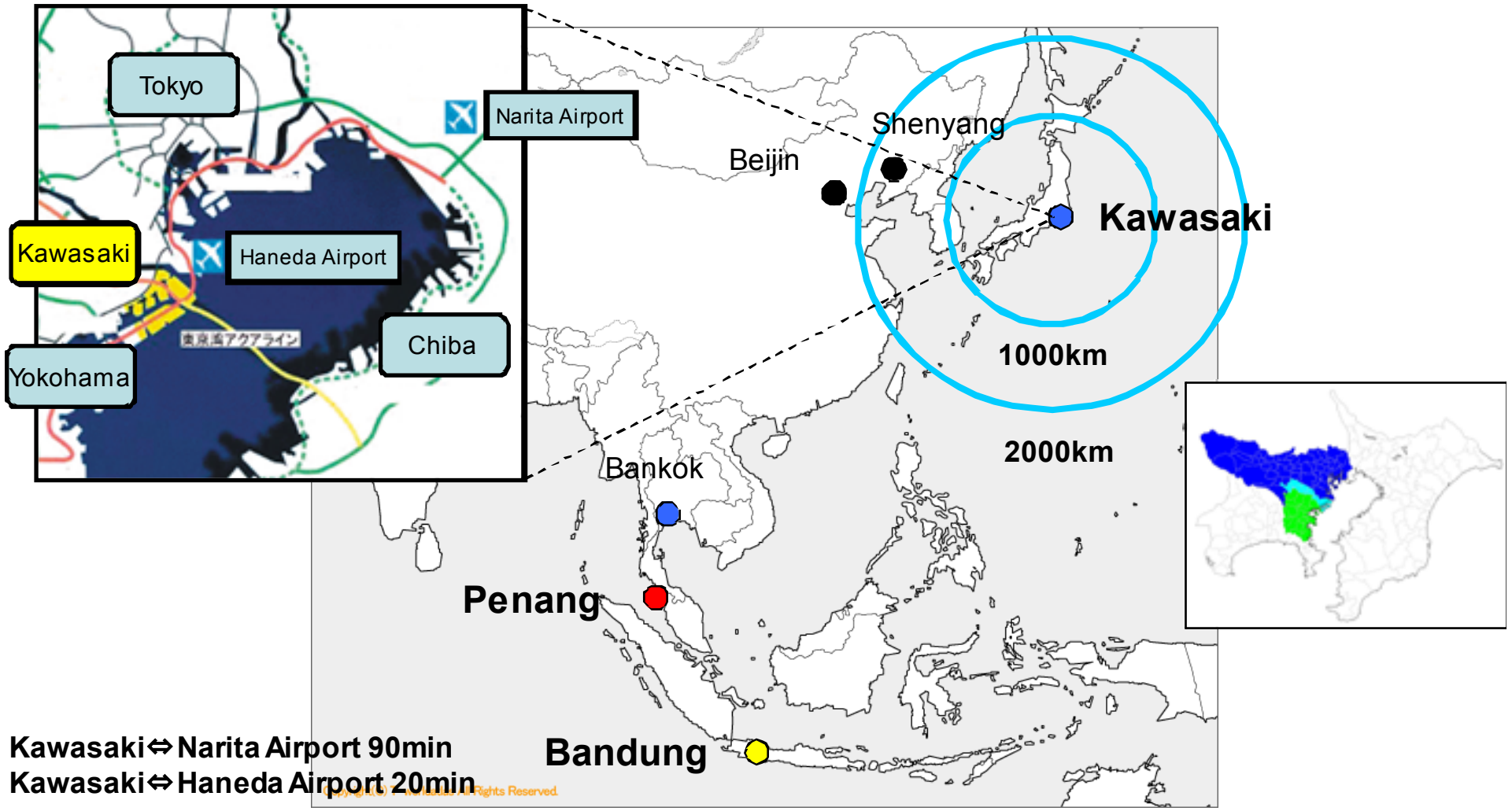
Environment technology transferred from Kawasaki City to the world

Past experience and message for the future

Takekazu Inoue
Associate Manager
Environment Bureau,
City of Kawasaki, Japan

KAWASAKI CITY

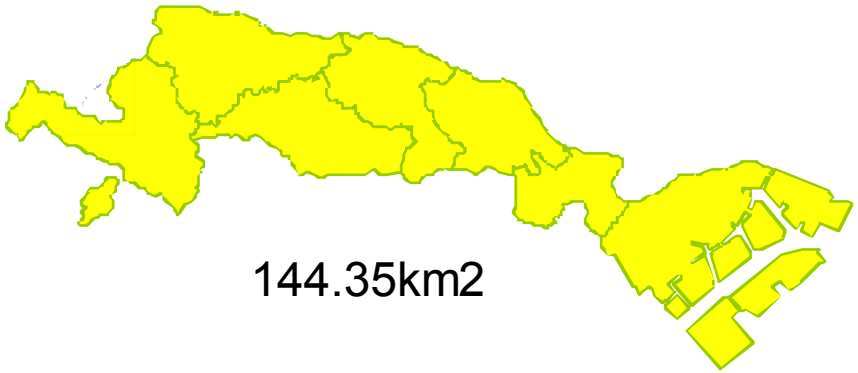
Location of Kawasaki City



Kawasaki⇔Narita Airport 90min
Kawasaki⇔Haneda Airport 20min

KAWASAKI CITY

Profile of Kawasaki City

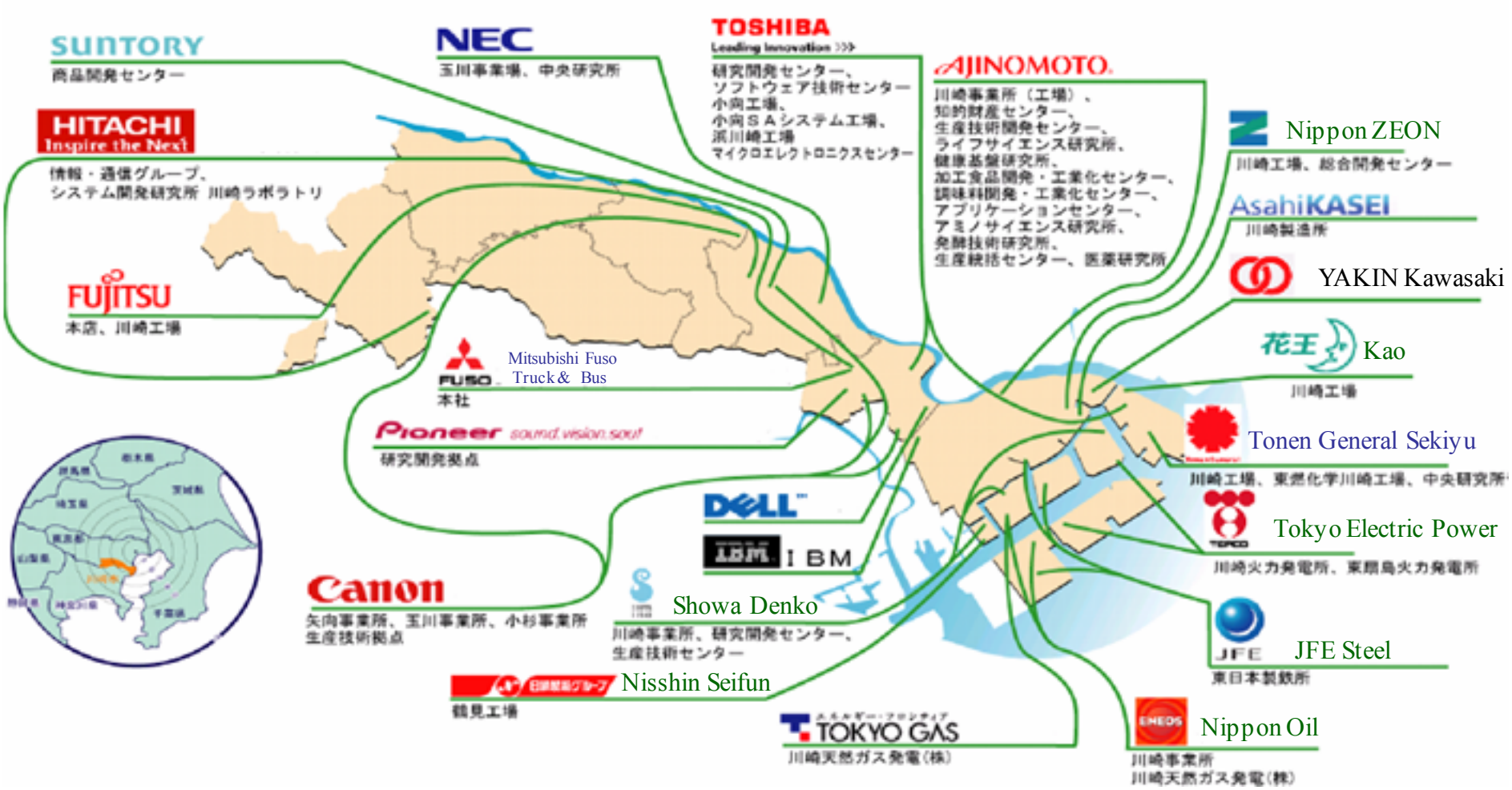


	Kawasaki	Japan
Population	1,419,680 (as of 08/1/2010)	127,427,000 (as of 3/1/2010)
Population Growth Rate	5.8% (FY 2006→2010)	−0.03% (FY 2006→2010)
Average Age	41.1 (as of 10/1/2009)	43.9 (as of 10/1/2007)
Labor Force Population	737,210 (FY 2005)	65,400,000 (FY2005)

	Kawasaki	Japan
Households	652,947 (as of 11/1/12009)	52,320,000 (as of 3/31/2008)
Area	144.35 km^2	377,929.99 km^2
GDP	43.1 billion dollars (4.7 trillion yen) (FY 2006)	4.37 trillion dollars (507trillion yen) (FY 2006)
Major Industries and business categories	Manufacturing (steel, electronics, telecommunications, precision machinery, petrochemical, chemistry) information and service	Manufacturing, services, wholesale and retail trade, real estate, finance, insurance, transportation, telecommunications
Developing Industries	Telecommunications, environmental, welfare and life sciences	Telecommunications, environmental, life sciences, nanotechnology materials, energyand manufacturing technologyetc.
Registered Foreign National Population	32,776 (from 120 countries) (as of 9/30/2009)	2,217,426 (as of 12/31/2008)
Foreign Firms	115 (83 head offices : 5th in Japan)	Approx. 3,500

KAWASAKI CITY

Globally Renowned Companies Location in Kawasaki

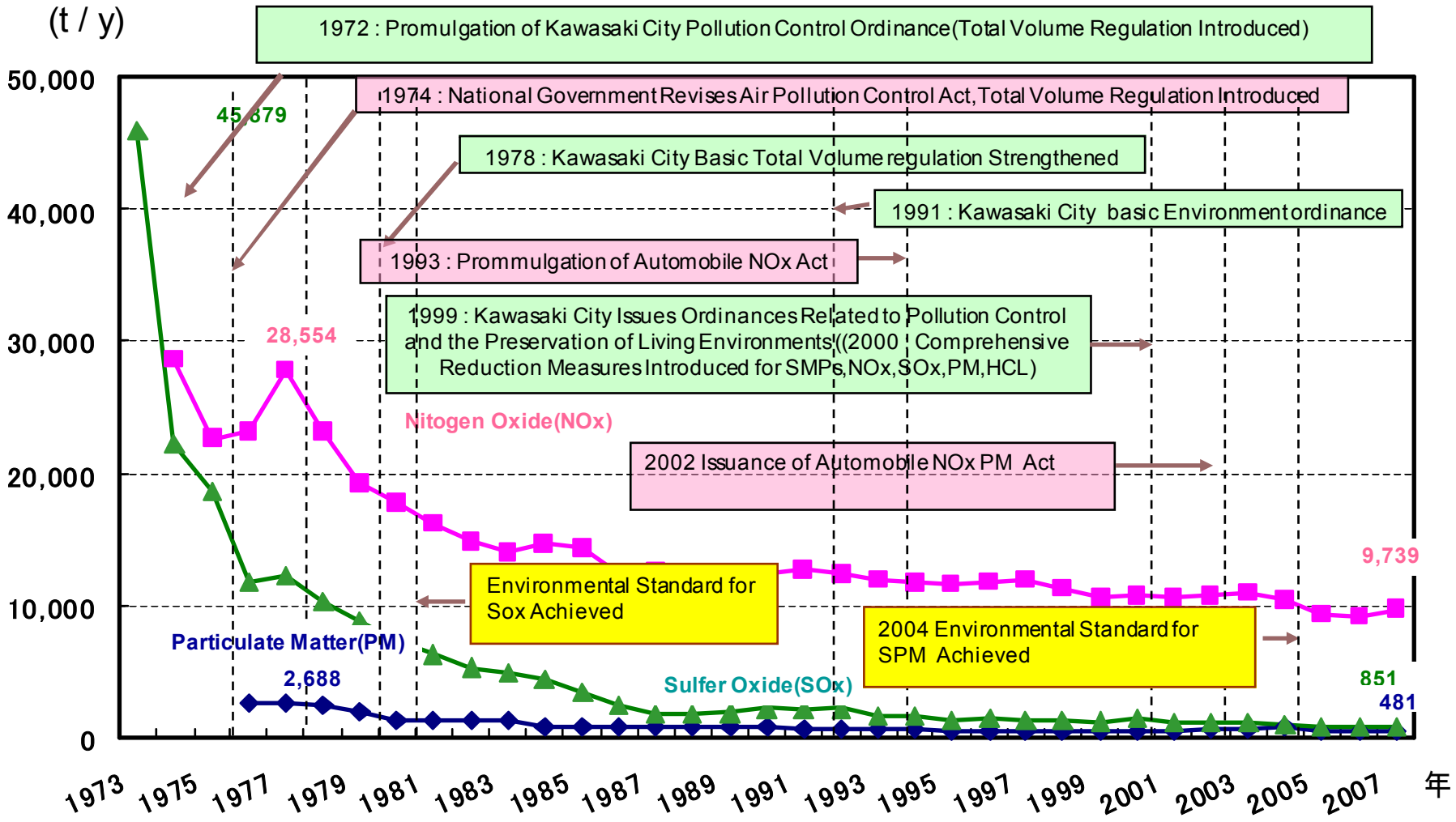


KAWASAKI CITY

View of coastal area

1967 (40 years ago)

2011



Changes in Atmospheric Pollutant Outputs Emitted by Factories/Offices (All Cities)

KAWASAKI CITY

Technology and Know-how Gained through Antipollution Measures

Initiatives of businesses

- Aggressive investment in antipollution measures
- Development of technology and know-how for preventing pollution
- Training of technicians and engineers in pollution prevention

Initiatives of residents

- Promotion of corporate and government anti-pollution measures through various activities including registering of complaints and filing petitions
- Cultivation of a heightened awareness of the environment among residents

- Establishment of a pollution victim relief system
- Signing of air pollution prevention agreements with 39 factories
- Establishment of anti-pollution local government ordinances
4 Introduction of a monitoring system

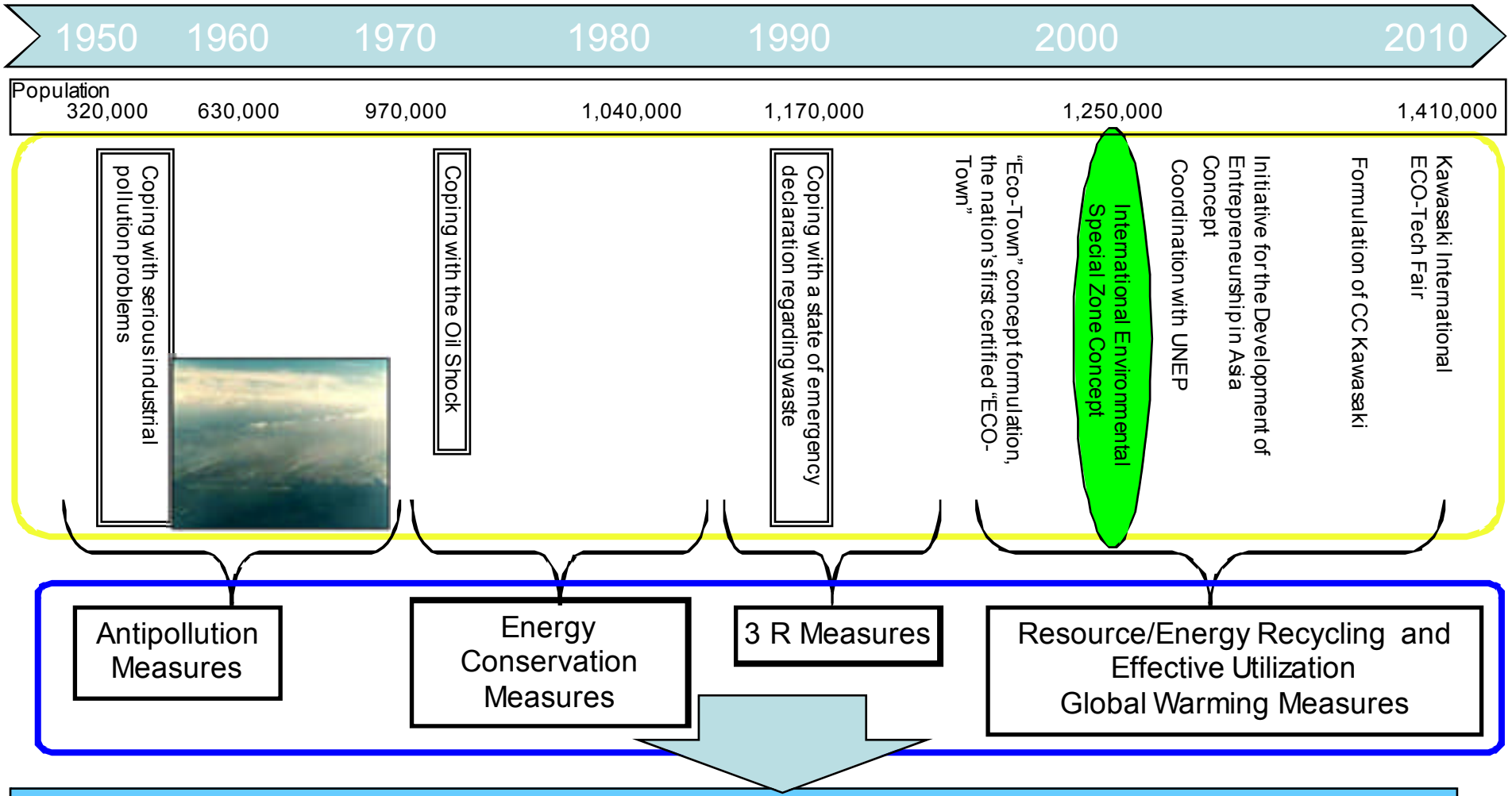
Initiatives of government

Realization of a dramatic improvement in the atmospheric environment

Accumulation of superior environmental technology and know-how in the course of implementing various antipollution measures

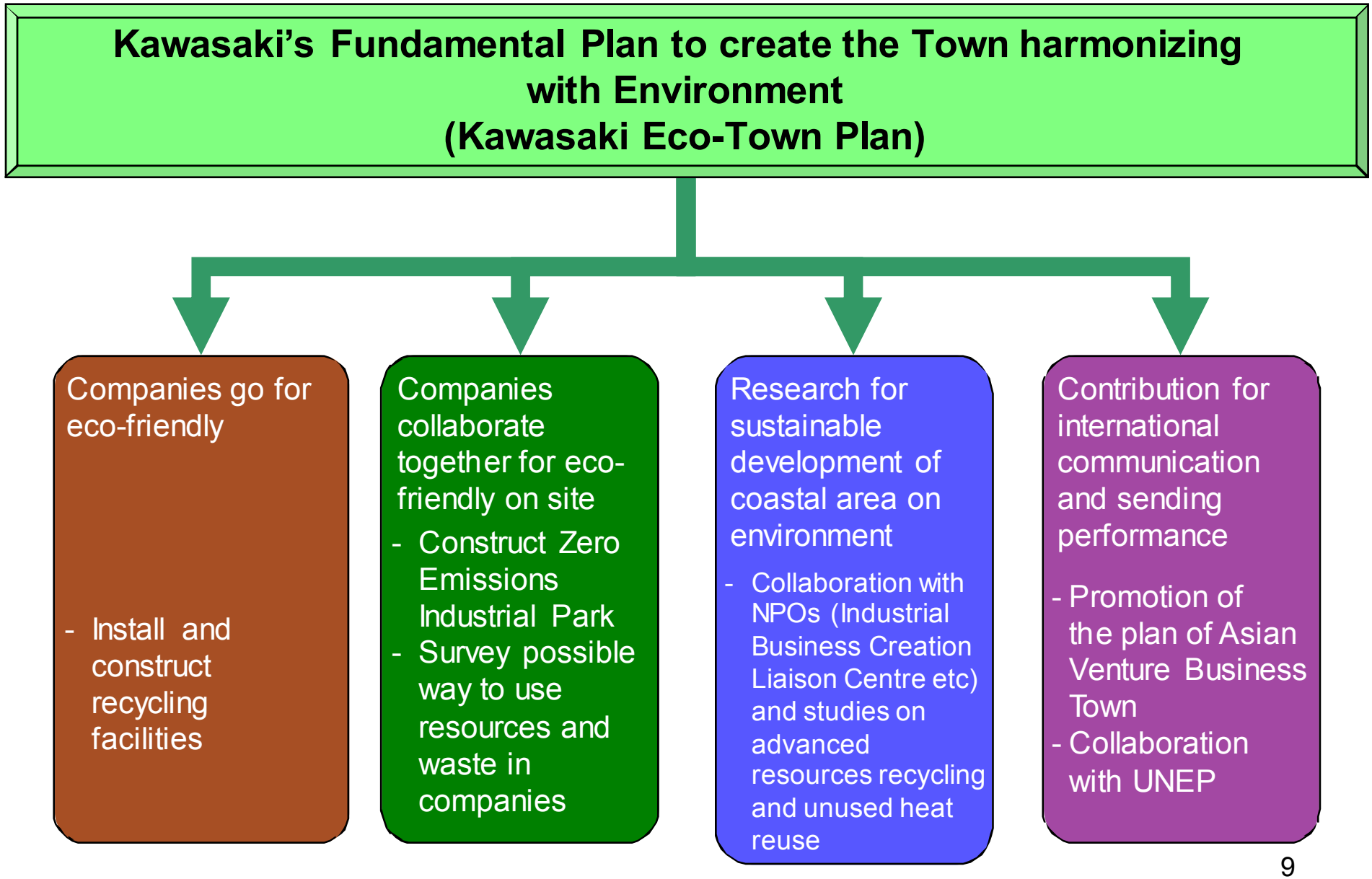
KAWASAKI CITY

Change of Kawasaki city's policy



- 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

Kawasaki Eco-Town Plan



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

Appointed zone

- 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

Realization of a Mutually Beneficial Cycle between the Environment and Industry

Resources Recycling Facilities

Reuse of waste plastics for blast furnace **2000 --**	Capacity (plastics) 25,000 t / year	**JFE Plastic Resource Corp.**
Recycling of used electric appliances **2001 --**	Capacity 400,000 - 500,000 sets / year	**JFE Urban Recycle Corp.**
Concrete setting frame production from waste plastic **2002 --**	Capacity (plastics) 20,000t / year	**JFE Plastic Resource Corp.**
Material production for ammonia from waste plastics **2003 --**	Capacity (plastics) 65,000t / year Ammonia production 58,000t / year	**SHOWA DENKO K.K.**
Used mix paper recycling **2002 --**	Capacity (used mix paper) 81,000t / year Produced toilet and tissue paper 54,000t / year	**SAN-EI Regulator Co.,Ltd**
PET bottles material recycling - PET to PET- 2004 -	**Capacity (used PET bottles) 27,500t / year** **Produced material for new bottles 22,300t / year**	**PET Refine Technology Co.,Ltd**

*** Others DC (Cement products) and YAKIN-Kawasaki (Non-ferrous products) implement recycling**

Resources Recycling Facilities

SHOWA DENKO K.K.
Material production for ammonia from waste plastics

DC CO.,LTD.

Recycling cement production

JFE group companies

Reusing material for blast furnace from waste plastics/Concrete setting frame production from waste plastics/Used electric appliances recycling

Kawasaki Zero Emissions Industrial Park

PET REFINE TECHNOLOGY CO.,LTD
Material production for new PET bottles (PET to PET)

SAN-EI REGULATOR CO.,LTD.

Toilet and tissue paper production from mix paper in used papers

Kawasaki Zero Emissions Industrial Park

- Industrial Park was launched as model facilities for Eco-town plan in this area

  (operation started in November 2002)

- Reduce waste from business activities as much as possible

- Minimization of environmental load in the park by reuse and recycling of waste and cascade use of energy

- The whole industrial park obtained ISO14001 certification in March 2005

Kawasaki Zero Emissions Industrial Park

Major Practices of Companies in the Park

- **Use of natural gas cars**
- **Use of hydro-generation plants**
- **Circulating use of chemicals and water**
- **Recycling of used mix papers**
- **Circulating use of waste water from surface plating**
- **Reuse of incinerated ash as material for cement**

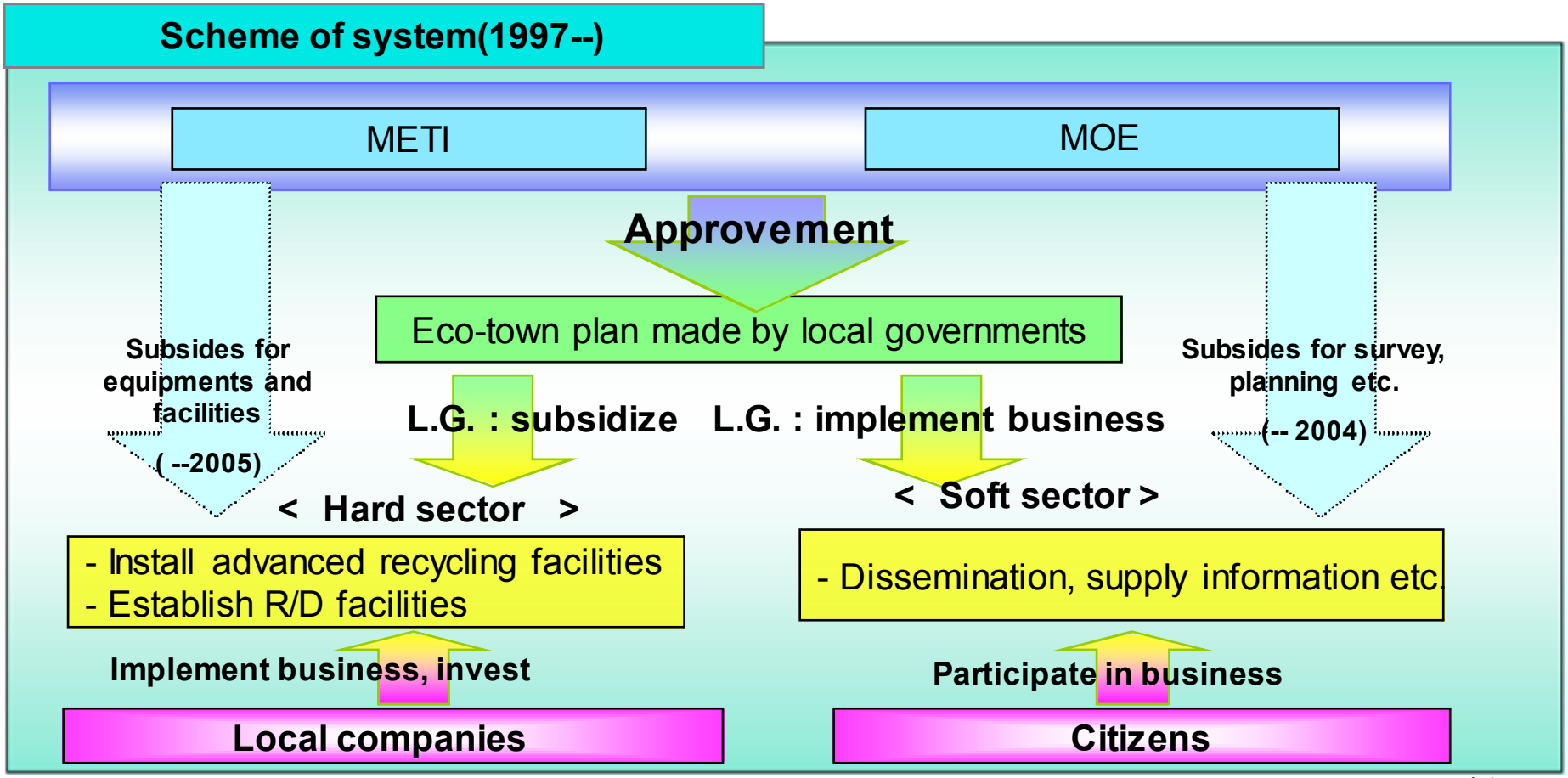
Location	**Mizue-town, Kawasaki Ward**
Area	**77,464m^2**
No of companies	**15 (metal fabrication, paper, surface plating etc.)**
Workers	**About 400**

Eco-Town Project

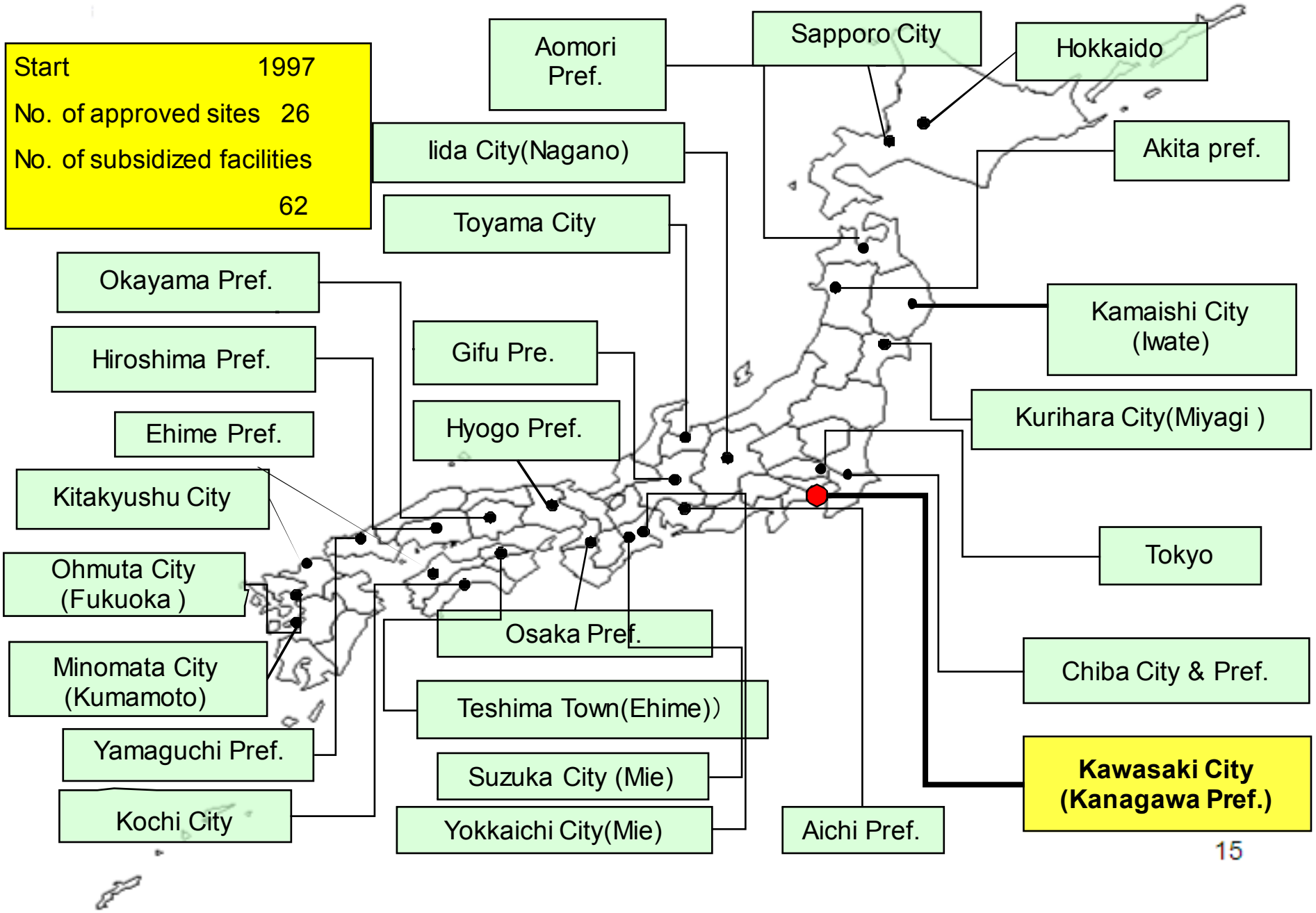
Creation of Advanced Environmentally Harmonized Town 「Zero emissions Plan」

1 Promotion of environmental industries on locally accumulated technologies

2 Formation of resources cycling economy and society through reducing waste generation and promoting waste recycling on site



Eco-Town Plans approved by Governments (Feb. 2010)



Carbon Challenge Kawasaki Eco-Strategy

- Announced the basic strategy of Kawasaki City's countermeasure against global warming in February 2008.

Basic concept

To promote a virtuous and harmonious circle for "environment" and "economy", and to engage the entire city in the development of a sustainable society on a global scale.

1. Promote Environmental Measures that Capitalize on Advantages and Features of Kawasaki
2. Promote international contributions through environmental technology.
3. Promote CO_2 Reduction through Collaboration of a Variety of Actors

- To promote CC Kawasaki, CC Kawasaki Eco Conference (Kawasaki Promotion Conference of Countermeasure against Global Warming) was established in July 2008 by citizens and businesses.

Mega Solar Generation Project

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: 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

Kawasaki City

Construction and operation of the PR facility

Land owned by Kawasaki City

Land owned by Tok Power Co.

PR facility for solar power generation, etc.

Ukishima Solar Power Plant (provisional name)
Output: about 7,000kW
Electricity generated: about 7.4 million kWh 11ha

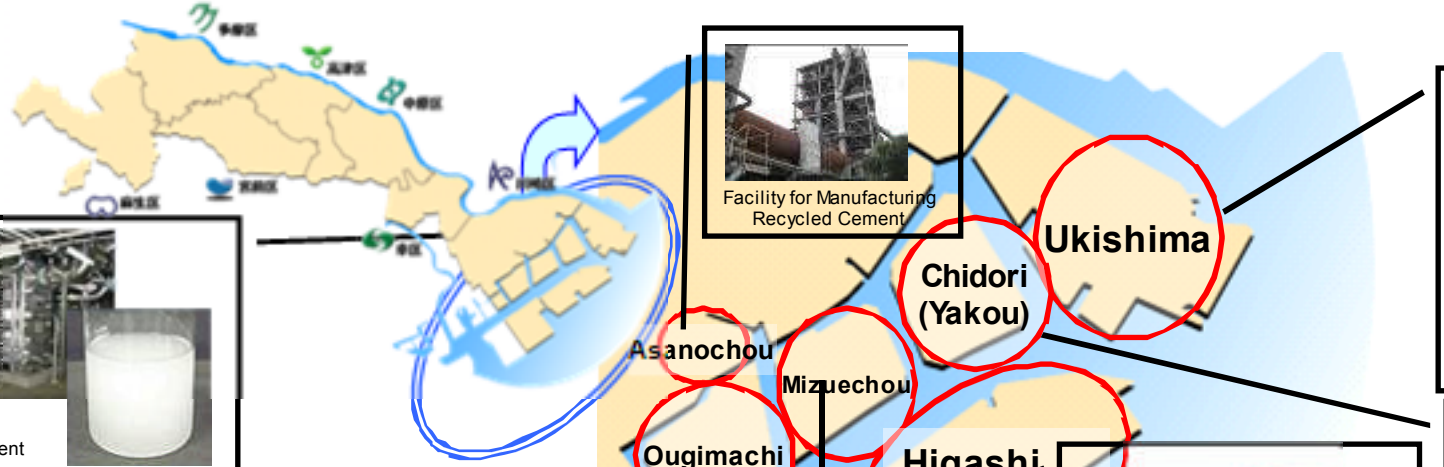
Ohgishima Solar Power Plant (provisional name)
Output: About 13,000kW
Electricity generated: about 13.7 million kWh 23ha

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

Tokyo Electric Power Co.

Compiled from data obtained from Tokyo Electric Power Co.'s website

Leading Environmental Technology / Facilities Concentrated in the Kawasaki Waterfront Area



Facility for Manufacturing Recycled Cement

Highly Efficient Thermal Storage Air Conditioning System

Mega-watt Solar Power Generation (planned) Output 7 MW
Combined with planned facility for Ougijima, will be one of the largest solar power facilities in Japan

Higashi Ougijima East Park
(Revived after a half century -manmade Beach)

Highly Efficient Thermal Power Generation Facility Meeting Highest Global Standards (Power Generation Efficiency 59%)

Thermal Power Generation Exhaust Heat Provided to Surround Businesses, Efficient Use

PET Bottle to PET Bottle Recycling Facility

Facility for turning ammonia from waste plastic into raw material

Contaminated Soil Cleaning Facility

Biomass Power Generation Facility (planned)

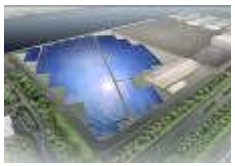
Natural Gas Power Generating Facility

Kawasaki zero emission factory complex

Waste Plastic Recycling Facility, etc

Development and Manufacturing Base for Large-scale Lithium-ion Batteries

Recycling facility for difficult to regenerate used paper



Mega-watt Solar Power Generation (planned) Output: 13 MW

Large-scale Wind Power Generation Facility (planned)

Resource-saving, CO2-reducing New-type Shaft Furnace

Low CO2 Kawasaki Pilot Brand ’10

We attempted to implement from fisical year 2009.
<Selected Products and Technologies>

TOSHIBA
Hamakawasaki
Operations

JFE Engineering
Corporation

JFE Steel Corporation

Nihon Genryo

FUJITSU

TOKYO GAS

FUJITSU Network
Solutions

TOSHIBA R&D

Kawasaki Steam Net

Kawasaki Global Warming
Prevention Association; Energy
Saving Group

Kawasaki Global Warming
Prevention Association
Green Consumer Group

Project for Civil Cooperative
Generating Station

Various kinds of power plants in the Kawasaki's coastal zone

1 Kawasaki Biomass Power Plant

(output) 33,000kW
(area) 3.2ha
(business entity)
Kawasaki Biomass Power Corporation
(establishment) 2011.2
(plant type) Biomass

2 Kawasaki Natural Gas Power Plant

(output) 847,400kW
(area) 6.2ha
(business entity)
(funder)JX Nihon Oil & Energy
Tokyo Gas Co., Ltd.
(establishment)2008.4
(plant type)Thermal（LNG）

3 Showa Denko K.K. Kawasaki branch

(output) 124,200kW
(area) 34.5ha
(business entity) Showa Denko K.K
(plant type) Thermal

4 JR East in house thermal Power Plant

(output) 633,000kW
(area) 6.7ha
(business entity) East Japan Railway Company
(establishment) 1973.10
(plant type) Thermal(paraffin, LNG)

5 Ogishima solar power plant

(output) 13,000kW
(area) 23ha
(business entity) TEPCO
Kawasaki City
(establishment) (2011.12)
(plant type) solar

6 Ogishima Wind Power Plant

(output) 1,990kW
(height) 123m (tower: 80m)
(business entity) JX Nihon Oil & Energy Corporation
(establishment) 2010.3
(plant type) Wind

11G ENEX CO.,LTD. Mizue Thermal Power Plant
(Output) 274,190kW
(area) 2.7ha
(business entity)
(funder) Toa Oil Co.,Ltd.
J-Power
(establishment) 2002.6
(plant type) Thermal
(diesel and other fuel)

12 kawasaki Thermal Power Plant
(output) 3.42million kW
(area) 28ha
(business entity) TEPCO
(establishment) 2007.6
(plant type) Thermal(LNG)
*Kawasaki Steam Net: Delivering the steam generated in this station to other plants

13 Ukishima Solar Power Plant
(output) 7,000kW
(area) 11ha
(business entity) TEPCO
Kawasaki City
(establishment) 2011.8
plant type)solar

14 Ukishima Municipal Solid Waste Disposal Center
(output) 12,500kW
(area) 6ha
(business entity)Kawasaki City
(establishment) 1995.5
(plant type) Thermal(waste)

9 Kawasaki Thermal Power Plant
(output) 128,000kW
*Urgent Installation
(business entity) TEPCO
(establishment) 2011.8
(plant type) Thermal(LNG)

7 Higashi Ogishima Thermal Power Plant
(output) 2 million kW
(area) 47ha
(establishment) 1987.9
(business entity) TEPCO
(plant type) Thermal
(LNG)

8 ELIIY Power Co., Ltd. Kawasaki branch
Manufacturer of High-capacity Lithium-ion Batteries
(area) 2.9ha

10 Kawasaki clean power power plant
(output) 30,000kW
(area) 2.7ha
(business entity) MARUBENI CORPORATION
(establishment) 2003.5
(plant type) Thermal(LNG)

Total generating capacity of all the power plants in the Kawasaki's coastal zone reaches 5.46 million kW, which is equal to 80% of electricity used by households in the Metropolitan area: 6.3 million kW(Tokyo, Kanagawa, Chiba and Saitama).

	10 thousand kW	
	the present time	the final
1 Kawasaki Biomass Power Plant	3.3	3.3
2 Kawasaki Natural Gas Power Plant	84.7	84.7
3 Showa Denko K.K. Kawasaki branch	12.4	12.4
4 JR East in house thermal Power Plant	63.3	63.3
5 Ogishima solar Power Plant	–	1.3
6 Ogishima Wind Power Plant	0.2	0.2
7 Higashi Ogishima Thermal Power Plant	200.0	200.0
9 Kawasaki Thermal Power Plant	–	12.8
10 Kawasaki clean powerpowerplant	3.0	3.0
11 GENEX CO.,LTD. Mizue Thermal Power Plant	27.4	27.4
12 Kawasaki Thermal Power Plant	150.0	342.0
13 Ukishima Solar Power Plant	–	0.7
14 Ukishima Municipal Solid Waste Disposal Center	1.2	1.2
total	545.6	752.4

-- *The 8th Asia-Pacific Eco-Business Forum*

February 8 - 9,2012 (Wednesday &Thursday)

- Urban and Industrial Symbiosis
- occasion for the participants to exchange information on the advanced environmental technologies

http://www.city.kawasaki.jp/30/30kokuse/home/index.html

-- *Kawasaki International Eco-Tech Fair*

February 10 - 11,2012 (Friday & Saturday)

http://www.kawasaki-eco-tech.jp/

KAWASAKI CITY

Conclusion

In Kawasaki City, we will make city-wide efforts to promote harmony and a virtuous circle between the “environment” and the “economy” in order to realize a sustainable society on a global scale.

Thank you for your attention.