OSAKA, KANSAI, JAPAN
EXPO 2025

Kansai Electric Power Group
power with heart

The Kansai Electric Power Group:
Shaping a Future of Promise

Kansai Electric Power Group
power with heart

Serving and Shaping the Vital Platform for a Sustainable Society

In serving the vital platform that electricity provides, we have built connections. Going forward, we will serve lifestyles lit by electricity and shape the vital platform for the future.

After seven years of what was a once-in-a-century project in terms of scale, Kurobegawa No. 4 Power Station—known as Kuroyon—was completed in 1963.

In 1970, we began operating Mihama Nuclear Power Station Unit 1, Japan's first commercial pressurized water reactor (PWR).

In 1998, we were the first Japanese utility to join a power generation project outside the Japan.

In 2011, we achieved another Japan-first, by launching operations at the megasolar project.

The Kansai Electric Power Company has long served and shaped the vital platform that electricity provides and the lifestyles it offers.

There is more to come.

We will continue to help bring about a sustainable society while always looking to benefit our customers and society, through active efforts in areas such as achieving zero carbon and creating new value and services.

Zero Carbon Vision 2050

The Kansai Electric Power Group, as it works to bring about a more sustainable society as a leading company of zero-carbon energy, is aiming for carbon neutrality throughout the entirety of its business activities including power generation by 2050.

Three key approaches

Zero-carbon emissions on the demand side

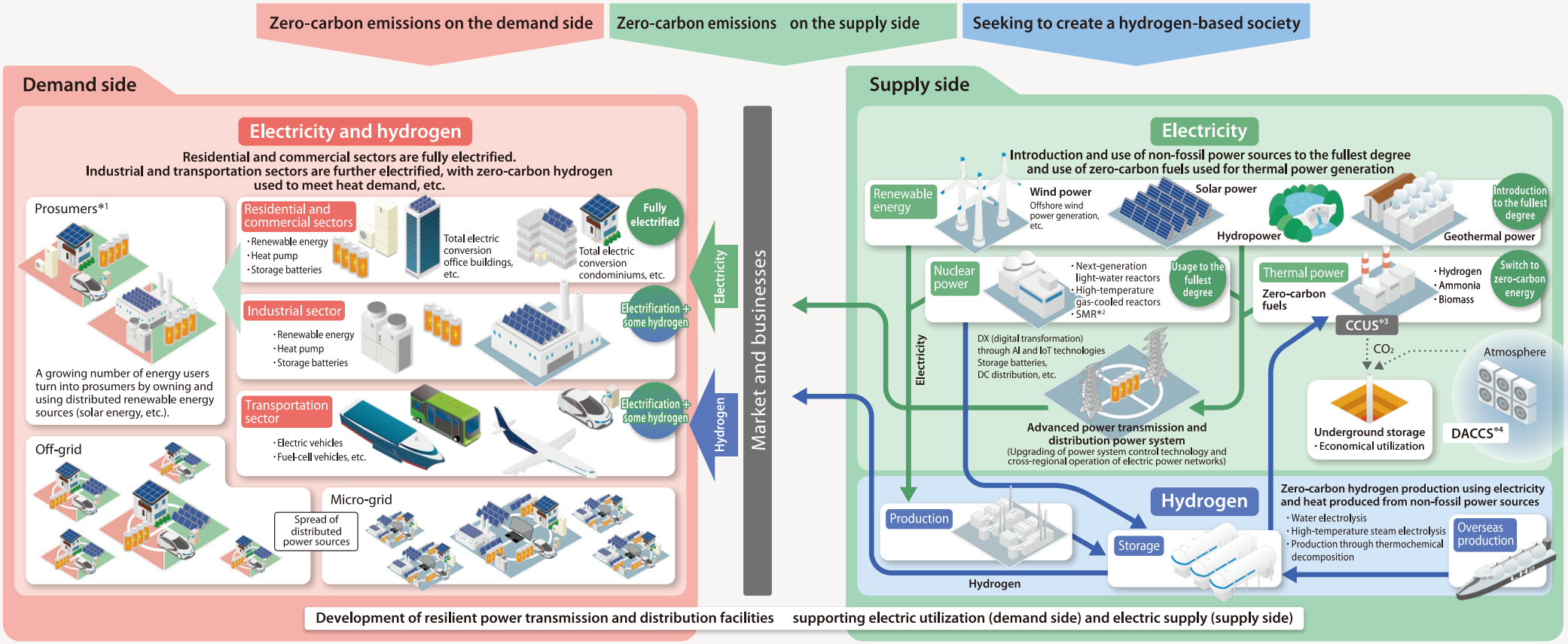
With the enlarged role on the demand side, the Kansai Electric Power Group, as a zero carbon solution provider, is pleased to provide customers with the best available solution toward zero-carbon emissions along with supporting its implementation across all sectors such as residential, commercial, industry and transportation.

Seeking to create a hydrogen-based society

As hydrogen is indispensable for a zero-carbon society, our group, as a key player working toward realizing a hydrogen-based society, will tackle the challenges to produce, transport and supply zero-carbon hydrogen with non-fossil fuels, in addition to using hydrogen for power generation.

Zero-carbon emissions on the supply side

With priority given to safety, our group will seek to achieve the best energy mix which can lead to full decarbonization, ensure secure stable supply with an increasing energy self-sufficiency ratio, and enhance economic efficiency.
Based on diversified social requests including promoting distributed energy resources and strengthening resilience, our group is making best efforts to maximize the introduction of renewable energy as a main power source, upgrade the power transmission and distribution system, and maximize nuclear power where power generation output stability and energy density are high with priority given to safety, as well as working to decarbonize thermal power generation which can flexibly adjust output to secure a stable supply despite the large-scale diffusion of renewable energy. Our group will also look to contribute to decarbonization on an international level.



*1. Prosumer: A consumer who consumes the electricity they generate while selling any surplus on the market. *2. SMR: Small Modular Reactor *3. CCUS: Technologies of Carbon Dioxide Capture, Utilization and Storage
*4. DACCS: Technologies that capture CO_2 directly from the atmosphere and store underground

Provided by: Japan Association for the 2025 World Exposition © Expo 2025

People's Living Lab: A Laboratory for A Future Society

World expositions have a magnetic appeal that brings together people from all over the globe to enjoy a wealth of attractions in support of a singular powerful theme. Osaka Expo '70, the first such event to be held in Asia, was a major attraction that symbolized Japan's coming out in 1970 as a follow-up to the country's era of rapid economic growth. Now, following the 20-year hiatus since Expo 2005 Aichi had its own successful run as the country's second world exposition, Japan is welcoming the world to Expo 2025 Osaka, Kansai.

This is where the world's wisdom and most advanced technologies have been combined to develop and display innovations that reveal their value as solutions to the common problems facing all of humanity. The innovations, technologies, and services introduced in Expo 2025, which is based on the concept of People's Living Lab, will serve as catalysts that accelerate Japan's growth and add even greater levels of convenience to our lives.

● Theme of Expo 2025 Osaka, Kansai, Japan

いのち輝く未来社会のデザイン

Designing Future Society for Our Lives

Expo Theme and Our Management Philosophy

The management philosophy of the Kansai Electric Power Group is Serving and Shaping the Vital Platform for a Sustainable Society.

We are participating in Expo 2025 Osaka, Kansai with a commitment to continue forging our vital platform to benefit the society of the future.

To date, we have maintained a record of energizing society by supporting the stability of our connections to electricity.

We pledge to continue supporting our modern way of life, powered by electricity, for years to come. We will fulfill this promise by maintaining our platform for the benefit of society well into the future. With this firm determination, we are renewing our commitment and demonstrating our vision of the future at this Expo, which represents a laboratory for a future society. Expo 2025 stands as a true milestone in our effort to overcome all challenges we encounter.

● Kansai Electric Power Group Purpose & Values

存在意義 「あたりまえ」を守り、創る

Serving and Shaping the Vital Platform for a Sustainable Society

Electric Power Pavilion Eggs of Possibilities

Provided by: The Federation of Electric Power Companies of Japan

A pavilion where all can enjoy learning about the energy sources of the future

Engagingly named “Eggs of Possibilities,” the Electric Power Pavilion enables visitors to encounter the vast potential of energy. Under the theme “New energy possibilities will pioneer a brighter future,” the exhibits look beyond carbon neutrality to depict the society of the future. Through this exciting experience, visitors can explore the potential of future energy from the unique perspective of the electric power industry, which meets most of our energy needs.

The architectural design of a pavilion that reflects the theme, Eggs of Possibilities

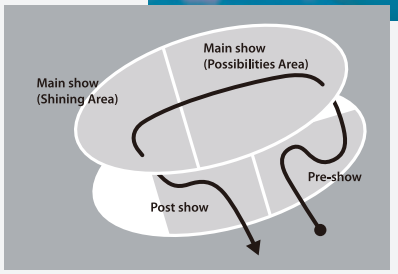
The main axis of the structure is positioned at a 15-degree angle to help ensure the maximum interior space. This intriguing egg-shaped structure, designed as a “Voronoi structure,” was constructed out of more than 2,100 steel beams. A non-flammable reflective membrane was applied over the structure, resulting in the formation of 352 individual Voronoi patterns classified into 60 types. The silver membrane not only expresses the potential of the future, but also captures the light from various angles, revealing colors that change with the weather and time of day.

Provided by: The Federation of Electric Power Companies of Japan

Shining eggs containing a wealth of possibilities

Visitors to the pavilion are provided with this egg-shaped device to carry while they stroll around the museum. Interestingly, visitors can experience the fascinating and unique properties of energy through their own bodies. What’s more, the eggs give off a soft glow every time they come into contact with a “possibility.”

Provided by: The Federation of Electric Power Companies of Japan



Structure of the pavilion

The pavilion is divided into three sections: Pre-show, Main show, and Post show. The entire exhibit takes 45 minutes to experience. Near the exit is a shop that sells original merchandise from the Electric Power Pavilion.

- Pre-show > The experience is introduced through a video presentation linked with the egg-shaped devices.
- Main show > Possibilities Area > Here, visitors encounter about 30 types of energy that are pioneering a brighter future.
  Shining Area > In this immersive show, the egg-shaped devices are linked to light and sound sources from countless LEDs.
- Post show > A panel exhibit encourages visitors to reflect on and learn from their experiences following the main show.

We believe the energy sector has a significant role to play in achieving a zero-carbon society.
We have always sought to develop an energy mix suitable for the times.
At Expo 2025 Osaka, Kansai, we are delivering zero-carbon electricity, the type of power destined to illuminate our bright future.
This power is sourced from solar power, hydropower, nuclear power, and especially hydrogen power generation facilities, which are gaining attention as a promising energy source for the future.

Provided by: Japan Association for the 2025 World Exposition ©Expo 2025

Kansai Electric Power is delivering zero-carbon electricity to the Expo site — the type of energy that will be commonplace in 2050.

MISSION

Mihama Nuclear Power Station

Himeji No. 2 Power Station

SUPPLY SIDE

From the Introduction of Nuclear Power in 1970 to the Emergence of Hydrogen Power in 2025

The electricity transmitted to Expo '70 in Osaka was nuclear power generated at the Mihama Power Station in Fukui Prefecture. The introduction of this innovative power source gave visitors of that time a glimpse of our nuclear-powered future.
Expo 2025 Osaka, Kansai is being supplied with zero-carbon electricity generated by hydrogen power and other innovative power sources.
We are demonstrating hydrogen power generation at Himeji No. 2 Power Station. This offers us a glimpse of what the future holds — a society in which everyone is familiar with hydrogen power.
In the years ahead, we will remain committed to meeting the challenge of constant innovation in the energy industry.

Trial power transmission from the nuclear power station to the World Expo venue in 1970

A pioneer in developing the future of electricity

- 1951 The Kansai Electric Power Company is established
- 1963 Construction of Kurobegawa No. 4 Power Station (Kuroyon) is completed
- 1970 Mihama Nuclear Power Station Unit 1 begins operation / Nuclear power is transmitted to the Expo venue in a trial demonstration
- 1998 We become the first Japanese utility to participate in a power generation project outside Japan
- 2011 The first mega solar power station project developed by a Japanese power company begins operation
- 2013 Units 1 and 2 at Himeji No. 2 Power Station begin commercial operation
- 2022 Triton Knoll Offshore Wind Farm Project in the UK begins operation
- 2025 Hydrogen-generated power is supplied to the Expo site

Hydrogen production facility located at the Himeji No. 2 Power Station

Demonstration Project for Hydrogen Power Generation

Himeji No. 2 Power Station

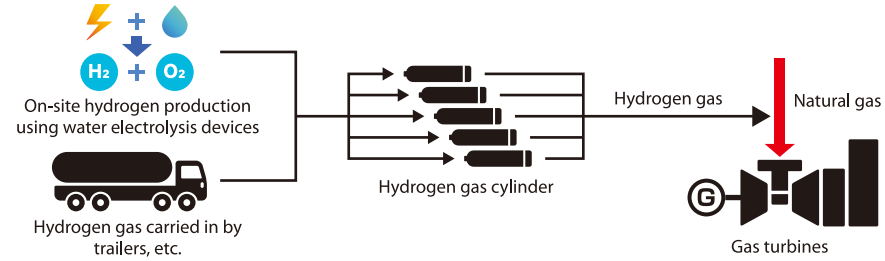
Generating hydrogen power to meet the challenge of achieving a zero-carbon society by 2050

We are focused on developing operational technologies that contribute to the emergence of hydrogen power generation to provide such power to meet public demand. In order to demonstrate hydrogen co-firing power generation during Expo 2025 Osaka, Kansai, we are making use of the gas turbine power generation facility already in place at the Himeji No. 2 Power Station.
This demonstration project is being carried out with the support of the Green Innovation Fund promoted by the Ministry of Economy, Trade and Industry (METI) and by the New Energy and Industrial Technology Development Organization (NEDO). A portion of the electricity generated by this project will be supplied to the Expo 2025 site.

A first in Japan — A hydrogen co-firing power generation system incorporating a large industrial gas turbine with a maximum hydrogen-by-volume ratio of 30%

This project entails the construction of a new hydrogen supply facility. Also, the gas turbine power generation equipment installed in the existing thermal power station is being modified.

Demonstration system process flow of hydrogen power generation



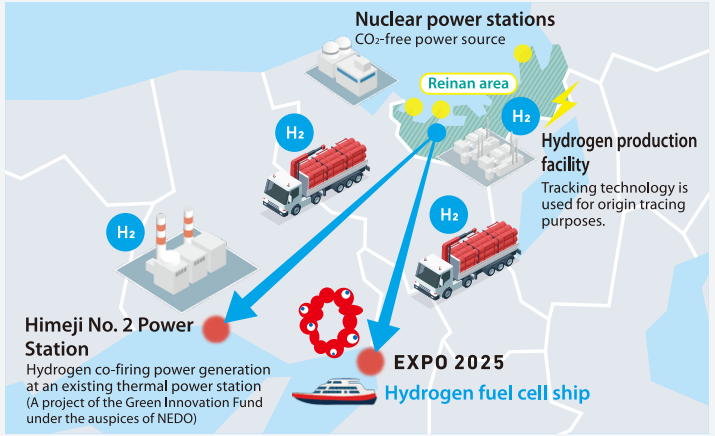
- To produce the hydrogen required for co-firing power generation, water electrolysis devices have been installed on the power station premises.
- A hydrogen gas compressor is used to compress the resulting hydrogen gas for storage in specialized hydrogen gas cylinders. It is then supplied to the gas turbine.

Hydrogen produced in Fukui Prefecture is used as part of the fuel.

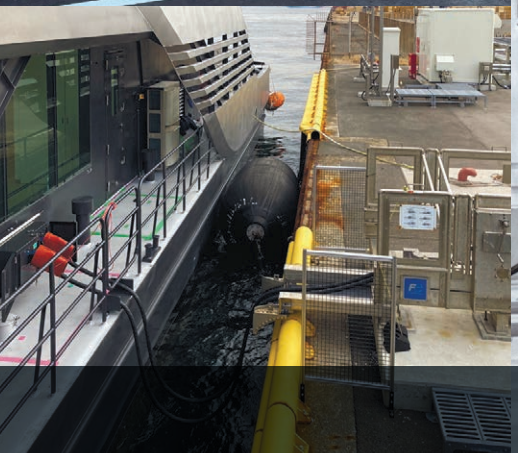
Most of the hydrogen used in this hydrogen power generation project is produced by water electrolysis devices located on the premises of the Himeji No. 2 Power Station. Efforts are also underway to produce CO_2-free hydrogen using electricity generated by our nuclear power station in the town of Oi in Fukui Prefecture. This hydrogen will be a component of the demonstration fuel used at the Himeji No. 2 Power Station. It will be used in hydrogen fuel cell ships as well.

See a demonstration of hydrogen co-firing power generation by means of augmented reality (AR).

Simply scan the 2D code and point your camera at the power station photo on the page at upper left.



Provided by: Osaka Metro



© SkyDrive

DEMAND SIDE

The Future of Land, Sea and Air Mobility: Optimizing Charging and Operation with an Energy Management System

We are developing charging facilities to support e-mobility by land, sea and air. We are also using an Energy Management System (EMS) to optimize the charging and operation of these mobility options. We developed an EMS that is integrated with an electric bus Fleet Management System for the buses that navigate and access the Expo site. We are also presenting a demonstration of dynamic wireless power transfer (DWPT), in addition to developing the charging infrastructure at the vertiport for electric vertical take-off and landing aircrafts (eVTOLs), and introducing a charging facility for hydrogen fuel cell ships. What's more, through power load leveling and efficient use of renewable energy sources, we are contributing to the emergence of a society committed to sustainable and energy-efficient smart mobility using zero-carbon energy.

Optimizing Efficient Power Usage with Our Energy Management System

One important mission we have adopted is to help people use electricity wisely. Typically, contracted power is calculated according to the month of the highest energy consumption and is maintained for one year. Our objective is to reduce peak power demand and level out the power load. By managing electricity usage from the demand side, we can suggest various measures to prevent or minimize increases in electricity costs.

In addition, we are conducting a large-scale demonstration of electric buses at the Expo site that operates under our Energy Management System. This innovation is integrated with a Fleet Management System, with the goal of ensuring the automatic and efficient operation of more than 100 electric buses. Through this initiative, we are contributing to a future in which all mobility options are fully automated.

Demonstration of Charging Facilities Suitable for Different Modes of Transportation

Accelerating technological innovation contributing to a society committed to carbon-neutral smart mobility

Land Electric buses for visitor transportation

We contributed to managing and optimizing the charging facilities for the more than 100 electric buses inside and outside the Expo site. Our objective is to use our Fleet Management System and Energy Management System to operate these electric buses automatically and efficiently. At the same time, we are demonstrating advanced technologies such as dynamic wireless power transfer and automated driving system. Thanks to these innovations, visitors can gain a glimpse into the future of mobility.

Provided by: Osaka Metro

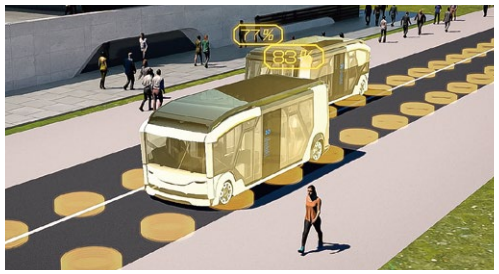
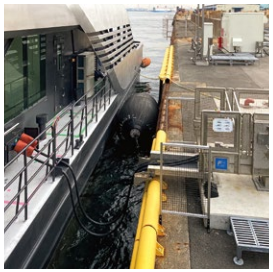


Image provided by Kansai Electric Power Company & Osaka Metro

● Dynamic wireless power transfer

Using coils embedded in the ground, this system supplies electricity wirelessly to electric buses as they travel. Since power can be supplied to a a moving vehicle, this system can be used while solar power, whose output is restricted, is available, helping to improve the utilization rate of renewable energy.



● Charging infrastructure

Charging facility for ships provided at Nanko Power Station

Provided by: Iwatani Corporation

Sea Hydrogen fuel cell ships

We have made it possible to enjoy comfortable passenger service with zero CO_2 emissions as well as minimal noise and vibration. As part of this effort, we are collaborating in a project by Iwatani Corporation to develop a hydrogen fuel cell ship. Our task is to establish an Energy Management System and introduce a ship charging facility. Our participation includes the use of nuclear power to produce and supply hydrogen as fuel.

Air Flying cars (electric vertical take-off and landing aircrafts, eVTOLs)

Flying cars are expected to alleviate traffic congestion in urban areas while providing basic transportation as well as emergency transportation for remote islands and mountainous areas and the like. “Flying car” is a generic term for eVTOLs (electric vertical take-off and landing aircrafts) that take off and land vertically and are powered by electricity. Working in collaboration with ORIX Corporation, which is sponsoring a flying car vertiport, we are in charge of developing and operating the power infrastructure. We are also providing the charging facilities, which were jointly developed with SkyDrive Inc.

© ORIX Corporation

● Charging infrastructure

Our charging facilities are installed at the takeoff and landing site called Expo Vertiport. A battery cooling unit (right) helps to prevent the battery from overheating, resulting in highly efficient charging with the quick charger (left).

FUTURE MOBILITY

Kansai Transmission and Distribution

Today's Dreams Will Soon Become Reality.

What is the "Future Life Expo: Future City"?
Through exhibits that interlink and combine the cyber and physical fields, the Future City serves as a stage where visitors can ask various questions and ponder the ideal city of the future.
Here, Kansai Transmission and Distribution, Inc. has introduced "Smart Poles," which have been defined as a next-generation platform. All these exhibits and demonstrations are intended to encourage visitors to experience the "Future City" to the full.

Demonstrations in the Future City Pavilion

The Smart Poles installed in front of the pavilion can generate electricity from wind and from perovskite solar cells. They display information on curved displays and use AI cameras to analyze the flow of visitors and find lost children. This installation provides an opportunity for evaluating the performance of Smart Pole capabilities.

Future Scope

This is an immersive experience in which visitors can create avatars of themselves that explore the Future City enabled by cutting-edge Smart Pole technology.

What are Smart Poles?

Smart Poles are multi-function poles equipped with communication base stations, public Wi-Fi, streetlights, security cameras, and more. In the event of a disaster, they can use electricity stored in batteries charged with wind and solar power to illuminate streetlights and charge smartphones. In the future, these poles can serve as a platform that provides cities with new features, such as support for autonomous driving and monitoring functions with the use of drones.

The map is for illustrative purposes only. The layout and shapes of buildings may differ slightly from the actual venue. Unauthorized reproduction or copying of this image is strictly prohibited.

The electric bus stop features zero carbon information stations.

The distinctive bus stops are designed to evoke the image of the society of the future. They incorporate various visual displays that provide information about the future of energy.

Expo 2025 is supported by these important offsite initiatives.

A Himeji No. 2 Power Station
Demonstration of hydrogen co-firing power generation

B Nuclear power stations in Fukui Prefecture
Supply of CO_2-free hydrogen derived from nuclear power generation

C Nanko Power Station
Provision of a charging facility for hydrogen fuel cell ships