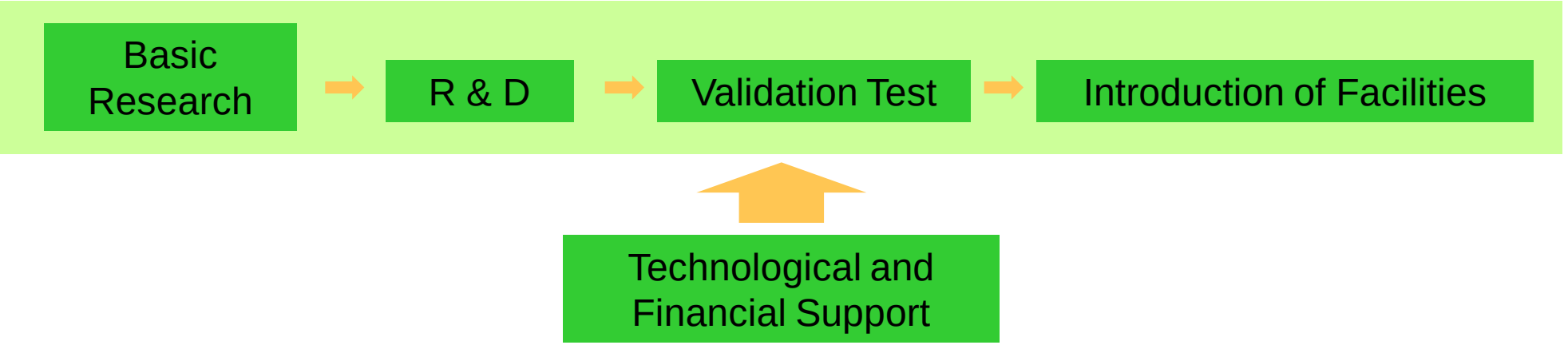
(e) Creation of the Biomass Industrial Community

- Establishment of green industry utilizing regional biomass and recycling-based energy system in combination with solar and small-scale hydro-electric power generation.
- Creation of environmental-friendly and disaster-resistant communities (Biomass Industrial Communities), centering on the biomass industry.



(5) Assistance for research and development (1/3)

- To promote biomass utilization, technologies at each phase of development, from basic research to practical use are supported.



Basic research phase	
Comprehensive approach	➢ Developing advanced low-carbon technologies ➢ Basic research into biomass refinery ➢ Basic research for efficient technologies of biofuel from microalgae
Research and development phase	
Biofuel	➢ Developing glycation and fermentation technologies from cellulosic biomass ➢ Development of technologies for cultivation and extraction of microalgae to gain usable resources.
Comprehensive approach	➢ Development of technologies for thermal usage of biomass, such as heat supply to greenhouse ➢ Developing Biomass-to-liquid technology

(5) Assistance for research and development(2/3)

- Validation tests are also supported. They are woody biomass collection and transport and bioethanol production from crop residues and others.

Validation phase	
Woody biomass	➢ Validation test for introduce of integrated system for woody biomass utilization (collection & transportation systems, heat supply plant and power plant)
Sewage sludge	➢ Validation test for power generation and/or methane gasification technologies using sewage sludge.
Biofuel	➢ Validation test for bioethanol plant operating using farm surpluses and by-products ➢ Validation test for introduction of integrated system for biodiesel production and distribution.
Comprehensive approach	➢ Validation test for heat supplying system using methane gasification.

(5) Assistance for research and development(3/3)

- Application of practical technologies are also supported. They are biofuel production facilities and biomass power generation facilities.

Introduction of biomass plant	
Woody biomass	➢ Construction of biomass power plant using woody biomass ➢ Lumber cutting and transportation, and improvement of forest road networks
Food waste	➢ Introduction of highly-efficient waste treatment power generation plant
Sewage sludge	➢ Introduction of biomass power plant using sewage sludge
Biofuel	➢ Introduction biofuel manufacturing facilities by refiners
Comprehensive support	➢ Establishment of Biomass Industrial Communities

(6) Tax systems related to biomass

- Support also is provided through tax reductions for the introduction of biofuel production facilities and renewable energy power generation facilities, and through reducing gasoline excise taxes regarding bioethanol.

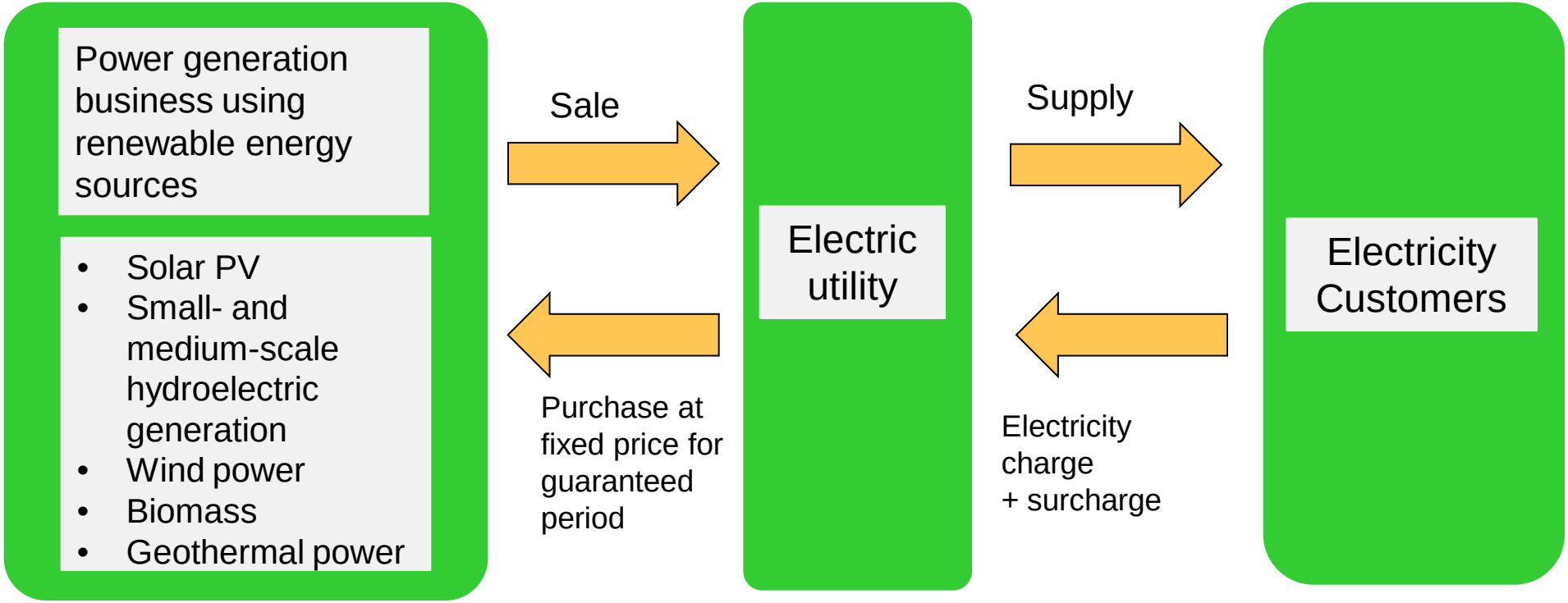
Item	Tax category	Method	Note
Bioethanol blended gasoline (E3, E10)	Gasoline tax (58.0 JPY/L)	Tax reduction for bioethanol	–
Manufacturing facility for biofuel (*1)	Property tax (1.4% → 0.7%)	50% reduction of property tax (3 years)	Certification required based on the Act on Agricultural, Forestry and Fisheries Biofuel
Manufacturing Facility for bioethanol	Income tax, corporate tax	Special depreciation of 30% facility cost (first year)	Green investment tax reduction
Renewable power plant (*2)	Property tax (1.4%→0.7%)	One-third reduction of property tax (3years)	–

(*1): Bioethanol, Biodiesel, Gasification, Pelleting
(*2): Solar PV, Wind power, Geothermal power, Small- and medium-scale hydroelectric power, Biomass

(7) Feed-in tariff (FIT) scheme(1/2)

- The FIT scheme was introduced in Japan in July, 2012 to promote renewable energy utilization including biomass.

■ Under the FIT scheme, if a renewable producer requests an electric utility to sign up a contact to purchase electricity at the fixed price and for fixed for long-term period, the electric utility is obligated to accept the request.



Reference: Ministry of Economy, Trade and Industry

(7) Feed-in tariff (FIT) scheme (2/2)

- Tariff and purchase duration are shown below. Biomass is categorized into five.

Energy source	**Solar PV**		**Wind power**	
Category	>10kW	<10kW	>20kW	<20kW
Tariff (per kWh - tax included)	42 yen	42 yen	23.10 yen	57.75 yen
Duration	20 years	10 years	20 years	20 years

Energy source	**Geothermal power**		**Small and medium-scale hydroelectric generation**		
Category	>15kW	<15kW	3 MW-1 MW	1 MW-200kW	<200kW
Tariff (per kWh - tax included)	23.7 yen	42 yen	25.2 yen	30.45 yen	35.7 yen
Duration	15 years	15 years	20 years		

Energy source	**Biomass**				
Biomass type	Biogas	Wood-fired power plant (timber from forest thinning)	Wood-fired power plant (other wood)	Waste (excluding wood waste)	Wood-fired power plant (recycled wood)
Tariff (per kWh - tax included)	40.95 yen	33.6 yen	25.2 yen	17.85 yen	13.65 yen
Duration	20 years				

Reference: Ministry of Economy, Trade and Industry

(8) Credit system for CO2 emission reduction (1/3)

- Two systems were used to certify greenhouse gas emission reduction with credits: domestic clean development mechanism (CDM) and J-VER system. Both systems ended temporarily with Japan's withdrawal from the Kyoto Protocol Treaty at the end of 2012, and the two systems are reviewed to be integrated because of their similarity (methods and purposes).

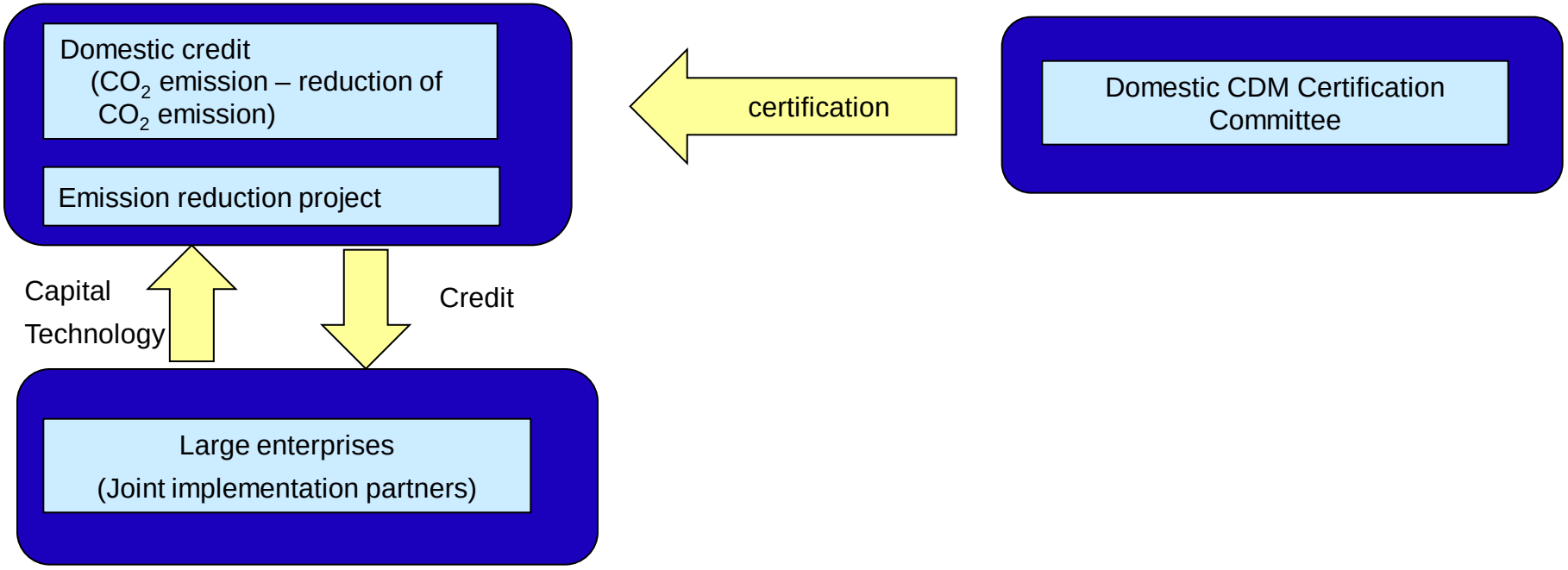
- Utilization of regional biomass is able to make credit from greenhouse gas emissions reduction activities, based on credit Certification system.
- Two credit systems existed in Japan (domestic clean development mechanism (CDM) and the J-VER system), and certified credit was totally 449,000 tones of CO_2 by the CDM, and 290,000 tones by J-VER until the end of 2011 .
- Both systems ended temporarily in 2012. They are reviewed to improve credit certification system, and they will be integrated in 2013.

Reference: Ministry of Economy, Trade and Industry, Ministry of the Environment

(8) Credit certification system for CO_2 emission reduction (2/3)

- Domestic CDM system certifies reduction of green house gas(GHG) emission as domestic credit. The credit comes from small and medium-sized enterprises, agriculture, forestry and fisheries industry, private sector, and transportation sector having capital and technologies provided by large enterprises. The large enterprises can use credit to achieve their goals to reduces GHG emission.

- Firstly, large enterprises supply small and medium-sized enterprises, agriculture, forestry and fisheries industry, private sector, and transportation sector with necessary capital and technologies.
- Secondly, small enterprises conduct GHGs emissions reduction approaches based on certificated projects.
- Thirdly, large enterprises gain domestic credits from GHGs emission reduction approaches and use them to achieve targets set in their voluntary action plans.

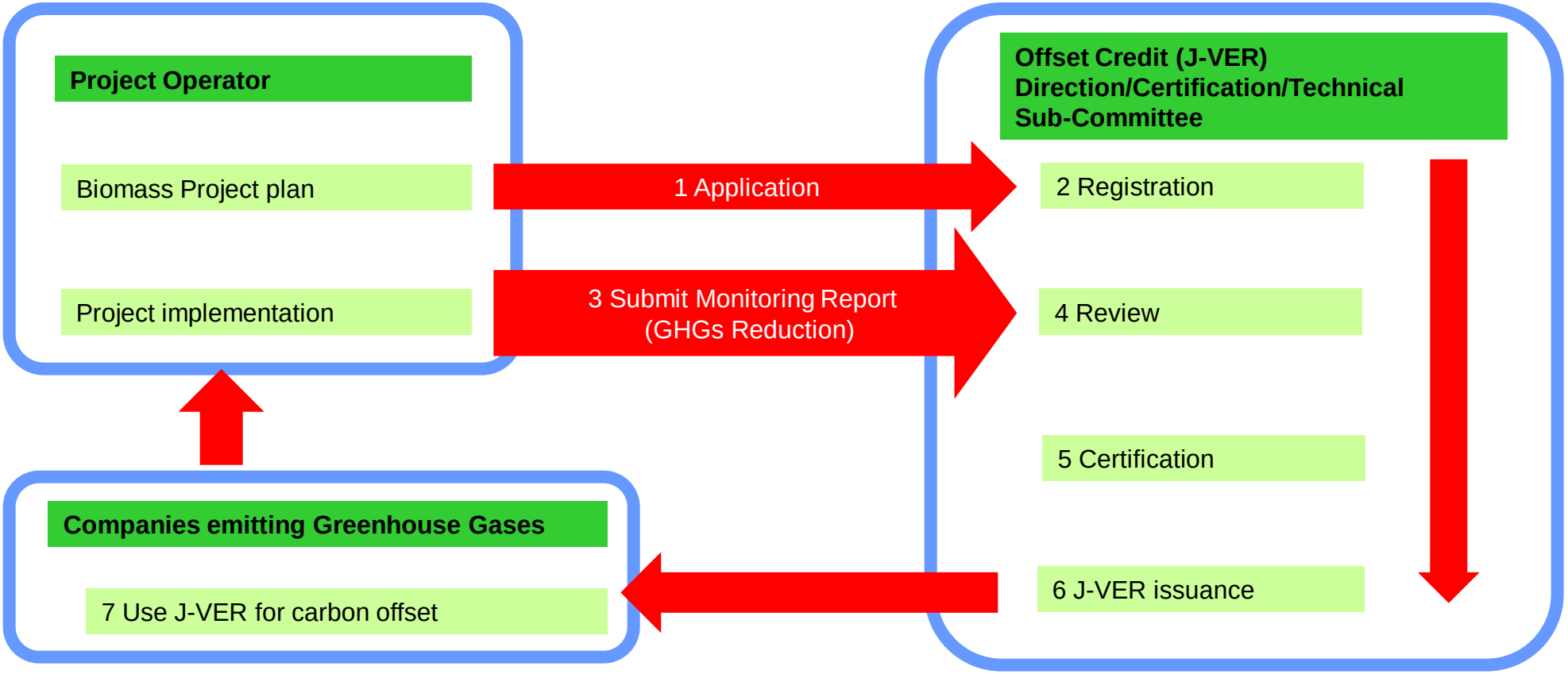


Reference: Ministry of Economy, Trade and Industry

(8) Credit certification system for CO_2 emission reduction (3/3)

- J-VER (Japan-Verified Emission Reduction) system is system utilizing the mechanism of carbon offset which means offsetting one's GHGs emission goal with other's GHGs emission reduction, in order to promote reduction or absorption of GHG emission.

- It is possible for one company to offset its some portion or all GHG emission with J-VER made by another company, based on carbon offset.
- Greenhouse gas emission reduction through domestic project is certified as J-VER.



Reference: Ministry of the Environment

(9) Personnel training (1/2)

- The Japanese government held training courses through private organizations to train people supporting Biomass Town Plan formulation in municipalities. The training had two courses. They were “Biomass Town Advisor training” targeted private operators and “Municipal Staff Training” targeted municipalities personnel engaged in formulating the Biomass Town Plan. (This training courses ended.)

Biomass Town Advisor training (2006 - 2010)

- Program to train human recourses who are capable of advice Biomass Town Plan formulation, advertisement, holding seminars, etc.
- 170 advisors were registered during 5 years by private organization.

Municipal Staff Training (2006 - 2009)

- Seminars and training in planning methods and on biomass utilization technologies for municipal staffs whose task were to formulate or implement their Biomass Town Plans.
- At the end of the training, participated staffs actually made Biomass Town Plan draft.

References: Japan Organics Recycling Association, The Japan Association of Rural Solutions for Environmental Conservation and Resource Recycling

(9) Personnel training (2/2)

- Biomass Town Advisors are human resources supporting the formulation of the Biomass Town Plan and supporting consideration of biomass industrialization in order to promote biomass utilization.

1. Activities of the Biomass Town Advisors

- Support the Biomass Town Plan formulation (created by municipalities)
- Support biomass-related projects planning in the region
- Support biomass utilization in the region (with symposium lecturers, making plan documents, etc.)

2. How to consult the advisors

- There are 170 Biomass Town Advisors registered by a private body (the Japan Organics Recycling Association (JORA).) Most of the them are employees of private consulting companies.
- Municipality requests advisor dispatch to JORA. JORA selects suitable advisor and confirms its work with the municipality, and sends it to the municipality.
- Support is offered for free charge.

Reference: Japan Organics Recycling Association

Reference 7

Publications and Websites on Biomass

Reference 7
Publications and Websites about Biomass

(1) Publications

Name	Language	URL
The Asian Biomass Handbook -A Guide for Biomass Production and Utilization-	Japanese, English, Thai, Malay, Indonesian	http://www.jie.or.jp/biomass/AsiaBiomassHandbook_e.html
Biomass Process Handbook	Japanese	
"Biomass for Renewable Energy, Fuels, and Chemicals", D.L.Klass, Academic Press (1998)	English	
"Renewable Energy: Power for a Sustainable Future", G.Boyle(ed.), Oxford University Press (1996)	English	
"Biomass Handbook", O.Kitani and W.Hall(eds.), Gordon and Breach Science Publishers (1989)	English	
"Handbook Biomass Gasification", H.A.M.Knoef Ed., BTG Biomass Technology Group (2005)	English	
"Handbook of Biomass Combustion and Co-firing", S. van Loo and J. Koppejan Eds., Twente University Press (2002)	English	
"Biodiesel - The Comprehensive Handbook", M. Mittelbach and C.Remschmidt, Graz (Austria) (2004)	English	
"The Biodiesel Handbook", G.Knothe, J.Krahl and J.V.Gerpen, AOCS Press (2004)	English	
"From the Fryer to the Fuel Tank- The Complete Guide to Using Vegetable Oil As an Alternative Fuel", J. Tickell, Green Teach Publishing (2000)	English	
"Handbook on Bioethanol- Production and Utilization", T C.E.Wyman,aylor & Francis(1996)	English	

Reference 7
Publications and Websites about Biomass

(2) Websites

Type	Name	Language	URL
General Biomass	Hiroshima University Biomass Project Research Center DB for "Foreign Books"	Japanese, English	http://home.hiroshima-u.ac.jp/bprc/books-e.html
Related Japanese Organization	Ministry of Agriculture, Forestry and Fisheries	Japanese, English	http://www.maff.go.jp/e/index.html
Related Japanese Organization	Ministry of the Environment	Japanese, English	http://www.env.go.jp/en/
Related Japanese Organization	Ministry of Economy, Trade and Industry	Japanese, English	http://www.meti.go.jp/english/index.html
Related Japanese Organization	Cabinet Office	Japanese, English	http://www.cao.go.jp/index-e.html
Related Japanese Organization	Ministry of Land, Infrastructure, Transport and Tourism	Japanese, English	http://www.mlit.go.jp/en/index.html
Related Japanese Organization	New Energy and Industrial Technology Development Organization	Japanese, English	http://www.nedo.go.jp/english/index.html
Related Japanese Organization	The Japan Institute of Energy, Biomass Division	Japanese, English	http://www.jie.or.jp/biomass/b-hmpg_e.html
Related Japanese Organization	The National Institute of Advanced Industrial Science and Technology	Japanese, English	http://www.aist.go.jp/index_en.html
Related Japanese Organization	Japan Science and Technology Agency	Japanese, English	http://www.jst.go.jp/EN/index.html
Related Japanese Organization	New Energy Foundation	Japanese, English	http://www.nef.or.jp/english/index.html
Related Japanese Organization	Institute for Global Environmental Strategies	Japanese, English	http://www.iges.or.jp/en/index.html
International Council/ Research Institution	Global Bioenergy Partnership	English	http://www.globalbioenergy.org/
International Council/ Research Institution	Association of South-East Asian Nations(ASEAN)	English	http://www.asean.org/
International Council/ Research Institution	International Energy Agency	English	http://www.iea.org/
International Council/ Research Institution	IEA Bioenergy	English	http://www.ieabioenergy.com/
International Council/ Research Institution	Asia Biomass Office	Japanese, English	http://www.asiabiomass.jp/english/
International Council/ Research Institution	The Life Cycle Initiative	English	http://lcinitiative.unep.fr/
International Council/ Research Institution	Asia Network of Organics Recycling	Japanese, English	http://www.jora.jp/anor/
International Council/ Research Institution	Economic Research Institute for ASEAN and East Asia	English	http://www.eria.org/

Reference 8

Japanese committee to formulate the Guidebook for Promoting Biomass Town Concept

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Japanese committee for making the Guidebook for Promoting Biomass Town Concept

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