Green Innovation in Kawasaki

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Kawasaki City, called “Industrial City Kawasaki” was developed as a city of manufacturing; recently, the city is transforming drastically into a city of high-tech technology and industry, a base for industrial technology and research & development, which leads Japan.

<table>
<thead>
<tr>
<th>Population</th>
<th>1,436,368 people (May.1,2012)</th>
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</thead>
<tbody>
<tr>
<td>Area</td>
<td>144.35 K㎡</td>
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<tr>
<td>Gross production of the city</td>
<td>5214.0 billion yen</td>
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<td>Major Industries</td>
<td>Manufacturing Service</td>
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<td></td>
<td>Transportation • Service</td>
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<tr>
<td>Major manufacturing industries</td>
<td>General machinery Metal products Electric</td>
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<tr>
<td>Developing industries</td>
<td>New manufacturing technology Info / telecommunication Environment Welfare Lifestyle / culture</td>
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Learned from pollutions

Sky of Kawasaki (1968)

Smokes from factories of the coastal area were hanging over the city.

Sky of Kawasaki (2011)

A large improvement was achieved through countermeasures by a joint effort of businesses, citizens, and local authorities.

The atmospheric conditions were considerably improved by the countermeasures. In winter when the atmosphere is stable, Mt. Fuji can be seen in distance.
In the process of dealing with a variety of environmental issues, a vast amount of environmental technology and know-how has been accumulated within Kawasaki City.

Contributing to solving environmental problems on a global-scale is Kawasaki’s responsibility through transferring these experiences overseas.
Integration of Research and Development

© Number of R & D institutions: 225
(201 privately owned, 22 universities or other research institutes) ※

※ Kawasaki Innovation status
research (FY 2007)
Realization of a Mutually Beneficial Cycle between the Environment and Industry

【Kawasaki’s Fundamental Plan to create the Town harmonizing with Environment (Kawasaki Eco-Town Plan)】

- Companies go for eco-friendly
- Companies collaborate together for eco-friendly on site
- Research for sustainable development of coastal area on environment
- Contribution for international communication and sending performance

- The plan was approved by MITI (at present, METI) in 1997
- Appointed area: Whole Kawasaki Coastal zone (2,800ha)
- Purpose 1: Facilitate companies operating there to develop resources recycling production and install new equipments for resources recycling
- Purpose 2: Construct Kawasaki Zero Emissions Industrial Park oriented to waste reuse and recycling
Status of Construction of Recycling Facilities

- Waste plastic ammonia feedstock production facility (Showa Denko K.K.)
- Recycled cement production facility (D.C.)
- PET-to-PET recycling facility PET Rebirth Co., Ltd.
- Waste plastic blast furnace feed facility/ Waste plastic concrete form panel production facility/ Appliance recycling facility (JFE Group)
- Within radius of approx. 1.5km
- Hard-to-recycle waste paper recycling facility (SAN-EI Regulator Co., Ltd.)

ISAP2012
Kawasaki City and Tokyo Electric Power Co. are moving ahead with a joint mega-solar power generation project to construct solar electric power plants with a combined total output of 20,000kW in the Kawasaki City coastal area. These plants are set to commence operation in FY2011.

Tokyo Electric Power: Construction of the solar power facilities; operation and management of the electric power plants
Kawasaki City: Construction and operation of a PR facility

One of the largest solar power generation plants in Japan
- 2 electric power plants with a total output of about 20,000kW (7,000kW + 13,000kW)
- Will generate about 21 million kWh, equivalent to the amount of electricity used by about 5,900 ordinary households annually
- Annual CO2 reduction effects of about 8,900t

PR facility for solar power generation, etc.
- Ukishima Solar Power Plant
  Output: about 7,000kW
  Electricity generated: about 7.4 million kWh
- Ohgishima Solar Power Plant
  Output: About 13,000kW
  Electricity generated: about 13.7 million kWh

Construction and operation of the PR facility
Land owned by Kawasaki City
Land owned by Tokyo Electric Power Co.

Construction of solar power generation facilities
Operation and maintenance of electric power plants

2012/7/24
Kawasaki Ecolife Museum for the future

- Environmental learning museum: Look, Listen, Touch
-Themes:
  - Global warming, Renewable energy, Resource circulation

- Start of operation: 2011/8/6
- In the site of the Ukishima Incineration Plant
- Open 9:00 close 16:30
- Close: every Monday
- Charge free

1F

2F

Observation deck at the top of the packaging factory for recycling
A framework that assesses technologies and products that contribute to lifecycle CO₂ reduction. CO₂ reduction amounts are calculated in comparison to existing products, not only at the time of production but for the product’s entire lifecycle as well.

Example of calculation (for manufactured goods):

\[
\text{CO}_2 \text{ reduction result} = \text{Compare} + \text{Compare} + \text{Compare} + \text{Compare} + \text{Compare}
\]

<<Subject to comparison (baseline): existing items, standardized items>>

Low-CO₂ Kawasaki Brand

System of assessment based on lifecycle

Based on the Kawasaki CO₂ reduction model, a product and technology assessment system that contributes to a low carbon society.
A show window of model project based on the theme of “visualization of environmental technologies” is being conducted. Ideas for utilizing environmental products and various facilities within the city, which are effective for saving/creating energy and easy for people to understand, are collected from business operators. The model projects displayed are decided based on these ideas. The projects using the Kawasaki Low CO2 Pilot Brand are conducted as well.

**Model Projects of the Kawasaki Environmental Show Window**

- Energy that is “created, stored, and used” in various places (Venue: Takatsu Ward Office)
- Electricity generation by wind and solar power, and emergency preparedness with manpower-generated electricity (Venue: Kawasaki City Yumemigasaki Zoological Park)
- Electricity consumption halving operation (Venue: Kawasaki underground shopping area, Azalea)
- Education on the new energy by introducing solar power system (Venue: LA CITTADELLA)
- Suspended lighting equipment using energy-saving “LED balloon floodlights” (Venue: Kawasaki City Industrial Promotion Hall)
- Energy saving for bus stop signs by using solar panels and LED (Venue: Kawasaki Municipal Bus stops; Nakamaruko Nishi-machi, Noborito-eki iriguchi, and Den-en Chofu University-mae)

**Kawasaki Environmental Show Window Grand Prize**

The award is presented to enterprises, etc. in the city, which have introduced technologies or products to their measures for saving/creating energy, and showed remarkable results.
Energy facilities accumulated in Kawasaki

Introduction of facilities for renewable energy and energy conservation to whole area in Kawasaki city; Networking among dissemination of environmental education and information facilities; and Appealing the potential toward environmental action in coastal area of Kawasaki city both to domestic and countries from overseas.

CC Kawasaki Energy Park
- Position whole area in Kawasaki as “Energy Park”
- Dissemination of collective information about leading-edge environmental energy technologies to domestic and countries from overseas
- Improvement for understanding of citizen and business entities toward energy

- Renewable energy and energy conservation facilities: 18
- facilities for dissemination of environmental education and information: 1

St. Marianna University School of Medicine:
Upgraded to Energy conservation (ESCO business)

Aso Ward Office: Collaborative solar power generation among citizens; 5kW

Takatsu Ward Office: Integrated system for solar power generation and electric storage

Nakahara Branch, TEPCO: Solar cleaning system

International Exchange Center: Communal generation power plant by citizens

Minami-kawara Child-caring Center: Air conditioning system with geothermal heat

Nakahara Ward Office: Integrated system for solar power generation and electric storage

Waterworks department:
Washinuma micro hydro generation plant; 90kW

Motosumiyoshi Sta., Toyoko line: Solar power generation; 140kW

Takatsu: Solar power generation and others

Waterworks department:
Egasaki small hydro power generation plant; 170kW

Kawasaki Sta. East Gate Plaza: Solar power generation and others

Kawasaki Steam Net:
Delivering steam made by generation plant to companies located in surrounding

TEPCO Kawasaki thermal electric power generation plant:
High efficiency generation plant (MACC)

Kawasaki Azeria
High efficiency air conditioning system with Hydrate slurry

Ukishima Solar Power Generation Plant: about 7,000kW

Facility for dissemination of environmental education and information (PR facility for solar power generation and others) had be finished to establish: Aug., 2011

Win power plant of JX Nippon Oil & Energy Corporation: 2,000kW

Elly Power Co.:
Production factory for lithium-ion storage battery

Kawasaki Natural Gas generation power plant: High efficiency generation plant

Ougijima generation Solar power plant: About

Kawasaki Natural Gas generation power plant: High efficiency generation plant

Facility for dissemination of environmental education and information (PR facility for solar power generation and others) had be finished to establish: Aug., 2011

Recycle Park Asao Plaza

Promotion Center on protecting of Global warming

- Relative facilities for environmental education
  - Toshiba Science Museum
  - Electric Power Historical Museum, TEPCO
  - Wondership Environmental Energy Museum Tokyo Gas
  - Tachibana Recycling Community Center (expected facility)
  - Multidisciplinary Institute for Environment
  - Promotion Center on protecting of Global warming
Development of decentralized smart communities that complement one another
Promotion for the clear visibility of energy usage
Implement a unified model that encompasses environment, disaster prevention and livelihood

Showcase: Smart Community Surrounding Kawasaki Station
Deepening cooperation and exchange with overseas organizations in the environmental field

Kawasaki City

Promotion of Carbon Challenge Kawasaki
Utilize Kawasaki's features and strengths to actively promote global warming countermeasures throughout the entire city

Concentration of environmental technology and know how
Accumulation of technology and know how in the environmental field by way of the current concentration of research facilities and past experiences dealing with pollution

Contributing internationally through environmental technology
Through the transfer of the city's accumulated leading environmental technology abroad, we are proactively contributing to global society

United Nations Environment Program (UNEP)

United Nations Industrial Development Organization (UNIDO)

ShenyangCity

Cooperation with UNEP
Since 2005 Kawasaki has been holding the “Asia-Pacific Eco-Business Forum” in order to share the results of our efforts with environmental measures with other Asian cities

Cooperation with UNIDO
Groups such as a delegation from African embassies in Tokyo (26 people representing 23 embassies) and researchers from South America inspect environmental technologies in use at businesses in Kawasaki

Initiatives Collaborated with Friendly City Shenyang
To assist the circular economy development of Shenyang, Kawasaki’s friendly city in China. Kawasaki City has organized collaboration with the Ministry of the Environment, National Institute for Environmental Studies and the United Nations Environment Programme (UNEP).
Kawasaki International Eco-Tech Fair

The Fair has been held since 2009 to transmit to all over Japan and the world the leading-edge environmental technologies and know-how of Kawasaki City’s enterprises, as well as technologies to quickly respond to global environmental problems. It thus aims to contribute to creating an international low-carbon society.

Outline of the International Eco-Tech Fair 2012

◎ Date: Feb. 10 to 11, 2012 (2 days)
◎ Venue: Todoroki Arena
◎ Theme: “Kawasaki now brings environmental technologies to the world”
◎ Participants: 136 organizations, mainly Kawasaki’s enterprises, set up booths. There were 13,500 visitors, including 174 from overseas.
◎ No. of business meetings: 500 meetings, including 100 with overseas participants

Exhibition of Environmental Technologies

A large number of Kawasaki’s prospective technologies, products and know-how in the environmental field were exhibited and transmitted to all over Japan and the world. There were many participants from overseas, including; Cities of Shanghai, Beijing, Shenyang, and Hong Kong, China; Taegu, Republic of Korea; States of Oregon, Pennsylvania and North Carolina, U.S.A.; and State of Queensland, Australia.

Programs on the Stage

Official announcement of the screening results for the Low CO2 Kawasaki Pilot Brand, ‘11 (Feb. 10)
Award ceremony of the Kawasaki Environmental Show Window Projects, 2011 (Feb. 11)
Lectures by various key persons in the environmental industries

Events with Close Focus on Kawasaki’s “Environmental Technologies”

● Introduction of the Kawasaki Environmental Show Window Projects
● Environmental Model Area Introduction of Kawasaki Eco Complex
● Excursion Tour of the environmental facilities in the city

CC Kawasaki, Ecological Lifestyle Tour

Tour through the Fair site on the theme of “CC Kawasaki, Ecological Lifestyle”, an environmental campaign conducted by Kawasaki City
I. Initiatives toward the Establishment of the Kawasaki Environment Research Institute

- Kawasaki City intends to establish the Kawasaki Environment Research Institute as a base for comprehensive research on the environment in collaboration with the United Nations Environmental Programme (UNEP), the National Institute for Environmental Studies, universities, and companies which possess environmental technologies by consolidating three existing organizations in Kawasaki City (Municipal Research Institute for Environmental Protection, Kawasaki Air Pollution Monitoring Center, and Kawasaki City Global Environment Knowledge Centre).
- In 2008, the Kawasaki City Global Environment Knowledge Centre was launched in anticipation of the establishment of the Kawasaki Environment Research Institute. Since that time, the Centre has been engaged in the collection and sending out of information on Kawasaki’s outstanding environmental technologies, joint research in collaboration with industry, universities, the public sector, and citizens utilizing the field of Kawasaki, and receiving of trainees from other countries, etc.

II. 5 Functions Introduced in the Kawasaki Environment Research Institute

<Function 1> Research aiming at “Integration of city and industry” (collaborative joint research with industry, universities, public sector, and citizens)
- Research on techniques for estimating greenhouse gas emissions and indexes for global warming countermeasures
- Research for the construction of a low carbon society and resource circulation society
- Joint research with the National Institute for Environmental Studies and others

<Function 2> Promotion of international environmental policy by transfer of Kawasaki’s outstanding environmental technologies
- Collaborative projects with United Nations Environment Programme (UNEP)
- Projects in collaboration with other international organizations
- Receiving of observers/trainees from other countries

<Function 3> Collection/sending out of Kawasaki’s outstanding environmental technologies
- Systemization and archiving of Kawasaki’s environmental initiatives and experience
- Analysis/processing for sending out of easily-understood information
- Collection/sending out of information on environmental technologies inside/outside Japan using ICT, etc.

<Function 4> Monitoring, surveys, and research for further environmental improvements and advance prevention of environmental pollution
- Regular monitoring, surveys, and research in connection with environmental protection
- Studies and research on environmental risk
- Emergency response in case of releases, leaks, or spills of pollutants
- Precision management of measurement and analysis
- Environmental monitoring

<Function 5> Environmental education and training in collaboration with diverse actors
- Development of physio-chemical environmental education and training programs
- Collaboration with diverse environmental activities

III. Establishment of the Kawasaki Environment Research Institute in Kawasaki’s Tonomachi 3-chome District

<Features of the Tonomachi 3-chome District>
- Kawasaki’s Tonomachi 3-chome District is located on the opposite shore from Haneda Airport, which is being expanded and will provide wider international service beginning in October 2010.
- The Tonomachi 3-chome District is an area of approximately 40ha which aims at hosting a concentration of universities, research institutes, and companies with advanced, cutting-edge technologies in the fields of the environment and life sciences, as well as airport-related industries and others.
- In April 2010, Kawasaki City acquired a 1.3ha site and is now promoting the establishment of the research and development facilities which will become the core of this project.

<Establishment of “Collaborative Research Center (Provisional Name)”>
- The Collaborative Research Center will be established as a core institution for the creation of R&D bases in the Tonomachi 3-chome District through collaboration among industry, universities, the public sector, and citizens. This will be a composite facility including a Health and Safety Center (provisional name), the research and development sections of companies and universities, etc., in addition to the Kawasaki Environment Research Institute.

<Establishment of the Kawasaki Environment Research Institute>
- The Kawasaki Environment Research Institute will be established in the above-mentioned Collaborative Research Center, which will be located in the Tonomachi 3-chome District.
- The Kawasaki Environment Research Institute will promote initiatives which create synergistic effects and ripple effects in the Kawasaki Coastal Area, such as concentration of environment-related industries and research institutions, promotion of joint research in the environmental field by exchanges of researchers, etc.

The Kawasaki Environment Research Institute expects to begin operations in FY2012.
Thank you for your attention!