



Japan: Green Technology in Northern Japan

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Summary

Green Technology, also referred to as environment-related business, is viewed by many in Japan as the most promising sector for future growth during the current economic downturn. On April 20, 2009, the Japan Ministry of Environment (MOE) announced a new policy called "Green Economy and Societal Transformation." When all measures under this policy are implemented, the market for environment-related business is expected to grow from \$700 billion in 2006 to US\$1.2 trillion in 2020. Employment in this sector is also expected to rise from 1.4 million jobs in 2006 to 2.8 million in 2020. Green Technology is not simply designed to reduce "burdens" on the environment, as was the case in the 1960's when pollution was a major social issue. Now this technology is perceived by many as the best way to revitalize both the Japanese and world economies. In Hokkaido, potential in the Green Technology market is somewhat different from other regions given Hokkaido's more rural orientation and colder climate. Rather than focusing on popular renewable energy technologies like photovoltaic solar panels, Hokkaido is focusing its attention on producing bio-fuel and bio-plastics made from biomass** products. This is because (1) solar energy may not be as cost effective due to Hokkaido's relatively cold and snowy climate and (2) biomass products are readily available in Hokkaido as it is the agricultural heartland of the country. In Hokkaido's efforts to also make its agriculture sector more environment-friendly, various Green Technologies are also expected to play a key role in creating a sustainable agricultural system.

Market Demand

The Japan Ministry of Environment (MOE) announced a new policy called "Green Economy and Societal Transformation" on April 20, 2009. When all measures are implemented, the environment-related business market is expected to grow from \$700 billion in 2006 to \$1.2 trillion in 2020. Employment in this sector is also expected to rise from 1.4 million jobs in 2006 to 2.8 million jobs in 2020. This policy is in line with the Japan Green New Deal, which aims at boosting the economy using environment and energy-related technologies, and incorporates a medium-term policy to realize a low-carbon social system designed to make society more compatible with the environment.

All developed countries realize the need to shift from a petroleum-dependent social system to a system more sustainable with less burdens on the environment, and Japan is no exception. This transformation is not only about conserving resources but also about renewing infrastructure and altering personal behavior as well. It is interesting, though, to note that this policy is not simply designed to reduce pollution, as was the case in the 1960's, but is designed to revitalize the economy. During the current economic downturn, environment-related business is seen by some experts as a ray of light for the future.

The Japan Ministry of Economy, Trade, and Industry (METI) has released figures similar to MOE regarding the potential market in this sector. According to METI, the market for environment-related business in Japan totaled US\$590 billion in 2005 and is expected to grow to \$830 billion by 2015. METI divides this market into three main segments: (1) Global Warming Prevention; (2) The 3Rs (reduce, reuse, and recycle); and (3) Symbiosis with Nature. For example, in the global warming prevention area, a few IT companies are jointly constructing an underground data center in a location which used to be a coal mine. The groundwater there is used to cool the servers, resulting in a 50% decrease in electricity consumption. The data center is scheduled to begin operation in April 2010.

** Note: Biomass is defined as biological material derived from living, or recently living organisms,^[1] such as wood, waste, and alcohol fuels. Biomass is commonly plant matter grown to generate electricity or produce heat. For example, forest residues (such as dead trees, branches and tree stumps), yard clippings and wood chips may be used as biomass.

Another example in this segment concerns plans to generate electricity using solar panels installed on roofs of temples in local neighborhoods, where people in the community purchase electricity and sell excess electricity to the local power company. In the 3Rs area, there are ongoing efforts to apply pre-existing mining technology for soil decontamination and to use current smelting technology for waste treatment and for recycling metals in household electronic appliances such as mobile phones (referred to as "Urban Mining").

The range of so-called Green Technologies is tremendously wide and the below table lists itemized sub-sectors of this industry. As seen in Table 1, showing the "Environmental Goods and Services Industry" as outlined by OECD in 1999, Green Technology covers a wide range of segments, and in all of these, new technologies are expected to decrease environmental burdens.

Table 1 Sub-sectors in Environment Business including Green Technology	
A Prevention of environmental pollution	D Global warming related business
<p>A-1 Production of pollution control devices and materials</p> <ul style="list-style-type: none"> 1 air pollution control 2 drainage treatment 3 waste disposal 4 soil and water purification 5 noise and vibration control 6 environmental measurement, analysis, assessment 7 others <p>A-2 Services</p> <ul style="list-style-type: none"> 1 air pollution control 2 drainage treatment 3 waste disposal 4 soil and water purification 5 noise and vibration control 6 environmental research 7 environmental engineering 8 analysis, data-collecting, measurement, assessment 9 education, training, providing information 10 others <p>A-3 Construction and installation of equipment</p> <ul style="list-style-type: none"> 1 air pollution control 2 drainage treatment 3 waste disposal 4 soil and water purification 5 noise and vibration control 6 environmental measurement, analysis, assessment devices 7 others 	<p>D-1 Greenhouse gas emission control</p> <ul style="list-style-type: none"> 1 regenerated burner 2 cogeneration 3 natural refrigerated storage 4 CFC abolition devices 5 carbon monoxide cracking unit 6 carbon fiber 7 bioplastic 8 household fuel cell 9 hybrid car 10 EV 11 fuel cell car <p>D-2 Fossil fuel, alternative energy</p> <ul style="list-style-type: none"> 1 biomass power generation 2 wind power generation 3 small hydropower generation 4 solar power generation 5 wave-activated power generation 6 pumped hydropower 7 geothermal generation 8 biodiesel generating system 9 biodiesel fuel 10 bioethanol generating system 11 bioethanol fuel <p>D-3 Carbon dioxide dissociation, fixation, and reuse</p> <ul style="list-style-type: none"> 1 capture, isolation, and reuse 2 forest absorption <p>D-4 "Kyoto Mechanisms" *see below</p> <ul style="list-style-type: none"> 1 CDM/JI (equipment and facilities) 2 CDM/JI (credit)
<p>B Technologies and products for the reduction of environmental burdens</p> <ul style="list-style-type: none"> 1 technologies for resource saving and reduction of environmental burdens 2 products for resource saving and reduction of environmental burdens 	
<p>C Efficient use of resources</p> <ul style="list-style-type: none"> 1 indoor air quality control 2 water supply 3 recycled materials 4 renewable energy facilities 5 energy saving and energy management 6 sustainable agriculture, fishery 7 sustainable forestry 8 natural disaster control 9 eco tourism 10 others (machines & furniture repair, housing reform, urban planting) 	

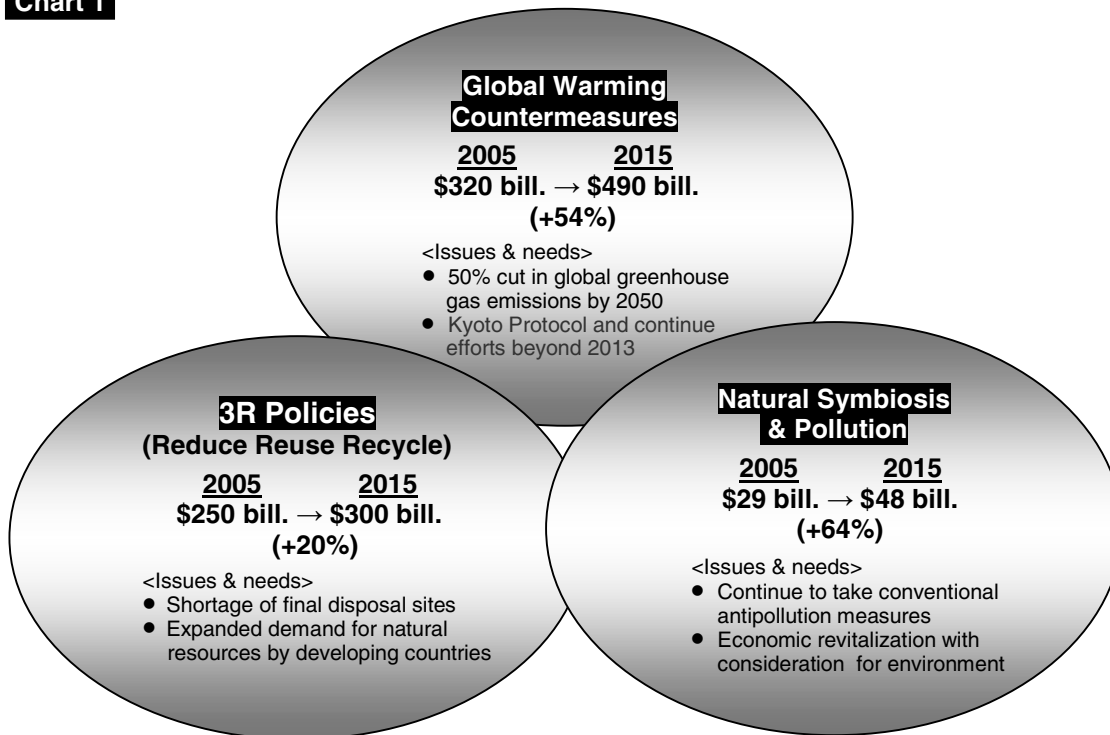
*The Protocol introduces four "Kyoto Mechanisms" for achieving emission goals through international collaboration; international emissions trading, joint implementation (JI), the clean development mechanism (CDM), and credit for forests and other carbon sinks

Source: Japan Research Institute, Ltd.

Market Data

As mentioned above, METI expects the Green Technology market, often referred to as the environment-related business in Japan, to reach US\$830 billion by 2015. The breakdown by market category is as follows: the "Global Warming Countermeasures" market is expected to increase from \$320 billion to \$490 billion; "The 3Rs (reduce, reuse, recycle)" market is expected to increase from \$250 billion to \$300 billion; and the "Natural Symbiosis and Pollution" market is expected to increase from \$29 billion to \$48 billion. These market segments are expected to each increase by between 20 to 64% respectively by 2015. Chart 1 below illustrates the expected market size increase in each category:

Chart 1



Source: Ministry of Economy, Trade and Industry

*Figures have been estimated based on data collected from businesses that are operating in these fields: □ global warming countermeasures (renewable energy, energy-conservation technology, etc.); □ 3R-related policies (waste disposal, recycling equipment); □ natural symbiosis and pollution related (antipollution facilities, environmental reclamation, environmental conservation)

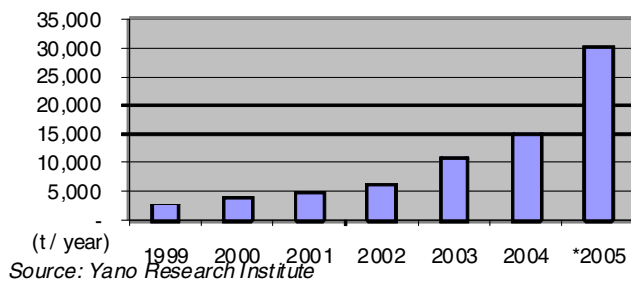
Hokkaido, the northernmost island of Japan, is the country's agricultural heartland, and the situation is therefore somewhat different from other regions of Japan. For example, solar energy may not be as cost effective here because of the cold snowy climate. Instead, Hokkaido may be able to contribute to renewable energy efforts through the creation of another form of energy, bio-fuel. Bio-fuel is a general term for fuel produced from biomass products: e.g. pellets made of sawdust, scrap wood, and waste paper, charcoal; Refuse Derived Fuel (RDF) for solid fuel; bio-alcohol, bio-ethanol, bio diesel Fuel (BDF), bio-gasoline, and liquid Ethyl Tertiary Butyl Ether (ETBE). In Japan, gasoline containing bio-ethanol was put on the market in April 2007. However, there is a great deal of public concern surrounding the materials used to make bio-ethanol: Since Japan's food self sufficiency rate is only 40%, the Japanese public do not want 'food products' to be used for bio-fuel production as they have already experienced severe imported food price increases because of increased bio-fuel production in the United States. If Japan depends on food crops for bio-fuel materials, even if the material is grown locally, it is feared the domestic economy would be impacted much in the same way.

Thus, Hokkaido is focusing on the use of byproduct materials to produce bio-fuels. For example, Taisei Construction and Sapporo Beer are jointly developing bio-fuels made with rice and wheat straw in Eniwa, Hokkaido, for which the Ministry of Agriculture, Forestry, and Fisheries (MAFF) is providing \$6 million in funding. Oenon Holdings is using imported rice that will not be consumed in Tomakomai, and they plan to use, in the future, other rice that is not suitable for eating which will be cultivated on fallow fields. Hokkaido Ethanol Inc., supported by the Japan Agricultural Association group is using off-spec wheat and surplus beets in Shimizu Town. Takenaka Komuten Construction also launched a development project using byproducts from potato starch. Mitsubishi Shoji and Kirin Beer are also building a production facility for Ethyl Tertiary Butyl Ether (ETBE) in Shimizu Town. What's common to all these developments is that they are focusing on using 'waste' biomass products, and Hokkaido is an ideal place for bio-fuel production as raw materials can be obtained locally.

Among these sub-sectors, another product worthy of consideration is biodegradable plastic which is classified into several types according to the origin of the materials used. This product also has key attributes helpful in protecting the environment: (1) it degrades into water and carbon dioxide in the soil thus decreasing waste; (2) it burns at a lower temperature and is carbon- neutral when burned; and (3) when biomass materials are used instead of petroleum, it will contribute to conserving fossil fuels.

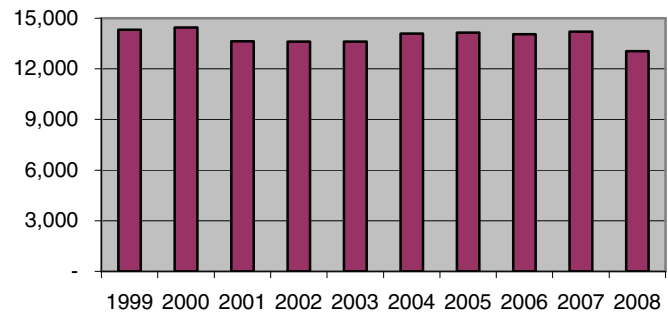
According to research conducted by the Study Group for Developing Bio Materials, the market for bio-plastics was once considered a high potential area in Japan with expectations that 30,000 tons of production in 2005 would increase to 150,000 tons by 2015. However, other sources note that the expected 'tremendous' increase has not taken place and will not happen because many of the earlier type of bio-plastics were petroleum in origin: these products would take a long time to degrade and would not conserve petroleum. Graph 1 A demonstrates the increase in the production of biodegradable plastic in Japan in comparison with the total plastic production illustrated in Graph 1 B, which is approximately 13 million tons on the average. Of the biodegradable plastic production, 70% is said to be biomass in origin yet biomass-degradable plastic only accounted for 0.5% of total plastics produced in 2005. The latest ratio is yet to be released but the Bio-plastic Research Institute predicts that the market may grow to account for as much as 10% of all the plastic produced in the future.

Graph 1-A Production of Biodegradable Plastic



Source: Yano Research Institute
*2005 from Study Group for Developing Bio-Materials

Graph 1-B (X1,000t / year) Production of Plastics

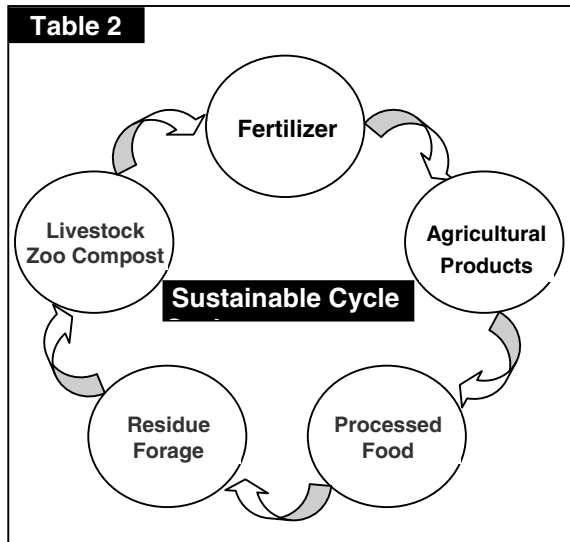


Source: Japan Plastics Industry Federation

Again it can be said that there is demand in Hokkaido for bio-plastic made from biomass for agricultural uses and food packaging. Bio-plastics can be used to manufacture many products such as film, sheets for insulation, packages, and foam products, and the market is particularly promising for sheets and film used for agriculture. At present, 200,000 tons of agricultural plastics are burned and buried, and switching to biomass plastics should accelerate when the price per kilo becomes lower than that for petroleum-origin plastics, which is in the range of US \$2.20 and \$2.78 (US\$= JPY90). The price for biomass-derived plastics has in fact become quite competitive recently due to the surge in the crude oil price over the last few years. Biodegradable plastics made with biomass products contribute directly to conserving petroleum and Hokkaido can provide the biomass inputs. Among many products made from biomass plastics, the production of multi-purpose film for agriculture totaled 1,770 tons in 2008, and production is expected to increase 10% annually according to Yano Economic Institute.

Best Prospects

In addition to bio-fuels and biomass-derived plastics mentioned earlier, Green Technology in Hokkaido also refers to technologies to help achieve a sustainable agricultural system that connects production with consumption and waste treatment back to production in a comprehensive cycle, as illustrated below in Table 2. There is a common recognition in Hokkaido that the shift to a more sustainable society and economy begins with restoring the agriculture sector's sustainability, and innovative Green Technologies are needed in fundamental aspects of this sector.



- Soil (soil analysis, effective fertilizing and fertilizer, soil decontamination, soil conditioning, residuals treatment)
- Water (assessment, water purification, self-purification system, sewage treatment)
- Air pollution control (assessment, gas circulation in soil ecosystem)
- New agrichemicals (pest control, herbicides)
- Manure and other waste treatments (recycling, transportation)
- Bio-fuel and biomass plastic (agricultural machines, heating, transportation, packaging)
- Agricultural Biotechnology

Key Suppliers

There are approximately 727 entities (both public and private) in the Environmental Business field in Hokkaido as of 2007, according to research conducted by Ministry of Economy, Trade and Industry (METI). Table 3 below lists some of these. Entities listed are suppliers as well as prospective buyers.

Table 3

Kankyo Giken	Oniki Seisakujo	Mitsui Engineering & Shipbuilding	Nishimura-gumi
Sanko Chemistry	Kyowa Kikou	Mitsubishi Kakouki Kaisha	Ikechi Kensetsu
Daiei Kensetsu	Green Plan	Mitsubishi Heavy Industries	Ace Clean
Chuo Chemistry	Kurita Chemical Hokkaido	Mitsubishi Electric	Kuramoto Tekkojo
Japan Data Service	Sato Kogyo	Resource Co., Ltd.	Hayashi Tekko
Hokkai Nisshoku	Shin-Chemical Shoji	Hokubu	Anzen Kensetsu
Hokkaido Wine	Setech	Honda Nouki	Hokudo Ryokka
Hokkaido Mitsui Chemistry	Daishin Sekkei	Kawatex	Kuribayashi Kikou
Hokuno Chemistry	Takuma, Hokkaido Branch	Rebio Co., Ltd.	Nittetsu Muroran Engineering
Hanamoto Kensetsu	Tamatukuri	River Industry	Hokkou Kakouki
Matsumura Sogo Institute	Dream, Ltd.	Solar Giken	Matsumoto Tekkojo
Hokuto Kensetsu Kogyo	Chudo Kikai	Fujiya Tekko, Ishikari Plant	Nakatani Sogyo
Hokkaido Shell Kogyo	Narasaki Sangyo	Ai Sec	Umeki Sangyo
Kawabe Concrete	Laboratory of Field Technology	Ise Kogyo	Nikkyo Setsubi
Ataka Daiki	Plantech	F.E.	Nexus
Ueno Denki	Hokusei	Onodera	Hokkaido Ecosis
Eco Material	Hokkaido Oless, Bio Green Dept.	Kisei-gumi	Sotoda-gumi
Ebara Engineering Service	Hokkaido Power Engineering	Creator	<i>and more...</i>
Ebara Corporation, Hokkaido	Hokkaido Fuji Denki	Showa Denko	
O&R Giken	Hokkaido Furukawa Kenpan	Huence Operation Center	

Source: Hokkaido METI

Prospective Buyers

Key suppliers listed above are also considered prospective buyers.

Market Entry

No matter how big expected market growth is, competition with already established Japanese market leaders will be difficult because they possess greater capital resources. It is also true, however, that many Japanese companies are seeking niche segments opportunities and ready-made technologies that can be applied in the market now to win a competitive edge, and that is where future opportunities are expected. It may also be useful to point out that the Japanese government generally will not procure specific technologies developed by specific firms, but rather procures products that meet standards using technologies many entities can offer. In the Green Technology field, solar energy generation and measuring greenhouse gases are examples of segments where many 'big players' are competing and thus, not recommended for U.S. exporters.

Market Issues & Obstacles

Short of establishing a presence in Japan, in order to market products in Japan, partnering with a local company is essential. A Japanese company who incorporates your technology into end-user products or services would be key to your entering this growing market. A technology partnership with local suppliers is also a recommended approach. The local company would also help you get any necessary certifications required to sell the products. Japanese partners play a key role in providing customers with maintenance and other services as well.

Trade Events

Environment Forum Sapporo (“Kankyo Hiroba”)(annual) <http://www.city.sapporo.jp/kankyo/hiroba/>

*not available in English

Trade event for environmentally friendly products and services

July-August (date: TBD) @Axes Sapporo

Organized by Executive Committee of Kankyo Hiroba

TEL: +81-867-1000 / FAX: +81-11-867-2006

Environment Fair for the Future of Hokkaido (“Hokkaido Mirai-zukuri Kankyo-ten”)

(annual) <http://www.noastec.jp/business/> *not available in English

Exhibition of green technologies

November (date: TBD) @Axes Sapporo

Organized by Hokkaido Committee of Technology and Business Exchange (NOASTEC Foundation)

TEL: +81-716-9650 / FAX: +81-11-708-6529

Held in conjunction with: **Hokkaido Technical Information & Business Exchange Fair**

ENEX2010 <http://www.enex.info/> *not available in English

Trade event for energy saving and new/renewable energy

February 10-12 @Tokyo Big Sight (Tokyo International Exhibition Center)

Organized by ENEX Organizing Office in Energy Center

TEL: +81-3-5543-3013 / FAX: +81-3-5543-3887 / E-mail: enex@eccj.or.jp

PV Japan 2010 <http://www.pvjapan2008.org/PVJAPAN-EN/index.htm>

Trade fair and seminar for the global solar-photovoltaic industry

June 30-July 2 @Pacifico Yokohama

Organized by Semiconductor Equipment and Materials International (SEMI) and Japan Photovoltaic Energy Association (JPEA).

Contact: Mr. Tetsuya Ono, SEMI Japan
TEL: +81-3-3222-5776 / FAX: +81-3-3222-5757 / Email: pvj@semi.org

Energy Solution, and Thermal Storage Fair (annual) <http://www.tepco.co.jp/solution/fair/outline-j.html>

*not available in English

Trade fair for heat pumps and other thermal storage systems

July (date: TBD) @Tokyo Big Site (Tokyo International Exhibition Center)

Organized by Tokyo Electric Power Co. (TEPCO), Heat Pump Center, Federation of Electric Power Companies

TEL: +81-3-4283-8830 / FAX: +81-3-4283-8834

Environment & Technology Exhibition (annual) <http://www.eco-t.net/kaisai.html> *not available in English

Exhibition of environmental technologies

October (date: TBD) @Nishi-Nihon Sogo Exhibition Center

Organized by: City of Kita Kyushu, Nishi Nihon Association of Industry & Trade Convention

Contact: Nishi Nihon Association of Industry & Trade Convention

TEL: +81-093-511-6848 / FAX: +81-93-521-8845 / Inquiry form: <http://www.eco-t.net/mailform/main.php>

Biwako Environmental Business Exhibition (annual) <http://www.biwako-messe.com/overview/index.html> *not available in English

Exhibition and seminar introducing environmental technologies and services

October (date: TBD) @Shiga Nagahama Dome

Organized by Shiga Environmental Business Association

TEL: +81-77-528-3793 / FAX: +81-77-528-4876

Inquiry form: <http://www.biwako-messe.com/contact/sformmail.php>

Eco Products (annual) <http://eco-pro.com/eco2009/english/index.html>

Trade fair of environment-friendly products and technologies

December (date: TBD) @Tokyo Big Sight (Tokyo International Exhibition Center)

Organized by Japan Environmental Management Association for Industry (JEMAI), Nikkei Inc.

E-mail: go@eco-pro.com

Held in conjunction with:

-Biomass Exhibition

Organized by Biomass Exhibition Organizing Committee

Eco Manufacture (annual) <http://www.jma.or.jp/ecoma/en/index.html>

Exhibition that supports environmental measures, energy measures and environmental management for manufacturers

November (date: TBD) @Tokyo Big Site (Tokyo International Exhibition Center)

Organized by the Society of Chemical Engineers, Japan & Japan Management Association (JMA)

Contact: the Secretariat of Eco Manufacture

TEL: +81-3-3434-1410 / FAX: +81-3-3434-3593

Inquiry form: https://www2.jma.or.jp/ecoma/2009/ecoma_siryou09_en.php

Held in conjunction with:

-INCHEM TOKYO (every second year) <http://www.jma.or.jp/inchem/en/index.html>

Trade fair for chemical plant engineering and advanced materials

-NDE TOKYO (held for the first time in 2009) <http://www.jma.or.jp/nde/en/>

Exhibition for Non-destructive testing, measuring, evaluation and diagnosing technology

Key Contacts

- Association of Green Technology, Hokkaido: <http://www.do-kankyo.jp/> *not available in English
TEL: +81-11-780-2882 / FAX: +81-11-782-5222 / E-mail: dk-info@do-kankyo.jp
- Ecologya Hokkaido 21 Committee: <http://www.ecologya.jp/> *not available in English
TEL: +81-11-221-6166 / FAX: +81-11-221-3608
- Japan Bio Plastics Association: <http://www.jbpaweb.net/english/english.htm>
TEL: +81-3-5651-8151 / FAX: +81-3-5651-8152 / E-mail: infojbpa34@jbpaweb.net
- Japan Photovoltaic Energy Association: <http://www.jpea.gr.jp/08eng.html>
TEL: +81-3-6268-8544 / FAX: +81-3-6268-8566 / E-mail: jpea@jpea.gr.jp
- Ministry of the Environment: <http://www.env.go.jp/en/>
- Ministry of Agriculture, Forestry and Fisheries: <http://www.maff.go.jp/e/index.html>
- Ministry of Economy, Trade and Industry: <http://www.meti.go.jp/english/index.html>

For More Information

The U.S. Commercial Service in Sapporo, Japan can be contacted via e-mail at: misa.shimizu@mail.doc.gov;
Phone: 81-11-641-1115 ext. 5; Fax: 81-11-643-1283; or visit our website: <http://www.buyusa.gov/japan/en>

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