

International Symposium on “Realizing Low Carbon Cities in North-East Asia:
Bridging science, policy and promoting cooperation”
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Practices, Experiences and Challenges toward Low Carbon City Development in Japan

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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

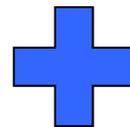
- **Eco-city innovations**
- **New community revitalization, city development, innovation**
- **A strategic business model from the cities to Asia**

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

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

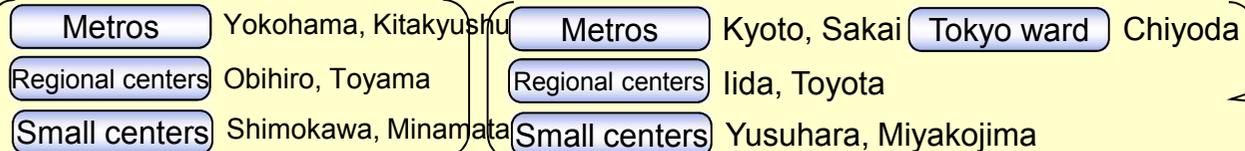
Goal

- 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

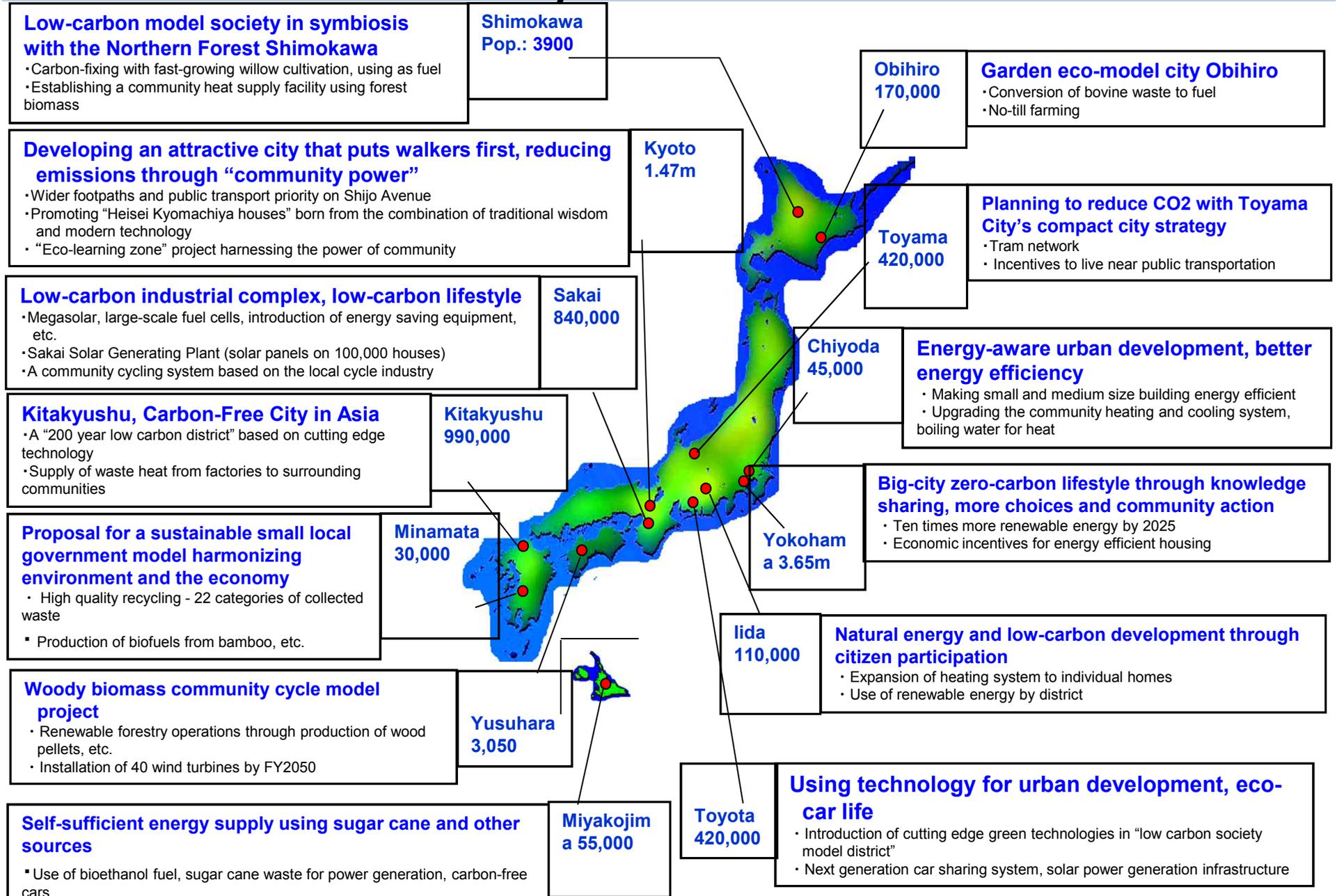
- Compact city (walkable city development)
- Investment in public transport (using LRT, etc.) and promotion of EVs
- Housing style change (200-year house, energy efficient house, promotion of fuel cells)
- Promotion of renewable energy (solar, wind, biomass, etc.)
- Use of unused energy (sewage, waste, 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



source) Cabinet Secretariat Regional Revitalization Bureau, Japan

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) |

source) Cabinet Secretariat Regional Revitalization Bureau, Japan

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) |

source) Cabinet Secretariat Regional Revitalization Bureau, Japan

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

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

source)T. Fujita: "The global trend towards low-carbon cities and the need for models in the Asian region"
International Conference on Promoting Low-Carbon Cities, Feb.21 2012, Tokyo

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.

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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 realizing social innovation

Frank W. Geels (2005) “[System Innovation](#)”

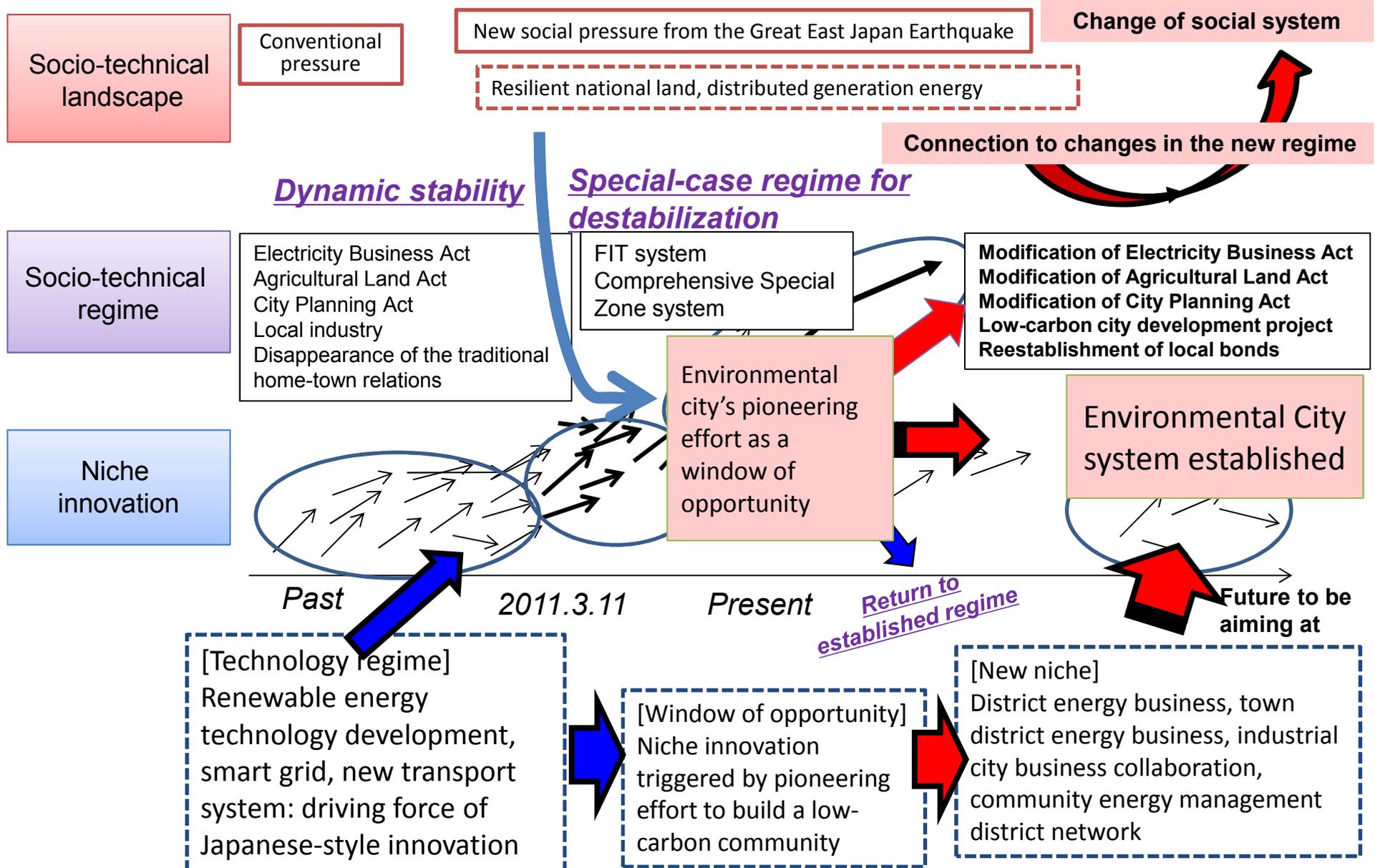
In the fields of transport, telecommunications, housing, energy and food, innovation in socio-technical systems is necessary on top of individual technological innovation

OECD(2011) [Green Growth Strategy](#)

Market mechanisms are insufficient for building production and consumption systems with high environmental efficiency.

The policy to increase the awareness of consumers and producers is needed, along with the appropriate regulations and price-signal inputs

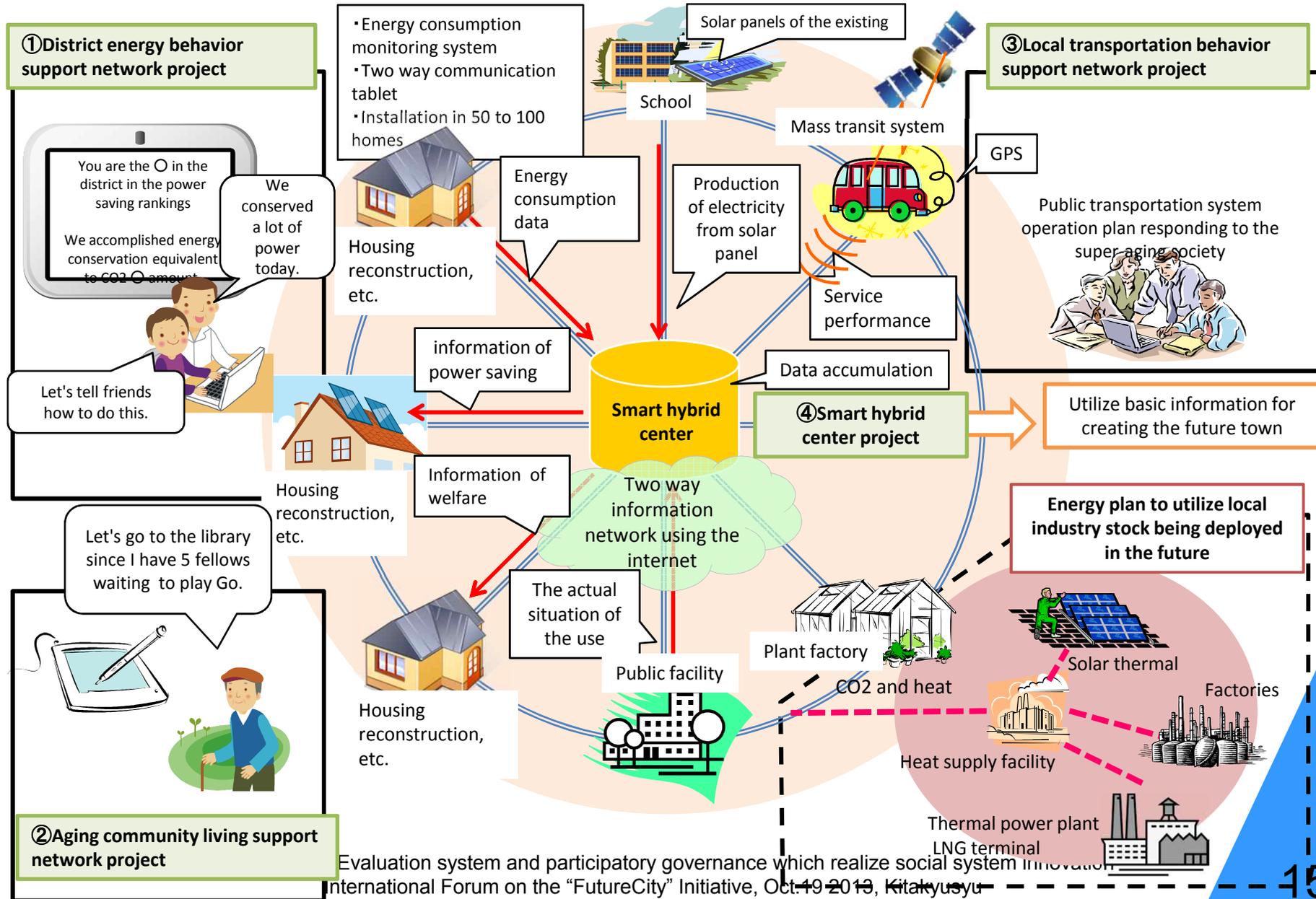
Significance of the environmental city based on social innovation theory



source)T. Fujita: "Evaluation system and participatory governance which realize social system innovation"
International Forum on the "FutureCity" Initiative, Oct.19 2013, Kitakyusyu

Restoration support database development project in Shinchi Town, Fukushima Prefecture

Future City pioneering model project of a two-way information system decided by the Cabinet in FY2013



Evaluation system and participatory governance which realize social system innovation
International Forum on the "FutureCity" Initiative, Oct. 19 2013, Kitakyusyu

Innovative Multi-stakeholder Participation System by Information Technology Innovation

【Expected Social System Innovation】

Information Communication Technologies (ICT) will provide the new phase of participation and decision making among various stakeholders

Centralization by one-way information system



- to revitalize of local community network 'Kizuna' through dual direction information system
- to integrate information sharing among environment, aging, health and local lives
- to share the recognition level of local circumstances, future visions and action programs

Innovative Multi-stakeholder Participation System by Information Technology Innovation (2)

【Challenges】

○ Collaborative regional information system and management among citizens, business sectors and governments

-from Confronting to Collaborative communication

○ Efficient local governance system by utilizing ICT function

-information sharing and management system by ICT

○ Common indicators and information in addition to comments and opinions

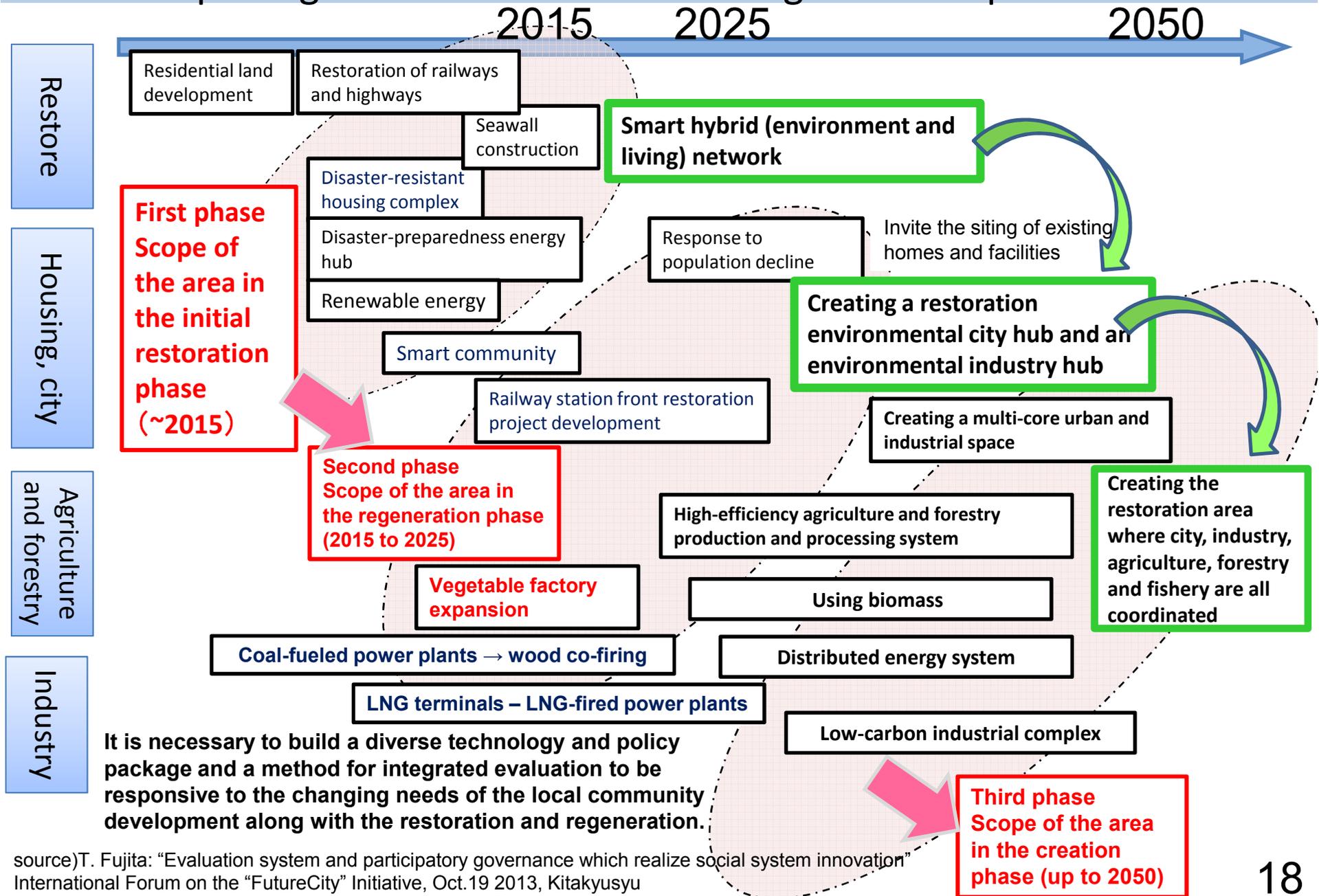
- Shared recognition by objective, scientific and quantitative measurement and indicators

⇒ Monitoring, Reporting and Verification System

Understandable Indicator System (multiple-integrative)

source) T. Fujita: "Evaluation system and participatory governance which realize social system innovation"
International Forum on the "FutureCity" Initiative, Oct.19 2013, Kitakyusyu

Example of short-term and mid-to-long-term technology and policy package in the restoration and regeneration process



source)T. Fujita: "Evaluation system and participatory governance which realize social system innovation" International Forum on the "FutureCity" Initiative, Oct.19 2013, Kitakyusyu

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

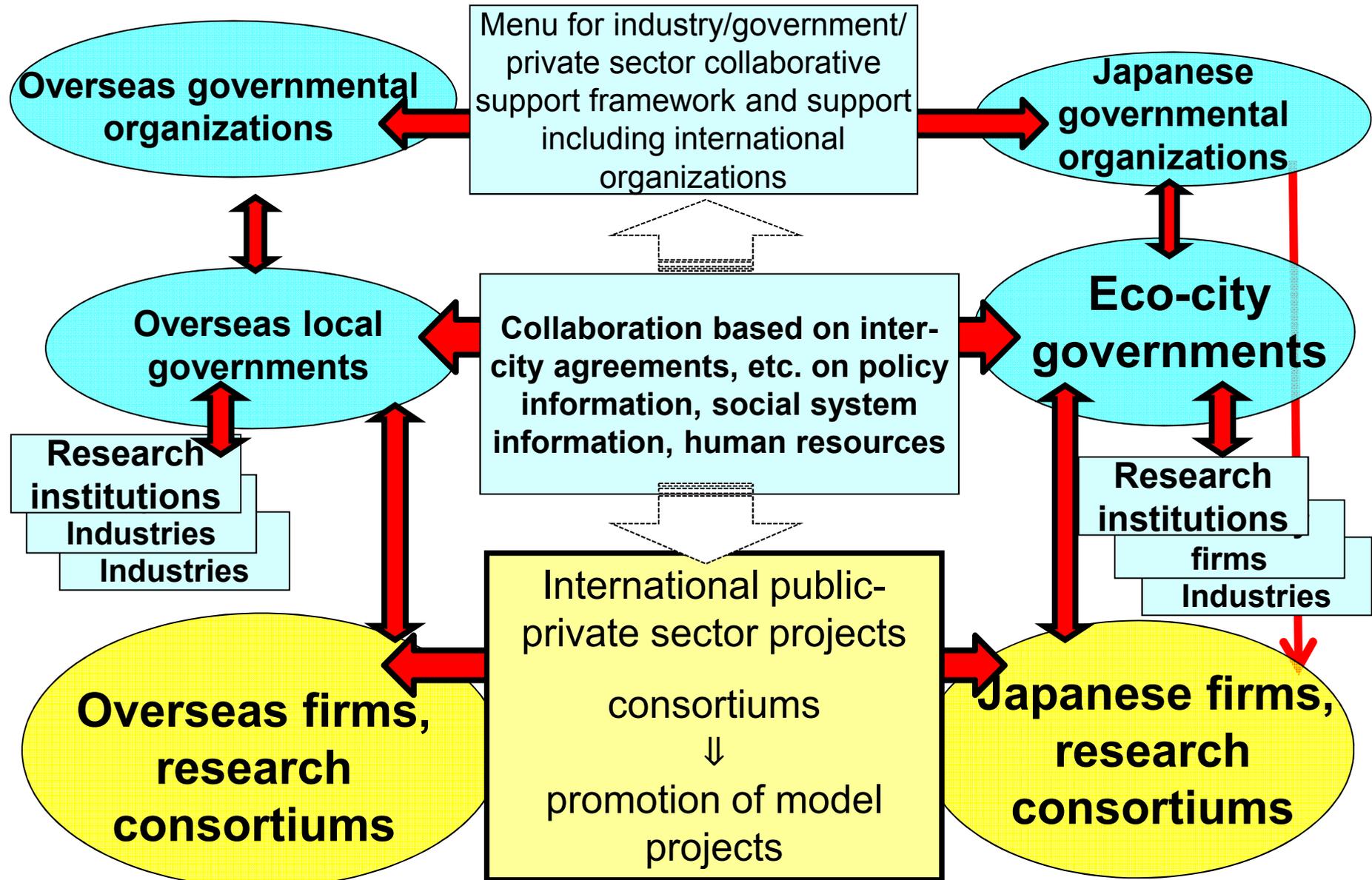
3. Reduction of future risks by building communities adapted to further global warming and resource scarcity (environmental change adaptation effect)

- 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 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 “Future City” Collaboration



source)T. Fujita: “Aiming at Reconstruction and Renovation in Cities While Making the Best Use of the Environment and Energy Moving Toward the Coexistence of Forestland and Cities” International Forum on the “FutureCity” Initiative, Feb.16 2013, Shimokawa, Hokkaido