Kashiwa-no-ha Smart City

Evolving into what the world will be like in the future

We have a large number of issues to address, including those related to the environment, energy, food, and health. Japan will face these challenges ahead of other countries around the world. With a sense of having a mission to help solve these issues, Kashiwa-no-ha Smart City has begun to set a stage for solutions that is open to everyone, based on cooperation and partnership between the public, private, and academic sectors.

We have set three themes of urban development for the city — they are, *eco-friendliness, health and longevity, and creation of new industries. Under these themes, the smart city will embody the vision of what the world will be like in the future.*

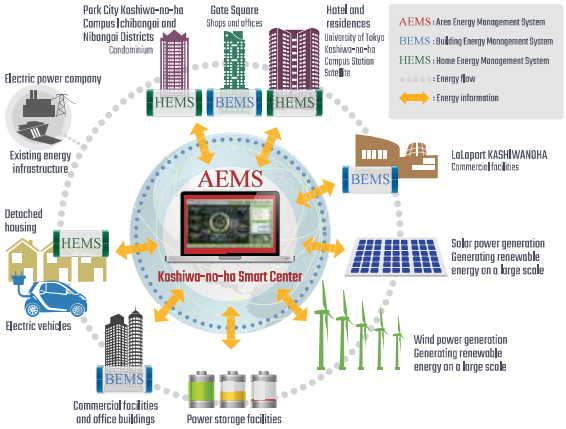
Area Energy Management System (AEMS)

Kashiwa-no-ha Smart City optimizes energy usage for the entire city. Playing the central role in this setup is the Area Energy Management System (AEMS). The city envisions the expansion of the area and the enhancement of the AEMS function, which will be enabled by combining AEMS with the development of a network of independent transmission lines. This system is designed to contribute to the progress of the smart grid that underpins lifestyles and innovations.

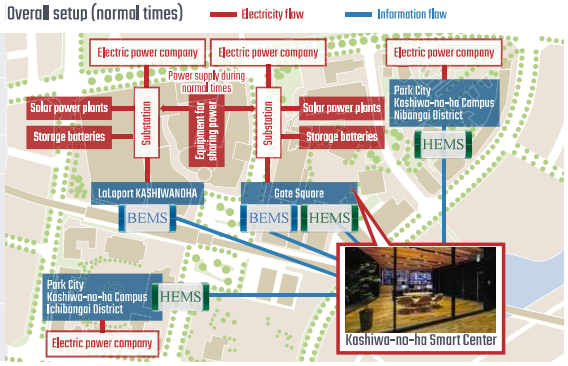
Japan's first smart grid that uses distributed power sources to share electricity in the community

The city began operating a smart grid in which energy from distributed sources, including solar power generation systems and storage cells, is shared between districts. The city uses electricity from both the electric power company and distributed power sources by using independent transmission lines, and reduces peak electricity consumption for the entire town by sharing power between districts. On weekdays, when office electricity demand is heavy, the commercial facilities supply power to the office building. On holidays, when power demand by commercial facilities is high, the office buildings supply power to the commercial facilities. This approach has enabled peak consumption to be lowered by approx. 26%, conserving energy and reducing CO_2 emissions.

CONCEPTUAL RENDERING OF
AREA ENERGY MANAGEMENT SYSTEM (AEMS)



CONCEPTUAL RENDERING OF
THE OVERALL SMART GRID (NORMAL TIMES)



Name	Kashiwa-no-ha Smart City
Development area	Approx. 273 hectares (a land readjustment project)
Type of facility	Mixed-use facility
Project implementation body	The project is being promoted in an integrated manner by a team led by the Chiba Prefectural Government and consisting of diverse organizations including universities and those from the private sectors.
Timeframe	2000 to 2023 (a land readjustment project)

Fujisawa Sustainable Smart Town (Fujisawa SST)

A town that evolves sustainably based on ideas from daily life

Fujisawa Sustainable Smart Town (Fujisawa SST), which is located in Fujisawa City, Kanagawa, is a public-private project being run by 18 organizations promoting progressive initiatives and the city government of Fujisawa.

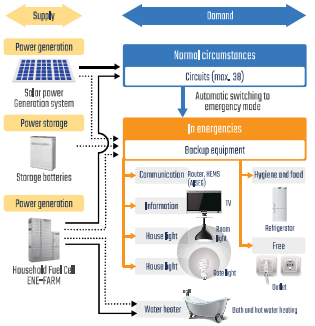
Fujisawa SST has been developed with a focus on the lives of every single resident, rather than on the infrastructure where technologies take precedence.

The project began by designing the overall town as a smart space from the viewpoint of energy, security, mobility, wellness, and community. In the final stage, the smart infrastructure that supports new life was developed.

Detached houses in this town boast extensive insulation, a high level of airtightness, efficient ventilation, and long life as features of the buildings. In addition, the Energy Creation-Storage Linked System, which consists of a photovoltaic generation system, storage batteries, fuel cells for household use, and other equipment linked together, has been introduced to all of the approximately 600 houses.

Also introduced to the houses is the Smart HEMS (Home Energy Management System) for managing the power consumption of each household, which is combined with energy-saving equipment (such as LED lights and energy-saving air conditioners). This enables residents to continue to access power even in the event of an emergency.

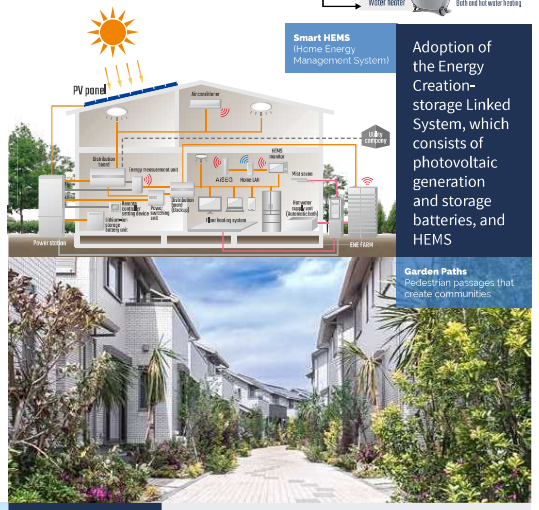
Conceptual image of emergency backup power supply system for detached houses



Overall View of Fujisawa SST

The entire town is designed to deliver light and breezes to every corner, with elements including biodiversity, green corridors, wind passages, garden paths, and underground cables, to create harmony with the local natural environment.

The garden paths (total length: approx. 3 kilometers, width: approx. 3.5 meters) are laid out in such a way that breezes are able to pass between houses. Combined with limitations on the height of the residences, the garden paths allow the solar panels of each residence to generate power efficiently, enabling comfortable, eco-friendly lifestyles and helping to improve the value of the entire town as real estate.



Name of the area	Fujisawa Sustainable Smart Town
Development area	19 hectares/ 300 meters north to south and 600 meters east to west
Facilities	1,000 residences (600 detached houses and 400 units in cluster housing), commercial facilities, health/welfare/ educational facilities, logistics facilities, facilities for the public benefit
Project implementing body	Fujisawa SST Council, which consists of Panasonic Corporation, PanaHome Corporation, and other companies and organizations
Schedule	April 2014: Opening of the town The town is planned to be completed in 2022 or later.

Funabashi Morino City

About Funabashi Morino City

In this project, which was implemented on a 17-hectare former factory site, a district plan was developed in a collaboration between the city government and private operators. The plan involved the construction of approximately 1,500 residential units, commercial facilities, a medical facility, and a childcare facility. "Smart Share Town Vision" was set as the development concept. This vision combines tangible and intangible elements. For example, areas for creating bonds between residents (spirit of sharing) are provided together with an urban infrastructure that uses cutting-edge environmental technologies (smart city). The project was selected for the Jutaku kenchiku-butsu sho-ene co2 sendo model jigyou (leading projects for promoting energy conservation and a CO2 reduction program for housing and buildings) by the Ministry of Land, Infrastructure, Transport and Tourism.

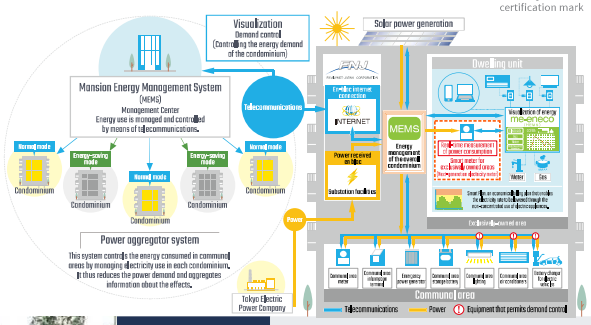
Energy

High voltage power is received en bloc by the condominium building at low cost before being distributed to the residential units. In addition, energy management of the entire condominium with ICT and panels for visualizing electricity use in each residential unit has been introduced to reduce concentrated power consumption and promote non-concentrated power consumption.

Éco Quartier certification granted for joint town development by residents and businesses

The operators promoted the establishment of the Morino City Machidsukuri Kyogi-kai (Morino City Town Association), and it was established in 2013. Residents and local companies participate in the association and discuss town development. The town became the first district outside France to obtain Éco Quartier certification (certification of an environmentally-friendly district) promoted by France's Ministry of Housing and Sustainable Homes (Ministère du Logement et de L'Habitat Durable), which rated the town development highly due to the participation of residents and the community-focused spirit.

Éco Quartier certification mark



Name	Funabashi Morino City
Development area	Approx. 17.6 hectares
Facilities	■ 1,497 residential units (five districts in total) ■ 42 single-family houses ■ Commercial facility ■ Hospital and childcare support facility
Project implementing body	Mitsubishi Corporation Nomura Real Estate Development Co., Ltd.
Construction period	Groundbreaking: 2011 Completion: 2014
Location	Kita-Honcho, Funabashi-shi, Chiba, Japan
Completion	The entire project was completed in July 2014

Introduction of passive design

Creative measures were devised to make use of natural power, including wind power and greenery.

The buildings are designed to enable the cool wind from Tokyo Bay to flow throughout the town and all residential units in summer. In addition, the introduction of equipment for growing green walls on the balconies has led to the development of town-wide greening activities.

HIGH-QUALITY JAPANESE HOUSING DEVELOPMENT

Use of Japanese construction technologies for housing complexes

Many housing complexes in Japan are developed by development companies and constructed by construction companies. To secure construction quality, Japanese development companies proactively introduce new technologies suggested by construction companies or architects. Real-estate companies and construction companies work together, with the former making use of their expertise in ensuring merchantability and the latter in construction technologies.

As for development companies, the important point is that we have internal engineering staff who can judge whether or not to introduce new construction technologies. Based on a construction manual, our employees check whether each building complies with the quality standards. We have a manual based on more than 50 years' experience, and we update it every year.

Housing performance evaluation

The performance indication system for new housing is useful for comparing housing performance. The performance of houses constructed under the performance indication system is evaluated under the same criteria, permitting a comparison of performance.

In the case of new housing, where the development company has issued a housing performance evaluation report, the company is deemed to have concluded a contract to deliver a house with the performance described in the housing performance evaluation report. The evaluation items include seismic capacity, fire-resistance performance, deterioration mitigation, and energy-saving performance.

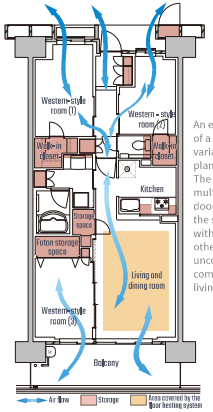
Evaluation items under the housing performance indication system (examples) (Required evaluation items for housing complexes)	
1	Structural stability (including seismic capacity, wind resistance, snow endurance, allowable bearing capacity of the ground or piles, and groundwork)
2	Deterioration mitigation (structural skeleton)
3	Consideration for maintenance and upgrades (including pipes for exclusively owned areas and pipes and drainpipes for communal areas)

Planning of housing complex

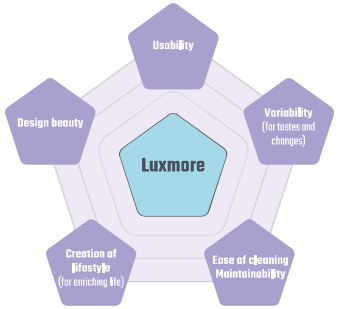
While each development company outsources construction to a construction company, it creates the uniqueness of each housing complex as merchandise based on the characteristics of the customers or property. For example, each company identifies customer needs through monitoring, questionnaire surveys of residents or other means, and creates original kitchen, bathroom, and other components by working together with a housing equipment manufacturer. Kitchens are equipped with drawer storage, and equipment such as garbage disposers and dishwasher is also introduced depending on the budget.

The wash stand has storage behind the mirror, which is common in Japan. It also has a space for a weight scale underneath it.

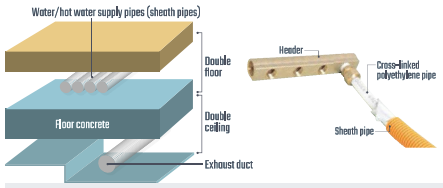
Each company makes lifestyle suggestions by planning these products and sharing information about them with the sales personnel.



An example of a highly variable floor plan.
The use of multiple sliding doors connects the spaces with each other, enabling unconstrained, comfortable living.



Examples of housing equipment.
Companies conduct questionnaires of their members and other people to identify their lifestyle needs. Based on these needs, they develop housing equipment jointly with manufacturers.



Specifications of exclusively-owned area planned in consideration of maintainability.
(Left) Electric wires, water supply pipes, and drain pipes are laid in the double floor/double ceiling part.
(Center) Cross-linked polyethylene pipes, which are corrosion-free, are used for water supply pipes in exclusively-owned areas. This is a measure for ensuring the durability of components.
(Right) Highly durable cast-iron pipes are used as drainpipes. This ensures that water can be discharged silently.

Emergency warehouses are set up in communal areas in preparation for a disaster. In addition, the condominium association conducts several disaster drills each year.

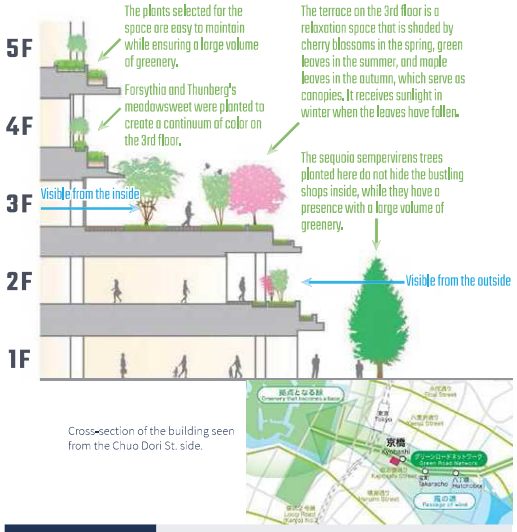
Tokyo Square Garden

Implementing environmental initiatives for future generations

Installing various state-of-the-art green technologies, Tokyo Square Garden leads the new way of urban development.

Various cutting-edge technologies of the building, such as integrated high-insulation perimeter with large eaves and Low-E double glazing glasses, geothermal heating/cooling system, natural ventilation system and others, reduce the annual energy consumption by approximately 50% compared to that of general office building of the same size.

Continuous green spaces from the sunken plaza to 30 meters above ground, Kyobashi no Oka (Hill of Kyobashi), with an area of about 3,000 square meters filled with as many as 140 species of plants cooling down the outdoor temperature, create the unique appearance of Tokyo Square Garden.



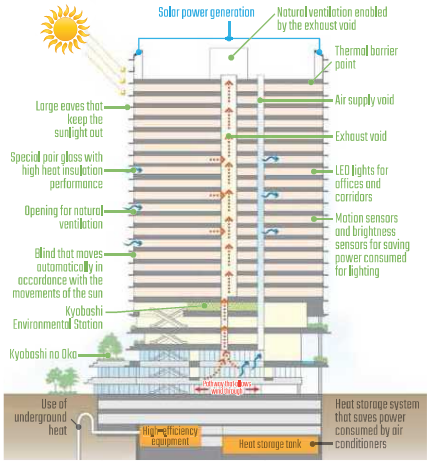
Cross-section of the building seen from the Chuo Dori St. side.

Name of project	Tokyo Square Garden
Development area	Approx. 8,131 square meters
Facilities	Offices, shops, clinic, conference room, childcare support facility
Project implementation body	Tokyo Tatemono Co., Ltd., The Daiichi Life Insurance Co., Ltd., Katakura Industries Co., Ltd., Shimizu & Co., Ltd., J & S Insurance Service Co., Ltd.
Schedule	Completed in March 2013


Kyobashi no Oka,
Lan urban oasis with flowers and greenery

The Kyobashi Environmental Station, the space provided to support the activities for CO2 reduction, is an another unique part of this building. The space is consisted from three parts; Eco-Tech Showroom exhibiting new green technologies, Environmental Information Center of Chuo Ward Office supporting community activities, and Area Energy Management Center providing energy saving consultation service for building owners.

Tokyo Square Garden achieved several major authentications in our country such as the Leading Project of CO2 Reduction in Housing & Building Sector by MLIT.



Harumi 1-chome District Urban Redevelopment Project

(Harumi Island Triton Square)

Harumi Island Triton Square is an attractive complex city where the three functions of work, play, and living are fully integrated.

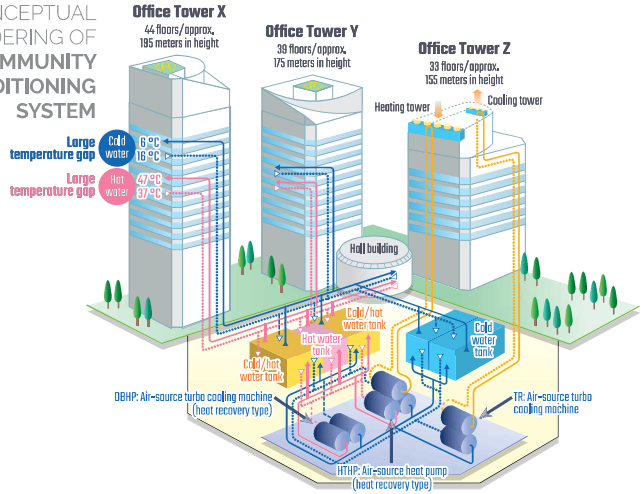
An advanced design concept is applied for facility planning, which supports the activities of the overall city as well as environmental measures. Functions for enriching life coexist beautifully in harmony with people's lives.

A highly efficient community air-conditioning system is achieved using large-scale water and heat storage tanks with a total capacity of 20,000 tons, which are installed in the ground under the facilities. This community air-conditioning system consumes 45% less energy than a standard air-conditioning system.

The total green area of the district is 6,000 square meters, and the area has more than 600 species of flowers and greenery planted in it. It serves as a relaxation space for residents and reduces the urban heat island effect.


Overall view of **Harumi Island Triton Square**

CONCEPTUAL RENDERING OF THE COMMUNITY AIR-CONDITIONING SYSTEM




Trees planted on the premises

Name of project	Harumi 1-chome District Urban Redevelopment Project (Harumi Island Triton Square)
Development area	84,800 square meters
Total floor area	671,600 square meters
Facilities	Residences 1,789 units Offices 361,400 square meters Commercial facilities 47,400 square meters Public facilities 13,700 square meters Car park 1,941 vehicles
Project implementing body	Harumi 1-chome Chiku Shigaichi Saikaihatsu Kumiai (Harumi 1-chome district urban redevelopment union) Urban Development Corporation
Schedule	Urban planning decision June 1992 Groundbreaking March 1994 Completion March 2001

DPL Sagamihara

A cutting-edge, eco-friendly logistics facility equipped with an energy management system.

Energy conservation has been enabled by introducing an energy management system, which visualizes energy consumption, permits real-time checks of data, and enables the approximately 100,000 square meter facility to be controlled with a terminal.

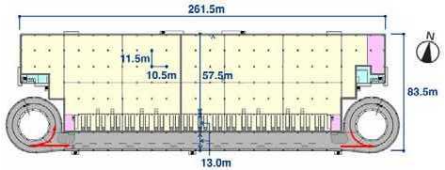
This is a cutting-edge, eco-friendly logistics facility that is equipped with a base isolation system and emergency power supply and is ready for business continuity plans (BCP), while also utilizing passive control, or the use of natural energy for ensuring energy efficiency; active control, or the use of the latest items for creating, saving, and storing energy; and smart management, which optimizes the overall facility by means of visualization.

Cutting-edge equipment that enables efficient logistics operations

With wide driveways and raised-floor truck berths on each floor, work with dozens of trucks can be undertaken at the same time.

Vertical conveyor

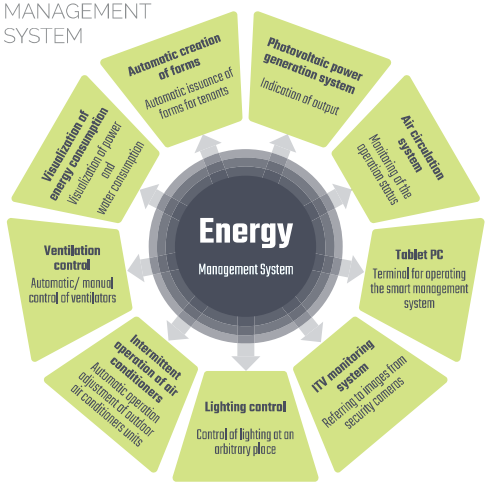
The multi-story facility has rampways that give trucks direct access to different floors.



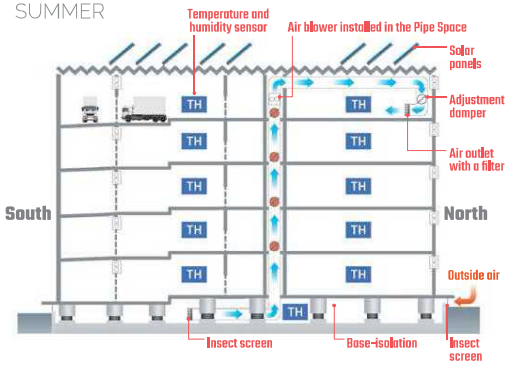
Floor plan:

The facility has two one-way ramps for incoming and outgoing vehicles, respectively, which permit passage of 40-feet trucks as well.

CONCEPTUAL RENDERING OF AN ENERGY MANAGEMENT SYSTEM



AIR CIRCULATION SYSTEM IN SUMMER



Air circulation system (cool heat trench)

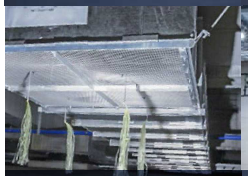
Outside air for air conditioning and ventilation is taken in via the underground base-isolation pit. The soil heat is used for precooling the air in summer and preheating it in winter to balance the temperature inside the overall building.

Name (of the district and project)	DPL Sagamihara
Development area	41,777.75 square meters
Facility	Multi-tenant logistics center
Project implementation body	Daiwa House Industry Co., Ltd.
Construction period	Groundbreaking: October 2012 Completion: December 2013

A photovoltaic power generation system is installed on the rooftop and its output can be checked with a tablet PC.

LED lights are used in the overall facility, permitting reduction of running cost.

Equipment in the warehouse is controlled with a **tablet PC.**



Air inlet in the underground base-isolation pit.

Air outlet on the top floor.

A work environment has been created as an office rather than as a warehouse.

Entrance hall with a touch of class.

The entire floor of the office is an office automation (OA) floor, which is ready for expansion and addition.

Consideration for business continuity planning in the event of a disaster (base isolation structure). A base isolation system has been installed beneath the building in preparation for a large earthquake to minimize human and property damage.