Japan’s Smart Cities

Solving Global Issues Such as the SDGs, etc. through Japan’s Society 5.0

Japan's Smart Cities: Table of Contents

Preface

Responding to Increasing Urban Problems and Global Challenges

The world's rapid urbanization (70% of the population will be concentrated in cities by 2050) is threatening to exacerbate problems such as traffic congestion, water and energy supply shortages, as well as sewage and waste disposal issues. Furthermore, the importance of smart cities as a solution is increasing due to the emergence of global issues including: ① the increase and intensification of disasters caused by climate change; and ② measures against infectious diseases such as the novel coronavirus and the model of social activities, etc., that can coexist with them.

Solving Social Issues and Economic Growth Led by Society 5.0

Japan is advancing projects with the principles of Society 5.0 at the core when promoting smart cities that use digital technology. Society 5.0 is an initiative that aims to build a human-centered society while solving social issues and achieving economic development at the same time by using cutting-edge technologies that integrate cyber (digital) and physical (substance).

Japan's Extensive Urban Construction Experience and Know-How

Japan's strengths are the experience and know-how it has obtained through a variety of domestic and international urban development projects. For example, Japan has a track record of the world's best urban development projects in terms of disaster prevention, disaster reduction, and public safety; environmentally symbiotic cities such as eco-cities; transit-oriented development (TOD) cities with no traffic congestion; and achieving the development of the world's leading optical fiber and 5G infrastructure. This wealth of urban solutions will from now on be an essential foundation for creating new services and improving the quality of life in cities using digital technology.

The Originality of Japan's Smart Cities

Based on this wealth of experience and know-how and with openness and transparency as the central principle and concept of the whole project, Japan aims to build smart cities where all citizens and businesses can participate.

The operating system of Japan's urban cities that embodies this concept is an information coordination platform. The platform collects and manages all kinds of urban data on the cities, thoroughly takes into account residents' perspectives, provides complex and personalized services, as well as having data interoperability and distribution capability that can also be extended to other cities. Furthermore, Japan's urban operating system has the ability to expand easily in response to regional growth and technological development, allowing the system to be maintained and developed continuously and agilely (can change quickly).

In this context, Japan's smart cities are oriented toward free, trustworthy and credible norms. Under the norms, major companies are not allowed to monopolize data handling, excessive regulations are not imposed on the usage of data and the state is not allowed to monitor data handling. This is the "originality of Japan" that complies with the DFFT (Data Free Flow with Trust) presented at the G20 Osaka Summit.

Comprehensive Future Cities Pioneered by Super City

The movement to build smart cities that will fundamentally change the nature of society by using advanced technologies is rapidly progressing internationally. With a growing interest in global environmental issues and the ongoing coronavirus-outbreak, this move is being further accelerated.

For this reason, in addition to building smart cities that expand and develop by using digital technology based on the urban infrastructure developed so far, Japan will also promote an initiative of "Super City" that introduces digital technology into all fields of life services in cities from the earliest stage by making drastic reform in regulations and build a system equipped with multiple linkage across cities.

Toward the Future

This brochure is a menu of smart city know-how that Japan can offer. We hope this will help cities around the world achieve the SDGs and can be of help to improve the value of cities from the perspective of the environment, society and economy as advocated by the United Nations.

Japan's Internationally Recognized Urban Infrastructure Development Track Record
~The Three Pillars of Japan's Approach are Strategic Preparations for Data-Driven Cities~

① Eco-Cities (Environmentally Symbiotic Cities)

Thoroughly considering low carbon, resource recycling, and reduction of environmental burden

As fossil resources are scarce in Japan, the country has been striving to improve its energy efficiency in order to effectively use precious energy. The oil crisis in the 1970s led to the pursuit of efficient energy use, which has in turn led to a thorough consideration of the environment. This trend is evident in efforts to create eco-cities (environmentally symbiotic cities) that are environmentally friendly in terms of both hardware and software including low carbon society, resource recycling, and the reduction of environmental burden.

② TOD (Transit-Oriented Development)

Reducing traffic congestion and upgrading urban functions through urban development with a focus on public transportation

As urban development not dependent on automobiles, Japan has focused on public transportation (Transit-Oriented Development or TOD) in its urban development. Offices, hotels, and other commercial complex facilities are located within walking distance of railway stations, and residential areas are systematically located around railway stations in the suburban areas along railway lines. Such urban structures avoid traffic congestion and allow high-level urban functions to be concentrated in the city center.

③ Building Disaster-Resilient Cities (Resilient Cities)

Globally sharing the knowledge of Japan as a major powerhouse in disaster prevention

Due to natural conditions such geography, topography, geology and weather, Japan is prone to disasters including earthquakes and typhoons, etc. As Japan has experienced many disasters in the past, the country has made proactive efforts in disaster prevention and reduction for the protection of assets and people's lives In addition to strengthening social infrastructure, Japan is making the best use of technology for predicting and preventing disasters, warning systems, and technology for minimizing disaster damage in urban development.

From now on, Japan will move forward to building a human-centered society (“Society 5.0”) that achieves both the resolution of social issues and economic development by adding “DX (Digital Transformation)” to the strength of conventional urban infrastructure development.

Everything is connected to the Internet. Contributing to the efficiency of industry and life by providing information in real time.

IoT

Aggregate and analyze huge amounts of data in a short period of time. New findings expected from unprecedented analysis.

Big Data and AI

TOD

Disaster-Resilient Urban development

Eco-Cities

Automated Driving

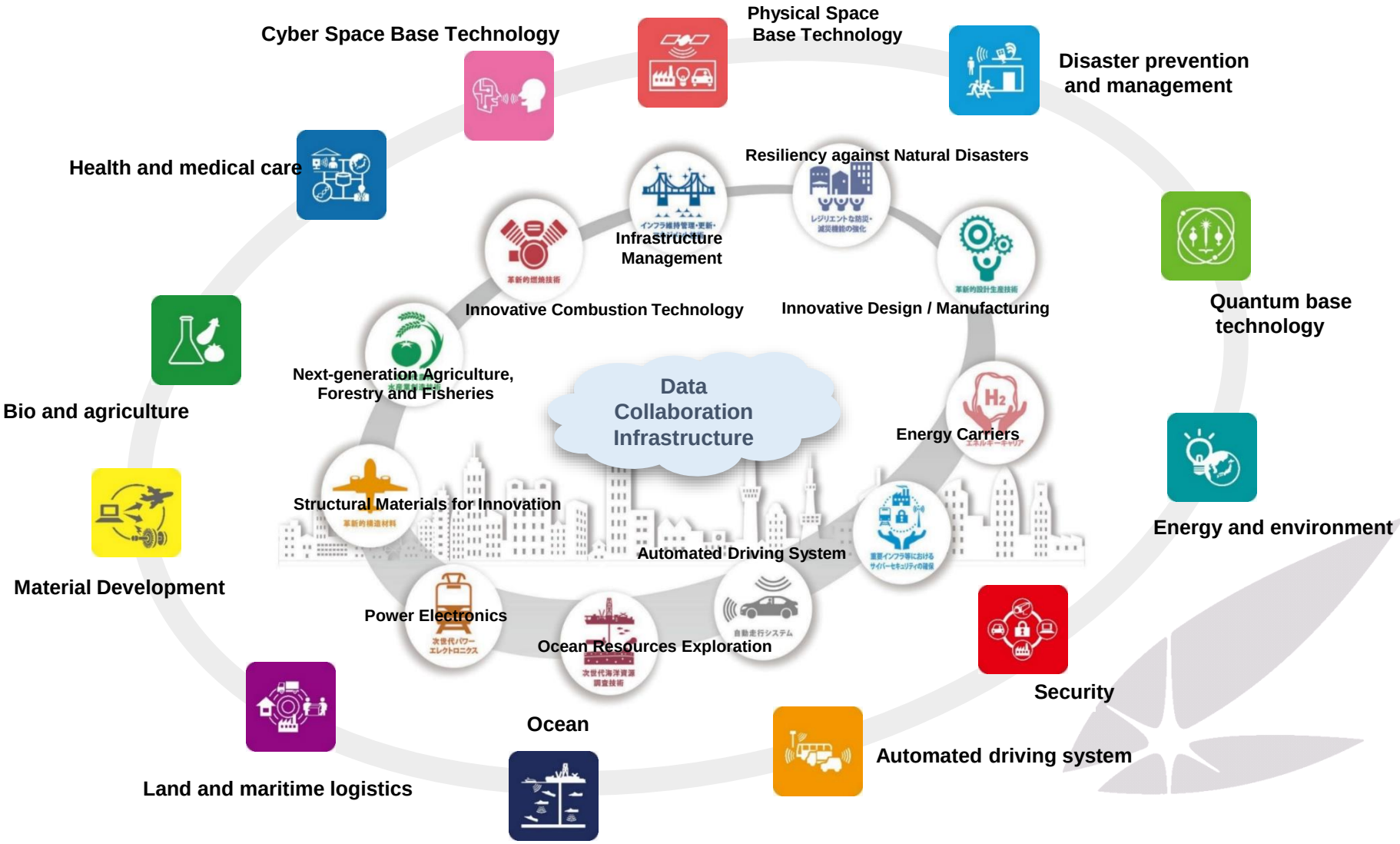
Contributing to driver shortage, securing local public transportation and MaaS. Eliminating human error and ensuring safety.

Biometric Authentication

Authentication by fingerprint and pupil is already widely used. New services introduction, including automatic bus fare payment, etc., is advancing.

The data-driven smart cities that Japan is working on involve a bottom-up approach to realizing data-driven smart cities by integrating DX that is underway in various fields. This will also assure free, trustworthy and credible norms by focusing on privacy and security.

From basic research to application and commercialization to solve social issues and achieve economic growth by cross-sectoral cooperation through SIP (Strategic Innovation Promotion Program)



Source: SIP (Cross-Ministerial Strategic Innovation Promotion Program)

Based on the National Strategic Special Zone system, Japanese Government will build Super City. Drastic regulatory reform will realize the optimization of multiple services across all aspects of life.

What are super cities?

1）Super City covers at least five areas mentioned below.

① Mobility; ② Logistics; ③ Payment; ④ Administration; ⑤ Healthcare and nursing care; ⑥ Education; ⑦ Energy and water; ⑧ Environment and garbage; ⑨ Crime prevention; and ⑩ Disaster prevention and safety, etc.

2）Data linkage platform promotes data connections services between multiple fields.

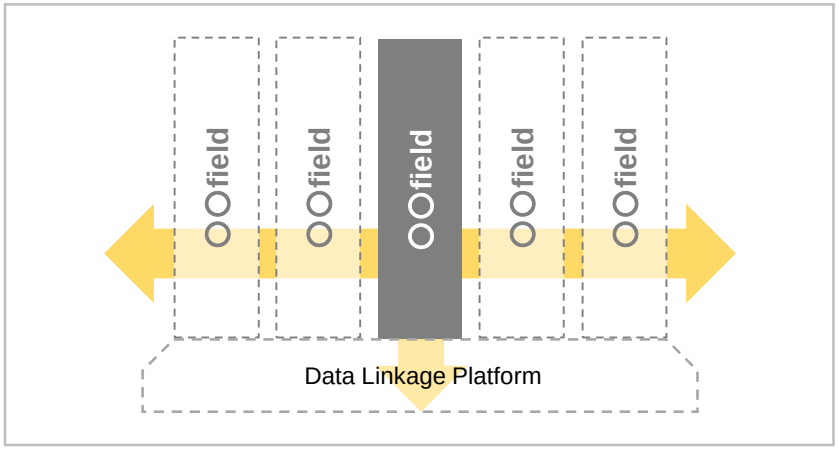
3）Drastic regulatory reform introduces future society that will be realized around 2030.

Legislation

Differences between “Smart City” and “Super City”

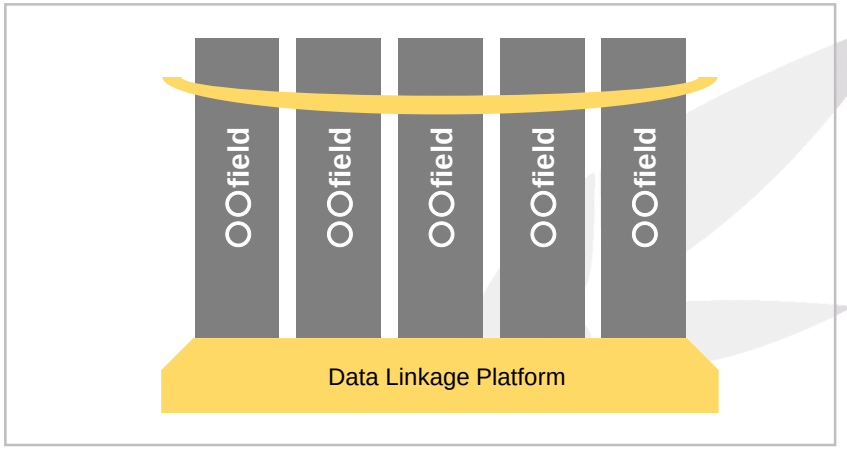
【Smart City】

Data combination will gradually change to Data Linkage Platform.



【Super City】

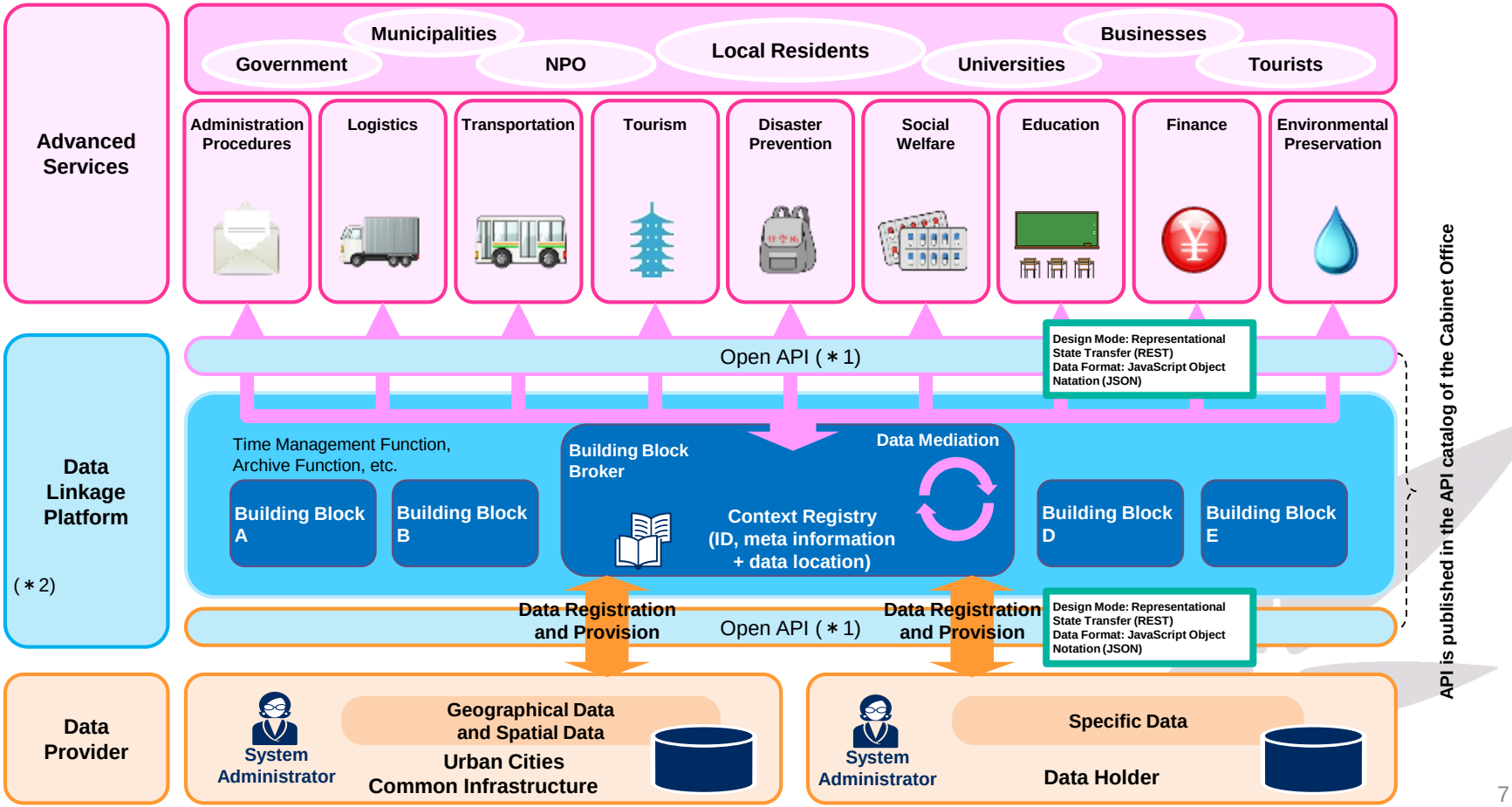
Developing a cross-disciplinary Data Linkage Platform all at once, along with drastic regulatory reforms.



Super City -Based on the National Strategic Special Zone system-

1）Data linkage platform
- ✔ Super City can request the governments to provide the data.
- ✔ Data linkage platform is required to follow the safety standard and open the APIs to the public.

2）Drastic regulatory reform
- ✔ Super City can request the Japanese government to grant special measures of regulation.
- ✔ Each minister with regulatory authority can decide whether special measures will be possible.



(＊1) API: Application Programming Interface

(＊2) A decentralized data system is recommended. Data accumulation is allowed as necessary.

Japan Offers Various Solutions

① Realizing the world's safest and securest society (disaster preparedness and crime prevention)

Concept: Real-time notification of emergencies and hazards to residents in wide areas. Promptly providing security and safety.

Issues of Urban Cities and Goals

《Issues》

- Deterring terrorism and crime while protecting individual privacy.
- Responding to the increase in disasters associated with climate change (disaster prevention and reduction).
- Through the abovementioned measures, making residents' living more comfortable, thereby increasing the attractiveness of cities.

《Goals》

- Crime control.
- Improving urban risk assessment.
- Prompt and effective disaster prevention and reduction.
- Improving residents' lives.
- Increasing population inflow.
- Increasing the rate of attracting conferences, events, and regional business bases.

Japan Can Offer Various Solutions

- Detection, prediction, and advanced analytical skills to grasp on-the-spot situation. thereby reducing response time.
- Personal identification while ensuring personal privacy.
- End-to-end connectivity of ICT resources for rapid deployment and configuration optimization.
- Push-type notification of disaster and evacuation information by community applications by taking advantage of location information.
- Urban development using big data (human flow data, health data, etc.).

(Remarks)

- Japan is a safe country with one of the lowest crime rates among developed nations (ranked 3rd to 7th in recent years according to a United Nations survey).
- In addition, despite the fact that the United Nations disaster risk assessment report identified Japan as an area at high risk of all kinds of disasters, Japan was successfully able to control flood damage.

Places visited for on-site inspection

- Kakogawa City, Hyogo Prefecture
- City of Las Vegas (U.S.)

Participating companies and main operators

- Kakogawa City, Hyogo Prefecture
- NEC Corporation
- NTT

② Maximizing the capacity of transportation and logistics infrastructure

Concept: Improving convenience for citizens and promoting industry through the provision of new mobility services such as MaaS, etc.

Issues of Urban Cities and Goals

《Issues》

- Developing a system to facilitate the smooth mobility of residents including the elderly and people with disabilities in particular who have difficulty traveling.
- Ensuring healthy life expectancy for residents.
- Revitalizing the local economy through increased human flow.
- Improving the attractiveness of cities.

《Goals》

- Improving the safety and convenience of residents' mobility. Improving the quality of life for vulnerable people in particular with limited transportation mobility by encouraging them to go out through increased opportunity to exercise and communicate.
- Easing congestion by making traffic more efficient.
- Creating sustainable cities where diverse generations live.
- Creating bustling cities.

Kasugai City's automated driving project.

A bustling scene in Sapporo City

Japan's Solutions

- Smart mobility.
  Developing car sharing and bicycle sharing.
  Providing on-demand last-one-mile mobility.
- Introduction of automated driving public transportation.
- Improving traffic accessibility using face authentication system (Providing seamless payment and services through face authentication system).
- Smart planning for urban development using data.
- Incentivizing residents to go out through the introduction of applications.
- Building a MaaS model that solves local issues by linking transportation methods with non-transportation services such as retail and tourism, etc. at destinations.

(Remarks)

- Over a period of 10 years, elderly people's physical strength and athletic performance were rejuvenated by the equivalent of 5 years through the exercise resulting from the increased walking opportunities.
- Increased residents' opportunities to go out. Opportunities for the elderly in particular to participate in social gatherings increased and the rate of care needs assessment decreased. A 30% reduction in the risk of developing dementia.

Sapporo City used big data (human flow data, health data, etc.) for its urban development.

Places visited for on-site inspection

- Sapporo City, Hokkaido
- Tsukuba City, Ibaraki Prefecture
- Kasugai City, Aichi Prefecture

Participating companies and main operators

- Smart Wellness City Council (Sapporo)
- Tsukuba Smart City Council
- Kozoji Smart City Promotion Study Group (Kasugai City)

③ Efficient use of energy and realizing energy conservation and zero emissions

Concept: Encouraging the efficient use of energy and reducing greenhouse gas emissions. Also improving the resilience of urban cities.

Issues of Urban Cities and Goals

《Issues》

- Efficient use of energy.
- Developing urban infrastructure which is less dependent on utilities companies.
- Increasing greenhouse gas emissions.
- Stable use of renewable energy.
- Strengthening resilience at the time of disaster including securing energy in the event of a large-scale disaster.
- Treatment and utilization of livestock manure generated by the livestock industry.

《Goals》

- Reducing CO2 emissions.
- Reducing greenhouse gas (GHG) emissions.
- Smart energy management.
- Realizing local production and local consumption of renewable energy.
- Industrializing local resources (example: establishing a hydrogen supply system).
- Strengthening the resilience of urban cities.

Japan's Solutions

- Local production and local consumption of energy with a focus on renewable energy.
- Industrialization of local resources, Shikaoi Town and Obihiro City (hydrogen, which does not generate CO2, is produced from biogas obtained from livestock manure and used for fuel cell vehicles, aquaculture, etc.).
- Establishing autonomous distributed energy system.
- Dispersing electricity peaks according to demand response by using Community Energy Management System (CEMS).
- Establishing a locally produced and locally consumed energy system that utilizes CEMS, Home Energy Management System (HEMS), Building Energy Management System (BEMS), Electric Vehicle (EV), etc.
- Standardization of smart homes equipped with solar power generation system and storage battery unit.

(Remarks)

- The town of Shikaoi has been demonstrating GHG reduction through the use of livestock manure and hydrogen.
- Securing power at the time of a large-scale disaster. Establishing a disaster prevention base and maintaining hygiene in the event of a disaster.
- Another demonstration test confirmed a reduction of 9,000 tons of CO2 emissions.

Places visited for on-site inspection

- Mutsuzawa Town, Chiba Prefecture
- Fujisawa City, Yokohama City, Kanagawa Prefecture
- Shikaoi Town, Kato-gun, Obihiro City, Hokkaido

Participating companies and main operators

- Mutsuzawa Town, Chiba Prefecture
- Fujisawa Sustainable Smart Town (SST) and Tsunashima SST
- Shikaoi Town, Kato-gun, Obihiro City, Hokkaido

④ Realizing the world's best recycling society

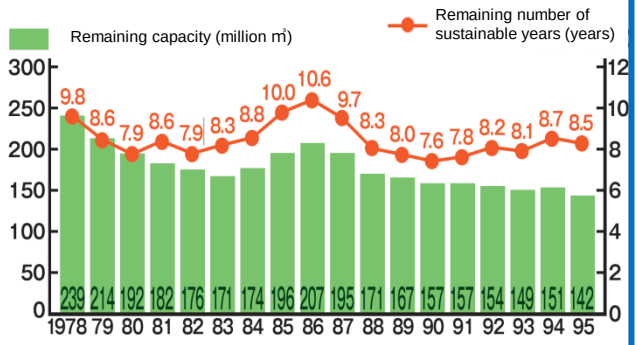
Concept: Urban development in harmony with the environment that promotes resource recycling. Realizing a recycling society.

Issues of Urban Cities and Goals

《Issues》

An increase in waste generation due to urbanization, industrialization and increased consumption.

- Tightening of the remaining capacity of final disposal sites.
- Diversification and increase in the types of waste, including large-size home electrical appliances that are difficult to properly dispose of, and increased use of containers and packaging.
- High concentration of companies and environmental technologies in industrial zones.

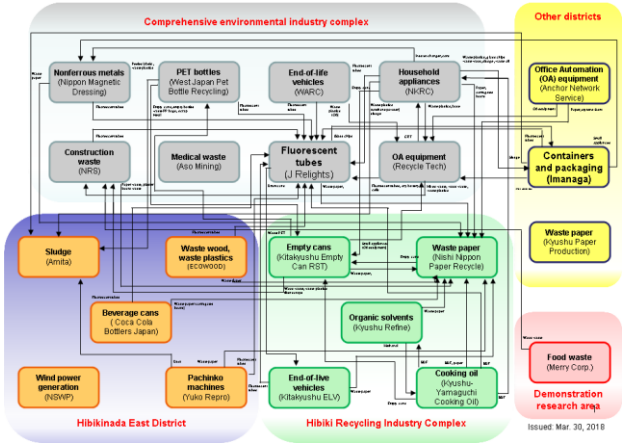


Remaining capacity and remaining number of sustainable years of the final disposal sites (general waste)

Source) Ministry of the Environment
"History and Current State of Waste Management in Japan" (February 2014)

《Goals》

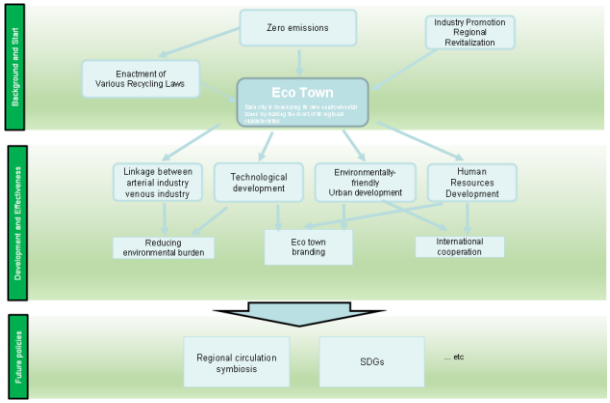
- Building resource-recycling communities through the "Eco-Town Project."
  - Centralized development of recycling facilities in specific areas.
    Development of various recycling laws at the national level.
    High-level mutual use of waste within region.
    Building a system and realizing zero-emissions.



Voluntary mutual resource recycling among companies in an eco-town.

Japan's Solutions

- Significantly reducing environmental burden by reducing the amount of final disposal and the proper disposal of toxic substances.
- The development of arteriovenous collaboration through the expansion of arterial companies into the venous industry and the development of recycling.
- Progress in technological demonstration of E-Waste through centralized processing at regional level.
- Progress in human resource development for environmentally friendly industries in a region and developing it into international cooperation.
- Contributing to the decarbonization of region and realizing the SDGs through recycling and reduced energy use.



Places visited for on-site inspection

- Kitakyushu City in Fukuoka Prefecture

⑤ Infectious disease control and public health that will set a new world standard

Concept: Improving public health through infrastructure development and preventing the spread of infectious diseases through remote and touchless technology.

Issues of Urban Cities and Goals

《Issues》

- Improving public health thereby reducing and eliminating diseases and infectious diseases.
- Preventing the elderly, pregnant women and nursing mothers, and children, etc., in particular from physically contacting with an unspecified number of people at the time of an outbreak of an infectious disease.

《Goals》

- Appropriate treatment of wastewater through the development of basic urban infrastructure including sewage systems and decentralized wastewater treatment system “Johkasou.”
- Appropriate waste management through basic urban infrastructure development.
- Ensuring the health of vulnerable residents, particularly the elderly, pregnant women and nursing mothers, and children, etc., at the time of an infectious disease outbreak.

Japan’s Solutions

- Urban development with basic urban infrastructure including sewerage and decentralized wastewater treatment system “Johkasou,” etc.
- Appropriate waste management through implementing Waste to Energy facility.
- Cutting-edge contactless technology such as touchless and automatic devices.
- A telemedicine system that utilizes mobile and cloud technologies. Through the system, the psychological, physical and economic burdens associated with going to hospital are reduced.

(Remarks)

- Decentralized wastewater treatment system “Johkasou” can treat sewage water to the same level as a collective sewage treatment plant (Biochemical Oxygen Demand (BOD) 20 mg/L or less, removal rate of 90% or more).
- The volume of waste can be reduced by almost one-tenth by Waste to Energy process.

Mobile measurement and monitoring device can be used to grasp the health status of mothers and children.

Places visited for on-site inspection

- Hokkaido University Hospital
- Nazetokushukai Hospital

Participating companies and main operators

Melody International Ltd.

⑥ Expanding access to education and improving the quality of education (distance and online education)

Concept: Providing “inclusive and high-quality education that leaves no one left behind” by using ICT.

Issues of Urban Cities and Goals

《Issues》

- Further improving the quality of school education.
- Eliminating regional disparities due to regional characteristics (remote islands and mountainous regions, etc.).
- Quality assurance and globalization in higher education.
- Ensuring learning opportunities in the event that schools are temporarily closed due to a disaster or the spread of an infectious disease.

School facilities damaged by the inflow of earth and sand due to heavy rain.

《Goals》

- Developing human resources capable of responding to innovation through the use of IoT and AI.
- Improving the quality of detailed education and reducing the workload of teachers and staff.
- Realizing quality assurance and globalization in higher education.
- Ensuring learning opportunities in an emergency situation.

Academic support by using ICT while schools are temporarily closed.

Japan’s Solutions

- Drastic improvement of school ICT environment.
- Promoting the use of ICT in education.
- Improving efficiency of school affairs by using a school affairs support system.
- COIL(Collaborative Online Implementing Collaborative Online International Learning (COIL).
- Implementing distance and online education.

COIL (Online session between Tokyo University of Foreign Studies and a university in the U.S.)

⑦ Utilizing tourism resources to attract visitors from around the world

Concept: Revitalizing the local economy through tourism and the maximum utilization of tourism resources.

Issues of Urban Cities and Goals

《Issues》
- Revitalizing the local economy through tourism. Increasing the attractiveness of cities to that end.
- Connectivity and convenience of multiple modes of transportation.
- Providing quality services with reduced workload.

《Goals》
- Attracting visitors, promoting excursions, and revitalizing a region (through the establishment of a highly connected and convenient intra-regional mobility service).
- Increasing the percentage of repeat tourists.
- Maximizing the use of tourism resources.

Japan's Solutions

■ Tourism-type MaaS
- Seamless coordination of multiple modes of transportation using MaaS applications. Promote collaboration with other industries including coupon distribution on the platform.
- Support for tourist transportation in conjunction with on-demand car-sharing vehicle reservation and dispatch systems, etc., in tourist resorts.

【Remarks】 Eight projects including the following are supported as "Tourism type MaaS." (FY 2019)

(Example) Otsu City and Mount Hieizan areas.
In addition to free digital passes for multiple public transportation systems, providing MaaS that can be used at hotels, tourist facilities, retail stores, restaurants, etc. to promote excursions using public transportation. (Operators: Keihan Holdings Co., Ltd. and Nihon Unisys, Ltd., etc.)

(Example) Izu area in Shizuoka Prefecture.
In addition to providing free digital rail and bus transit passes and operating on-demand transportation services such as MaaS, providing free digital passes for sightseeing facilities as MaaS. In this way, developing a comfortable environment that allows seamless travel at destinations to promote tourism and revitalize local communities. (Operators: Tokyu Corporation, East Japan Railway Company, etc.)

- Providing a service that combines self-driving buses and trains, etc., at a flat-rate and unlimited-ride fare.
- Distributing coupons linked to shopping and sightseeing.

■ Seamless and cashless payment using face authentication technology.

Places visited for on-site inspection
- Shirahama Town, Wakayama Prefecture
- Oya district, Utsunomiya City, Tochigi Prefecture
- Shizuoka Prefecture

Participating companies and main operators

NEC Corporation
- U Smart Council (Utsunomiya City)
- Shizuoka Prefecture, Softbank Corp.

⑧ Asset management and ensuring long-life and reliable infrastructure

Concept: Reducing the lifecycle cost of infrastructure by utilizing data based on reality.

Issues of Urban Cities and Goals

《Issues》

- Robust maintenance of basic infrastructure that supports people's daily lives.
- Addressing the unpredictability and difficulty of predicting the scale and location of infrastructure where an accident may occur.

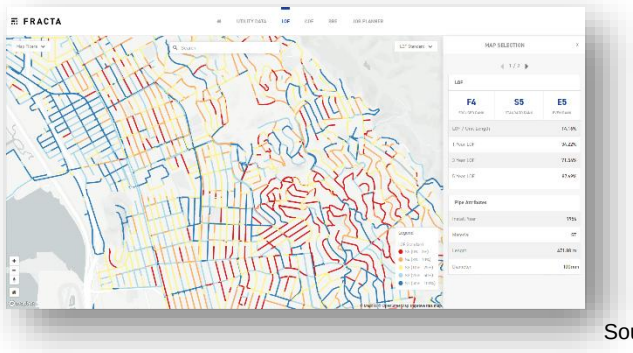
《Goals》

- Maintaining infrastructure that can provide safety and security for residents while reducing the costs and risks of basic infrastructure management.
- Realizing planned basic infrastructure investments.
- Providing a safe and secure environment for residents including prompt recovery from a disaster by utilizing data.

Japan's Solutions

- Grasping and managing road surface conditions using data from accelerometers and vehicle-mounted cameras.
- Prioritized repair of heavily trafficked roads by using a combination of deterioration detection data based on AI-processed image data and human flow analysis data.
- Using the difference of three-dimensional point group data to grasp changes over time for the maintenance and management of roads and rivers.
- Highly accurate damage/leakage prediction using AI/machine learning for water pipes (Note: Tests are also being conducted on gas pipes).
- Calculation of the amount of accident risk taking into account the surrounding circumstances.

Predictive diagnostic system offered by Fracta



- Highly accurate prediction of the deterioration of underground water pipes without conducting direct physical inspection. Software that enables the optimization of investment in the replacement of water pipes by calculating "water leak probability."
- Establishing own environmental database including over 1,000 environment variables.
- The probability of leakage of each pipe is calculated and mapped by color coding from blue (safe) to red (dangerous) (see drawing on left).
- In the U.S., more than 60 water utilities in 27 states have already introduced the system.

Source: Created based on information provided by Fracta.

Places visited for on-site inspection

- Masuda City, Shimane Prefecture
- Fujieda City, Shizuoka Prefecture
- Atami City, Shimoda City, Shizuoka Prefecture
- Kobe City, Hyogo Prefecture

Participating companies and main operators

- Masuda City, Masuda Cyber Smart City Creative Consortium
- Fujieda City, Shizuoka Prefecture, Fujieda ICT Consortium
- Shizuoka Prefecture, Softbank Corp.
- Fracta

⑨ Agricultural production and distribution bases that ensure safety and high quality

Concept: Initiatives toward social implementation of Smart Agriculture technologies such as robotics, AI and IoT, etc.

Issues and Goals

《Issues》

- Labor shortage due to decrease in the number of business farmers and aging of farming population.
- Need for further value addition and productivity improvement in preparation for expected market shrinkage due to population decline.

《Goals》

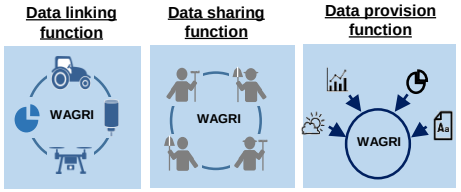
Solving issues by introducing advanced technologies such as robotics, AI and IoT in the field of agricultural production (smart agriculture).

- Work Automation.
- Simplified information sharing.
- Data utilization.

Japan's Solutions

Agricultural Data Collaboration Platform (WAGRI)

- A platform that supports smart farming from a data perspective. Linking data from production to processing, distribution, consumption and export.



Three functions of the Agricultural Data Collaboration Platform

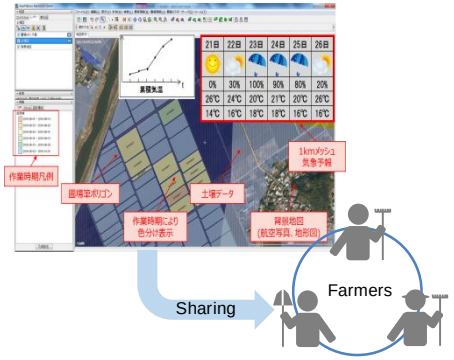
Work Automation

- Advanced technologies such as robotic tractors, etc., enable farmers to expand the scale of production.

Two robotic tractors, manned and unmanned, working in collaboration

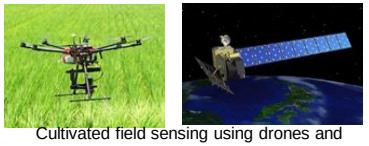
Succession of farming skills and management

- Digitizing farm management with ICT and making farming more efficient by hiring new people.

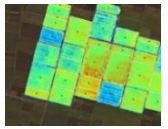


Data utilization

- Using remote sensing data, etc., to predict the growth of crops, which achieves advanced agricultural management.



Cultivated field sensing using drones and satellites



Cultivated field sensing

Places visited for on-site inspection

- Nitta farm, Iwamizawa City, Hokkaido (Representative organization: Research Faculty of Agriculture, Hokkaido University)

Participating companies and main operators

- Smart Link Hokkaido Inc.

Examples of the development of smart cities overseas by Japan

Examples of major projects

Blue: Efforts to develop urban city infrastructure
Red: Efforts for urban city development using digital technology

Promoting Japanese-style education using digital teaching materials

- Providing Surala Ninja!," a digital learning material for learning arithmetic while interacting with cartoon characters.
- Promoting the establishment of independent study habits and the improvement of academic ability among elementary school students. (Sri Lanka)

Pilot operator: SuRaLa Net Co., Ltd.

A teacher training program on English teaching methods using Japanese digital teaching materials and ICT is being conducted at a national teacher training school through an industry-academia collaboration. (Cambodia)

Pilot operator: Uchida Yoko Co., Ltd.

Overseas expansion of Decentralized wastewater treatment system "Johkasou"

As of the end of 2019, more than 30,000 septic tanks with Japanese technology have been installed overseas, contributing to the improvement of public health and water environment conservation.

Overseas expansion of sewage system

- Established the Asia Wastewater Management Partnership (AWaP), a partnership toward resolving issues regarding wastewater in Asia.
- Since 2017, conducted overseas demonstrations of sewerage technology in five countries.
- Industry-academia-government collaboration to contribute to the spread of sewage systems overseas.

Smart city promotion by a Japanese company in Las Vegas, U.S.

- In December 2018, based on the results of the demonstration test (which began in September 2018), the NTT Group agreed with the City of Las Vegas and the State of Nevada to promote a smart city by commercially providing public safety solutions using advanced technologies. In February 2019, the company started providing its public safety solution services for citizens as part of commercial rollout while also expanding its business to other cities in the U.S.
- NTT was highly evaluated for not claiming the ownership of data.

(Image: NTT)

Smart city promotion by a Japanese company in Denver, U.S.

- A smart city project in the city of Denver based on the "Fujisawa Sustainable Smart Town" conducted by Panasonic Corporation in Japan.
- Achieving efficient energy use by taking advantage of advanced technologies of pilot systems including microgrids (distributed power generation network) and smart LED streetlights.

(Source: Panasonic Corporation)

Vietnam (Demonstration, etc.)
Cooperation in the development of smart city evaluation indicators

Vietnam: North Hanoi district urban development (introduced on P20)

Vietnam: Complex urban development in Binh Duong Province (introduced on P20)

Thailand: Eastern Economic Corridor (EEC) Amata Chonburi Smart City Development Project (Introduced on P20)

Thailand: Urban development project around Bang Sue Station in Bangkok. (Introduced on P20)

Indonesia
Deltamas City
(Introduced on P20)

Promoting smart cities in New Clark City, Philippines.

- A new regional development project being conducted by the Base Conversion and Development Authority (BCDA) of the Philippines at part of the former U.S. military Clark base site located north of Manila for civilian use. Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development (JOIN) is involved from the upstream process.
- In July 2016, BCDA and JOIN developed a master plan that included a smart city concept. The goal is to achieve sustainable urban development using ICT.

U.S.
Horizontal expansion of data utilization model

Central and South America (demonstration, etc.)
Research and demonstrations aimed at expanding ICT solutions that promote smart cities in small and medium-sized cities (targeting Chile, Colombia, Argentina, etc.)

Cambodia: Introduction of High-Efficiency LED Streetlights Using Wireless Networks

- The installation of LED streetlights in various places from emerging cities to World Heritage sites saves 70% of energy.
- Building a smart city environment with a focus on establishing a wireless network environment through the installation of LED streetlights.

Indonesia Bumi Serpong Damai (BSD) district Mixed use development project

A project by Mitsubishi Corporation, Nishi-Nippon Railroad Co., Ltd., Hanshin Electric Railway Co., Ltd., and Keikyu Corporation to jointly develop commercial facilities and detached housing in a part of a large development area southwest of Jakarta.

Indonesia: Jakarta Garden City Central Area Urban Development Project (TOD)

- A project to develop and operate commercial facilities and bus terminals in the suburbs of Jakarta. AEONMALL Corporation and JOIN will jointly invest and participate in the project. The Joint Crediting Mechanism (JCM) is also used to introduce Japanese technology.
- Transferring Japan's expertise in TOD support to Indonesia. It is also expected to serve as an evacuation site in the event of a disaster, which promotes a high level of disaster preparedness in Japan.

(Image of Completed Project: Material provided by the Ministry of Land, Infrastructure, Transport and Tourism)

Australia: Development plan for the new Western Sydney Airport

- A new urban development promoted by the New South Wales Government in Australia with focus on a new airport to be opened in 2026.
- Memorandums of Understanding (MoU) were signed between the New South Wales Government and the following Japanese companies: Mitsubishi Heavy Industries on the proposal for energy management solutions, etc.; Hitachi, Ltd., in the field of healthcare and heavy industry, etc.; NEC Corporation on the utilization of biometrics, 5G, IoT and AI, etc.; and Sumitomo Mitsui Banking Corporation (SMBC) on business opportunities.
- Urban Renaissance Agency (UR) signed a memorandum of understanding with the New South Wales Government for technical assistance to the development around the new Western Sydney Airport and an advisory agreement with Western City and Aerotropolis Authority (WCAA).

Source: Compiled by the Cabinet Secretariat based on various materials.

Examples of Japan's urban infrastructure development overseas
～Based on the development of solid urban infrastructure, promoting future cities that utilizes digital technology, etc.～

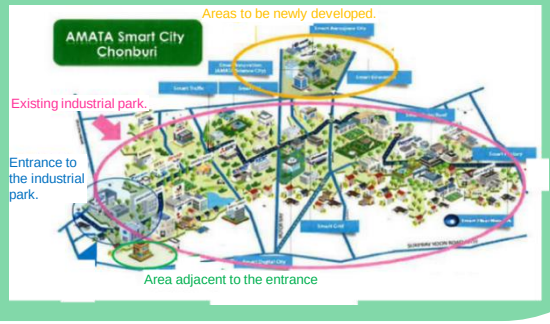
Complex urban development in Binh Duong Province, Vietnam

Supporting the complex urban development by conducting feasibility study (F/S) on the development of railways, stable electricity supply, and the development of ICT communication networks around cities.

(Image: Becamex Tokyu Co., Ltd.)

Eastern Economic Corridor (EEC) in Thailand Amata Chonburi Smart City Development Project

- A national comprehensive regional development project that designates three eastern provinces in Thailand (Chachoengsao, Chon Buri and Rayong), which are home to a high concentration of Japanese companies, as special zones with the aim of developing large-scale infrastructure and attracting advanced industries.
- As the Amata Chonburi Smart City Development Project, Amata Corporation Public Company Limited, a local conglomerate, is working with the City of Yokohama, Yokohama Urban Solution Alliance (YUSA) (an incorporated association established mainly by companies in Yokohama City), etc., to upgrade existing industrial parks (making them smart) and develop smart cities.



(Image: AMATA)

Urban Development Project (TOD) around Bang Sue Station in Bangkok, Thailand

- Urban development project (372 hectares) around Bang Sue Station, which will become the terminal station for the airport rail link, urban railway, and high-speed railway, such as the Red Line under development through yen loan from JICA.
- Multiple master plans prepared by each Thai organization were integrated and improved with the cooperation of Japan. Going forward, the Government of Japan aims to facilitate Japanese companies' participation in the development.

Image Drawing (Source: JICA survey report)

Delta Mas City in Indonesia

- The project is being developed by Sojitz Corporation jointly with a local developer in the east of Jakarta. Planning to develop commercial, residential and educational facilities in an area of 1,464 hectares.
- Aiming to build a showcase for demonstrations of smart technologies and services using IoT, AI, etc.

(Image: Sojitz Corporation)

Smart City Development in Northern Hanoi, Vietnam

- The development is underway with local companies in an area of 272 hectares north of Nhat Tan Bridge, roughly halfway between Noi Bai International Airport and Hanoi's city center. A TOD is under consideration in the basic survey, which centers on a new station in the main development area of the railway (Hanoi Line 2). Aiming to create a safe, secure and comfortable environment and community through the development of hospitals, schools, disaster prevention facilities, security systems, commercial facilities and greening facilities.
- Also planning to upgrade smart city services through the introduction of 5G, face recognition system and blockchain technologies.

(Image: Sumitomo Corporation)

List of Japan's support available for the Introduction of Smart Cities

Organizations	Contents of Support
JICA	● Technical support for developing countries to formulate and implement their smart city plans. ● Formulation of an urban development master plan that envisions the overall vision of a smart city, technical support for the promotion of TOD in conjunction with public transportation, financial cooperation for the development of social infrastructure to realize the plan, and response to private sector demand for funds through overseas investments and loans. ● Expanding support by local governments that are proactive in sharing their experience in smart cities to overseas by utilizing financial cooperation and grassroots technical cooperation to promote the export of urban infrastructure, https://www.jica.go.jp/information/seminar/2019/20190516_01.html https://www.jica.go.jp/publication/mundi/ku57pq00002kfsx7-att/201611.pdf
JBIC	Support for projects such as smart city, smart energy and green mobility, etc., that utilize the technology and know-how of Japanese companies through funding and loan guarantees, etc. https://www.jbic.go.jp/ja/business-areas/sectors/infrastructure.html
NEXI	Providing insurance covering country risks and credit risks associated with international trade and other overseas transactions (export, investment, loan) conducted by Japanese companies. Loan Insurance for Green Innovation with higher coverage rates can be applied particularly to projects that contribute to environmental protection and energy conservation. Examples of projects covered by the insurance: renewable energy, smart grid, energy management system (EMS), Net Zero Energy House Grade B (ZEH/B), green mobility, hydrogen-related technologies, fuel cell-related technologies, etc. https://www.nexi.go.jp/en/topics/newsrelease/2019072901.html
JOIN	In addition to transportation and urban development projects, support for a wide range of related businesses including energy, communication facilities, water, and waste treatment facilities that support these projects; development, maintenance, and management of facilities that collect, analyze, control, and manage data; and investment in and operation of local subsidiaries that produce mechanical equipment and materials. http://www.join-future.co.jp/english/our-mission/index.html
JICT	When Japanese companies participate in overseas projects to develop and operate ICT infrastructure (networks, data centers, sensor networks, etc.) related to smart cities and projects to provide services using such infrastructure (ICT solutions using urban data collected from sensor networks, etc.), support can be provided for the establishment of financing schemes and hands-on support for investment and operation. https://www.jictfund.co.jp/en/business/isJict/
NEDO	● NEDO provides financial support for dissemination of Japanese advanced energy-related technologies and systems abroad through the international demonstration program. ● The program covers technologies and systems such as renewable energy grid stabilization, mobility (MaaS, etc.), energy management (storage batteries, etc.) , which will lead to overseas smart cities development. https://www.nedo.go.jp/english/activities/activities_AT1_00175.html

List of Japan’s support available for the Introduction of Smart Cities

Organizations	Contents of Support
Ministry of the Environment (JCM)	The JCM funding support program provides support for the initial cost of introducing Japanese advanced decarbonization and low-carbon technologies and equipment such as renewable energy and energy conservation in the JCM partner countries. Financing Programme for JCM Model Projects：<http://gec.jp/jcm/> CARBON MARKET EXPESS：<https://www.carbon-markets.go.jp/eng/>