

3.2 Planet (Ecosystem and Environment)

The Association aims to develop and operate venues that contribute to the realization of international agreements (such as the Paris Agreement, Osaka Blue Ocean Vision and Kunming-Montreal Global Biodiversity Framework).

[Direction to pursue]

- ① The Expo strives to reduce greenhouse gas emissions by introducing CO₂ emissions reduction technology, energy conservation technology and renewable energy.

【Background】

An international framework for reducing greenhouse gas emissions, which cause global warming, has been under discussion since the Kyoto Protocol came into effect in 2005. In December 2015, at the 21 Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) held in Paris, the Paris Agreement was adopted as a fair and effective framework with the participation of all countries. The Paris Agreement set a global long-term goal to keep the average temperature increase from pre-industrial levels well below 2°C (the 2°C target) and to limit it to 1.5°C, and to balance anthropogenic greenhouse gas emissions and anthropogenic sinks in the second half of this century. In addition, an agreement was reached for further promotion of measures to combat global warming, such as requiring each country to develop a long-term low-greenhouse gas development strategy and update the target to a higher greenhouse gas reduction every 5 years. According to the Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report, it is highly necessary to reduce CO₂ emissions to net 0 or negative by the early 2050s in order to keep temperature rise below 1.5 degrees Celsius.

In its Global Warming Countermeasures Plan announced in February 2025, Japan aims to achieve net zero greenhouse gas emissions by 2050, in other words, net zero by 2050, based on the idea that measures against global warming are no longer a constraint on economic growth, but that proactive measures against global warming will lead to significant growth by transforming the industrial structure and society. In addition, as an ambitious target consistent with the 2050 target, Japan aims to reduce greenhouse gas emissions by 46% in FY 2030 from FY 2013, and will continue to take on the challenge of 50%. In addition, as an ambitious target consistent with the global 1.5°C target and the linear path toward net zero by 2050, Japan aims to reduce greenhouse gas emissions by 60% and 73%, respectively, from FY 2013 in FY 2035 and FY 2040. The Seventh Strategic Energy Plan, published in February 2025, sets out the following direction for energy policies toward fiscal 2040, with the aim of achieving carbon neutrality by 2050.

- From the perspective of achieving both stable energy supply and decarbonization, we will maximize the use of renewable energy as our major power source and we will aim for a balanced power generation mix that does not excessively depend on specific power sources or fuel sources.
- To realize a transition to a resilient energy supply-demand structure that can withstand energy crises, we will promote thorough energy efficiency improvement and fuel switching within the manufacturing, while maximizing the use of decarbonized power sources such as renewables



and nuclear power, both of which contribute to energy security.

- From the perspective of promoting a transition to a supply-demand structure that can withstand energy crises, the importance of thorough energy efficiency improvement remains unchanged. In addition, electrification and a shift to non-fossil fuel sources will be of unprecedented importance in promoting emission reduction measures toward 2050.
- Hydrogen and its derivatives (including ammonia, e-methane, and e-fuels) are expected to be utilized in a wide range of fields and are key energy sources for achieving carbon neutrality. Promote the decarbonization of thermal power by utilizing hydrogen, ammonia, CCUS, etc..
- CCUS can achieve decarbonization in areas that are difficult to decarbonize through electrification and a shift to non-fossil sources using hydrogen and its derivatives.
- CDR is necessary as a means to offset residual emissions.

Source: Excerpt from The 7th Strategic Energy Plan (Outline) (Cabinet decision, February 2025)

In addition, with the aim of achieving a decarbonized society, an increasing number of local governments have announced their commitment to achieving net zero CO₂ emissions by 2050. Osaka Prefecture and Osaka City, the hosts of Expo 2025 Osaka, Kansai, Japan, have also announced their commitment to zero carbon city by 2050 and are further promoting their efforts toward decarbonization.

Furthermore, the GX2040 Vision (February 2025) sets out the direction of the GX (Green Transformation) policy, which aims to achieve a stable energy supply, economic growth, and decarbonization at the same time. In addition to efforts to achieve the desired industrial structure and the promotion of GX industrial location, such as the acceleration of industrial agglomeration with a view to the use of decarbonized power sources, efforts in individual fields such as energy will be promoted to accelerate GX.

In the economic field, the Task Force on Climate-related Financial Disclosures (TCFD), which was established by the Financial Stability Board (FSB) at the request of the Group of 20 Finance Ministers and Central Bank Governors, formulated recommendations in June 2017 to promote efficient disclosure of information with consistency, comparability, reliability, and clarity to promote appropriate investment decisions regarding climate change factors. The recommendations recommend companies to understand the risks and opportunities of climate change that affect their business activities and to disclose governance, strategy, risk management, and metrics and targets. In Japan, Prime Minister Kan announced at the TCFD Summit hosted by the Ministry of Economy, Trade and Industry in 2020 that Japan would contribute to global decarbonization by creating innovations to achieve "Beyond zero," which would reduce cumulative CO₂ emissions, and by presenting a picture of a "virtuous cycle of environment and growth," and that the Japanese government would support the TCFD. The Corporate Governance Code (CGC), revised in June 2021, requires companies listed on the Prime Market of the Tokyo Stock Exchange to disclose information based on the TCFD or an equivalent framework. While the TCFD ceased operations in October 2023, the International Sustainability Board (ISSB), established under the International Financial Reporting Standards (IFRS) Foundation, has taken over its efforts. The Financial Accounting Standards Foundation (FASF) Sustainability Standards Board (SSBJ) published a domestic version of its sustainability disclosure standards based on the ISSB standards in March 2025.

【Details of the initiative】

In response to these energy policy directions, efforts at the Expo were pursued from two



perspectives. The first was to work toward carbon neutrality by using technologies that were advanced and economical as of 2025 yet adoptable. The second was to present and allow visitors to experience advanced technologies and systems that should be developed with a view to 2050 in order to realise a decarbonised society in Japan by 2050. The initiatives were implemented with these two perspectives in mind.

【Main items to be implemented】

< A forum for formulating and discussing policies for implementing decarbonization initiatives. >

Specific consideration of the direction of decarbonisation-related efforts at the Expo began at the "Committee for the Study of Environment and Energy in the Future Society," which was held 10 times between January and June 2021. The committee considered the direction of the environment and energy that should be communicated at the Expo, as well as the technologies that will be important in realising this and the first edition of the "EXPO 2025 Green Vision" was released."

In addition to outlining the direction the Expo should pursue, the vision identifies energy management, hydrogen energy and CO₂ capture and utilisation as priority technologies for further consideration. It also highlights other technologies that may require government demonstration funding for their introduction, those that need longer lead times, and those that could influence the development of the Expo site's infrastructure. The vision also states that consideration will continue to be given to introducing demand-side technologies and mechanisms for promoting visitor understanding.

To materialize the demonstration and implementation projects of the technologies described in EXPO 2025 Green Vision, the "EXPO 2025 Green Vision Implementation Task Force" was established and nine investigative committees and working groups were held by April 2022, with further discussions taking place in collaboration with the New Energy and Industrial Technology Development Organisation (NEDO) and the Ministry of Economy, Trade and Industry. A "Sustainability Expert Committee" was established in December 2021 and revisions to the EXPO 2025 Green Vision were carried out in parallel with the task force's discussions. The revised EXPO 2025 Green Vision was positioned as part of the "Sustainability Policy of Expo 2025 Osaka, Kansai, Japan," which aims to achieve overall sustainability at the Expo, and was announced at the same time as the policy in April 2022. Further discussions on realising the vision were transferred to the "Decarbonisation Working Group" under the Sustainability Expert Committee. Over 9 sessions held between July 2022 and January 2025, the working group reviewed supply-side technologies outlined in the first and revised EXPO 2025 Green Vision and examined demand-side initiatives such as promoting behavioural change and calculating greenhouse gas emissions. These discussions summarised initiatives that will contribute to the decarbonisation of Expo operations both inside and outside the Expo site and presented a concrete image of a decarbonised society.

Based on the discussions within the same working group, the revised version of the 2025 Green Vision is updated and published every year, with the final version published in March 2025. The greenhouse gas emissions estimates, and various initiatives described in the vision were also included in the "Sustainability Action Plan of Expo 2025 Osaka, Kansai, Japan," which was



formulated after discussions at the Sustainability Expert Committee.

Furthermore, working groups were held during the conference to follow up on the progress of the initiatives and after the conference concluded, a draft of this report was compiled and the results were reviewed.

< Calculation of Greenhouse gas (GHG) Emissions >

- Greenhouse gas emissions associated with the Expo have been calculated, validated by a third party and published referring to GHG Protocol, an internationally widely used calculation method and are projected to be in the Business as Usual (BAU) scenario in which no special measures are implemented. With the end of the Expo, greenhouse gas emissions have been calculated based on available actual values.



Figure 3-2-1 Validation report of greenhouse gas emissions calculation results under BAU

Table 3-2-1 Prerequisites for calculating greenhouse gas emissions

Organisational boundary	The organisational boundaries are set by referring to the operational control approach in GHG Protocol and include the Japan Association for the 2025 World Exposition, the organising body of the Expo, as well as participating countries and companies.
Operational boundary	The Operational boundary includes direct GHG emissions (Scope 1) and indirect emissions (Scope 2 and Scope 3) that fall within the defined organisational boundary. In addition, following the carbon footprint calculation approach used for the 32nd Olympic Games (Tokyo 2020) and the Tokyo 2020 Paralympic Games, the calculation scope has been expanded to include indirect emissions (Scope 3) from visitor activities. These activities include travel, accommodation, eating and drinking, and the purchase of officially licensed merchandise, even though they fall outside the defined organisational boundary.
The main subject of evaluation greenhouse gases	Carbon dioxide (CO ₂), hydrofluorocarbons (HFCs)
Geographical boundary	Association offices located inside and outside the Expo site and parking lots outside the site.
Temporal boundary	January 2019 - March 2027 (From the establishment of the Expo Association to the planned completion of the Expo site removal work). *Dates: April 13th to October 13th, 2025 (184 days)
Scope 1 and 2 Evaluation Scope	Inside the Expo site: during the event Off-site: January 2019 - March 2027 For the future period up to March 2027, when actual figures are unavailable, calculations are made based on estimates from actual results.
Scope 3 Evaluation Scope	January 2019 - March 2027 For the future period up to March 2027, when actual figures are unavailable, calculations are made based on estimates from actual results.



(note) At the time of the BAU calculation, the Expo site demolition work was scheduled to be completed by March 2027, but this has been updated to reflect the current situation in order to make the calculation range more accurate to the actual situation. The items affected by the difference in evaluation periods between BAU and actual values are shown in Table 3-2-3.

Table 3-2-2 Main external sources used to calculate GHG emissions

Name /Source	Version and items used
LCI Database IDEA, IDEA Lab in the Research Institute of Science for Safety and Sustainability in National Institute of Advanced Industrial Science and Technology (AIST)	BAU calculation: Ver. 3.4.1 (September 2, 2024), LCIA results_GWP, Climate Change IPCC 2021 without LULUCF, AR6, GWP 100a. Actual calculation: Ver. 3.5.1 (May 30, 2025), LCIA results_GWP, Climate Change IPCC 2021 without LULUCF, AR6, GWP 100a.
GHG Emissions Calculation and Reporting Manual, Ministry of the Environment and Ministry of Economy, Trade and Industry	BAU calculation: Ver5.0 (February 16, 2020) Actual calculation: Ver6.0 (March 10, 2020)
Emissions intensity database for calculating greenhouse gas emissions of organisations throughout the supply chain, Ministry of the Environment	BAU calculation: Ver. 3.4 (March 2024) Actual calculation: Ver. 3.5 (March 2025)

Table 3-2-3 GHG emissions calculation results

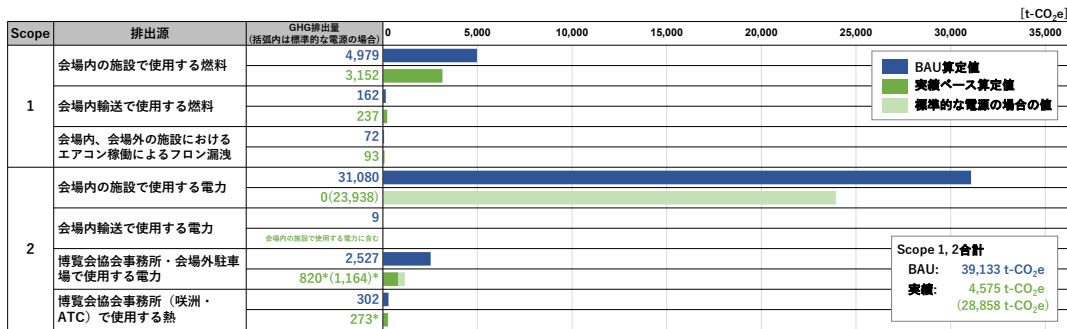
Scope/Category	Emission source	GHG emissions (t-CO ₂ e)	
		BAU	Based on actual figures
Scope 1	Fuel used at facilities in Expo site	4,979	3,152
	Fuel used for transportation within the Expo site	162	237
	Leakage of fluorocarbons due to operation of air conditioners in facilities inside and outside the Expo site	72	93
Scope 2	Electricity used at facilities inside and outside the Expo site	31,080	0 (23,938)
	Electricity used for transportation within the Expo site	9	Included above
	Electricity used by the Expo Association office and parking lots outside the Expo site ^{*1}	2,527	820 ^{*2} (1,164) ^{*2}
	Heat used at the Expo Association Office (Sakishima, ATC)	302	273 ^{*2}
Scope 1 and 2 total		39,133	4,575 (28,858)
Scope 3	Category 1 Operations (purchasing goods and services)	113,974	119,456 ^{*2}
	Category 2 Construction and infrastructure development	361,700	357,274
	Category 3 Fuel and electricity used ^{*1}	14,283	3,309 ^{*2}
	Category 5 Waste generated during the event	2,749	1,365
	Category 6 Business trips by Expo association staff	3,545	3,572 ^{*2}
	Category 7 Commuting for Expo association staff and transportation for volunteers and related parties to the Expo site ^{*1}	2,533	14,576 ^{*2}
	Category 12 Construction waste, including building and infrastructure demolition	167,343	166,861 ^{*2}
	Others Visitor transportation, accommodation, food and drink (within the Expo site), shopping (within the Expo site and official licensed merchandise)	2,858,622	2,199,221
Scope 3 total		3,524,747	2,865,635
Total GHG emissions		3,563,880	2,870,210 (2,894,493)

The figures in parentheses represent the values obtained by applying standard GHG emission factors (equivalent to the location-based method)

*1 This includes emissions resulting from the extension of the performance-based evaluation period from BAU.

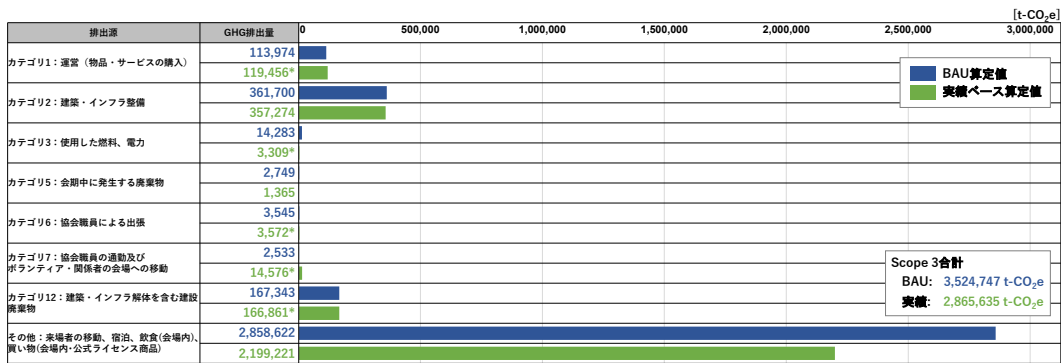
*2 This includes projected emissions for the Expo Association's post-event operations (up to February 2028). Furthermore, the association plans to receive a corresponding amount of credits for Scope 1 and 2 emissions (during fiscal year 2026).





* This includes projected emissions for the Expo Association's post-event operations (up to February 2028).

Figure 3-2-2 Comparison of Scope 1 and 2 emissions



* This includes projected emissions for the Expo Association's post-event operations (up to February 2028).

Figure 3-2-3 Comparison of Scope 3 emissions

While calculating actual greenhouse gas emissions, measurements of energy usage within the Expo site, the types of energy sources and the number of related parties and visitors were applied as activity data. After the reduction efforts, Scope 1 and Scope 2 emissions were approximately 4,700 t-CO₂e, representing a reduction of approximately 88% compared with BAU emissions. The following section describes the status of Scope 1 and Scope 2 emissions and provides analysis focusing on Scope 3 categories that showed significant increases or decreases compared with BAU emissions.

a) Scope 1

Emissions originating from the combustion of city gas used in the heat-source equipment supplying chilled water for air conditioning to facilities within the Expo site, as well as LPG used in each facility, accounted for the majority of total emissions, and the overall result was below the BAU emission level.

First, regarding “Fuel used at Expo site facilities”, Emissions from city gas were set based on actual utility usage at the 2005 World Exposition, Aichi, Japan (EXPO 2005 Aichi, Japan). Twenty years have passed since EXPO 2005 Aichi, emissions from city gas have fallen below BAU levels due to improvements in the efficiency of heat supply systems, the introduction of renewable energy sources such as seawater thermal and aquifer thermal storage and the implementation of energy management. In contrast, emissions from fuels other than city gas exceeded BAU levels because of higher-than-expected use of LPG for cooking and other purposes and the use of internal combustion engine generators installed independently by each facility.

Regarding “Fuel used for transportation within the Expo site,” the number of vehicles associated with event personnel exceeded the level assumed in the initial plan. Regarding “Leakage of



fluorocarbons due to operation of air conditioners in facilities inside and outside the Expo site,” the number of facilities utilizing chilled water was lower than planned, resulting in increased use of individual air-conditioning systems. Consequently, emissions in both categories exceeded the BAU emission level.

b)Scope 2

As the electricity used at the Expo site and the park-and-ride parking lot outside the site during the event was sourced from non-fossil fuel power, overall emissions were significantly lower than BAU levels. As for the actual results, emissions were recorded for the electricity and heat used at the Association’s offices, where the procurement of non-fossil power sources proved difficult.

Furthermore, assuming that the electricity procured came from a general power source, the actual emissions value remained lower than BAU levels. As with Scope 1 city gas emissions, the BAU emissions for this item were set based on the results of EXPO 2005 Aichi, Japan and this result is thought to be due to the energy savings achieved through higher efficiency equipment and energy management.

c)Scope 3 Category 2 (Construction and infrastructure development)

Additional GHG emissions were generated in connection with infrastructure works undertaken in response to the occurrence of methane gas. In contrast, many facilities were constructed using wooden structures rather than the typical steel frame construction assumed in the BAU emissions calculation and a significant number of facilities were built using membrane structures that require fewer materials. As a result, actual greenhouse gas emissions from construction were lower than BAU levels, even though many pavilions with complex structures and designs were built, and Category 2 emissions as a whole also fell below BAU levels.

d)Scope 3 Category 7 (Commuting for Expo association staff and transportation for volunteers and related parties to the Expo site)

For this category, emissions were estimated on the assumption that commuting to the Expo site would be carried out by the Association staff, pavilion staff and volunteers. In practice, individuals entering the Expo site using official admission passes (“AD passes”) were not limited to these groups and also included those involved in one-off events and those working in business facilities. As a result, emissions significantly exceeded the BAU setting and led to an increase in GHG emissions.

e) Scope 3 Other (Visitor transportation, accommodation, food and drink (within the Expo site), shopping (within the Expo site and official licensed merchandise))

Emissions from visitor activities, particularly those related to travel, were significantly lower than BAU levels, and this category as a whole also fell below BAU emissions. Two factors can be identified as contributing to the reduction in emissions associated with visitor transportation: the points of origin of visitors and the modal split.

First, with respect to points of origin, both the proportion and the absolute number of international



visitors were lower than the levels assumed under the BAU scenario. Domestically, although the number of visitors from Osaka Prefecture increased substantially and the number of visitors from the Kanto region also rose, visitor numbers from other regions were generally below the BAU assumptions.

Next, with respect to the modal split, a decline in air travel occurred as the number of international visitors fell below the BAU assumptions. In addition, the shares of private cars, shuttle buses, and chartered buses were lower than those assumed under the BAU scenario, while the share of rail transport significantly exceeded the BAU assumption. These factors indicate a shift toward transportation modes with lower emission factors.

In addition to the fact that the actual points of origin and modal split of visitors shifted in ways that reduced GHG emissions compared with the BAU scenario, further reductions were achieved through the electrification of shuttle bus services—including those operating on the Sakurajima Station routes—and through the effective procurement of 100% renewable electricity for the Osaka Metro Chūō Line serving Yumeshima Station, the nearest station to the Expo site. As a result, emissions from this category, which accounts for the largest share of Expo-related GHG emissions, also fell below the BAU level.

Details of the efforts that contributed to reducing GHG emissions are provided below. It is expected that the remaining Scope 1 and 2 emissions of approximately 4,700 t-CO₂e will be offset by procuring and paying for the equivalent amount through clean gas certificates (mandatory in the procurement specifications) and J-Credits (donations from Osaka Prefecture) via the donation box at Osaka Prefecture's "MOZUYAN Expo.Green Community Chest" Details of these carbon credits are provided below.

< Efforts to reduce greenhouse gas emissions >

(1) Thorough promotion of energy conservation

- Improving efficiency of air conditioning at each facility

For the Expo site's air conditioning, a district cooling system was introduced in which chilled water for air conditioning is produced centrally at a chilled water plant and supplied to multiple buildings through pipelines. The water plants are distributed throughout the Expo site and are operated through remote monitoring and control from a central monitoring facility. An automatic control system enables efficient operation and visualisation, including control of the number of heat sources, prediction of heat load and reduction of the power required to transport chilled water. In addition, as renewable energy sources, an aquifer thermal storage system is installed (which pre-cools groundwater in winter for use as cooling water in summer) and equipment that uses seawater as cooling water for refrigeration units is also installed.





Figure 3-2-4 the location of the chilled-water supply processing facility for air-conditioning

- Visualisation of energy consumption

Power and lighting demand at each pavilion varied according to performance content, while air conditioning demand was expected to be broadly proportional to total floor area. On average, approximately 40% of energy demand was for air conditioning. Accordingly, each pavilion was encouraged to implement energy-saving measures with a focus on air conditioning. Specifically, for pavilions and other facilities that opted to participate, systems were provided that integrate various sensors with AI technologies to enable optimal management of air-conditioning, thereby improving cooling efficiency. The system was installed in 11 pavilions and Association facilities. Although the control systems implemented varied across pavilions and other facilities, energy savings of up to approximately 30 percent were achieved.

A system was introduced to encourage facility users to adopt more energy-conscious behaviour by visualising energy usage data for pavilions and other facilities within the Expo site. This system not only provided information on daily energy-use conditions but also supported routine reviews by offering data such as comparisons of energy consumption with other facilities and energy-use patterns under different weather conditions. Although the number of pavilions and other facilities that made active use of the system was limited, those that did employ it expressed appreciation for being able to obtain detailed data on their daily energy consumption. One possible reason for the limited uptake is that, at the Expo, visitors frequently entered pavilions and other facilities after waiting outdoors in extreme heat. As facility managers prioritized visitor comfort, energy-saving measures comparable to those implemented in conventional office settings proved difficult to achieve.





Figure 3-2-5 user interface of the energy visualization system

• Energy consumption reduction measures at each pavilion

Expo Association provided participants with guidelines outlining the planning and management requirements necessary for pavilion design. These guidelines encouraged the implementation of highly energy-efficient and environmentally sound practices to the fullest extent possible, including energy-conscious facility construction, the procurement of building materials, equipment, and devices with low environmental impact, and the adoption of the Comprehensive Assessment System for Built Environment Efficiency (CASBEE).

3-4-2. Energy and Global environment

C-23 Participants must install equipment and apparatus with high energy efficiency.

With regard to the apparatus covered by the Top Runner Programme, participants must install the ones that satisfy the programme's energy saving criteria. (However, this does not apply when the participant will install leased and/or reused apparatus to reduce waste.)

G-14 In order to achieve carbon neutrality, it is recommended that participants should proactively pursue energy saving and the adoption of renewable energies in designing their pavilion.

Please note that the Organiser plans to develop sustainability standards for Expo 2025, Osaka, Kansai, Japan to be published in the future.

G-15 It is recommended that participants should adopt heat insulating/shielding methods and materials for the pavilion exterior (roof/outer wall/window/floor) or introducing eaves etc. as sunshine blinds to reduce heat loss/gains.

G-16 It is recommended that participants should adopt methods that use natural energy such as natural ventilation and natural lighting.

G-17 It is recommended that participants should adopt renewable energy systems such as solar power generation and wind power generation.

G-18 It is recommended that participants should adopt the EMS (energy management system) that enable monitoring of energy usage by intended use (air conditioning, ventilation, lighting, hot-water supply, wall sockets, etc.) and/or by apparatus.

Participants are encouraged to strive to reduce energy consumption by quantifying the usage of energy and adopting energy efficient systems.

G-19 It is recommended that participants should adopt equipment with lower ozone depletion potential and global warming potential values.

G-20 It is recommended that participants should install equipment with low Nox emissions.

(Source: Excerpt from the Design Guidelines for Type A (Self-Built) Pavilions)



(2) Electrification and Utilisation of decarbonised power sources

The vision of a carbon-neutral society is to use electricity as an energy source wherever possible, with an emission coefficient of zero, and this approach was also applied at the Expo.

Electricity with a zero-emission coefficient was introduced at the Expo site and in the offsite parking lot (Expo P&R parking lot). Specifically, electricity at the Expo site was sourced from renewable energy, nuclear power and hydrogen power, while electricity at the offsite parking lot (Expo P&R parking lot) was sourced from renewable energy. The procured power sources included solar power generated by a mega solar power plant on site. In addition to electricity supplied by the Association, each pavilion and other facilities also considered the use of renewable energy by installing their own solar power generation equipment.

Furthermore, electric vehicles were introduced for buses inside and around the Expo site, waste transport vehicles and related applications, and electrification was promoted in air conditioning facilities, with electric chilled water plants operated prior to gas chilled water plants. However, LPG was used for cooking, water heaters and other applications where electrification was difficult, resulting in greenhouse gas emissions.

For city gas used in cooling facilities within the Expo site—where achieving actual GHG reductions was difficult—the Expo Association procured “carbon-neutral gas,” for which emissions had been offset. J- Credits were used for offsetting and Clean Gas Certificates, which transfer environmental value from e- methane and biogas, were also used in part. Furthermore, regarding the use of gases such as LPG within the Expo site, the "the Procurement Code (3rd Edition)" issued in May 2024 stipulates that "when electricity, city gas or LPG is used within the Expo site, carbon-neutral sources must be used." Gas procured by the Association and by participants complied with this requirement, and carbon credit-certified gas was introduced.

The amounts of electricity and gas used within the Expo site during the event are as follows:

Table 3-2-4 electricity and gas consumption within the Expo site

Classification	Usage amount	Remarks
Electricity (grid)	59,696,650kWh	Solar power 45.2%、Hydropower 18.6%、Nuclear power35.8%、Hydrogen 0.4%
Generator	440,971kWh	
City Gas	877,146m ³	Credit:531,977m ³ equivalent、Clean Gas Certificates: Equivalent to 345,169m ³
LPG	141,522m ³	Specify the Procurement Code for credit allocation

* The electricity (grid) usage figures cover the period from April 13, 2025 to October 13, 2025, and the City Gas usage figures cover the period from April 1, 2025 to October 31, 2025. For generators and LPG, the meter reading dates vary depending on the reporter, so while the period includes the conference, there is no unified timeframe.

Before the start of the event, there were concerns that peak power demand might exceed expectations, but the event concluded with sufficient available capacity. This outcome is considered to have resulted from the difficulty of estimating the energy consumption of facilities with unprecedented designs for a short-term event such as the Expo.

Although each facility had surplus electricity capacity, facility managers were concerned about



potential power shortages and installed regular generators to operate in parallel with the supplied electricity. They also installed generators to power additional equipment that had not been anticipated initially. These factors resulted in additional GHG emissions, which represented a challenge.

(3) Introduction of synthetic fuels and renewable diesel

For on-site logistics of waste and other materials, four electric vehicles have been introduced and for other vehicles, fuel-efficient vehicles, synthetic fuels and renewable diesel are being used.

(4) Transportation demand measures

To ensure the safe and smooth movement of the Expo visitors and to minimise the impact on the flow of people and goods supporting socio-economic activities in the Osaka-Kansai region, the Council for Visitor Transportation Measures for Expo 2025 Osaka, Kansai, Japan (hereinafter referred to as the "Council") was established in July 2021. The Council consisted of academic experts, relevant government agencies and related organisations and coordinated discussions on specific measures for visitor transportation.

The "The Expo 2025 Osaka, Kansai, Japan Basic Policy on Visitor Transportation" was established in June 2022, followed by the first Edition of "The Expo 2025 Osaka, Kansai, Japan Specific Policy on Visitor Transportation (Action Plan)," which outlined specific initiatives to realise the basic policy. The fifth (final) edition of the action plan was published in December 2024. The action plan included plans for access routes and details of traffic management initiatives.

(Outline of the action plan)

- Try to curb the use of private cars as much as possible and encourage people to use public transportation (trains and buses).
- Visitors who have no choice but to use their own vehicles due to difficulties in using public transportation will be guided to use of site external parking lots (P & R) in Amagasaki and Sakai by setting fees for site external parking lots (P & R), etc. With respect to the site external parking lot in Maishima, the use of such parking lots will be restricted to the extent that it would not affect shuttle bus service or logistics traffic.
- All Sakurajima Station shuttle buses and Maishima P&R shuttle buses will operate as EV buses, and EV chargers will be installed at Yumeshima Transportation Terminal 2 and the Maishima Expo P&R parking lot to provide the charging capacity required for EV bus operations.
- The Expo will adopt Ticket Control that discounts the price of admission tickets in the first half of the period when tickets are sold, and systems for reserving admission time to the site and parking lot entry time to equalise the peak of the day and time of visit.
- The implementation of measures to increase provision of transportation supply-side measures such as increase the number of trains, Utilise the Yodogawa-Sagan Route (2nd terms), expansion of road traffic capacity.
- Since the implementation of measures for visitor transportation, such as demand-levelling measures and measures to expand transportation supply, does not fully solve traffic problems, the implementation of Transportation Demand Management (TDM) should be encouraged in order to control, disperse, and level general traffic.

- 142 EV buses were operated per day on shuttle buses to Sakurajima Station and the Maishima Expo Park & Ride Parking Lot. To ensure the necessary number of buses and reduce traffic on surrounding roads, EV chargers were installed at the Yumeshima No. 2 Transportation Terminal



and the Maishima Expo Park & Ride Parking Lot on the Expo site side to reduce the number of vehicles sent out for charging. Furthermore, the system authenticated each EV bus, allowing for proper tracking and management of the operating status of charging equipment at the transportation terminals and the amount of charge on the EV buses. The system also worked with each bus operator to reflect this information in operational management, ensuring efficient operation. For non-routed bus services, efforts were made to decarbonise by using domestically produced synthetic fuels.

- With the cooperation of the bus companies, EV buses were operated as commuter buses for construction personnel engaged in Expo site preparation work. In addition, electric mobility vehicles were introduced to facilitate movement of personnel within the Expo site.
- Construction Bureau, Osaka City Government and Expo Association held “the Expo Bicycle Access Council” to consider safe and smooth ways to access the Expo by bicycle and other means. The council considered bicycle access and traffic safety measures for visitors, as well as fostering momentum in cooperation with surrounding municipalities. As a result, the cumulative number of bicycles used during the event was approximately 20,000, with an average of approximately 100 bicycles used per day.

(5) Use of biodiesel in Expo site construction

- During construction work within the Expo site, many businesses demonstrated the use of B100 fuel (100% biodiesel fuel) and RD (renewable diesel) made from waste cooking oil in construction machinery such as hydraulic excavators, forklifts and generators. In addition, a hydrogen–ethylene mixed gas was used as an alternative to acetylene as cutting gas in some facility construction work, reducing CO₂ emissions and the environmental impact throughout the entire construction process.

(6) Reducing GHG emissions across the value chain

- In the Procurement Code standards were established regarding the promotion of energy conservation, the use of low-carbon and decarbonized energy, initiatives that contribute to the reduction of greenhouse gases and the use of raw materials that help reduce greenhouse gases throughout the entire value chain. The Code requires suppliers, licensees, pavilion operators and other related entities, as well as their respective supply chains, to comply with these procurement standards. Many pavilions and other facilities implemented initiatives based on the standards, including the use of wood, the adoption of membrane structures that reduce the quantity of materials used and the adoption of leasing and rental, all of which contributed to reducing greenhouse gas emissions.
- With respect to GHG emissions related to air travel, which are difficult to reduce substantially,



the Procurement Code states that participants exhibiting pavilions are “encouraged to offset greenhouse gas emissions related to the air transport of procured goods, etc. and the air travel of suppliers and other related parties.”

< Presenting a concrete vision of a decarbonised society toward 2050 >

At the Expo, with reference to the descriptions in the Strategic Energy Plan and taking into account the constraints of the event period and location, visitors were showcased and provided with hands-on experiences of the technologies and mechanisms of a carbon-neutral society—specifically: (1) a hydrogen society utilizing hydrogen power generation and other applications; (2) the use of renewable energy; (3) CO₂ capture and utilization technologies such as DAC and methanation; and (4) energy saving.

(1) A hydrogen society using hydrogen power generation and other applications

As part of efforts towards a hydrogen society, electricity generated from hydrogen power plants was introduced from outside the Expo site, a hydrogen supply chain was established and a hydrogen fuel cell ship was operated.

- Hydrogen power generation

The electricity used at the Expo was non-fossil-fuel and included renewable energy, nuclear power and electricity generated in a hydrogen co-firing power generation demonstration conducted outside the Expo site. To allow visitors to experience the future of electricity supply, signage installed at bus stops clearly communicated the amount of electricity received and the power source composition.



Figure 3-2-6 Power supply configuration displayed on bus stop signage

- Hydrogen supply chain

In collaboration with several Domestic Pavilions, a hydrogen supply chain was established and exhibited at the Expo site, in which hydrogen produced using renewable energy was stored within the Expo site and then supplied via pipelines to other pavilions for use in fuel cells.





Figure 3-2-7 Hydrogen supply pipeline and the hydrogen fuel cells it supplies

- Hydrogen fuel cell ship

A hydrogen fuel cell ship was used as one of the transportation options for the Expo. Powered by a fuel cell system that uses hydrogen and oxygen, the ship demonstrated zero CO₂ emissions during operation. It also allowed passengers to experience a comfortable ride, free from engine vibration and fuel odour.



提供:岩谷産業株式会社

Figure 3-2-8 hydrogen fuel cell ship

- others

A demonstration test using clean ammonia in a 2-megawatt gas turbine was also conducted outside the Expo site and the decarbonisation value generated was donated.

(2) Use of Renewable Energy

As part of its renewable energy initiatives, the Association implemented and exhibited a perovskite solar power generation system and introduced air conditioning equipment that uses aquifer heat storage and seawater cooling within the Expo site.

- Perovskite solar power generation system

The bus shelter at Yumeshima Island Terminal 1, adjacent to the West Gate, was fitted with one of the world's largest film-type perovskite solar cells, measuring approximately 250 metres in length. Throughout the event, the lighting beneath the bus shelter was powered solely by this solar power generation system. As film-type perovskite solar cells are made from lightweight and flexible materials, they can be installed in locations where conventional solar cells cannot be used, allowing visitors to experience how the system supplied electricity for the bus shelter's lighting. The Perovskite solar power generation system was confirmed to have a power generation efficiency equivalent to commonly used solar cells and to be sufficiently durable for outdoor use throughout the event. After the event, the solar-powered bus shelter will be relocated



to Kagawa Prefecture, where demonstration tests will continue.

In addition to the bus shelter installation, film-type perovskite solar cells were exhibited and used in various locations within the Expo site, including trailer homes, pavilion ceilings and smart poles. Glass-type perovskite solar cells (expected to be used as an alternative to residential glass) were also exhibited in the pavilion. Benches and exhibits using organic thin-film solar cells were additionally displayed, demonstrating the diverse application and exhibition of next-generation solar cell technologies.



Figure 3-2-9 Perovskite solar cell-equipped bus shelter installed at Yumeshima Island Terminal 1

- Aquifer heat storage and seawater cooling

Within the Expo site, air-conditioning is provided through a central heat source system that supplies chilled water to buildings such as pavilions. Renewable-energy-powered equipment was installed for some of the chillers in this system, including an aquifer thermal storage system that pre-cools groundwater in winter and uses it as cooling water in summer, as well as equipment that uses seawater as cooling water for the chillers. These systems contributed to efficient chiller cooling, leading to energy savings and reductions in greenhouse gas emissions.

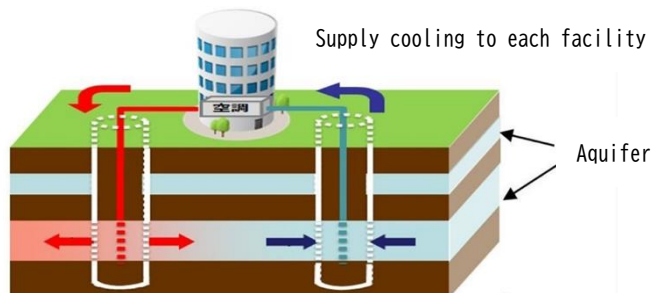


Figure 3-2-10 Image of Aquifer Thermal Energy Storage (Extracted from materials provided by the Osaka City Environment Bureau and the Consulate General of the Kingdom of the Netherlands in Osaka)



Figure 3-2-11 Heat Source Wells of the Aquifer Thermal Energy Storage System Installed within the Expo site

(3)CO₂ Capture Utilisation Technologies, including DAC and Methanation



As part of its carbon recycling initiatives, the Association implemented measures such as Direct Air Capture (DAC), methanation, CO₂ capture equipment, synthetic fuels, and the promotion of concrete that maximizes CO₂ emission reductions and CO₂ fixation.

- DAC, methanation and CO₂ capture equipment as “Carbon Recycling Factory”

A “Carbon Recycling Factory” was established in the management area adjacent to the southeast side of the Expo site, where demonstration tests of DAC, methanation and CO₂ capture equipment were carried out, and guided tours were offered to visitors.

DAC is a technology that captures CO₂ directly from the atmosphere by adsorbing CO₂ at low concentrations of approximately 400 ppm and desorbing CO₂ with minimal energy. DAC is regarded necessary for carbon negativity due to the ability to directly reduce atmospheric CO₂ concentrations. Using DAC equipment, a bench-scale demonstration was conducted to capture CO₂ directly from the ambient air over Yumeshima Island. The captured CO₂ was then supplied to a separate methanation facility as a feedstock.

As part of initiatives to decarbonise energy sources, it is essential to achieve “decarbonisation of the gas itself” through supply-side innovations such as methanation and hydrogen utilisation. To achieve this, synthetic methane (e-methane) was produced by methanation, using CO₂ contained in biogas generated by fermenting food waste collected from within the Expo site, CO₂ captured by DAC, CO₂ captured by CO₂ capture equipment, and hydrogen produced from renewable energy. The e-methane was transported through pipelines and used for cooking in the kitchens of the State Guest House and for heat-supply equipment.

Technologies to efficiently separate and capture high-temperature, low-pressure and low-concentration CO₂ emitted from factory boilers are also being developed. At the Expo site, demonstration tests were conducted to capture CO₂ from boiler flue gas, and the recovered CO₂ was used as dry ice for cooling and supplied to a separate facility as a feedstock for methanation. In addition, various carbon-recycling-related technologies were exhibited, including membrane-based DAC, cold-energy-assisted DAC, and CO₂-absorbing roadbed materials.

Due to constraints related to the location and the demonstration facilities, the number of visitors to the Carbon Recycling Factory remained at 26,870. However, the guided tour received positive feedback as an educational opportunity that allowed participants to see and experience the latest technologies in operation and to deepen their environmental awareness.

Specifically, the following comments were received:

- “It was a valuable experience to be able to see an actual plant implementing future-oriented initiatives.”
- “It was a great learning opportunity for my child to see what the future of our global environment might look like.”
- “Being able to observe a system tackling global warming in operation significantly changed my own awareness.”
- “The staff were very kind, their explanations were easy to understand, and it was also helpful to be able to ask questions directly to the developers.”



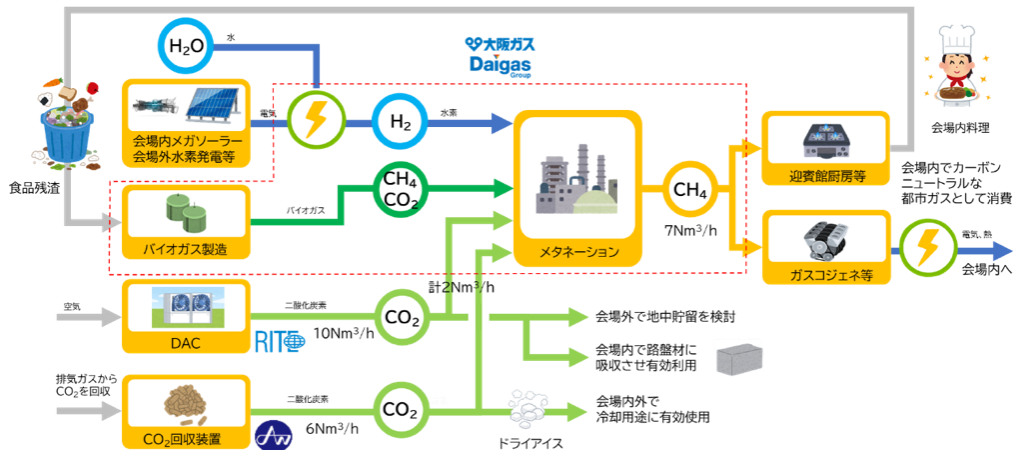


Figure 3-2-12 Overview of the Carbon Recycling Factory



Figure 3-2-13 Future Forest exterior and tour



Figure 3-2-14 The exterior of Bakeru* Labo and the tour
* "Bakeru" means "to transform" in Japanese.~ Recycling food waste and carbon dioxide into e-methane, the city gas of the future.

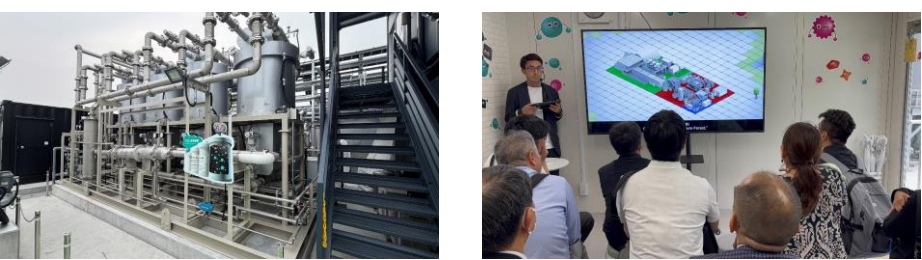


Figure 3-2-15 Earth's Blessing Station CO2 capture equipment and the tour

- Synthetic fuel

Synthetic fuel produced from CO₂ and green hydrogen was used in eight vehicles operating within the Expo site and in a shuttle station bus. With the support of several automobile manufacturers, a driving demonstration using synthetic fuel was conducted. The demonstration examined a wide range of fuel-blend ratios, from low to high, with a view to future uptake of synthetic fuel in society and confirmed that a shuttle bus could operate using 100% synthetic fuel. In addition, renewable diesel was used in one logistics vehicle operating within the Expo site.





Figure 3-2-16 Vehicles used for the synthetic-fuel vehicle operation demonstration

- CO₂-absorbing building materials

CO₂-absorbing building materials were used in the structures of facilities within the Expo site, including interlocking paving blocks, and their durability and other relevant aspects were evaluated in preparation for standardisation.



Figure 3-2-17 A structure constructed using CO₂-absorbing building materials (Sustainability Dome)

(4) Energy saving

- Energy management

While power and lighting demand at each pavilion varied according to performance content, air-conditioning demand was expected to be generally proportional to total floor area and, on average, approximately 40 per cent of total energy demand was attributable to air conditioning. Accordingly, pavilions were encouraged to implement energy-saving measures with a focus on air conditioning.

For pavilions that requested support, a system was provided that optimally manages air conditioning by combining various sensors with AI technology (to improve operational efficiency). The system was introduced in eleven pavilions and Association facilities. Although the measures introduced differed by facility, energy savings ranging from a few per cent to approximately 30 per cent were achieved. Table 3-2-5 summarises the control methods implemented at each pavilion and the resulting energy-reduction rates.



Notably, in facilities where the system was installed, the proportion of energy consumption attributable to air conditioning was around 70 per cent, which was higher than in general facilities, making energy management through air conditioning particularly effective.

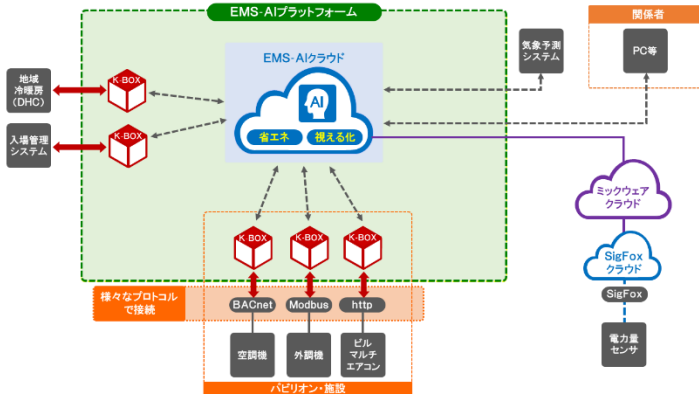


Figure 3-2-18 Conceptual Diagram of the Energy Management System

Table 3-2-5 Control methods implemented in each pavilion and energy reduction rate

制御手法	パビリオン・施設											制御手法削減率平均	
	A	B	C	D	E	F	G	H	I	J	K		
外気冷房制御	外気の取入れが有効と判断した場合、積極的に外気を取り入れる										制御停止		
風量最適化制御	室内温度の推移を予測し、FCUの風量を最適化する						3.3%						3.3%
外気量制御 (CO2)	CO2濃度の推移を予測し、換気機器の運転を抑制する			制御不可	33.8%	7.1%		23%			複合	12.0%	19.0%
室外機容量制御	効率の良い負荷容量で運転できるように室外機容量を制限しながら運転する	15.0%											15.0%
室内機インターバル制御	効率の良い負荷容量で運転できるように室内機の運転モードを変更する			制御停止							複合	制御不可	
在館人数制御	外気温度、室内温度と空調設定温度、室外機容量制御指令値、人数情報をもとに学習を行い、10分後の室内温度を予測する		制御停止										
起動時間自動設定	立ち上がりに要する時間を学習し、起動時刻を自動設定する										複合		
空調機給気温度設定変更	外気温度、室内温度と給気設定温度、電力量を基に学習を行い、最適となる給気温度を決定する								18.0%	24.0%			21.0%
フィードフォワード制御	室温による風量制御並びにCO2濃度による外気量制御に10分後予測値を利用し、制御の安定化と省エネを図る	複合											
室内設定温度変更	「エエきも値」に基づき室内設定温度を緩和する	複合											
パビリオン・施設ごとの削減率		5.4%	15.0%		33.8%	7.1%	3.3%	23.0%	18.0%	24.0%	6.2%	12.0%	14.8%

• Introduction of EV Buses for On-site Transportation

Electric buses were introduced for on-site visitor transport, and a technology demonstration was conducted to enable both operation and charging by utilising an Energy Management System (EMS) integrated with a Fleet Management System (FMS). New technologies, including operation equivalent to Level 4 autonomous driving and in-motion charging, were also integrated, demonstrating next-generation mobility through a large-scale demonstration unprecedented in scope globally.

< Initiatives to Foster Public Engagement and Promote Behavioural Change >

To support progress towards a decarbonised society, Initiatives were not limited to actions taken by the Association or by participants within the Expo Expo site. Recognising the importance of encouraging behavioural change using the Expo as a catalyst, a symposium was held, an application was operated to promote individual decarbonisation actions, and awards were presented for



sustainable initiatives.

(1) Holding a symposium on decarbonisation and resource circulation

In January 2025, prior to the opening of the Expo, a symposium was held to explain the Association's policies and specific initiatives. The symposium also included presentations on initiatives in the Netherlands and Australia and a lecture and panel discussion on hydrogen, which is a key element in realising a decarbonised society in Japan by 2050. Presentations on various sustainability initiatives were accompanied by active discussion.



Figure 3-2-19 Decarbonisation and Resource Circulation Symposium

(2) Initiatives to Encourage Behavioural Change for the Future

Before the Expo, the “EXPO Green Challenge” was launched outside the Expo site in order to call on individuals, through organisations such as companies, schools and local governments, to work collectively on various CO₂ reduction initiatives, using the Expo as a catalyst to create a legacy for a decarbonised society.

The core of the initiative was the “Challenge Menu”, which targeted individuals. Through the “EXPO Green Challenge App”, nine decarbonisation actions were presented and the amount of CO₂ reduction achieved through each action was visualised. Points were awarded in proportion to the reduction achieved, and participants could enter a prize lottery. This mechanism encouraged behavioural change.

The app was released in March 2024 and operated until the close of the Expo. The total number of registered users exceeded 30,000, and the initiatives undertaken were estimated to have reduced approximately 642 tonnes of CO₂ equivalent. The app continues to be operated by sponsors under a different name.

The initial target for the number of app registrants was around 200,000. However, this target was not achieved. To increase the number of registrants, additional incentives such as Expo-related merchandise or modifications to allow participation at the company level would probably have been effective.

In addition, the “MOZUYAN EXPO Green Fundraising Box” initiative was implemented in cooperation with Osaka Prefecture. Under this initiative, Osaka Prefecture compiles CO₂ reduction data from the initiatives of participating businesses, converts this data into credits and donates the



credits to the Expo in order to contribute to decarbonisation at the Expo. The process of converting the data into credits is currently under way.

Table 3-2-6 EXPO Green Challenge App Initiative Results

Number of subscribers	30,875 people
CO ₂ reduction	642t-CO ₂ e



Figure 3-2-20 Image of the EXPO Green Challenge

【Looking back and future prospects】

At the Expo, environmental and energy technologies that were both advanced and economically viable at the time were adopted in order to reduce the environmental impact associated with hosting the Expo, including greenhouse gas emissions. As a result, approximately 88 per cent of Scope 1 and Scope 2 emissions were reduced.

In addition, advanced technologies such as hydrogen, renewable energy, CO₂ capture and utilisation, and energy conservation were implemented and demonstrated as technologies expected to support a carbon-neutral society in 2050, allowing visitors to gain an image of how such technologies may be deployed in society in the future.

As an international event committed to contributing to the achievement of the SDGs, the Expo implemented environmental impact reduction measures appropriate for 2025. Furthermore, by presenting from an early stage its considerations on what a future decarbonised society could look like, the Expo was able to embody its overall concept of serving as a “People’s Living Lab”.

Looking ahead to the realisation of a decarbonised society in 2050, further development and deployment of innovative technologies, behavioural and mindset changes, and the dissemination of these efforts throughout society will be essential. Although the initiatives showcased at this Expo alone are not sufficient to achieve this goal, they are considered to have served as an impetus for future developments.

While the specific initiatives undertaken by the Association are detailed throughout this report, the following section provides a reflection and outlook based on an overview of the initiatives as a whole, with the aim of serving as a useful reference for future practitioners.



- As described in detail in this report, the Association itself took the lead in implementing decarbonisation initiatives and, through the inclusion of requirements in the pavilion design guidelines and procurement codes, encouraged participants to design facilities and introduce equipment that support decarbonisation. As a result, many participants undertook their own initiatives with a high level of decarbonisation awareness, incorporating various considerations for reducing CO₂ emissions into pavilion design and construction.
- At participants' pavilions and events, numerous technologies and initiatives contributing to decarbonisation were exhibited, reflecting interpretations of the theme and concept of the Expo.
 - Exhibitions on renewable energy such as wave power generation and offshore wind power generation that take advantage of the area's geographical features.
 - Exhibits of energy-saving initiatives such as rooftop greening and special heat-shielding materials.
 - Exhibition of initiatives to promote CO₂ absorption, such as blue carbon, afforestation and mangrove cultivation.
 - Exhibits of carbon removal related technologies such as MOFs (metal-organic frameworks), artificial photosynthesis, biochar and carbon fixation in underground minerals.
 - Exhibits on hydrogen storage alloys, hydrogen fixation and other storage technologies, initiatives to realize a hydrogen society such as hydrogen production ships and nuclear fusion power generation.

It is believed that through the initiatives undertaken by the Association and these exhibits, the momentum towards realizing a decarbonised society was able to be raised throughout the Expo.

- Given the nature of the Expo, in which many participants independently built and operated pavilions and facilities, it was effective to provide guidelines and require compliance from the early planning stages (such as design and procurement) to support the implementation of decarbonisation initiatives. However, in areas left to participant discretion, such as the use of LPG and energy-saving measures during the operational stage, levels of engagement varied and, in some cases, the expected effects were not achieved. To thoroughly advance decarbonisation, it is considered important to establish common rules and requirements after developing shared understanding with stakeholders from an early stage.
- The Carbon Recycling Factory was highly praised by many visitors, who reported that they learned about the environment and decarbonisation and valued the opportunity to experience the latest technology. The ability to observe actual equipment was noted as particularly beneficial, especially given that many exhibits relied on video. Visitor satisfaction with the facility was accordingly high.
- Businesses that provided cutting-edge decarbonisation technologies reported increased inquiries from local governments, domestic businesses and overseas entities as a result of their exhibits at the Expo. In the field of decarbonisation at an international event such as the Expo, impacts



are expected not only in terms of business-to-consumer awareness and associated ripple effects but also in business-to-business matching and promotional outcomes, including international expansion.

- Between the formulation of the decarbonisation plan and the opening of the Expo, changes were observed in the social context surrounding decarbonisation, including shifts in public awareness regarding the quality and scope of use of carbon credits. In response to these developments, when procuring carbon credits, attention was given not only to ensuring their quality but also to selecting credits derived from environmental value generated in sectors as close as possible to the emission sources associated with the Expo. For long-term projects, it is considered necessary to implement initiatives that appropriately respond to evolving social conditions.



Message from Chairman, Decarbonization Working Group

Approximately five years before the opening of the Expo, I chaired the "Committee for Considering Environment and Energy in a Future Society," initiating discussions on the "environment and energy" field, a key pillar in realizing a testing ground for a future society. Subsequently, the discussions shifted to the Decarbonization Working Group established under the Expert Committee for the Sustainable Expo. Taking into account global trends and the direction of national energy policy, we aimed to foster understanding of building a decarbonized society by implementing various cutting-edge technologies at the Expo site, along with carbon neutrality in Expo site management, and clearly communicating these efforts.

While not all envisioned initiatives were realized, many pavilions and other facilities at the Expo demonstrated efforts to reduce CO₂ emissions throughout their entire lifecycle. Energy consumption was suppressed through energy management systems and other measures, and Scope 1 and 2 emissions were reduced by 88% from the Business-As Usual (BAU) through the supply of zero-carbon electricity. The remaining emissions were offset through credits. Thus, achieving almost the initial targets in terms of CO₂ emission reduction is considered a significant achievement. At the same time, we were able to visually present a vision of the decarbonized society we aim for around 2050, including the carbon recycling factory, which was well-received during site visits for demonstration experiments, as well as perovskite solar cells and EV buses. Furthermore, the Junior SDGs Camp allowed us to implement ESD (Education for Sustainable Development) practices primarily for young people and children.

An exposition that disappears without a trace after only six months might seem fundamentally contrary to sustainability. However, if we were able to impress upon the hearts of more than 20 million people who gathered at the Expo site a vision of a sustainable future society, and if that vision spreads, I believe it will be a significant achievement for the future. I sincerely hope that all those involved in the planning and operation will pass on their experiences to the next generation.

For me personally, being deeply involved in the hosting of the Expo was a valuable experience. I would like to express my gratitude once again to everyone involved for their efforts in implementing various decarbonization initiatives at the Expo.

Chairman, Decarbonisation Working Group
SHIMODA Yoshiyuki



The Association aims to develop and operate venues that contribute to the realization of international agreements (such as the Paris Agreement, Osaka Blue Ocean Vision and Kunming–Montreal Global Biodiversity Framework).

[Direction to pursue]

(b) The Expo shall use resources effectively by actively leveraging the 3R initiatives (Reduce, Reuse and Recycle) and procuring renewable materials.

【background】

Economic growth in emerging and developing countries is driving an increase in global resource consumption and it is estimated that by 2060 global resource consumption will be more than double the level in 2017. Amid concerns about the resulting resource shortage and the growing environmental impact associated with resource extraction and consumption, the Sustainable Development Goals (SDGs) were set globally, including the goal to "ensure sustainable consumption and production patterns."

At the Group of 20 Osaka Summit held in June 2019, the "Osaka Blue Ocean Vision" was shared, aiming to reduce additional pollution from marine plastic litter to zero by 2050. The "G20 Implementation Framework for Actions on Marine Plastic Litter" was also adopted, promoting voluntary initiatives such as appropriate waste management. In addition, intergovernmental negotiations have been under way since 2022 to develop a legally binding international instrument (treaty) on measures to combat plastic pollution.

In Japan, the "Resource Circulation Strategy for Plastics" was formulated in May 2019, setting out the basic principles of 3Rs + Renewable and establishing 6 ambitious milestones as the direction to aim for. The "Act on Promotion of Resource Circulation for Plastics," which came into effect in April 2022, encourages environmentally conscious design at the design and manufacturing stages of plastic products and calls for the rationalisation of the use of plastic products such as forks, spoons, table knives, stirrers and drinking straws provided free of charge to consumers at the sales and supply stages, with active initiatives being made by various entities.

Regarding food, the 4th Fundamental Plan for Establishing a Sound Material-Cycle Society, formulated in June 2018, set a target of reducing household food waste by half compared with fiscal 2000 levels by fiscal 2030. To promote food loss and waste reduction as a national movement through collaboration among the national government, local governments, businesses and consumers, a bill for the Promotion of Food Loss and Waste Reduction was submitted to the Diet at the initiative of a member of parliament and was passed unanimously by both the House of Representatives and the House of Councillors, resulting in the enactment of the Act on the Promotion of Food Loss and Waste Reduction in May 2019.

The basic policy of the Food Recycling Law, revised in July 2019, set a new target of reducing food loss and waste generated by food-related businesses by half across the entire supply chain by fiscal 2030 compared with fiscal 2000 (5.47 million tonnes). It also established targets for the rate of recycling and reuse by fiscal 2024 of 95% for food manufacturing, 75% for food wholesale, 60% for food retail and 50% for the restaurant industry. The basic policy of the Food Recycling Law



announced in March 2025 further deepened the reduction target for business food loss and waste by fiscal 2030 to 60% compared with fiscal 2000 and raised the recycling and reuse target for food retail to 65% by fiscal 2029.

In addition, the basic policy on the Promotion of Consumer Education, approved by the Cabinet in March 2023, calls for the promotion of smart consumption behaviour (so-called ethical consumption) in which consumers consider people, society and the environment, including regional revitalisation and employment.

Regarding construction recycling, the industry is considered to have entered a period of maintenance and stability following the development and growth experienced in the 1990s and 2000s and improving the quality of recycling is expected to become increasingly important. In response, the Ministry of Land, Infrastructure, Transport and Tourism formulated the "Construction Recycling Promotion Plan 2020 – Toward Quality-Focused Recycling" in September 2020 and is promoting construction recycling.

【Details of the initiative】

Regarding waste and resource circulation, measures were established in light of the domestic and international trends outlined in the background section, together with the relevant laws and basic policies.

(General)

Resource circulation measures at the Expo consist of two main parts. The first is to maximise the reduction of food, plastic and other waste generated daily within the Expo site through reduction and reuse, followed by the thorough recycling of separated waste. The second is to implement resource circulation initiatives for facilities and equipment that cover the entire process from Expo site construction through to post-Expo.

These initiatives aim to promote resource circulation in a way that minimizes environmental impact and is cutting-edge and feasible as of 2025. However, rather than basing decisions solely on current environmental impact, multiple methods will be applied, considering the possibility and feasibility of reducing environmental impact as of 2050.

These initiatives will be carried out with the aim of contributing to decarbonisation.

(Measures for waste generated daily within the Expo site)

With recognition of the public awareness effect that can promote behavioural change both inside and outside the Expo site, the aim is for participants, visitors and local residents to engage in the initiatives and to ensure that a legacy is maintained outside the Expo site after the event. In addition, participants within the Expo site will be able to cooperate in a coordinated manner.

Based on the government's basic policy of 3Rs + Renewable and the priority of food recycling, the aim is to (1) operate the Expo site in a way that generates as little waste as possible, (2) recycle as much waste as possible (excluding thermal recovery) and (3) promote comprehensive circular utilisation, including thermal recovery. The Expo is focusing on areas that will generate particularly large amounts of waste, including (1) plastic waste management, (2) food loss and waste reduction,



(3) paper-usage reduction, and (4) the reuse of facility equipment.

Single use plastics will be reduced by focusing on products that use specific plastics as specified in the “Act on Promotion of Resource Circulation for Plastics”, with the aim of achieving the targets set out in the Resource Circulation Strategy for Plastics, including the 2030 targets, ahead of schedule through the reuse and recycling of containers and packaging.

Initiatives to reduce food loss and waste and food recycling will be based on the legally mandated targets as a minimum, while drawing on leading domestic initiatives to implement efforts equivalent to the most advanced practices in Japan.

Regarding paper, although there are no immediate national targets, paper consumption at the Expo is to be reduced to a level comparable with that of international conferences and events, in line with its positioning as a Digital Expo.

Visitors and participants will be encouraged to bring and use their own bags (including “furoshiki,” Japanese wrapping cloths) and bottles, and information on waste sorting will be disseminated through the Association’s official website and other channels to raise awareness.

After reducing waste generation, recyclable materials will be thoroughly recycled, and for waste that is difficult to recycle, thermal recovery through incineration will be promoted as much as possible to minimize landfill disposal.

(Initiatives for facilities and equipment over the entire event period)

The Expo site will be constructed with consideration for the global environment and the effective use of resources by adopting building structures and construction methods that facilitate material separation during dismantling, by simplifying and reducing building weight and by using renewable resources such as wood. Materials, equipment and buildings will be reused to the greatest extent possible after the event.

In addition, when equipment is procured, environmentally friendly items will be purchased and shared, leasing and rental will be used to the maximum extent and recycled materials will be utilised.

【Major implementation items】

The above background and initiatives were considered and implemented as follows:

- A Resource Circulation Working Group was established under the Expert Committee on Sustainability and initiatives were undertaken in consultation with the group on the direction of resource circulation measures, including reducing waste generation and establishing recycling systems for the operation of the Expo.
- Towards the realisation of a circular economy during the event as well as before and after the event, waste emissions were estimated and reduction and recycling targets were set for the 3Rs+Renewable. With regard to recycling, legal systems, mechanisms and approaches have been organised globally and targets were therefore set based on government targets.

< Waste reduction targets and results >



The waste generation amount, reduction targets and recycling targets estimated and set before the event will be presented and compared with the actual waste generation amount.

(1) Waste emissions (BAU) and reduction and recycling targets

The average amount of waste generated per visitor at Expo 2005 Aichi, Japan and two domestic amusement facilities was used as the amount of waste generated per visitor at the Expo if no additional measures were taken. This amount was multiplied by the expected number of visitors to the Expo (28.2 million) to obtain the BAU waste generation. In addition, the amount of waste generated by type was calculated using the proportion of each waste type at Expo 2005 Aichi, Japan and was organised according to the waste sorting classification at the Expo.

Table 3-2-7 Waste generation at the Expo (BAU)

Type	Waste generated [t]	Ratio [%]	Basic unit [g/person]
Non-Plastic Bottles	611.5	6.3	21.7
Cans	42.8	0.4	1.5
Commercial-use cans	45.0	0.5	1.6
Plastic bottles	562.8	6.4	22.0
Plastic bottle caps	58.8		
Other plastic items	5.6	5.8	19.8
Polystyrene forms and polystyrene form trays	554.1		
Cardboard	1,711.7	17.6	60.7
Paper	110.4	1.1	3.9
Food waste	1,501.2	15.5	53.2
Waste cooking oil	110.4	1.1	3.9
Burnable waste	4,181.4	43.1	148.3
Compostable tableware			
Disposable chopsticks			
Wooden pallets			
Disposable diapers	212.8	2.2	7.5
Non-burnable waste and mixed waste			
Sludge (grease trap)			
Total	9,708.5	100.0	344.3

注：四捨五入により各欄の数値の合計と合計値が一致しない場合がある。

At the Expo, emphasis was placed on reducing and reusing resources, and based on the figures in Table 3-2-7, estimates of waste generation and reduction targets were established assuming the implementation of individual reduction measures. Recycling targets have also been set for the estimated emissions after reduction.

Table 3-2-8 Waste generation (BAU), reduction targets and recycling targets for the Expo

Type	BAU	Reduction target				Recycling Targets	
	Waste generated [t]	Reduction amount [t]	Reduction rate [%]	Amount after reduction [t]	Basic unit [g/person]	Amount recycled [t]	Recycling rate [%]
Non-Plastic Bottles	611.5	-	-	611.5	21.7	699.3	100.0
Cans	42.8	-	-	42.8	1.5		
Commercial-use cans	45.0	-	-	45.0	1.6		
Plastic bottles	562.8	188.2	30.3	433.5	15.4	433.5	100.0



Plastic bottle caps	58.8						
Other plastic items	5.6						
Polystyrene forms and polystyrene form trays	554.1	139.9	25.0	419.8	14.9	419.8	100.0
Cardboard	1,711.7	-	-	1,711.7	60.7	1,711.7	100.0
Paper	110.4	61.1	55.4	49.2	1.7	49.2	100.0
Food waste	1,501.2	321.2	21.4	1,179.9	41.8	1,179.9	100.0
Waste cooking oil	110.4			110.4	3.9	108.4	100.0
Burnable waste		721.9					
Compostable tableware							
Disposable chopsticks	4,181.4	-	17.3	3,459.5	122.7	94.6	2.7
Wooden pallets							
Disposable diapers							
Non-burnable waste and mixed waste	212.8	10.0	4.7	202.8	7.2	19.3	9.5
Sludge (grease trap)							
Total	9,708.5	1,442.3	14.9	8,266.2	293.1	4,717.8	57.1

(note) Due to rounding, totals may not equal to the sum of individual columns.

Recycling does not include thermal recovery.

In setting reduction targets, reduction measures for each type of waste were examined and the details were included in the Expo guidelines and various application procedures. Information sessions were also held to inform participants and request the implementation of these measures. Specific measures will be explained in the next section.

Regarding recycling, legal systems and mechanisms have been established and the overall approach has been organised, so consideration is being given to government targets with a target of 100% recycling for all waste other than "burnable waste" and "non-burnable/mixed waste" as sorted within the Expo site. The goal is to recycle a total of approximately 95 tonnes of waste, including hard-to-recycle paper such as used paper cups, paper plates and receipts, which would normally be classified as "burnable waste", as well as compostable tableware, disposable chopsticks, wooden pallets and disposable nappies (special collection boxes will be set up within the Expo site).

(2) Waste generated from Expo site operations (actual figures)

Tables 3-2-9 and 3-2-10 show the amount and recycling rate of each type of waste generated in connection with Expo site operations during the event. Waste generated by visitors and participants was collected in the main stockyard via sub-stockyards and was then removed and processed by the Association, while some waste was processed independently by participants through removal to waste treatment facilities outside the Expo site. (The next section describes the flow of waste generated within the Expo site.)

The number of visitors during the event was 29.02 million (including related parties) and the total waste generated was 5,276.8 tonnes. This was 2,989.4 tonnes lower than the estimated 8,266.2 tonnes for an expected 2.82 million visitors and was approximately 64% of the estimated amount. Waste generated per visitor (basic unit) was 181.9g per person, or approximately 62% of the estimated 293.1g per person. Of the total waste generated, 688.1 tonnes was processed independently as noted above.



Table 3-2-9 Waste generated from Expo site operations (actual figures)

Type	Target after reduction		Overall waste generated during the event	
	Waste generated [t]	Basic unit [g/person]	Waste generated [t]	Basic unit [g/person]
Non-Plastic Bottles	611.5	21.7	256.9	8.9
Cans	42.8	1.5	85.0	2.9
Commercial-use cans	45.0	1.6		
Plastic bottles	392.5	13.9	381.9	13.2
Plastic bottle caps	41.0	1.5	242.0	8.3
Other plastic items	415.6	14.7		
Polystyrene forms and polystyrene form trays	4.2	0.1	3.7	0.1
Cardboard	1,711.7	60.7	1,072.7	37.0
Paper	49.2	1.7	95.4	3.3
Food waste	1,179.9	41.8	413.8	14.3
Waste cooking oil	110.4	3.9	108.4	3.7
Burnable waste	3,459.5	122.7	2,428.7	83.7
Compostable tableware			0.7	0.0
Disposable chopsticks			6.8	0.2
Wooden pallets			6.8	0.2
Disposable diapers			10.9	0.4
Non-burnable waste and mixed waste			202.8	7.2
Sludge (grease trap)		-	0.7	0.0
Total	8,266.2	293.1	5,276.8	181.9

Note: Due to rounding, totals may not equal to the sum of individual columns.

-Cans and commercial cans removed from the main stockyard, as well as caps and plastics separated to promote horizontal recycling of plastic bottles, were processed together, so individual waste generation was not measured.

-To conduct the demonstration experiment, disposable nappies collected in special collection boxes by August 4th were weighed.

Looking at the basic unit by type of waste, all items except paper were lower than the estimated value. For plastics, the use of reusable tableware and reductions in single-use plastic packaging contributed to lower volumes. For food waste, preparing appropriate quantities of ingredients based on expected visitor numbers and the use of frozen products were effective. For burnable waste, separating and recycling hard-to-recycle paper containers with food residue, which were treated as paper, contributed to reductions.

On the other hand, the amount of paper waste was approximately twice the estimated value. This is considered to be because although flyers and leaflets were rarely distributed at the Expo site and reductions were progressing, the amount of paper products included paper containers that contributed to aforementioned reduced use of plastics and burnable waste.



Figure 3-2-21 Examples of used reusable tableware (left) and paper containers with food or drink residue (right)

The estimates were based on waste generated at Expo 2005 Aichi, Japan and two amusement facilities in Japan, but twenty years have passed since Expo 2005 Aichi, Japan and, with the development of legal systems and growing interest in resource circulation, society as a whole is



reducing waste. Nationwide waste generated per person per day has decreased by approximately 25% from fiscal 2005 (1,131g) to fiscal 2023 (851g). These broader societal trends are also considered factors contributing to actual waste generation being lower than the estimate.

Regarding recycling rates, of the eleven types of waste including cans, bottles, plastic bottles and food waste, the target of 100% was achieved for all except plastic bottles and food waste. For plastic bottles, the rate was 88.8%, affected by moisture adhering to the inside of bottles and labels that could not be completely separated. All food waste transported from the main stockyard was recycled, but recycling of waste processed independently did not progress, resulting in an overall rate of 76.9%. For non-burnable waste and mixed waste, a certain amount of recycling had been expected by separating items such as umbrellas, but recycling did not progress in practice.

Other than the waste indicated in Table 3-2-9, 52.8 tonnes of prohibited items collected at the Expo site gates, some left-behind items and infectious waste were generated as waste not included in the preliminary estimates. In addition, approximately 20 tonnes of waste was collected from the parking lot, bus terminal and floating pier. These were outsourced for disposal according to their properties, separate from disposal according to the sorting categories within the Expo site.

A total of 405 tonnes of residue was generated from a demonstration experiment in which food waste generated at the Expo site was converted into biogas and utilised. The amount of food waste used in this experiment is included in the total waste generation in Table 3-2-8, so to avoid duplication the residue was not included in the waste generated.

Table 3-2-10 Amount and rate of recycled waste from Expo site operations (actual figures)

Type	Recycling Targets		Overall waste generated during the event		
	Amount recycled [t]	Recycling rate [%]	Waste generated [t]	Amount recycled	Waste generated [t]
Non-Plastic Bottles	611.5	100.0	256.9	256.9	100.0
Cans	42.8	100.0	85.0	85.0	100.0
Commercial-use cans	45.0				
Plastic bottles	392.5	100.0	381.9	339.1	88.8
Plastic bottle caps	41.0	100.0	242.0	242.0	100.0
Other plastic items	415.6				
Polystyrene forms and polystyrene form trays	4.2	100.0	3.7	3.7	100.0
Cardboard	1,711.7	100.0	1,072.7	1,072.7	100.0
Paper	49.2	100.0	95.4	95.4	100.0
Food waste	1,179.9	100.0	413.8	318.1	76.9
Waste cooking oil	110.4	100.0	108.4	108.4	100.0
Burnable waste	94.6	2.7	2,453.9	25.2	1.0
Compostable tableware					
Disposable chopsticks					
Wooden pallets					
Disposable diapers	19.3	9.5	162.5	0.0	0.0
Non-burnable waste and mixed waste					
Sludge (grease trap)			0.7	0.2	29.6
Total	4,717.8	57.1	5,276.8	2,546.5	48.3

Note: Due to rounding, totals may not equal to the sum of individual columns.

Recycling does not include thermal recovery.





Figure 3-2-22 Examples of restricted items at the Expo site

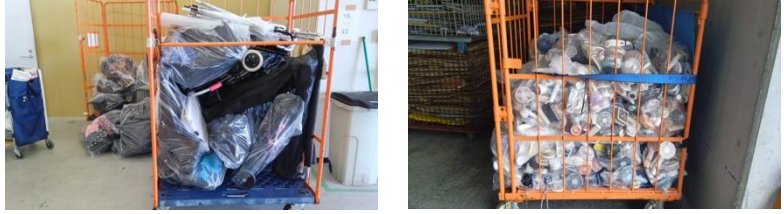


Figure 3-2-23 Examples of lost items (Left: Stroller and umbrella, Right: Handheld fan)

(3) Waste collection system within the Expo site

To support effective resource recovery and ensure the proper treatment of waste generated on site, the Expo site implemented a structured waste separation system. As shown in Table 3-2-11, in total, 10 waste categories were designated for visitors and 17 categories for participants, enabling more detailed sorting where operationally feasible. These categories were adapted from the system used at EXPO 2005 Aichi and updated to reflect the waste management and recycling practices in place as of 2025.

Table 3-2-11 Waste separation categories

		Participants	Visitors
1	Leftover water	-	○
2	Food waste	○	
3	Waste cooking oil	○	-
4	Commercial-use cans	○	-
5	Cans (aluminum/steel)	○	○
6	Non-plastic bottles	○	
7	Plastic bottles	○	○
8	Plastic bottle caps	○	○
9	Polystyrene forms and polystyrene form trays	○	○
10	Other plastic items	○	
11	Compostable tableware	○	-
12	Cardboard	○	-
13	Paper	○	○
14	Disposable nappies	-	○
15	Sludge (grease trap)	○	-
16	Wooden pallets	○	-
17	Disposable chopsticks	○	-
18	Burnable waste	○	○
19	Non-burnable waste	-	○
20	Mixed waste	○	-
		17 categories	10 categories

Waste generated by visitors was collected and separated at 44 “3R Stations” located throughout the Expo site. Each station was equipped with 9 separate waste bins, with pictograms displayed to support correct sorting, and cleaning staff were assigned to assist visitors with disposal and prevent



mis-sorting. Dedicated collection bins for disposable nappies were also installed at 11 service facilities. Visitor waste collected at the 3R Stations was transported by cleaning staff to 11 sub-stockyards, where it was weighed in accordance with its classification. Staff inspected the waste to verify its classification and to confirm whether any beverage containers contained residual liquid. Where incorrect sorting was identified, staff provided on-site guidance to support re-sorting. After sorting and verification, the waste was transferred to the main stockyard, which served as the final collection point. From there, it was transported to an off-site waste management contractor for recycling or appropriate treatment.

Furthermore, participants were responsible for sorting their own waste, bringing it to the sub-stockyard, and after weighing it, processing it in the same manner as visitors' waste. Participants were also permitted to dispose of their waste independently, in accordance with the guidelines. Those who carried out independent disposal were required to report to the Expo Association the types of waste, the amount generated, the disposal method, and whether or not it was recycled.

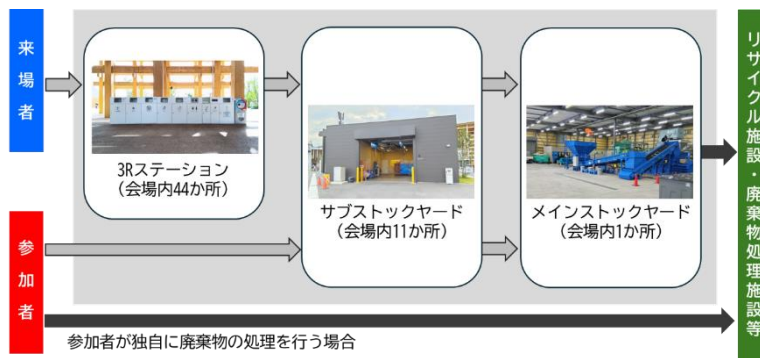


Figure 3-2-24 Flow of waste generated within the Expo site



Figure 3-2-25 Layout of waste-related facilities



Waste management at the Expo site was positioned not only as an operational function but also as a platform for demonstrating technologies aligned with the concept of a testing ground for future society. Autonomous (self-propelled) waste bins were deployed on the Grand Ring, and robots were utilised to collect floating waste in the Sea of Connection, enabling verification of labour-saving benefits and operational efficiency.



Figure 3-2-26 Garbage can robot (left) and water feature cleaning robot (right)

According to a visitor survey, many respondents commented that the cleaning staff at the 3R Stations provided thorough support with waste separation. Some visitors also reported difficulty in understanding which items should be placed in the burnable and non-burnable waste categories. To support more accurate waste sorting by visitors, it is considered effective to provide clear examples in addition to displaying pictograms.



Figure 3-2-27 Cleaning staff guiding waste separation

(4) Waste Reduction and Prevention (Reduce)

At Expo 2025 Osaka, Kansai, Japan, efforts were undertaken to reduce plastic and food-related waste generated in significant volumes during Expo site operations, in line with wider initiatives being promoted in Japan in recent years.

To reduce the use of disposable plastics, reusable tableware was introduced in the Expo food truck area, and the use of their own bottles was promoted by installing up to 70 water dispensers and water refill units throughout the Expo site for visitors to use freely. Information sessions were held for participants on reducing disposable plastics, and measures were implemented to promote the use of their own bags, encourage the sale of eco-bags and paper carrier bags, prohibit the sale and distribution of plastic bags, and reduce the use of disposable plastic containers.

Regarding food waste reduction strategies, information sessions were held for food service providers, examples of procurement practices that help minimize waste were introduced, and awareness-raising activities were conducted to promote food waste prevention. In addition, systems such as food-sharing schemes were provided to make effective use of food items that were likely to remain unsold.



The main reduction measures are presented in Table 3-2-12, with details of the associated initiatives provided as the following table.

Table 3-2-12 Types of waste reduction measures related to Expo site operations

Type	Plans	Achievements
Plastic bottles / Plastic bottle caps	<ul style="list-style-type: none"> Encourage and raise awareness of bringing their own bottles Create an environment that enables the use of their own bottles 	<ul style="list-style-type: none"> Information on water refill units and bringing their own bottles was disseminated via the Association's official website and social media 70 water dispensers and water refill units were installed (including additional units in summer), and 10 bottle washers for visitors' own bottles were placed throughout the Expo site. Some convenience stores and pavilions were equipped with facilities that allowed refilling of their own bottles
Plastics / Polystyrene form / Polystyrene trays	<ul style="list-style-type: none"> Introduce reusable tableware in the Expo food truck area Reduce plastic containers and packaging (including prohibiting the distribution of plastic bags) Promote the use of refill products 	<ul style="list-style-type: none"> Reusable tableware was used in principle in the Expo food truck area Distribution of plastic bags was prohibited Guidelines recommended the use of refillable products
Paper	<ul style="list-style-type: none"> Actively digitise materials, including posters, maps, tickets and pamphlets at each facility within the Expo site Reduce paper use in facility offices 	<ul style="list-style-type: none"> Digital signage was used within the Expo site, and tickets and Expo site maps were digitised Participants were informed of reduction measures, and private printing settings were implemented within the Association
Kitchen waste (Food waste)	<ul style="list-style-type: none"> Implement food waste reduction measures for participants providing food and beverages Specify measures for items not covered above, including staff meals and parties, and publish these on the Association's official website Encourage visitors to reduce food waste 	<ul style="list-style-type: none"> Pre-event briefing sessions were held to raise awareness of food waste reduction measures Examples of measures applicable when serving food and beverages, including at parties, were posted on the Association's official website Educational materials were distributed to food and beverage providers to encourage visitors to finish their meals
Burnable waste	<ul style="list-style-type: none"> Address items that are easily discarded (such as paper fans) 	<ul style="list-style-type: none"> Where paper fans were distributed, guidelines required them to be durable and long-lasting, and an explanatory meeting was held for participants prior to the event
Non-burnable waste / Mixed waste	<ul style="list-style-type: none"> Proactively utilise items lent free of charge for use during the event through participation in operations Promote reuse of equipment through "MYAKU-ICHI!" 	<ul style="list-style-type: none"> Electrical equipment, uniforms and other items were provided free of charge through operational participation Facilities and equipment were reused through "MYAKU-ICHI!"

(1) Plastic

(Shopping bag)

For shopping bags provided within the Expo site, priority was given to the sale of eco-bags, followed by the provision of paper carrier bags. The distribution of plastic bags was prohibited. Paper carrier bags were designed to be recyclable in accordance with the Association's waste separation classifications, and the use of plastic rain covers for paper bags was also prohibited. Visitors were encouraged to bring their own bags through the Association's official social media channels. These measures were communicated through guidelines, information sessions for participants, and symposiums introducing environmental initiatives at the Expo. The prohibition on distributing plastic bags attracted media attention.



During the event, a small number of participants who were unaware of the rules distributed plastic bags. The purpose of the rules was reiterated, and they were asked to discontinue the practice. However, the approach of providing shopping bags only upon request became commonplace at many stores in the Expo site, and visitors were rarely seen carrying plastic bags. Against the backdrop of advances in domestic and international measures against disposable plastics, including plastic bags, combined with the Association's publicity efforts and the fact that the rules became a widely discussed topic, efforts generally aligned with the established requirements.



Figure 3-2-28 Eco bags and paper bags sold at the official store

(Containers and packaging for merchandise sales - excluding shopping bags)

For merchandise sales within the Expo site, plastic packaging was, in principle, prohibited, and only materials that could be recycled under the Association's waste separation categories were permitted. However, from the standpoint of preventing damage to purchased goods and maintaining hygiene, the following exceptions were established:

- Plastic cushioning materials were also prohibited, although there was no requirement for them to be recyclable.
- Poly bags on roll could be used to package food and beverages that might be exposed to liquid leakage within the Expo site.
- Insulated bags could be sold for a fee when used to package food and beverages within the Expo site.

Participants were also encouraged to reduce plastic use through the following recommendations:

- Avoid excessive packaging, and ask visitors whether packaging is required rather than providing it proactively.
- When pre-packaging products outside the Expo site, consider alternatives that reflect the context of the Expo, such as using materials that can be recycled as paper under the Association's waste categories or non-plastic materials such as wood or bagasse.

Although some instances were observed where plastic cushioning was used to wrap bottles, participants generally adhered to the rules.

(My own bottles)

The Association encouraged visitors to bring their own bottles through announcements on its official website and social media, and installed 70 water refill stations (36 water refill units and 34



water dispensers, including additional units installed during the summer) as well as 10 bottle washers for visitors' own bottles throughout the Expo site, thereby creating an environment conducive to the use of their own bottles.

Images of visitors queuing at water refill stations were widely reported in the media and on social media from the outset, and the availability of freely accessible water stations within the Expo site received positive feedback. According to visitor surveys, many visitors appreciated being able to refill their own bottles.

Water refill units capable of recording the number of refills, supplied approximately 12.06 million refills of around 500 ml each, while 20 water dispensers with consumption data for replaceable tanks used a total of 12,320 tanks (12 litres each). If this volume had been purchased as 500 ml plastic bottles, it would have equated to approximately 12.36 million bottles, corresponding to an estimated reduction of around 300 tonnes of disposable plastic bottles.

Additionally, several retail stores installed water dispensers for reusable bottles, convenience stores sold ice for use with their own bottles and installed coffee machines and washing machines, and international pavilions placed water refill units near their entrances. These Expo site-wide initiatives are considered to have contributed significantly to reducing the use of disposable plastic



bottles.

Figure 3-2-29 Examples of water stations within the Expo site (left), (center), and a Mybottle washer(right)

(Reusable tableware)

The use of reusable tableware was made mandatory for food and beverages provided to visitors dining in the retail area. In addition, Expo food trucks (kitchen cars), which typically generate large amounts of disposable plastic waste, were invited to participate on the condition that all food and beverages be served using reusable tableware. Reusable tableware operators were recruited to supply the necessary tableware and to manage lending, collection and cleaning, thereby establishing a system to support the smooth use of reusable tableware in Expo food trucks. These operators were also responsible for tasks such as providing guidance on waste separation at reusable tableware return points.

Nine areas were established within the Expo site for the deployment of food trucks, with a total of 30 food trucks using reusable tableware. However, due to insufficient space for some trucks to install collection points, certain food trucks introduced compostable plastic tableware as an alternative, and some offered dishes that did not require tableware. As a social demonstration, the compostable plastic tableware was composted together with food waste generated on-site.

In the Expo food truck area, food truck operators were required to use reusable dishes, cups,



cutlery and chopsticks, and to negotiate rental prices and enter into direct contracts with reusable tableware operators designated by the Association. However, despite having entered into direct contracts, some operators discontinued the use of reusable tableware during the event due to cost concerns, and others failed to apply reusable tableware when introducing new menu items. As a result, the Association conducted additional information sessions to reconfirm the purpose of using reusable tableware and the requirements set out in the application guidelines. Subsequent operations were generally carried out in accordance with these guidelines. Approximately 1.23 million reusable tableware items were used by Expo food trucks during the event, reducing disposable container use by an estimated 10 tonnes.

Reusable tableware was used on an unprecedented scale and for an extended period at Expo 2025 Osaka, Kansai, Japan, contributing to reductions in single-use plastics and other waste. Nevertheless, some participating operators noted several issues with the system, citing relatively high rental fees compared with disposable containers, insufficient explanations provided to visitors regarding the purpose of reusable tableware, and the large number of staff required to collect the tableware.

To promote the wider adoption of reusable tableware at future events as a sustainable practice, it will be necessary to explain clearly the purpose and significance of its introduction and ensure the understanding and support of participants. Taking the issues above into account, it is also necessary to establish a shared understanding of roles and cost burdens among stakeholders and to develop a business model appropriate for the scale, duration and characteristics of each event location.



4.6 使用予定のリユース食器の種類と貸出単価等

リユース食器の種類と貸出単価は下記を参考としてください。参考情報であって、現時点で確定している訳ではありません。フードトラック事業者は、自らの責任で協会の指定するリユース食器事業者と価格調整を行ってください。

リユース食器の種類一覧表・貸出単価(リユース食器事業者公募提案より)

※食器の貸出単価は今回公募における参考価格であり、最終的な契約価格を轉るものではありません。
 ※予定貸出単価は食器の貸出、食器回収、洗浄、運搬までの費用を含んだ予定単価になります。

食器アイテム名	サイズ	最低ロット数	予定貸出単価(計画)	リユース食器のイメージ(形状や色などは今後変更の可能性があります)
① メインプレート大	直径 21.5 cm	140	120 円	
② メインプレート小	直径 18.7 cm	240	100 円	
③ 角皿 M	17 cm×10 cm	120	120 円	
④ 角皿 S	16 cm×8 cm	160	100 円	
⑤ 丼 L	直径 18.5 cm 深さ 7 cm	160	120 円	
⑥ 丼 S	直径 14.7 cm 深さ 7 cm	240	100 円	
⑦ 飲料カップ 大	450ml	200	90 円	
⑧ 飲料カップ 小	280ml	360	80 円	
⑨ カトラリー(箸)		800	50 円	
⑩ カトラリー(スプーン、フォーク)		800	50 円	

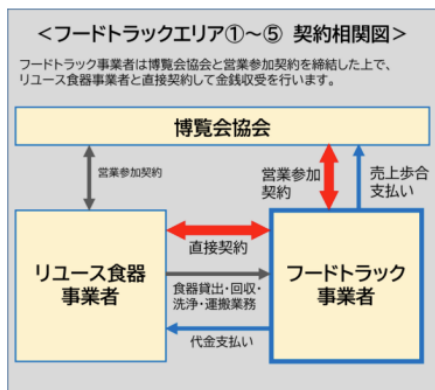


Figure 3-2-30 Business Participation Application Guidelines: Open Call for EXPO Food Truck (Kitchen Car) Operators (Excerpt)





Figure 3-2-31 Reusable tableware return station in the Expo food truck area

(Disposable food and drink containers, cutlery)

The use of reusable tableware was made mandatory for food and beverages prepared within the Expo site. However, when it was not feasible to install dishwashing equipment within a facility due to limitations such as insufficient electrical capacity or a lack of kitchen space, or when reusable tableware was unsuitable including for take-out services the use of disposable tableware and cutlery was permitted, provided that a reasonable justification was submitted along with a usage plan and usage report specified by the Association. Requiring these documents created an opportunity for participants to actively consider whether disposable containers were being used unnecessarily. In addition, those who submitted documentation were invited to consult with the Association, helping to reinforce understanding of the purpose and objectives of the initiative. The use of food containers and related items within the Expo site was carried out in accordance with the policies outlined below.

A) Food cooked and served within the Expo site

- Use reusable dishes, chopsticks, cutlery and stirrers.
- Wrapping paper may be used where food or drink does not require tableware.
- Where reusable items cannot be used, the materials for disposable tableware and cutlery shall be prioritised in the following order:
 - i) Recyclable paper
 - ii) Non-plastic materials (wood, bamboo, bagasse, etc.)
 - iii) Other materials (plant-based, petroleum-based plastics, etc.)

B) Food cooked within the Expo site and taken out

- The materials used for disposable tableware and cutlery shall be prioritised as follows:
 - i) Recyclable paper
 - ii) Non-plastic materials (wood, bamboo, bagasse, etc.)
 - iii) Other materials (petroleum-based, plant-based plastics, etc.)

Regarding containers and packaging for food and drink prepared outside the Expo site, the Association requested that priority be given to materials that could be recycled as paper in its sorting categories, and that, where this was not possible, consideration be given to non-plastic alternatives. Disposable chopsticks were also assumed to be reusable chopsticks by default, and where disposable chopsticks were necessary, they were required to be made from domestically produced wood or bamboo. Additional recommendations were made to further reduce single-use plastics:

- Lids for drink cups and straws should not be used when serving beverages, and where unavoidable, non-plastic alternatives should be considered.
- For wet towels, reusable cloth towels should be prioritised. If disposable towels were



unavoidable, they should be made from fabrics without petroleum-derived ingredients, and packaging should contain at least 50% biomass content.

- When offering tastings and samples, the number of disposable items should be minimised, and if disposable items were necessary, materials such as paper, wood or bamboo should be used.

According to the usage plan submissions, some sales participants showed significant interest in using disposable plastic containers because the appearance of their food was a priority, indicating recognition that balancing sustainability considerations with sales promotion was challenging. Furthermore, during the event, there were instances where food prepared on-site was served in plastic containers, and some participants implementing appropriate measures asked whether a unified approach existed. These variations revealed differences in understanding and implementing sustainability requirements among participants, and demonstrated an ongoing challenge in ensuring that all participants consistently understand both the commercial guidelines and the EXPO 2025 Green Vision and translate them into practice.

(Paper fan, umbrella bag, novelty items, etc.)

The distribution of plastic fans free of charge was prohibited. Most plastic fans observed at the Expo site had been brought by visitors, although some were confirmed to have been distributed by event organisers. Where such cases were identified, organisers were instructed to cease distribution immediately and to collect the items concerned.

As organisers of short-term events were not always fully aware of material restrictions during the preparation stage, cooperation with the Association's event coordination contact point was strengthened, enabling early identification of events intending to distribute fans. As a result, some organisers substituted materials other than plastic during the planning stage.

The report also presented the following recommendations:

- Taking safety into consideration, umbrella bags should not be used, and umbrella drip catchers should be considered instead.
- When distributing materials, novelties or souvenirs, the use of bags should be minimised. Where bags are used, eco-bags or paper carrier bags should be selected.
- Paper cartons or refillable products should be used proactively for beverages, seasonings, detergents and similar products, with consideration given to reducing plastic usage.
- For the novelties distributed at each pavilion, participants were encouraged to consider options with minimal environmental impact, including electronic items such as game applications. Even when physical items were distributed, participants were asked to ensure that: (1) the use of plastics was reduced; (2) if plastics were used, materials with lower environmental impact, such as biomass-derived plastics, were selected; (3) items were not of a type that would be discarded immediately; and (4) distribution methods were designed so that visitors could confirm whether they actually wanted the item before receiving it.



As a result of promoting alternative measures, umbrella bags were rarely observed at the Expo site, with most participants installing umbrella catchers and umbrella stands instead. Measures relating to novelties were also generally implemented in accordance with the above recommendations. In addition to raising awareness through guidelines on reducing disposable items, advance submission of a distribution plan was required when distributing novelties, enabling more efficient promotional activities. This system is considered to have contributed to reducing the distribution of items that are quickly discarded.



Figure 3-2-32 Non-plastic fan



Figure 3-2-33 Umbrella drip catcher (left), umbrella stand (right)

(2) Food

The government initially set a target of halving food waste across the entire supply chain by fiscal 2030 compared with fiscal 2000 (5.47 million tonnes). As this target was achieved eight years ahead of schedule, a new target was established to reduce commercial food waste to 60 per cent of fiscal 2000 levels by fiscal 2025.

To reduce food waste as much as possible at Expo 2025 Osaka, Kansai, Japan, information sessions were held for participants prior to the event, and restaurants and retail stores were asked to implement food waste reduction measures that could generally be carried out within stores. Participants were also encouraged to submit materials related to food waste reduction (such as reduction plans) to promote awareness and accountability.

The Association also supported efforts to reduce food waste by providing a free food-sharing service within the Expo site, and by compiling and sharing a list of food donation recipients for participants. Details of these measures are outlined below.

1) Food waste reduction measures that participants can implement at stores within the Expo site

(a) Initiatives exemplified by the Association

To encourage food and beverage providers to reduce daily food waste, the Association requested the following measures, which were communicated through guidelines and information sessions:

- Manage and adjust procurement methods and quantities to reduce waste.
- Provide portions and serving sizes that can be easily finished.
- Encourage visitors to order only the amount and size they can comfortably eat.



- Consider introducing behaviour-influencing methods, such as nudges, to prevent food being left uneaten.
- Reduce food waste by using a system provided by the Association that enables easy distribution of unsold bento boxes and similar items.
- Consider donating leftover food items with sufficient time remaining before their expiration date, and which retain guaranteed quality, to children's cafeterias or food banks.
- Implement food waste reduction measures at parties and similar events by referring to examples presented on the Association's official website.

Examples of food waste reduction measures published on the Association's official website are provided below.

■ Measures that can be taken by restaurants

【For food and beverage providers】

Ingredient procurement and preparation:

- To accurately forecast and determine procurement quantities, information such as past procurement data, the actual number of visitors and reservation figures should be utilised.
- To reduce food waste efficiently, coordination with nearby stores outside the Expo site may be undertaken for purchasing and sharing ingredients.
- An order management system should be used to optimise inventory control and order quantities.
- Methods of food preparation and storage should be devised to extend the period before items must be discarded.

Menu:

- Ensure that diners can understand portion sizes.
- Ensure that diners can understand the taste profile and level of spiciness of dishes.
- Review menu items to address trends of food being wasted due to leftovers or low orders.

Order taking and serving:

- Use educational materials (point-of-purchase materials, stickers and similar tools) to encourage diners to order appropriate amounts and finish their food.
- When taking orders, ask about allergies and dietary restrictions.

Surplus food (food likely to remain unsold)

- Discount items approaching their expiration date.
- Use surplus items for employee breaks and meals.
- Donate suitable items to children's cafeterias or food banks.

Other measures:

- Provide employee education on food waste reduction.
- Introduce behaviour-influencing methods, such as nudges, to reduce food being wasted.

■ Measures that can be taken at buffet-style parties

【For food and beverage providers】

- Discuss the menu and food quantities with organisers to minimise leftovers.
- Provide a variety of small-portion menu items, including finger foods, to reduce waste.

【For organisers】

During preparation

- Determine the expected number of attendees accurately and order appropriate quantities.
- Consider the attributes of participants (age group, etc.) that may affect consumption when determining menu items and quantities.
- Consult food service providers about appropriate serving sizes and menu composition.
- If the primary purpose of the party is dining, serving quantities appropriate for 70 per cent of those planning to eat may be suitable. If socialising is the focus, further reductions may be



effective.

Mealtime

- Work with food and beverage providers to portion food according to participants' eating habits, and proactively serve pre-portioned items.
- Encourage participants to take only what they can comfortably eat and to finish their food within an appropriate timeframe.

(b) Examples of food waste reduction measures implemented at the Expo site

During the event, restaurants implemented measures such as procuring ingredients based on information provided by the Association regarding visitor numbers and crowding, adjusting stock levels and using frozen foods. Some stores also consumed leftover food among those involved in operations.

Point-of-purchase materials (POPs), stickers and similar tools incorporating behavioural nudges to encourage customers to finish their food were placed beside cash registers or on tables. These materials had been jointly distributed by the government and the Association, which also encouraged stores to use them. In addition, some stores displayed signs informing customers that they could request small portions of rice, enabling them to choose an amount they could comfortably finish.



Figure 3-2-34 Educational materials placed next to the cash register (left), and an example of a small portion of rice (right)

2) Initiatives implemented by the Association within the Expo site

(a) Food sharing service "Expo Tabesuke"

Expo Tabesuke is a food-sharing service that enables restaurants and retailers within the Expo site to list unsold food items online at prices lower than the regular price, and to match these items with visitors seeking to purchase them. The service was introduced through sponsorship (participation in operations), and operates with the following main features:

- Free of charge for both sellers and buyers.
- Listings are limited to food and beverage outlets and merchandise stores within the Expo site.
- Rules are established regarding the permitted listing times and allowable food types.
- Location information ensures that reservations can only be made by users physically present within the Expo site.
- Potential buyers make a reservation online, then visit the physical store to pay and collect the item.
- Since the weight of each food item is registered at the time of listing, the amount of food waste reduced through matching can be measured.



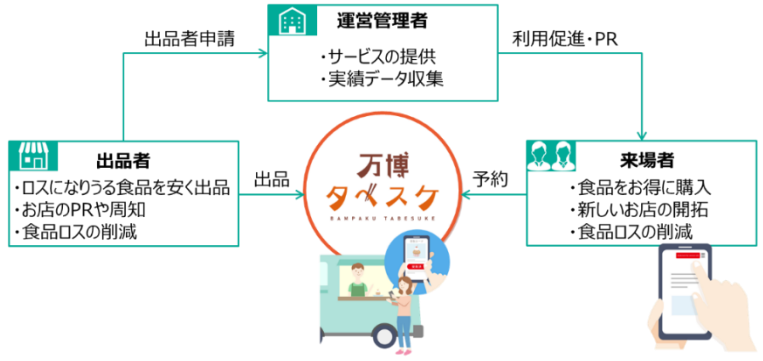


Figure 3-2-35 Overview of Expo Tabesuke (Provided by G-Place Co., Ltd.)

The “Expo Tabesuke” service operated throughout the entire event period, from 13 April to 13 October. Over the 184 days of operation, a total of 6,596 food items were listed, and 5,799 of these were successfully matched, resulting in a success rate of approximately 87.9 per cent. This contributed to an estimated reduction of 917.7 kilograms of food waste.

A total of 28,342 users registered for the service, of whom 1,777 made purchases. Detailed figures for the event period are provided in Table 3-2-13.

Awareness of the service was initially low, which kept the success rate modest. However, awareness increased steadily as the event progressed, and in the latter half of the event the success rate exceeded 90 per cent. As a result, the service made a significant contribution to food waste reduction.

Table 3-2-13 Expo Tabesuke – listing status and food waste reduction (by month)

	Number of items listed	Number of transactions completed	Success rate (%)	Reduction amount (kg)
April	334	192	57.5	23.0
May	875	704	80.5	64.9
June	944	801	84.9	106.1
July	1,297	1,103	85.0	161.7
August	1,217	1,147	94.2	194.9
September	1,369	1,314	96.0	264.8
October	560	538	96.1	102.3
Total	6,596	5,799	87.9	917.7

Figure 3-2-36 Expo Tabesuke user screen (Provided by G-Place Co., Ltd.)



On the other hand, the use of Expo Tabesuke did not become widespread among many stores. This was partly due to the need for stores to manage both their in-store inventory and the quantities



listed on the platform. These tasks included setting aside the food items listed and managing them separately, or adjusting the listed quantities when items on display were sold. In addition, the requirement to register the weight of each item made the process time-consuming, since food had to be weighed before listing. Some stores chose to offer discounted in-store sales instead.

② Listing and providing food donation recipients

To create an environment in which participants could more easily consider donating surplus food, the Association invited accepting organisations such as children's cafeterias and food banks that were willing to receive surplus food from restaurants and retail stores operating within the Expo site. The recruitment was conducted through the Association's official website. Based on the information submitted by these accepting organisations, including their acceptance conditions and contact details, the Association compiled a list and established a system to provide this information to participants at the Expo site upon request.

This system was not designed for the Association to collect and donate food on behalf of participants. Rather, it was structured so that participants would make donations on their own responsibility by coordinating directly with the accepting organisations, with the expectation that such efforts would continue even after the Expo had ended.

Food donations were not limited to those made through this scheme. Participants were also able to decide their own donation recipients independently and donate without using the list.

A total of 56 accepting organisations, mainly located in the Kansai region, applied to be listed, and their information was compiled accordingly. Although participants at the Expo site requested the list during the event period, no reports were received indicating that any accepting organisation actually collected food at the time of donation. It is therefore considered that no food donations were made using this list. Related matters are also noted in the results of the food waste reduction survey presented later in this report.

③ Supporting food bank organisations

Separately from the scheme described in section (b), nine Official Participants donated food to an NPO after the closure of the Expo. The NPO independently approached the Official Participants, and the donations were realised in response to these requests. The Association supported these activities by coordinating vehicle entry and exit within the Expo site, facilitating the collection of food, and providing other necessary assistance. According to the NPO, approximately six tonnes of food and beverages were donated and distributed to children's cafeterias, support organisations, and children's homes in Kyoto, Osaka, Hyogo, Okayama, and Hiroshima.

In addition, there were cases in which participants donated items to Osaka Prefectural Government to support local welfare activities through social welfare councils and other relevant organisations within the prefecture.





Figure 3-2-37 Receiving food donations at the Expo sites

(3) Other waste management measures

1) Paper

Within the Expo site, efforts were made to reduce paper waste by distributing maps, pamphlets, leaflets and flyers electronically whenever possible. The Expo site map, which was expected to be used by a large number of visitors, was made available as a digital map on the Association’s official website, while printed maps were sold for a fee. In addition, information such as event details and exhibition content was disseminated through the digital signage installed throughout the Expo site, and visitors were encouraged to obtain more detailed information via their smartphones by actively utilising 2D codes.

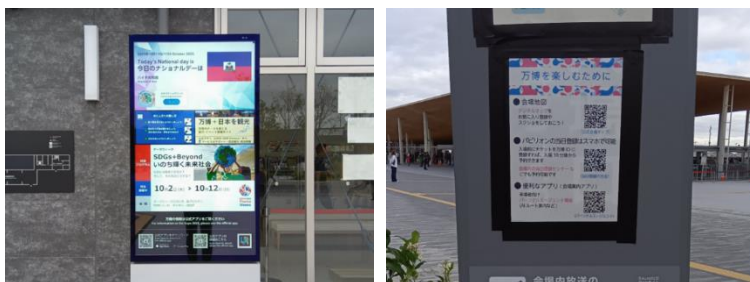


Figure 3-2-38 Examples of using digital signage (left) and 2D codes (right)

2) Uniforms

The uniforms provided by the Association were designed to be sustainable, and pavilion exhibitors were also asked to consider sustainability in their own uniform designs. There were many different types of uniforms, and procurement methods varied. Uniforms for administrative staff and medical staff were supplied free of charge by sponsors and were returned after the event, thereby reducing waste. Other uniforms, such as those for Expo site service attendants, were provided free of charge by sponsors or procured directly by the Association. Although these uniforms were no longer required after the event, efforts were made to recycle them as much as possible.

(Staff uniform)

Some staff uniforms were made from compostable polyester, which decomposes into water and carbon dioxide when composted using cow dung.





Figure 3-2-39 Putting uniforms into compost (provided by V&A Japan Corporation)

(Doctor staff uniforms)

The fabric used for doctor staff uniforms was made from thread produced using domestically sourced thinned wood. This material can be converted back into thread and reused to produce gardening aprons, eco-bags and other items.

3) Awards for Sustainable Initiatives

Awards were presented for cutting-edge sustainability initiatives implemented at Expo 2025 Osaka, Kansai, Japan, with the aim of encouraging further efforts by participants and ensuring that the outcomes of these initiatives would continue as a legacy in society after the event.

(Further details are in Chapter 2, Section 2.2, Awards for Sustainable Initiatives.)

4) Other reduction efforts

As Expo 2025 Osaka, Kansai, Japan, Expo site was surrounded by the sea and it would be difficult to collect debris if it were blown away, the distribution of novelties that could be carried off by the wind was prohibited. The use of balloons in outdoor displays within the Expo site and the sale of inflated balloons were also prohibited. In addition, to encourage visitors to take actions that would contribute to waste reduction, the “EXPO Green Challenge App” was used, enabling visitors to participate in activities such as using their own bottles, reducing food waste and using and returning reusable tableware at the Expo food trucks in an enjoyable manner.

< Recycling generated waste (Recycle) >

At Expo 2025 Osaka, Kansai, Japan, even after implementing waste reduction measures, the aim was to recycle 100 per cent of recyclable waste, sorted according to the waste separation categories within the Expo site, and transported to the main stockyard. This excluded burnable waste, non-burnable waste and mixed waste. The recycling methods for each major waste type are shown in the table below.

Table 3-2-14 Recycling methods for each major type of waste

Waste	Recycling methods, etc.
Bottle	Recycled raw materials (glass raw materials)
Can	Metal raw materials
Commercial-use cans	
Plastic bottles	Plastic raw materials (PET bottles, etc.)
Plastic bottle caps	Coke oven chemical raw materials (Plastic raw materials and fuels)
Plastics	



Polystyrene form	Plastic raw materials
Cardboard	Recycled paper raw material (cardboard)
Paper	Recycled paper raw materials (toilet paper)
Kitchen waste (Food waste)	Biogasification (biogas)
	Composting (compost)
Waste cooking oil	Blending to create raw fuel (coal alternative fuel, etc.)
Compostable tableware	Composting (compost)
Disposable chopsticks	Ethanol fermentation (bioethanol)
Wooden pallets	Crushing (chips for raw material or fuel)

(1) Recycling initiatives expected to see increased social implementation

The separated waste was recycled using the methods described in the previous section, and this section outlines initiatives that are expected to see further expansion in social implementation.

1) Recycling of hard-to-recycle wastepaper

By adopting a specialised technology, hard-to-recycle wastepaper such as paper cups and plates with food and beverage residue, and paper drink containers with plastic spouts, which had previously been categorised as burnable waste was recycled into toilet paper together with general waste paper. The recycled toilet paper was also used in Expo site toilets, and information explaining the initiative was displayed to introduce the technology to visitors and promote awareness of the importance of proper waste separation. Through these measures, participants were encouraged to replace the large volume of disposable plastic food and drink containers generated at the Expo site with paper alternatives, thereby reducing plastic waste and establishing a framework in which used containers could be recycled as paper rather than incinerated.

In actual operation, paper containers were sometimes disposed of as burnable waste, and excessive food or drink residue hindered the recycling process. Further efforts were therefore considered necessary to improve awareness among visitors and participants regarding the purpose of recycling hard-to-recycle paper and to ensure thorough separation of paper containers.



Figure 3-2-40 Paper containers, etc. that are eligible for recycling



Figure 3-2-41 A notice in the toilet explaining the initiative to visitors

2) Bio gasification and composting of kitchen waste



Kitchen waste generated within the Expo site was recycled through four processing routes: biogas production at facilities in the Japan Pavilion and the Carbon Recycling Factory within the Expo site; composting using composting machines installed at the main stockyard within the Expo site; and off-site composting at external facilities. As there were no composting facilities available within Osaka City, off-site composting was carried out at facilities outside the city in accordance with special provisions under the Food Recycling Act and related waste-management regulations.

The respective amounts recycled through each route were approximately 77 tons at the Japan Pavilion, 99 tons at the Carbon Recycling Factory, 62 tons through the on-site composting machines, and 79 tons at the off-site composting facilities.

At the Japan Pavilion, biogas generated from food waste was used as fuel for power generation, and the resulting electricity was consumed within the pavilion. At the Carbon Recycling Factory, the biogas was utilized as a feedstock for the production of e-methane, which was subsequently used in the kitchens of The Guest House and other facilities.



Figure 3-2-42 Biogas equipment at the Japan Pavilion (left), composting machine in the main stockyard (right)
Source: Japan Pavilion Official X (https://x.com/japanpavilion_j/status/1942524100779663459/photo/2)



Figure 3-2-43 Composting facility outside the Expo site

In implementing recycling, because the mixing in of items such as seashells, bones, eggshells, the cores of corn and pineapples, or bamboo shoots' husks can cause equipment malfunctions or impede processes such as biogasification, Accordingly, guidelines were issued to ensure that such items are not sorted as food waste, and that plastic bags, containers and packaging —items that frequently become mixed with food waste— as well as toothpicks, disposable chopsticks, paper napkins, newspapers, and similar materials are thoroughly removed. Because food waste actually brought into the sub-stockyard was at times found to contain these non-recyclable contaminants, on-site guidance was provided and repeated reminders were issued to relevant parties via the portal site used between participants and the Association. Although the situation improved towards the closing of the Expo, it is considered that more thorough communication before the Expo began would have been important.



3) Composting of compostable plastics

In the Expo food-truck area within the Expo site, reusable tableware was used in principle. However, in areas where it was difficult to establish collection points for reusable items, compostable plastic tableware was introduced and dedicated collection boxes were installed for its collection. After collection, the compostable plastic tableware was sent to a composting facility outside the Expo site, where it was processed together with food waste generated within the Expo site.



Figure 3-2-44 Compostable plastic tableware (left), Collection box (right)



Figure 3-2-45 Compostable tableware collected and brought in (left), The state after composting (right)

In implementing these measures, it was difficult to ensure that only compostable tableware was collected. Because visitors frequently disposed of other types of waste into the designated collection boxes within the Expo site, the openings of the boxes were modified, and food-truck operators were required to re-sort the collected waste to remove contaminants.

When considering the processing scheme, composting was also pursued for tableware made from plant-derived materials such as bagasse. However, the necessary conditions—such as compliance with the Act on Waste Management and Public Cleaning required for transportation and composting—could not be met, operations were limited to compostable plastics. When recycling items that are classified as a different category of waste, it is necessary not only to confirm technical feasibility, but also to carefully establish a scheme that ensures compliance with the Act on Waste Management and Public Cleaning, among other requirements.

4) Horizontal recycling of PET bottles (i.e. bottle-to-bottle recycling)

Used PET bottles delivered to the sub-stockyard were compressed and reduced in volume (baled) at the main stockyard, then transported off-site for horizontal recycling.

To enable efficient horizontal recycling, it is important to improve the quality of bottles at the point of collection. This requires reducing the amount of leftover liquid and preventing the mixing of contaminants. Accordingly, each 3R Station was equipped not only with a collection box for bottles,



but also with a container for disposing of leftover beverages and a box for collecting caps and labels. Cleaning staff also provided verbal guidance, thereby promoting proper sorting.

At the 3R stations, however, completely separating caps and labels proved difficult, as some visitors disposed bottles into the collection boxes with the labels still attached. Accordingly, cleaning staff provided continuous guidance, and prominent notices were displayed on the collection boxes. Efforts were made to ensure that PET bottles were collected with caps and labels removed as much as possible.



Figure3-2-46 PET bottle collection box (left) and the baled waste (right)

(2) Considerations for implementing recycling initiatives across the entire Expo site

Various companies and organisations proposed environmentally friendly goods and materials. However, when such products are discarded as waste, their composition may hinder the recycling system operated uniformly throughout the Expo site. Decisions on whether to introduce these goods therefore need to be made carefully, with consideration of their overall impact on waste sorting and recycling.

For example, an item may appear to be paper, yet its primary material may be plastic rather than pulp, making correct separation extremely difficult. If visitors unfamiliar with such products place them into the wrong categories at the 3R station, this may adversely affect the recycling process.

Furthermore, the promotion of horizontal recycling for PET bottles requires preventing the mixing of coloured PET bottles. However, in the retail operations of some Official Participants, beverages in coloured PET bottles were observed being sold. It would have been desirable for the EXPO 2025 Green Vision to include provisions such as a prohibition on the sale of coloured PET bottles. In such cases, to avoid coloured bottles being placed in PET-bottle collection boxes, it was suggested that stores display point-of-purchase signs stating: “If you dispose of a PET bottle at the Expo site, please separate it into plastic waste.”

As noted above, although cleaning staff were assigned to the 3R Stations, at the beginning of the Expo there were differences in their level of understanding regarding waste-sorting procedures and language barriers also existed, resulting in inconsistencies in the sorting guidance provided by staff. Thorough waste separation can be better achieved by responding flexibly to on-site conditions, including revising staff manuals and holding training sessions for staff.

【Review and Future outlook】

The following provides a review on the initiatives implemented at the Expo, outlining their outcomes, challenges, and perspectives on how they can be applied to society in the future.



(1) Plastics Countermeasures

1) Promoting awareness and understanding among participants

Details of the plastics countermeasures were compiled in the EXPO 2025 Green Vision, which has been revised and published annually since 2021 and were reflected in guidelines and related documents to encourage participants to take appropriate action. Considering the preparation period required for procuring materials, pre-event briefing sessions were held for sales participants and domestic pavilions from late October 2024 to January of the following year. Policies and rules that had not previously been detailed were clarified based on frequently asked questions. During the Expo, most participants followed the EXPO 2025 Green Vision. However, some continued to use plastic materials that did not comply with the policies and rules due to insufficient understanding of the significance and the details of the initiative, delays in preparation or prioritization of profitability, etc. Providing information through multiple channels, such as briefing sessions and explanations during participant recruitment and contracting, would likely have increased awareness. Strengthening cross-sector collaboration across business areas within the Association is also important.

For official participants, given that rules related to resource circulation including those concerning plastic materials differ across countries and regions, consideration was given to enabling all participants to comply without excessive burden. Accordingly, supplementing the content described in the commercial guidelines, the 'Rules for Waste Reduction and Recycling within the Expo site (for Official Participants)' were provided in English and French. However, because these rules were distributed only about one month before the opening, the submission rate for reports on shopping-bag use and other required items was low, indicating that awareness of these requirements remained insufficient.

2) Dealing with operations that do not comply with policies and rules

To verify whether operations were being carried out in accordance with the policies and rules set forth in the EXPO 2025 Green Vision, on-site inspections were conducted as necessary, focusing primarily on food and retail establishments. To enable efficient on-site inspections, check items and key points were compiled in lists according to the type of store or facility, and the usual operating conditions were visually confirmed both inside and outside the stores while taking visitor flow into consideration. For facilities and pavilions where it was not possible to freely observe the interior, on-site inspections were conducted after prior notice. When operations were found not to be in accordance with the rules, the responsible department of the Association, which served as the liaison with participants (hereinafter referred to as the "responsible department"), was consulted, and improvements were requested in a step-by-step manner. As stores inspected without prior notice were often crowded with visitors and managers were sometimes absent, as a general rule, on-site communication with staff was not conducted.

While requesting improvements, differences arose among participants in the degree of their response, and in some cases additional time was required to achieve improvements, while others did not reach improvement at all. As there are practical limits to relying solely on efforts to promote understanding of the initiative's purpose, it may be appropriate to consider methods that utilise



contractual provisions concluded between the responsible department and participants prior to the start of the Expo to reinforce improvement requests.

(2) Food countermeasures

During the preparations for the Expo, ensuring a sufficient supply of food and beverages for visitors was a key concern. Restaurants were therefore asked to avoid shortages. At the same time, requiring them to take measures to reduce food waste created a dilemma for the Association. To address both issues, the number of visitor reservations recorded each day, and predictions of crowding were used as reference points for planning food preparation, which helped ensure that the quantity provided was appropriate.

At the Expo site, more than 100 establishments served food and beverages in various formats, including restaurants, food courts, cafés, food trucks and take-out counters. These were operated by Official Participants, Unofficial Participants and General Business Participants. It is understood that each establishment implemented some level of food-waste-reduction measures, which also contributed to operational cost savings.

The Association established a system for Expo Tabesuke and created a list of businesses that accept food donations and distribute them to designated recipients. Initiatives of this nature are most effectively implemented at the organiser level, and broad participation from exhibitors requires early design and widespread communication of the scheme. It was therefore important to incorporate the system into business policies at an early stage and to ensure that participation required minimal additional effort.

Although a wide range of food-waste-reduction options was examined through case studies and stakeholder interviews, some initiatives were not implemented. For example, recommending that visitors take home unfinished food was avoided due to concerns around extended periods spent at the Expo site and the risks of carrying food during hot weather.

Furthermore, when comparing the Expo with large-scale sporting events such as the Tokyo Olympic and Paralympic Games, as well as theme parks and similar facilities used as references, it is important to note key differences. At sporting events, meals are typically provided primarily to athletes, whereas at the Expo, food and beverage establishments rented space within the Expo site and served an unspecified number of visitors. As a result, measures considered effective in one context may not be applicable in another.

(3) Recycling initiatives

As noted above, the guidelines for proper waste disposal allowed participants to manage their own disposal (independent disposal) without bringing waste to the sub-stockyard. Even in such cases, participants were reminded that recyclable items must be separated appropriately to enable recycling. However, reports from participants conducting independent disposal indicated instances where waste was not properly separated and was disposed of as burnable waste, as well as cases where separated items were not recycled. For this reason, it was necessary to emphasise the importance of correctly separating and recycling waste during independent disposal. It may also have been



appropriate to limit the use of independent disposal to unavoidable circumstances.

1章

2章

第3章 持続可能な万博の運営に向けた指標・取組

4章



<Resource circulation for facility equipment that spans from the construction phase through to the post-event period >

At the Expo, numerous facilities and equipment were constructed within the Expo site, and a large quantity of fixtures and equipment was used. After the Expo closed, the Expo site was cleared and returned to the city of Osaka, meaning that these facilities, equipment and fixtures needed to be removed promptly. Accordingly, the Association proceeded with the construction of these assets with consideration for their reuse after the Expo, beginning from the design stage. To ensure a smooth transfer for reuse, the Association identified and selected potential recipients, conducted the necessary handover procedures and then carried out demolition and removal work in a planned manner. The Association also took the lead in proactively using leased items and reusing facilities, equipment and fixtures before the Expo closed, and sought the cooperation of participants in these efforts.

In August 2023, in order to ensure that the initiatives undertaken for the Expo would not end as a one-time event but instead remain as a legacy and contribute to sustainable resource use, the Association announced the public solicitation for proposals for the reuse of Expo site facilities and equipment developed by the Association. A dedicated contact point for enquiries about the public solicitation was also established.

Furthermore, a dedicated website for “EXPO CIRCULAR MARKET MYAKU-ICHI!” (hereinafter referred to as “MYAKU-ICHI!”) was launched in August 2024. A public solicitation and bidding process for specific facilities, equipment and fixtures was scheduled to begin in March 2025, prior to the Expo’s opening. Participants were encouraged to make use of MYAKU-ICHI! to identify potential reuse recipients and promote further reuse.

(1)Consideration of reuse and recycling from the design stage

To promote reuse, the Association has stipulated the following in “Design Guidelines for Type A (Self-Built) Pavilions” for Type A Pavilion, in which sites are provided to participants and the buildings are constructed and used by the participants themselves. The guidelines encourage active reuse not only of buildings, equipment and materials but also of trees used in exterior structures and plants used for rooftop and wall greening. They also call for the use of leased equipment and materials and aim from the design stage onwards to minimise the amount of waste generated when pavilions are dismantled and removed.

<p>“Design Guidelines for Type A (Self-Built) Pavilions” (excerpt)[</p> <ul style="list-style-type: none"> • It is recommended that participants should proactively use natural and reusable/recyclable materials and adopt sustainable structures and construction methods. • Participants must utilise more than two types of recycled materials* as construction materials. • Participants must adopt construction structure/methods that allow easy separation of scrap materials when demolishing the pavilion. • It is recommended that participants should proactively reuse equipment and structures. • Participants should design architecture with prior consideration of how to reuse it upon its removal from the Expo site. • Interior materials tend to become mixed waste. However, participants are encouraged to proactively reuse them • Participants should consider feasibility of reusing not only equipment but also a wide variety of items such as structures • It is recommended that participants should consider planting trees on the exterior and plants on the roof and walls that can be easily transplanted and transferred



- ・ It is recommended that participants should lease or rent equipment. Participants should consider feasibility of leasing/renting not only equipment but also a wide variety of items such as structures.

For Pavilion Types B, C and X, which are constructed by the Association and handed over to Official Participants, the Association applied the same principles of reuse and recycling from the design stage as those requested of participants in “Design Guidelines for Type A (Self-Built) Pavilions”. In doing so, the Association made extensive use of leased materials (reusable materials) for roofs, columns, beams, exterior wall framing and certain equipment (including lighting fixtures, packaged air-conditioning units and power-receiving and transforming equipment). These initiatives were undertaken to reduce the volume of waste generated within the Expo site.

(2) The Association's efforts regarding reuse

In order to reduce the amount of waste generated during the dismantling of facilities and equipment, it is important to make active use of leased items and to promote reuse. To advance reuse efforts effectively across facilities managed by the Association, items eligible for reuse were classified into three categories. The Association also sought the cooperation of companies with expertise in reuse and recycling, while considering the development of a structured reuse system.

《Launch of EXPO Circular Market “MYAKU-ICHI!”》

As part of the development of a reuse system, MYAKU-ICHI! website was launched in August 2024. The purpose of the website is to compile information on the reuse of facilities and assets managed by the Association, identify reuse needs and disseminate information regarding public solicitations for reuse. On MYAKU-ICHI! website, items eligible for reuse are categorised into three groups: Category 1 (Relocation of facilities, etc.), Category 2 (Reuse of building materials and equipment) and Category 3 (Reuse of fixtures and equipment).



Figure 3-2-47 MYAKU-ICHI! website Image

MYAKU-ICHI! website was created to actively promote the reuse of materials from the Expo. The system is intended to be carried forward as a legacy and to be applied at future large-scale events. It is also expected to contribute to the establishment of matching platforms for building materials in Japan, similar to those already operated in the EU and the United States.

Fourteen supporting companies cooperated with various initiatives related to MYAKU-ICHI!, including the establishment and operation of the public solicitation and exhibition website, and served



as a key driving force behind the series of reuse initiatives.

List of sponsoring companies (in alphabetical order, according to the Japanese syllabary) Ishizaka Inc., J E M S Inc., Sakai Moving Service Co., Ltd., Daiei Kankyo Co., Ltd., Dai Nippon Printing Co., Ltd., DAIWA HOUSE INDUSTRY CO., LTD., Daiwa Logistics Co., Ltd., TRE HOLDINGS CORPORATION, NIPPON EXPRESS CO., LTD. , HAMAYA Corporation, Mizuho Leasing Company, Limited, Maynards Japan Co., Ltd., mojax Inc., LY Corporation

For reference, we checked the access statistics for the Myaku-ichi! website and found that the total number of monthly page views ranged from approximately 100,000 to 2,700,000, while the average number of pages visited ranged from 3.27 to 5.97. Although these are not precise statistics, it is generally said that the benchmark for monthly page views on an e-commerce site is 10,000 to 100,000 pages, and the benchmark for the average number of pages visited is 3 to 5 pages. While the Myaku-ichi! website has a short public access period and other operating conditions that differ from typical e-commerce sites, the number of page views and pages visited are close to these ranges, suggesting that the site functioned effectively to a certain extent as an e-commerce site.

Table 3-2-15 Myaku-ichi! Website Access Statistics (May 2025 - January 2026)

		May 2025	Jun 2025	Jul 2025	Aug 2025	Sep 2025	Oct 2025	Nov 2025	Dec 2025	Jan 2026
Category 1	Sessions	11,954	25,862	19,805	27,669	54,353	187,419	56,567	23,469	17,568
	Page views	35,974	92,998	52,543	75,515	136,507	442,338	108,211	48,120	38,801
	Number of page viewed	3.01	3.60	2.65	2.73	2.51	2.36	1.91	2.05	2.21
Category 2	Sessions	19,483	30,466	20,992	41,300	20,433	99,082	22,211	8,001	4,266
	Page views	66,704	128,090	127,347	225,060	116,835	528,872	127,729	33,401	17,931
	Number of page viewed	3.42	4.20	6.07	5.45	5.72	5.34	5.75	4.17	4.20
Category 3	Sessions	—	—	—	—	27,998	164,755	46,011	15,968	12,409
	Page views	—	—	—	—	180,209	1,723,116	420,191	116,437	80,357
	Number of page viewed	—	—	—	—	6.44	10.46	9.13	7.29	6.48
Total	Sessions	31,437	56,328	40,797	68,969	102,784	451,256	124,789	47,438	34,243
	Page views	102,678	221,088	179,890	300,575	433,551	2,694,326	656,131	197,958	137,089
	Number of page viewed	3.27	3.93	4.41	4.36	4.22	5.97	5.26	4.17	4.00

Note: All figures are for the Myaku-ichi! website only and do not include information from the official website of the Expo Association related to the public offering, or information from existing e-commerce sites operated and managed by sponsors related to Category 3 public offerings.

- Sessions: Number of visits to the website
- Page Views: Number of pages viewed on the website
- Page Views (Browsing Rate): Number of pages viewed in a single site visit (= Page Views / Sessions)

【Category 1 (Relocation of facilities, etc.)】

This project covers the full or partial relocation of the Signature Pavilion, various event venues and several facilities designed by young architects. the Grand Ring and landscape trees were also included within Category 1.

When the MYAKU-ICHI! website (hereinafter referred to as “MYAKU-ICHI! site”) was launched in August 2024, it listed approximately 30 facilities, including the Signature Pavilion and facilities



designed by young architects, as potential relocation targets. Applications for the full or partial relocation of each facility were invited before the opening of the Expo. Organisations or individuals considering reuse (hereinafter referred to as “potential users”) were requested to submit a “Reuse Consideration Application”[SF17.1] through MYAKU-ICHI! site and subsequently meet with the Association either in person or online. Where more detailed consideration was required, potential users were provided with facility drawings after the non-disclosure agreement had been signed by both parties. Once the potential users consideration progressed and reuse was deemed feasible, a public solicitation for proposals was issued.

The call for proposals was approved by the supervisory authorities and a Property Disposal Committee comprising two external experts was established within the Association, and the offering was conducted with the Committee's approval. Any decisions made following the public bidding process were subject to the approval of this committee and the consent of the supervisory authorities.

The results of the Category 1 (Relocation of facilities, etc.) initiatives are presented in the table below.

Table 3-2-16 Overview of major initiatives in Category 1 (relocation of facilities, etc.)

Name of facility	Summary of results
the Grand Ring	Three rounds of calls were conducted from June to November 2025 (approximately 3,300 m ³ transferred)
	Approximately 200 metres of the northeastern section was retained and transferred to Osaka City
Trees	Public solicitations were conducted for tall and medium-to-low landscape trees from July to October 2025
	(approximately 460 tall trees and about 600 medium-to-low shrubs were transferred)
the Signature Pavilion	For the Forest of Tranquility, approximately 1,200 trees will be retained and transferred for a fee to the developer of Yumeshima second area development project
Other facilities	The public solicitation for proposals was issued for the partial relocation of the facility and distinctive equipment from August to December 2025

Note: Quantities and other details are tentative and will be finalized upon delivery.

(a)The Grand Ring

Regarding the Grand Ring, the Working Group on the Utilisation of the Grand Ring, comprising representatives from the national government, Osaka Prefecture, Osaka City, the business community and relevant associations, held 4 meetings between 2 May and 16 September 2025. The group examined the possibility of retaining approximately 200m of the northeastern section of the Grand Ring and developing the surrounding area as a park and green space managed by Osaka City.

It was estimated that reusing the timber from the Grand Ring would require additional dismantling costs of approximately 1 billion yen per 1,000 m³ compared with standard dismantling. As the Grand Ring is an important symbolic structure of the Expo, and in keeping with the Expo's sustainability principles, it was decided, with the approval of the Board of Directors, that these additional costs associated with careful dismantling for reuse would be covered through the Expo site construction budget.

Three public solicitations were conducted between June and November 2025, resulting in approximately 3,300 m³ of timber being designated for transfer to 41 entities, including local governments and private companies.

Furthermore, with the aim of reusing structural components, which offer higher added value, we have been working with experts in woodworking to consider the selection of environmental



measurement equipment, installation methods, and measurement methods, and have been conducting environmental measurements since the start of the conference.

Table 3-2-17 Main recipients of the Grand Ring timber

Main recipients (50m ³ or more)	Transfer volume [m ³]	
Local government	Suzu city Ishikawa Pref.	1,191
	Yokohama city, Kanagawa pref.	113
	Osaka city, Osaka pref.	89
	Namie town, Fukushima pref	78
	Kochi prefecture	52
Other public organizations	Kansai university	385
Others (Private companies and persons etc.)	KAJIMA CORPORATION	703
	SALADCOSMO co., ltd.	357
	SHIMIZU CORPORATION	228
	EI-MEI co., ltd.	84
	TAKENAKA CORPORATION	54

Note: Quantities and other details are tentative and will be finalized upon delivery.



Examples of use in public housing built for disaster recovery
Provided by Shigeru Ban Architects



Examples of use at GREEN×EXPO 2027
Provided by: Kajima Corporation

Figure 3-2-48 Image of reusing wood from the Grand Ring

(b)Trees

A total of approximately 2,500 trees were planted across the Expo site, including around 1,000 trees in the landscape areas and approximately 1,500 trees in the Forest of Tranquility. From July to October 2025, the public solicitation for the reuse of landscape trees was conducted, resulting in the planned transfer of roughly 460 tall trees and 600 shrubs to 17 parties, mainly local governments. However, due to extreme heat and limited rainfall during the Expo period, many trees were in poor condition by the closing of the Expo, and the number of trees transferred was lower than anticipated.

The trees in the Forest of Tranquility, alongside the remaining portion of the Grand Ring, are planned for use in the town development of Yumeshima second area. [CK1.1]Approximately 1,200 trees are expected to be left in place, excluding those that must be removed due to the dismantling of surrounding pavilions.

Table 3-2-18 Main recipients of the landscape trees

Tree species	Main recipients	Number of transferred units/shares	
Tall trees	Local government	Osaka city, Osaka pref.	107
		Kainan city, Wakayama pref.	53
		Kobe city, Hyogo pref.	45
		Kameoka city, Kyoto pref.	24
		Izumiotu city, Osaka pref.	16
		Toyonaka city, Osaka pref.	14
		Taishi town, Osaka pref.	10
		Kishiwada city, Osaka pref.	8
Moriguchi city, Osaka pref.	6		



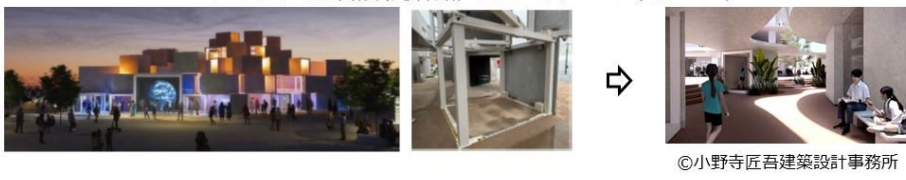
		Neyagawa city, Osaka pref.	5
		Hikone city, Shiga pref.	4
		Izumi city, Osaka pref	3
		Katsuyama city, Fukui pref.	3
	Others (Private companies and persons etc.)	SORA BOTANICAL GARDEN Project Inc.	133
		KAJIMA CORPORATION	29
	Total		460
medium to small shrubs	Others (Private companies and persons etc.)	SHIROHATO FOOD CORP	597

Note: Quantities and other details are tentative and will be finalized upon delivery.

(c)The Signature Pavilion and other facilities

With respect to the relocation of the Signature Pavilion and other facilities owned by the Association, as a result of continued efforts to identify potential users since the launch of the MYAKU-ICHI! website in August 2024, the partial relocation of the Signature Pavilion’s building and the reuse of its distinctive equipment were realized.

いのちめぐる冒険(河森館)のセルのリユース(イメージ)



©小野寺匠吾建築設計事務所

EARTH MART(萱屋根)

いのちの遊び場クラゲ館(大屋根)



Figure 3-2-49 Relocation of part of the Signature Pavilion building

Table 3-2-19 The partial relocation of the Signature Pavilion’s building and the reuse of its distinctive equipment

Pavilion Name	Main items for reuse	Recipients	Planned purpose
DYNAMIC EQUILIBRIUM OF LIFE	Clathra /(3D theatre system)	Dynamic Equilibrium of Life Foundation	Currently adjusting whether to publish
Future of Life	Seven Android Robots, etc.	Kyoto prefectural government	Used by research institutes in the Keihanna Science City
LIVE EARTH JOURNEY	"Cell" (15 units)	KOKUBA-GUMI Co.,Ltd.	Used in the construction of a Nakagusuku Village Junior High School, Okinawa Prefecture
	"Cell" (3 units)	Kobelco Eco-Solutions Co.,Ltd.	Use in exhibition facilities on company premises
	"Cell" (3 units)	ICHIHIRO CO.,LTD.	Exhibited in Towel Museum, Imabari City,Ehime Pref.
	"Cell" (3 units) HPC panels (wave shape)	Spice Factory Inc.	Planned for use in company own office
	"Cell" (3 units)	NISSIN KIKAI Co.,Ltd.	Display on school grounds, reuse as a seaweed bed structure.
	"Cell" (2 units)	MINAMI KINZOKU Co., Ltd.	Plans are underway to reuse the facilities as a bus stop, temporary waiting room, etc.
	"Cell" (1 unit)	Vector Vision Co., Ltd.	Planning a traveling exhibition at cultural facilities, etc.
	"Cell" (1 unit)	AKASHI School Uniform Company Ltd.	Plans to utilize the site within the company premises.
EARTH MART	Kaya-thatched roof	Ministry of Land, Infrastructure, Transport and Tourism	Use at the GREEN×EXPO 2027 Japan Government Garden
		Osaka Prefectural Government	Use in "Open-air Museum of Old Japanese Farm Houses"
	Flooring	民間企業	自社及び関連施設にて利用



Playground of Life: Jellyfish Pavilion	Roof (structure), creative trees, stage lighting fixtures, etc.	Fukuyama city, Hiroshima pref.	Use at Fukuyama City's "Children's Future Center" (tentative name)
null?	Set of equipment	Digital Nature Group Association	Use at GREEN×EXPO 2027
	Robot arm "Goshintai (sacred object)"	FANUC CORPORATION	Display in company's exhibition space
	Robot arm "for Voxel"	TOYO KEISOU Co., Ltd.	Display in company's exhibition space
Sun Mechanic co., ltd.		Display in company's exhibition space	
Dialogue Theater -sign of life-	Entrance building	Izumisano city, Osaka pref.	Utilize as a local educational and cultural resource in Izumisano Hill Green Space
	Forest meeting place		
	Dialogue Theater Building		

Note: Quantities and other details are tentative and will be finalized upon delivery.

In addition, for other facilities as well, parts of the structures, materials, and equipment were reused.

Table 3-2-20 The reuse of other facilities, including their partial relocation

Facility name	Main items for reuse	Recipients	Planned purpose
EXPO National Day Hall "Ray Garden"	Ceiling beams	BIG-TREE design and construction joint venture	Use for wood-finished areas in open areas of public facilities
	Floor tiles	hide k 1896 co., ltd.	Planned for use in commercial facilities
Toilet W41 (Toilet 5)	Some units	Osaka Prefectural Government	Relocation to Osaka Garden of Floral Culture
	Some units	WIDE LEISURE co., ltd.	Planned for use in park
Pop-Up Stage Outer East	Dome structure	Okuda Koumuten co.,ltd.	Planned to use as event stage at roadside station in Shiga Pref.
EXPO Arena " Matsuri "	Audio equipment	MSI JAPAN TOKYO Co.,Ltd.	Planned to use for sound-related activities in Japan, Asia, and the USA
Toilet F43 (Toilet 6)	Cedar planks	HAIOKU LLC.	Planned to use as Facility building materials and in workshops.
	Trees	Urata garden design office	Planned to transplant to the shrine grounds
Toilet W77 (Toilet 3)	Exterior plywood	(Private company)	Planned to use in a community space in Natori city, Miyagi pref.

Note: Quantities and other details are tentative and will be finalized upon delivery.

【Category 2 (Reuse of building materials and equipment)】

The reuse of building materials and equipment was pursued through the public solicitation (open call for proposals) and bidding via a platform developed by the sponsors. Between March and October 2025, 12 rounds of public solicitation were held, with 745 items listed and 311 items successfully bid on.

Table 3-2-21 Category 2 (Reuse of building materials and equipment) Public bidding items

Public bidding items	Number of items listed	Number of successful bids	Success rate (%)
<ul style="list-style-type: none"> ○Landscape-related: Benches, table sets, garden parasols, etc. ○Event venue-related: Chairs, carpet tiles, etc. ○Facilities-related: Lighting equipment, lampposts, air conditioning equipment, sanitary facilities (toilets), fire extinguishers, etc. ○Kitchen equipment, etc. ○Expo Association-produced items: Monuments, signage, etc. 	8,727	5,402	61.9

Note: Quantities and other details are tentative and will be finalized upon delivery.



Public bidding items	Number of items listed	Number of successful bids	Success rate (%)
Benches, etc.	3,460	3,410	98.6
Lighting equipment, Air-conditioning equipment, etc.	739	434	58.7
Lighting pole	147	147	100.0
Table sets and garden parasols, etc.	128	128	100.0
Fire extinguisher	84	84	100.0
Kitchen equipment, etc.	67	23	34.3
Sanitary fixtures (toilets)	30	30	100.0
Expo Association-produced items (Monuments, etc.)	24	24	100.0

Note: Quantities and other details are tentative and will be finalized upon delivery.



Figure 3-2-50 Public bidding items in Category 2 (Reused building materials and equipment)
(Left:benches, Centre: Table sets, Right: garden parasols)

For Category 2, original stickers were distributed as a perk to the successful bidders (Figure 3-2-50). By scanning the QR code printed on these stickers, bidders could view detailed product information (facility name, specifications, GHG emission reduction effect, etc.), allowing them to feel that they had contributed to the continuation of the Expo legacy.

Figure 3-2-51 Original stickers (sample)

Other items not put up for sale at the “Myaku-ichi!” will be recycled as much as possible, and those that cannot be recycled will be discarded. However, after accepting a proposal from the demolition contractor to reuse building materials themselves, the cedar planks used for the roof of the west gate, the crushed stone for the exterior of the small event hall, and the corridor floor tiles will be used in other construction work being carried out by the demolition contractor.

【Category 3 (Reuse of fixtures and equipment)】

For the “reuse of fixtures and equipment”, public solicitation targeting local governments and similar entities were conducted mainly through the MYAKU-ICHI! website and the Association’s official website. Applications from companies and individuals were accepted through MYAKU-ICHI! website and EC site by private company.

For the total of 792 items listed (approximately 27,300 pieces in total), public bidding was conducted from October 2025 to March 2026, 792 items had been successfully bid and a bid success rate of 100 %.

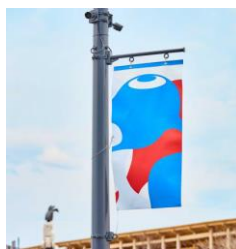
Public calls for proposals from national and local government bodies were conducted on the Myaku-ichi! website and the official website of the Expo Association. Public calls for proposals from private companies and individuals were conducted using the Myaku-ichi! website and existing e-



commerce sites operated and managed by sponsors.



Association-related materials
(Myaku-Myaku statue)



Association-related materials
(Banner flag)



Office desk

Figure 3-2-52 Reused fixtures and equipment items for listing

【Use of leased materials】

The pavilion construction guidelines encourage the use of leased or rented equipment and materials, and the Association applied this approach to the facilities it built.

Leasing involves obtaining items such as pillars and walls from a leasing company for use in pavilions and other structures, with the expectation that they will be used again after the Expo. Some items go directly into reuse, while others are stored by the leasing company until they can be used in another project. In some cases, the future reuse location is not yet known, and certain items cannot be reused after inspection.

The facilities constructed by the Association included Type X pavilions (built by the Association and handed over to Official Participants), Type B and Type C common pavilions, a group rest area, a heat-supply and processing facility, and “The Earth at Night,” a large Wajima-lacquered globe. Leased materials were used extensively in “The Earth at Night” and in other facilities.

(3)Participants' initiatives regarding reuse

While Expo Association suggested that participants use Myaku-ichi! to find customers, most participants found customers on their own.

(a)Pavilion

The Netherlands Pavilion, Serbia Pavilion and Luxembourg Pavilion have been approved for relocation.

The UK, USA, Australia, Bulgaria and Italy Pavilions, as well as the Type X Angola, India and Türkiye Pavilions and the Type B and Type C pavilions (Commons), were constructed almost entirely from leased materials and are planned to be reused.

(b)Fixtures and equipment

For fixtures and equipment, many assets identified by official participants for potential reuse were bonded goods, which limited reuse through MYAKU-ICHI! by the participants to the Osaka Healthcare Pavilion. For official participants, efforts were made to promote the reuse of fixtures and equipment by holding business meetings in collaboration with the Osaka Chamber of Commerce and Industry to attract potential buyers, introducing second hand furniture and equipment dealers through the Association, and independently identifying recipients for the items.



(4) Targets for industrial-waste generation and recycling from construction and demolition

Estimated amounts of industrial waste from construction and demolition, and the associated recycling targets, were established in Sustainability Action Plan of Expo 2025 Osaka, Kansai, Japan (Pre-Event Report), based on figures from the Environmental Impact Assessment Report for Japan Association for the 2025 World Exposition.

Demolition and removal work is currently under way at the Expo site, with all work scheduled for completion in February 2028, after which the Expo site will be returned to Osaka City. Industrial-waste quantities generated during construction and demolition will be reported to Osaka City in a post-investigation report submitted in accordance with Article 28 of the Osaka City Environmental Impact Assessment Ordinance.

【Looking back and future prospects】

(1) Challenges in reuse

One of the challenges in the reuse efforts implemented at the Expo 2025 Osaka, Kansai, Japan was the need to improve the platform used for soliciting applications for the reuse of building materials and equipment, as well as for the reuse of fixtures and fittings.

In particular, regarding the assets of the Expo Association, based on the examples of past Expos, regulations were established such as "priority in selecting recipients" and "free transfers to the national and local governments," and recipients were not selected solely based on monetary value. Unless a platform capable of handling such cases is designed, the amount of manual work will increase; therefore, the platform should be carefully designed to reflect the established rules.

(2) Best practices that should be preserved as legacy

While the reuse of fixtures and other items is becoming established in Japan, there are still no such systems in place for the reuse of buildings, building materials, or equipment. Therefore, we planned "Myaku-ichi!" with the aim of creating a matching platform similar to those already in place overseas. Although there are challenges as mentioned above, we believe we have contributed to accumulating knowledge regarding the reuse of building materials and equipment.

Furthermore, reuse initiatives related to the Expo are not limited to the Expo Association; some organisations are also undertaking similar efforts. For example, the Osaka Chamber of Commerce and Industry launched a website called "BM Expo After Commerce," listing furniture, electrical appliances, shelves, and other building materials and equipment used in the Indonesian and UAE pavilions. They facilitated connections with domestic companies, not only for reuse but also for upcycling. We believe it is important to seek the cooperation of those who can collaborate on areas that the Expo Association alone could not adequately address.

(Reuse targets and results are described in Chapter 4.)



Message from Chairman, Resource Recycling Working Group

Expo 2025 Osaka, Kansai, Japan, held as a "People's Living Lab," aimed to realize future-oriented initiatives in venue management as well! Responding to the aspirations of many stakeholders, consideration of resource recycling began in August/September 2022 with the collection of best practices from companies and organizations at a resource recycling study group. In February 2023, a Resource Recycling Working Group was formed, and the "EXPO 2025 Green Vision" was compiled with the overarching principle of "minimizing waste generation through 3R + Renewable, emphasizing reuse, and aiming for 100% recycling."

In line with this vision, proactive measures were implemented, including reducing single-use plastics by banning the distribution of plastic shopping bags, introducing reusable tableware at food trucks, installing water dispensers and personal bottle washing machines, and operating "Expo Tabesuke" to reduce food waste. Ten-way sorting of waste and resources was also implemented, centered around 44 3R stations within the Expo site. These measures will lead to behavioral changes in future society and business settings.

Ultimately, the amount of waste generated from venue operations was 64% of the projected amount, demonstrating a significant reduction in waste. Including policies and rules in the guidelines and informing participants through explanatory meetings during the preparation phase contributed to the success. However, there were instances where participants showed varying levels of commitment, such as in the use of reusable tableware. We intend to convey the need for mechanisms to enhance effectiveness in the future.

Various efforts were made in the relocation of pavilions and other facilities. Many facility equipment, including the large roof ring timber, were reused through initiatives like "Myaku-ichi!", resulting in a waste reduction of approximately 6,200 tons. A reuse and matching platform for buildings, building materials, and equipment is unprecedented in Japan, making "Myaku-ichi!" a pioneer in large-scale reuse.

Resource recycling yields results through the cooperation of many stakeholders. I would like to express my gratitude to everyone who was involved this time. I visited the venue many times to check on the progress of the Green Vision initiatives and discussed with members of the Expo Association. The experience gained from facing challenges and making improvements daily at each site is truly a legacy. This detailed report will undoubtedly serve as a guidepost for future initiatives not only at large-scale events but also in local communities, and ultimately for realizing a circular economy. I will also share my experiences from the Expo.

Chairman, Resource Recycling Working Group
SAKITA Yuko



The Association aims to develop and operate venues that contribute to the realization of international agreements (such as the Paris Agreement , Osaka Blue Ocean Vision and Kunming-Montreal Global Biodiversity Framework).

【Direction to pursue】

(c)The Expo shall conserve and restore the natural environment and ecosystems around the venue where there are important ecological hubs in the coastal zone in the Osaka region.

【Background】

With regard to [CK2.1]ecosystems and biodiversity, Japan has been leading global initiatives for the conservation and sustainable use of biodiversity, including hosting the 10th Conference of the Parties (COP10) to the Convention on Biological Diversity in 2010.

At COP10, the Aichi Biodiversity Targets and the Nagoya Protocol on Access and Benefit-Sharing (ABS), which serve as global targets for achieving the objectives of the Convention on Biological Diversity, were adopted. According to the Global Biodiversity Outlook 5 (GBO5), published in September 2020, considerable progress had been made toward many of the Aichi Targets, but none of the 20 individual targets had been fully achieved. The report noted that achieving the 2050 Vision of “living in harmony with nature” requires coordinated action across various fields, including expanding efforts to conserve and restore biodiversity at all levels, addressing climate change, responding to the drivers of biodiversity loss, transforming production and consumption patterns and promoting trade in sustainable goods and services.

In response, at the 15th Conference of the Parties (COP15) to the Convention on Biological Diversity held in December 2022, the “Kunming–Montreal Global Biodiversity Framework” was adopted as the new set of global biodiversity goals for the post-2020 period, replacing the Aichi Targets. Within this framework, “30 by 30”, which aims to conserve more than 30 percent of land and sea areas as healthy ecosystems by 2030, was established as one of the key global targets. Goals such as mainstreaming biodiversity in business were also adopted.

With regard to marine environmental conservation, the G20 Osaka Summit was held in 2019, where leaders shared the “Osaka Blue Ocean Vision”, which aims to eliminate additional marine plastic pollution by 2050. Marine plastic waste discharged into the ocean due to improper management causes various problems, including deterioration of the marine environment and ecosystems, loss of coastal functions, impacts on landscapes, navigational hazards and negative effects on fisheries and tourism. It is reported that approximately eight million tons of plastic waste enter the ocean globally each year, and at this rate, the weight of plastic waste in the ocean is estimated to exceed that of fish by 2050. The issue of marine plastic waste must be addressed as a global challenge. Osaka Prefecture and Osaka City, the host governments of Expo 2025 Osaka, Kansai, are taking a leading role in reducing marine plastic waste in partnership with a wide range of stakeholders.

Furthermore, in a 2009 report by the United Nations Environment Programme (UNEP), carbon absorbed by marine ecosystems such as seagrass beds and tidal flats was named “blue carbon” and



proposed as a new option for global carbon-sink measures. In Japan, marine ecosystems that sequester and store blue carbon include seagrass beds, seaweed beds, tidal marshes, tidal flats and mangrove forests, collectively referred to as “blue carbon ecosystems.” In January 2022, Osaka Prefecture announced the “Osaka Prefecture Blue Carbon Ecosystem Vision”, which promotes efforts to restore the marine environment of Osaka Bay, historically known as the “fish garden” of Naniwa due to its rich marine resources.

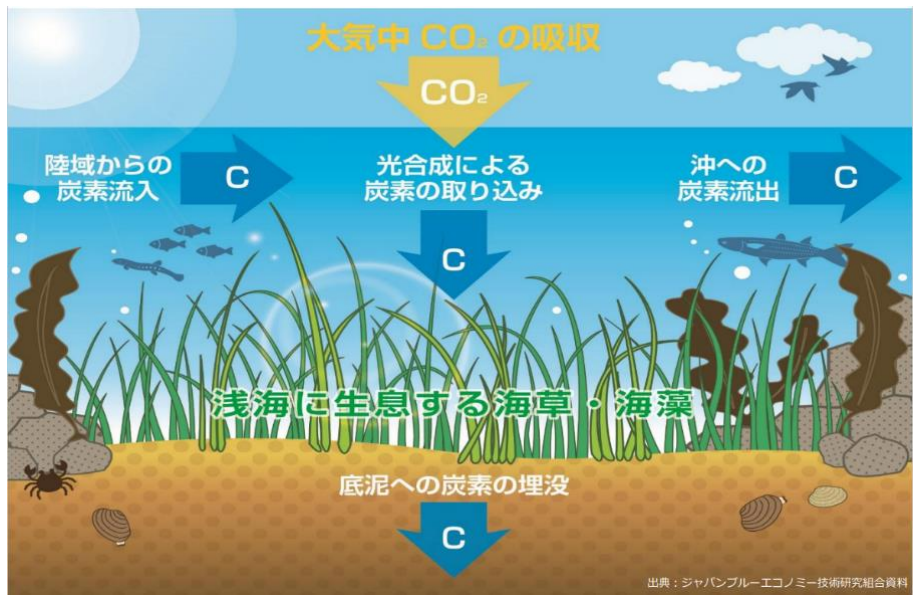


Figure 3-2-53 Blue carbon mechanism (Source: Ministry of Land, Infrastructure, Transport and Tourism website) (<https://www.mlit.go.jp/kowan/content/001394943.pdf>)

In the economic field, the Taskforce on Nature-related Financial Disclosures (TNFD) was established at the 2019 World Economic Forum Annual Meeting as a framework for reporting and responding to nature-related risks. TNFD aims to guide organisations in identifying and addressing these risks and to shift global financial flows from activities that harm nature to those that have a positive impact. The framework considers both how nature affects organisations and how organisations affect nature.

In September 2023, TNFD released its final recommendations (v1.0), introducing the LEAP approach, which provides a structured process for identifying, assessing, prioritising and disclosing nature-related dependencies, impacts, risks and opportunities across the value chain. In parallel, work is underway to develop methodologies for setting Science Based Targets for Nature (SBTs), measurable and actionable targets designed to enable companies and other organisations to operate within planetary boundaries and in line with society’s sustainability goals.

【Details of the initiative】

Initiatives will be undertaken to promote coexistence with nature and to ensure a comfortable environment. In collaboration with local governments and other relevant organisations, measures will be taken to protect endangered animals and important plant species that inhabit or visit the areas surrounding the Expo site. Expo site construction will be carried out with the greatest possible



consideration for the preservation and enhancement of the natural environment and ecosystems.

The environmental impacts arising from the implementation of the project will be assessed, and appropriate conservation measures will be taken where necessary.

【Major implementation items】

The background and related initiatives were considered and implemented as follows:

- An environmental impact assessment (EIA) was carried out in accordance with the Osaka City Environmental Impact Assessment Ordinance, and an EIA report was submitted to Osaka City in June 2022.

The project was implemented in line with the EIA report, and consideration for terrestrial flora and fauna during construction was reported in the post-construction survey reports published in January and December 2024.

(Specific initiatives)

(1) During construction

○ General considerations

- Construction personnel are prevented from entering areas outside the construction zone unnecessarily.
- Construction machinery that generates noise and vibration is replaced, wherever possible, with low-noise and low-vibration models.
- When night-time construction is carried out, the work is kept to the minimum necessary, and shading hoods and appropriately positioned lighting fixtures are used to reduce impacts on flora and fauna outside the Expo site and the Maishima Expo P&R parking area.

○ Consideration for animals (birds)

- Near the inland waters of Yumeshima District 1, measures such as mowing are implemented in coordination with Osaka City and other organisations to ensure that birds using bare ground can utilise these areas.
- If little terns are observed, nesting-prevention measures such as bird-proof netting are implemented in accordance with the Guidelines for the Conservation and Consideration of Little Tern Breeding Grounds. If nesting is confirmed, access to the surrounding area is restricted in principle.
- The sedimentation pond in the southern part of the Expo site is not scheduled for ground-improvement works and is considered capable of supporting birds as shallow resting habitat.

○ Consideration for animals (mammals)

- At the Maishima Expo P&R parking area, when grass cutting is carried out before construction, work is divided into several stages and cut gradually toward the grassland so that harvest mice can move into nearby areas where they are able to remain.

○ Consideration for plants

- Before construction, the growth status of important plant species within the Expo site is confirmed, and where growth is identified, expert opinions are consulted and appropriate measures are taken.

○ Confirmation of the implementation status of conservation measures

- From April to July each year during the construction period, bird-migration status is monitored once per month at the Expo site and its surrounding areas.

(2) During operation

○ General considerations

- Air-conditioning and other equipment is, wherever possible, of low-noise and low-vibration type and is properly maintained.
- Shading hoods and appropriately arranged lighting fixtures are used to minimise impacts on flora and fauna outside the Expo site and the Maishima Expo P&R parking facility.

○ Consideration for animals (birds)

- Green spaces within the Expo site are secured to support wildlife use.



- ・ Areas near the inland waters of Yumeshima District 1 are maintained for birds using bare ground, through coordination with Osaka City and other organisations.
- ・ Waterside areas are secured within and around the Expo site wherever possible in consideration of birds that frequent such habitats.
- Confirmation of the implementation status of conservation measures
 - ・ From April to July during the Expo period, bird-migration status is monitored once per month at the Expo site and its surrounding areas.

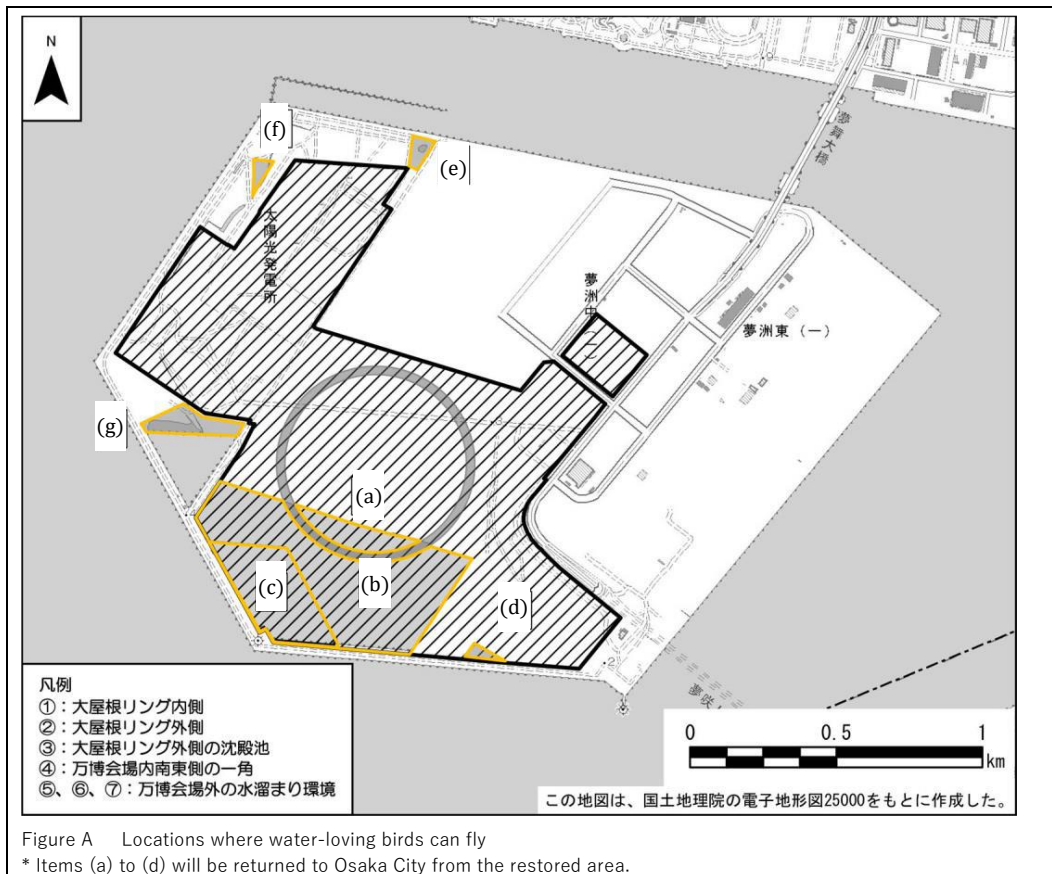
- The habitats of animals (birds) that migrate to the Expo site and its surrounding areas have been categorized into bare ground (gravel), green spaces, and waterfront areas (water surface and water's edge). For each category, considerations for birds have been announced in accordance with the specifics of the construction schedule, and considerations for birds that use waterfront areas were announced in December 2024.

Consideration for birds that use waterside areas (water surface and waterfront areas) (excerpt)

- The “The Sea of Connection” (locations (b) and (c) in Figure A), located in the southwestern part of the Expo site, is designated as a site available for use by birds because no water-based events or visitor access are planned during the Expo period. ... During the period when seawater is introduced and the area becomes a water body, it serves as a resting site for ducks and other birds that prefer open water.
 - ・ Settling pond (c), located outside the large roof ring, can be used by birds that rely on waterside areas as a place to rest. While seawater is being drawn in to create a water area, it will be suitable for waterfowl that prefer open water. After the Expo, seawater will be released and the pond returned to its original state before being handed back to Osaka City.
- In the south-eastern corner of the Expo site (location (d) in Figure A), a newly constructed temporary rainwater-retention area is maintained as a site available to birds that prefer waterside environments. Following the Expo, the area is to be subjected to demolition work, and once restored to its original condition, will be returned to Osaka City.
- The water-accumulation areas located outside the Expo site (locations (e), (f) and (g) in Figure A), which have formed naturally through the accumulation of rainwater on Yumeshima Island, are secured as alternative sites for birds while “the Sea of Connection” is converted into a water area. These areas are maintained as sites available to birds until around the end of FY2025. The waterside margins are available to shorebirds such as plovers and sandpipers, while the water surfaces serve as sites available to ducks and other waterfowl.

After the Expo closes, demolition work will begin, and the area will be restored to its original condition and returned to Osaka City.





In response to this, specifically, before and during the conference, efforts were made to create bare ground by mowing grass in the area adjacent to the planned venue site before the period when Little Terns require attention (April to mid-August), and decoys were placed in the bare areas after mowing.

Furthermore, during the period when the Sea of Connection was transformed into a body of water, as an alternative habitat for waterside birds (shorebirds and plovers at the water's edge, and ducks on the water's surface), a newly constructed temporary storage area for rainwater was utilized on the southeastern side of the Expo site. In addition, it was considered to secure naturally formed puddles within Yumeshima as areas usable by birds, and ultimately, a small but available puddle outside the site was secured.



Figure 3-2-54 Potential waterfront locations (left: rainwater reservoir (construction), right: rainwater puddle)

When nesting activity was confirmed, relevant parties were notified to prevent unnecessary entry, and the area was monitored until breeding was complete.

Following the event, a post-event survey report summarizing the results of bird migration surveys conducted during construction and the event was published in February 2026. Regarding bird migration during the event, the number of passerine species increased compared to other survey



periods. On the other hand, for charadriiformes, 23 species were confirmed to have arrived at the time of the assessment survey, and 24 to 26 species during construction, but this number decreased to 15 species during the event. Although a migration site was secured adjacent to the Expo site as mentioned above, in reality, Black-winged Stilts (an important species) migrated not to the secured area, but to the water's edge created by water level fluctuations in the southern area of the "Connecting Sea," where nesting and breeding were confirmed.

The increase in passerine species is thought to be due to some effect of the efforts made to green the Expo site. The decrease in charadriiform species is thought to be because many species prefer waterside areas, and it was difficult to secure sufficient waterside areas during the event, resulting in fewer migrating species.

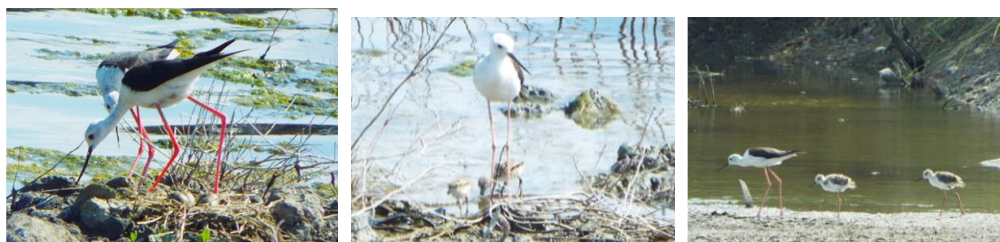


Figure 3-2-53 Black-winged stilts observed at the Expo site (left: incubating eggs, center: adult and chick, right: adult and juvenile)

Based on these considerations, although some nature conservation groups felt that the measures taken to the extent possible to protect the habitat and growth environment of birds, as described in the environmental impact assessment report, were not appropriate because their opinions and suggestions from the joint study were not reflected in the countermeasures, the Expo Association evaluated the measures as appropriate (implemented appropriately) because it had taken the review into account and implemented as many countermeasures as possible. (The joint study will be discussed later.)

Table 3-2-19 Post-event survey report (Comparison results by survey period: Expo site and surrounding area)

No.	Biological order	Family name	Species name	Transitional classification	During the period		During construction				Environmental Impact Assessment Report		
					2025	important species	2024	important species	2023	important species	2020	important species	
19	Charadriiformes	Stilt	Black-winged Stilt	Migratory	44	●	85	●	35	●	3	●	
20			Northern Lapwing	Resident	51	●	32	●	13	●	3	●	
21			Black-bellied plover	Migratory			6	●	54	●			
22			Grey plover	Migratory					2	●			
23			Little Ringed Plover	Resident	74	●	62	●	129	●	68	●	
24			Kentish plover	Resident	19	●	85	●	97	●	78	●	
25			Kentish plover	Migratory	6	●	62	●	52	●	31	●	
26			Greater Sand Plover	Migratory				3	●				
27			Sandpiper	Whimbrel	Migratory	5	●	10	●	1	●	14	●
28				Bar-tailed Godwit	Migratory			8	●			1	●
29	Ruddy Turnstone	Migratory				10	●			12	●		
30	Great Sandpiper	Migratory						6	●				
31	Common Sandpiper	Migratory					2	●	3	●	4	●	
32	Sanderling	Migratory					1	●	3	●			



33		Little Stint	Migratory						1	●			
34		Little Stint	Migratory	10	●	129	●	261	●	139	●		
35		Sanderling	Migratory					6	●				
36		Sanderling	Migratory	1	●	1082	●	83	●	343	●		
37		American Sandpiper	Vagrant					1					
38		Common Snipe	Winter	13	●			2	●	1	●		
39		Curlew Sandpiper	Migratory			10	●	29	●	12	●		
40		Red-necked Phalarope	Migratory			1				4			
41		Common Sandpiper	Resident	15	●	3	●	8	●	12	●		
42		Common Sandpiper	Migratory	3	●	46	●	22	●	56	●		
43		Common Redshank	Migratory			1	●						
44		Common Greenshank	Migratory					2	●				
45		Common Greenshank	Migratory			12	●	8	●	10	●		
46	Family Pallas	Oriental Pratincole	Migratory							8	●		
47	Laridae	Black-headed gull	Winter	472		58		177		253			
48		Black-headed Gull	Winter					1	●				
49		Black-tailed gull	Resident	59	●	59	●	159	●	28	●		
50		Herring Gull	Winter	10		7		2		10			
51		Little Tern	Summer	476	●	1094	●	230	●	456	●		
64	Passeriformes	Shrike	Shrike	Resident		1				1			
65		Corvidae	Carrion Crow	Resident	22		21		32		34		
66			Large-billed crow	Resident	36		22		33		63		
67		Penduline	Penduline Tit	Winter							2		
68		Lagoonidae	Skylark	Resident	36	●	27	●	44	●	122	●	
69		Bulbul	Brown-eared bulbul	Resident	2		3		1		2		
70		Swallow	Swallow	Summer	58		41		45		124		
71		Sylviidae	Japanese bush warbler	Resident	1								
72		Reed Warbler	Great Reed Warbler	Summer	5	●	3	●	2	●	8	●	
73		Cisticola	Zitting Cisticola	Resident	32	●	59	●	57	●	125	●	
74		Starling	Starling	Resident	115		32		198		444		
75		Turd	Thrush	Winter	6		2				21		
76		Muscicapidae	Daurian Redstart	Winter	2								
77		Passer	Sparrow	Resident	136		76		108		151		
78		Motacillidae	White Wagtail	Resident	53		39		41		46		
79			Meadow Pipit	Winter	2		9		2		10		
80		Finch	Oriental Greenfinch	Resident	8		8				41		
81		Emberizidae	Red-cheeked Bunting	Winter	2	●							
82			Yellow Bunting	Winter	1	●					3	●	
83		Eyelets	Columbidae	Rock Dove	Introduced	39		30		82		124	
84		Passeri-formes	Starling	Myna	Introduced						1		

(Excerpt from the Post-Exhibition Survey Report for the Expo 2025 Osaka, Kansai, Japan (April 2025-October 2025) [During the Period])

- At the planned site of Expo 2025 Osaka, Kansai, Japan, important species such as plovers, sandpipers and little terns are present. Accordingly, the Environmental Impact Assessment conducted by the Association set out that every effort would be made to consider the habitat



needs of birds as far as possible. Recognising that collaboration with NGOs is essential in undertaking these considerations, the Association held joint discussions with NGOs on the conservation and management of bird habitats, as part of its approach to NGO cooperation and broader stakeholder engagement.

【Outline of the joint study】

- First meeting (September 2023):

The Association explained the results of the post construction bird survey, based on the follow up survey plan, as well as its conservation and management measures for birds such as plovers, sandpipers and little terns, and exchanged views with participants.

- Second meeting (February 2024):

Following proposals from NGOs regarding the conservation of birds that use waterside habitats, the Association explained its response and approach and engaged in further discussions.

- Third meeting (September 2024):

The Association presented the status of its review of conservation areas for birds that use waterside environments and outlined event related considerations, followed by an exchange of views.

【Summary of comments and proposals from NGOs in the joint studies】

First meeting (September 2023)

At the first meeting, the Secretariat explained

- (1) the preliminary results of the bird follow up survey based on the follow up survey plan, and
- (2) conservation and consideration measures for birds—particularly shorebirds and terns.

The following comments were made by participants:

- Counting the number of individuals is extremely important.
- Information should be disclosed on where and to what extent key species—particularly black-winged stilts[CK1.1] and snowy plovers—are breeding.
- For shorebirds, the mere presence of waterside areas does not guarantee use. Their arrival and patterns of use depend on factors such as gentle slope gradients and the condition of the substrate. Habitat characteristics—including water-level settings and slope angles—should be examined in light of the types of environments preferred by wild birds.
- The content of internal discussions within the Association should also be shared, and the future approach should be developed jointly, drawing on the experience accumulated by NGOs.
- Participants also raised comments regarding Yumeshima District 2 (south-west) and Area B (the Sea of Connection). They noted that, in addition to rising water levels in Area B, visitors would likely be able to look down from the elevated circular Ring structure. Given that shorebirds—typically highly wary—tend to avoid areas near objects that cast shadows, there was concern that if the structure is positioned close to the water's edge, roughly the northern half of Area B could become an avoidance zone, with very few birds approaching during the Expo period.
- If insect-repellent substances are used at the Expo site, the area may no longer function as a resting site for birds; this should also be taken into consideration.
- Little terns are breeding on Nijijima, but roseate terns are becoming more dominant. If conservation measures are implemented outside the Expo site, NGOs expressed willingness to cooperate by providing decoys.
- Regarding how the area will be returned to Osaka City after the Expo, participants stated that coordination with the City will be necessary.
- The discussions should not focus solely on wildlife during the Expo period. Broader themes—such as the future of Japan and the world, the environmental condition of Osaka Bay, and biodiversity—should be considered together with the Osaka Port Authority, environmental NGOs, companies and academia.

Second meeting (February 2024)

At the second meeting, the Secretariat explained

- (1) the results of the bird follow-up survey based on the follow-up survey plan,
- (2) considerations for bird habitats, and
- (3) proposals concerning event-related impacts.

The following comments were made by attendees:



- The conservation and consideration measures for birds that use waterside environments appear to have been weakened compared with the previous explanation. It seems that the measures have fallen below what was indicated in the Environmental Impact Assessment.
- Regarding the plan to secure areas for waterside birds on the western side, there are places where intervention is appropriate and places where it is not. We ask that sufficient care be taken, and that the work be coordinated in advance with our views. Ideally, a reed-bed should be recreated with internal wetlands where birds and benthic organisms can live.
- What will happen to the boundary between Area A and Area B on the eastern side of the “The Sea of Connection”? We would like the continuity between the areas (the ecotone) to be examined.
- If the water depth in Area C is made deeper again, it will become unsuitable for black-winged stilts and other shorebirds. Could the water level in Area C be adjusted by controlling drainage?
- What is the water quality of the seawater entering the “The Sea of Connection”? Will organisms enter together with the seawater?
- When seawater is drawn in, we request that water be taken from the middle or upper layers during summer to avoid hypoxic water masses.
- Is it possible to know in advance the frequency of events and fireworks during the Expo period?
- Regarding the proposal to establish a nature-restoration review committee, has Osaka City provided any response?
- We hear that Osaka City will consider post-Expo land use. Is there any information on this?
- Using this discussion on the conservation and restoration of habitats in Yumeshima as a starting point to advance wider initiatives and actions for nature restoration across Osaka Bay would be important for enhancing the significance of the Expo. The Association, as one of the stakeholders, should actively consider this.
- As the Association is examining indicators to evaluate its initiatives, indicators will also be needed to assess the impacts of Expo-related activities on the natural environment and on birds.
- For the next meeting, outreach should be extended not only to NGOs but also to the media and companies.
- Extensive ground-improvement works in Yumeshima have significantly damaged the environment. We raised this issue with Osaka City through a residents’ audit request, but the Osaka City Audit Committee took the view that there was no issue because the Association would implement conservation measures. However, based on today’s explanation, the measures fall far short. Moreover, Osaka City’s development plans suggest that the “The Sea of Connection” will be completely lost after the Expo. If the view is that impacts can simply be covered during the Expo period and development can proceed afterwards, this approach is highly problematic and should be discussed in light of the Expo’s founding principles.
- Regarding the proposals and comments on Areas A, B and C, the indication that 対応 would occur only in part of Area A and a portion of the western area outside the Expo site amounts to an almost zero-response. Given that the land will ultimately be returned to Osaka City for development, we question whether this joint discussion is meaningful. We request that these concerns be clearly recorded in the minutes.

Third meeting (September 2024)

At the third meeting, the Secretariat explained

- (1) the status of considerations for conservation areas for birds that use waterside environments, and
- (2) proposals concerning events.

The following comments were made by attendees:

- Regarding the three candidate conservation sites for waterside birds located outside the planned venue: will these sites remain in place after the Expo? If black-winged stilts are confirmed to be breeding at any of these locations, we would like the Association to request Osaka City to continue conservation efforts after the Expo.
- If the intention is to create breeding-suitable environments through water-level control, that would constitute a proper measure. However, simply using the existing conditions does not appear to constitute any meaningful measure. The only shallow-water measure within the planned venue is a 0.3-hectare rainwater-retention area in the south-east corner, and it is highly unlikely that birds will use such a small area.
- We would like to know what impacts drones and fireworks have on birds, what mitigation measures were taken, and what aspects were reviewed or improved.
- It is not enough to report only what was achieved or what efforts succeeded. It is essential to record clearly the aspects that did not reach the ideal outcome.
- I have serious doubts about the meaning of this joint study and whether the Environmental Impact Assessment system has really functioned. We do not believe that the Expo’s assessment has resulted in the conservation outcomes it should have delivered. Under the assessment system, surveys and conservation of necessary habitats must be carried out, and the mayor’s opinion explicitly stated that environments—particularly for birds—must be preserved. The Association was supposed to implement such measures. However, areas evaluated as valuable—especially the “The Sea of Connection”—have been completely



degraded by ground-improvement work.

- A residents' audit request was submitted, but it was dismissed on the grounds that the Association would implement conservation measures. In reality, all the Association has done is create a small water-accumulation area in the south-eastern corner of the Expo site. This is an insufficient measure, and even this will disappear upon restoration after the Expo. None of the bird habitats evaluated in the assessment will remain. While the Expo speaks of SDGs and biodiversity, nothing will remain as a legacy. I want to emphasise strongly whether this joint study has been meaningful at all. The Association, as a stakeholder, should raise these issues clearly with Osaka City.
- I would like to confirm the relationship between the external candidate sites and the landfill area for incineration ash. This was also a site where a rare aquatic plant (Hito-moto-susuki[CK1.1]) had been transplanted—what has happened to it since then?
- We have repeatedly asked for citizen-participation monitoring, but we have been told it is difficult and that only the surveys in the follow-up survey plan will be conducted. This lack of proactive effort from the Association is disappointing. In particular, since black-winged stilts are breeding in Area C, if increased water depth makes it unusable, could the three external sites be prepared and monitored as alternative habitats?
- The assessment concluded that Nanko Wild Bird Park would compensate for the loss of habitat in Yumeshima if development proceeded, but this has not materialised. Yumeshima functions as the hinterland of the park, and if its migratory-bird environment is lost, the number of birds visiting the park will decline. It is impossible to evaluate the impacts adequately under current conditions. Monitoring needs to cover waterside birds—not only little terns—at the Nanko Wild Bird Park as well.
- If the three locations outside the Expo site are to be developed as alternative habitats, the Association should carry out thorough surveys and measures so that it can demonstrate that birds are actually using them and that the measures have had an effect.
- Once the “Considerations for conservation areas for waterside birds” are published, the citizen-led “SDGs Expo Citizen Action,” which participates in the Co-Creation Challenge, plans to issue its overall evaluation of the Association’s roadmap responding to the mayor’s opinion under the assessment. Is the Association planning to produce its own overall evaluation? If so, what will it include?

Considering opinions and suggestions from NGOs during the joint study, and based on considerations of bird habitat, it was decided that the Sea of Connection would be kept as a water area during the Expo period, with seawater drawn in to make it suitable for birds that prefer water surfaces. As additional waterside habitats, a temporary rainwater-storage area at the southeast corner of the Expo site and a naturally formed rainwater puddle outside the Expo site was maintained until the end of FY2025 to support birds that prefer waterside environments.

- For the planned off-site parking facility in Sakai City (the Expo P&R parking lot), an Environmental Impact Assessment was conducted in accordance with the Sakai City Environmental Impact Assessment Ordinance. An Environmental Impact Assessment report was prepared and made public in April 2023. Opinions relating to environmental conservation were received, and a briefing session on the assessment report was held. In March 2024, an Environmental Impact Assessment report and a follow-up survey plan were prepared and made public.
- In Amagasaki City, preparations for establishing the off-site parking facility (the Expo P&R parking area) were carried out. Although the development of the parking facility was not subject to the Amagasaki City Environmental Impact Assessment Ordinance, the Association, with the cooperation of Amagasaki City, formulated the Guidelines for Conducting an Environmental Impact Assessment for the Development of the Off-Site Parking Facility for Expo 2025 Japan in Amagasaki. In accordance with these guidelines, a voluntary environmental assessment was undertaken. An Environmental Impact Assessment report was prepared and made public in February 2024.
- During the Theme Week on “The Future of the Planet and Biodiversity”, the Association held a



programme titled “Agenda 2025” as part of its official events. Discussions centred on a central question: what perspectives or elements should be added to international debates on the richness of “life” (biodiversity), with a view toward 2030 and beyond.

The discussions highlighted that maintaining natural capital can only advance through collaboration among businesses, civil society and policymakers. Protecting natural capital is not limited to environmental conservation; it is inseparable from addressing social challenges and ensuring economic sustainability.

A shared understanding emerged that the recovery of biodiversity and the realisation of a society in harmony with nature can be achieved by combining scientific knowledge, concrete corporate practices, international frameworks and the participation of local communities.

- In collaboration with Osaka Prefecture and Hyogo Prefecture, which are advancing the Osaka Bay MOBA Link Initiative, a project creating seaweed beds and habitats for aquatic life including fish and shellfish, as well as spawning and nursery areas while increasing carbon-dioxide absorption, the Expo promoted biodiversity conservation and nature-positive measures.
- A Forest of Tranquillity was created at the centre of the Expo site as a quiet space within the Expo site. Trees were transplanted from Expo Commemoration Park and other parks in Osaka Prefecture, including trees scheduled for thinning, to establish the forest.
- The Code of Sustainable Procurement (hereinafter referred to as “the Procurement Code”), formulated and published in June 2022, sets sustainability-focused procurement standards for suppliers, licensees, pavilion operators and their supply chains, including standards related to biodiversity conservation. The standards prohibit the use of raw materials derived from endangered wild fauna and flora for which sustainable-use measures have not been taken. Suppliers are also expected to reduce impacts on biodiversity and ecosystems by conserving endangered species and using production methods that minimise effects on organisms and habitats during the procurement, production and distribution of materials.

To ensure the Code’s effectiveness, implementation measures included pledge submissions, checklists and hearings.

(Details of the Procurement Code is provided in 3.3 Prosperity.)

- In November 2023, in collaboration with the Signature Pavilion “LIVE EARTH JOURNEY” (theme: Totality of Life) produced by Shoji Kawamori, the ecosystem-observation and collaboration project Connecting Life! Myaku Myaku Living Things Quest was launched. Beginning 500 days before the Expo opening, the project focuses on “Nature Positive: Restoring Biodiversity.” Its purpose is to advance the Expo’s theme, Designing Future Society for Our Lives, by enabling participants to experience firsthand that human life depends on biodiversity.
- To protect the water environment, the following measures were implemented:
 - During construction, wastewater, including domestic wastewater, was collected and treated using septic tanks.
 - Earthworks were avoided during heavy rainfall to reduce muddy-water discharge.
 - Rainwater collected during construction was routed through the Sea of Connection and



discharged into the open sea via the existing spillway.

Alkaline wastewater from concrete processes was pH-adjusted before discharge through the Sea of Connection and the existing spillway.

Pavilion-design guidelines promoted the adoption of water-saving fixtures.

During the Expo, water was supplied from the municipal water system and wastewater was discharged into the public sewer.

(Water and sewerage usage during the Expo was 912,789 m³, compared with the predicted 1,743,529 m³ in the Environmental Impact Assessment Report.)

【Looking back and future prospects】

- Following the adoption of the Kunming–Montreal Biodiversity Framework, nature-themed exhibits were presented in the pavilion; however, there were relatively few exhibits focused on nature-positive initiatives or the 30 by 30 target. Through theme-week events, information was shared on biodiversity, including biodiversity restoration and nature-positive initiatives.
- Regarding biodiversity conservation during Expo preparations and operations, the Procurement Code was formulated to establish sustainability-focused procurement standards, including those related to biodiversity conservation. Efforts were made to ensure its effectiveness. However, hardware-related implementation was difficult due to time and land constraints.
- The project was implemented appropriately in accordance with the environmental impact assessment report, and the post-project survey report published in February 2026 included a report on the bird migration situation during the event. The survey results regarding the migration of terrestrial animals (birds) during the event showed an increase in the number of passerine species compared to the survey results at the same time in the assessment report and the post-project survey results during construction, suggesting that the efforts to green the Expo site had a certain effect.

On the other hand, for charadriiformes, 23 species were confirmed to have migrated during the assessment report's survey, and 24 to 26 species were confirmed during construction, but the number decreased to 15 species in the post-project survey during the event. This is thought to be due to the temporary increase in the waterline area caused by lowering the water level in the connected sea area during construction. Furthermore, seawater was introduced into the connected sea area during the event, and incubation and breeding of black-winged stilts were confirmed at the waterline area created by the water level fluctuations on the south side of the site. Therefore, relevant parties were notified to avoid unnecessary entry, and the area was monitored until breeding was complete.

- Regarding these matters, some nature conservation groups have expressed the opinion that the measures were not appropriate because their opinions and suggestions from the joint review were not reflected in the countermeasures. However, they have evaluated the consideration given to the bird habitats and growing environments as described in the environmental impact assessment report as appropriate (implemented appropriately).
- In stakeholder engagement regarding biodiversity, conservation groups suggested that the Expo



Association should take the lead in establishing a study group on natural restoration plans, involving the national and local governments, to ensure the conservation and creation of ecosystems on Yumeshima Island, including after the Expo, as a legacy of the Expo. In response, it was explained that the city of Osaka, the landowner, is considering the use of the Expo site after the Expo, and that, as a temporary organization, it would be difficult for the Expo Association to take the lead in considering land use after the Expo.

- For mega-events like the World Expo, the scope of impact is wide and the stakeholders are diverse. Therefore, it is considered necessary to consider the matter from a medium- to long-term perspective from the planning and bidding stages, and to indicate the direction for the use of the site afterward.

