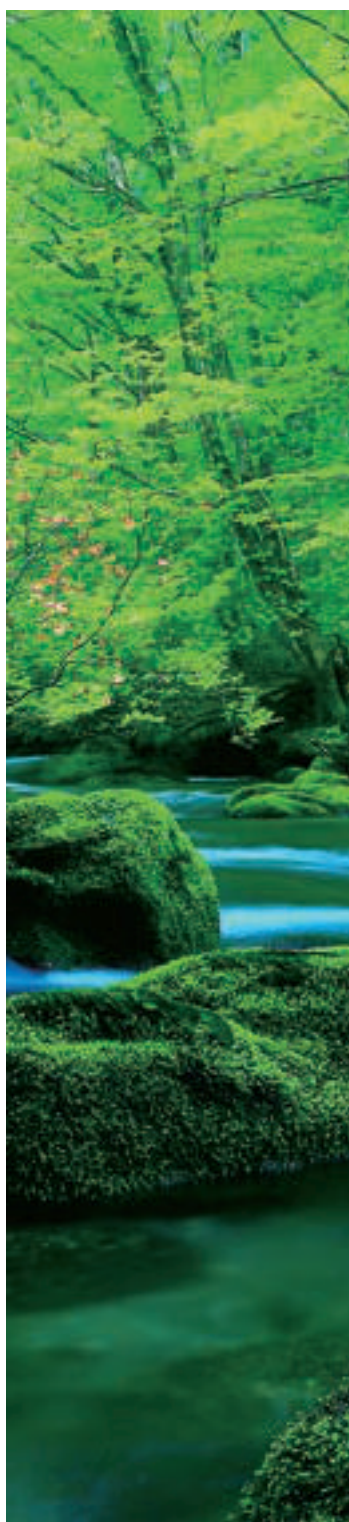


Low-carbon and Resilient cities

November 2015

日本の低炭素・レジリエント自治体カタログ

Local Governments in Japan






























































































































Low-carbon and Resilient cities
















































































































November 2015

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Local Governments in Japan

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アイコンの説明



Renewable Energy



Energy Saving



Air



Water



Waste Management



Transport



Green

Low-carbon and resilient cities

JCM

What is the JCM (Joint Crediting Mechanism)?

The JCM is a mechanism whereby Japan helps developing countries reduce greenhouse gas (GHG) emissions through introducing and facilitating the diffusion of leading low-carbon technologies, products, systems and services in the countries concerned. Actual contributions from Japan for GHG emissions reductions and removals are appropriately evaluated as credits, and Japan utilizes them to attain its emission reduction targets.

What is the Large Scale JCM Feasibility Study?

It is a program whereby Japan and other Asian cities work together to develop low-carbon societies in Asia. Japan, working with research institutes and private companies, adapts leading technologies and structures to the circumstances of local communities and establishes a relevant operation and maintenance management system to promote the formation of JCM projects in larger units, such as cities and regions, and to support projects with the aim of transforming the entire city into a low-carbon society. This program is implemented through intercity cooperation between the local governments of countries that have signed onto or are considering signing onto the JCM and those of Japan.

JCM-related websites

Ministry of the Environment of Japan

The Ministry of the Environment has opened a Web portal intended to support the formation of large-scale JCM projects, provide detailed information on the JCM projects and introduce case studies, and enable local governments and business entities and their stakeholders, all of whom play an important role in low-carbon development in Asia, to exchange opinions and information with each other. For more information, visit the websites below.

- **Ministry of the Environment's Web Portal for Low Carbon Development in Asia**

<http://www.env.go.jp/earth/coop/lowcarbon-asia/english/index.html>

This website provides information regarding international negotiations and related policy trends, policies and support systems.

- **Business Collaboration Support Platform for Low-Carbon Development in Asia**

<http://lowcarbon-asia.org/english/index.html>

This website provides information regarding the Japanese companies' low-carbon technologies, business support systems and case studies on relevant business development.

- **Asia Low-Carbon Cities Platform**

<http://lowcarbon-asia.org/english/city.html>

This website provides information regarding support schemes for local governments' engagement in international cooperation, case studies on the usage of JCM, and case studies on the development of a low-carbon society.

ICLEI

What is ICLEI ?

ICLEI-Local Governments for Sustainability is the world's leading network of over 1,000 cities, towns and metropolises committed to building a sustainable future.

What ICLEI Do ?

By 2050, the global population is estimated to reach nine billion people of which two-thirds will be living in cities. Because of this, the role of municipalities is becoming increasingly crucial to make their cities and regions sustainable, low-carbon, resilient, ecomobile, biodiverse, resource-efficient and productive, healthy and happy, with a green economy and smart infrastructure.

ICLEI believes that cumulative voluntary actions on the local scale are indispensable in order to address worldwide environmental issues. As such, in order to address these environmental issues, ICLEI engages in various activities in support of regional efforts.

About ICLEI Japan

ICLEI Japan was founded in 1993, as one of the country offices of ICLEI – Local Governments for Sustainability, and serves to build and enhance the local governments' network in Japan. ICLEI Japan supports the member cities to lead local initiatives, to promote global collaboration to achieve regional and global sustainability goals in partnership with other ICLEI offices and partner organizations.



• ICLEI Global <http://www.iclei.org/>

• ICLEI Japan Office <http://japan.iclei.org/en/index.html>

programs and networks

Future
City

Future City

The Japanese Government has been promoting the FutureCity Initiative in anticipation of the future worldwide trend toward urbanization. The aim is to create the urban city and community with the sustainable economic and social system that can respond to the issues of aging and the environment. Once a city is chosen as a FutureCity, to be a community to meet the shared human challenges of the environment and aging, it will develop pioneering projects to realize the dream of a community that is continuously creating environmental, social and economic values, a community everyone wants to live, and a community where everyone is empowered.

Eco-Model
City

Eco-Model City

The Eco-Model City has been promoted since 2008. This low carbon city is promoted as a part of the same initiative and supports the foundation of the FutureCity Initiative. The government has selected as Eco-Model Cities those cities that are working on high but achievable goals, making pioneering efforts to realize the low-carbon society. This is to clearly show the low-carbon society in practice that Japan should aim at in the future. The first thirteen cities were selected in 2008. After the Great East Japan Earthquake in 2011, energy issues received close attention. Seven cities were selected in 2012 and three cities in 2013 to promote the effort to realize a low-carbon society nationwide. Each of these communities is making maximum use of local resources and taking a crosscutting approach that goes beyond stakeholder boundaries to establish local models for carbon reduction and sustainable development.

• Future City Eco-Model City <http://future-city.jp/en/>

C40

About C40

C40 is a network of the world's megacities committed to addressing climate change. C40 supports cities to collaborate effectively, share knowledge and drive meaningful, measurable and sustainable action on climate change.

• C40 <http://www.c40.org/>

The contents of this catalog is available on the following website:

<http://lowcarbon-asia.org/english/city.html>



Promotion of the development of a low-carbon society based on local energy production for local energy consumption

<http://www.pref.aichi.jp/0000009599.html> (Japanese text only)



Other

Disaster management

Developing a low-carbon society is one of the most challenging issues for Aichi Prefecture, one of the world's leading manufacturing bases. Formulating the Aichi Global Warming Prevention Strategy 2020, Aichi has worked on various initiatives for the sustainable development of the prefecture where a virtuous cycle of environment, the daily life of residents, and industries can be achieved.

Aichi Prefecture, which has more hours of sunlight than other prefectures in Japan and is endowed with solar energies, works with local areas to support the installation of solar power generation equipment for residential use. It has become one of the top prefectures in terms of the number of installations of solar power generation equipment.

The prefecture also strives to facilitate the use of renewable energies and implement local energy production for local energy consumption, so as to create a local community capable of providing a safe and secure environment, in which energies can be stably secured in the event of natural disasters.

More specifically, Aichi Prefecture is working to install storage batteries and power generation equipment based on renewable energies, including solar power generators, at evacuation or disaster-prevention centers in preparation for typhoons, earthquakes and other large disasters. These centers include local municipali-

Image of the development of energy supply networks

Autonomous power supply system based on renewable energies, storage batteries, Electric Vehicles, Plug-in Hybrid Vehicles, and Fuel Cell Vehicles

Installation of solar power equipment and storage batteries at disaster-prevention centers

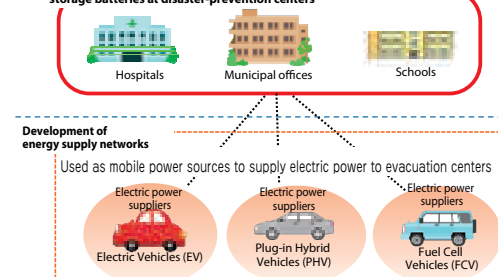


Image of the development of energy supply networks

ties' schools and hospitals within the prefecture. This work is intended to reduce CO₂ emissions during normal times and secure sufficient electric power to maintain operations at evacuation centers in case of power failures caused by disasters.

In the future, the prefecture will use local communities' electric vehicles and plug-in hybrid vehicles as mobile power sources to supply electric power to evacuation centers, with the aim of developing energy supply networks in the event of natural disasters.

Strategical promotion of global warming mitigation measures based on the Aichi Global Warming Prevention Strategy 2020

<http://www.pref.aichi.jp/0000079149.html> (Japanese text only)



Aiming at developing a society where the natural environment and the use of vehicles are well-balanced

<http://www.pref.aichi.jp/0000044820.html> (Japanese text only)



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JCM

Future
City

Eco-Model
City

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Amagasaki City Smart Community Promotion Project

<http://www.city.amagasaki.hyogo.jp/kankyo/hozen/34587/index.html> (Japanese text only)



Amagasaki City has been promoting the “creation of comfortable and sustainable low-carbon city” as an Environmental Model City. Since 2015, it has implemented measures related to energy management systems in the region when developing housing areas expanding more than a certain size, utilizing HEMS (home energy management systems); and has supported the creation of smart communities, enabling the revitalization of the local economy through such efforts.



Image on Digital Display



This year, the first Amagasaki Smart Community was certified. This project involved the installation of equipment to monitor electricity use at private homes and commercial facilities in newly-developed areas in front of JR Tsukaguchi Station. The equipment visualizes electricity usage on a digital screen, realizing the real-time display of the supply-demand situation in the area. Using this system,

residents can see electricity usage not only for their own homes but also the entire area, which is expected to encourage residents to have a sense of a community and tackle power saving hand-in-hand.

Amagasaki City has also introduced a new regional-currency point system covering the entire city. This is a system to stimulate the regional economy by encouraging local people to save electricity during peak hours of electric power demand in summer and in winter. By giving twice as many points as usual when people go out of their homes and spend money at local shopping streets during these periods, demand for electric power is expected to be reduced; and by effectively utilizing a regional-currency point system, the region is expected to be revitalized.

In the future, based on the level of residents' cooperation in responding to the above-mentioned incentives, the city will study which types of smart communities are suitable for Amagasaki in consideration of its features, and expand the project's scope to include the entire city.

Amagasaki Environment Open College

<http://www.city.amagasaki.hyogo.jp/kankyo/hozen/22911/index.html> (Japanese text only)



Other (Environmental protection, public awareness)

Amagasaki City Energy-Saving Evaluator Registration System

<http://www.city.amagasaki.hyogo.jp/kankyo/hozen/34540/030140.html> (Japanese text only)



Holding Amagasaki City Symposium on Fuel-cell Vehicles (FCV)

<http://www.city.amagasaki.hyogo.jp/kankyo/hozen/11335/033718.html> (Japanese text only)



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Operation Green Stock: low carbonization of small and midsize office buildings and apartments

<https://www.city.chiyoda.lg.jp/koho/machizukuri/kankyo/ondanka/greenstock/index.html> (Japanese text only)



Operation Green Stock is an initiative to enhance energy efficiency, low carbonization, and greenification of a large number of existing buildings ("stock") in Tokyo's Chiyoda Ward.

The project consists of the following two categories: "Business," which targets small and midsize office buildings in the ward to help them save energy; and "Apartment," which targets existing dwellings to help them become energy smart. In both cases, the ward collaborates with universities, research institutes and engineers from relevant companies.

[Business Category]

About 75 percent of CO₂ emissions in Chiyoda Ward are from business operations. With the aim of reducing such emissions, this category targets small and midsize office buildings, of which there are about 4,700 in total. Based on the results of a present-situation survey and an energy-efficiency inspection of each building, the ward makes a proposal to the businesses on how to improve operations and upgrade their facilities. Additionally,

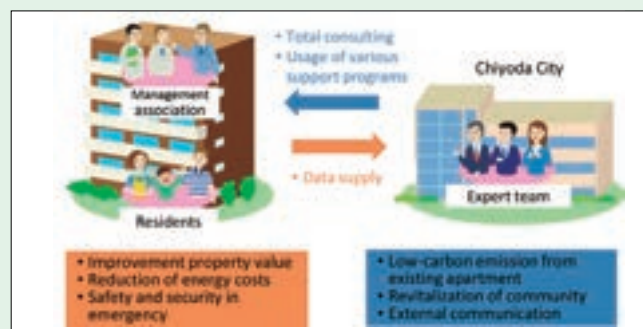
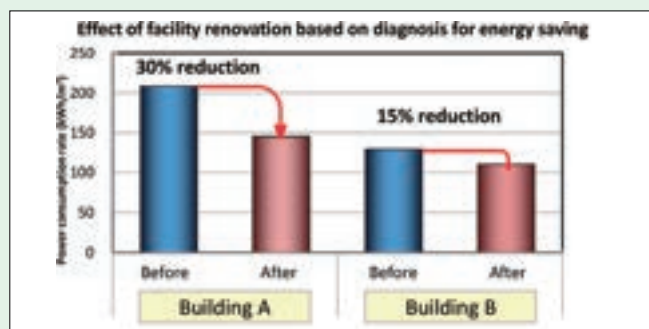
to encourage building owners to actually upgrade their facilities, the ward offers support programs such as subsidies.

[Apartment Category]

Taking into account the characteristics of Chiyoda Ward, in which more than 80 percent of residents live in apartments, Operation Green Stock's target for the ward expanded to include existing apartments, starting from FY2014, with the aim of encouraging a general shift toward smart use of energy (optimization) and energy efficiency.

In FY2015, the ward recruited and selected some model apartments. Through consultation with their management associations and other related organizations, effective methods for a "smart shift" have been looked into, from the perspective of creating, storing and saving energy.

From this point forward, verification of the effects of the model apartments will be conducted. At the same time, the ward will widely promote the outcome, and encourage other existing apartments in the ward to shift to smart energy use.



Asking offices to submit their action plan in consideration of global warming

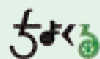
<https://www.city.chiyoda.lg.jp/koho/machizukuri/kankyo/ondanka/kekakusho/index.html> (Japanese text only)



Other (Consideration towards global warming)

Verification tests on the community cycle project

<https://www.city.chiyoda.lg.jp/koho/machizukuri/kankyo/cycle/start.html> (Japanese text only)



Forest management (carbon offset) project in collaboration with provincial cities

<https://www.city.chiyoda.lg.jp/koho/machizukuri/kankyo/ondanka/carbon-offset/index.html> (Japanese text only)



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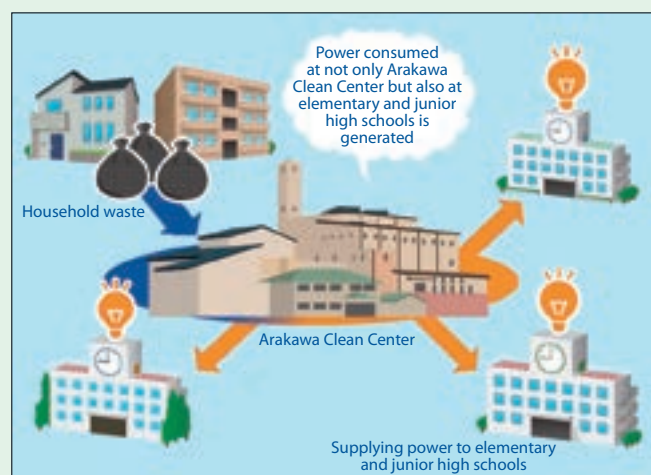
Project to utilize power locally produced at Arakawa Clean Center

<http://www.city.fukushima.fukushima.jp/soshiki/29/saiseikanouenerugi-suisin150409.html> (Japanese text only)



Fukushima City established its “Fukushima City Renewable Energy Implementation Promotion Plan” in February 2015, thereby deciding to actively promote the introduction of renewable energy suitable to the city’s local characteristics through united efforts by the city government, residents and local businesses.

By implementing renewable energy, the city aims at creating a low-carbon and recycling society to prevent global warming and reduce environmental burdens, as it strives to recover from the nuclear power plant crisis and revitalize the community. The city also promotes the idea of building a city that can withstand future disasters or emergencies and seeks to be an “Environ-



mental Model City” full of vitality, contributing to building a society not dependent on nuclear power in the future.

Among the actual initiatives, the city started local production and consumption of power generated at the Arakawa Clean Center. Surplus energy from power generated by using waste incineration heat is supplied to municipal elementary, junior high and other schools (71 schools in total, as of October 2015) since April 2015 via PPS (Power Producer and Supplier). By supporting the local production and consumption of biomass power generation using heat from the incineration of waste, the city promotes the use of cleaner and eco-friendly renewable energy.

The Arakawa Clean Center is also positively engaged in environmental studies with local elementary school pupils in the city and strives to raise awareness of global warming prevention and the establishment of a low-carbon, recycling society with fewer environmental burdens.

Introducing renewable energy generation facilities, etc.

<http://www.city.fukushima.fukushima.jp/soshiki/29/saiseikanouenerugi-suisin150316.html> (Japanese text only)



Other (Improvement of disaster prevention base functions)

Project promoting the introduction of renewable energy

<http://www.city.fukushima.fukushima.jp/soshiki/29/saiseikanouenerugi-suisin150416.html> (Japanese text only)



Project promoting next-generation automobiles

<http://www.city.fukushima.fukushima.jp/soshiki/29/saiseikanouenerugi-suisin14111001.html> (Japanese text only)



Other (Global warming prevention)

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Recycling of earthquake debris based on the Higashi Matsushima City method



Other

Recycling

[Background] Massive tsunami that struck the Higashi Matsushima City following the 2011 Great East Japan Earthquake took the lives of 1,110 residents and swept away or completely or partially destroyed about 70 percent of dwellings.

At that time, a total of 3,258,800 tons of disaster waste, nearly equivalent to more than 100 years' worth of annual household waste in the city, were generated in a single day. Based on lessons the city learned from a series of strong earthquakes that hit northern Miyagi Prefecture in 2003, the city had entered into an agreement concerning mutual cooperation for emergency measures in response to natural disasters with local contractor associations. In accordance with this agreement, the city implemented disaster debris disposal operations.



Demolishing disaster-stricken houses and establishments while sorting out debris

[Initiatives] The greatest characteristic of the city's initiatives is that debris materials were sorted into 14 items at the site during the demolition of devastated establishments and then sent to temporary garbage collection sites (storage yards). In the storage yards, mixed waste was separated into debris and sand by machines and then manually separated into 19 items.

These initiatives enabled the city to reduce its disposal costs to 14.6 billion yen, far lower than the government's estimate of 23.2 billion yen. In terms of



Manual separation of mixed waste (into 19 items)

cost-effectiveness, the city succeeded in carrying out its disposal initiatives more effectively than other disaster-stricken areas.

The manual separation processes for waste materials in the storage yards required increased manpower. This led to the creation of new jobs for local residents, including elderly people and those who lost their possessions or jobs due to the disaster.

Thanks to collaboration among industries (local contractors associations), universities (Tohoku University etc.), government (Higashi Matsushima City) and residents (disaster victims), the disaster waste disposal operations were completed in almost every area of the city. As a result, the city succeeded in realizing the following achievements. Specifically, the city attained a high recycling rate of 97% and introduced the use of the recycled waste as construction material (environmental values), worked on initiatives through close mutual cooperation between relevant persons and business entities (social values), and locally held sufficient funds for the disposal costs (economical values).

It should be possible for every area and region to actually implement these initiatives as long as the appropriate structures are established in advance.

Project to create Quake Restoration Forests and Woods with Healing Effects (Quake Restoration Forest Growth & Forest School Project)

<http://www.afan.or.jp/af-fukkou/fukkou.html> (Japanese text only)



Project to introduce coastal tsunami-monitoring systems

<http://future-city.jp/en/torikumi/higashimatsushima/>



Other (Disaster Management)

Okumatsushima "Kizuna" Solar Park & Higashi Matsushima "Kizuna" Carport Solar Project

<http://future-city.jp/en/torikumi/higashimatsushima/>



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Global warming countermeasures implemented by the city of Hiroshima

<http://www.city.hiroshima.lg.jp/www/contents/1433238293510/index.html> (Japanese text only)



The City of Hiroshima has set a target of “Hiroshima Carbon Minus 70: A Vision for Counteracting Global Warming by 2050” to promote the implementation of global warming mitigation measures. In line with this, it has developed the Hiroshima City Global Warming Countermeasures Regional Promotion Plan and the Hiroshima City Hall Environmental Protection Action Plan, as well as the Hiroshima City Ordinance on the Promotion of Global Warming Countermeasures. The city is taking various initiatives based on these plans and regulations.

[Initiatives regarding residents and business entities]

In May 2015, the city worked out the Hiroshima City Action Program for Global Warming Countermeasures to help residents and business entities in facilitating their initiatives toward greenhouse gas emissions reduction. The action program stipulates some action plans that should be implemented intensively at households, business offices and shops. The city has posted information on the action plans on its website and newsletters, and has held on-site workshop activities concerning the action plans. Through such efforts, the city is enhancing awareness of and furthering initiatives for greenhouse gas emissions reduction.

To control and reduce greenhouse gas emissions from households, the city also has established a program to provide subsidies to households that install home-use fuel batteries for effective use of energy and has strived to promote the spread of such batteries this fiscal year.

[Initiatives taken on by the city]

The city has developed and operated its own environmental management structure to encourage the implementation of energy-saving initiatives and other environmental conservation action initiatives in the city office building.

To save on electricity, the city has been replacing lights in city-owned buildings and facilities with LED lights, which are leased in order to reduce costs at the time of introduction. This fiscal year, LED lights will be installed at nine school buildings and eleven facilities owned by the city.

Furthermore, the city has taken on initiatives toward the adoption of renewable energy. Specifically, the city has promoted the installation of solar power generation equipment at city-owned buildings and facilities, including the MAZDA Zoom-Zoom Stadium (Hiroshima Municipal Baseball Stadium). Since fiscal 2013, the city has lent the roofs of the city-owned buildings and facilities to private business entities seeking to use the roofs to operate solar power generation businesses. By the end of this fiscal year, such solar power generation businesses will be carried out at a total of nine facilities owned by the city.



MAZDA Zoom-Zoom Stadium (Hiroshima Municipal Baseball Stadium)

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Ordinances relevant to the development of a sustainable community through introduction of renewable energy in Iida City

<http://www.city.iida.lg.jp/site/ecomodel/project-79.html> (Japanese text only)



In April 2013, Iida City enforced “Ordinances Relevant to the Development of a Sustainable Community through Introduction of Renewable Energy in Iida City” (hereafter “Local Environment Right Ordinances”).

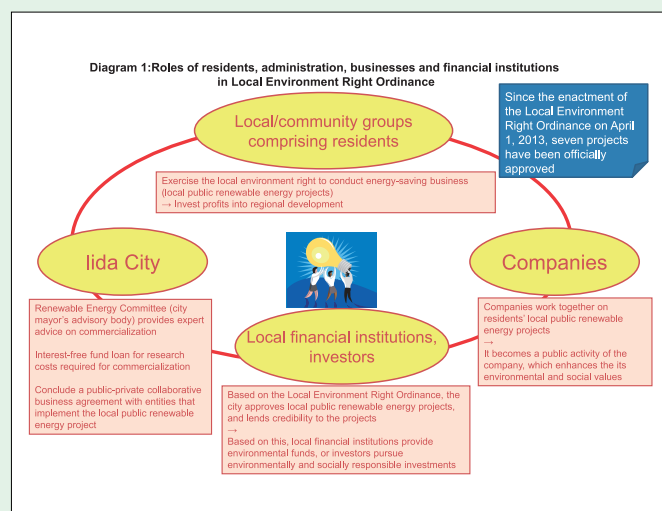
Sunlight, river water and air are resources that benefit the daily life of residents. These resources should first be utilized by locals who live there. They should be utilized in a sustainable manner for communal development as common resources of citizens. Therefore, the city guarantees the local environment right to residents, and when they operate an energy business using this right based on local consensus, the city will offer various forms of support.

For those who seek to exercise the local environment right, the activity must be in harmony with the local environment right and property rights of other residents. On top of this, one needs to “return the public benefit back” to an area that may help residents foster a sustainable community.

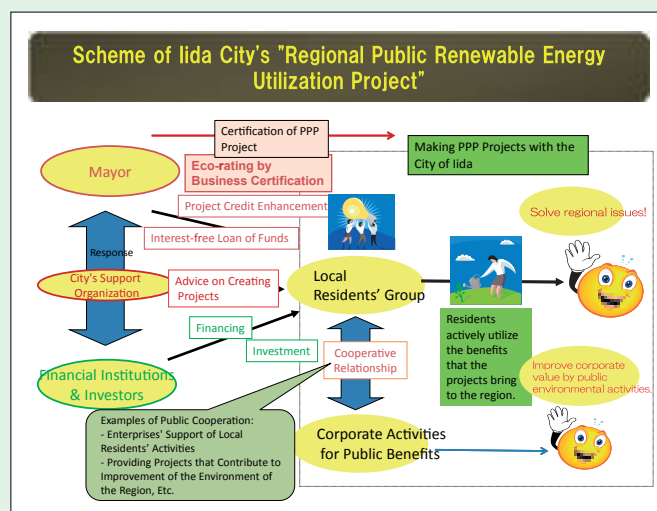
Upon request from a business to exercise the local environment right, “Iida City Renewable Energy Introduction Supporting Committee,” which is an advisory board of the city mayor on Local Environment Right Ordinances, provides advice, proposals and evaluations on the public benefit and the operational feasibility of the project. If it judges that the business meets the requirements of the ordinance, it will report so to the city mayor.

Upon receiving this report, the mayor will announce the contents. This announcement based on the report aims at providing objective and official credibility to the project to make it easier to fund-raise from the market. In cases where multiple companies are involved, the collaborative project also has an effect of enhancing the environmental values of the companies.

Currently, seven projects have taken advantage of the scheme set forth in this ordinance and have started their businesses.



Conceptual diagram of the ordinance



Scheme diagram of the ordinance

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Studying the creation of new power generation/regional energy companies

<http://www.city.ikoma.lg.jp/0000001448.html> (Japanese text only)



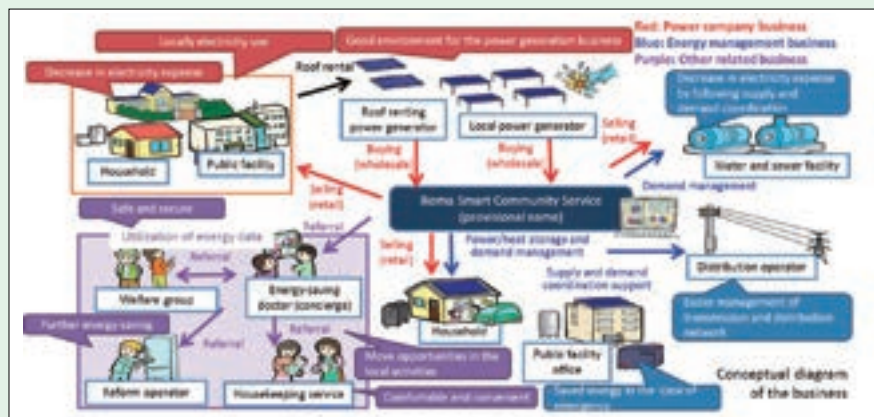
Ikoma, which borders Osaka and Kyoto prefectures, has prospered over the years as a commuter city for Osaka in particular. Making use of its residential features as a model environmental city, Ikoma has been striving to transform itself into a sustainable city, tackling challenges faced by many residential cities, including a low birthrate, a growing proportion of elderly people and disaster prevention.

As a part of its efforts, the city plans to establish a local public corporation that purchases electric power from within Ikoma and sells it to businesses and residents in the city. This public corporation, modeled after “Stadtwerke” (a regional infrastructure service company funded by municipalities), which has taken root in Germany, would be engaged to provide a

variety of community services with functions to realize low-carbon areas and improve resilience. This includes energy-saving services such as demand-response for users and other ESCO (energy-savings company) services monitoring elderly persons utilizing energy data; care prevention; shopping support; parenting support for the younger generation; and the provision of information related to the municipal government, community activities and disasters and evacuation guidelines.

By playing a role as demand-response aggregator making a contribution to system stabilization of the energy transmission and distribution businesses, the public corporation will be studying the possibility of entering into real-time markets and volume markets as an aggregator. These measures, expected to generate effects such as new jobs in the city and local production of energies for local consumption, are also expected to act as a jumpstart for the local economy.

Ikoma City, adopting a motto of “low-carbon, recycle-oriented residential town established through the cooperative participation of citizens, businesses and local governments,” has powerfully been advancing the above-mentioned measures through the cooperation of the business, government, academic and private sectors, all key interests in the promotion of the “Model Environmental City.”



Energy System Sought by Ikoma City

Advancing Smart Communities

<http://www.city.ikoma.lg.jp/0000001448.html> (Japanese text only)



Advancing ICT-utilizing Community Services

<http://www.city.ikoma.lg.jp/0000001448.html> (Japanese text only)



Power Plant Business Jointly Funded by Residents and Dissemination and Promotion of Renewable Energy

<http://www.city.ikoma.lg.jp/0000001448.html> (Japanese text only)



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JCM

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Let's work together to widely promote the installation of Green Walls across the whole city!

http://www.city.itabashi.tokyo.jp/c_kurashi/005/005016.html (Japanese text only)



Itabashi City is working to widely promote the installation of Green Walls mainly based on the four basic measures below.

1. Information transmission

- Registration System for "Let's work together to widely promote the installation of Green Walls across the whole city!"
This system is intended to communicate information concerning Green Walls to those registered with the system. The information includes methods for growing plants, useful tips, and relevant workshop, contest, and event information.

2. Assistance for the growth of Green Walls

- Workshops and consultations concerning growth
The city dispatches instructors to workshops to provide instruction on how to grow Green Walls.
- Cooking classes
The city holds cooking classes to provide instruction on how to cook dishes using bitter melons and loofahs harvested from Green Walls. In the class "Eco Cooking," participants can learn environmentally friendly methods for shopping, cooking, and cleanup for meals.



3. Promotion through events

- Green Wall contests
The city holds contests to judge and recognize great achievements of individuals, groups (companies, organizations, etc.) or public facilities and their respective innovation efforts.
- Tours of Green Walls
The city holds events to offer a tour of Green Walls installed at neighborhood associations, shopping streets, companies and public facilities within the city. This tour is intended to recognize the fact that Green Walls have spread to every corner of residential areas, as well as across the whole city.
- Eco Life Fair and other events
The city promotes public awareness of Green Walls through events related to environmental issues and global warming mitigation and local communities' festivals and fairs.

4. Human resource development and mutual cooperation

- Green Walls Support Club
The club dispatches instructors to growth workshops and cooking classes, provides relevant support services, and offers consultation on and gathers information on Green Walls.

Eco Police Center, an environmental education and study base

<http://itbs-ecopo.jp/> (Japanese text only)



Other (Environmental education)

Itabashi City's Snail Movement "Promise of Snails"

http://www.city.itabashi.tokyo.jp/c_categories/index06006001.html (Japanese text only)



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Disaster-reconstruction Project Harmonious with Nature and the Creation of the "Hill of 1,000-Year Hope"

<http://www.city.iwanuma.miyagi.jp/kakuka/040300/sennnennkibounooka.html> (Japanese text only)



Other
**Disaster
management &
risk reduction**

Tsunami triggered by the Great East Japan Earthquake on March 2011 reached 10 meters in height, yet some residents of Iwanuma city survived the disaster by evacuating to man-made hills near the coast. Incorporating lessons from the experience, Iwanuma city made a plan to create the Hill of 1,000-Year Hope along a coastal area.

The initiative, which aims at reducing damage from similar disasters, involves the creation of 15 hills about 11 meters high along the coast running north to south, enabling people to evacuate in the event of future massive tsunami.

The project also involves the construction of garden paths that are elevated three meters, connecting the hills and planting evergreen broad-leaf trees on the slopes. After years of growth, the trees are expected to be able to serve as "green levees," reducing the impact of tsunamis. As these hills will be covered not with concrete or other artificial materials, but rather with natural materials such as soil and trees, they can continue to protect our hometown for a long time.



The third tree-planting festival at the Hill of 1,000-Year Hope (May 30, 2015)

By using recyclable waste generated by the earthquake inside the hills and for the paths, this project not only reduces waste-treatment costs and CO₂ generated by its transportation, but also, by utilizing the Hill as a disaster-prevention education facility, conveys memories of and lessons from the disaster, as well as individual residents' thoughts and prayers for future generations born 1,000 years from now.

In terms of construction costs, the project is financed by money donated to disaster-hit areas from across Japan, as well as government subsidies for reconstruction from the Great East Japan Earthquake. The invitation for contributions will continue to be open in the future, and securing resources for managing the park will be studied.

So far, six hills have been built (including one existing hill); and a large-scale tree-planting festival is held every year. A total of more than 17,000 volunteers from both inside and outside of the city have participated, planting about 150,000 trees. The remaining hills will be built as scheduled.



The Hill of 1,000-Year Hope (left) and the monument to the disaster victims (right)

Swift Collective Relocation for Disaster Prevention with Active Participation by Citizens (disaster victims)

<http://www.city.iwanuma.miyagi.jp/kakuka/040300/syuudannitenn.html> (Japanese text only)



Other (Compact City, Community redevelopment)

Mega-Solar Project Largest-class in Quake-hit Area (Reconstruction Project)



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Model project for smart disaster-victim public housing

http://www.city.kamaishi.iwate.jp/fukko_joho/fukko_torikumi/fukko_smart/detail/1191468_3130.html (Japanese text only)



Kamaishi City, which formulated the Smart Community Basic Plan for the City of Kamaishi in March 2013, is working to become a Smart City where people can lead a richer life more efficiently with ease.

Kaminakajima Disaster-Victim Public Housing, which became available to the public in April 2015, has actively adopted smart community initiatives for city restoration and reconstruction. In order to develop a more attractive city, it adopts facilities and equipment capable of securing electric power even in emergency situations to enhance its energy independence. In addition, it is an eco-conscious public-housing designed to contribute to energy-saving and CO₂ emissions reduction.

○ Eco-conscious facilities and equipment

The solar-powered water heaters, covering the entirety of the dwelling units, are designed to circulate anti-freeze solutions heated by solar power from and to all

the units so that hot water can be efficiently supplied. The heaters and solar power generation equipment employ renewable energies to reduce CO₂ emissions.

○ Initiatives in preparation for natural disasters

The housing contains an emergency supplies store-house and a meeting facility that can accommodate a large number of people. In natural disasters or emergency situations, the meeting facility, serving as a disaster-prevention base for all local communities, temporally houses the dwellers and neighborhood residents for evacuation. Solar power generation equipment, electric vehicles, power charging and supply facilities, and emergency power generators can be used to secure electric power in the event of a power failure, so as to secure the safety and reassurance of evacuees.



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Area Energy Management System/Smart Center

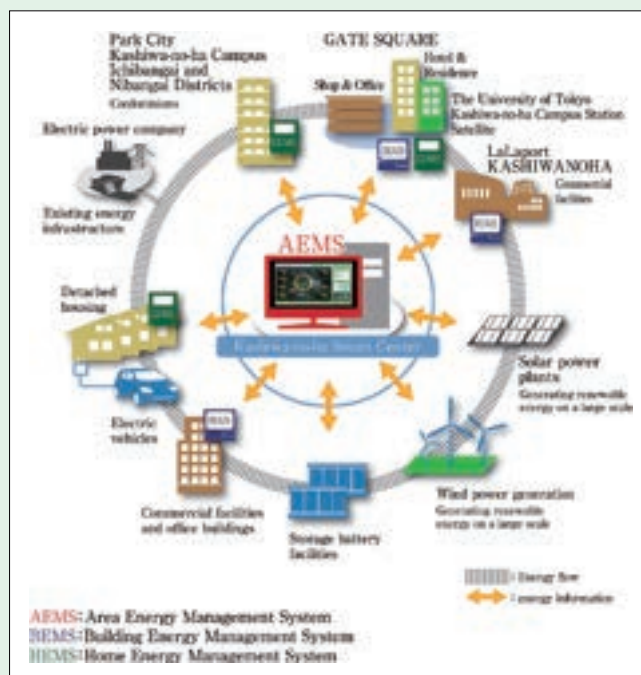
<http://www.kashiwanoha-smartcity.com/en/concept/environment.html>



Buildings in each district combine reliance on a power company's power system and distributed power systems such as solar power and storage cells. Different districts share electricity generated by the distributed power systems in order to reduce the peak electricity consumption of the city as a whole. On weekdays, as demand for electricity in offices increases, LaLaport Kashiwanoha (a shopping mall) supplies electricity to Gate Square (a complex of business facilities and a hotel). On weekends, demand for electricity in commercial facilities increases, so Gate Square supplies electricity to LaLaport Kashiwanoha.

Through these efforts, Kashiwa City aims to cut the peak electricity consumption, thereby contributing to energy saving and decreasing CO₂. At the same time, we anticipate economic benefits such as reducing the total cost of electricity in these facilities.

As a means of strengthening the city's ability to cope with disasters, in the event of a disruption to power company systems, the distributed power-generation and power-storage systems will be used to supply electricity to facilities needed for sustaining people's lives as "Specified Supply." Namely, energy



generated and stored in Gate Square will be supplied to Park City Kashiwa-no-ha Campus Ichibangai District and Park City Kashiwa-no-ha Campus Nibangai District, both collective residences, and it will be used in facilities for common purposes, such as elevators (one for each building), lighting in common spaces, and meeting rooms.

Kashiwa-no-ha Smart Center is situated in Gate Square as a base for the Area Energy Management System. The center is in charge of monitoring electricity in each area, controlling power-generation and power-storage facilities, and adjusting the amount of electricity sent between facilities. The center also has a function to analyze trends in energy consumption for each facility, and provides advice on energy saving in the form of "activity navigation."

Multimobility

<http://www.kashiwanoha-smartcity.com/en/>



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Kawasaki City's Initiative for Green Innovation

<http://eri-kawasaki.jp/english/>

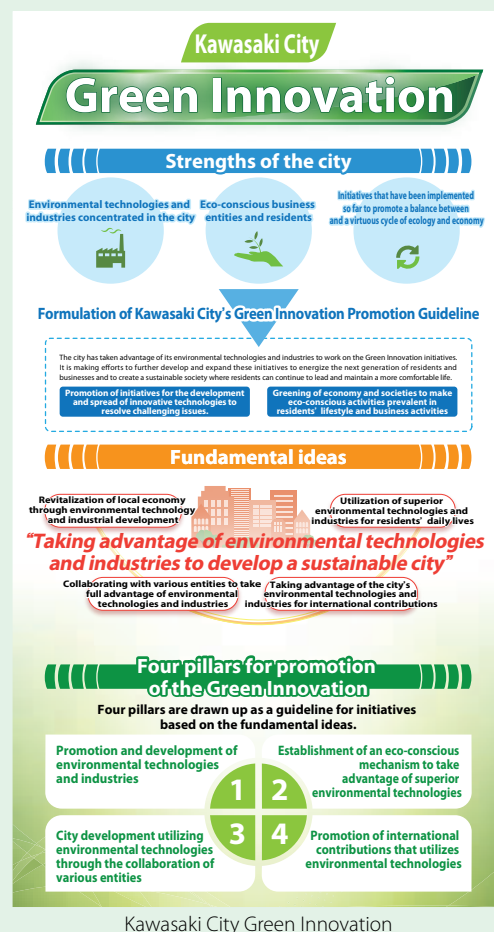


Kawasaki City was founded in 1938, with a population of 48,000. Since then, the city has been a driving force behind industry in Japan. When the city faced serious pollution problems as a result of rapid economic growth, its officials and residents worked together to tackle them. This has made Kawasaki what it is today: an internationally recognized eco-minded model city.

In Kawasaki City's Initiative for Green Innovation, the city has taken advantage of the concentration of environmental technologies and industries in the city — its strength and special features — to further promote balance and a virtuous cycle of ecology and economy, with aims of making international contributions and developing a sustainable society. In 2014, the Green Innovation Promotion Guideline was formulated. Based on the guideline, the city has worked on the following initiatives to actively promote the Green Innovation: the establishment of Green Innovation Network Clusters; linking business entities with the government or support organizations; implementation of projects in collaboration with business entities and the like; and promotion of cooperative research and projects in partnership with the United Nations Development Programme and other international institutes.

<Examples of projects>

- ◇ Assisting with the development of a low-carbon city in Bandung City, Indonesia
- ◇ Assisting with achieving co-benefits to generate energy from waste materials in Penang, Malaysia
- ◇ Assisting with creating eco-conscious models to effectively use water resources in Ba Ria-Vung Tau, Vietnam
- ◇ Trials to verify Japan's first energy-cycling garbage collection system
- ◇ Cooperative demonstrations for self-reliance energy supply systems based on renewable energies and hydrogen



“Low CO₂ Kawasaki Brand” and “Kawasaki Mechanism Certification System”

<http://www.k-co2brand.com/about/english.html>
<http://www.city.kawasaki.jp/en/category/134-5-0-0-0-0-0-0-0-0-0.html>

Environmental Technology Information Collection and Transmission Project (Publication of "Environmental technology transferred from Kawasaki City to the world")

http://eri-kawasaki.jp/english/wp-content/uploads/2013/08/all_pamphlet_english.pdf



Other (Eco-business)

Asia-Pacific Eco-Business Forum

<http://eri-kawasaki.jp/english/event-forum/>

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Energy policies of Kitakyushu City



ENERGY POLICIES OF KITAKYUSHU CITY

Challenging energy issues

Energy policies for climate change measures
Increase in energy costs
Diversification of energy sources, including renewable and new types of energy
Strengthening energy security

Innovations essential to resolve challenging issues

Smart society to enable local communities to flexibly make full use of energies

Generation of various energies, including renewable energy

Realization of a "hydrogen society"

Initiatives Kitakyushu City is working on as a forerunner

Smart community development project in Kitakyushu

Realization of energy management centered on local megawatt power, in which citizens can participate

Promotion project for creation of local energy centers in Kitakyushu

Realization of various energy supply systems (general showrooms)

Hydrogen town in Kitakyushu

Realization of a "hydrogen town," the only one in the world to be located in a city

District Energy Hub Development Promotion Project



LNG import terminals



Offshore wind power generation



Large-scale solar power generation

Hydrogen Town in the City of Kitakyushu

— Pipeline



Hydrogen Station
3kW Battery fuel



Home Center
1kW Battery fuel



Eco House
1kW Battery fuel



Kitakyushu Museum of Natural History and Human History
100kW Battery fuel



Fuel Cell operated home
1kW Battery fuel



Eco Club House
1kW Battery fuel



Kitakyushu Smart Community Development Project

Project for the construction of "Kitakyushu City's Model to Export a Green City"

<http://asiangreencamp.net/eng/>



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Toward promoting the implementation of renewable energy

<http://www.kumamoto-ondankataisaku.jp> (Japanese text only)



Kumamoto City has established a “Low-Carbon Kumamoto City Strategic Plan” toward the realization of a low-carbon city. Heralding the “Realization of energy-saving and an energy-producing city rich in water, greenery and the sun” as part of its strategies, the city strives to promote the implementation of rich solar energy and other renewable energy sources fully utilizing the characteristics of the region.

The following are some examples representative of renewable energy projects introduced in Kumamoto.

◇ Solar power generation

The city granted subsidies to cover part of the costs of installing solar power generation systems with a total power generation capacity of about 20,000kW (annual power generation: about 20,000,000kWh) at a total of 4,457 households.

The city also installed solar power generation systems with a total output of 1,300kW (annual power generation: about 1,300,000kWh) at about 60 public facilities (government buildings, schools, community centers, etc.)



Solar power generation facility serving Kumamoto City Hall (10kW) and Kumamoto Castle

◇ Biomass (waste/digestion gas) power generation

Power is generated when about 200,000 tons of garbage and waste from households, etc. are incinerated at two environmental plants in the city (power generation capacity in total: about 13,500kW; annual power generation: about 68,000kWh), while waste heat (vapor) of about 1,579,000GJ per year is utilized at hot bath facilities in the neighborhood.

Power is generated through utilizing digestion gas that is produced (about 4,160Nm³ per day) during the treatment of household sewage sludge (power generation capacity: 500kW; annual power generation: about 2,800,000kWh). In addition, 2,300 tons of sludge-derived fuel per year is produced from dehydrated sludge of about 16,000 wet tons per year and is supplied to a thermal power plant.



Sewage sludge-derived fuel

◇ Small hydraulic power generation

A small hydraulic power generation system with a power generation capacity of 65.5kW (annual power generation: about 324,000kWh) utilizing a hydraulic pressure difference based on a water level difference of about 29m to distribute tap water from upland areas.

Kumamoto Green Carpet Project

http://www.city.kumamoto.jp/hpKiji/pub/detail.aspx?c_id=5&id=1957&class_set_id=2&class_id=1850 (Japanese text only)



Kumamoto Water Life (Ground-water conservation)

<http://www.kumamoto-waterlife.jp/> (Japanese text only)



Sorted collections of “Specified items” such as fluorescent lamps

http://www.city.kumamoto.jp/hpkiji/pub/Detail.aspx?c_id=5&id=6124 (Japanese text only)



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「DO YOU KYOTO?」 Project

http://doyou-kyoto.com/dyk/index_en.html



Other

(Public awareness)

Kyoto, where the Kyoto Protocol climate treaty was adopted, is striving to promote public awareness of environmental conservation and the implementation of eco-conscious activities, based on the slogan “Do you Kyoto?” In other words, “Are you making efforts to save the environment?”

The city has therefore designated the 16th of every month as “Do you Kyoto? Day,” a day to promote environmentally-friendly activities. On the day, the city is encouraging citizens and business entities to work together on eco-friendly initiatives, such as “No My Car Day” and “Lights down” (turning off lights). In this collaboration, business entities advocating the slogan “Do you Kyoto?” are producing and selling relevant promotional items, including eco-friendly shopping bags and “furoshiki” wrapping cloths. Under close cooperation between the city and private bus and train companies, buses and trains with “Do you Kyoto?” logos or Kyoto’s environmental mascot “Eco-chan” on their exteriors are being operated by these transportation companies.

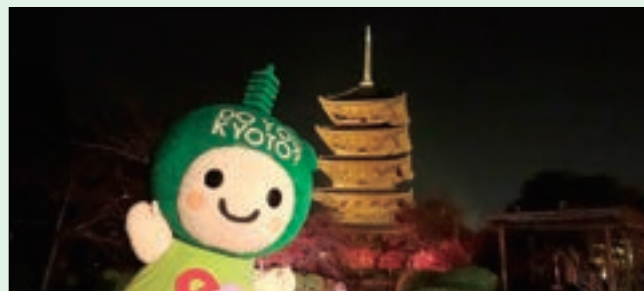


Implementation of “Car-Free Days” to encourage the citizens to use public transportation, rather than their cars

Making the most of “Eco-chan” as a “Do You Kyoto?” characteristic mascot, the city has hosted environment-related events to enhance awareness of the slogan and the importance of global warming mitigation measures.

(1) Project to promote “Children’s Eco-Life Challenge”

In this project, children, who will play leading roles in the future, participate in hands-on experience programs in which they think and act for themselves to deepen their understanding of global warming issues, and keep Children Household Eco-Account Books in each household during summer or winter vacations. These are intended to serve as a review of people’s daily lifestyles from a child’s perspective, and to encourage people to continually lead an eco-conscious life, which helps prevent global warming. To enable children to work on their initiatives



Toji Temple and Eco-chan illuminated with LEDs

efficiently during their school vacations, preparatory study programs are held before the vacations, and programs for review are held after the vacations for 4th graders attending public schools in the city (166 schools in 2014).

(2) Project to shift to an environmentally-friendly lifestyle

To put into practice the 12 perspectives incorporated in the proposals from the Citizens’ Alliance to Consider Environmentally-friendly Lifestyles, the city has been conducting a campaign that helps people shift their lifestyle in cooperation with citizens’ associations and private companies. In addition, the city has conducted a campaign targeting students, with the aim of encouraging them to change their lifestyles. It has facilitated the spread of “On-line Household Eco-Account Books,” and sponsored an initiative “KYO ASA Style” to encourage everyone to become a “morning person.”

(3) Project for “Eco School Districts”

In Kyoto, school districts play a central role in local communities’ activities. To make it possible for the districts to shift to an environmentally-friendly lifestyle and enhance their local capabilities and strengths, the city embarked on the project “Eco School Districts” in the fiscal year 2013. This project is based on the achievements of the low-carbon model district project “Eco School Districts,” which was launched in 2011. The city plans to expand the project to all 222 districts in the city within three years.

As each school district has declared itself among the “Eco School Districts,” the city is helping to enhance environmental awareness and facilitate the spread of eco-conscious activities across all districts while ensuring the independence and diversification of residents.

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Kyoto CO₂ Emissions Trading System

<http://www.kyoto-ets.com/> (Japanese text only)



The Kyoto Protocol climate treaty adopted at The 3rd Session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP3) includes mechanisms to trade emissions allowances among advanced nations, and to utilize the amount of GHG emissions reduction through projects conducted in developing countries toward the achievement of an advanced nation's targets for emissions reduction.

The agreement serves as an effective means of promoting global warming countermeasures. In Kyoto Prefecture, the Kyoto Prefecture Global Warming Countermeasures Ordinance was enacted, and it started the "Kyoto CO₂ Emissions Trading

System" with the Kyoto system in cooperation with the government, economic groups, environmental NPOs, etc. in October 2011.

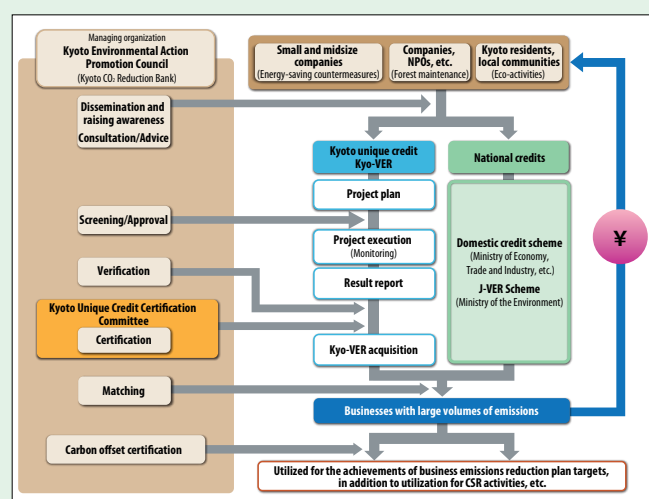
The system aims at not only creating credits (credits unique to Kyoto: Kyo-VER) from energy-saving countermeasures at small and midsize corporations, forest maintenance work conducted by companies and NPOs, eco-activities by Kyoto residents and local communities, etc. but also promoting a reduction in total GHG emissions in Kyoto Prefecture while minimizing the total cost to society by establishing a mechanism to enable businesses with large volumes of emissions to utilize credits to achieve targets of GHG gas emissions reduction plans based on Kyoto Prefecture and Kyoto City Global Warming Countermeasure Ordinances and to take advantage of them for carbon offsets, CSR activities, etc.

The system is also a platform that creates and utilizes diverse credits adapted to Kyoto Prefecture's industrial structures and local characteristics, and promotes initiatives to create and utilize credits unique to Kyoto, supplementing the J-Credit Scheme and other emissions trading systems by different entities.

A total of 145 cases or 5584.5t-CO₂ credits have been created thus far, and they have been utilized to achieve corporations' GHG emissions reduction targets and offsetting GHG gases emitted from the printing of printed matter.



Logo of the Kyoto unique credit, "Kyo-VER"



Flow chart of the Kyoto CO₂ Emissions Trading System

The Earth Hall of Fame Kyoto

<http://www.pref.kyoto.jp/tikyu/1288317993199.html>



Other (Recognition of contribution to environmental protection)

Kyoto Prefecture climate change action officers

<http://www.pref.kyoto.jp/tikyu/suisinin.html> (Japanese text only)



Eco-MEISTER system

<http://www.pref.kyoto.jp/tikyu/ecomeister.html> (Japanese text only)



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Realizing a disaster-resilient town: Introducing renewable energy to public facilities

<http://www.town.mitake.gifu.jp/> (Japanese text only)



The town of Mitake used to have mines for lignite, known as a low-grade and poor-quality type of coal. Even today, many abandoned lignite mines are spread beneath the town's plains, which causes the land to collapse and sink several times a year. This is a serious problem facing the town, since it threatens people's lives and property. In particular, it is anticipated that when a large-scale earthquake such as a Tokai or Tonankai earthquake occurs, national roads and public facilities may suffer severe damage due to land subsidence, which may lead to a breakdown in the energy-supply infrastructure.

To cope with this situation, the town of Mitake is continually working to fill the abandoned mines. At the same time, from an environmental point of view, we also aim to realize a "disaster-resistant and low-carbon society" by promoting the construction of "self-sufficient shelters." Namely, even in the

case of a disaster that disrupts the energy-supply infrastructure, the town will supply energy to designated shelters for a certain period of time, by comprehensively combining renewable energy (such as solar power), innovative energy (such as fuel cell and storage cell), energy saving technology (by use of LED lights etc.), and disaster-resistance techniques (such as the use of water tanks).

Moreover, the town is working to promote renewable energy by offering subsidies to households that install solar-power facilities. In return for the subsidy, the households are asked to register with "share the sun's blessing with your neighbors," a system for supplying electricity to neighbors in case of a disaster. In this way, Mitake is working toward realizing a "disaster-resilient town" through collaboration between the government and residents.



Future image of Mitake Town as an Eco-Model City

Promotion of a sustainable forest management model by adopting the forest management trust system

<http://www.town.mitake.gifu.jp/> (Japanese text only)



Revitalization of public transportation (encouraging people to use public transportation)

<http://www.town.mitake.gifu.jp/> (Japanese text only)



Energy-saving activities for households and offices

<http://www.town.mitake.gifu.jp/> (Japanese text only)



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Initiatives to reduce carbon emissions and reinforce disaster-prevention utilizing waste-processing plants (Japanese text only)

http://www.city.musashino.lg.jp/sesaku_keikaku/kankyoubu/cleancenter_keikaku/index.html



Musashino Clean Center, the only incineration plant in the city, is located close to the main building of the city office and public facilities, namely at the city center surrounded by residential areas.

Thirty years have passed since the plant was built, and the time has come for its reconstruction. After discussions with residents about the need to build a new plant and its location, construction of the New Musashino Clean Center (tentative name) started in FY 2013 on the grounds of the current plant, with a plan to start full operations in April 2017.



Planned image of New Musashino Clean Center (tentative name)

Aiming at securing energy sources in times of disaster and utilizing energy in an effective manner, the New Musashino Clean Center will introduce both waste power generation facilities utilizing waste collected in the city and gas cogeneration facilities utilizing city gas as fuel.

Making the most of these facilities, the center will be able to generate 4,150kW of electricity without relying



New Musashino Clean Center under construction

on power sources in times of disaster, operating on its own. The city is also trying to realize “disaster-resilient facilities” to serve as a base for the cross-supply of energy to surrounding public facilities and evacuation centers.

With regard to the cross-supply of energy, the New Musashino Clean Center will collectively receive electricity, and combined with its power-generating function, it will promote effective and low-carbon energy use with surrounding facilities in an integrated manner.

Musashino City’s efforts are highly regarded by government ministries and agencies, including the Ministry of the Environment and Ministry of Economy, Trade and Industry, for the two functions of promoting a low-carbon society utilizing waste-processing facilities and reinforcing disaster prevention.

Mizu no Gakkou (School of Water)

<https://www.facebook.com/musashinomizunogakkou> (Japanese text only)



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City where you can meet the future: collaborative creation of two “low-carbon model areas”

<http://www.city.nagoya.jp/shisei/category/53-5-15-8-0-0-0-0-0-0-0.html> (Japanese text only)



In order to set a course for achieving a comfortable, low-carbon city, the city of Nagoya is collaborating with its residents and businesses to create an energy-saving city with low environmental impact making use of natural power. These efforts include the proactive reduction of energy consumption and the introduction of natural energies.

Moreover, Nagoya is working on realizing a low-carbon society, and it aims at reducing greenhouse gas emissions by 25 percent from 1990 levels, by 2020. The formation of “low-carbon model areas” is thus positioned as an important policy, and the implementation is highly prioritized.

“Low-carbon model areas” refers to initiatives in specific areas such as in the vicinity of train stations, which aim at realizing a lifestyle in harmony with the natural environment by using advanced low-carbon technology. The initiatives are introduced together with city planning, in the form of redevelopment projects. By showing actual cases of low-carbon towns and lifestyles to residents and businesses in Nagoya, the intention is to facilitate low-carbon development projects throughout the entire city.

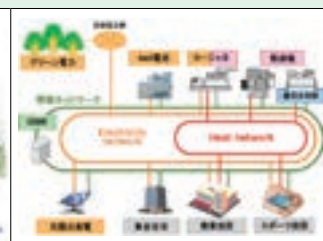
<Two identified projects>

1. Minato Aquils (development project for the Komei area)

Focused on gas cogeneration, this project combines various sources of energy such as green electricity purchased from outside, NAS battery, solar power generation and canal-water heat, through monitoring their usage. By doing so, it has realized the first town in Chubu Area equipped with an electricity, heat, and information network (CEMS: Continuous Emissions Monitoring System).



Predicted completion image
(plane view from the east side of the premise)



Energy Management
※東邦ガス株式会社ホームページより

2. Nishiki 2-chome low-carbon area town planning project

The Nishiki 2-chome Town Planning Council formed various project teams, and many different entities such as businesses and residents collaborated to promote town planning targeted at existing town areas. For instance, it aims at constructing a share house by jointly rebuilding old houses, as well as decreasing traffic by extending pedestrian-only streets.



Future Vision
※錦二丁目まちづくり連絡協議会 / マスタープラン策
定委員会・マスタープラン作成企画会議「これからの
錦二丁目長者町まちづくり構想 (2011-2030)」より



Green wall in built-up area

Mizunowa Fukkatsu 2050 Nagoya Strategy (2050 Nagoya Strategy for revival of water circulation)

<http://www.city.nagoya.jp/kankyo/page/0000012024.html> (Japanese text only)



Solar power generation business by lending roofs

<http://www.city.nagoya.jp/kankyo/page/0000058274.html> (Japanese text only)



Scheme to recognize ecological offices

<http://www.city.nagoya.jp/kankyo/page/0000011823.html> (Japanese text only)



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Twelfth Sector Industrialization

<http://www.city.niigata.lg.jp/shisei/seisaku/12th-indus/index.html> (Japanese text only)



Other

(Rural area)

Niigata is working toward becoming a city where urban and rural areas can cooperate to promote a virtuous cycle of all sorts of valuable resources, including human resources, food culture and energy. The city is also striving to create its own values to make itself more distinct. All of these efforts are intended to help further drive the city's future prosperity. By being engaged in environmental conservation in rural areas, the city is making the most of its abundant resources, with the aim of facilitating coexistence between urban and rural areas for mutual benefit.

Niigata City is blessed with a variety of resources in its rural areas, such as extensive agricultural lands owned by the city, areas

rich in biodiversity near human settlements (called "satoyama" in Japanese), and other natural environments.

For the "Twelfth Sector Industrialization" project, the city fully utilizes these diversified resources in the public welfare and education fields, which are closely tied to daily life, while promoting the sixth-sector industrialization of agriculture (a scheme advocated by the government, in which those classified as traditional primary industries, for example farmers, are encouraged to engage in food processing, distribution and marketing, in addition to farming). This project is thus aimed at creating new values, industries and jobs, as well as developing a city where all residents can show a strong attachment to and be proud of their local communities and can lead active lives in good health, securely and safely.



Image of Twelfth Sector Industrialization



IKUTOPIA SHOKU HANA

Base to transmit and exchange food and flower brands

Promotion of the active use of agricultural biomass

<https://www.city.niigata.lg.jp/kurashi/kankyo/saiseikanou/dennen-shigen/index.html> (Japanese text only)



Reconstruction of public transportation service

<http://www.city.niigata.lg.jp/kurashi/doro/kotsu/newsystem/index.html> (Japanese text only)



Promotion of the development of "Smart Wellness City" where people can lead healthy, happy lives

<https://www.city.niigata.lg.jp/iryo/kenko/smartwell/kenkoutosidukuri.html> (Japanese text only)



Other (Health, quality of life)

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JCM

Future City

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ICLEI

C40

Cooling and heating equipment utilizing geothermal heat pumps installed at public facilities

http://www.town.niseko.lg.jp/machitsukuri/kankyo/post_165.html (Japanese text only)



Tourism and agriculture are the key industries of the town of Niseko, with both supported by a rich natural environment. Based on the belief that the natural environment is the key to the town's prosperity, the town has made an exclusive effort to work on its environmental policies.

With regard to renewable energies, the town has actively introduced geothermal heat pumps to public facilities. There is great thermal demand in the town, where the average annual temperature falls to as low as about 7 degrees Celsius, as thermal energy is required for supplying hot water and heating in winter.



Niseko Town Center

Niseko Town Center, located at the center of the town, is one of the public facilities utilizing geothermal heat pumps. The multi-purpose facility provides a venue to accommodate a wide variety of events ranging from interactive and cultural programs for residents to international conferences, as well as seminars



Geothermal heat pumps installed in the air house of Hokkaido Niseko High School

and training programs. When the center was largely renovated in 2012, geothermal heat pumps were installed. The pumps take underground heat from 31 boreholes 80 meters deep to supply thermal energy, which is used to heat the entire facility and partially to cool the space. Although the total floor area of the center became about 1.4 times greater after the renovation, the amount of CO₂ emissions per unit area was reduced to about half.

Meanwhile, Hokkaido Niseko High School has adopted an "air house" utilizing geothermal heat pumps, in which the students grow vegetables in winter the same way as they do in the summer. The students are able to farm all year round using the air house.

Geothermal heat pumps are also installed in local community FM station buildings, Arishima Takeo Memorial Museum, and care homes. The city plans to actively introduce natural energy such as heat pumps to newly-built and renovated public facilities.

Initiatives for water environment preservation

http://www.town.niseko.lg.jp/machitsukuri/kankyo/post_80.html (Japanese text only)



Improvement in recycling rates through garbage separation, and "closed-type" final waste disposal sites

<http://www.town.niseko.lg.jp/machitsukuri/kankyo/syobunjo.html> (Japanese text only)



Initiatives for landscape preservation

<http://www.town.niseko.lg.jp/machitsukuri/keikan/keikan.html> (Japanese text only)



Other (Landscape)

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C40

Formulation of a project to develop a low-carbon city in Ho Chi Minh based on JCM

<http://gec.jp/citycoop/osaka-hcm-lcc/en/index.html>



The City of Osaka is cooperating with private companies based in Osaka and other cities in the Kansai region to develop low-carbon cities mainly in Asia. The city exchanged a memorandum of understanding (MOU) on low-carbon city development with Ho Chi Minh, Vietnam in 2013. To help Ho Chi Minh grow in a sustainable manner, Osaka, which possesses extensive know-how with regard to city management and development, and private companies possessing advanced technologies have put together a team to facilitate the transfer of the technologies and systems of the framework and infrastructure industries and to provide comprehensive policy support to Ho Chi Minh.

Based on the MOU, Osaka has worked with Global Environment Centre Foundation (GEC) to help Ho Chi Minh develop itself into a low-carbon city, working under the framework of the Joint Crediting Mechanism (JCM) agreed upon by the Japanese and Vietnamese governments. Specifically, Osaka is striving to formulate private-public partnership projects and assist with setting up a climate-change measures action plan.

Ho Chi Minh has identified 10 fields, including Land Use, Energy, Public Transportation, Water and Waste Materials, as targets of the climate-change measures action plan. Utilizing its knowledge and experience, Osaka worked with private companies to formulate a list of proposals concerning about 70 projects covering the above-mentioned fields, in which the

challenging issues and needs of Ho Chi Minh were reflected. The list was submitted to Ho Chi Minh with a view toward the formulation of a project for developing a low-carbon city.

In Ho Chi Minh City, a total of four JCM-based projects in the fields of Energy, Public Transportation and Waste Materials have been launched so far. For the fiscal year 2015, Osaka is carrying out industrial plant energy-saving projects and inspection projects for industrial solar power generation in order to embark on other projects.

The City of Osaka will continue to share its experience, technologies, and know-how and encourage the formation of private-public partnership projects based on JCM through mutual cooperation with Ho Chi Minh.



Central area of Ho Chi Minh City, which has continued to grow



Ho Chi Minh City and Osaka City International Symposium for Developing Low Carbon City

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JCM

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C40

Spread & Use of Hyper Energy Stations

<http://www.city.saitama.jp/001/009/004/index.html> (Japanese text only)

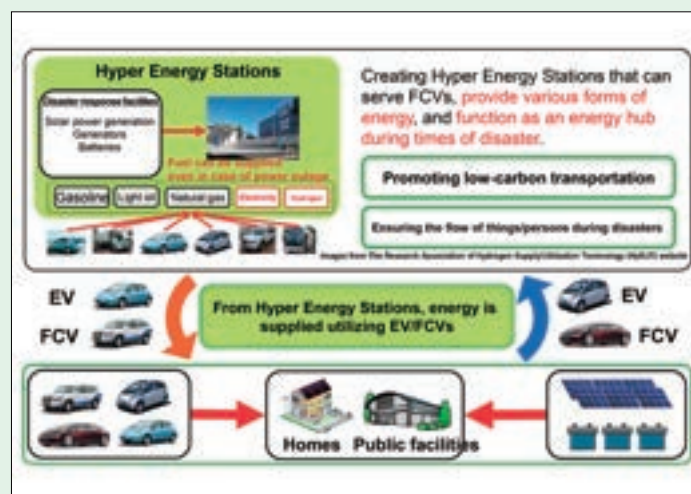


Since FY 2005, Saitama city has been striving to popularize “compressed natural gas vehicles” ; and since FY 2009, as a part of its unique efforts to spread electric vehicles, it has promoted the “E-KIZUNA Project,” as well as promoted low-pollution, low-carbon regional transportation.

After the Great East Japan Earthquake on March 11, 2011, the city was designated by the government as special economic zone. Incorporating lessons learned from the disaster, the city joined the “Special Next-Generation Vehicles/Smart Energy Zone” project, and has been making efforts to establish a supply system for various types of energy for transportation during the early stages of an emergency, through the development of Hyper Energy Stations.

In FY 2014, as a part of the introduction of Hyper Energy Stations, the city installed high-pressure water electrolysis equipment at a waste incineration plant and external power-supply facilities enabling replenishment charging from fuel-cell vehicles to storage batteries at elementary schools expected to serve as evacuation centers. It has also established a system to produce hydrogen by utilizing a power source unique to the region (power generation using waste) and tap water, to offer hydrogen as energy for fuel-cell vehicles during normal times, and to utilize it through fuel-cell vehicles as a precious energy source at evacuation centers during times of disaster.

Saitama city is proud of its endeavors to create a model for realizing the utilization of fuel-cell vehicles that can be implemented in any municipality in Japan at such waste incineration plants, which most municipalities have, sending a message across Japan and around the world.



Policy : Popularization and Utilization



Implementation : Example of usage in city

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JCM

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C40

Harumidai Eco Model Town Development Project

<http://www.city.sakai.lg.jp/kurashi/gomi/ondanka/harumidaiecomodel/index.html> (Japanese text only)



For this project, the city invited business entities to develop eco-friendly, low-carbon residential housing areas at the former sites of elementary schools that were closed due to school integration. The areas are designed to offer comfortable living environments and spaces, as well as enhance the residents' quality of life. This project has enabled the city to realize Net Zero Energy Houses (ZEH) and create an Eco Model Town with excellent environmental performance.

To realize ZEH, any one or a combination of the following equipment and devices was introduced to all dwellings: Solar power generation systems, lithium-ion storage batteries, highly efficient water heaters, household fuel batteries, Home Energy Management Systems (ERMS), LED lighting, and external power outlets for charging electric vehicles. In CASBEE Sakai, all dwellings acquired the highest grade of "S."

As part of initiatives to develop a sustainable town, the city established a housing-complex association enabling residents to take a lead in managing the town independently. This has helped maintain a high-quality residential environment and enhance the town's value. The meeting places, serving as a disaster-prevention base, are equipped with solar power generation equipment, large storage batteries and "Vehicle to Home" (V2H) systems. Large rainwater gathering tanks are installed to secure water for daily living, food is stored for emergencies, and benches have ovens or toilet functions installed. The whole town has realized the installation of LED street lights and the burying of power lines underground.



ing, food is stored for emergencies, and benches have ovens or toilet functions installed. The whole town has realized the installation of LED street lights and the burying of power lines underground.

As a result, the city has achieved the development of a low-carbon town and succeeded in creating an additional value for sustainable development of a town resistant to disasters.

Through this project, the city is working to install solar panels in each household so as to promote the spread of "Solar Power Generation Station within a Town." With CO₂ emissions from general households having been on a rising trend, the city is aiming at spreading the achievements of its initiatives for wider implementation of energy-saving and energy-generating equipment at homes within and outside the city.

Project for combined use of recycled wastewater

http://www.city.sakai.lg.jp/shisei/koho/hodo/hodoteikyoshiryo/kakohodo/teikyoshiryo_h26/teikyoshiryo_h2610/1029_01.files/1029_01.pdf (Japanese text only)



Sakai Community Cycling Project

<http://www.city.sakai.lg.jp/kurashi/doro/jitensha/comckaishi.html> (Japanese text only)



Osaka Bay Area, Sakai Next-Generation Energy Park

<http://www.city.sakai.lg.jp/kurashi/gomi/ondanka/energypark.html> (Japanese text only)



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ICLEI

C40

Transformation of people's lifestyles through the Sapporo Smart City Project

<http://www.city.sapporo.jp/kankyo/smartcity/index.html> (Japanese text only)



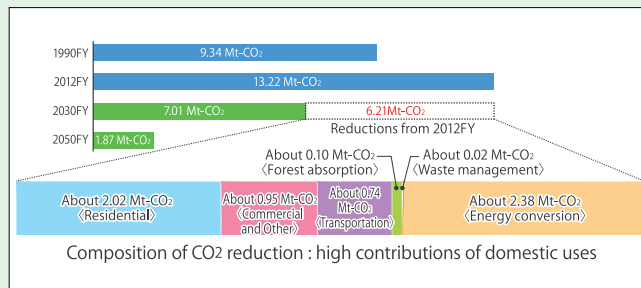
Sapporo City is encouraging its residents to adopt smarter lifestyles to reduce greenhouse gas emissions in households.

This initiative is called the “Sapporo Smart City Project,” and it is aimed at raising people’s awareness, with the city’s mayor himself taking the initiative to advocate a way of life to “enjoy” saving energy and electricity in a conscientious and efficient manner.



Poster to raise awareness

This project includes the following activities: advisory services that propose a low-carbon lifestyle to households; environmental education for children; “Environment Plaza Sapporo,” which is an environmental event targeted at residents, with exhibitions by corporations, etc.; and a call for reducing waste and increasing use of



Greenhouse gas reduction target

public transportation.

Moreover, while Sapporo has a population of 1.9 million, it is a cold, snowy city where total snowfall can reach as much as five meters, unique in the world. It thus faces an issue of large energy consumption (mainly kerosene) used for heating and supplying hot water in the winter. To address this, the city provides subsidies to households that introduce energy-saving or energy-recycling equipment such as highly efficient hot-water supply and heating systems or solar-power systems. It also provides subsidies for the construction of the highly heat-insulating and highly airtight housing.

Through these efforts, Sapporo aims to help its residents adopt a low-carbon lifestyle, and thereby reduce its greenhouse gas emissions by 25 percent from 1990 levels by 2030.

Project to promote highly heat-insulating and highly airtight housing based on Sapporo Next-Generation Housing Standard

<http://www.city.sapporo.jp/toshi/jutaku/10shien/zisedai/zisedai.html> (Japanese text only)



Constructing the city-center energy network through supplying local heat

<http://www.city.sapporo.jp/kikaku/downtown/energy-index.html> (Japanese text only)



Project to support the promotion of Sapporo-style smart factories

<http://www.city.sapporo.jp/keizai/kensetsu/smart-factory.html> (Japanese text only)



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JCM

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City

ICLEI

C40

Creation of an energy-autonomous city



Based on the experience and the lessons learned from the Great East Japan Earthquake in March 2011, Sendai City is promoting the construction of an energy-autonomous city that can contribute to the promotion of a low-carbon city and increase disaster-resistance by securing energy supply sources in preparation for future disasters or accidents.

(1) Three directions for creating an energy-autonomous city:

1) "Creation of distributed energy sources resistant to disasters and with high energy efficiency"

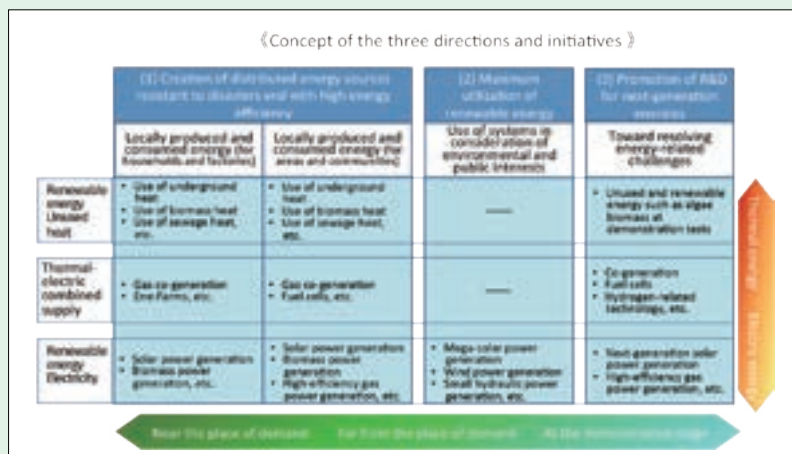
At the level of households and offices, in addition to areas and communities, renewable and other energies are generated independently or within the region, creating energy sources to be used by residents.

2) "Maximum utilization of renewable energy"

Sendai City consideration environmental and public interests promotes and support the use of mega-solar and other power generation systems far from places where the power is in demand.

3) "Promotion of research and development of next-generation energies"

The research and development of algae biomass at the demonstration stage and other next-generation energy is promoted.



(2) Actual initiatives to promote the creation of an energy-autonomous city:

1) Subsidy to promote energy generation installation

When an energy provider, acquires energy creation facilities or R&D facilities for next-generation energy, the municipality will provide a subsidy.

2) Promotion of joint research on energy with private businesses or entities

When an energy provider, studies the possible commercialization of energy creation facilities or R&D of next-generation energy within the city, the city of Sendai will actively engage in joint research with private businesses, etc. to support such commercialization.

Implementation Project for Disaster-Prevention Type Photovoltaic Power Supply System

http://www.city.sendai.jp/business/d/kankyo_01.html (Japanese text only)



Eco Model Town Promotion Project

<http://www.city.sendai.jp/business/d/ecomodel.html> (Japanese text only)



Algae Biomass Project

<http://www.city.sendai.jp/business/d/sourui.html> (Japanese text only)



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Eco-Model City

ICLEI

C40

Creation of a sustainable renewable-energy society making the most of forest resources



The town of Shimokawa is located in northern Hokkaido, and with forests covering about 88 percent of its area, forestry is a major industry. Since forests ceased to be state-owned in 1953, the town has promoted sustainable recycling-oriented forest management, and endeavored to develop an industry that makes the most of its forest resources, as well as create jobs. As it is very cold and snows heavily in Shimokawa, residents rely heavily on fossil fuels for heating and hot-water supply. As a result, CO₂ emissions are higher and fuel is more expensive compared to towns in other regions.



Shimokawa started producing woody biomass fuels utilizing forest debris and scrap from saw mills in town, and in 2004 started a project to introduce biomass boilers to town-operated facilities. In addition to the installation of individual biomass boilers, the town



created in 2009 a regional heat supply system (district heating) in areas surrounding the town office, supplying heat to elementary schools and hospitals. Currently, with 11 boilers operating at 10 facilities, about 60 percent of thermal demand at all public facilities in Shimokawa is supplied by locally-produced biomass energy. Also, the town has created a fund utilizing savings from fossil fuel costs (¥17 million) through the utilization of woody biomass. Half of the fund is used for the renewal of biomass facilities and the other half for parenting support in the region.

Shimokawa has been trying to accelerate a shift toward renewable energy looking toward 2030. This shift involves promoting the introduction of biomass boilers at private facilities; improving technologies enabling the installation of a cogeneration system; making such efforts as expanding so-called passive house-type housing complexes using local materials; and realizing the full-scale self-supply of energy.

Establishing a Social Model for Dealing with the Rapidly Graying Society – Ichinohashi Bio Village Initiative

<https://www.town.shimokawa.hokkaido.jp/gyousei/kankyomirai/keikaku2012.html> (Japanese text only)



Other (Collective living & Community service)

Supporting Environmental Practices Led by Residents

<https://www.town.shimokawa.hokkaido.jp/gyousei/kankyomirai/keikaku2012.html> (Japanese text only)



Other (Citizen Participation, Education)

Sustainable Forest Management and Full Utilization of Forest Resources

<https://www.town.shimokawa.hokkaido.jp/gyousei/kankyomirai/keikaku2012.html> (Japanese text only)



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C40

Shinchi Town – Towards Environmentally and Industrially Symbiotic Reconstruction

<http://www.shinchi-town.jp/> (Japanese text only)



Other

(District energy system)

□ Shinchi Town Smart Hybrid Network Plan

In coordination with ongoing infrastructure reconstruction projects, Shinchi Town is developing an ICT network to address issues about the environment, declining birthrate and aging population. The town promotes a community demonstration project as a recovery model that enhances the values of the environment, society and economy. By developing the interactive Shinchi Town Smart Hybrid Network that supports the local energy and aging community, Shinchi Town promotes sharing of information on daily life and recovery, in order to encourage energy-saving conducts and assist recovery of people's life including support for elderly people.



□ Town planning around the station and local energy project

An urban zone reconstruction project is under way in an area of about 24 ha around JR Shinchi Station which had been destroyed by the tsunami of the Great East Japan Earthquake. At the same time, the possibility of natural gas usage in the area is expanding because of the Soma Port LNG Project. Shinchi Town is investigating local energy business opportunities together with town planning around the station, in order to realize co-existence between the environment and industry.

With the natural gas branched from the pipeline to be installed on the east side of the station area, Shinchi Town is aiming for commercialization of an autonomous and distributed local energy system by a co-generation system that supplies heat and electricity to nearby facilities, as well as by a tri-generation system to supply CO₂ to the agricultural production facilities.



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Promotion of rainwater utilization

https://www.city.sumida.lg.jp/kurashi/kankyou_hozen/amamizu/index.html (Japanese text only)



In recent years, in cities with concrete or asphalt surfaces, most of the rainwater does not penetrate into the ground, but rather flows into the sewage systems. At the same time, cities drawing water from dams built upstream can easily suffer water shortages when it does not rain upstream, even if it rains in the city.

To address this problem, Sumida city has been making efforts for more than 30 years to collect rainwater in the city and effectively utilize it as a valuable resource.

Rainwater is natural and pure. By removing substances and other material that the water absorbs from the air or from roofs, it can be used in various ways as highly clean water for daily living.



Rainwater utilization system



Rojison, rainwater storage tank in the city

Currently, Sumida incorporates rainwater usage in all public buildings newly constructed by the city. In addition, a city ordinance and other regulations mandate buildings over a certain size to utilize rainwater; and the city has established a system to subsidize the installation of water storage tanks. As a result, the utilization of rainwater is widely practiced all over the city.

With the law regarding the promotion of rainwater use which came into effect in 2014, the central government has also started to actively introduce rainwater utilization. Under such circumstances, it is expected that Sumida will play an important role as a leading municipality in terms of rainwater utilization.

Green Promotion

https://www.city.sumida.lg.jp/kurashi/kankyou_hozen/midori/index.html (Japanese text only)



Promotion of Global Warming Prevention

https://www.city.sumida.lg.jp/kurashi/kankyou_hozen/ondanka_bousi/index.html (Japanese text only)



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Tokyo Cap-and-Trade Program

http://www.kankyo.metro.tokyo.jp/en/climate/cap_and_trade.html



In April 2010, the Tokyo Metropolitan Government implemented the Tokyo Cap-and-Trade Program: a mandatory program designed to reduce the total CO₂ emissions in Tokyo. Targeting not only industrial facilities but also commercial sector buildings, it is called the world's first urban cap-and-trade program.

The program's major features are 1) regulations that are based on an absolute cap, not an intensity target; 2) compulsory participation in emission reduction; 3) clearly established rules for monitoring, reporting and verifying CO₂ emissions; and 4) including an emission trading scheme adding the program's flexibility and incentives. This is a significant milestone to strengthen climate change measures in Japan.

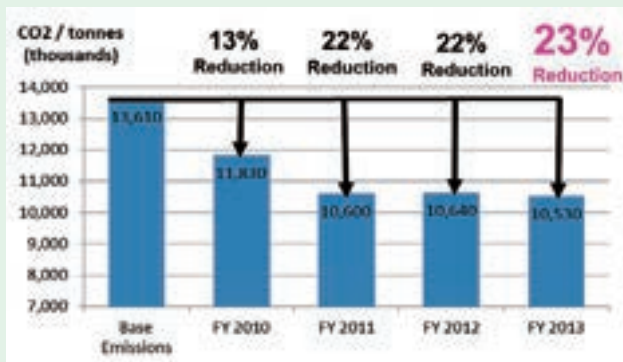


Chart 1

The first five-year compliance period has finished in FY2014; its remarkable results are shown in Chart 1. Total emissions from covered facilities (approx. 1,300 buildings and plants) were already reduced by 23% from base-year emissions in FY 2014, which is a significant level considering their compulsory reduction rate was set at 6 or 8%. Various improvement efforts, including retrofitting using new technology as well as operational improvements, have been successfully implemented. One notable example is the significant increase in LED lighting installations, which is shown in Chart 2.

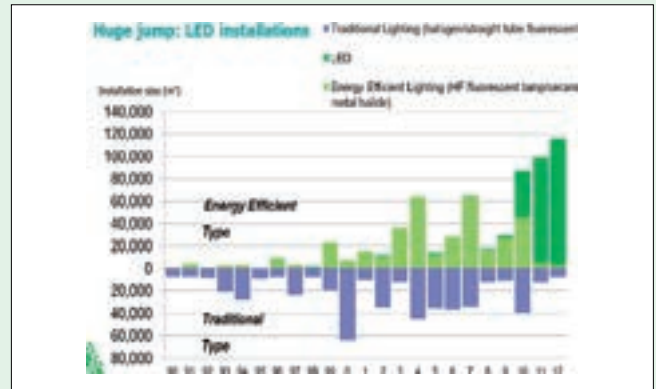


Chart 2

Other Measures

Tokyo has implemented comprehensive measures in the building sector (Chart 3). The following links are examples:

1. Carbon Reduction Reporting for Small and Medium Sized Facilities
http://www.kankyo.metro.tokyo.jp/en/climate/small_report.html
2. Tokyo Green Building Program (for new buildings)
<http://www.kankyo.metro.tokyo.jp/en/climate/build.html>
3. District Plan for Efficient Energy Use
<http://www.kankyo.metro.tokyo.jp/en/climate/plan.html>



Chart 3

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Future City

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ICLEI

C40

Project to establish LRT Networks

<http://www.city.toyama.toyama.jp/toshiseibibu/romendenshasuishin/romendensha.html> (Japanese text only)



Toyama City has faced challenging issues in its local communities, such as the decline of the city center and rise in city management costs due to extensive expansion of urban areas, as well as dwindling public transportation services resulting from residents' excessive dependence on automobiles. To tackle these issues, the city has worked on various projects in accordance with its main policy of developing a more compact city with a focus on public transportation. As the leading project, the city is working toward the full establishment of light rail transit (LRT) networks.



Toyama Light Rail

In this project, JR Toyama-port Line, which was seeing a decrease in the number of passengers, has been transformed into Japan's first authentic LRT "Toyama Light Rail" funded by the local government and run by a private company. The tracks for trains running in the city have been extended and connected to form loop lines, and the line for LRTs operating on the south side of Toyama Station has been connected to that for LRTs on the north side of the station under the elevated structure of Toyama Station against the backdrop of Hokuriku Shinkansen Line coming into



LRT Network

operation. The final goal of this project is to establish a 25.3-kilometer-long LRT Network in the future.

This project, which is under way, has delivered concrete results, such as a significant increase in the number of passengers. This has gradually led to the following achievements: a reduction in CO₂ emissions due to a shift from the use of automobiles to LRTs; the creation of opportunities for elderly people to venture outside; a rise in new housing starts along the route; and an increase in the number of people visiting tourist attractions along the route.

This project is also a key to the city's goal of becoming resistant to shocks (crises) and stress (threats).

Project to promote a resilient city



Project to promote an environmental model city

<http://www.city.toyama.toyama.jp/kankyobu/kankyoseisakuka/ondankataisakukikaku/kankyomoderutoshi.html> (Japanese text only)



Project to promote an eco-town

<http://www.toyama-ecotown.jp/> (Japanese text only)



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Project to encourage the spread of Smart Houses through subsidies and tax breaks

<http://jscp.nepc.or.jp/en/toyota/index.shtml>



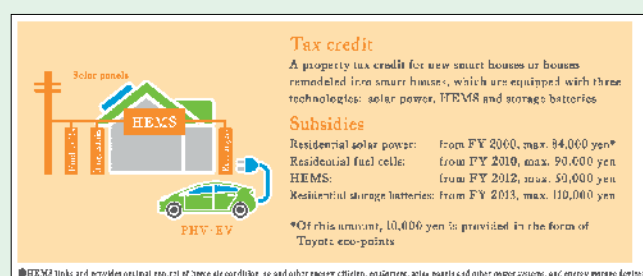
Toyota City is aiming to transform from an automotive city to one of the world's leading eco-conscious cities where everyone can lead a comfortable life at his or her own pace in a low-carbon society while taking into account a reduction of wasteful consumption. To this end, the city has strived to encourage the spread of Smart Houses as a part of its initiatives.



Smart house

Toyota City is the first city in Japan to introduce the Smart House Tax Break system. Residents who build new Smart Houses, which come fully equipped with solar power generation panels, home energy management systems (HEMS), and storage batteries, or residents who install these systems

and devices in their current dwellings, are exempted from half of the municipal real-estate tax on the buildings. In addition, the city provides special subsidies through the "Eco-Family Support Subsidy Program" to assist households with installing home solar power generation systems, home fuel battery systems, HEMS and home lithium-ion storage battery systems.



Encouraging the spread of smart houses

Through these initiatives, the city seeks to encourage the spread of Smart Houses to reduce CO₂ emissions from households, and develop a low-carbon society. Smart Houses, which are equipped with solar power generation systems and storage batteries, are designed to secure power sources day and night in the event of natural disasters. Also included in Smart House are next-generation vehicles, such as electric vehicles (EV) and plug-in hybrids (PHV), the batteries for which can be used as power supplies. In this regard, Smart Houses are highly resistant to natural disasters.

100-year Plan for Growing Forests in Toyota City

<http://www.city.toyota.aichi.jp/shisei/gyoseikeikaku/sangyo/1007611.html> (Japanese text only)



Establishment of low-carbon public transportation system (Ha:mo)

<http://www.toyota.co.jp/jpn/hamo/location/toyotacity/> (Japanese text only)



Toyota City Renewable Energy Center

<http://www.city.toyota.aichi.jp/shisetsu/sodan/1010357.html> (Japanese text only)



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Formation of an integrated approach model block

<http://www.city.tsukuba.ibaraki.jp/14215/14284/9593/009622.html> (Japanese text only)



By moving forward with a leading project in an area under development along the Tsukuba Express Line and through local energy management networks, Tsukuba City is developing a versatile and comprehensive method for creating a high-quality urban environment and a new community. Individual technological elements such as mass and concentrated implementation of solar power generation, rechargeable batteries, as well as community formation know-how to support the method, are approached so that individual elements can be tailored to match the characteristics of different places.

In particular, the formation of a low-carbon model block in the “Northwestern Block of the Katsuragi Area,” based on an integrated approach, is already in progress.

In FY2013, Daiwa House Industry Co., Ltd., NTT Urban Development Corporation and the City of Tsukuba concluded an “Agreement on the Promotion of Residents-driven ‘Sustainable Community’ Plan to Materialize Tsukuba Environmental Style of ‘SMiLe.’” Currently, there are 175 detached houses installed, each equipped with solar panels, a storage battery, a fuel cell, and HEMS, as well as three condominiums with BEMS.



Conceptual drawing of model block

Furthermore, cutting-edge know-how and the utilization of leading-edge low-carbon facilities at public facilities has been proposed, and to realize achievements both internally and externally, a solar shelter will be installed on a path exclusive for cyclists and pedestrians in the model block.

In addition, a plan is under way to implement low-carbon facilities at a municipal integrated elementary and junior high school, with the aim of building a “low-carbon town” that covers the entire block.

Tsukuba City Ultra-small Mobility Project

<http://www.city.tsukuba.ibaraki.jp/14215/14284/9593/016277.html> (Japanese text only)



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Yokohama Smart City Project

<http://www.city.yokohama.lg.jp/ondan/english/yscp/>



In 2010, Yokohama City was nominated by the Ministry of Economy, Trade and Industry as one of the Next-generation Energy and Social Systems Demonstration Areas. Since then, the city has been promoting the Yokohama Smart City Project (YSCP) demonstration projects. In cooperation with Japan's 34 leading companies in the fields of energy, electronics, and construction businesses, Yokohama City has introduced the

system to optimize the energy supply-demand balance in the existing city areas with houses and commercial buildings.

Through this project, the city set the individual target numbers for the HEMS adoption, solar panels, and electric vehicles and achieved these targets by FY2013. From now on, the YSCP will be updated from the demonstration stage to the implementation stage.

	HEMS	PV	Electric vehicles	CO ₂ emission reduction	CO ₂ reduction rate
Adoption result	4,200 systems	37 MW	2,300 units	39,000 tons	29 %



Yokohama Smart City Project

FutureCity Yokohama

<http://www.city.yokohama.lg.jp/ondan/english/futurecity/>



Inundation (Inland Water/Flood) Hazard Map

<http://www.city.yokohama.lg.jp/kankyo/gesui/naisuihm/> (Japanese text only)



Other (Adaptation)

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