

Shaping a New Journey



Kansai International Airport / Osaka International Airport / Kobe Airport

Environmental Report 2023



Queries

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Continue to be the airports that actively cooperate with the local communities and contribute to realizing a sustainable society



Shaping a New Journey

Kansai Airports Group Environmental Policy

Environmental Philosophy

We, Kansai Airports Group, recognize the importance of solving environmental problems on a global scale and contribute to the realization of a sustainable society through the operation of airports, which are public infrastructure.

Basic Environmental Policy

- Each employee of the group will diligently preserve the global environment in their daily work.
- We will clarify the environmental impact of our business activities, set goals to reduce it, and take proactive measures.
- We will regularly check on the progress of initiatives and work to improve the content.
- We will play a pioneering role in the airport field. Furthermore, we will contribute to reducing the environmental burden by overall airports, including the aviation sector.
- We will communicate with all stakeholders involved in airports and communities.

Based on the "Environmental Philosophy" and the "Basic Environmental Policy", we have set the targets for FY2030 to realize our long-term vision with three pillars.

Decarbonization

- By FY2050, we will achieve net zero greenhouse gas emissions in business activities of Kansai Airports Group.
- As well as promoting energy conservation including operational optimization, we propel decarbonization by using renewable energy and hydrogen to contribute to a decarbonized society.

Circular economy

- We aim to become a Zero Waste Airport by FY2050. In addition to further reducing, sorting and recycling combustible waste, we will further reduce the amount of single-use plastic and work on conversion of materials and closed-loop recycling to contribute to a circular society.

Environmental symbiosis

- We ensure a healthy living environment around the airports and aim to realize symbiosis with nature.
- We continue to monitor aircraft noise and surrounding environment. We also use water resources efficiently through utilization of grey water and enhanced water conservation operations and conserve biodiversity to contribute to an environmentally symbiotic society that is in harmony with nature and local communities.

Environmental Goals (Target: FY2030)

- Decarbonization** · Reduce greenhouse gas emissions by Kansai Airports Group by 50% from the FY2016 level
- Circular economy** · Not to increase the amount of incinerated waste of the entire airports from the FY2016 level
- Reduce the amount of single-use plastic by Kansai Airports Group by 30% from the FY2016 level
- Environmental symbiosis** · Continue appropriate and steady monitoring of noise and the surrounding environment
- Not to increase the total water use of the entire airports from the FY2016 level
- Reduce the clean water use by Kansai Airports Group by 15% from the FY2016 level
- Conservation of biodiversity

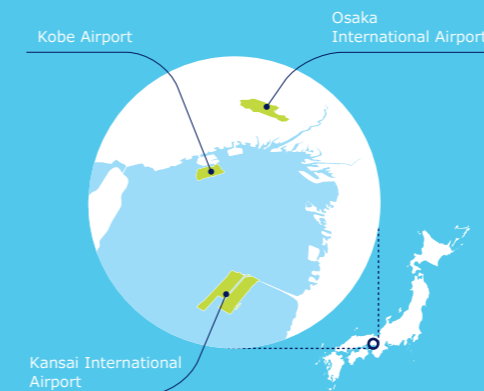
Yoshiyuki YAMAYA
Chief Executive Officer
Kansai Airports

Benoit RULLEAU
Co-Chief Executive Officer
Kansai Airports

Company Profile

Name	Kansai Airports
Date of incorporation	December 1, 2015
Location	1-banchi, Senshu-Kuko Kita, Izumisano-shi, Osaka 549-8501, Japan
Company representatives	Yoshiyuki YAMAYA Chief Executive Officer Benoit RULLEAU Co-Chief Executive Officer
Business scope	<ul style="list-style-type: none"> ● Operation and management services, etc. of Kansai International Airport and Osaka International Airport ● Operation of Kobe Airport by Kansai Airports Kobe
Capital	25 billion yen
Shareholders	ORIX Corporation 40% VINCI Airports 40% Other investors 20%

* On April 1, 2018, Kansai Airports Kobe commenced its business as an operator of Kobe Airport (KOBÉ).



● Kansai International Airport
Website: www.kansai-airport.or.jp
Official Facebook page: www.facebook.com/KansaiInternationalAirport/



● Osaka International Airport
Website: www.osaka-airport.co.jp
Official Facebook page: www.facebook.com/OsakaInternationalAirport/



● Kobe Airport
Website: www.kairport.co.jp
Official Facebook page: www.facebook.com/kobeairports/



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Editorial Policy

● Purpose of this report

This report is published to convey to stakeholders in an easy-to-understand manner initiatives, including data, for reducing environmental impacts being carried out by Kansai International Airport, Osaka International Airport and Kobe Airport to help realize sustainable society, which are managed by Kansai Airports.

● Reporting boundary

This report focuses on the activities of Kansai Airports and also covers the activities of certain Group companies and businesses operating at the airports its manages.

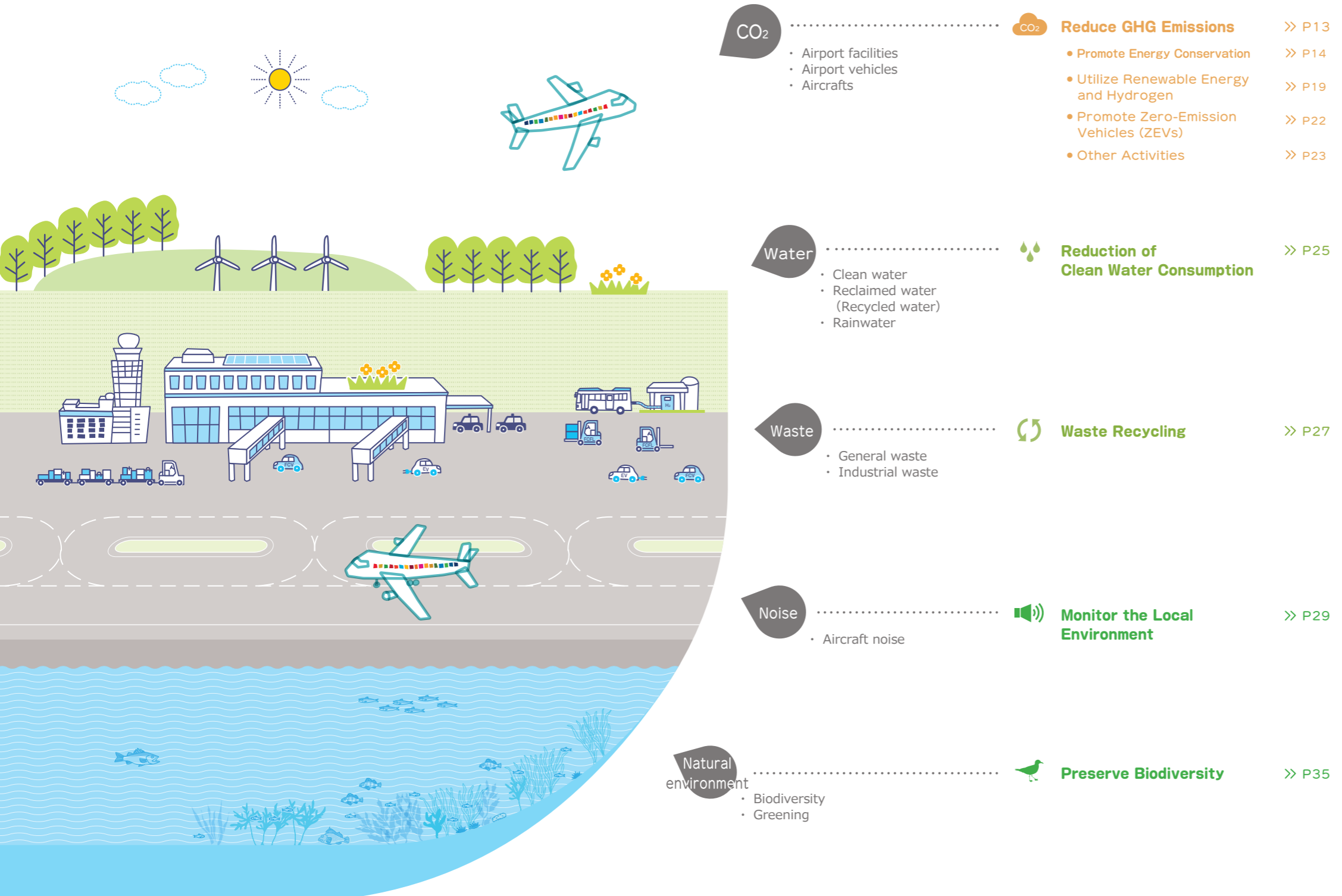
● Reporting period

Activities carried out up to the end of September 2023, focusing mainly on fiscal year 2022 (April 2022 to March 2023).

Addressing Environmental Impact at Airports

- Causal relations between our operations at airports and environmental impact -

We have clarified our environmental impact and issues having arose through our airport operations to determine the impact quantitatively and established goals to reduce the impact. By regularly confirming and evaluating the progress of activity and striving to improve our initiatives and address new challenges, we are proceeding proactively with our activities to reduce the environmental impact.



KIX : Kansai International Airport



ITAMI : Osaka International Airport



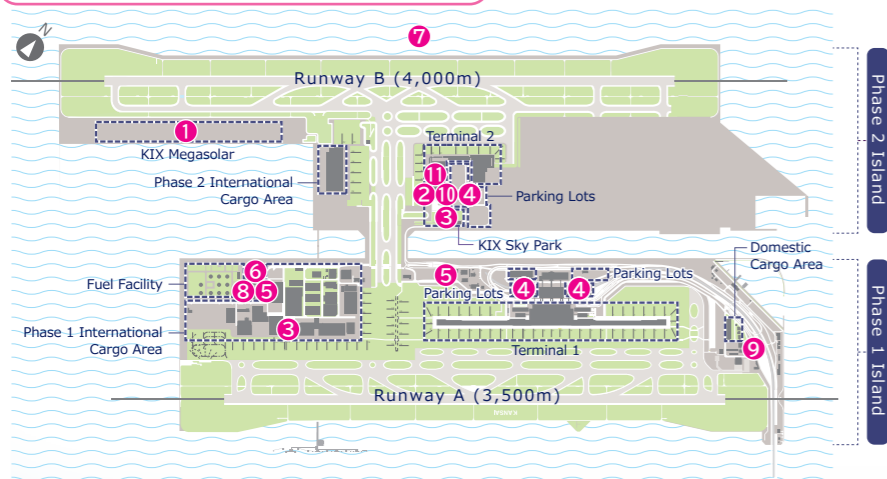
KOBE : Kobe Airport



Runways	Operating Hours	Aircraft Parking Stands
2	24 hours	102

Size
Phase 1 Island approximately 510 ha / Phase 2 Island approximately 545 ha

Environmental Facilities and Equipment



2 Small-scale wind turbines

Three wind turbines are installed at the airport. The generated electricity is used to power streetlights.



3 Hydrogen stations

Hydrogen stations have been installed at two locations for fuel-cell vehicles and industrial vehicles such as forklift.



4 EV charging stations

EV charging stations are available to meet the growing demand of eco-friendly vehicles.



5 Heat supply plant

The plant serves as a community heating and cooling system that centrally supplies cold water and steam.



1 KIX Megasolar

A mega solar power plant capable of generating 11.6 MW of power.



6 Sewage Treatment Center

Wastewater from each facility is treated onsite and reused as reclaimed water.



8 Waste Disposal Center

General waste from the airport is sorted and either incinerated or recycled.



7 Seaweed bed

The gently sloping rubble mound seawall surrounding the airport island fosters the growth of seaweed, providing a habitat for sea life.



9 Environmental Center

Introduces environmental information and initiatives at the Sky View Observation Hall.



11 Solar panels

The electricity generated on the roof of the Terminal 2 building is consumed onsite.



10 KIX Sky Park

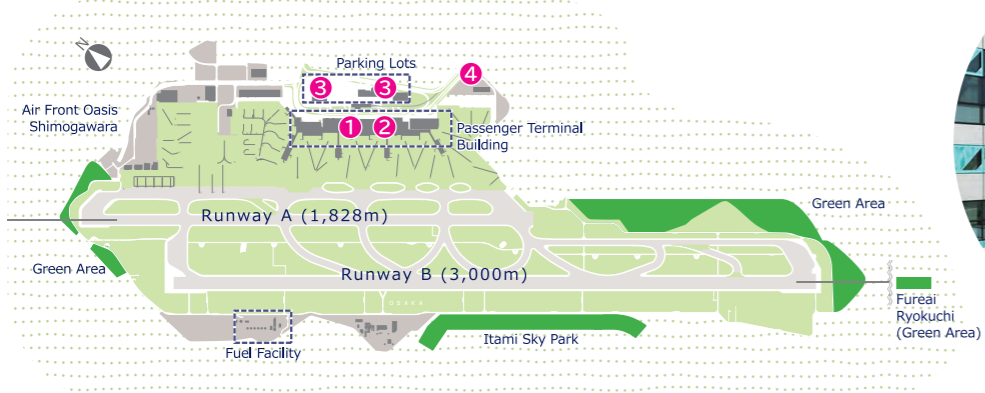
A grand park features an expansive lawn and view of the sea.





Runways	Operating Hours	Aircraft Parking Stands	Size
2	7 a.m. to 9 p.m.	52	approximately 311 ha

Environmental Facilities and Equipment



1 Light blocking panels
Light blocking panels are installed on the windows of the passenger terminal buildings as part of the airport's energy conservation efforts.



2 Rooftop greenery
Rooftop greenery is encouraged and used on top of the passenger terminal building.



3 EV charging stations
EV charging stations are available to meet the growing demand of eco-friendly vehicles.



4 Hydrogen station
A station serves fuel-cell vehicles.



Runways	Operating Hours	Aircraft Parking Stands	Size
1	7 a.m. to 11 p.m. (※From the summer of 2020)	10	approximately 156 ha

Environmental Facilities and Equipment



1 EV charging stations
EV charging stations are available to meet the growing demand of eco-friendly vehicles.



2 Rainwater filtration system
Rainwater is filtered and reused as recycled water.



3 Co-generation facility
The facility uses heat from the generation of electricity to heat and cool the passenger terminal building.

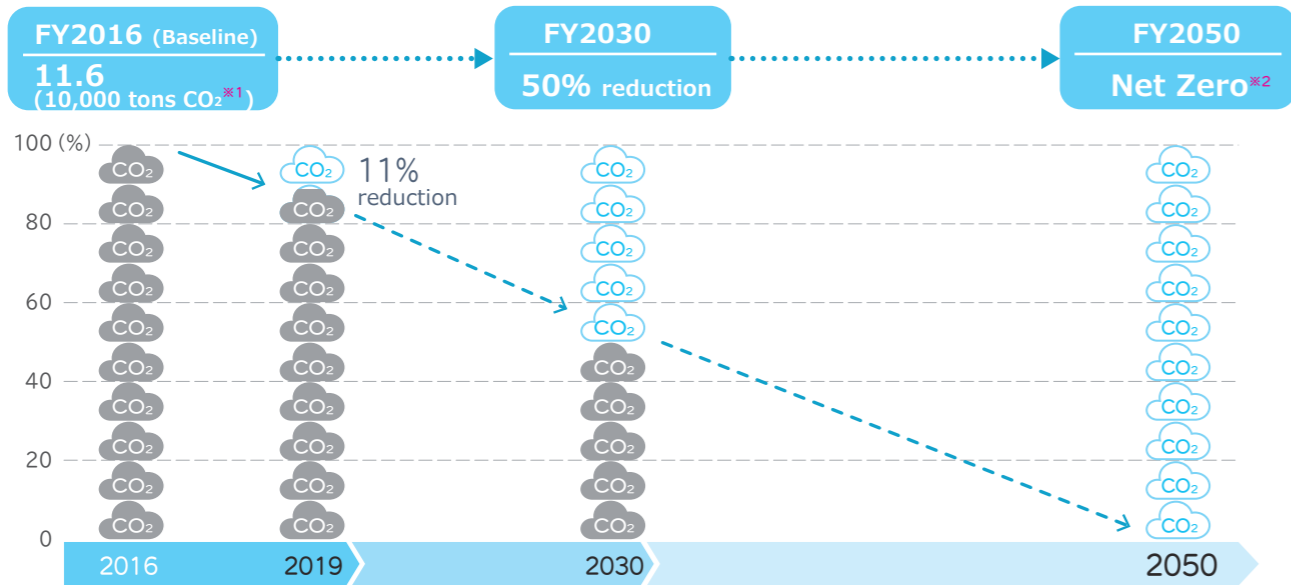


Kansai Airports Group sets a long-term target aiming for net zero greenhouse gas emissions and a decarbonized society

Kansai Airports Group recognizes the importance of addressing environmental issues on a global scale and has set a long-term target to reach net zero greenhouse gas emissions by FY2050.

The international community and Japan alike have been committed to the goal of realizing a decarbonized society with net zero greenhouse gas emissions by 2050.

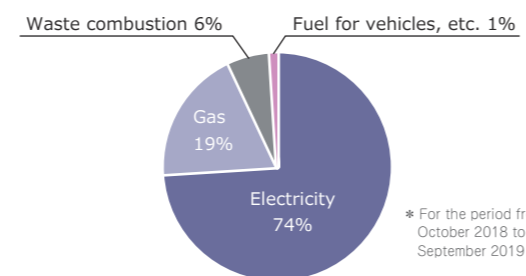
At Kansai Airports Group, various steps have been taken to reduce the environmental footprint of the three airports it operates. We will continue to work on a medium- to long-term plan and promote the measures for achieving carbon neutral status by further reducing energy consumption and using renewable energy.



- Major initiatives**
 - Promote Energy Conservation**
 - [Air-conditioning]
 - Upgrading energy-efficient heat-source equipment
 - Optimizing the ventilation system
 - Insulation and anti-sunlight measures
 - Optimizing the air-conditioning system
 - [Operations]
 - Visualizing and analyzing energy usage with BEMS^{*3}
 - Optimizing operations using AI
 - [Lighting]
 - Full-scale upgrading to LED lighting
 - Expanding the brightness sensor and control
 - Utilize Renewable Energy and Hydrogen**
 - Install more solar panels
 - Promote the Hydrogen Grid Project
 - Promote ZEVs^{*4}**
 - Replace existing service vehicles with electric and fuel-cell vehicles
- Further energy saving**
- Purchase of green energy**
- Technological innovation**
 - Use of hydrogen
 - Use of city gas produced through methanation
 - Carbon capture and methanation to reduce emissions from waste combustion
 - Full switch to zero-emission vehicles and others



Breakdown of Kansai Airports Group's CO₂ emission sources Scope 1 and Scope 2 ^{*5}



^{*1}: Calculated based (Scope 1 and Scope 2) on the Airport Carbon Accreditation (ACA) Level 4 emission calculation scope.
^{*2}: Includes the purchase of green energy, etc.
^{*3}: BEMS: Building Energy Management System
^{*4}: ZEV: Zero-Emission Vehicle
^{*5}: Scope 1: Direct emissions from fuel combustion, etc. Scope 2: Indirect emissions through the purchase of electricity.

One Eco-Airport Plan

Committed to Operating Eco Friendly, Smart Airports



We established the One Eco-Airport Plan, a five-year environmental plan from FY2018 to FY 2022 covering the three airports of Kansai International Airport, Osaka International Airport, and Kobe Airport, using four policies to promote activities across all three major airports in the Kansai region aimed at reducing our environmental impacts.

Since FY 2022 saw the final year of the plan, we summarized achievement progresses and initiatives for each item. Incorporating the summary results into the next environmental plan, "Environmental Vision 2050 and Environmental Goals 2030", we keep reducing our environmental impacts.

Impact of COVID-19
 The spread of the new coronavirus infection (COVID-19) led to a significant reduction in domestic and international human traffic due to global immigration restrictions and the declaration of a state of emergency in Japan. In FY 2022, passenger traffic demand has been recovering thanks to gradual easing of immigration restrictions and moving restrictions in Japan and other relaxations. The reduction in passenger and flight numbers due to COVID-19 has also affected environmental data, with lower CO₂ emissions, drinking water consumption and general waste, but higher passenger numbers and volumes per traffic unit. Despite these unusual circumstances, we have been working on innovations and promoting various initiatives under the One Eco-Airport Plan for the past five years.

Initiatives under the One Eco-Airport Plan and SDGs

To develop as an airport holistically alongside local communities and society and also minimizing environmental impacts, we established the One Eco-Airport Plan, under which the three airports collectively address the task of reducing their environmental impacts. Although such integrated efforts will further boost our activities, our initiatives as Kansai Airports Group to build a sustainable society have become more important, given the growing impact on the environment and international community we expect. Moreover, actions to achieve the Sustainable Development Goals (SDGs) to resolve environmental, economic and social issues are already underway worldwide. With this in mind, Kansai Airports Group will strive to help achieve a sound global environment and sustainable society through our business operations.



Sustainable Development Goals (SDGs)
 Global goals are set in the 2030 Agenda for Sustainable Development adopted at the United Nations Summit in 2015 to realize a sustainable future. SDGs comprise 17 goals and 169 targets.

Summary of the One Eco-Airport Plan

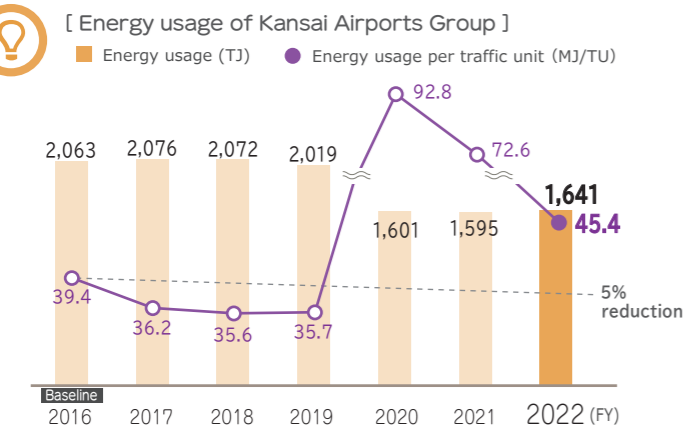
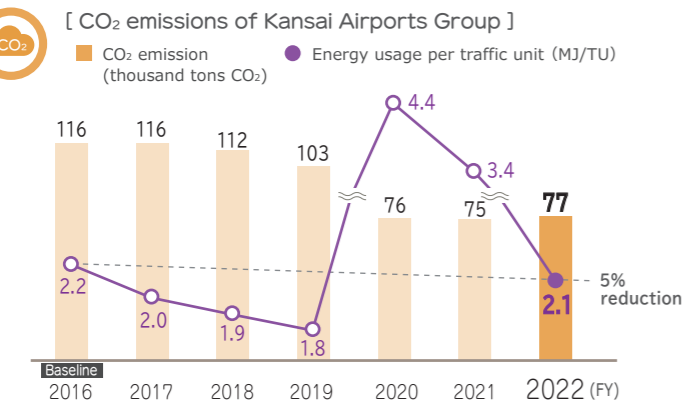
1 Adaptation to climate change

We promote efficient energy usage to reduce environmental burdens and engage in measures aimed at reducing greenhouse gas emissions. We also encourage the use of solar, hydrogen and other types of sustainable energy and new energy that contributes to protecting the global environment.

Reduce GHG Emissions	Promote Energy Conservation
<p>[Strategic Goal]</p> <p>By fiscal 2022 : CO₂ emissions</p> <p>5 % reduction</p> <p>(compared to fiscal 2016, per traffic unit)</p>	<p>[Strategic Goal]</p> <p>By fiscal 2022 : energy usage</p> <p>5 % reduction</p> <p>(compared to fiscal 2016, per traffic unit)</p>



- [Major efforts over the past five years]
- Promotion of energy conservation → Ensured optimum air-conditioning temperature control and improved facility operation by analyzing energy usage with BEMS
 - Introduction of energy-efficient equipment → Upgraded energy-efficient heat-source equipment and introduced LED lighting
 - Building insulation and anti-sunlight measures → Promoted insulation measures by introducing double low-e glass and anti-sunlight measures by installing light-blocking panels and blinds
 - Clean energy utilization → Commenced operation of The ITAMI Iwatani Hydrogen Station and introduced FC forklift and FC bus
 - Installed solar panels on the Terminal 2 rooftop



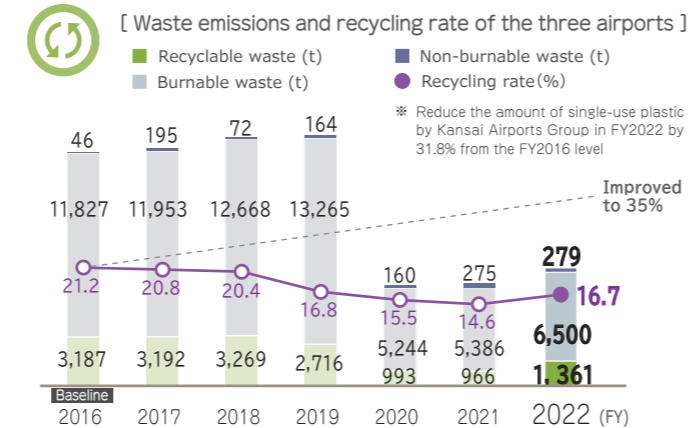
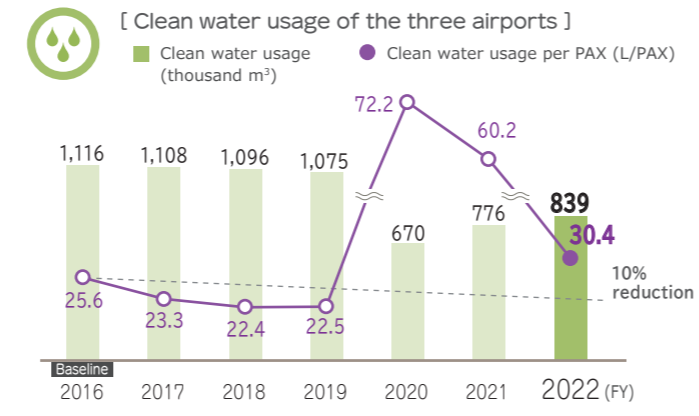
2 Resource Usage

We reduce, separate, recycle and reuse all the waste and plastics generated. We also contribute to resource conservation through the promotion of "Reduce, Reuse and Recycle (the 3Rs)" with respect to both waste and water, including efforts to make water use more efficient through data analysis, expand the adoption of recycled water and examine rainwater usage.

Reduction of Clean Water Consumption	Waste Recycling
<p>[Strategic Goal]</p> <p>By fiscal 2022 : Clean water usage</p> <p>10 % reduction</p> <p>(compared to fiscal 2016, per PAX)</p>	<p>[Strategic Goal]</p> <p>By fiscal 2022 :</p> <ul style="list-style-type: none"> Waste recycling rate : 35% Amount of one-way plastics waste : 25% reduced



- [Major efforts over the past five years]
- Grey water (recycled water and rainwater) utilization → Ensured grey water utilization
 - Water conservation operations → Installed water-saving equipment and automatic water faucet and optimized the water amount
 - Waste reduction and reusing → Introduced a food waste disposer in restaurants and reused suitcases
 - Plastic Free Airport → Introduced paper shopping bags and biomass amenities in hotel guestrooms
 - Used paper/wooden containers in events



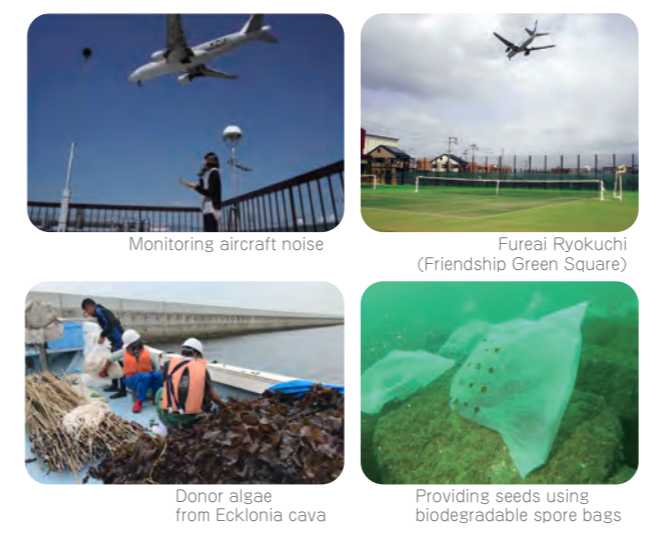
3 Environmental Harmony

We continue to work on reducing aircraft noise, conduct environmental monitoring appropriately and disclose monitoring results. We will also promote efforts to create the creation of positive spaces where in which airport users can relax and feel comfortable while striving to preserve biodiversity through the maintenance by maintaining and expansion expanding of green belts and conducting environmental surveys to verify species.

Monitor the Local Environment	Preserve Biodiversity
<p>[Strategic Goal]</p> <p>Measure environmental parameters</p>	<p>[Strategic Goal]</p> <p>Increase biodiversity</p>



- [Major efforts over the past five years]
- Aircraft noise monitoring → Monitored and taken measures for aircraft noise and investigated water quality based on the Environmental Monitoring Plan
 - Biological environmental conservation and growth → Grew seaweed beds following the wave-dissipating block installation as part of BCP measures in KIX



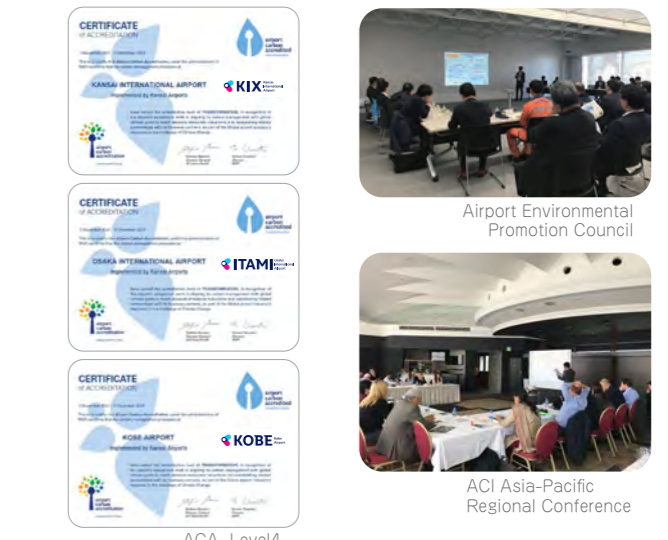
4 Environmental management

Using environmental evaluation programs, we have created a mechanism to enable the understanding and assessment of environmental burdens that lead to their reduction. We also make an effort to engage in dialogues with customers, airport staff and local communities through the dissemination of environmental information and the provision of environmental education, as well as alliances with airport-related businesses and airports throughout Japan and overseas.

Utilize Evaluation Programs	Cooperation and Education
<p>[Strategic Goal]</p> <p>Acquire environmental certification</p>	<p>[Strategic Goal]</p> <p>Establish management framework</p>

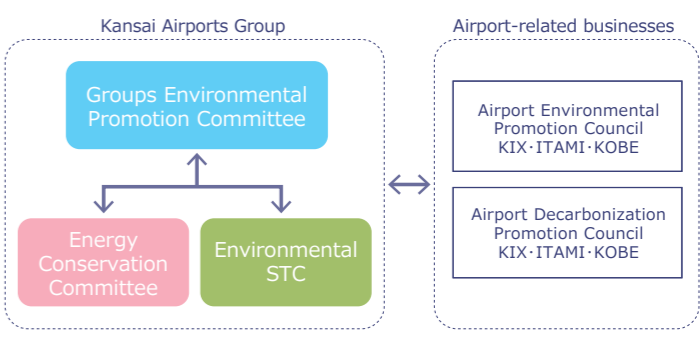


- [Major efforts over the past five years]
- Utilization of environmental certification systems → Upgraded to ACA Level 4 certification systems
 - Alliance with airport-related businesses → Established the Environmental Standards Regulations
 - Cooperation with domestic/international airports → Hosted the 18th ACI Asia-Pacific Regional Assembly, Conference and Exhibition



Environmental Promotion System

Kansai Airports Group established the Groups Environmental Promotion Committee to promote plans, analyze and assess the status of target achievement and improve initiatives. The Energy Conservation Committee promotes specific analyses and actions aimed for efficient energy use. Moreover, the Environmental STC* proceeds with cross-sectoral coordination between departments and group companies on environment-related themes. Further, we promote our initiatives in cooperation and collaboration with airport-related businesses via our Airport Environmental Promotion Council established in each of the three airports and the Airport Decarbonization Promotion Council which is established by airport providers.



* A committee engaging in specific environment-related themes

1

Adaptation to climate change

KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport

CO₂ Reduce GHG Emissions



At the Kansai Airport Group, we have actively committed to measures intended to make people more aware of the need to reduce CO₂ emissions and take the process forward as part of our long-term target of net-zero GHG emissions, established in March 2021*. In line with Japanese government policy and with mid- and long-term goals in mind, our airports are also reducing emissions in collaboration with the Airport Decarbonization Promotion Council which is established by airport providers and the Airport Environmental Promotion Council comprised of airport-related businesses and other stakeholders.

* In April 2022, each of the three airports also enacted environmental standards regulations to ensure eco-friendly operation of airport-related businesses.

We aim to calculate CO₂ emissions by categorizing them into Scopes 1 to 3 in line with the GHG protocol* concept.

- **Scope1:** CO₂ directly emitted by incinerating fuels used in vehicles, emergency generators and other machinery.
- **Scope2:** CO₂ indirectly emitted when electricity is purchased and used.
- **Scope3:** CO₂ emitted by other businesses involved in airport business activities.

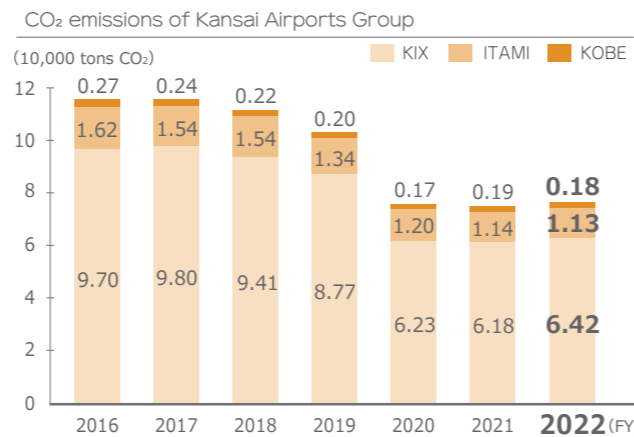
* GHG protocol: Universal standards for calculating and reporting on GHG emissions.

CO₂ emissions from airports

Thanks to energy-saving efforts and scope to reduce the proportion of electricity emissions, the Kansai Airports Group reduced overall CO₂ emissions by 11.0% in fiscal 2019, before the COVID-19 crises emerged, compared to the level in fiscal 2016.

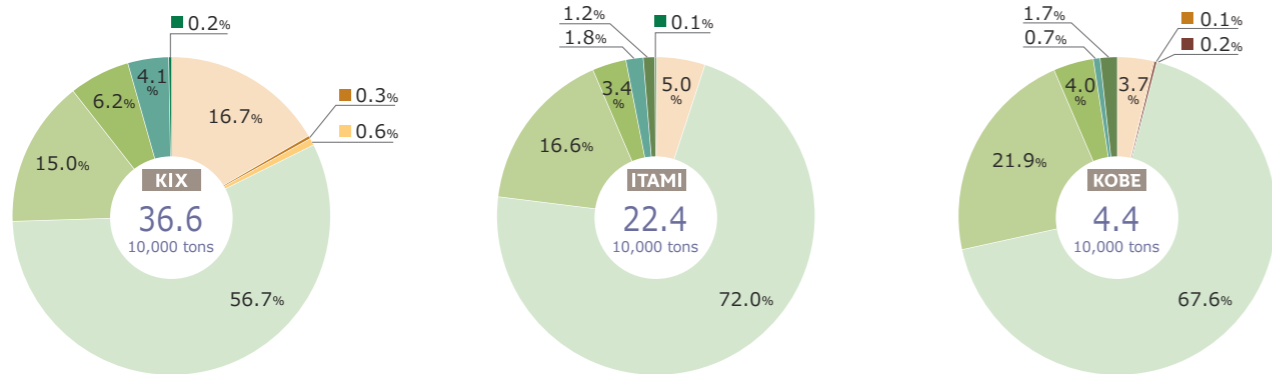
In fiscal 2021, overall CO₂ emissions fell even more sharply due to the impact of COVID-19. A year later, in fiscal 2022, although the number of domestic aircraft movements was recovered to the pre-pandemic levels, that of international aircraft movements remained around 40%. Accordingly, amid the ongoing impact of COVID-19, overall CO₂ emissions in fiscal 2022 slightly increased from the previous year.

Going forward, we will strive to reduce energy consumption further and boost overall energy efficiency at our airports via the Airport Environmental Promotion Council in collaboration with the Airport Decarbonization Promotion Council.



Note: • The CO₂ emission factor for electricity is based on the data from fiscal 2021.
• Calculated based on the Airport Carbon Accreditation (ACA) Level 4 emission calculation conditions.

CO₂ emissions from all the three airports (in fiscal 2022)



Note1: Since component percentages are rounded to two decimal places, their sum does not necessarily add up to 100%.

Note2: Calculation Conditions

- Vehicles refer to passenger vehicles and GSE vehicles.
- Waste materials are based on carbon neutrality.
- Emissions from accessing the airport and aircraft are based on estimates.
- Emissions from aircraft are based on the LTO (Landings and Takeoffs: aircraft activity at altitude of 3,000ft and under) cycle stipulated by ICAO.

- **Scope1,2**
 - Facilities managed by Kansai Airports
 - Vehicles managed by Kansai Airports
 - Waste/wastewater
 - Others
- **Scope3**
 - Aircraft
 - Accessing the airport, etc.
 - Business facilities
 - Vehicles managed by businesses
 - Waste/wastewater
 - Others

Promote Energy Conservation

At Kansai Airports Group, we established a promotion system to reduce CO₂ emissions and medium to long-term plans to achieve reduction targets to promote our energy conservation measures which aim to reduce CO₂ emissions.

Within the airport, the areas consuming most energy are the passenger terminal building and other building facilities, particularly air-conditioning and lighting systems.

Accordingly, the airport's energy conservation efforts focus on these facilities and systems.

Air-conditioning System

[Major efforts]

- **Upgrading energy-efficient heat-source equipment**
- **Optimizing the ventilation system**
- **Insulation and anti-sunlight measures**
- **Optimizing the air-conditioning system**

We further promote energy conservation efforts in our air-conditioning system by introducing energy-efficient equipment. This is also done by reducing the air-conditioning load such as utilizing ambient air-cooling methods, controlling the inflow of ambient air while the air-conditioning is active, window insulation and anti-sunlight designs.

Lighting System

[Major efforts]

- **Full-scale upgrading to LED lighting**
- **Expanding the brightness sensor and control**

We promote a switchover to LED throughout our building and aviation lighting as part of a plan to upgrade systems and renovate facilities, while introducing an energy-efficient transformer system as part of electrical upgrades. Capitalizing on the opportunity to refine and install new equipment, we promote energy conservation efforts over a range of systems.

Optimizing energy-conservation operation

[Major efforts]

- **Visualizing and analyzing energy usage with BEMS**
- **Optimizing operations using AI**

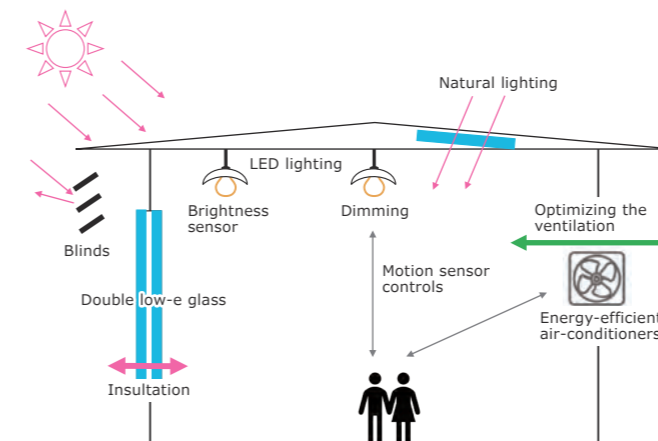
As well as taking tangible measures that include upgrading to energy-efficient equipment, optimizing energy-conservation operations is also one of our top priorities.

Energy Conservation Committee members within the Kansai Airport Group patrol all three airports regularly to ensure the facility configuration and operation is set up to maximize energy saving; modifying temperature settings and extinguishing lighting in non-operational areas.

When optimizing operational energy usage, understanding issues flagged by data analysis following energy visualization and continuing to implement accurate measures are both important. Accordingly, we establish a Building Energy Management System (BEMS), with which we can collect, manage, share and analyze energy data.

This system allows us to share daily and monthly information via an energy dashboard, quantitatively analyze air-conditioning systems and analyze data using BI tools.

Further, we are aiming to optimize automatic operations by combining BEMS and AI.



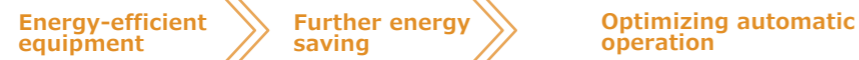
1 Adaptation to climate change

Towards a carbon-free airport

Going forward, we must redouble our efforts to achieve a carbon-neutral status as part of the drive to combat global warming. As well as promoting the use of renewables and other carbon-free energies within our airport facilities, energy conservation efforts which feature the efficient use of energy to minimize consumption will become even more important.

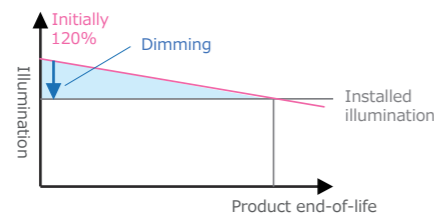
The Kansai Airport Group will promote its basic energy conservation measures as planned, while aiming to collaborate with universities; pursuing advanced AI-centric solutions and further optimizing energy conservation and efficient operations.

Seeking advanced solutions /

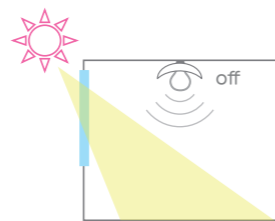


Automatically optimizing LED brightness

Initial illumination correction



Brightness sensor

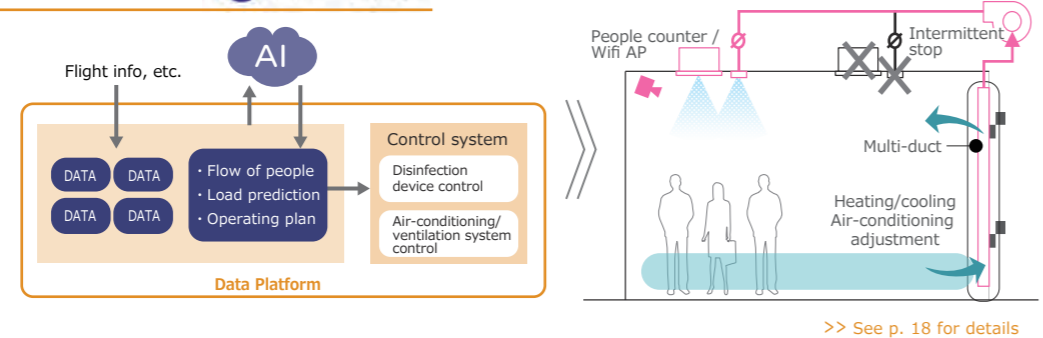


Human sensor



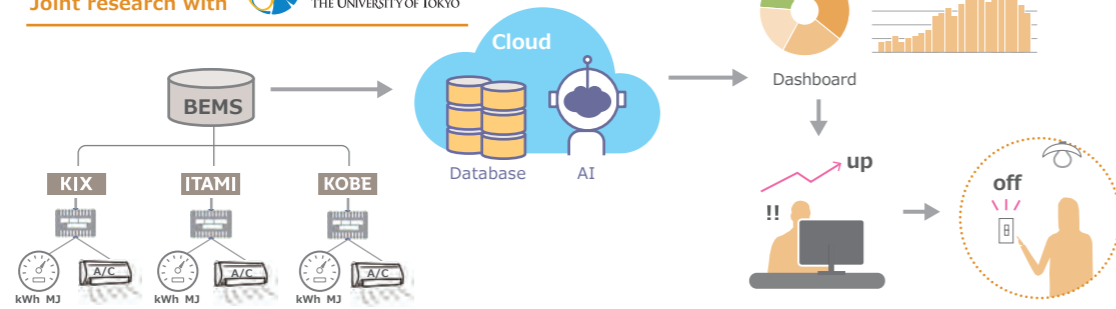
Seeking advanced solutions

Joint research with 神戸大学



>> See p. 18 for details

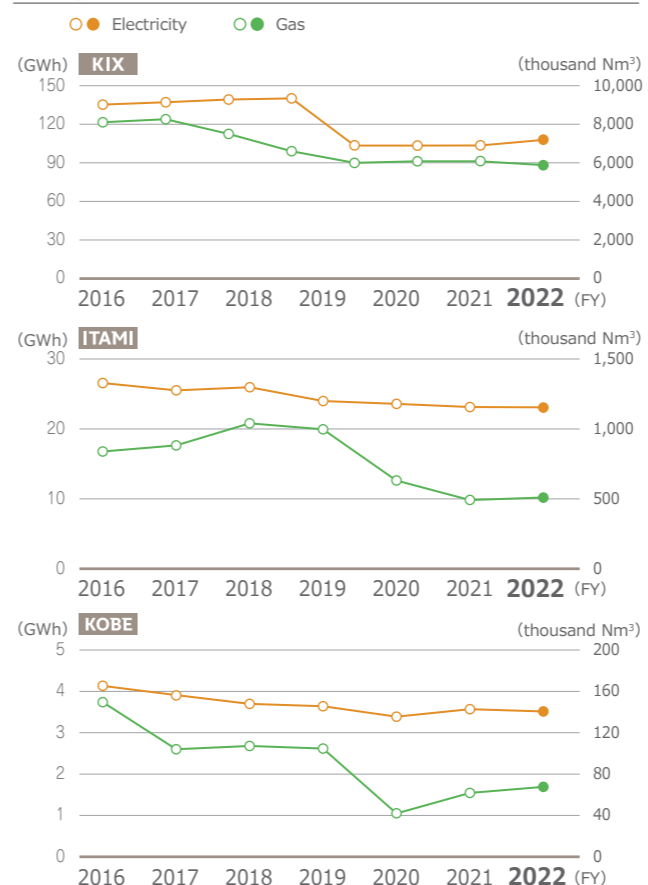
Joint research with 東京大学 THE UNIVERSITY OF TOKYO



Energy saving measures

Since February 2020, we have initiated energy-saving measures for facility operations in response to the significant downturn in airline demand due to the COVID-19 crisis. In fiscal 2022, we opened a new domestic area from late October and have expanded the scope of terminal building operations reflecting a resurgence in demand for international airlines since December. ITAMI and KOBE airports have recovered their operation to almost pre-crisis levels. As for electricity and gas consumption for fiscal 2022, electricity consumption in Kix increased due to the extension of facilities and expansion of their operational scope. Meanwhile, although the operation of ITAMI and KOBE airports are almost normal, their energy consumption has been declining compared to fiscal 2019 or earlier, before the COVID-19 crisis emerged. In ITAMI and KOBE airports, throughout the 2016 to 2022 period, electricity and gas consumption declined by 13% and 39%, respectively in ITAMI, and 17% and 54% in KOBE. Electricity consumption was reduced following ongoing efforts to save power, such as upgrading to LED lighting. A lower gas consumption was achieved by upgrading to energy-efficient inverter-controlled electric turbo chillers in ITAMI airport and improving the operation of heat source equipment in KOBE. We also promote the operational improvement of air-conditioning systems by introducing BEMS.

Energy consumption of the Kansai Airports Group



Energy-Efficient Air-Conditioning System

We strive to optimize the control of air-conditioning systems and make them as energy-efficient as possible.

KIX

KIX Terminal 1 building and other major facilities are heated and cooled by Kansai International Airport Heating & Cooling Supply Co., Ltd., a Kansai Airport group company. We also work hard to ensure only energy-efficient heat source equipment is used for heating.

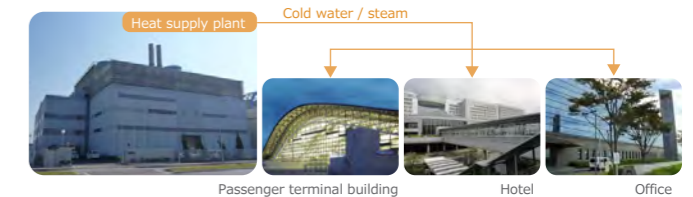


Inverter-controlled turbo chiller

Thanks to an energy-efficient inverter-controlled turbo chiller introduced from 2018 over 2019 and other initiatives, we were able to **reduce annual emissions by approximately 2,450 tCO₂**.

[Community heating and cooling system]

A community heating and cooling system centrally produces cold water, steam and other heat sources at the heat supply plant and supplies them to multiple buildings via local pipelines. Air pollution can be prevented and greenhouse gases can be reduced by taking advantage of economies of scale and using efficient large heat-source system. KIX Terminal 1 building and other major facilities are heated and cooled by Kansai International Airport Heating & Cooling Supply Co., Ltd. (KHC), a Kansai Airport group company.



● KHC Environmental Report : <https://www.kiahc.co.jp/pdf/report2023.pdf>

ITAMI

In renovating the terminal building, we have also upgraded heat-source equipment for air-conditioning from 2019 over 2020. With this upgrading, including centralizing multiple heat-source equipment and introducing an energy-efficient inverter-controlled turbo chiller, we were able to **reduce annual emissions by approximately 1,100 tCO₂**.



Inverter-controlled turbo chiller

Our program for the period 2021 to 2024 includes successively upgrading to cold- and hot-water pumps for air-conditioning in the terminal building. Promoting energy efficiency by consolidating pumps and introducing inverter-controlled equipment will **reduce annual CO₂ consumption by approximately 150 tons**.



Cold- and hot-water pumps for air-conditioning

1 Adaptation to climate change

KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport

Insulation and Anti-sunlight Measures

As well as upgrading our facility, we also prioritize window insulation, sunlight blocking and other building upgrades as part of our energy conservation measures.

ITAMI

When renovating the terminal building, we introduced double low-e glass and applied heat-shielding paint to the windows.



KOBE

We installed automatic curtains and applied heat-shielding paint to the waiting room of the terminal building.



Energy-Efficient Electrical Equipment

KIX

When upgrading electrical equipment in the terminal and annex buildings at KIX between FY 2019 and FY 2020, we introduced a new high efficiency transformer, which reduces power loss by 50% and annual emissions by approximately 150 tCO₂.



Upgrading to LED lighting

KIX ITAMI KOBE

In FYs 2018 and 2019, we upgraded the apron and offices to LED lighting. Overall, we were able to reduce annual emissions by approximately 650 tCO₂.

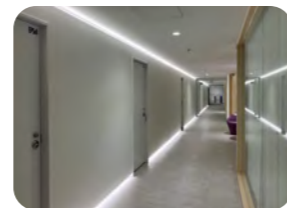
We also introduced LED lighting in the ITAMI terminal building, which is renovated and reopened in August 2020, the ceiling of the terminal building in KOBE renovated in FY 2021 and the new area in KIX which started its operation in October 2022. We will fully convert LEDs for facility lightings and aviation lightings by fiscal 2030.



Apron LED lighting (ITAMI)



LED lighting in the terminal building (ITAMI)



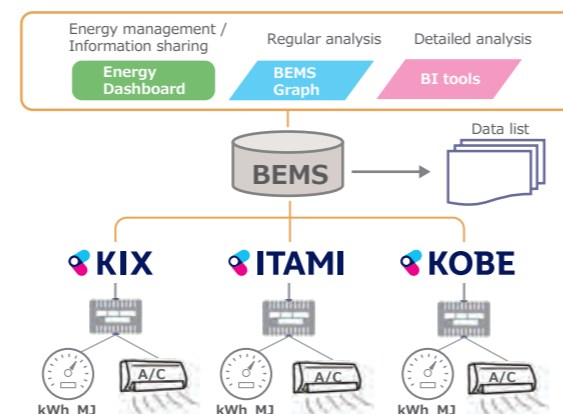
Brightness control by sensor (KIX)

Introducing BEMS

KIX ITAMI KOBE

Through the analysis of data from the KIX terminal building, air-conditioning operation could be improved and we were able to reduce emissions by 600 tCO₂ within two years, from FY 2018 to FY 2019.

We completed the task of rolling out BEMS in the ITAMI terminal building and the KOBE terminal building in fiscal 2021 and 2022, respectively. The task of analyzing data, which was conducted from winter onward, allowed 300 tons (ITAMI) and 30 tons (KOBE) of CO₂ to be reduced by improving the pump operation in air-conditioning systems.



KIX T1 Renovation New domestic area opened

Renovation work is currently underway at KIX Terminal 1 aiming for grand opening in spring 2025. As the first phase of the project, a new domestic area was opened earlier in October 2022. In the new domestic area, the commercial area after the security inspection will be greatly expanded with the opening of six shops with a rich Kansai flavor (four

restaurants and two retail shops) and a domestic flight lounge accessible to eligible passengers. Energy conservation measures have also been taken in this area, including window insulation (Low-e double glasses), energy-efficient air conditioners (energy-efficient fans, airflow control by inverters and CO₂ control to optimize ventilation) and LED lighting.

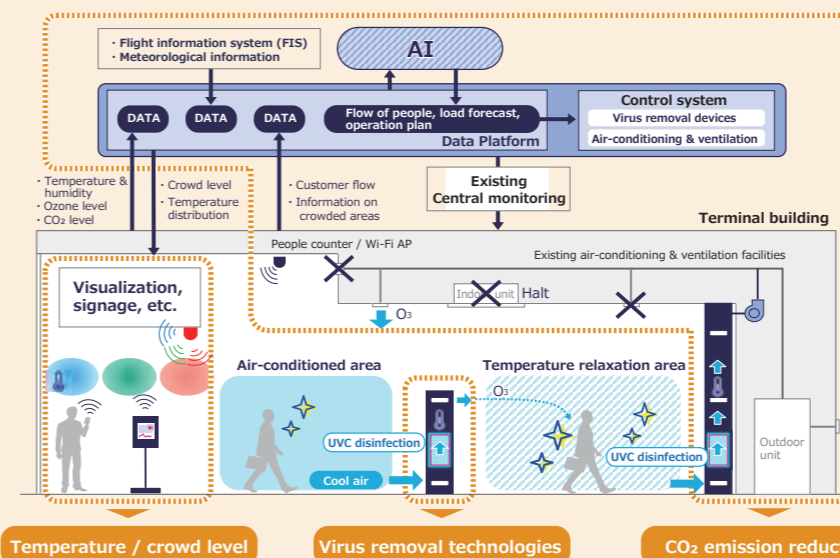


KIX T2 Smart Air Conditioning Demonstration Experiment

Joint research with 神戸大学

From FY 2021 to FY 2022, we conducted a demonstration experiment of air-conditioning system for energy savings and infection control in In KIX Terminal building 2 (as part of the demonstration project for accelerating the practical application of innovative, CO₂-saving infection-control technologies commissioned by the Ministry of the Environment). This experiment combines existing air-conditioning system with infection control for efficient operation, thereby reducing the energy consumption for air-conditioning as well as preventing infections.

Going forward, we will reflect findings from the experiment in the facility renovation plan. In terms of infection control technology, ultraviolet irradiation to circulating air directly inactivates viruses while low-concentration ozone generated by ultraviolet irradiation is spread over the space to inactivate viruses. Moreover, the energy-efficient technology introduced is efficient air-conditioning, which uses precise control according to human flow and other indoor environmental conditions to provide the required amount of air conditioning at the required place and time.



A demonstration experiment tour (September 2022)

Temperature / crowd level Virus removal technologies CO₂ emission reduction

[Press release] http://www.kansai-airports.co.jp/en/news/2021/786/E_210630_PressRelease_T2AirconditioningSystem.pdf

1 Adaptation to climate change

Utilize Renewable Energy and Hydrogen

We are encouraging the use of renewable energy and new forms of energy to lower our GHG emissions.

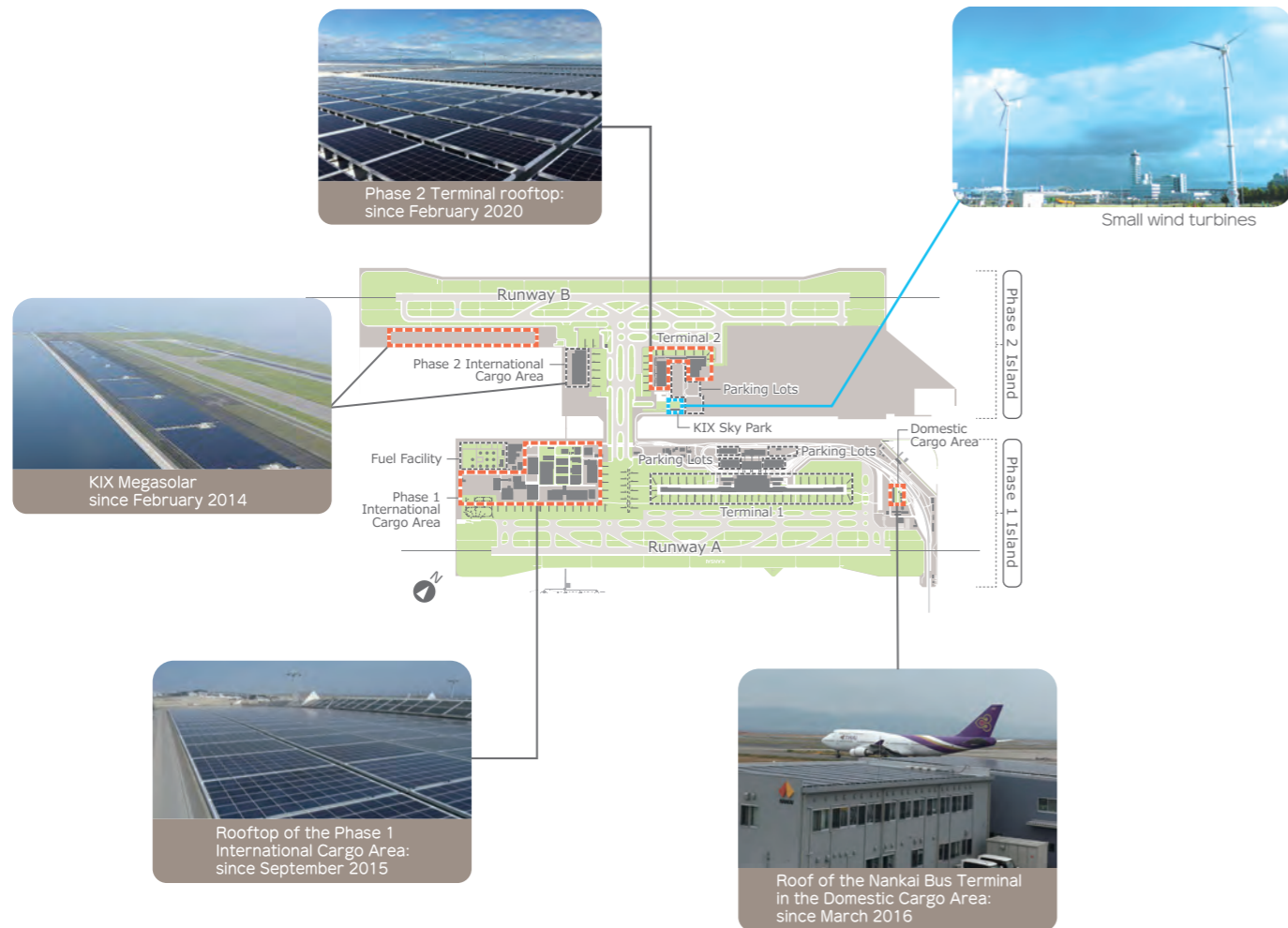
KIX

Solar Power

In February 2014, KIX Megasolar commenced operations using solar panels installed at a site on the south side of the phase 2 airport island and on the Phase 2 International Cargo Area rooftop. The airport began operating a solar power system installed on the rooftop of the Phase 1 International Cargo Area in September 2015, later extending the scope to the roof of the Nankai Bus Terminal in the Domestic Cargo Area in March 2016. Further expanding the initiative, February 2020 saw a solar power system come into operation on the rooftop of the Terminal 2 building to promote the spread of solar power onsite.

Small Wind Turbines

As a first for Japanese airports, KIX began operating a small 5kW wind turbine as part of a trial in September 2014 and now has **three of these turbines in operation**. The electricity they generate is used to power the streetlights inside KIX Sky Park.



KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport

KIX ITAMI

Hydrogen Energy

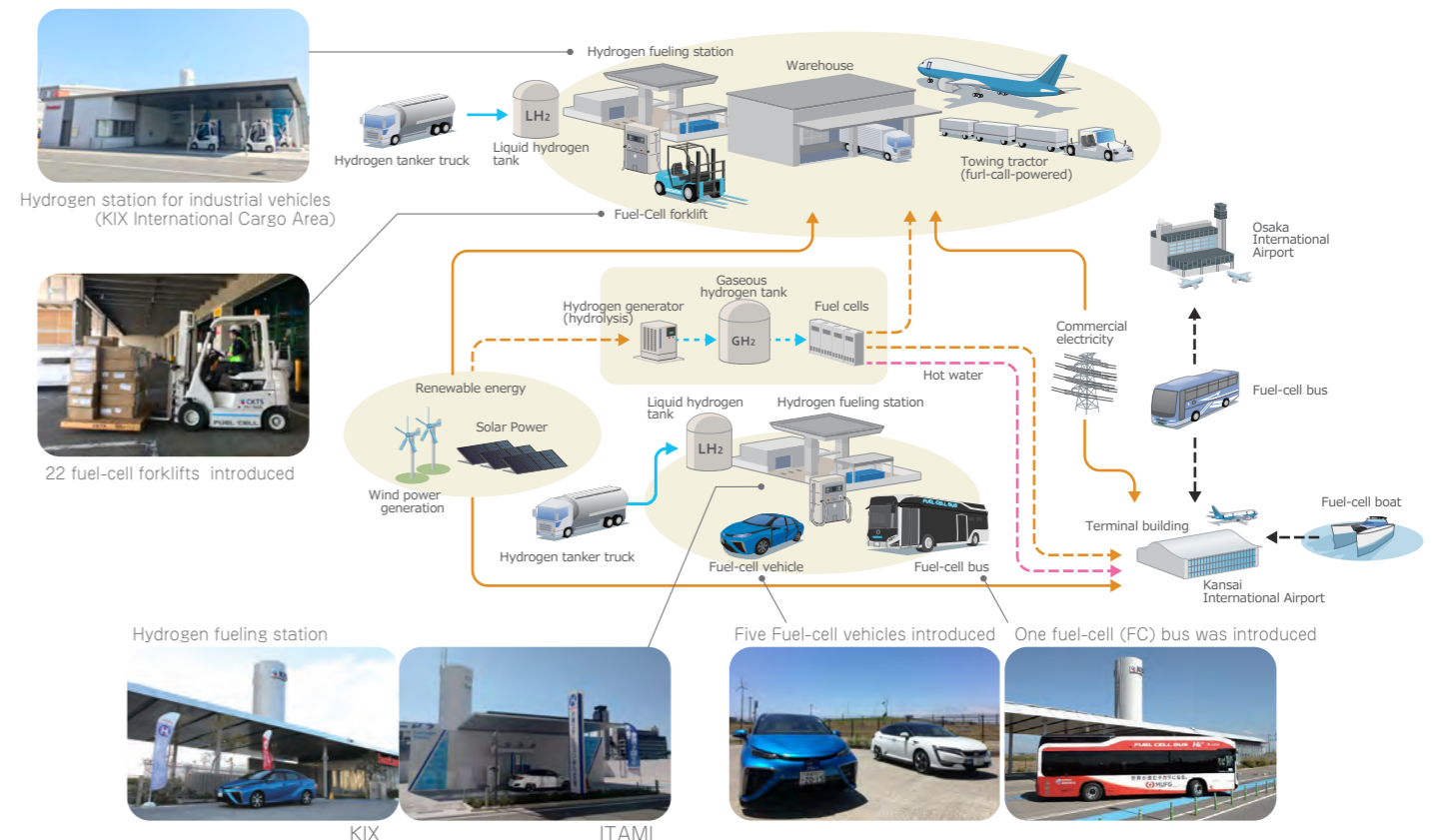
In anticipation of the hydrogen society on the horizon, KIX is promoting the use of hydrogen in collaboration with airport businesses and working towards the full-scale introduction of hydrogen energy for airport facilities and vehicles. The airport marked the full-scale launch of the Hydrogen Grid Project in May 2014 and actively engaged in testing fuel-cell forklifts for practical applications; establishing a model case involving the use of hydrogen at airports and other activities. Hydrogen is the ultimate form of clean energy; generating only water after combustion. It can also be stored and shipped easily, so users can use it whenever and wherever needed. To make carbon-free operation a reality in a venue like an airport, covering a large area and operating around the clock, expanding the use of hydrogen energy will become important. Given technological trends in terms of hydrogen energy innovation and the status of hydrogen energy use outside the airport, we strive to build on results already achieved and pave the way for further development.

Currently, commercial hydrogen stations for fuel-cell vehicles (FCVs) and fuel-cell buses (FC buses) have been installed at both KIX and ITAMI, while a hydrogen-charging facility for fuel-cell industrial vehicles were also installed at KIX. Establishing this kind of infrastructure reflects our wish to expand the use of fuel-cell vehicles.

The Kansai Airport Group currently uses four FCVs as operational vehicles within KIX and ITAMI. In KIX, 22 fuel-cell forklifts (FCFLs) were introduced in the CKTS import cargo building and currently operate in the KIX International Cargo Area. Most forklifts, except the large type, were replaced with FCFLs at the CKTS import cargo building. Since FCFLs generate minimal noise and zero exhaust fumes, it helps mitigate the environmental impact and vastly improve the working environment.

In March 2022, we cooperated with Nankai Bus Co., Ltd. to introduce fuel-cell buses operating within KIX. This marked a first for Osaka Prefecture to introduce fuel-cell buses as airport shuttle bus on a full scale.

KIX Hydrogen Grid (Concept) Heat grid Electricity grid H2 Solid arrow : Introduced Dotted arrow : Unintroduced * FC = Fuel-cell



1 Adaptation to climate change

KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport

KIX

● Fuel-cell Forklifts

In April 2017, the airport completed work on Japan's first hydrogen station for industrial vehicles at the International Cargo Area that includes liquid hydrogen tanks and high pressure hydrogen supply lines. The largest trial operation in Japan using hydrogen station and fuel-cell forklifts is now taking place.

Introducing fuel-cell forklifts to handle air cargo 24 hours a day can help to lower CO₂ emissions compared to forklifts powered by fossil fuel or electricity. In addition, fuel-cell forklifts can be refueled in around three minutes, meaning they can be operated continuously without the hassle of charging or replacing battery packs. As a result, they can offer significant improvements in both work efficiency and work environment.



- February 2015: Begins trial operation of fuel-cell forklifts at the International Cargo Area as part of the Fuel-cell Forklift Practical Application and Development / Testing of Optimal Hydrogen Infrastructure Improvements Project, selected by the Ministry of the Environment, becoming the first airport in Asia to do so
- November 2016: Introduces first mass produced fuel-cell forklift
- April 2017: Commences operations of hydrogen station for industrial vehicles
- February 2018: With additional two FCFLs, three FCFLs in total
- February 2019: With additional four FCFLs, seven FCFLs in total
- February 2020: With additional 15 FCFLs. 22 FCFLs in total

KIX ITAMI

● Fuel-cell Vehicles and Fuel-cell Buses

Infrastructure has been established at both KIX and ITAMI airports to enable hydrogen filling for FC (fuel-cell) vehicles as well as FC buses.

We also introduced a hydrogen-fueled FC bus at KIX. Aided by a subsidy program from the Ministry of the Environment of Japan and Osaka Prefecture as well as contributions from five Mitsubishi UFJ Financial Group companies*, Nankai Bus Co., Ltd. introduced and operated the bus in KIX.



- May 2007: Opens hydrogen station and introduces vehicles with a hydrogen engine into its fleet
- October 2012 to March 2014: Conducts real-life testing using an FC bus as a shuttle bus from the Aeroplaza to KIX Terminal 2
- April 2015: Introduces the Toyota Mirai, the world's first mass produced hydrogen fuel-cell vehicle, into its vehicle fleet
- January 2016: Iwatani Hydrogen Station KIX, the first commercial hydrogen station to be introduced in a Japanese airport, commences operations in the phase 2 KIX airport island
- March 2019: Introduces the first FCV in ITAMI
- April 2019: The ITAMI Iwatani Hydrogen Station is installed and goes into operation
- March 2022: FC buses are introduced in KIX, marking a first for Osaka Prefecture.

* MURC Bank. Ltd., Mitsubishi UFJ Trust and Banking Corporation, Mitsubishi UFJ Securities Holdings Co., Ltd., Mitsubishi UFJ NICOS Co., Ltd. and ACOM CO., LTD.

Promote Zero-Emission Vehicle (ZEV)

To become a zero-emission airport, we promote the introduction of vehicles that mitigate our impact on the environment. Within the Kansai Airports Group, we are promoting the introduction of eco-friendly vehicles*¹ including EV, FCV and other types of zero-emission vehicle (ZEV) in our fleet as well as establishing a vehicle sharing system that streamlines our vehicle operation.

As of March 2023, within the Kansai Airports Group fleet, 60.4% of passenger vehicles and 27.8% of GSE vehicles*² were classed as eco-friendly. Alongside these measures, we will also keep calling on airport-based businesses to follow suit.



- *¹ EV, FCV, CNG, HV, PHV, CDV, and low emission vehicles (see note)
- Note: Low emission vehicle refers to vehicles that satisfy the following emission and fuel economy standards.
- Gasoline vehicles
Emissions: 75% less than 2005 standards
Fuel economy: At least 2015 standards or 25% above 2010 standards
 - Diesel vehicles
Emissions: Post new long-term regulation
Fuel economy: At least 2015 standards

*² Ground support equipment (GSE) vehicles

Installation of EV Charging Stations

KIX ITAMI KOBE

Our three airports have a full complement of EV charging stations to encourage the use of eco-friendly vehicles.

We plan to install 184 electric vehicle charging stations in the North Parking Structure 1 and South Parking Structure in ITAMI, aiming to commence the service in early 2024. This will make ITAMI the airport with the largest number of EV charging stations in Japan.

Given the further rise in the number of EVs as expected, we plan to roll out additional stations over time, to meet demand.



EV Charging Stations

To capitalize on hydrogen in the aviation industry

KIX ITAMI KOBE

In June 2022, Airbus, an aerospace manufacturer in Europe and Kansai Airports signed a Memorandum of Understanding to partner in operating hydrogen-powered aircraft within the three airports. This initiative will contribute to decarbonization within airports as well as the wider aviation industry. It is also part of efforts to consider and develop infrastructure to facilitate the operation of hydrogen-fueled aircraft in future. Going forward, we will jointly prepare a roadmap toward policy recommendation efforts and relevant issues concerning the use of hydrogen for aircraft to spearhead infrastructural development for the use of hydrogen in aviation.



1 Adaptation to climate change

Other Activities

Promoting the use of GPUs

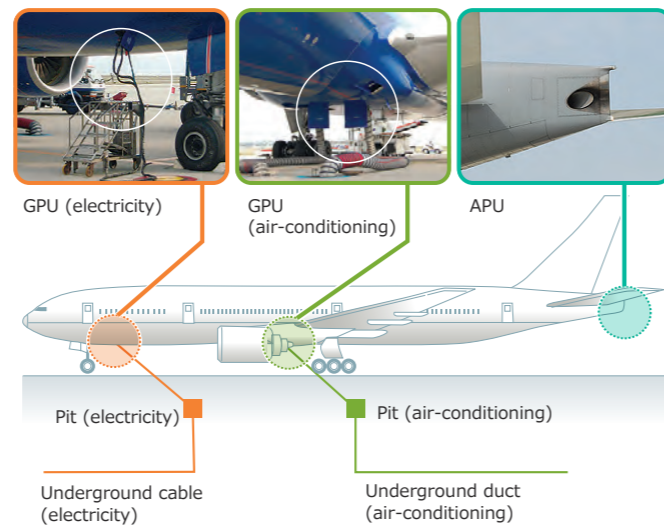
KIX ITAMI KOBE

CO₂ emissions can be controlled by increasing the use of GPUs (Ground Power Units) instead of APUs (Auxiliary Power Units) to supply electricity to parked aircraft. Kansai Airports has requested that all airlines using its airports use GPU.

In terms of GPU use, partial changes were made to the AIP (Aeronautical Information Publication) effective January 2010. This included shortening the time allowed for APU use at KIX from 30 minutes to 15 minutes prior to scheduled departure, making KIX the first airport in Japan to do so.

At ITAMI and KOBE, the AIP defines the time allowed for APU use as 30 minutes prior to scheduled departure, effective from March 2018 and January 2019, respectively. Accordingly, we strive to promote the use of GPUs.

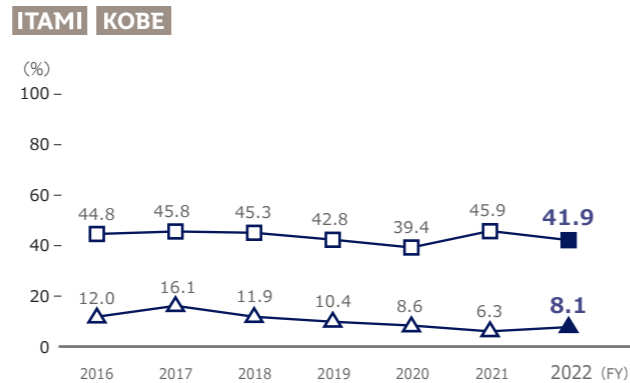
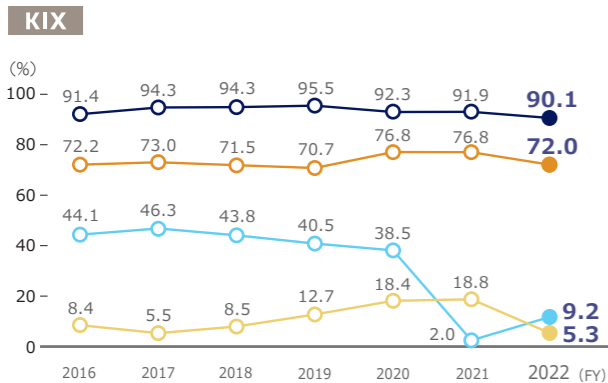
Outline of GPU



GPU utilization rate

These **18 airlines** below (in alphabetical order), have a GPU utilization rate of over 95% in 2022.

- Air China Cargo
- Air France
- Emirates
- FedEx
- Finnair
- Hawaiian Airlines
- HK express
- Japan Transocean Air
- Lufthansa Cargo
- Lufthansa German Airlines
- Malaysia Airlines
- Philippine Airlines
- Qatar Airways Cargo
- Sichuan Airlines
- Thai Airways International
- United Airlines
- United Parcel Service
- Vietnam Airlines



Japanese airlines: ● FSC ● LCC
Foreign airlines: ● FSC ● LCC

* FSC: Full Service Carrier
* LCC: Low Cost Carrier

Note: Indicates the ratio of flights supplied to the number of flights with an opportunity to be supplied.

To utilize Sustainable Aviation Fuel (SAF)

KIX ITAMI KOBE

Since aircraft generate the majority of CO₂ emissions associated with airports, each airline has also introduced low-emission aircraft when upgrading. Given the global need for airlines to minimize CO₂ emissions, demand for Sustainable Aviation Fuel (SAF)* is climbing ever higher. In Japan, a stable supply of domestically produced SAF is considered key to achieve 10% of the mixing ratio of SAF to aviation fuel by 2030, as set out by the Ministry of Land, Infrastructure, Transport and Tourism.

Accordingly, in June 2022, Kansai Airports concluded a basic agreement on cooperation to commercialize domestic SAF production with JGC Holdings Corporation and REVO International Inc. Under this agreement, production and supply of the first domestic SAF for large-scale commercial use will get underway in 2025; capitalizing on used cooking oil and other materials generated within the three airports as feedstock. Establishing supply networks for waste

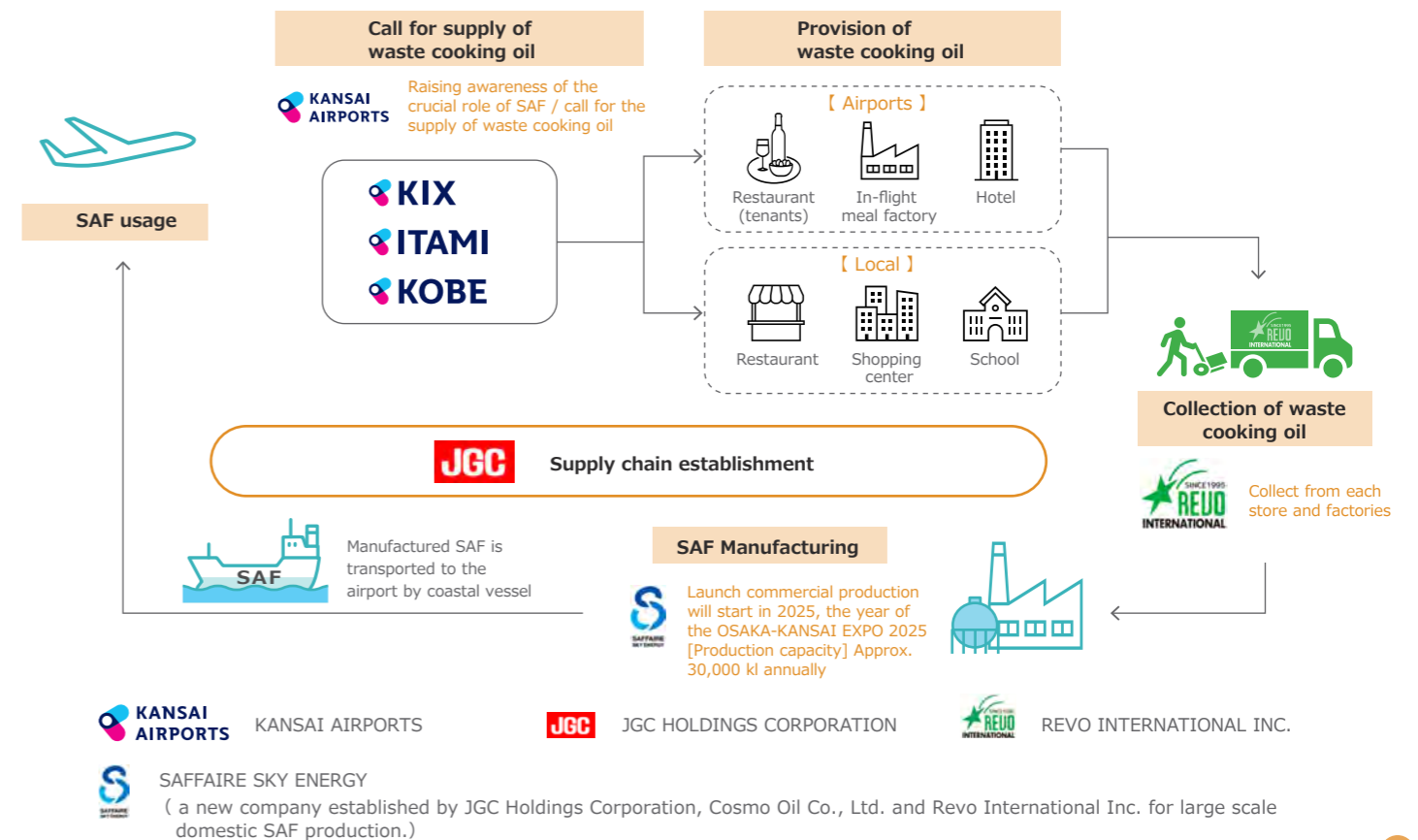
cooking oil will help us promote decarbonization at the "air gateway" to the Kansai region as well as developing a reliable supply system for domestic SAF products. As the Kansai Airport Group, we have called on airport-related facilities and local communities to supply waste cooking oil and started collecting waste cooking oil from ten airport-related facilities and one school meal facility by March 2023. We will continue to encourage more companies to cooperate this initiative. Currently, the waste cooking oil collected is being recycled as biodiesel by REVO International Inc., which is also used in part of maintenance vehicles of KYOWAROAD Co., Ltd. who oversees the maintenance and management of KIX.



Vehicles powered by biodiesel

* An aviation fuel produced from used cooking oil, plant/animal fat, woody biomass and other feedstock, which substantially reduces CO₂ emissions compared to other conventional fuels derived from crude oil.

SAF scheme



2

Resource Usage

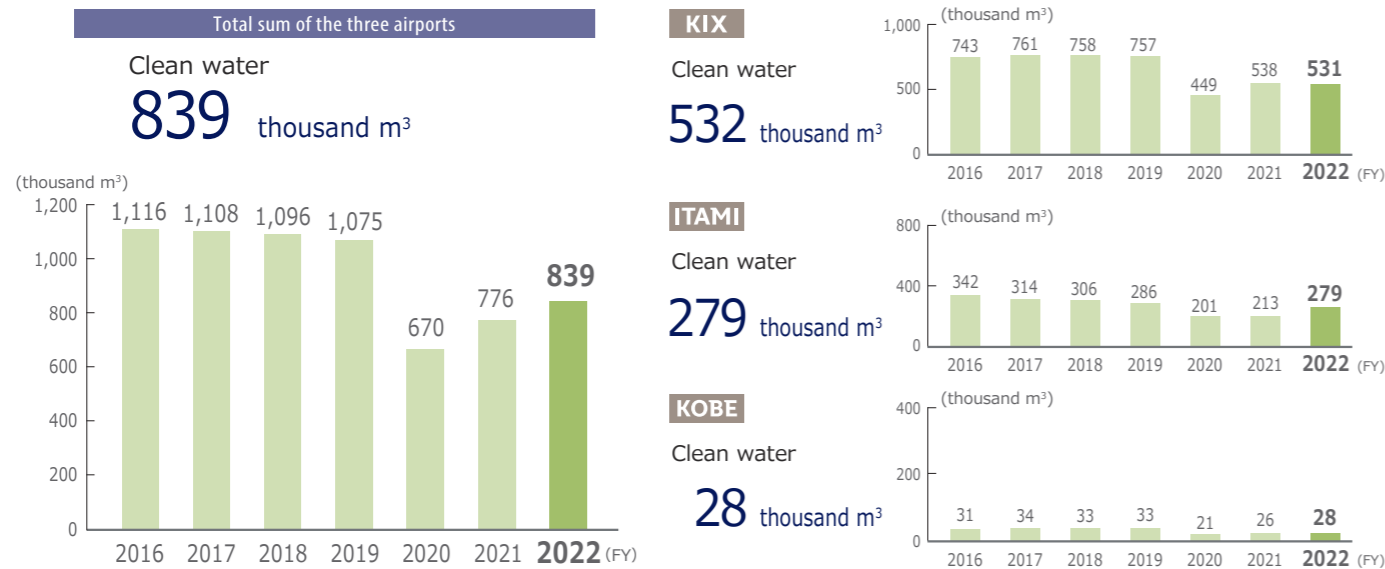
KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport

Reduction of Clean Water Consumption



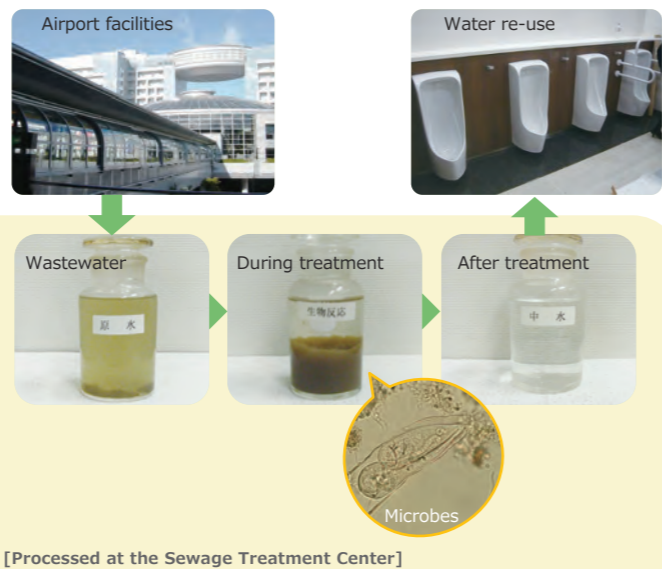
We have initiated various efforts to reduce clean water consumption at our airports. The total consumption figures for the three airports in fiscal 2022 persistently declined compared to pre-pandemic levels, reflecting a significant decrease in the number of passengers due to COVID-19. At KIX and KOBE, we utilize reclaimed (recycled) water and rainwater to meet around 30 to 40% of our water needs, as part of efforts to optimally exploit water resources.

Clean water usage



Utilizing rainwater/reclaimed water

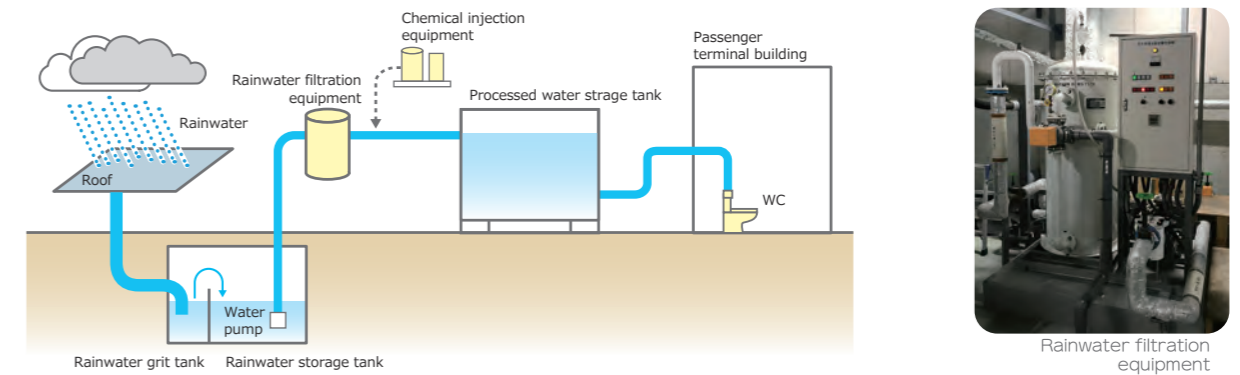
KIX
Water resources are effectively utilized by reclaiming and reusing water treated at the Sewage Treatment Center on the airport island within public restrooms.



KOBE

KOBE utilizes resources effectively by using filtered rainwater and water that has been processed at a sewage treatment plant in restrooms and to water plants.

Rainwater utilization

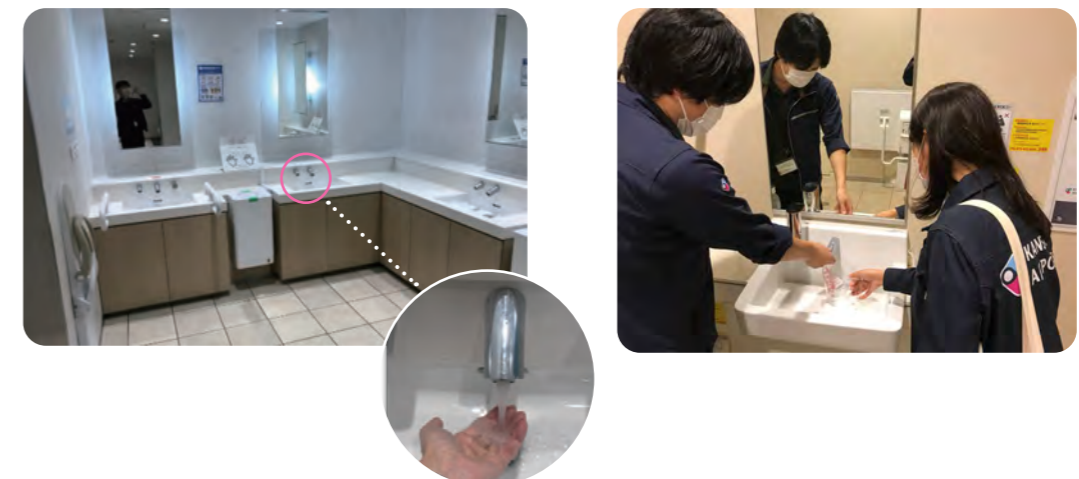


Efforts to save water

KIX ITAMI KOBE

Kansai Airports is spearheading a number of initiatives to conserve water, including installing low flowtoilets when remodeling terminal buildings. As well as introducing systems and equipment, we applied daily awareness to further refine our operations.

Given the obvious excess usage of water over and above the required amount at many restrooms in the terminal building, we promote efforts to optimize the amount of water consumed by automatic water faucets. With customers in mind, we started the optimization process by determining the water amount management standards, confirming the flow of water on site and reconfiguring settings when the baseline was exceeded. Collectively, these efforts help reduce the environmental load in the long term with a single adjustment.



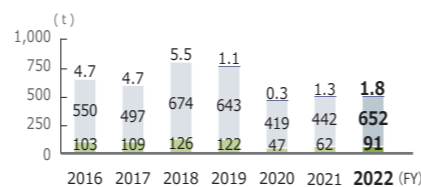
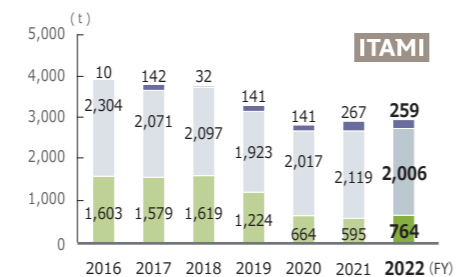
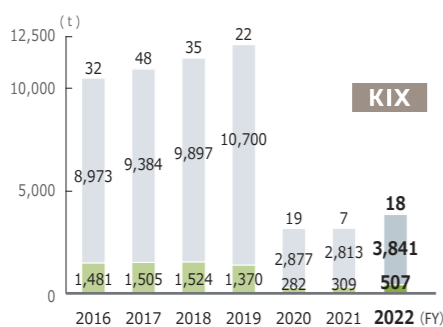
Waste Recycling



To promote efforts to reduce and recycle general waste, we strive to reduce waste and boost our recycling rate by carefully sorting and separating waste and collecting any portion that is recyclable.

In fiscal 2022, the total amount for general waste generated in the three airports declined at the same level as the previous year, reflecting a significant decrease in the number of passengers due to COVID-19. We have also set up a working group to consider waste reduction to further reduce waste generation and improve the recycling rate by further accelerating the study on how to dispose waste and recycle waste plastic and grass clippings.

General Waste Emissions and Recycling Rate



Reducing waste and recycling

KIX

Annual amount of general waste **4,366 t** Recycling rate for general waste **11.6 %**

The general waste from KIX is also disposed of using an incinerator operated by Kansai Airport. KIX has established waste separation rules in its "Regulations Governing the Use of Waste Processing Facilities" and encourages all businesses operating at the airport to sort their waste. Since wastewater from the airport is also treated at the Kansai Airports' Sewage Treatment Center, the center also treats sludge normally generated from local government wastewater treatment facilities.

As well as a portion of the airline catering process being transferred to KIX in FY 2018, the volume of burnable waste has been increasing. At the airline catering factory, we reduce the quantities incinerated by sorting waste and biodegrading burnable waste. We also request that airport-related operators promote proper handling, reduction and recycling of industrial waste in line with relevant laws and regulations.

Introducing the use of a food waste disposer in restaurants

As part of efforts to reduce and recycle waste, we introduced a food waste disposer in KIX's restaurant in June 2020 and the disposer processes daily food waste.

This disposer biodegrades food waste using microbes, which, once decomposed, is discharged into the sewage system. Eliminating transport, burning and other processing on site allows us to reduce the volume of waste to be incinerated and CO₂ emissions from incinerating garbage bags as well as reducing the transport demands on staff.

We will strive to roll out the disposer to as many restaurants and tenants in the terminal building as possible to reduce the amount of food waste incinerated airport-wide.

Waste reduction initiatives in cooperation with airport-related businesses

KIX collects waste from international airlines. To reduce and sort such waste, we continue dialog with a range of stakeholders. The Airport Environmental Promotion Council is working to raise awareness of waste reduction as well as encouraging initiatives to the KIX Airline Operators Committee (KIXAOC) to help airlines mitigate their environmental impacts.

ITAMI

Annual volume of general waste **3,029 t** Recycling rate for general waste **25.2 %**

Toyonaka City has accredited shops promoting eco-friendly activities as Toyonaka Eco Shops. To facilitate certification for airport restaurants and retail stores, we cooperate with Toyonaka City in encouraging them to promote eco-friendly activities. Currently, one airport shop is certified and we will strive to boost the number of certified shops. Through its Airport Environmental Promotion Council, ITAMI is also sharing best practices and working to raise awareness of waste.

KOBE

Annual amount of general waste **744 t** Recycling rate for general waste **12.2 %**

KOBE is also sharing best practices and working to raise awareness of waste through its Airport Environmental Promotion Council.



KOBE Airport Environmental Promotion Council (FY 2019)

Promoting plastic free airports

KIX ITAMI KOBE

Kansai Airports Group proactively promotes plastic-smart activities throughout all three of its airports, aiming to become a "Plastic Free Airport".

We also reiterate the purpose of the Osaka Declaration toward Zero Plastic Waste and the Plastic-Smart Campaign and will promote the 3Rs (Reduce, Reuse and Recycle). We will also push forward our plastic waste-reducing activities within all three airports via the Airport Environmental Promotion Council, which comprises representatives of airport businesses.

Major initiatives

- ✓ Using paper shopping bags (FSC certified)
- ✓ Using paper straws, paper cups and wooden cocktail stirrers at the lounge
- ✓ Introducing biomass amenities in hotel guestrooms
- ✓ Using wooden cup holders
- ✓ Raising environmental awareness via original eco-bags and badges
- ✓ Reusing suitcases
- ✓ Filling up the personal bottles with free water supply machines
- ✓ "No PET Bottle Day" for employees.



Wooden cup holders



Biomass in-room amenities



Original eco-bags and badges



Reusing suitcases

Horizontal recycling (BtoB) of PET bottles

KIX ITAMI KOBE

The Kansai Airport Group conducts horizontal recycling (BtoB) of PET bottles generated at airports to reproduce the same type of product.

The mainstream recycling of used products into different types of products is ultimately incinerated, but horizontal recycling produces the same type of product, thereby reducing CO₂ emissions and enabling sustainable resource recycling.

Moreover, garbage boxes are installed at KIX terminals to foster awareness of proper separation of PET bottles and the need to sort waste.



Recycling of cargo packing materials

KIX

Used cargo packing film and Styrofoam generated in the air cargo unloading operations conducted by Kansai Airport Group had been disposed of as industrial waste and accounted for a large portion of its disposable plastic volume.

In June 2023, we contracted with a recycling company to recycle cargo packing film and established its recycling system. In August 2023, we also purchased a Styrofoam melting machine and established a system to recycle it after volume reduction. We will also consider recycling of other materials in the future.



3

Environmental Harmony



Monitor the Local Environment



KIX

Measuring and monitoring aircraft noise

Environmental assessments based on flight paths and flight procedures established to minimize aircraft noise found that only areas over water were affected by noise levels exceeding environmental quality standards. KIX conducts both continuous and periodic monitoring of aircraft noise, and publishes the findings. For fiscal 2022, as in the prior year, noise levels complied with environmental standards (below Lden 57 dB) at all land-based continuous monitoring stations and periodic monitoring sites.



KIX was built on an artificial island in Senshu Bay 5km from the coast to enable 24-hour-a-day operations as an airport that is pollution free and co-exists with surrounding communities. Since the new overland flight path was established in December 1998, the airport measures aircraft flight path and altitude as part of its noise monitoring efforts.

Currently, KIX examines flight path and altitude data for ten observational cross-sections and publishes the results.

Reducing aircraft noise

To reduce aircraft noise, we encourage airlines to switch to quieter aircraft and closely monitor established flight paths and altitude. We ask the KIX Airline Operators Committee to take steps to ensure compliance with flight paths and to find ways to reduce aircraft noise.

Measures at noise sources

• Noise abatement flight procedures

- Aircraft are expected to fly over land only after gaining sufficient altitude over Osaka Bay after takeoff from the runway.
- Aircraft arriving or departing late at night or in early morning are restricted to flight paths in airspace over Akashi Strait and Kitan Strait.
- Quieter flight procedures*1 and continuous descent flight procedures*2 have been adopted to minimize noise from aircraft approaching the airport from Kitan Strait.

- *1 Quieter flight procedures
Noise-reducing flight procedures for aircraft, including delayed use of flaps and delayed deployment of landing gear on approach to the runway.
- *2 Continuous descent operations (CDO)
A method of aircraft flight during descent, maintaining the minimum engine thrust for optimal descent (not horizontal flight) until the aircraft reaches the starting point for instrument landing. KIX uses CDO during certain hours. Benefits of the method include reduced fuel consumption and reduced CO₂ emissions.

Complaints, inquiries, and responses

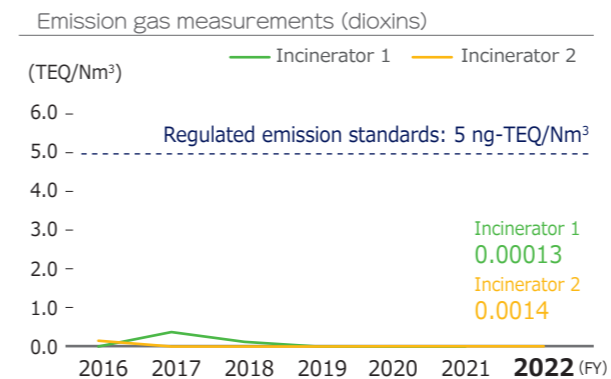
The annual number of complaints and inquiries peaked at 263 in fiscal 1998 when new flight paths were introduced in airspace over the Osaka Prefecture region, and since then have been on a declining trend. In fiscal 2022, the airport received a total of 10 complaints and inquiries.

The majority of complaints and inquiries were about individual aircraft being too loud or flying too low, or queries about whether aircraft were staying on their regular flight paths. In response, we study these issues in cooperation with the Civil Aviation Bureau (under the Japanese Ministry of Land, Infrastructure, Transport and Tourism) and publish our findings.

KIX

Measures to reduce emissions from Incineration

We separate general waste from the airport island into combustibles and recyclables, with combustible waste incinerated at the airport's Waste Disposal Center. Emissions from incineration go through a filter-type precipitator. As a result, air pollutant levels such as nitrogen oxides are fully below regulated emission standards. Dioxin emissions are also well below regulated standards. Waste heat from incineration is being used as a source of heat for the incinerator, and for hot water and air-conditioning at the Waste Disposal Center.



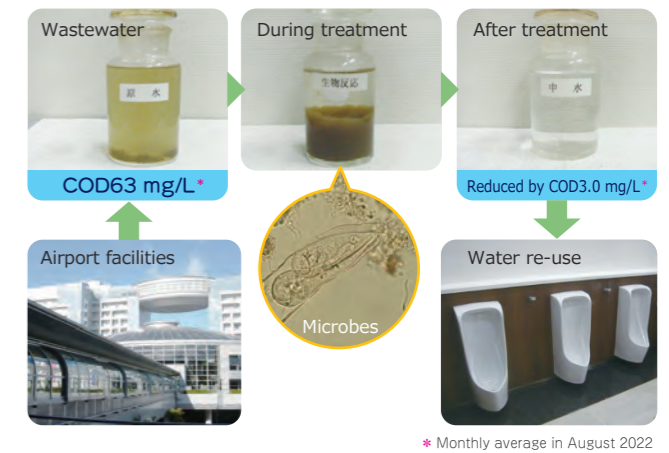
Waste Disposal Center

This plant features a fluidized bed furnace. It also uses a filter-type precipitator that utilizes catalysts to remove nitrogen oxides, as well as humidity-regulated fly ash stabilizing equipment. The plant was designed with careful consideration of the local environment. Emissions at about 850°C from the incinerator's furnace are directed into a cooling chamber, through heat exchangers designed with heaters to prevent white smoke, and then to a reactor. Dust and hazardous gases are then removed by a filter-type precipitator, and exhaust gases are released into the atmosphere via an induced-draft fan and an exhaust stack. We operate with strict voluntary standards at the stack outlets for dust, sulfur oxides, hydrogen chlorides, and nitrogen oxides, with maximums of 0.02 g/Nm³, 20 ppm, 30 ppm and 70 ppm, respectively.



Advanced treatment of general wastewater

General wastewater generated from each facility undergoes sophisticated treatment at the airport's Sewage Treatment Center. Water quality is carefully managed during each treatment process and water is discharged only after fully meeting regulated water quality standards. We also strive to maximize the effective use of water resources and to consider the local environment, such as by using some of the treated water for flushing toilets and watering plants.



Sewage Treatment Center

Wastewater from the passenger terminal buildings and other airport facilities is considered to be general wastewater, and undergoes advanced treatment such as activated-sludge circulation nitrification/denitrification, chemical clarification, and rapid sand filtration. Wastewater from industrial sources first undergoes on-site pre-processing to remove hazardous substances, and then undergoes advanced treatment at the Sewage Treatment Center, through chemical coagulation/sedimentation and rapid sand filtration processes and other processes.

Processing capacity in fiscal 2022 (daily average)

General wastewater: 1,241 m³ Industrial wastewater: 103 m³



ITAMI

Measuring and monitoring aircraft noise

To monitor aircraft noise, ITAMI conducts continuous monitoring of noise levels at 10 locations in the airport region, and releases the results publicly.

The noise level exceeds the legal limit (below Lden 57 or 62 dB) in certain communities around the airport. To reduce the impacts of aircraft noise on these communities, the airport is working on measures at noise sources, improving airport layout, and measures in the vicinity of the airport.



Reducing aircraft noise

Measures at noise sources

• Restricting flight movements and hours of operation

Considering the impacts of noise on local communities, the airport has established a limit on aircraft movements for regularly scheduled flights of 370 movements per day (200 for jets and 170 for quieter aircraft).

In addition, airport operations are restricted to the 14 hours between 7:00 am and 9:00 pm.

• Noise abatement flight procedures

The airport employs the following noise abatement flight procedures in order to reduce the impacts of aircraft noise.

Rapid ascent (take-offs/departures)

To reduce aircraft noise on communities next to the airport, the airport has established flight procedures that require departing aircraft to rapidly ascend to 3,000 feet (about 1,000 meters).

Delayed-flap approach and landings with low flap angle (landings)

The airport has established flight procedures that reduce engine noise and wind noise due to air resistance by controlling the necessary engine thrust and air resistance by having aircraft on approach delay the lowering of flaps and gear down, and use the lowest flap angle possible when landing.

Preferential flight paths

To minimize the range of aircraft noise impacts, aircraft taking off to the north are required to fly inside the area of (1) Chugoku Expressway Connector to the north, (2) Zuga Pond and Koya Pond to the south, and (3) Muko River to the west (see figure below).

• Encouraging the use of quieter aircraft

ITAMI promotes the introduction of low-noise aircraft through a unique landing fee system, with discounts for low-noise aircraft and surcharges for high-noise aircraft, based on actual noise levels measured around the airport.



← Red dotted line: Preferential flight paths Orange line: Area of preferential flight paths

Note: The figure above is a conceptual flight path diagram and does not suggest that all aircraft will fly on the red dotted lines.

ITAMI

• Reducing aircraft noise from within the airport

Curtailing the use of reverse thrust at night

Jet aircraft landing on runway B between 7:00 pm and 9:00 pm are required to minimize the use of reverse thrust* within the safe operation parameters of the aircraft, in order to reduce aircraft noise at night for communities near the runway.

* Reverse thrust is when jet engine thrust is diverted to decelerate an aircraft.

Noise reduction measures during aircraft engine testing

The airport has erected a large noise barrier at the engine testing site in order to reduce noise during aircraft engine testing.



Promoting use of GPUs and limiting use of APUs

In order to reduce noise impacts from auxiliary power units (APUs) while aircraft are parked, we are promoting the use of ground power units (GPUs).

Improving airport design

Noise barriers, noise protection embankments, and noise protection forests have been set up around the airport to reduce the impacts of noise from aircraft takeoffs and landings and use of the taxiways.



Noise barrier



Noise protection embankments

Measures in the vicinity of the airport

ITAMI carries out the following measures in the vicinity of the airport based on the extent of noise impacts on local communities.

General: Lden 57 dB or higher

- Financial assistance for soundproofing of schools, hospitals, common-use facilities, etc.
- Financial assistance for park improvements
- Financial assistance to make common-use and other facilities barrier-free
- Financial assistance for local events
- Financial assistance to purchase materials for schools, common-use facilities.
- Mobile health checkups

Class 1 area : Lden 62 dB or higher

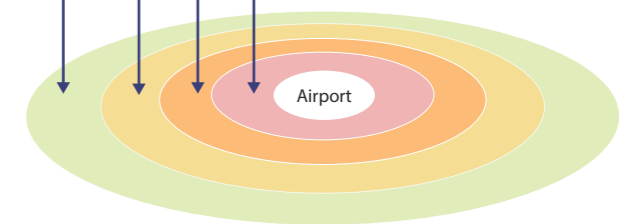
- Financial assistance for soundproofing of housing

Class 2 area : Lden 73 dB or higher

- Relocation compensation program

Class 3 area : Lden 76 dB or higher

- Creation/improvement of green buffer zones, etc



Relocation compensation program

In areas around the airport significantly affected by aircraft noise, the airport provides relocation compensation or purchases the land of buildings located in designated areas.

ITAMI

• Utilization of land acquired through the relocation compensation program

The airport clears and plants trees on land purchased through the relocation compensation program located in the Class 3 area around the airport. As a result, a greenbelt (see photo below) that serves as a buffer zone between the airport and surrounding communities is taking shape. With the progress of the relocation compensation program in Class 2 and 3 areas, there has been an increase in vacant sites (after residents have relocated) in the area. Responding to community concerns about losing local cohesiveness, the airport has been working to develop green space integrally in a planned way, by having Class 2 and 3 areas and surrounding areas designated as green space, as defined under the nation's City Planning Act. Examples include the Itami Sky Park on the Hyogo prefecture side and Fureai Ryokuchi (public green space) on the Osaka prefecture side of the airport.

Also, the airport developed Air Front Oasis Shimogawara using land acquired in the Class 2 area as part of the relocation compensation program. This area aims to familiarize local residents with the airport through greenery and it also serves to improve the disaster prevention functions of the surrounding communities. As a result, the area improves the living environment of people in the surrounding communities along with disaster preparedness.

Green buffer zones

Green buffer zones created on sites after residents have relocated out of the Class 3 area near airport.



Itami Sky Park

This green space was developed as a place of relaxation for the local community and is also designed to serve as a refuge area in time of disaster.



Fureai Ryokuchi (Friendship Green Square)

This area was developed as a green space for local residents and, based on their feedback, it features a multipurpose open space, tennis court, heated swimming pool, grass lawn, play equipment, and biotope, among other amenities.



Air Front Oasis Shimogawara and Shimogawara Green Area

Air Front Oasis Shimogawara is well-located with a view of ITAMI. Its main feature is an observation deck with a commanding view of the daily activities at the airport, but it also includes a monument to the wind and other items with an aeronautical motif. Together with the Shimogawara Green Area provided by Itami City, it is a place for locals to relax and enjoy the play and athletic equipment, and rest area.



ITAMI

• Soundproofing for communities surrounding the airport

In accordance with laws, ITAMI subsidizes part of the costs for soundproofing work of homes and educational facilities in communities that are significantly impacted by aircraft noise.

Category		Outline
Sound-proofing of public facilities	Soundproofing of schools, etc.	If the aircraft noise exceeds intensity and frequency limits specified by legislation* related to aircraft noise prevention, a subsidy is provided to local governments and other bodies to defray part or the entire cost for work (soundproofing, installation of upgraded air-conditioning) to prevent or reduce aircraft noise in facilities including schools, child care centers, and hospitals.
	Improvement of shared or common-use facilities	Based on legislation, a subsidy is provided to local governments where noise reaches Lden 57, to defray the partial cost for improvements of shared or common-use facilities used by local residents for learning and other purposes. Eligible work includes new construction, renovation, installation of upgraded air-conditioning.
Sound-proofing of housing	Soundproofing of housing	Based on legislation, a subsidy is provided to defray the partial cost for work to prevent or mitigate aircraft noise (soundproofing, installation of upgraded air-conditioning) on housing that was located in Class 1 areas when the national government made the designation.

* Act on Prevention of Damage caused by Aircraft Noise in Areas around Public

• Other programs

In addition to legally mandated programs, ITAMI provides mobile health checkups and subsidizes part of project costs (of up to 80%) of community events and park development by local governments in communities that are significantly impacted by aircraft noise.

Category		Outline
Others	Mobile health checkups	To promote the good health of residents living near the airport, mobile health checkups are offered, particularly for people who live in areas with greater amounts of aircraft noise.
	Environmental improvements in surrounding areas	In order to improve the living environment around the airport, this program offers subsidies (of up to 80%) for efforts of local governments, to improve noise-measuring equipment, develop parks, make public facilities more accessible, support equipment purchases by schools and public facilities, revitalize the area, and other activities.

Complaints, inquiries, and responses

The airport responds to complaints and inquiries appropriately, sharing this information between relevant parties in a timely manner. Complaints and inquiries usually increase at ITAMI when aircraft take off and land in a direction different to the norm (taking off towards the south and landing on the north side). The airport received 144 complaints/inquiries about aircraft noise and flight paths in fiscal 2022.

KOBE

Measuring and monitoring aircraft noise

KOBE monitors aircraft noise at four and six locations respectively on an ongoing and periodic basis and publishes the findings. For fiscal 2022, as in the prior year, noise levels were confirmed as complying with environmental standards (below Lden 57 dB) at all land-based continuous and periodic monitoring sites.



Reducing aircraft noise

Measures at noise sources

• Restricting flight movements and hours of operation

Although the airport established a daily limit on aircraft movements for regularly scheduled flights of 60 movements considering the impacts of noise on local communities, the limit was extended to 80 movements after confirming the environmental impact, following discussions at the Kansai Airports Round Table Meeting held in May 2019.

Airport operations were also restricted to a 15-hour window between 7:00 am and 10:00 pm while operations were extended an hour from summer 2020 to include 16-hour operation until 11:00 pm.

• Noise abatement flight procedures

At KOBE, aircraft take off and land while using a flight path over the Akashi Strait to reduce the impact of aircraft noise.

Complaints, inquiries and responses

The airport responds to complaints and inquiries appropriately and shares information between relevant parties where appropriate. KOBE received 36 complaints and inquiries about aircraft noise and flight paths in fiscal 2022.



KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport



Preserve Biodiversity



Establishing Seaweed Beds

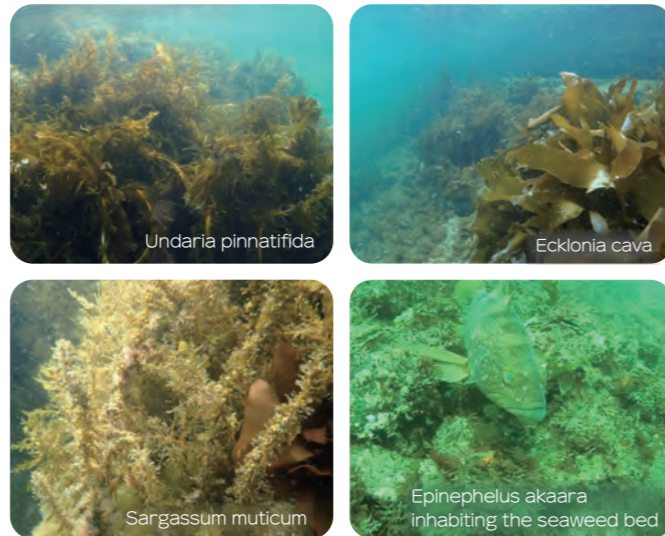
KIX

KIX is the world's first full-scale offshore airport. To prevent the impact of aircraft noise on the surrounding area, the airport was built on reclaimed land in an area approximately 5 km off coast of Senshu in Osaka Bay, with an average water depth of 18 to 20 m. From the planning stage, the airport was constructed considering the harmony with the marine environment. To contribute to the creation of a habitat for marine life in Osaka Bay, we are actively engaged in the creation of a rich seaweed bed environment around the airport island.

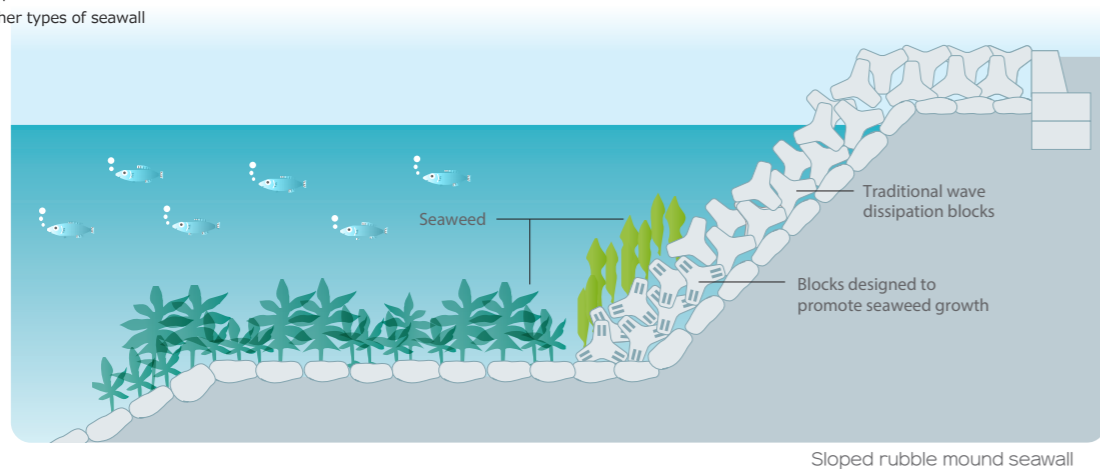


Use of sloped rubble mound seawalls

At the time of the airport island construction, sloped rubble mound seawalls were primarily used for the revetment, which allows light to reach a wide area. and the various innovations actively implemented during the construction of the airport island created a rich seaweed bed environment, which is still inhabited by a wide variety of creatures.



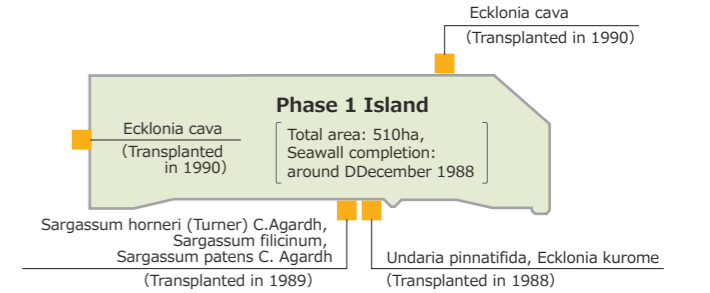
- Sloped rubble mound seawall (with wave-dissipating blocks)
- Sloped rubble mound seawall
- Other types of seawall



Seaweed bed creation during the construction of the 1st Airport Island

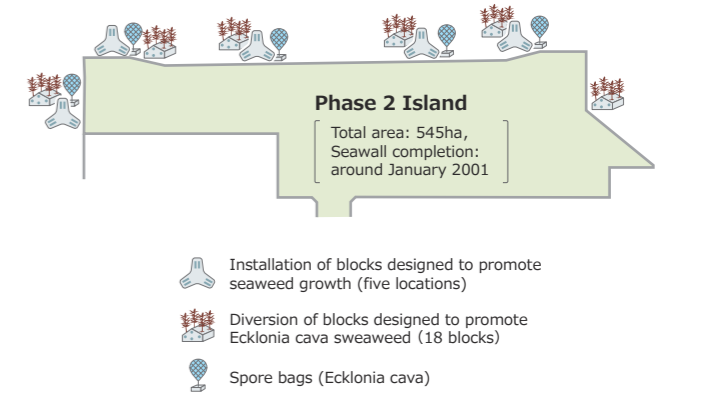
After the construction of the seawall on the 1st airport island, we actively transplanted seeds and seedlings of large seaweeds using various methods. In addition to seed ropes and seaweed nets, we devised and installed reef blocks in the roof shape to prevent mud from accumulating on the top surface of the substrate.

Active seed transplantation resulted in the gradual spread of perennial Ecklonia, which form highly stable seaweed beds as underwater forests, and spread from the areas where seeds and seedlings were supplied to almost the entire area of each seawall.



Seaweed bed creation during the construction of the 2nd Airport Island

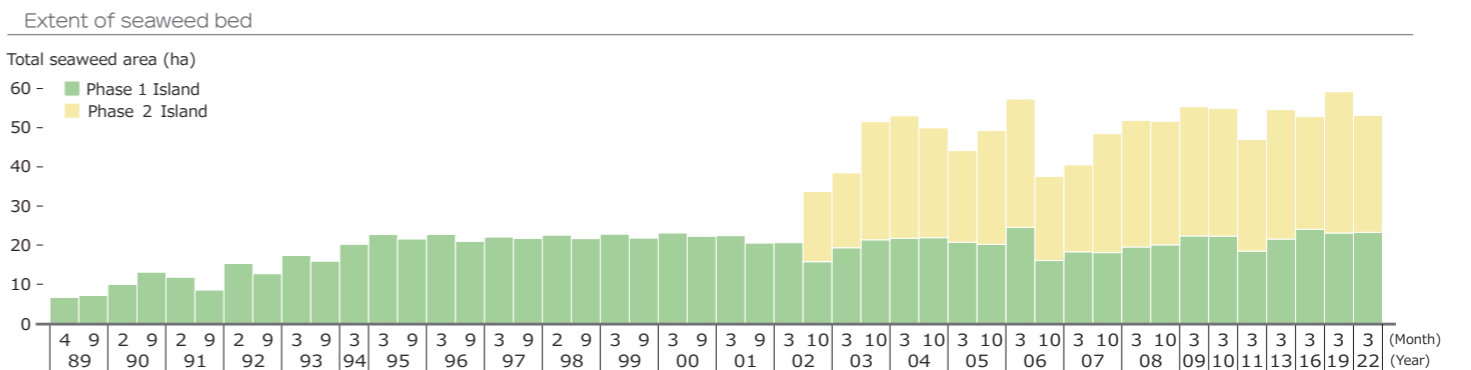
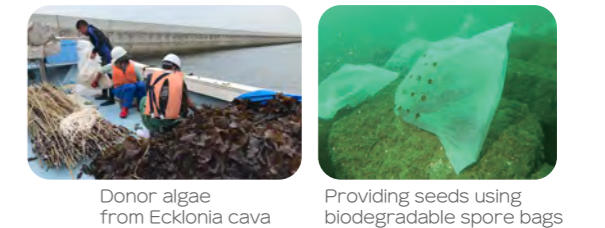
When constructing the seawall for the 2nd Airport Island, based on the findings from the monitoring survey of the 1st Airport Island, we devised and installed wave-dissipation blocks (Blocks designed to promote seaweed growth) with enhanced seaweed-growth functions, utilized the seaweed reef blocks used on the 1st Airport Island and seeded seaweed using spore bags containing mature, large seaweeds.



Extent of seaweed bed

The airport aims to maintain as well as expand the growth of high-quality seaweed beds by conducting various surveys and experiments including monitoring their condition. In the monitoring survey conducted in March 2022, we observed 54 hectares of seaweed bed area which is equivalent to about 20% of all seaweed bed areas in the Osaka Bay. Recently, we have transplanted donor algae from Ecklonia cava, Undaria pinnatifida and Sargassum as well as regular monitoring. Despite the seaweed bed recovery being impacted by external factors and involving repeated trial and error, we have promoted our activities utilizing the PDCA cycle.

Considering recent damage sustained by Ecklonia cava due to algae-eating fish, we would like to continue monitoring the status and attempt to create seaweed beds with a view of their multifaceted functions.



3 Environmental Harmony

KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport

Development of seaweed bed creation activities

KIX

J Blue Credit Certification and issuance

It is being recognized that “blue carbon”, carbon stored in marine ecosystems such as seaweed beds and shallow water, plays a very important role as a new sink for CO₂. In December 2022, we have quantified the amount of CO₂ absorbed by seaweed growing on the seawall around KIX islands and obtained J Blue Credit* certification.

* J Blue Credit: a credit certified, issued and managed by Japan Blue Economy Association (JBE). The certification and issuance are made after examination and verification by a third-party committee independent of JBE.



J Blue Credit Certification

Collaboration with local governments

In collaboration with Hannan City, we have jointly implemented the Osaka Bay Sea Forest (Seaweed Bed) Conservation and Restoration Project to create a rich sea. In February 2023, this project was registered to the “TEAM EXPO 2025” Program Co-Creation of Osaka-Kansai Expo. In April, as part of the challenges, seaweeds taken from KIX were transplanted into the sea in Hannan City.



Participation in the 30by30 Alliance for Biodiversity

The 30by30 Alliance for Biodiversity has been launched as a voluntary coalition from government, business, and NPOs to achieve the goal of halting and reversing biodiversity loss by 2030. Since October 2022, Kansai Airport Group has participated in the Alliance. We will contribute to a global goal of 30by30* via our seaweed bed conservation activities.



* 30by30: goals aiming to effectively conserve at least 30% of land and sea areas as sound ecosystems by 2030.

Fish and shellfish survey on the seawall around the airport island

KIX

We have surveyed and released fish and shellfish every year in order to understand the habitat conditions of fish and shellfish in the waters around the airport island and improve the environment of fisheries resources in Osaka Bay. The useful fisheries species caught (Sebastes inermis, Sebastiscus marmoratus, red seabream, Stephanolepis cirrhifernd and octopus sinensis) are released into the coastal seawall area to increase the stock. As for Epinephelus akaara, which Osaka Prefecture aims to brand as "Naniwa Aco", individuals smaller than 30 cm are offered to related organizations in Osaka Prefecture as spawning parents to increase thier stocks in Osaka Bay.



Taking up the cage



Sorting and measuring catch



Release of catches

Activities to conserve the rich ocean

KIX

By partnering with the Osaka Prefectural government, Osaka Prefectural Federation of Fishermen’s Cooperatives and other major maritime businesses, we strive daily to keep the coastal area of Osaka Prefecture beautiful and safe via the Osaka Prefecture Sea Area Beautification and Safety Association. These activities include cleaning and collecting waste accumulating and floating within Osaka Bay and drifting to the coast.

We also collaborate with relevant fishery industry parties to collect waste during daily fishery operations, which generated an annual total of around 1,300 m³ in gathered waste. Recently, given the challenge of increasing marine plastic waste, we help conserve the ecosystem in Osaka Bay via this activity.



Island greening and scenic improvement projects

KIX

Aiming to preserve landscapes and create spaces for rest and relaxation on the airport island, we are working to install plantings. The airport has also created a large-scale green space called KIX Sky Park that allow visitors to enjoy watching aircraft taxi, take off and land.



KIX Sky Park

ITAMI

We are committed to improving landscaping and creating a comfortable environment through rooftop greening along with a rooftop observation deck and planters within the passenger terminal building. The rooftop observation deck is a spatial wooden structure, 400 meters long with total floor space of 8,200 square meters, which allows visitors to watch aircraft up close in an open space.



Rooftop greenery



Rooftop observation deck

As part of efforts to improve the heat environment within outdoor spaces, we have installed planters for trees to form fresh areas of shade and a dry mist device at a shuttle bus station connecting Terminals 1 and 2. This project was subsidized by the Osaka Prefecture Intense Heat Countermeasure Project Utilizing Urban Greening.

KOBE

We are also working to improve landscaping and the internal environment at KOBE through wide-ranging seasonal planters set up inside the passenger terminal building. From the rooftop deck, visitors can enjoy urban panoramas on the north side as well as aircraft operating up close. A visual feast for visitors, with views and greening alike.



Planter



Dry mist device



4

Environmental Management



Utilize Evaluation Programs



Airport Carbon Accreditation

In December 2016, our efforts to reduce CO₂ emissions were recognized by the Airports Council International (ACI) when KIX and ITAMI received Level 2* Airport Carbon Accreditation (ACA).

In December 2018, the ACA of KIX and ITAMI were upgraded to Level 3 while KOBE also newly received ACA Level 2.

Moreover, in November 2021, KIX, ITAMI and KOBE were upgraded to an unprecedented Level 4 - a first in Japan. They were updated in December 2022.

This reflects our successful policy to date of committing to a long-term goal of net-zero GHG

emissions by 2050, as exemplified by the Kansai Airports Group. Equally, it echoes our quest to achieve the mid- and long-term goals of the Japanese Government to reduce GHG, as reconfirmed by the Airport Environmental Promotion Committee comprising of airport-related businesses.

We will continue striving to work with airport-related businesses to reduce CO₂ emissions and will consider a framework in which eco-friendly businesses can participate.

* Airport Carbon Accreditation is an international evaluation and accreditation program/system to manage and reduce CO₂ emissions from airports. As of September 2022, 411 airports are accredited. It is the only environmental accreditation program designed specifically for airports. ACA has four levels for carbon management as shown below to the left.



Outline of each level

- Level 4+ (Transition)**
 Conforming to the Level 4 requirement to offset CO₂ emitted by airport businesses.
- Level 4 (Transformation)**
 To reduce overall CO₂ emissions, transform airport operations and consolidate the involvement of airport-related businesses.
- Level 3+ (Neutrality)**
 Conforming to the Level 3 requirement to offset CO₂ emitted by airport businesses.
- Level 3 (Optimisation)**
 Reducing CO₂ emissions, some of which come from airport-related businesses.
- Level 2 (Reduction)**
 Implementing carbon management to reduce the CO₂ emitted by airport businesses.
- Level 1 (Mapping)**
 Calculation of CO₂ emitted by airport businesses.



KIX Level 4



ITAMI Level 4



KOBE Level 4



Cooperation and Education



Dissemination of environmental information

We have renewed the environmental information on our website to make it easier to understand Kansai Airport Group's environmental initiatives. The ITAMI page includes information on environmental projects, such as subsidies for soundproofing work around airports implemented for residents in the surrounding areas.

We will continue to disseminate information on our environmental initiatives on a regular basis to make them widely known.



Environmental learning events

KIX

Organizing events in collaboration with airlines (Singapore Airlines CSR Event for 50th Anniversary of Osaka Route)

In December 2022, KIX collaborated with Singapore Airlines to host a community contribution event for elementary school students. As part of the programs, we introduced KIX's environmental initiatives.



Parent-child Environmental Tour

In August, 2022, we organized an environmental tour for elementary school students and their parents at KIX to visit our environment-related facilities and share how we engage in environmental efforts by visiting a hydrogen station, sewage treatment center and other facilities.



In-house environmental education

The Kansai Airport Group conducts environmental training for all employees in order to foster a culture in which each employee strives for self-improvement and promotes environmental initiatives in their daily work. Moreover, we encourage voluntary environmental learning among employees by providing a system to assist them in taking an environmental certification test as well as raising their awareness by disseminating e-learnings and environmental information. We also provide ongoing educational opportunities, including keynote speeches by experts and other opportunities to incorporate external views.



4 Environmental Management

Environmental Promotion System

Establishment and enhancement of the Environmental Promotion System

Kansai Airports Group has established an environmental promotion system to promote group-wide environmental activities under the Group Environmental Promotion Committee (chaired by the CEO and Co-CEO), which consists of the heads of divisions and group companies.

In October 2022, we enhance the promotion system to ensure that each division and group company implements the action plans it has formulated and regularly assesses and reports on them to improve its initiatives. The Group Environmental Promotion Committee organized in February 2023 decided a new environmental plan and shared goals and action plans formulated by each division and group companies.



Airport Environmental Promotion Committee initiatives

We have set up councils comprising of representatives from airport-related businesses at each of our airports to share best business practices and collectively engage in various efforts with business to help mitigate the environmental impacts. These include initiatives for energy conservation, reducing CO₂ emissions, reducing and recycling waste and encouraging the use of eco-friendly vehicles.

Since cooperation with airport-related businesses is key to helping decarbonize the airport, we will promote our activity and strive to consolidate even stronger cooperation going forward.

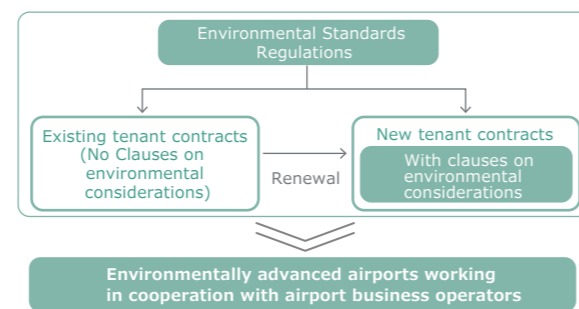
Activities in the Airport Decarbonization Promotion Council

As efforts to achieve a carbon-neutral status accelerate in various sectors globally, the Basic Policy for the Airport Decarbonization Promotion has been established by the Japanese government. Based on this policy, Airport Decarbonization Promotion Councils have been established at Kansai International Airport, Osaka International Airport, and Kobe Airport. We are working with New Kansai International Airport Co., Ltd., which is an airport provider, Kobe City and member airport-related businesses to formulate airport decarbonization promotion plans to achieve the government's target of a 46% reduction in CO₂ emissions compared to the FY 2013 level by fiscal 2030.



Environmental Standards Regulations

In April 2022, Kansai Airports enacted Environmental Standard Regulations for its business partners to promote environmentally friendly business practices across its airports. The Regulations set out matters to be observed in reducing environmental burdens and clearly reaffirmed the group's commitment to social responsibility as an airport operator. We will also renew contracts with tenants in phase to include clauses on environmental standards.



Collaboration with stakeholders

We are working with airport-related businesses and domestic and international airports to link our efforts to airport-wide initiatives.

In fiscal 2022, the restrictions imposed by COVID-19 have been relaxed compared to last year and face-to-face meetings have gradually increased, resulting in more information sharing and interaction with our stakeholders.

Presentation at the NIKKEI Blue Ocean Forum

We were invited to the NIKKEI Blue Ocean Forum held during the Nikkei SDGs Festival in May 2023, where we had a panel discussion on Blue Carbon and J Blue Credit. We also gave a presentation on KIX's seaweed beds.



Participation in the International Airports Council

Kansai Airports is a member of Airports Council International, an organization representing 712 organizations that manage 1,925 airports in 171 countries and regions worldwide (as of January 2023). The 16th meeting of Asia-Pacific Regional Environment Committee was held online in November 2022. Furthermore, in May 2023, its 17th meeting was held in-person in Kobe, where active discussions were held on environmental measures at airports. The 18th Asia-Pacific Regional Assembly was also held in the same period with a program on the theme of the environment. Kansai Airport Group presented its hydrogen initiatives and on BCP and shared case studies with members and stakeholders.



Exchange of views at ICAO The Industry Consultative Forum

At the ICAO* The Industry Consultative Forum held in June 2023, the theme of alternative energy technologies in the aviation industry was discussed. Kansai Airport Group shared information about the hydrogen grid project that it has been working on.

* ICAO : International Civil Aviation Organization

Published in the ICAO Environmental Report 2022

Kansai Airports' initiatives to promote the use of hydrogen energy and ramp up solar power generation were included in the ICAO Environmental Report 2022, issued by ICAO in September 2022.

This report shares information on the progress made over the last three years in key areas of ICAO's environmental protection activities. Collectively, the technical and scientific articles compiled here inform the public of the work of the ICAO Secretariat, ICAO Member States and the many other stakeholders involved. As such, it is considered as the benchmark reference document within international aviation and environmental sectors.



Certification and Awards

KRS eco-friendly shop

General souvenir stores and restaurants operated by Kansai Airport Retail & Services (KRS) of the Kansai Airport Group have acquired "Eco Mark Certification".

The Eco Mark is an environmental label for products and services that are recognized as having a low environmental impact and contributing to environmental conservation. It is managed by the Japan Environment Association and the only ISO 14024 Type-I label in Japan that is approved for use based on rigorous screening by a third-party organization.

The certified stores are promoting their own environmental initiatives, such as taking out leftover food.



Kansaitabinikki, Kobetabinikki (KIX-ITAMI-KOBE)



Osaka takoyaki takobon (ITAMI)

Osaka Climate Change Awards

Kansai Airports won the Osaka Governor's Award for the Climate Change Action Awards for its BCP measures.

The "Osaka Climate Change Award" is given to companies having made outstanding efforts to set an example for others regarding climate change countermeasures and heat island effect mitigation. In response to the damage caused by Typhoon Jebi in September 2018, Kansai International Airport raised the seawalls around the airport island by adding the projected sea level rise due to climate change to the usual amount of raising.

Following these efforts aiming to mitigate and contain the effects of natural disasters, such as unexpected typhoons, and minimize their impact on the Kansai economy, Kansai Airports Group will continue to create a safe and secure environment.





Environmental Vision 2050 and Environmental Goals 2030

Kansai Airports Group contributes to a sustainable society by promoting initiatives for decarbonization, circular economy, and environmental symbiosis.

In April 2023, Kansai Airports Group launched its new environmental plan, “Environmental Vision 2050” and “Environmental Goals 2030”, to reduce the impact on the environment at the 3 airports (Kansai International Airport, Osaka International Airport and Kobe Airport). We have been actively engaged in various initiatives to reduce environmental burdens at the three airports.

The “Environmental Vision 2050” and “Environmental Goals 2030” were formulated not only to take over but also to further develop previous plans with a renewed awareness of the importance of addressing global environmental issues, including decarbonization.

Kansai Airports Group will contribute to sustainable society by promoting group-wide environmental activities and via airport operation which is one of the public infrastructures.

● Environmental Vision 2050 and Environmental Goals 2030

We are now facing various ever-growing environmental issues such as climate change and depletion of energy and resources. Kansai Airports Group, through airport operations, contributes to a decarbonized society, a circular society, and an environmental symbiosis society that is in harmony with nature and local communities.

The “Environmental Vision 2050” sets the long-term vision of the Kansai Airports Group, while the “Environmental Goals 2030” sets specific milestone targets for achieving the vision.

Environmental Management

● Environmental Promotion Structure

Kansai Airports Group has established an environmental promotion system to promote group-wide environmental activities. Under the Group Environmental Promotion Committee (chaired by the CEO and Co-CEO), which consists of the heads of divisions and group companies, each division and group company implements the action plans it has formulated and regularly assesses and reports on them to improve its initiatives. We are also promoting environmental initiatives in cooperation with airport-related businesses through the Airport Environmental Promotion Councils of the three airports and the Airport Decarbonization Promotion Councils established by the airport administrator.

● Raise awareness

Environmental training will be conducted for all employees in order to foster a culture in which each employee diligently self-improves and promotes environmental initiatives in their daily work.

● Acquire a certification

Our progress will be reviewed by utilizing third-party verification, while aligning with our goals.



“Decarbonization”, “Circular Economy” and “Environmental Symbiosis”

With the three pillars of “Decarbonization”, “Circular Economy” and “Environmental Symbiosis” to address global environmental issues, Kansai Airports Group promotes environmental activities through multifaceted approaches to promote climate change measures, sustainable resources use, symbiosis with nature and airport operation in harmony with local communities.

Decarbonization



Environmental Vision 2050

- Net zero greenhouse gas emissions in business activities of Kansai Airports Group
- Contribution to the reduction of greenhouse gas emissions for the entire airports, including airport-related businesses

Environmental Goals 2030

- Reduce greenhouse gas emissions by Kansai Airports Group by 50% from the FY2016 level

Major initiatives

- Promotion of energy conservation
- Use of renewable energy and hydrogen
- Promotion of the Zero Emission Vehicles introduction

Circular economy



Zero Waste Airport

- ▷ Thorough reduction, sorting and recycling
- ▷ Recycling rate: 100%

- Not to increase the amount of incinerated waste of the entire airports from the FY2016 level
- Reduce the amount of single-use plastic by Kansai Airports Group by 30% from the FY2016 level

Major initiatives

- Use of eco-friendly materials
- Reduction of plastics, conversion of materials and closed-loop recycling
- Further reduction, sorting and recycling of combustible waste

Environmental symbiosis



- Ensuring a healthy living environment around the airports
 - ▷ Monitoring aircraft noise and the surrounding environment
- Symbiosis with nature
 - ▷ Efficient use of water resources
 - ▷ Conservation of water and soil environments
 - ▷ Contributing to ensuring a healthy ecosystem

- Continue appropriate and steady monitoring of noise and the surrounding environment
- Not to increase the total water use of the entire airports from the FY2016 level
- Reduce the clean water use by Kansai Airports Group by 15% from the FY2016 level
- Conservation of biodiversity

Major initiatives

- Monitoring of aircraft noise and surrounding environment
- Active utilization of grey water (recycled water and rainwater) and enhanced water conservation operations
- Maintaining the rich seaweed bed environment

Environmental Chronology

KIX : Kansai International Airport (1/3)

Year	Mo.	Event
1968	4	Ministry of Transport (MOT) launches basic study for airport siting
1971	10	Minister of Transport asks Council for Civil Aviation for advice on scale/siting for Kansai International Airport
	11	MOT conducts trial flights to study noise levels at 3 candidate sites (Senshu, Kobe, Akashi)
1972	8	Council for Civil Aviation (Kansai International Airport committee) conducts hearings with local communities
1973	8	MOT surveys 3 candidate sites commercial aircraft air pollution
1974	8	Council for Civil Aviation reports initial findings to Minister of Transport: Optimal airport location is off coast of Senshu
1975	9	MOT convenes series of briefings in communities
1976	9	MOT announces Survey Implementation Guidelines
1977	10	Marine observation facilities completed
1978	2	MOT announces plans for noise, vibration, and air pollution studies, starts site studies
	3	MOT begins bore studies near candidate sites
1979	5	MOT conducts flight studies with aircraft
1981	5	MOT presents three reports: Airport Proposal, Environmental Impact Assessment, and Approaches to Regional Infrastructure
1983	12	MOT begins ground improvement testing off the coast of Senshu
1984	10	Kansai International Airport Co. (KIAC) established
1986	2	Kansai Int'l Airport Env. Monitoring Org. established (Osaka Pref. Governor, mayors of 9 cities, 4 towns currently)
	6	Environmental Impact Assessment submitted to governor of Osaka Prefecture
	12	Environmental Monitoring Plan adopted environmental monitoring begins
1987	1	Permit obtained for land reclamation on public waters for Phase 1 construction. Phase 1 construction begins
	6	Construction begins on bridge linking mainland to airport begins, KIX Environmental General Center opens
1989	6	Phase 1 airport island seawall construction completed
1994	1	Phase 1 airport island construction areas completed
	3	Plan for Environmental Monitoring of KIX Construction/Operation adopted
	7	Kansai International Airport Environmental Center opens
1995	9	Kansai International Airport (KIX) opens for service (Sep 4). Monitoring begins: Aircraft noise, low-freq. air vibration
	8	Council for Civil Aviation releases Basic Approach to 7th Airport Preparatory 5-Year Plan (mid-term report)
1996	6	Kansai International Airport Land Development Co. (KALD) est., designated by Min. Transport as official land developer
1997	6	MOT releases "Comprehensive Initiatives relating to Flight Path Issues at KIX" paper
1998	10	Environmental Impact Assessment on Phase 2 Construction submitted
	12	New flight paths introduced. Environmental Monitoring Plan for aircraft noise, etc., reviewed, monitoring enhanced
1999	6	Environmental Monitoring Plan for Phase 2 Construction Project adopted
	7	Permit obtained for land reclamation on public waters, Phase 2 construction (start Jul 14. Silt protection sheets deployed)
	11	KIX International Symposium marks fifth anniversary of opening
	12	KALD acquires ISO 14001 certification for environmental management system
2001	1	KIAC establishes Environmental Management Committee
	4	KIX receives "Monument of the Millennium" award from American Society of Civil Engineers, as offshore airport
	6	KIAC adopts Environmental Management Plan (Eco-Island Plan)
	9	Placement begins for wave-dissipating blocks to support seaweed bed growth along Phase 2 seawall
2002	11	International Airport Symposium 2001 hosted, Phase 2 airport island seawall completed
	10	KIAC adopts Regulations Governing the Use of Waste Processing Facilities
2003	12	• KIAC establishes Energy Conservation Committee • KIAC releases first Eco-Island Report (2002 edition)
	12	KIAC establishes KIX Customer Satisfaction Council
2004	9	International Airport Symposium 2004 hosted
	12	KIAC, KALD mount their first exhibit at "Eco-Products 2004" exhibition
2005	7	Kansai International Airport Environmental Center relocated to Kanku Observation Hall
2006	8	Kansai International Airport & Rinku Town designated by government as CNG vehicle model project areas
2007	1	KIAC awarded MITI Award at FY2006 Nat'l Energy-Efficiency Best Practices Conf., for IT-based air con system in passenger terminal
	5	JHFC hydrogen charging station for vehicles opens at KIX
2008	3	KIX Eco-Island Promotion Council launched KIX Environmental Plan adopted
	4	Windbreak fence completed for KIX rail system access bridge, use of pro-beam low-location lights begins

KIX : Kansai International Airport (2/3)

Year	Mo.	Event
2008	5	Kanku Environmental Exhibition features KIX Environmental Plan
	6	First idling-prevention awareness campaign launched
	7	First conference held to report on KIX Eco-Island Promotion Council environmental initiatives
	10	Study tour organized by KIX Eco-Island Promotion Council
2009	7	Trial use of truck-mounted ground power units (GPUs) begins
	11	KIX Science Classes held
2010	12	Exhibit at Eco-Products 2009 exhibition
	1	Partial changes to aircraft auxiliary power unit (APU) usage restrictions (use reduced from 30 to 15 min. before departure)
2010	9	Photovoltaic system installed for temperature-controlled building for medical products
	12	Exhibit at Eco-Products 2010 exhibition
2011	1	IATA Environment Stand display installed at KIX
	3	Rapid charger installed at KIX for electric vehicles
	7	Japan fully adopts digital terrestrial broadcasting; measures targeting signal interference
	9	Electricity-powered commercial shuttle vehicles introduced (two vehicles by fiscal year end)
2011	12	Exhibit at Eco-Products 2011 exhibition
	4	• New Kansai International Airport Company (NKIAC) established • Professor KIXeco quiz system launches at Environmental Center
2012	5	KIX wins judges' special award, Airports Council Int'l (ACI) Asia-Pacific 2011 Green Airports Recognition Awards
	6	Phase 2 airport island construction almost completed, land development work by KALD is completed
	7	Kansai International Airport and Osaka International Airport are merged
	8	KIX earns runner-up award in 2012 Osaka Environmental Awards for efforts to grow seaweed beds
	10	KIX Sky Park opens adjacent to Phase 2 Terminal Building, trial begins for hydrogen fuel-cell buses
	11	Olive tree planting ceremony along walking path for Phase 2, decision made to do KIX Megasolar project
2013	12	Exhibit at Eco-Products 2012 exhibition. Four regular chargers for electric vehicles installed in parkade
	2	Int'l Strategy Comprehensive Special Area expanded by Kansai Innovation to include KIX (green innovation theme)
	3	• Smart Eco Logi Council holds ceremony for launch of 20 large CNG trucks in international freight zone • KIX Eco-Island Promotion Council changes name to KIX Smart Island Council
	4	KIX Smart Island Plan adopted
2013	8	Summer Vacation Family Eco Classes held
	10	East Asia Airport Alliance (EAAA) annual general meeting held. "Environmental Relay Declaration" adopted
	12	Exhibit at Eco-Products 2013 exhibition. Winter Vacation Family Eco Classes held
	1	KIX announces event for EAAA Environmental Relay
2014	2	KIX Megasolar starts generating electricity (largest photovoltaic system of any Asian airport)
	5	Hydrogen Grid Project launched
	6	Rapid charger installed for electric vehicles at open parking lot No.5, with 24-hour operations
	7	• "Megasolar Observatory" and "Visualization Monitor" start operating • Small wind turbine power generator installed—a first for any Japanese airport
2015	2	Trial operations launched for first fuel-cell forklift at any airport in Asia, plus demonstration trial of hydrogen grid
	8	Megasolar system starts operating on roof of air freight warehouse in the International Cargo Area at 1st Island
	9	Megasolar system starts operating on roof of air freight warehouse in international freight zone
	10	Exhibit at Biwako Environmental Business Exhibition 2015
	12	• Awarded the FY2015 Environment Minister's Award for Global Warming Prevention Activities • Exhibit at Eco-Products 2015 exhibition
2016	1	Largest hydrogen station at an airport in Asia opens
	3	• Awarded 2015 Kansai Eco Office Grand Prize from Union of Kansai Governments • Two new model fuel-cell forklifts added for demonstration trials
	4	• Kansai Airports begins operating Kansai International Airport • Four more regular chargers installed for electric vehicles in parkade
	6	• Environmental initiatives introduced at Fifth Fukeko Festival • Potato harvest event at KIX Sora Farm promotes environmental education • KIX Smart Island Exhibit in passenger terminal
	8	KIX Family Eco-Classes: Hydrogen/Magnesium Air Fuel Cells
	12	• Airport Carbon Accreditation (ACA) Level 2 obtained, a first for airports in Japan • Exhibit at 2016 EcoPro International Exhibition on Environment and Energy
2017	1	Terminal 2 opens (international flights)
	4	Large hydrogen filling station for industrial vehicles opens, a first in Japan
	5	Conducts trial operations of fuel-cell bus at Kanku Tabihaku 2017 and to the Terminal 2 building

Environmental Chronology

KIX : Kansai International Airport (3/3)

Year	Mo.	Event
2017	6	<ul style="list-style-type: none"> • Hosts Smart Island Environmental Exhibition • Holds KIX Eco Class at KIX Sky Farm • Holds idling stop campaign
	8	Holds KIX Science Class
	12	Exhibits at 2017 EcoPro International Exhibition on Environment and Energy
2018	2	Introduces additional two fuel-cell forklifts
	4	Establishes new environmental plan called One Eco-Airport Plan
	9	Keynote and exhibit at the six World Smart Energy Week Osaka Show
	10	Hosts the tenth ACI Asia-Pacific Regional Environment Committee
2019	2	With additional four fuel-cell forklifts introduced, seven fuel-cell forklifts in total
	9	With additional FCV introduced, three FCV in total
2020	1	Solar panels on the rooftop of the Terminal 2 building were installed and energy generation started
	2	An additional 15 fuel-cell forklifts introduced meant 22 fuel-cell forklifts in total
	3	Trial operation of the electrical ground power unit (eGPU) got underway
	4	Plastic shopping bags used in shops directly managed by the Kansai Airports Group are replaced with paper bags
2021	3	Set a long-term goal of net-zero greenhouse gas emissions
	7	<ul style="list-style-type: none"> • Started T2 smart airspace demonstration experiment • Selected as a "Priority Survey Airport" by the Civil Aviation Bureau of the Ministry of Land, Infrastructure, Transport and Tourism with the aim of making the airport carbon-neutral.
	11	Airport Carbon Accreditation (ACA) Level 4 obtained
2022	3	Introduced a new fuel-cell bus
	4	Established Environmental Standards Regulations at KIX
	6	<ul style="list-style-type: none"> • A partnership agreed with Airbus to capitalize on hydrogen in the Japanese aviation industry • Concluded the basic agreement on the mass production of International SAF (Sustainable Aviation Fuel)
	10	Joined the 30by30 Alliance for Biodiversity
2023	2	Registered the seaweed bed initiatives for Co-Creation Challenges of the TEAM EXPO 2025 program
	3	Formulated the Environmental Plan, "Environmental Vision 2050 and Environmental Goals 2030"
	4	Received the 2022 Osaka Prize for Climate Change Measures

ITAMI : Osaka International Airport (1/2)

Year	Mo.	Event
1939	1	Opens as No. 2 Osaka Airport
1958	3	Complete return of airport from U.S. forces to Japan. Renamed "Osaka Airport" by the Ministry of Transport (runway was 1,828 m long)
1959	7	Designated a class 1 airport under Civil Airport Development Law, renamed "Osaka International Airport"
1960	4	International flights begin
1964	6	Passenger jet service begins
1969	1	Construction of terminal building completed
1970	2	Additional runway (3,000 m) opens and airport takes its present form
1975	12	Abolishes domestic line operation between 9:00 pm to 7:00 am the following morning
1976	7	Abolishes international line operation between 9:00 pm to 7:00 am the following morning
1977	10	Limit on aircraft movements for regularly scheduled flights of 370 movements per day (200 for jets)
1990	12	MOT concludes the agreement with local municipalities (11 cities) and local groups (mediation group) on the airport continuation
1994	9	International flights shift to newly opened Kansai International Airport
1997	4	Osaka Monorail starts operation
1999	7	Former international terminal building is renovated and opens as South Terminal
2002	6	Erects noise barrier at the engine testing site
2004	3	Established the Osaka International Airport's Eco Airport Council
2006	4	Switches from 24-hour operations to 14-hour operations (7:00am to 9:00pm)
2010	4	Begins examining ways of reducing amount of grass clippings incinerated as waste (recycling as fertilizer and feed)
2012	4	New Kansai International Airport Company established
	7	Management of Osaka International Airport and Kansai International Airport is integrated
	10	Successfully produces fertilizer made of grass clippings from the airport's landing strips

ITAMI : Osaka International Airport (2/2)

Year	Mo.	Event
2013	3	Introduces landing fee system based on actual noise level
2014	2	Receives 7th Toyonaka Eco Citizen Award 2013 (for recycling grass clippings as fertilizer and feed)
	9	Receives the Grand Prize at the 2014 Osaka Environmental Awards (for recycling grass clippings as fertilizer and feed)
	10	Receives the Chairman's Prize at the 2014 Reduce, Reuse, Recycle Promotion Merit Awards (for recycling grass clippings as fertilizer and feed)
2016	4	Kansai Airports begins operating Osaka International Airport and Kansai International Airport
	12	<ul style="list-style-type: none"> • Airport Carbon Accreditation (ACA) Level 2 obtained, a first for airports in Japan • Exhibit at 2016 EcoPro International Exhibition on Environment and Energy
2017	5	Constructs warehouse for storing grass clipping feed
	12	Exhibits at 2017 EcoPro International Exhibition on Environment and Energy
2018	3	<ul style="list-style-type: none"> • Receives Silver at ACI Asia-Pacific Green Airports Recognition 2018 (for recycling grass clippings as feed) • AIP defines the auxiliary power unit (APU) usage restrictions
	4	<ul style="list-style-type: none"> • Installed light-blocking panels and rooftop greenery in the terminal building • Establishes new environmental plan called One Eco-Airport Plan
	8	Presents ITAMI environmental action in INTER-NOISE 2018
	12	<ul style="list-style-type: none"> • Upgrades to Airport Carbon Accreditation (ACA) Level 3 obtained • Exhibit at 2018 EcoPro International Exhibition on Environment and Energy
2019	3	Fuel-cell vehicle introduced for the first time
	4	Iwatani Hydrogen Refueling Station in Osaka International Airport opens in the airport
	6	ITAMI environmental measures are presented in INTER-NOISE 2019
	10	One rapid charger is installed
2020	4	Plastic shopping bags used in shops directly managed by the Kansai Airports Group are replaced with paper bags
2021	3	Set a long-term goal of net-zero greenhouse gas emissions
	7	Selected as a "Priority Survey Airport" by the Civil Aviation Bureau of the Ministry of Land, Infrastructure, Transport and Tourism with the aim of making the airport carbon-neutral.
	11	Airport Carbon Accreditation (ACA) Level 4 obtained
2022	4	Established Environmental Standards Regulations at ITAMI
	6	<ul style="list-style-type: none"> • A partnership agreed with Airbus to capitalize on hydrogen in the Japanese aviation industry • A basic agreement on cooperation concluded to commercialize Sustainable Aviation Fuel (SAF)
	8	Presents ITAMI's instantaneous display system of aircraft noise level and ITAMI environmental action in INTER-NOISE2022
2023	3	Formulated the Environmental Plan, "Environmental Vision 2050 and Environmental Goals 2030"

KOBE : Kobe Airport

Year	Mo.	Event
2006	2	Open Kobe Airport
2018	4	<ul style="list-style-type: none"> • Kansai Airports Kobe begins operating Kobe Airport • Establishes new environmental plan called One Eco-Airport Plan
	12	<ul style="list-style-type: none"> • Upgrades to Airport Carbon Accreditation (ACA) Level 2 obtained • Exhibit at 2018 EcoPro International Exhibition on Environment and Energy
2019	2	Established the Kobe Airport Environmental Promotion Council
	4	AIP defines the auxiliary power unit (APU) usage restrictions
	5	The limit on aircraft movements for regularly scheduled flights is expanded to 80 movements per day
2020	3	Operating hours extended to 16 hours between 7:00 am and 11:00 pm
	4	Plastic shopping bags used in shops directly managed by the Kansai Airports Group are replaced with paper bags
2021	3	Set a long-term goal of net-zero greenhouse gas emissions
	7	Selected as a "Priority Survey Airport" by the Civil Aviation Bureau of the Ministry of Land, Infrastructure, Transport and Tourism with the aim of making the airport carbon-neutral.
	11	Airport Carbon Accreditation (ACA) Level 4 obtained
2022	4	Established Environmental Standards Regulations at KOBE
	6	<ul style="list-style-type: none"> • A partnership agreed with Airbus to capitalize on hydrogen in the Japanese aviation industry • A basic agreement on cooperation concluded to commercialize Sustainable Aviation Fuel (SAF)
2023	3	Formulated the Environmental Plan, "Environmental Vision 2050 and Environmental Goals 2030"

Reference Data

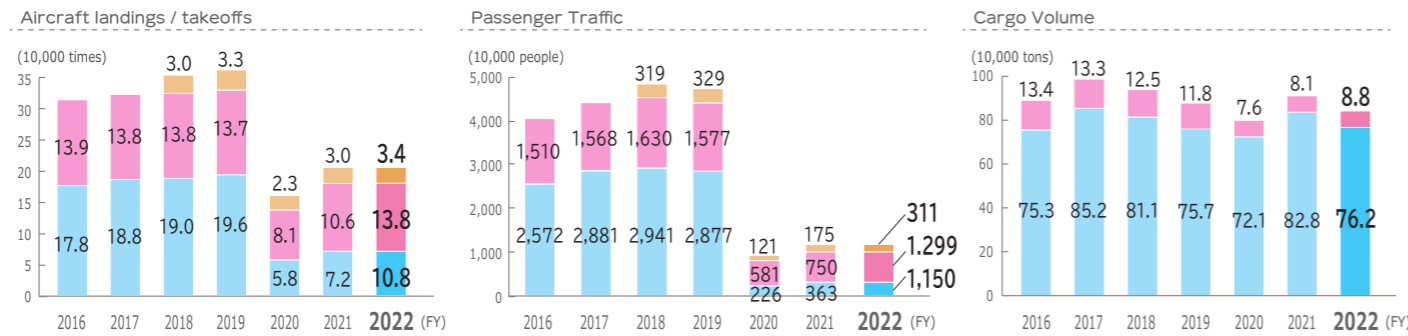
Following the spread of COVID-19 infections, 2021 saw domestic and international travel, air passenger numbers and flights in KIX decline even further from 2021 compared to 2019 and pre-pandemic. Eventually, CO₂ emissions, clean water consumption and general waste amount have decreased while the units of traffic* and amount per passenger remain high. Meanwhile, domestic and international travel, air passenger numbers and flights in ITAMI and KOBE have roughly been recovered to pre-pandemic levels. Despite such unusual circumstances, we will continue striving to mitigate the environmental impact through appropriate measures, such as improving energy efficiency throughout the airport.

* Traffic Unit (TU) : Passengers (persons) + cargo volume (per 100 kg)

KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport

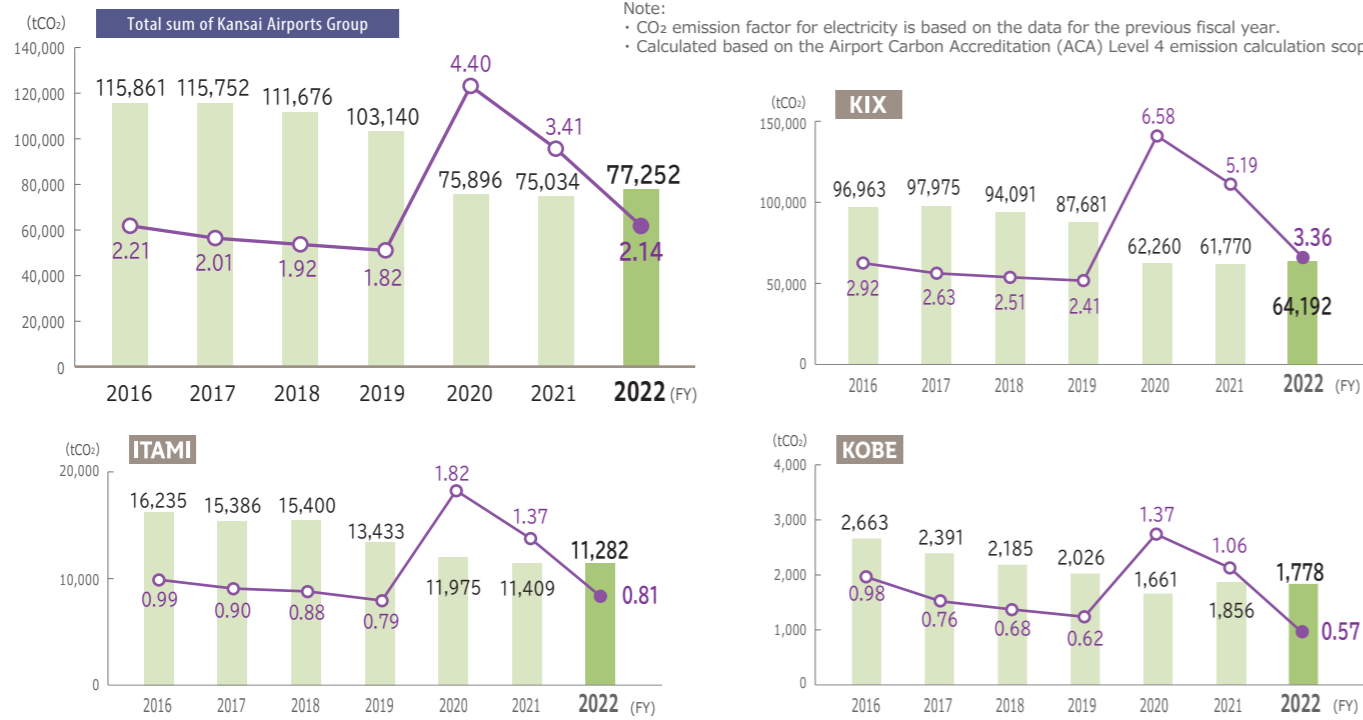
Number of passengers and flights

Note: On April 1, 2018, Kansai Airports Kobe commenced its business as an operator of Kobe Airport (KOBE).



CO₂ emissions of Kansai Airports Group

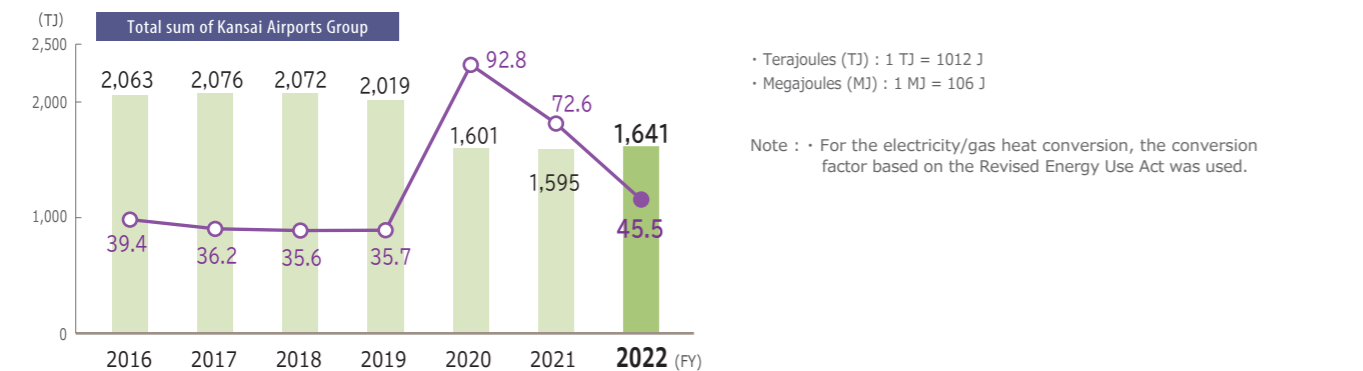
Note: CO₂ emission factor for electricity is based on the data for the previous fiscal year. Calculated based on the Airport Carbon Accreditation (ACA) Level 4 emission calculation scope.



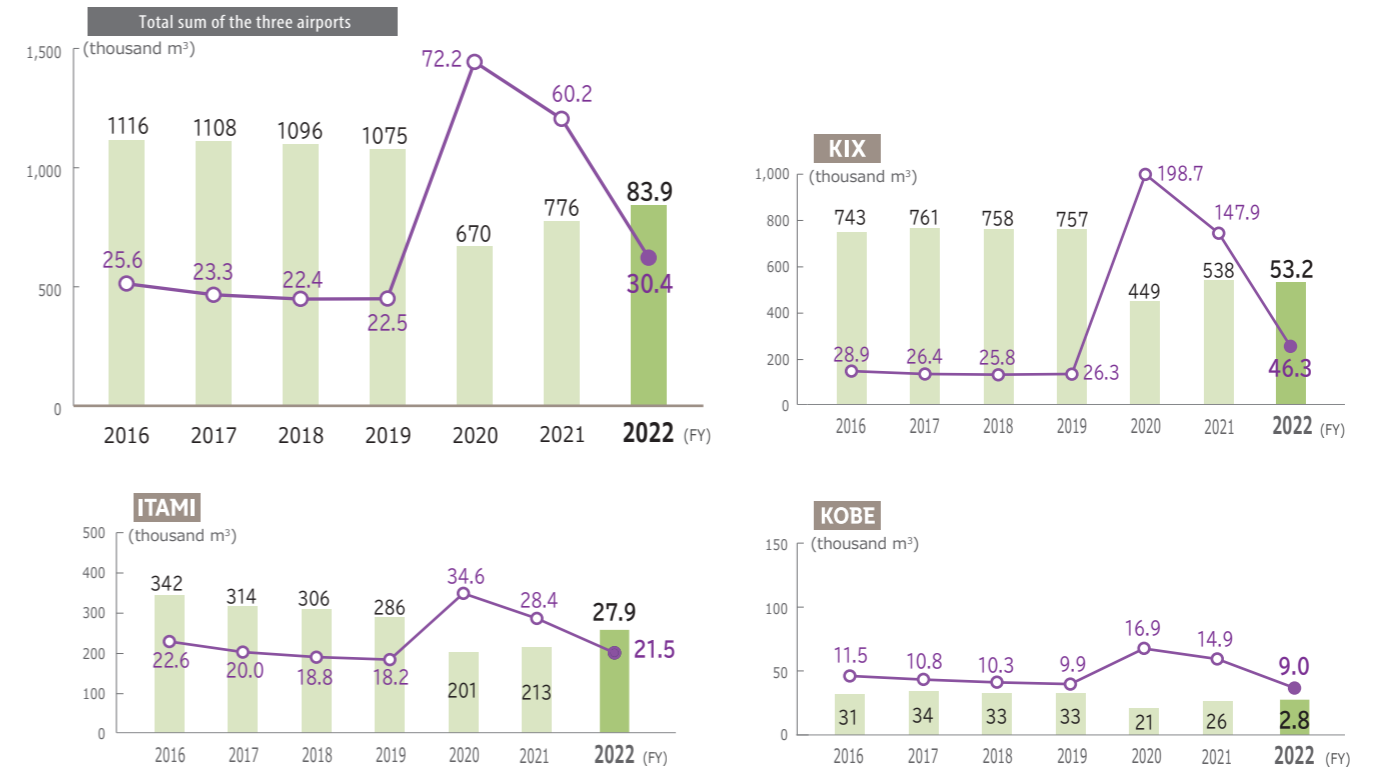
Energy usage of Kansai Airports Group

• Terajoules (TJ) : 1 TJ = 1012 J
• Megajoules (MJ) : 1 MJ = 106 J

Note: For the electricity/gas heat conversion, the conversion factor based on the Revised Energy Use Act was used.



Clean water usage of the three airports



Waste emissions and recycling rate of the three airports

