

International Conference on Promoting Low-Carbon Cities
Future eco-cities concept promotion international forum –
environment breakout group

Realizing a low carbon society through inter-city cooperation –
From Japan to Asia
21 February 2012

The global trend towards low-carbon cities and the need for models in the Asian region

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Today's presentation

1. Eco-cities and green growth

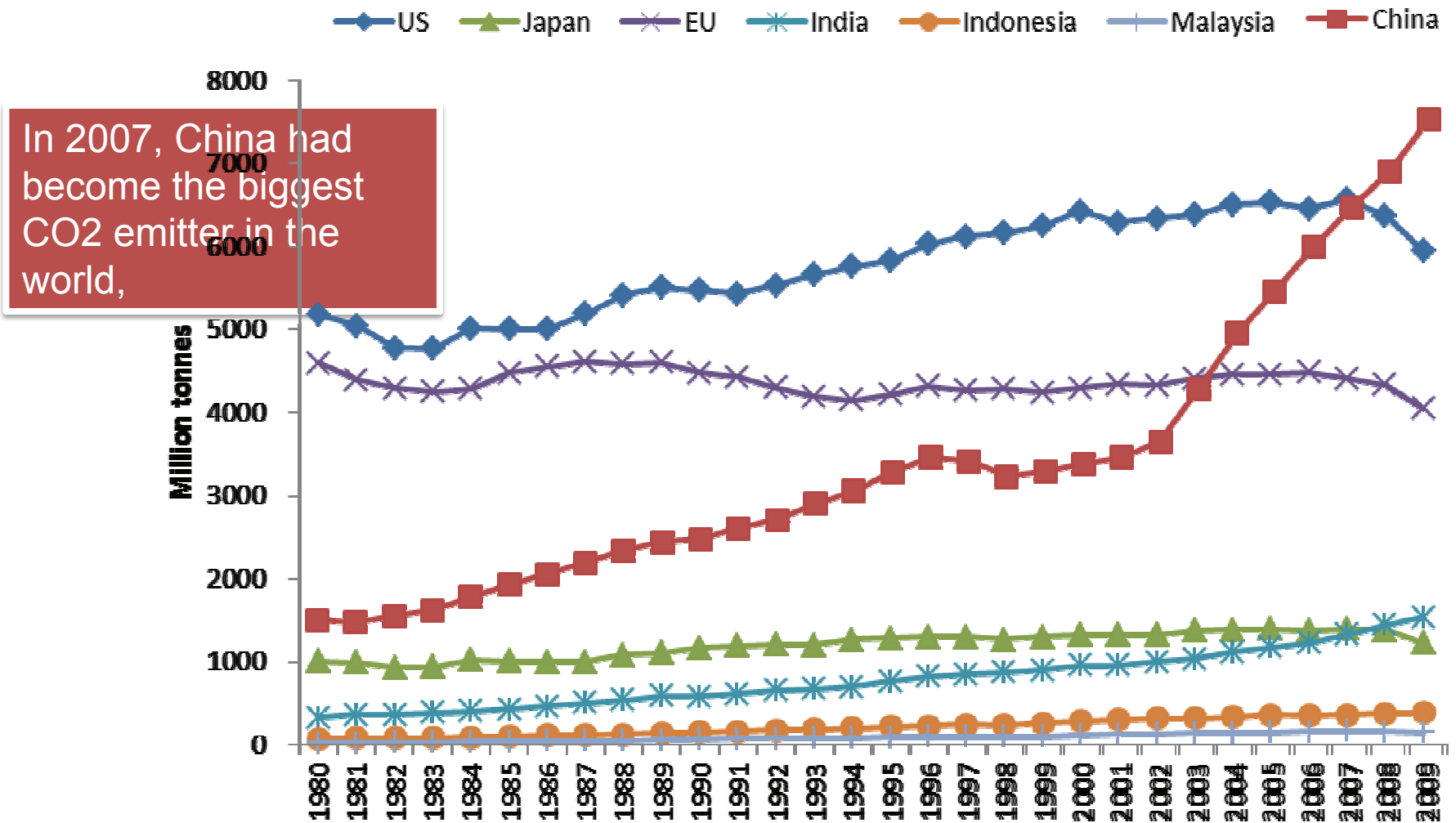
- Environmental and social crisis in Japan
- Eco-model cities, eco-future cities, low carbon cities

2. Eco-innovations out of eco-cities

- Eco-city innovations
- New community revitalization, city development, innovation
- A strategic business model from the cities to Asia

Why from cities/communities?

CO₂ emissions since 1980



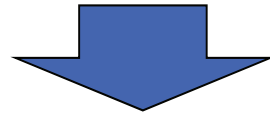
CO₂ Emissions in Different countries from 1980 to 2009

Data Source: BP Statistical Review of World Energy, June 2010

Strategy of cities working for a low-carbon society in Japan

Mid- to long-term goal for Japan (60-80% cut nationally by 2050)

- Draft proposal by Minister of Environment in March 2010: “a cut of 25% in 2020, 80% in 2050”



- Development of innovative technology and wide adoption of existing leading technology
(Technology development and popularization of renewable energy and energy saving)

- Actions to move the whole country toward decarbonization
(emissions trading, tax reform, transparency)



- The power of regions: Eco-model cities since 2008
(United efforts to decarbonize by cities and communities)

Restoring the vitality of communities by promoting eco-model cities

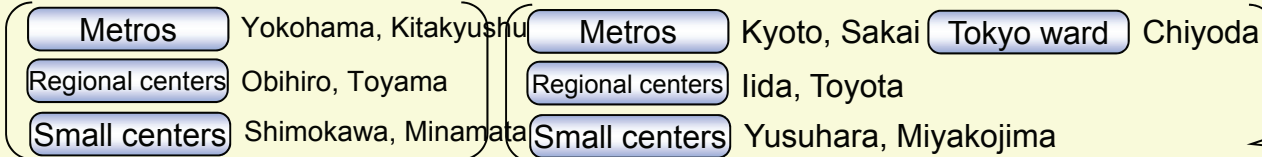
Goal

- To make Japan a low-carbon society. The way society works is going to have to change from top to bottom, from lifestyles to cities and transport and beyond.
- To give a specific and easy-to-understand form of the low carbon future we should be aiming for. The national government has selected cities setting high targets and taking pioneering steps such as large-scale cuts to GHG emissions as eco-model cities, and supporting their plans.
- The vitality of these communities is being restored because residents and local companies are working together, tapping their potential to become low-carbon community models, as well as reducing their environmental impact and bringing about sustainable local development.

Selection process

○ In the call for submissions from 11 April to 21 May 2008, 82 proposals (89 organizations) were received from a wide range of cities and communities.

13 cities were publicly selected as eco-model cities



While challenges remain in some categories, these municipalities can meet the standard by addressing these in the process of setting their action plans

Eco-model city ideals

- Compact city (walkable city development)
- Investment in public transport (using LRT, etc.) and promotion of EVs
- Housing style change (200-year house, energy efficient house, promotion of fuel cells)
- Promotion of renewable energy (solar, wind, biomass, etc.)
- Use of unused energy (sewage, waste, industrial waste heat, etc.)
- Protection and use of forests (harnessing forest resources and land for carbon offsetting, energy autonomy, etc.)

Comprehensively implemented in cities

- Specific shape of a low-carbon city based on local characteristics of city and community
- Led by local public authorities, creating community vitality by engaging industry, academia, and the private sector by creating a wave of social change to transform lifestyles, ways of business, and other social changes



Eco-model city initiatives since 2008

Cabinet Secretariat Regional Revitalization Bureau document

Low-carbon model society in symbiosis with the Northern Forest Shimokawa

- Carbon-fixing with fast-growing willow cultivation, using as fuel
- Establishing a community heat supply facility using forest biomass

Shimokawa
Pop.: 3900

Developing an attractive city that puts walkers first, reducing emissions through "community power"

- Wider footpaths and public transport priority on Shijo Avenue
- Promoting "Heisei Kyomachiya houses" born from the combination of traditional wisdom and modern technology
- "Eco-learning zone" project harnessing the power of community

Kyoto
1.47m

Obihiro
170,000

Garden eco-model city Obihiro

- Conversion of bovine waste to fuel
- No-till farming

Toyama
420,000

Planning to reduce CO2 with Toyama City's compact city strategy

- Tram network
- Incentives to live near public transportation

Low-carbon industrial complex, low-carbon lifestyle

- Megasolar, large-scale fuel cells, introduction of energy saving equipment, etc.
- Sakai Solar Generating Plant (solar panels on 100,000 houses)
- A community cycling system based on the local cycle industry

Sakai
840,000

Chiyoda
45,000

Energy-aware urban development, better energy efficiency

- Making small and medium size building energy efficient
- Upgrading the community heating and cooling system, boiling water for heat

Kitakyushu, Carbon-Free City in Asia

- A "200 year low carbon district" based on cutting edge technology
- Supply of waste heat from factories to surrounding communities

Kitakyushu
990,000

Big-city zero-carbon lifestyle through knowledge sharing, more choices and community action

- Ten times more renewable energy by 2025
- Economic incentives for energy efficient housing

Proposal for a sustainable small local government model harmonizing environment and the economy

- High quality recycling - 22 categories of collected waste
- Production of biofuels from bamboo, etc.

Minamata
30,000

Yokoham
a 3.65m

Woody biomass community cycle model project

- Renewable forestry operations through production of wood pellets, etc.
- Installation of 40 wind turbines by FY2050

Yusuhara
3,050

Iida
110,000

Natural energy and low-carbon development through citizen participation

- Expansion of heating system to individual homes
- Use of renewable energy by district

Self-sufficient energy supply using sugar cane and other sources

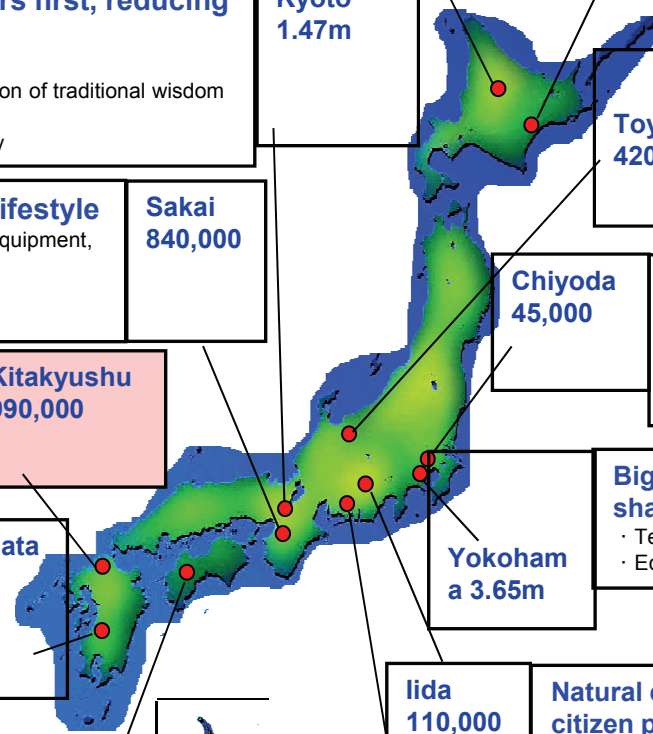
- Use of bioethanol fuel, sugar cane waste for power generation, carbon-free cars

Miyakojim
a 55,000

Toyota
420,000

Using technology for urban development, eco-car life

- Introduction of cutting edge green technologies in "low carbon society model district"
- Next generation car sharing system, solar power generation infrastructure



Proposals for Eco-Model Cities

- Low traffic environmental load city through compact cities and LRT
⇒ Land use and public transport measures
Toyama, Nagoya
- Highly efficient districts; renovated and newly rebuilt buildings
⇒ A well planned out district renewal system and pilot areas
Chiyoda, Yokohama, Nagoya, Minamata
- Self-sustaining energy city which utilizes natural energies
⇒ Uses local resources; implements carbon offset and other social systems
Kita-Kyushu, Yusuhara Town, Sakai City, Obihiro City
- Highly efficient city driven by resource recycling and recycling industries
⇒ Eco-towns and waste resources
Toyama, Teshima, Kita-Kyushu, Kawasaki, Minamata
- Cool city with a water and greenery network
⇒ Maps out a detailed process for low-carbonization

Advanced Measures for Eco-Model Cities

Combinations of technology and social systems by area and sector

Sector	Industry and manufacturing	Agriculture/forestry/fishery	Others
Industrial sector	<ul style="list-style-type: none"> • Support for SMEs to acquire Eco Action 21 certification (Toyota) • Promotion project “Team Toyama” (Toyama) • Promotion of eco-town concept (Toyama) • Progressive measures in an environmentally advanced energy complex (energy management system, LED, etc.) (Sakai) • Energy saving inspections (Sakai, Kitakyushu) • Utilization of waste heat from factories (introduction of CDQ equipment at coking factories) (Kitakyushu) • Use of CASBEE Kitakyushu (Kitakyushu) • Environment “master” system (Minamata) 	<ul style="list-style-type: none"> • Promotion of new uses for “bio willow” (Shimokawa) • Carbon storage in the soil through introduction of good quality fertilizers and non-tilled cropping (Obihiro) • Promotion of wooden pallets (Obihiro) • Introduction of wooden biomass district recycling model (Yusuhara) • Creation of safe and secure agricultural and marine product (Storage in the soil through use of fertilizers, reduction in burnable waste) (Minamata) 	<ul style="list-style-type: none"> • Pilot project to test design of carbon offset system (Shimokawa) • Eco Field project (Food residue) (Obihiro) • Recycling of raw household waste (Toyama) • Waste power generation (Kyoto) • Operation of global warming countermeasures plan system (Yokohama) • Switch to biodiesel fuel (Minamata)
Sector	Automobile	Public transport	Others
Transportation sector	<ul style="list-style-type: none"> • Conversion to and use of next generation vehicles (Obihiro, Chiyoda, Yokohama, Toyama, Kyoto, Sakai, Yusuhara, Kitakyushu, Minamata) • Support for acquisition of green management certification (Yokohama) • Support for eco-driving and no-car days (Yokohama, Iida, Toyota, Toyama, Kyoto, Sakai, Kitakyushu) • Provision of recharging stations (Yokohama, Toyota) 	<ul style="list-style-type: none"> • Introduction of LNG and fuel cell buses (Yokohama, Toyota, Kitakyushu) • Community cycles (Iida, Toyama, Sakai, Kitakyushu, Minamata) • Community buses (Minamata) • Conversion of trams to LRT type (Toyama) • Modal shift (Kitakyushu) 	<ul style="list-style-type: none"> • Switch to biodiesel fuel (Shimokawa, Obihiro, Kyoto, Yusuhara, Kitakyushu) • Promotion of ethanol mixed fuel (Obihiro) • Bioethanol and biodiesel (Miyakojima) • Pilot project for a park and drive society (Toyama) • Environment “master” system (Minamata)

Advanced Measures for Eco-Model Cities (2)

Combinations of technology and social systems by area and sector

Sector	Energy	Facilities/equipment	Other
Industrial sector	<ul style="list-style-type: none"> • Use of wood fuel (Shimokawa, Obihiro, Iida, Kyoto, Yusuhara) • Conversion to natural gas (Obihiro) • Solar power generation (Obihiro, Chiyoda, Toyota, Kyoto, Sakai, Yusuhara, Kitakyushu, Miyakojima) • Waste power generation (Toyota, Kyoto) • Wind power generation (Toyota) • Hydro power generation (Toyama) • Use of “raw” green energy (Chiyoda) • Use of green energy (Toyota) • Creation of biomass from raw household waste (Yokohama) 	<ul style="list-style-type: none"> • Energy saving refurbishments to facilities or extensions to operating life of facilities (Obihiro, Chiyoda, Yokohama, Toyama, Kyoto, Sakai, Kitakyushu, Miyakojima) • Eco houses (Shimokawa) • Greening of roofs, walls and gardens, etc. (Toyama, Kitakyushu) • Switch to energy saving lighting (LED) (Obihiro, Toyota, Toyama, Kitakyushu) • Support for introduction of energy saving home appliances (Chiyoda) • Increased efficiency for air conditioners (Chiyoda) 	<ul style="list-style-type: none"> • Promotion project “Team Toyama” (Toyama) • Environment “master” system (Minamata) • Introduction and promotion of KES (environmental management system) (Kyoto) • Collection of sorted waste (Sakai)
Sector	Energy	Facilities/equipment	Other
Residential sector	<ul style="list-style-type: none"> • Solar power generation (Obihiro, Yokohama, Iida, Toyota, Toyama, Kyoto, Sakai, Yusuhara, Kitakyushu, Minamata, Miyakojima) • Use of solar power (Toyama, Minamata) • Conversion to natural gas (Obihiro) 	<ul style="list-style-type: none"> • Energy saving housing/apartments (Obihiro, Kitakyushu) • Use of local materials in housing (Shimokawa) • Promoting living along major public transportation routes (Toyama) • Application of CASBEE in cities (Yokohama, Kitakyushu) • Support for introduction of energy saving equipment (Chiyoda, Yokohama) • Support for introduction of water heaters (Obihiro, Iida, Yusuhara) • Support for introduction of wood-fuel and pellet stoves (Iida) • Subsidies for installation of home-use fuel cell batteries (Toyota) 	<ul style="list-style-type: none"> • Reduction of plastic bags / use of eco-bags (Shimokawa, Obihiro, Kitakyushu, Minamata) • Environmental education (Yokohama, Toyama) • Toyota eco points (Toyota) • Promotion project “Team Toyama” (Toyama) • Waste reduction and advanced recycling methods (Minamata) • Home version environmental ISO (Minamata) • Environment “master” system (Minamata)

The Revolutionary Significance of Eco-Model Cities

(1) Enthusiastic response from many diverse municipalities

- More than 80 municipalities applied, ranging from ordinance-designated cities to municipalities with several thousands of people
- Ambitious goals established that guide the national goal

(2) Comprehensive approach encompassing environmental and urban development policies

- Considers cross-cutting policies, such as energy, city renewal, resource recycling, civic action, forestry biomass, and water resource and *satoyama* conservation and recycling
- Calculates indirect low-carbon effects in Japan and overseas

(3) National and local governments jointly follow-up planning

- Coordination and discussion of greenhouse gas calculation methodology
- Objective progress evaluation process

Reduction targets for 13 eco-model cities

City	Population	Area	Base year	Reduction target (mid-term)	Reduction target (2050)
Kitakyushu City	990,000	488 km ²	2005	30% (2030)	50-60%
Kyoto City	1,470,000	828 km ²	1990	40% (2030)	60%
Sakai City	840,000	150 km ²	2005	15% (2030)	60%
Yokohama City	3,650,000	437 km ²	2004	30%/person or above (2025)	60%/person or above
Iida City	110,000	659 km ²	2005	Residential sector 40-50%(2030)	70%
Obihiro City	170,000	619 km ²	2000	30% (2030)	50%
Toyama City	420,000	1,242 km ²	2005	30%(2030)	50%
Toyota City	420,000	918 km ²	1990	Essential target: 30% (2030) Challenge target: 50% (2030)	Essential target: 50% Challenge target: 70%
Shimokawa-cho City	3,900	644 km ²	1990	32% (2030)	66%
Minamata City	29,000	163 km ²	2005	33% (2020)	50%
Miyakojima City	55,000	205 km ²	2003	30-40% (2030)	70-80%
Yusuhara-cho City	5,000	237 km ²	1990	50% (2030) *Excluding energy conversion 3.5 times absorption amount (2030)	70%*Excluding energy conversion 4.3 times absorption amount
Chiyoda Ward	45,000人	12 km ²	1990	25% (2020)	50%

Methods for calculating volumes of greenhouse gas emissions in eco-model cities, industries

Name of city	Electricity			Gas		Other fossil fuels			Other
	Amount used (provided by business operators)	Prorated and estimated from statistical data	Reports from large-scale operators	Amount used (provided by business operators)	Prorated and estimated from statistical data	Amount used (provided by business operators)	Prorated and estimated from statistical data	Estimated from amount used in previous year	Question naire
Kitakyushu City	○			○				○	
Kyoto City	○		○	○			○		
Sakai City		○			○		○		
Yokohama City	○			○				○	
Iida City	○			○			○		
Obihiro City	○			○				○	
Toyama City	○			○				○	
Toyota City	○			○				○	
Shimokawa-cho City	○								○
Minamata City	○								○
Miyakojima City	○			○		○			
Yusuhara-cho City	○			○		○			
Chiyoda Ward	○			○				○	

Assessment of the progress of eco-model cities

(1) An “eco-model city follow-up map” that summarizes the progress of initiatives, the results of initiatives, issues, policies for improvement, and so on with regard to the individual projects set forth in action plans in the respective eco-model cities was submitted.

* The map covers the types of progress made with regard to individual projects (which step the city is on: “implementation”, “launch”, “examination”, or “no examination or implementation”), particularly concerning the status of progress of initiatives, etc.

(2) The bureau will confirm the status of projects and future policies, etc., and will formulate a four-step assessment plan called SABC.

(Approach to assessment)

- Looking at whether planned projects are being carried out steadily
- Level of importance of measures that are ahead of plan (spirit of innovation, amount of reduction expected, etc.)
- Level of importance of measures that are behind schedule/not being addressed
- Status of examining alternatives to policies that are behind schedule/not being addressed
- Expression of effects (record of reducing greenhouse gases, record of building regional vitality, etc.)

“S”	The status of progress is extremely outstanding, and the city is a leader in its region and is ahead of national systems, etc.
“A”	The status of progress is outstanding, and the city is implementing advanced projects ahead of schedule, etc.
“B”	The status of progress is good, and the city is implementing projects on schedule, etc.
“C”	The city needs to further promote projects, and it appears that there are delays in the progress of projects, etc.

Environmental Future City serving as leader in national growth strategy

- Eco-model cities (2008-)
Efforts towards systematic carbon reduction by cities and regions
- Promotion Council for Low-Carbon Cities
- Best practices for building low-carbon cities (2010-)
- **Environmental Future City (2011-)**
Creating a successful example by making a “concept for the environment and the future” that is one of the best in the world, and carrying out concentrated investment. Then, spreading this example domestically and developing it internationally.

Today's presentation

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Why from cities/communities?
Why from Eco cities?

Expectations from Low-Carbon Cities for Environment-Driven Growth

- The 20th Century brought a common understanding to the global community that environmental issues of global scope such as global warming, resource depletion, and biodiversity loss were becoming new constraints on growth.
- Expectations from governments and businesses towards new markets and businesses means public and private sector drive for:
“Green Innovation”
Expectations towards “Green Innovation”
- Under “environmental constraints” as a new social trend, expectations as the driver of economic and job growth directed toward:
Green Innovation

Key to Achieving Environmental Innovation

- “System Innovation” (F.W. Geels, 2005)

In transport, communications, housing, energy, and food, innovation is needed in the socio-technical systems, and not only by way of individual technological breakthroughs.

- “Green Growth Strategy” (OECD, 2001)

The market mechanism is insufficient to construct an environmentally efficient production and consumption system.

Policies to raise consumer and producer awareness are necessary in addition to appropriate regulation, as well as price signals.

Green Innovation in the Growth Strategy

- Green Innovation is:
 - a growth area where Japan should play to its strengths as an “environmental power”
- Comprehensive policy packages encompassing system design and regulation

Propagation and promotion of environmental technologies

Propagation and expanded use of renewable energy sources, etc.

Smart grid, Japanese-style

Thorough recycling of domestic resources

Promotion system for environment-friendly lifestyles

Systematic renewal of building stock

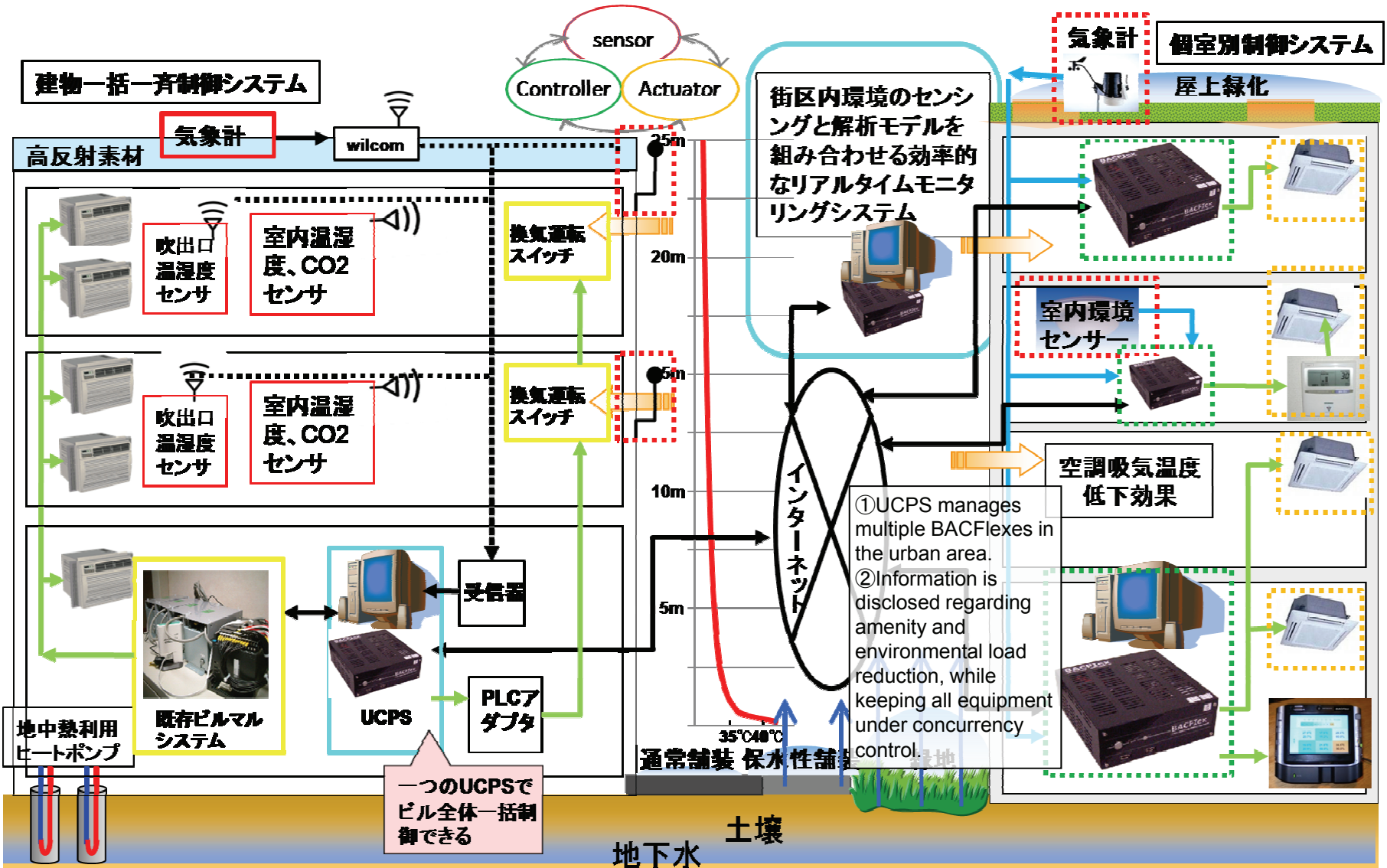
- The “FutureCity” (comprehensive innovation in the city) as one of the 21 National Strategic Projects.

Environmental Innovation Strategy for Cities and Districts

- Only a small portion of **environmental values** is traded in the marketplace. Carbon reduction and resource circulation have long-term and widespread value, but mechanisms to internalize them in the market are necessary.
- **“Environmental Market Mechanism”** Support for environmental projects, environmental regulation, environmental premium pricing, and other means to internalize external costs as “environmentalization of the market”
- **“Environmental Foundation Development Support”**
Environmental infrastructure (physical and otherwise) that will be much needed in the future due to worsening environmental problems but will take time to develop
****Physical environmental foundation: transportation infrastructure for resource circulation, high-efficiency compact cities, high-efficiency materials manufacturing, etc.***

From Smart Buildings to Smart Cities, Environmental Cities

From the National Institute for Environmental Studies (NIES):
The Urban Clustering Protocol System (UCPS) as an Example

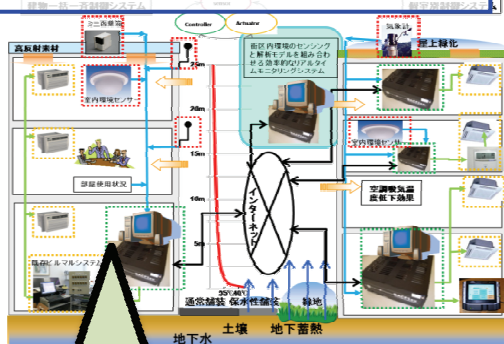


Strategic Business Models for Environmental Innovation (2)

From Smart Buildings to Low-Carbon, Circulatory Cities

Area effects and network effects that interact with individual technologies to produce synergy can be achieved by moving up from energy management at the individual building level to efficient management of supply and demand at the area level and management of land use and facility locations at the city level.

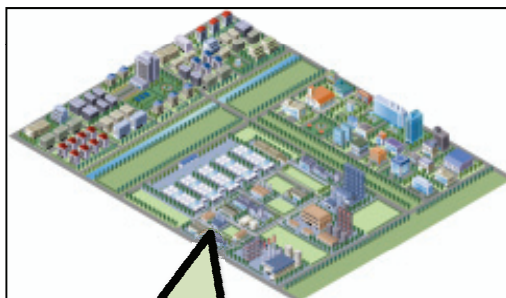
Demonstration with building clusters



Social institutional systems in red

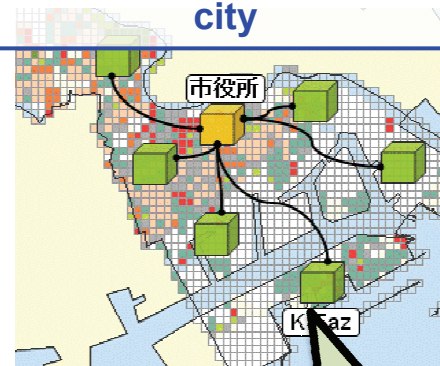
Energy-efficient buildings
Smart meters
—
External air supply through BEMS
Co-generation
Carbon credits

Network development within the city



Local hybrid heat and power supply system
Supply-demand 'heijunka' energy management
Zoning for low-carbon facilities

Network development by the city



Low-carbon energy monitoring network
Capping and trading
Guiding industrial location close to cities (compact cities)

Environmental Business Models Spreading from Eco-Cities

Value Creation through Innovation in the City, Districts, and Neighborhoods

1. Revitalization effect from switching investment on fossil fuels to developing local “carbon capital” and “circulation capital” (low-carbon and circulation economic value)

- Low-carbon economic revitalization by supplying low-carbon products, energy, and services

2. Improvement effect in the local environment through the development of low-carbon environmental capital (environmental co-benefits effect)

- Synergy between low-carbon and improvements in the daily living environment and in disaster resistance as the result of the development of water resources, greenery resources, local energy base, public transportation base, and resource circulation base

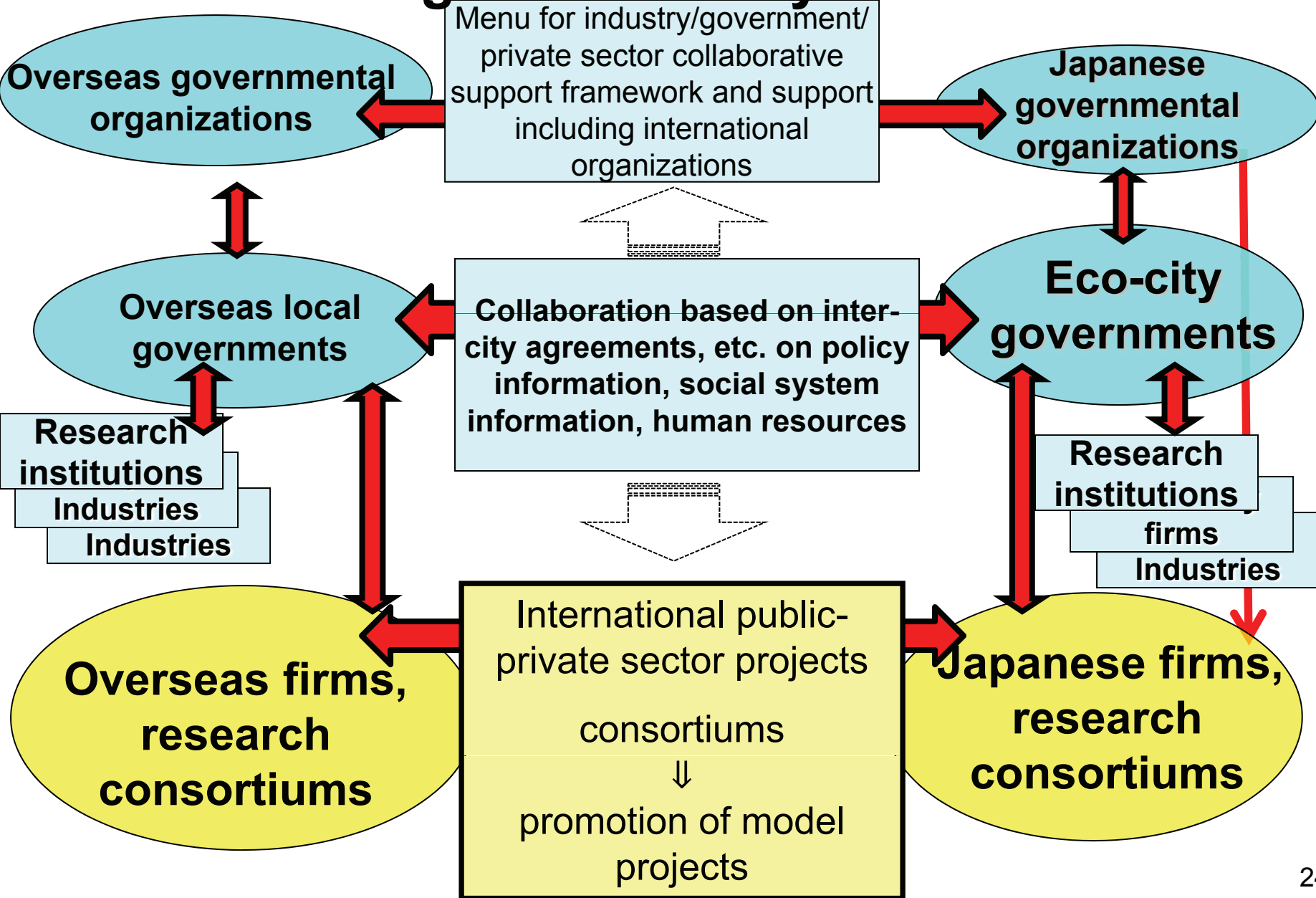
3. Reduction of future risks by building communities adapted to further global warming and resource scarcity (environmental change adaptation effect)

- Effect on responses to external changes and disasters through the enhancement of local self-reliance for services, and the reduction of future health risks through amenity improvements

4. Enhancement of self-reliant governance at the local level through collaborative action by a wide variety of actors (town management effect)

- New public-private collaborative activities effect generated by the power of new communitarian ties created through trust building between citizens and businesses at the local level

Promoting Projects between Japan and Overseas through “FutureCity” Collaboration



Projection by Environmental Businesses from Urban Areas in Japan

Knowledge and wisdom in low-carbon cities in Europe

- Carbon reduction in the context of de-industrialization and de-materialization
- High environmental awareness among citizens and businesses and multi-actor collaborations and urban management



Environmental innovations and businesses projecting from Japanese cities

- Low-carbon package that utilizes target-oriented development capacity for technology and products (combination of equipment, network, and social technologies)
- Social governance system that encompasses environmental awareness at the civic and business levels
- Local communities that have environmental activist capabilities based on pollution experiences



Efforts toward low-carbon cities in Asia

- Promotion of carbon reduction linked to industrialization and economic growth
- Top-down project promotion and policy execution capabilities

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