The 6th High Level Seminar on ESC

Creating Low-Carbon Cities in Asia through Intercity Cooperation

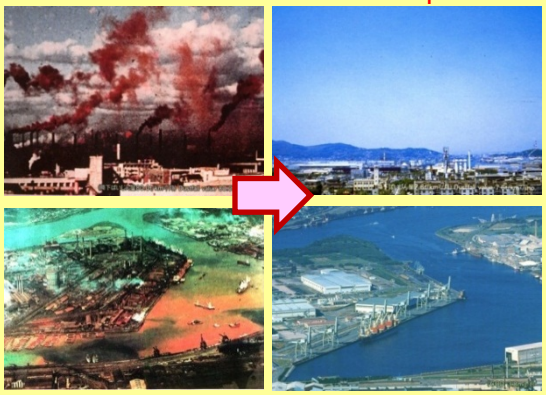
Kitakyushu Asian Center for Low Carbon Society

Environment Bureau, City of Kitakyushu

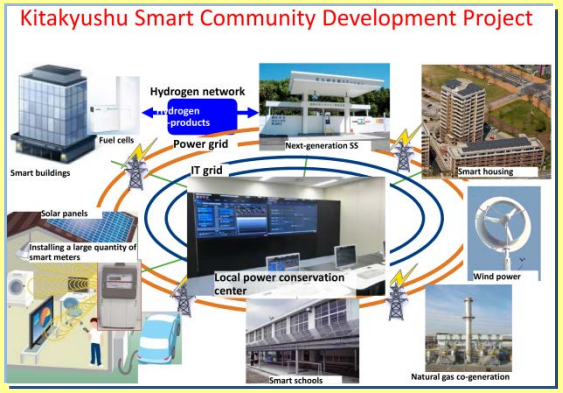
Kitakyushu as a base for exporting Green Cities

Kitakyushu aiming to become the World Capital of Sustainable Development

Experience of overcoming pollution and International Environmental Cooperation



Prominent environmental technologies and Social System



Urban environment diplomacy with Asian cities

Eco-Model City
(July,2008)

Environmental Future City
(December,2011)

OECD Green City Program Model City
(June,2011)
Together with Paris, Chicago, and Stockholm!

Kitakyushu Asian Center for Low Carbon Society

as a base for exporting Green Cities

Establish green city development that accommodates the diverse needs of Asian cities and firms

Overview of the Kitakyushu Model

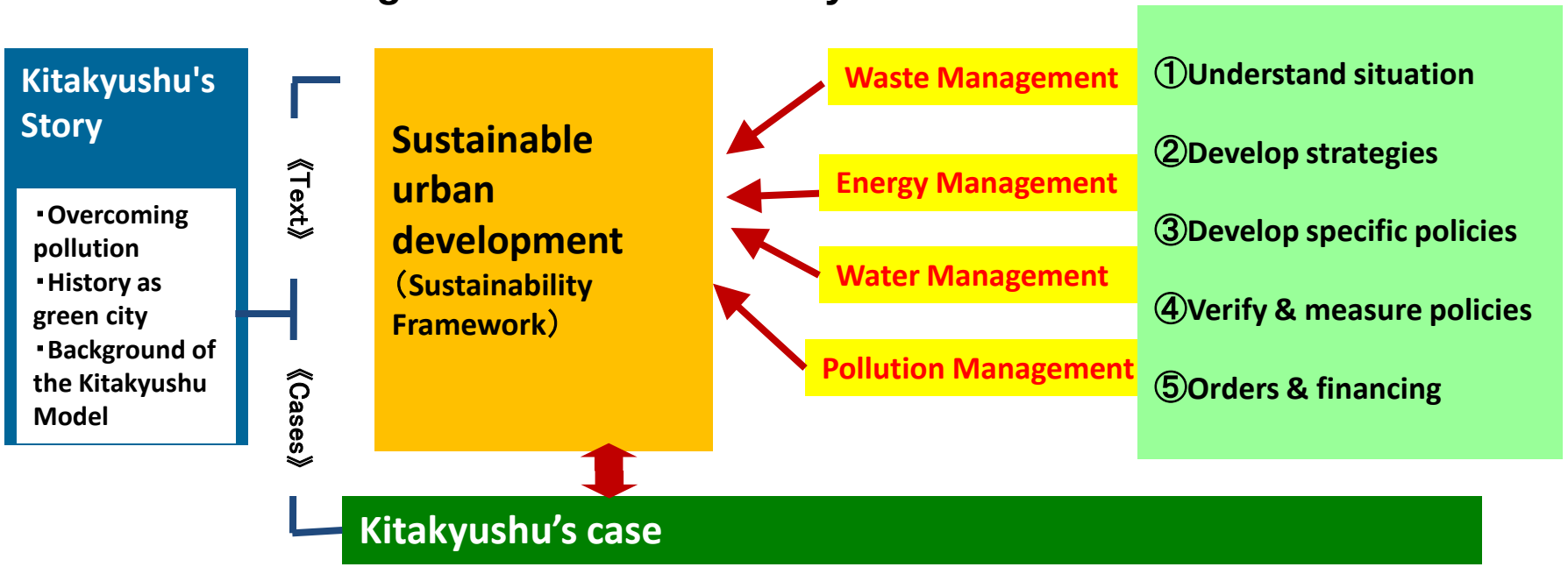
1. Objective of the Kitakyushu Model

■ Kitakyushu, which faced and overcame pollution for the first time in Asia, became a leading environmental city in Japan.
■ Kitakyushu is developing the Kitakyushu Model (support tool) that systematically arranges information on the technologies and know-how of Kitakyushu from its experience in overcoming pollution to its quest as an environmental city.
■ Kitakyushu is utilizing the Kitakyushu Model to promote the export of customized infrastructure packages to cities overseas, and grow together with Asia.

2. Applications of the Kitakyushu Model

■Support tool to examine future ideal city image and for cities to take appropriate measures and procedures to achieve this.
■Support tool to examine management systems for waste, energy, water and sewage services, and environmental protection.
■Support tool to develop sustainable master plans that integrates waste, energy, water and sewage services, and environmental protection.

－Organization of the Kitakyushu Model－



Export of Green Cities Model & Development of Master Plan

<4th Step>
Overseas business development

<3rd Step>
Development of Green City Master Plan

<2nd Step>
Formation of project proposals by sector

<1st Step>
Basic research

Group of companies involved with the Green City Master Plan⇒Overseas business development!

【City of Surabaya (Indonesia)】

＊Requests to the following companies for development of the Green City Master Plan using funds from JICA and Ministry of Foreign Affairs

【Waste Management】
Nishihara Corporation, Amita Corporation, Hitachi Zosen Corporation, NTT Data Institute of Management Consulting, Inc.

【Energy】
Hokosha, Fuji Electric Co., Ltd., Nippon Steel & Sumikin Engineering, NTT Data Institute of Management Consulting, Inc., NTT Facilities

【Water & Sewage Management】
Matsuo Sekkei, Kitakyushu Water & Sewer Bureau, TOTO, Ishikawa Engineering

【Transportation】
Almec VPI

Method for developing plan

【City of Haiphong (Viet Nam)】

＊Signed sister city cooperation agreement in April 2014
＊Members of the Kitakyushu Overseas Water Business Association sign contracts for U-BCF improvement project
＊Implementation of project to support the development of the Haiphong Green Growth Action Plan in FY 2014 (MOE JCM project)

Method for project formation

【Thailand】

＊MoU signed between Kitakyushu and Thailand Ministry of Industry
＊Talks between Mayor of Kitakyushu and Chair of the Thailand Office of the National Economic and Social Development Board ⇒Start of dialogue with Thailand
＊Implementation of survey for the project to support the development of an industrial town in Rayong Province, Thailand in FY 2014 (municipal expenditure)

Method for basic research

【Iskandar Development Region, Malaysia (Pasir Gudang City (MPPG)】

＊Implementation of feasibility study on the formation of a large-scale GHG emissions reduction project in the Iskandar Development Region of Malaysia in FY 2014 (MOE JCM project)

Method for basic research

Support for the development of the Green City Master Plan＝Application of the Kitakyushu Model

Exporting Green Cities (Surabaya)

Development of a green city master plan

Comprehensive urban development plan that incorporates the formation of a social system and the training of human resources in urban development

Kitakyushu

Reinforcing the foundation that is the source of growth
(local governmental strength, civic-mindedness, technological strength)

Surabaya

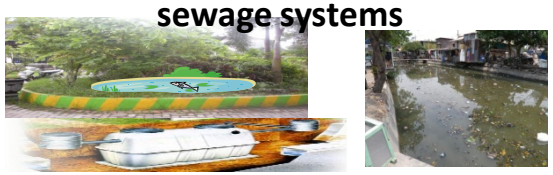
Intercity Cooperation (Learning together/mutually enhancing & intensifying linkages/expanding cooperation)

Application of Kitakyushu Model

Kitakyushu City systematically arranges information on the technologies and know-how of Kitakyushu from its experience in overcoming pollution to its quest as an environmental city

Waste treatment

Maintenance/improvement of sewage systems



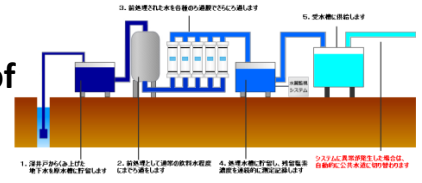
Export of green cities

"Green Sister City" agreement signed in November 2012

Studies on quantification techniques to reduce CO_2 emissions

Co-generation and energy saving

Purification of tap water



Project on Low-Carbon City Planning in Surabaya(JCM F/S in 2013)

Potential CO2 emission reduction: Total 151,000t/year

Energy sector — 63,000t-CO2/yr

NTT DATA Institute of Management Consulting Inc. NTT Facilities Inc. Green Prop Co., Ltd KPMG Azusa LCC,	FS for energy saving and dispersed power system	Local companies, city hall, universities, hospitals, shopping malls, data centres etc.
Cooperation: Fuji Electric Co., Ltd. Nippon Steel & Sumikin Engineering Co., Ltd.	Cogeneration technology	PT SIER, local companies, National Electricity Company (PLN)
Cooperation: Japan NUS Co., Ltd.	LED conversion at highway	National Highway Corporation (PERSERO)

Solid waste sector — 72,000t-CO2/yr

Cooperation: **Nishihara Co., Ltd.**	Waste sorting, recycling, composting	Dept. of Cleanliness and Landscaping (DKP), Environment Dept. (BLH)
Hitachi Zosen Co., Ltd.	Waste-to-energy (incineration)	Ministry of Energy and Mineral Resources, Ministry of Public Work, Ministry of Environment
Amita Co., Ltd.	Waste-to-energy for industrial waste	Local companies, cement company

Transportation sector — 1,000t-CO2/yr

Public transportation, Improvement of traffic system for waste collection vehicles, low emission vehicles

ALMEC VPI Co., Ltd.		Transportation Dept., bus and taxi companies, DKP

Water resource sector — 15,000t-CO2/yr

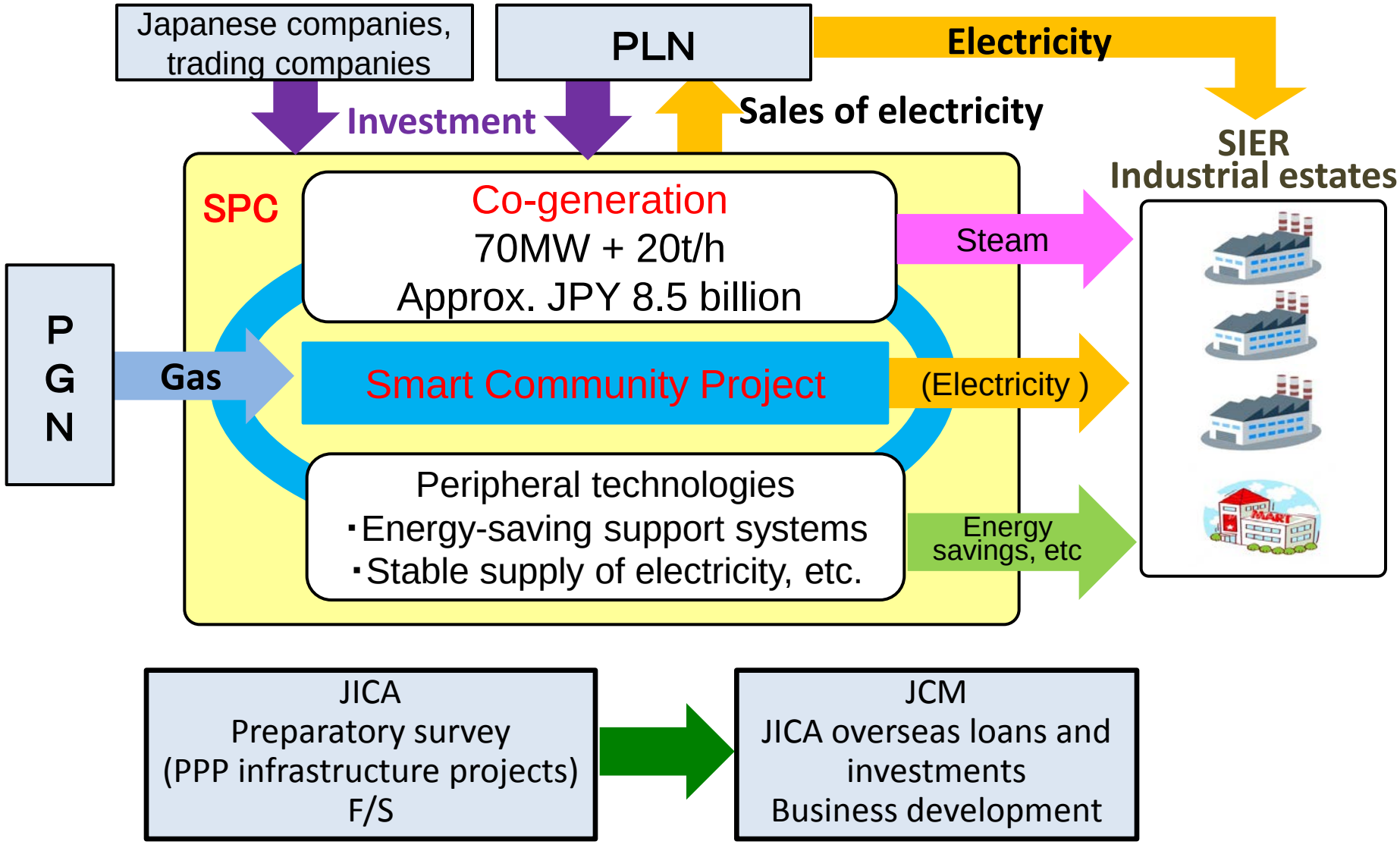
Matsuo Sekkei Co., Ltd. Kitakyushu City Waster and Sewer Bureau	Energy saving at water and sludge treatment plants	PDAM, Keputih sludge treatment plant, Industrial Estate Company (PT SIER)

Cooperation: Findings of other projects in Surabaya funded by other sources were shared to this project.

Cogeneration (Combined Heat & Power) in Industrial Estates

Nippon Steel & Sumikin Engineering, Fuji Electric etc.

Overseas development of Kitakyushu Smart Community Project

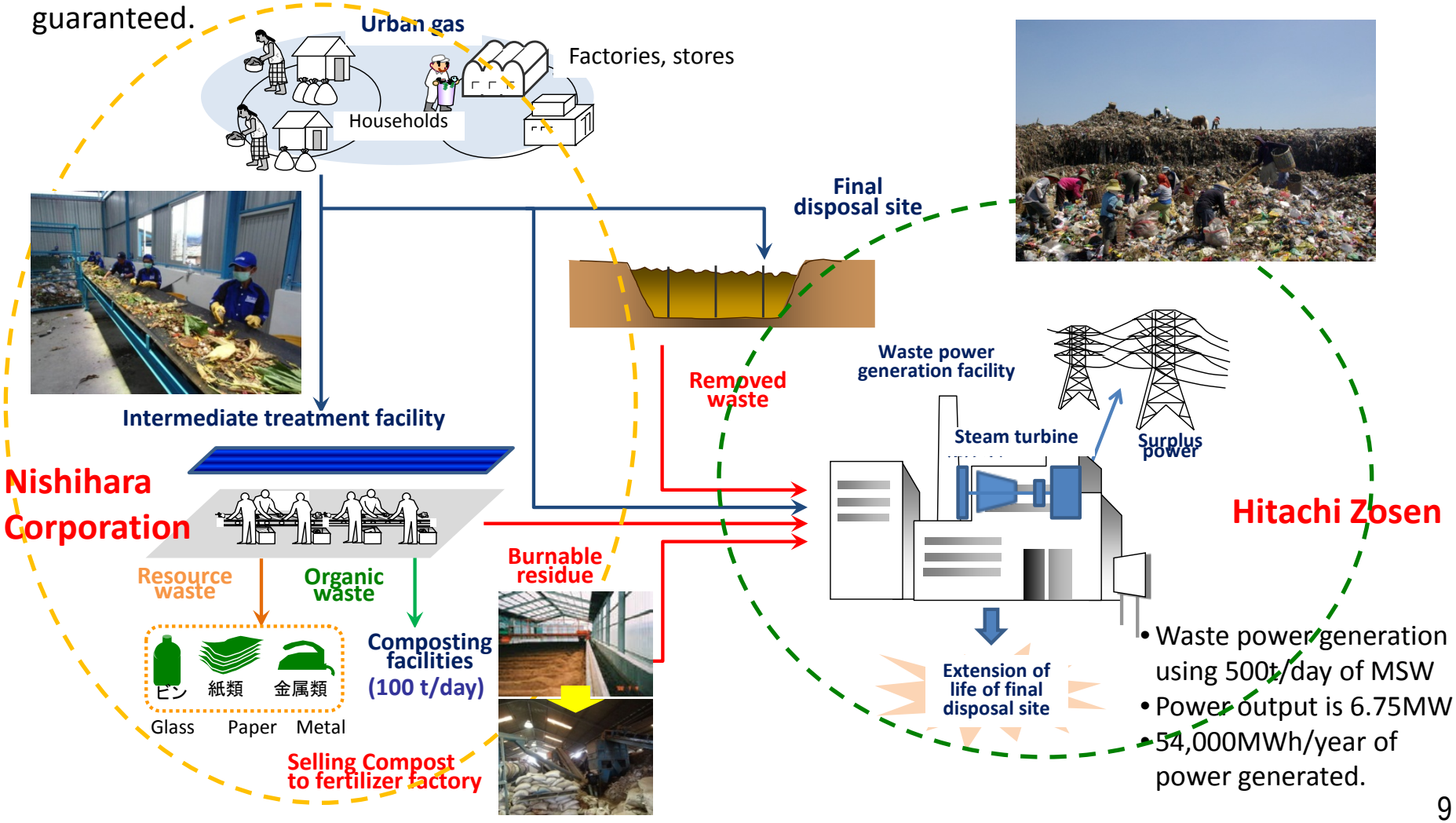


Energy Management Projects

	Hotel A	Hotel B	Commercial Establishment A	Office Building A
Overview	• U.S.-owned hotel chain (owned by Indonesian company). • Hotel has global energy conservation targets, and strong awareness regarding energy savings.	• Indonesian-owned company (purchased from U.S.-owned hotel chain). • Two office buildings are located within the site of the hotel.	• Largest shopping mall in Surabaya managed by Indonesian-owned company. • Two 50-floor buildings are currently under construction on the site.	• Prominent, large-scale office building in Surabaya. • Owned by Indonesia's largest newspaper group. HQ is located inside building.
Completed	1996	1979 (Remodeled in 1993)	1986 (Expanded in 1991, 1996, 2001)	1997
Floor space	35,000m^2	25,500m^2	125,000m^2	25,000m^2
No. of floors	28 floors	27 floors	6 floors above ground, 1 floor underground	21 floors
Introduced technologies	LED lighting 	Electricity and cold water supplied to the hotel by cogeneration system (one 1,000kW gas engine and absorption refrigerators)	High-efficiency turbo chiller, pumps, cooling towers, EMS  	High-efficiency turbo chiller, pumps, cooling towers, EMS 
Exterior				

Intermediate Treatment Facility for Recycling of Waste & Waste Power Generation from Urban Waste

- 1,500kcal of heat is required for waste power generation. In order generate this amount of heat, municipal waste must be separated and waste removed from final disposal sites must be used.
- By combining high-calorie waste (Separation and composting of residue, waste removed by Nishihara Corporation) and general urban waste, it is anticipated that 500t/day of 1,500-2,000kcal waste can be guaranteed.



- Waste power generation using 500t/day of MSW
- Power output is 6.75MW
- 54,000MWh/year of power generated.

Project on Low-Carbon City Planning in Haiphong (JCM F/S in 2014)

Japan-side

City of Kitakyushu

Project Management

IGES

Kitakyushu Asian Center for Low Carbon Society

Agreement for Friendship and Cooperation (April 2009)

Sister City April 2014)

Vietnam-side

City of Haiphong

People's Committee

Dept. of External Affairs, Dept. of Planning and Investment

Potential CO2 emission reduction: Total 133,000t/year

Low-carbon City Development

Preparation of Low-carbon City Development Plan

Nikken Sekkei Civil Engineering Ltd.
M. I. Consulting Group Corp.

DEA, DPI, DONRE, DOC, DOIT, DOT, DARD, HEZA

Energy sector

Energy conservation of infrastructure

NTT DATA Institute of Management Consulting Inc.
University of Kitakyushu
NTT Facilities Inc.

Energy Conservation Center (ECC)
Manufacturing plants
Large-scale buildings and offices, Infrastructure

Solid waste sector

Recycling of solid waste, Waste-to-energy, Development of a package model for addressing energy conservation and F-gases

NTT DATA Institute of Management Consulting Inc.
Nishihara Co., Ltd.
Amita Co., Ltd.

Dept. of Natural Resources and Environment (DONRE),
URENCO, Local companies

Conservation of Cat Ba Island

Eco-friendly facilities and transportation, Capacity building, Recycling of all waste

NTT DATA Institute of Management Consulting Inc.
Amita Institute for Sustainable Economies Co., Ltd.
Other makers ,etc.

People's Committee, DOC, DONRE, DCST, URENCO, Cat Hai District, and any other related stakeholders

Support for Development of Green Growth Promotion Plan in Haiphong

【Items under deliberation】

(1) Baseline assessment

Main Sectors

Waste	Energy	Transport	Cat Ba Island
•No proper disposal, treatment, resource recycling.	•Necessary to correct inefficient use of energy.	•Air and noise pollution due to traffic congestion is a problem.	•Waste, water, and sewage management lags behind. •Degradation of natural environment

Other Sectors

Water & Sewage	Rainwater Drainage	Environmental Protection	Green Production
•Improvements to systems are overdue. Preservation of public health is pressing need.	•Floods during heavy rain are an issue.	•Serious water quality, air and noise pollution.	•No progress in shift to eco-industries from traditional models.

〈Check of Related Items〉

Forecasts / Existing master plans / Confirm regulations, legislation / Current industrial situation / Understanding market structure

Identify issues in each sector

(2) Formulation of strategy

Set vision, targets for each area, quantitative targets, and evaluation indicators

Consistency with GGS

(3) Detailed policies & measures

Main Sectors 〈Examination of measures by sector (example)〉 Other Sectors

Waste	Energy	Transport	Cat Ba Island
•Separation and recycling of waste. •Proper treatment, recycling of waste.	•Support development of energy conservation plans based energy conservation laws.	•Urban development centered around public transport (buses, etc.).	•Protection of natural environment. •Waste recycling.

Water & Sewage	Rainwater Drainage	Environmental Protection	Green Production
•Improve water purification and treatment facilities using the Kitakyushu Method.	•Flooding prevention measures such as improvements to levees and pumping stations.	•Measures to deal with waste gas in factories. •Improvements to wastewater treatment facilities.	•Promotion of cleaner production. •Development of green agriculture.

Examine effects of improvement such as GHG emissions and the environment, generate approximate project costs

(4) Validation of strategies and policies / measures

Verify feasibility and validity of measures, examine validation methodology after application of methodology

(5) Methods to develop contracts and raise funds

Examine project implementation risks, financing, contract methods, and project implementation schedule

(6) Compilation of plan

Green growth promotion plan that is instrumental to the development of the GGS action plan

Introduction of Highly-efficient Electric Furnaces in Iron Foundries (3)

Effects from introduction of Japanese electric furnaces

【Actual conditions of iron foundries】
Dissolution intensity (dissolution efficiency):
- **Electric furnaces: 1.0kWh/kg**
- **Coal furnaces: 0.3kg/kg**

※Based on questionnaire survey of 15 companies and interview surveys with 9 companies (total of 15 companies)

Japanese electric furnaces
Dissolution intensity 0.55kWh/kg

Preconditions: Production amount (dissolved amount) : 150 ton/M
Furnace size: 1.5 ton
Dissolution intensity of Japanese electric furnaces: 0.6 kWh/kg

Chinese electric furnaces: 30,000USD
Japanese electric furnaces: 300,000USD
⇒50% subsidy(3) ⇒150,000USD

Reduce CO_2 emissions

Conversion from Chinese electric furnaces:
~390 ton/year

Conversion from coal furnaces:
~1,050 ton/year

Cost reductions

Reduce electricity costs by converting from Chinese electric furnaces(1)
~66,000USD/year
Reduce fuel costs by converting from coal furnaces(1)
~62,000USD/Y

Recover capital in approx. 3 years(2)
Simple maintenance
No malfunctions
Long service life

(1) Currently, dissolution is conducted during the day. With the introduction of Japanese induction furnaces, this can be done at night.

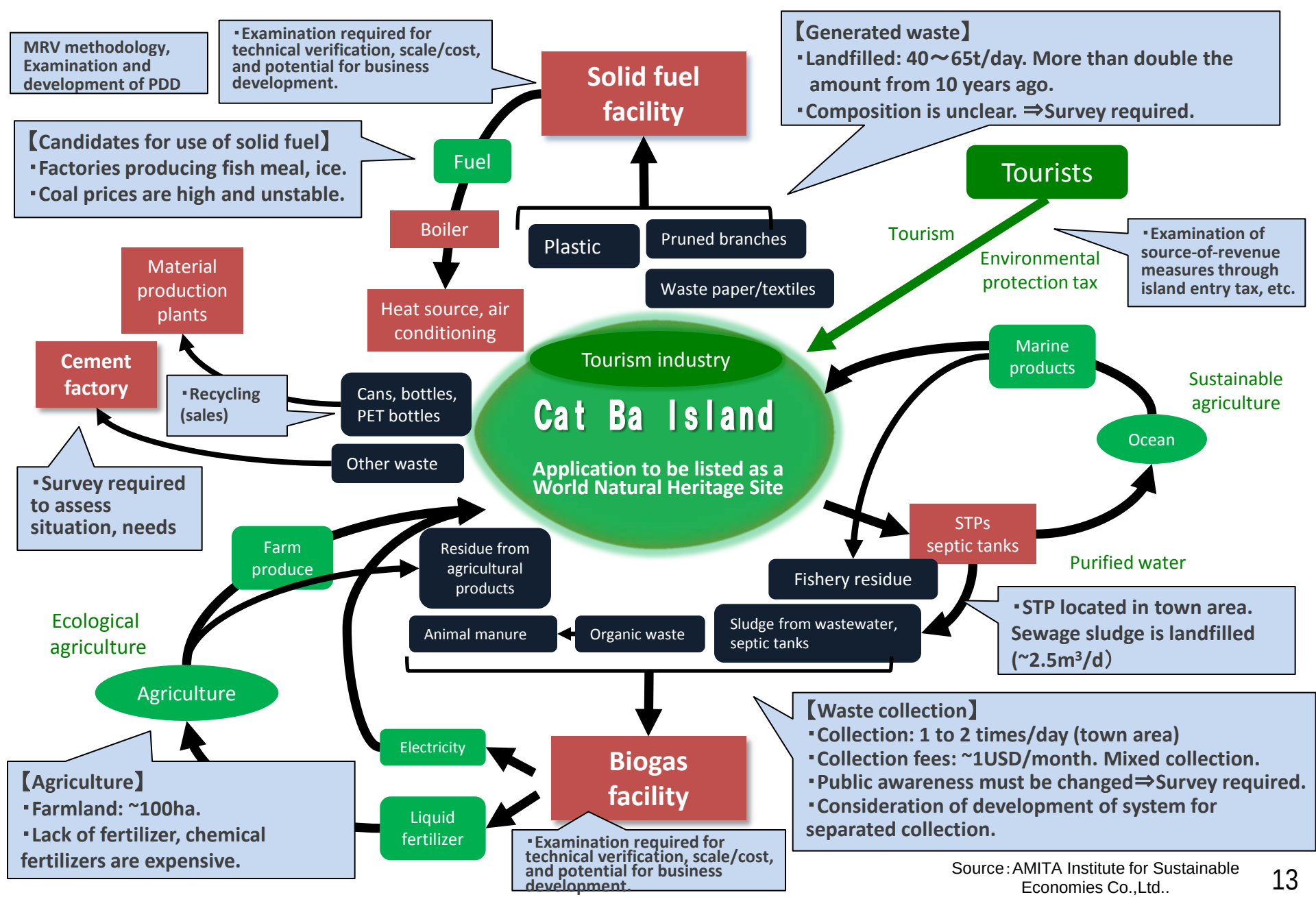
Electricity costs: Daytime (11:30-17:00), 0.0592USD/kWh
Nighttime (23:00-05:00), 0.0373USD/kWh

Coal costs: Calculated from results of interview survey with companies, 190USD/ton

(2) Calculations based on preconditions. Detailed examination will be required in the future.

(3) With a maximum 50% subsidy, CO_2 emissions could be reduced 1/3 or 1/4.

Development of Comprehensive Resource Recycling System on Cat Ba Island (1)



Source：AMITA Institute for Sustainable Economies Co.,Ltd..

Development of Kitakyushu Model

Kitakyushu Model

(feedback)

(feedback)

(feedback)

(application)

Surabaya City in Indonesia

Surabaya Model

(application)

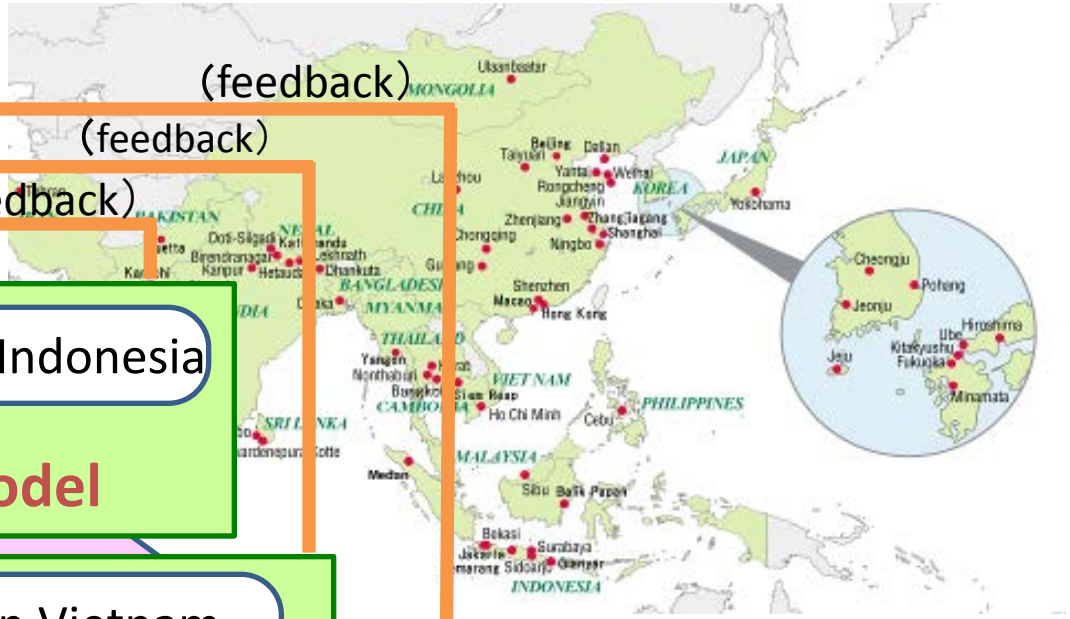
Hai Phong in Vietnam

Hai Phong Model

(application)

Eco Industrial Town in Thailand

Eco Industrial Town



Asian Green Growth Model

We are aiming at sustainable development with Asian countries