


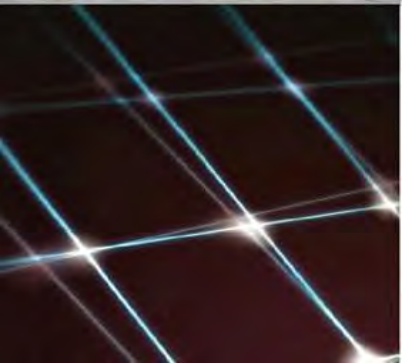

Kitakyushu City's Challenge toward a Low-carbon Society

Kitakyushu Smart Community Creation Project




November 29th, 2012

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Director for Business Support

Kitakyushu Asian Center for Low Carbon Society

City of Kitakyushu

City of Kitakyushu

KITAKYUSHU

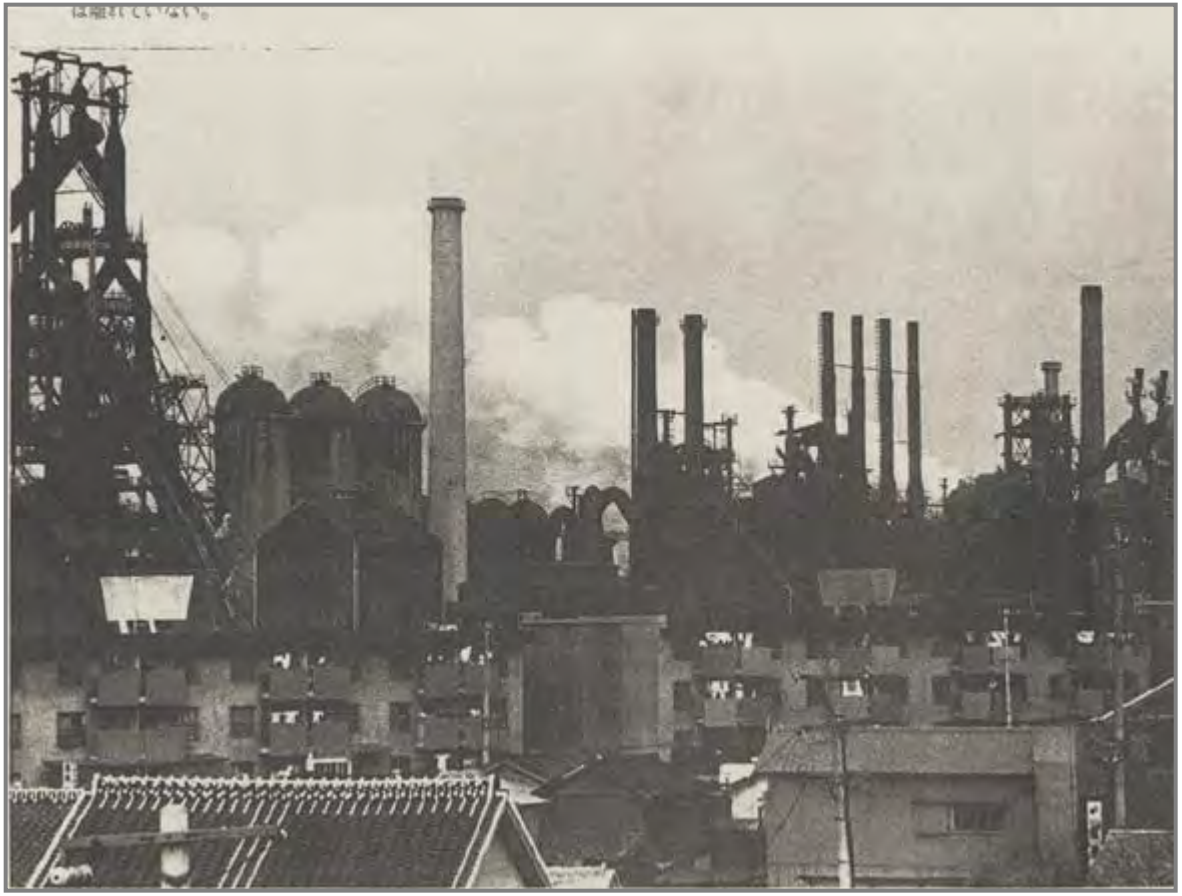
Population: 980,000 (Oct 2011)

Area: 488km^2 (Oct 2010)

GDP: 3.52 trillion yen (2008)

The Birthplace of Modern Industry in Japan

The National Yawata Steel Works
（1901）



In 1950s

Overcoming Severe Environmental Pollution

In 1960s

Worst Air Pollution
Caused closing a school

“The Dokai Bay” Sea of Death
Erode screw of ship and E.coli bacteria died.

Present

Recovered Blue Skies and Sea, People Enjoying Environment

City of Kitakyushu's Environmental Policy

1901

Government-run **Yawata Steel Works** | We have developed as an **Industrial City**

Industrial Wastewater | **Exhaust Emission**

1950

Aggravation of Pollution Problems

Women's Movement against Environmental Pollution

1960's

Pollution Control Policy

City Government
Organizational Arrangement, Ordinance, and
Pollution Control Agreement with Companies

Private Enterprise
Cleaner Production
Improvement of Production Process
Treatment of Pollutant, Tree Planting

Overcoming Environmental Pollution

1980's

Establishment of "KITA" (1980)

KITA: Kitakyushu International Techno-cooperative Association

Local Diplomacy Policy

Environmental International Cooperation (1988～)

Agenda 21 Kitakyushu (1996)

Kitakyushu Eco-Town(1998)
Environmental Preservation and Industrial Promotion

Resource-Circulating Society Policy

Reduction of Domestic Waste by Introducing New System and Citizen Participation
(First one at Designated Cities)

2002

Sustainable Society Policy

Decision of Establishing PCB Treatment Facility (2001)

Johannesburg Summit (2002) identified **Kitakyushu Initiative for a Clean Environment**

Grand design on **World Capital of Sustainable Development** (2004)

Implementation and Evaluation of Practical Activities

2008

Low Carbon Society Policy

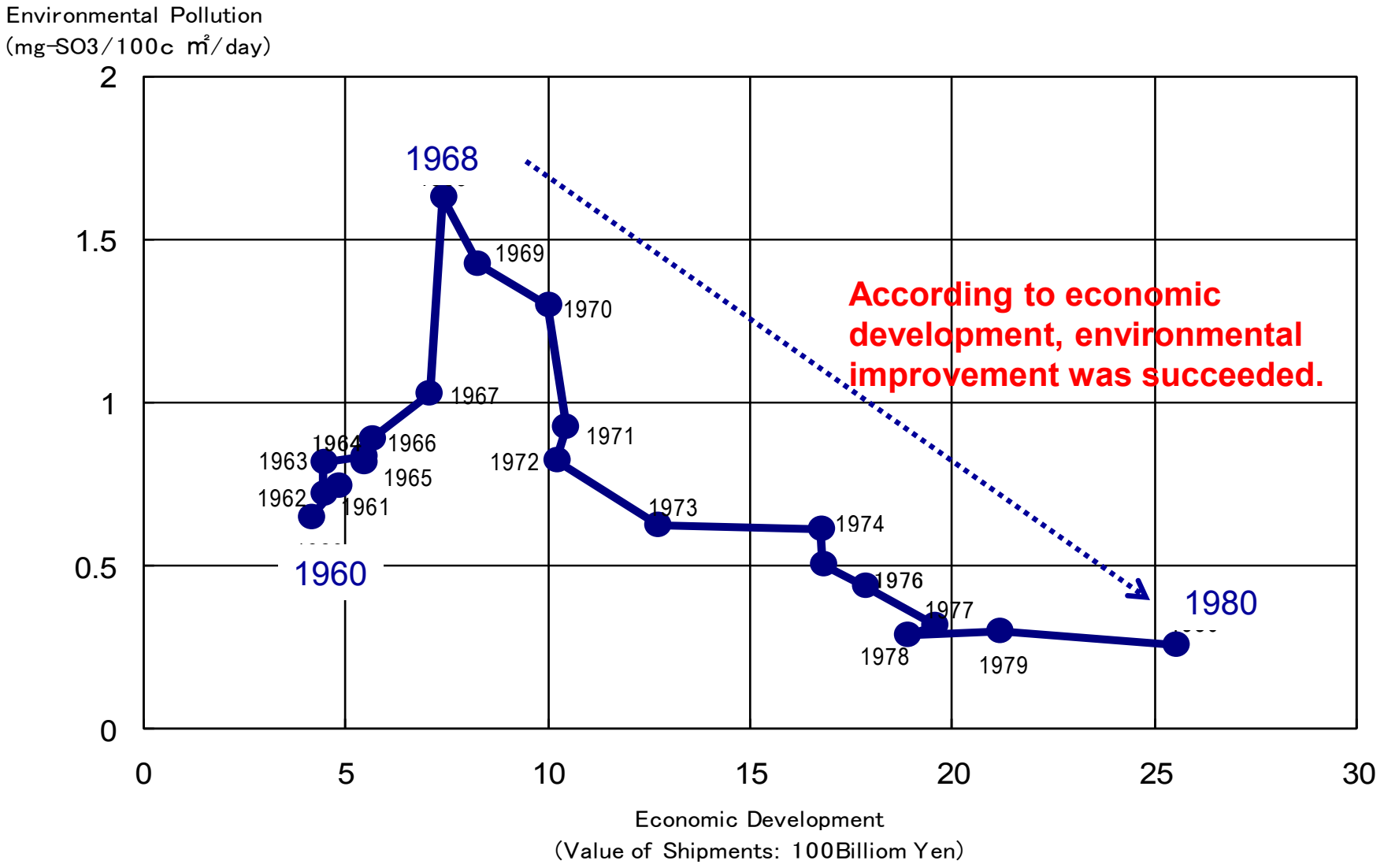
Eco-Model City
Green Frontier plan(2009)

Green Growth Model City selected by OECD (2011)

Environmental Future City(2011)

Creation of Local and Global Sustainable Society

Economic Development and Environmental Achievement



Source: World Bank, MEIP Report, 1993

Kitakyushu City's Efforts toward a Low-carbon Society

Kitakyushu Hibikinada Area is promoting three elements—low carbon, recycling, and nature coexistence—in a balanced manner.

General energy frontier zone

Kitakyushu Next-generation Energy Park


Wind power generation


Photovoltaic power generation


Natural gas


Coal gas


Oil storage station


Biomass

Various energy-related facilities that lead the next generation are clustered here, such as intensive use of solar, wind, and coal power.

Demonstration of the next-generation energy/social system

Kitakyushu Smart Community Creation Project

Create city bustle with ecological activities

Murasaki River Eco-river Concept (urban district model)


Sunlight arcade and roof


Ecological human traffic line formation will be promoted.


Positive introduction of next-generation vehicles


Diffusion and promotion of energy-saving buildings

Promote next-generation urban planning, including installation of photovoltaic power generation and promotion of rooftop greening on bridges and arcades in the Kokura city center

Intercity diplomacy with various cities in Asia

International environmental cooperation

Jono area
aiming at a zero-carbon society
(advanced low-carbon model block)

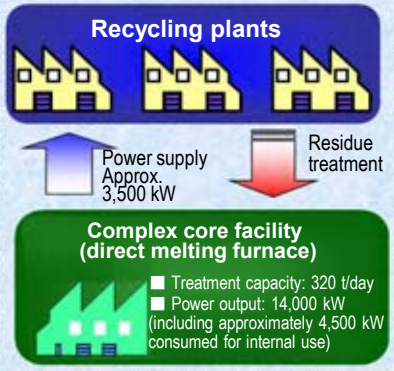
Promotion of recycling and 3R

Eco-town project


A recycling community will be constructed where all sorts of waste will be used as raw materials for other industrial fields to eliminate waste (zero emissions).

Research institutes:	16
Industrial facilities:	29
Total investment:	66 billion yen
Jobs created:	1,350 employees
Number of visitors:	940,000 in total

Kitakyushu Eco-town Power-receiving Association (established based on the Cooperative Association of Small and Medium Enterprises Act)



A community in harmony with nature that preserves and fosters the environment

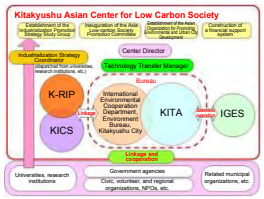
A green corridor where birds tweet

Japan's largest biotope inhabited by wildlife, including wild birds, will be developed by improving and foresting a waste disposal site as a "green station."


Eco-town agreement concluded with Dalian City


Water system cooperation (Cambodia)


Takakura kitchen waste composting system (Indonesia)



Establishment of the Kitakyushu Asian Center for a Low-carbon Society


Mr. Xi Jinping, Vice President of the People's Republic of China, inspected Kitakyushu City (December 2009)

Efforts by the whole city

Environmental Model City Action Plan
(developed in March 2009)
135 measures and projects
376 registered organizations


Eco-style town


One million trees planted


Promotion of rooftop and wall greening


Environmental passport


Dissemination of community cycle


Development of the Environmental Model City Region Steering Committee/Green Frontier Plan

Composition of Kitakyushu Smart Community Creation Project

Realization of an energy community participated in by regional blocks → **Society capable of full use of energy** → **CO_2 reduction by 50%**

Blocks using 10% new energy

Town Mega Solar

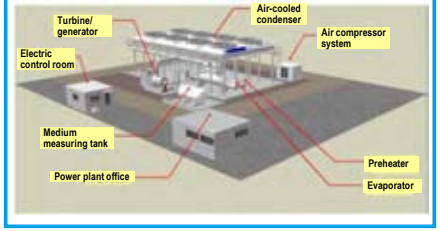
Infrastructure will be developed to enable photovoltaic power generation of 1,000 kW within the community

Kitakyushu Hydrogen Town

Hydrogen supply using the hydrogen byproduct pipeline (used for fuel cells, etc.)

Binary power generation

Demonstration project for binary power generation using low-temperature waste heat emitted from a factory



【Roles and Form】

- New energy will be systematically introduced into urban design
- Civilian use of factory energy

Introduction of energy-saving system with all block functions

Introduction of bioelectric management systems and home energy management systems compatible with the demand

20 smart houses, 4 smart stores, 4 smart schools, 1 next-generation service station, 1 smart hospital, etc.

5 smart offices | 1 smart data center | 10 smart factories

- Photovoltaic power generation
- Small-scale wind power generation
- Battery chargers for electric vehicles and plug-in hybrids
- Intensive greening area

【Roles and Form】

- Enabling both efficient energy use at individual facilities and energy use by the whole community
- Standardization of smart meters beyond the differences among factories, buildings, etc.

Regional society planning for a next-generation traffic system

Total mobility management system

- A total mobility management system will be constructed that enables linkage with public transportation systems and community buses as well as the introduction of a large number of electric vehicles, promotion of the use of bicycles, and the use of small fuel-cell vehicles.

General energy station | Bicycle rental station | On-demand transportation system Community bus

【Roles and Form】

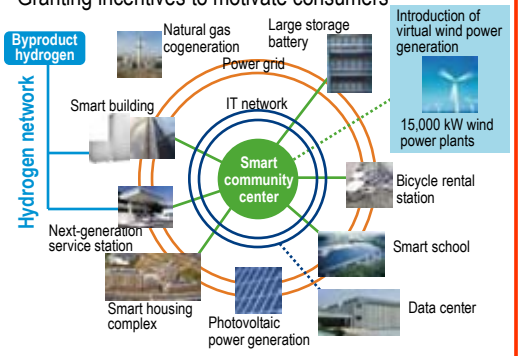
- Development of the next-generation mobility station
- A traffic system that considers aged people, such as on-demand community buses linked with hospitals

Construction of regional energy management

A Smart Community Center

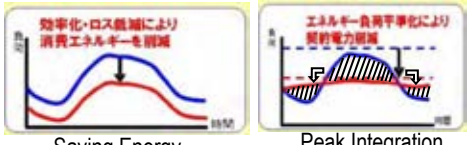
The Regional Energy-saving Station will be constructed with the following functions as the foundation for managing regional energy:

- Optimum energy distribution in accordance with power-generating status
- Rationalization of control from the demand side for optimization of the demand in the entire community
- Visualization of energy and CO_2
- Granting incentives to motivate consumers



Demand-side Management

- **Dynamic Pricing**
- **Incentive Program**



Saving Energy | Peak Integration Peak Shift

Introduction of a large number of smart meters

Introduction of smart meters to approximately 70 companies and 200 households

【Roles and Form】

- Maximum use of new energy in accordance with the demand within the community
- Minimization of energy use in the entire community
- Minimization of the impact of unstable new energy on core electric power

Summary of Kitakyushu Smart Community Project

1. Summary of activities

This project implements various demonstrations, including communications, urban planning, a transportation system, and lifestyle, with emphasis on demonstration of energy projects such as electric power.

2. Implementation body

Kitakyushu Smart Community Council
46 companies and organizations, including Kitakyushu City, Nippon Steel Corp., IBM Japan, and Fuji Electric Systems Co. Ltd.

3. Implementation district

Higashida district,
Yahata-Higashi ward
(approximately 120 ha)

4. Implementation period

Five years from fiscal 2010 to 2014

5. Scale of operation

38 projects worth 16.3 billion yen
(estimated amount for 5 years)

Objectives of Smart Community-Demonstrating Business

GreenFrontier 環境モデル都市 北九州市

Current trends in society and economy

- Increase in environmental regulations (CO_2 reduction goal) → Introducing renewable energy to many companies
- Economic growth and strategy → Increasing use of smart grids in many countries
- Great earthquake and its effects → Improving energy security

Issues

- Encouraging business customers to improve efficiency and thereby reducing loads on electric power transmission systems
- Enacting international standards on key technologies
- Improving energy efficiency in industries that use electric power, heat and transport

Constructing smart communities, next-generation social systems with controlled energy

Demonstrative projects in which local inhabitants participate

Energy optimization
Supporting various daily functions (in homes, offices, commercial facilities, hospitals and factories)

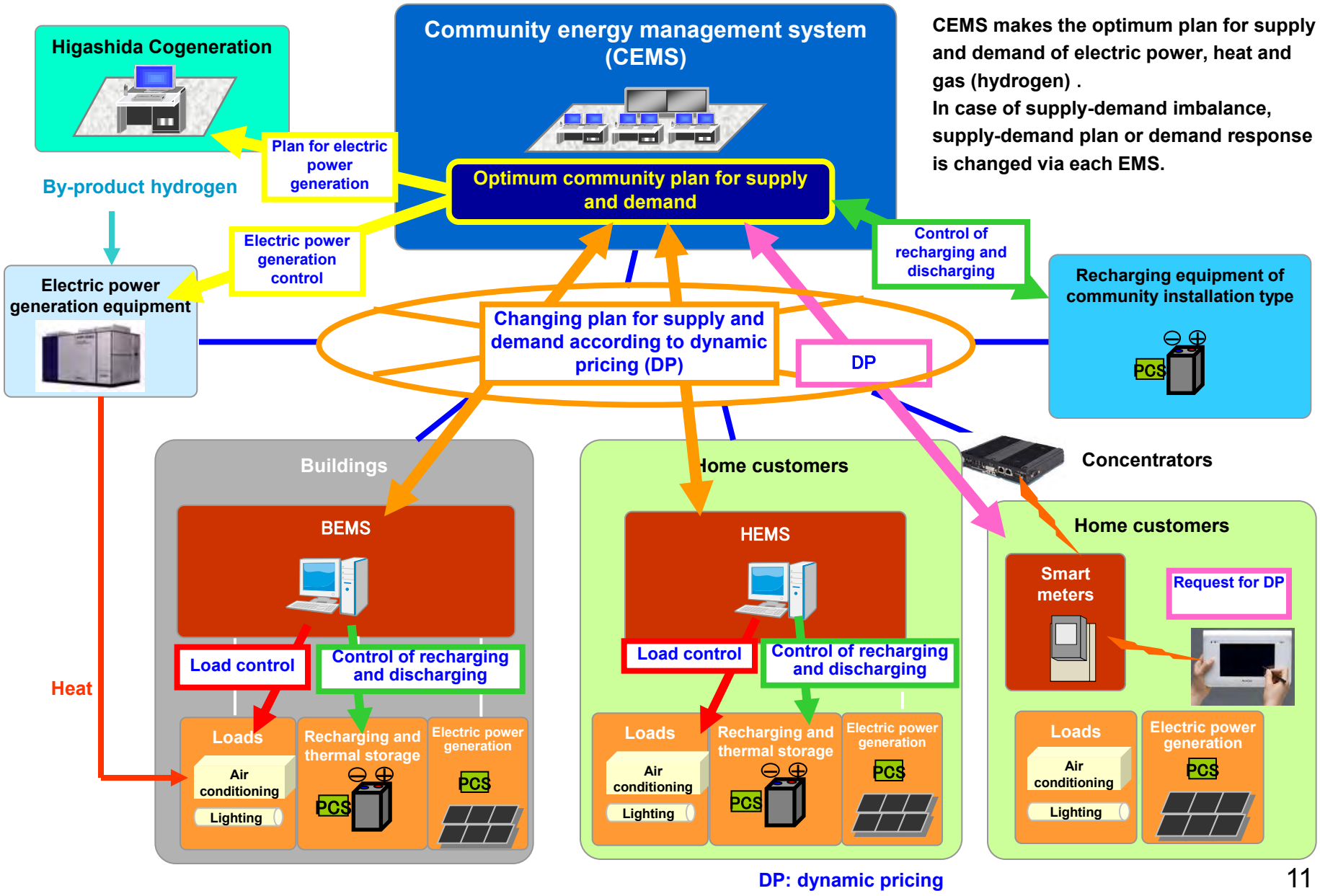
Recharging control technology
Verifying correlation between heavy use and degradation

Business model
Optimum plan for compatibility between system construction costs and energy saving without causing discomfort

Standardization
Preventing the Galapagos syndrome

Optimum Use of Local Energy and Demand Response

GreenFrontier 環境モデル都市 北九州市



CEMS makes the optimum plan for supply and demand of electric power, heat and gas (hydrogen) .
In case of supply-demand imbalance, supply-demand plan or demand response is changed via each EMS.

DP: dynamic pricing

KITAKYUSHU SMART COMMUNITY

Outline of the Higashida district of Yahatahigashi-ku (as of April 2012)

Area: 120 ha. District employment: approx. 6,000 Residents: approx. 900
Corporations and organizations: approx. 210 Annual visitors: approx. 10 million

Outline of the demonstration project (direction of social development)

Qualitative targets

- To transform consumers who use energy, such as residents and businesses, into "prosumers" (producers-consumers) by installing photovoltaic arrays and other systems.
- To implement demand-side self-management, where individual and corporate prosumers work with legacy energy providers in managing energy.
- To introduce dynamic pricing and incentive programs.

Quantitative targets

[Reduced environmental impact] To reduce CO2 emissions by 50% overall in comparison to average residential district in Kitakyushu

[Stable supply] To maintain voltage and frequency fluctuations with defined limits during alternative energy system introduction (voltage 101V±6V, frequency 60Hz)

The Kitakyushu Smart Community Creation Project is working to create three grids: the Energy Grid to assure a stable supply of electric power, the Human Grid to interconnect region and community residents, and the Green Grid to enrich the global environment through greenery.

Cogeneration, hydrogen, sunlight, wind power, etc. Make smart use of a variety of energy

KITAKYUSHU SMART COMMUNITY

Backbone power of Higashida Area using natural gas

Fuel cell of the hydrogen demonstration house (Higashida H2)

Kitakyushu hydrogen station

Wind-power generation of Kitakyushu Environment Museum

Photovoltaic generation panels installed on roofs of museum, company dormitory and condo in the Higashida street

Project Status　New Energies

GreenFrontier 環境モデル都市 北九州市

"Green Condominiums、Single Dormitory

【Condominiums】
Photovoltaic　170kW
HEMS
Smart Mater

【Dormitory】
Solar Heat Sys.
Geothermal Heat Sys.
BEMS

Hydrogen Apartment

Fuel Cell　1kW×7
Photovoltaic　3kW
Secondary Battery　3kW

Office Building（with CEMS）

Photovoltaic　10kW
Wind Power　3kW
BEMS（2012）

Hospital for Dialysis

Solar Heat Sys.
BEMS

Environment Museum

Photovoltaic　6kW
Wind Power　3kW
Fuel Cell　1kW

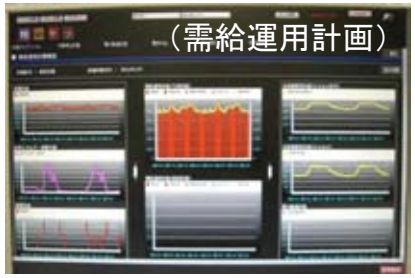
Museum of Natural History & Human History

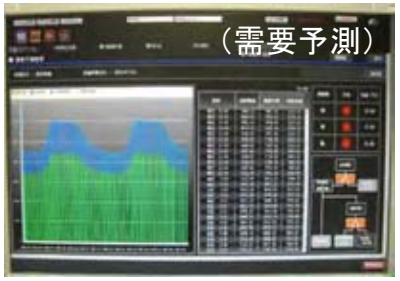
Photovoltaic　160kW
Fuel Cell　100kW
Secondary Battery　120kW
BEMS(2012)

Project Status　CEMS（ Smart Community Center ）

Large Capacity Secondary Battery（300kW）
- Community Type

CEMS screen sample





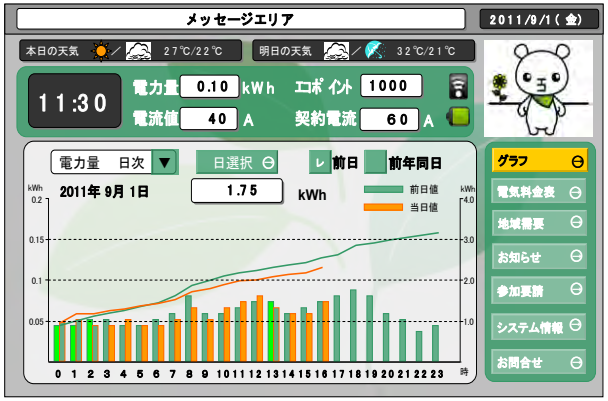
Project Status Smart Mater / HEMS

GreenFrontier
環境モデル都市 北九州市

Smart Mater

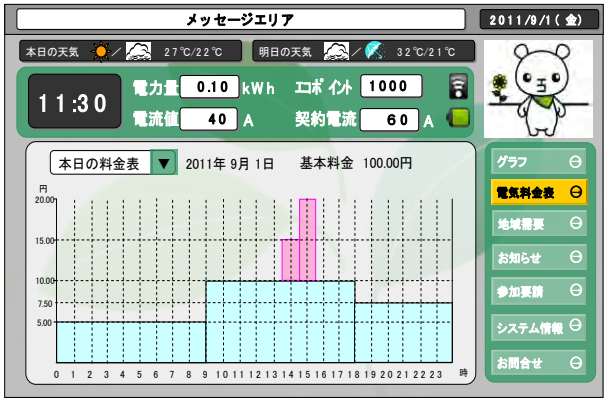
Tablet PC

Tablet PC screen sample



(Amount of Electric Power used)

(Information)

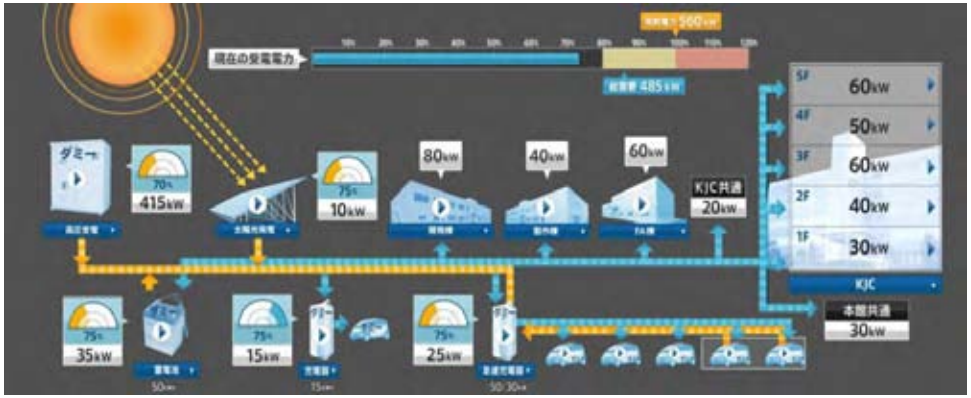


(Electric Power Rates)

Communication Robot with HEMS

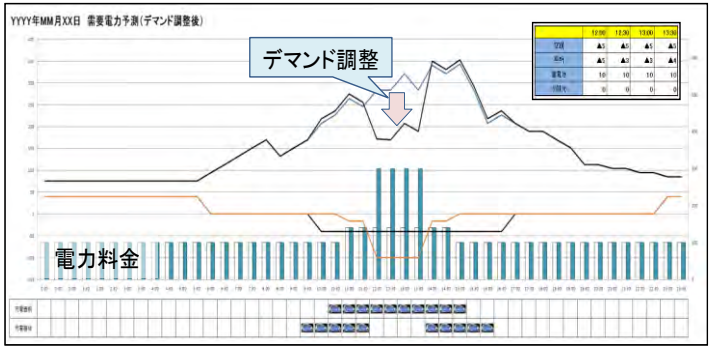
Project Status　BEMS

NS-ELEX Building
BEMS



BEMS composition figure

CEMSの価格調整後
（料金テーブル受信）



BEMS control image

SMART SPOT

11 ENEOS Smart Energy Station

10 FamilyMart Co., Ltd

9 Environment Museum / Kitakyushu Eco House

8 KITAKYUSHU MUSEUM OF NATURAL HISTORY & HUMAN HISTORY

1 Human Media Creation Center / KYUSHU

CEMS

2 Takamiya Corporation

3 NITTETSU ELEX CO.,LTD.

4 NIPPON STEEL ENGINEERING CO.,LTD Kitakyushu Dormitory

5 Community Energy Storage System

This sign mark each Smart Spot, and lists its key features.

17 HIGASHIDA CLINIC

12 Kitakyushu Telecom Center, Bldg. No.2

6 Higashida H2

7 Higashida Eco Club House

Transmission of Results

STEP 1

● **Demonstration at Yahata-Higashida**

STEP 2

● **Expansion to the Advanced Low-carbon Model Block (Jono area)**

STEP 3

● **Expansion to the entire municipal area**

To all of Japan and to Asia

● **Promotion Council of Low-carbon Cities**

— Leadership in low carbon urban planning

Established with the objective of expanding the activities conducted by 13 environmental model cities to all of Japan and transmitting the information to the rest of the world. The project has 168 participating organizations, including municipalities all over Japan.

● **Kitakyushu Asian Center for Low-carbon Society**

The results produced in this demonstration project will be transferred chiefly to Asian regions on a business basis.

Transfer of low-carbon technology to Asia

Kitakyushu Asian Center for Low-carbon Society

Expanded in a package as a solution with high added value

The know-how and results obtained by the Kitakyushu Smart Community will be formed into a business product

- Smart grid
- IT
- Photovoltaic power generation
- LED
- EV (electric vehicle)
- Hydrogen utilization technology
- Green IT
- Power electronics

Kitakyushu's International Cooperation with Asian Cities

Asian Partnership Program towards Shared Prosperity

Trainees Received: more than 6,200 people from 138 countries
Experts Dispatched: more than 160 people to 25 countries
Coordinating Cities' Cooperation Network in Asia
Promoting Environmental Projects in Asia

City of Dalian's Environmental Improvement, China
Dalian received the Global 500 Award from UNEP in 2001

Exchange of Memorandum on Cooperation for establishing Eco-Town with Tianjin at Prime Minister's Office

City of Surabaya's Composting Project, Spreading to more than 20 thousand households