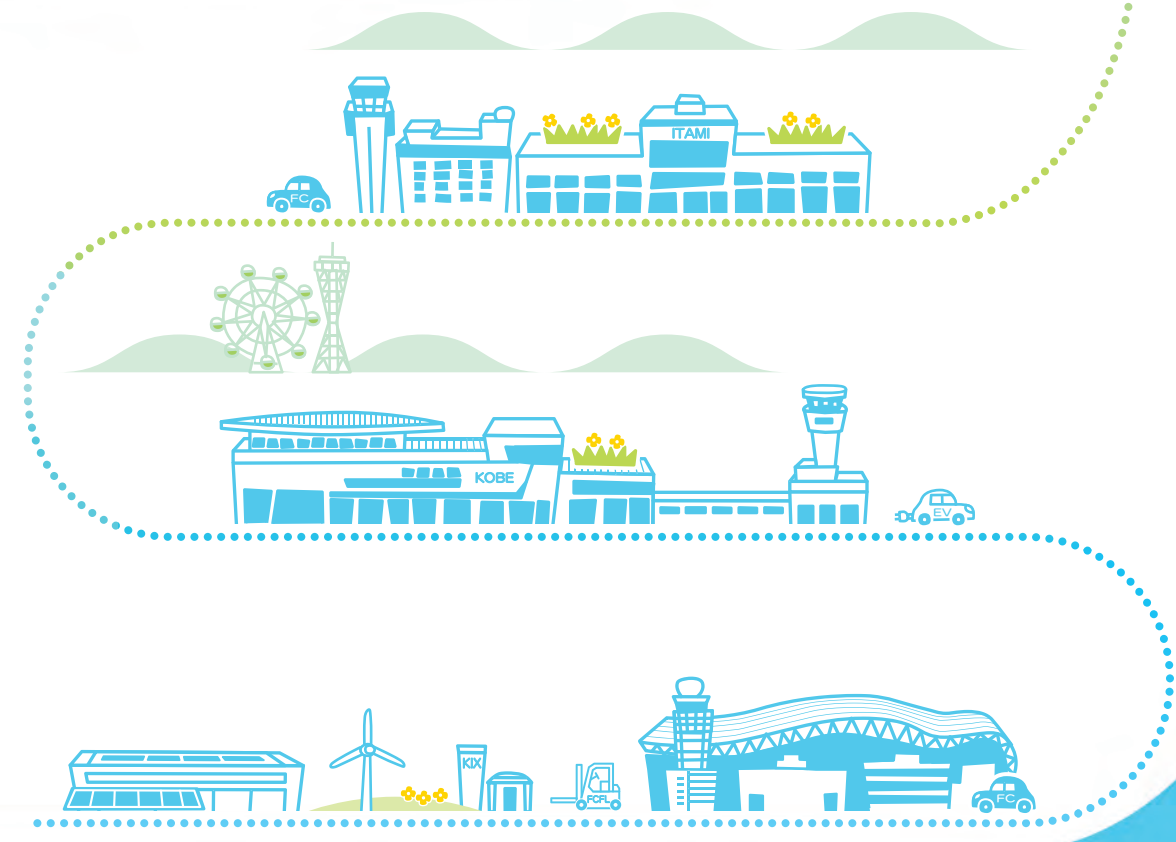


Shaping a New Journey



Kansai International Airport / Osaka International Airport / Kobe Airport

Environmental Report 2022



Queries

Kansai Airports Technical Headquarters, Environment & Master plan Gr., Tech HQ
E-mail: kankyo@kansai-airports.co.jp

Published: September 2022

Committed to Operating Eco Friendly, Smart Airports



Shaping a New Journey

Kansai Airports Environmental Statement

Kansai Airports Group is engaged in various activities to reduce the impact on the environment at the 3 airports (Kansai International Airport, Osaka International Airport and Kobe Airport). In order to further promote our activities, we have created a new environmental plan "One Eco-Airport Plan," and set specific targets and measures based on the following 4 pillars as indices for future initiatives toward reduction of environmental impact.

- Adaptation to climate change**
 Having set a long-term goal of net zero greenhouse gas emissions by 2050, we promote efficient energy use to reduce environmental footprint and implement measures aimed at reducing greenhouse gas emissions. We also encourage the use of solar, hydrogen and other types of renewable and alternative energy to contribute to protecting the global environment.
- 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)" of both waste and water. This includes making water use more efficient through data analysis, expanding the use of recycled water and exploring the use of rainwater.
- Environmental harmony**
 We continue to work on reducing aircraft noise, conduct environmental monitoring appropriately and disclose monitoring results. We also promote the creation of positive spaces where airport users can relax and feel comfortable while striving to preserve biodiversity through the maintenance and expansion of greenbelts and conducting environmental surveys to verify species.
- Environmental management**
 Using environmental evaluation programs, we develop and refine a mechanism to assess, understand and reduce environmental footprint. 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.

Kansai Airports Group is fully aware of its responsibility toward the global and regional environmental changes. We will continue to promote initiatives aimed to reduce our environmental impact and to develop the airport while coexisting with the surrounding environment.

【Our environmental targets: (target year: FY 2022, base year: FY 2016)】

- Reduce our energy use per unit of traffic by 1% per year on average.
- At each airport, reduce our CO₂ emissions per unit of traffic by 1% per year on average.
- At each airport, reduce the use of city water per passenger by 2% per year on average.
- Increase the rate of recycling to 35 %.
- At each airport, reduce the use of single-use plastics by 25%
- At each airport, achieve environmental certification such as Airport Carbon Accreditation and ISO14001.
- Perform biodiversity assessments and protect biodiversity in and around our airports.
- Actively support the use of hydrogen as a clean energy source.

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 2022, focusing mainly on fiscal year 2021 (April 2021 to March 2022).

Addressing Environmental Impact at Airports

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

At the Kansai Airports Group, we are aware of the need to take great responsibility for environmental issues on regional and global scales. Accordingly, 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.



CO ₂	<ul style="list-style-type: none"> • Airport facilities • Airport vehicles • Aircrafts 	CO ₂	Reduce GHG Emissions <ul style="list-style-type: none"> • Promote Energy Conservation • Utilize Renewable Energy and Hydrogen • Promote Zero-Emission Vehicles (ZEVs) • Other Activities 	>> P13 >> P14 >> P19 >> P22 >> P23
Water	<ul style="list-style-type: none"> • Clean water • Reclaimed water (Recycled water) • Rainwater 	💧	Reduction of Clean Water Consumption	>> P25
Waste	<ul style="list-style-type: none"> • General waste • Industrial waste 	♻️	Waste Recycling	>> P27
Noise	<ul style="list-style-type: none"> • Aircraft noise 	🔊	Monitor the Local Environment	>> P29
Natural environment	<ul style="list-style-type: none"> • Biodiversity • Greening 	🐦	Preserve Biodiversity	>> P35



KIX : Kansai International Airport



ITAMI : Osaka International Airport



KOBE : Kobe Airport



Runways	Operating Hours	Aircraft Parking Stands
2	24 hours	99

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

Two stations serve fuel-cell vehicles and industrial vehicles such as forklifts, etc.



4 EV charging stations

EV charging stations are available to encourage the use 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 inside the Sky View Observation Hall.



11 Solar panels

The electricity generated by these panels is used in the Terminal 2 building.



10 KIX Sky Park

This roughly 4 hectares 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



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.



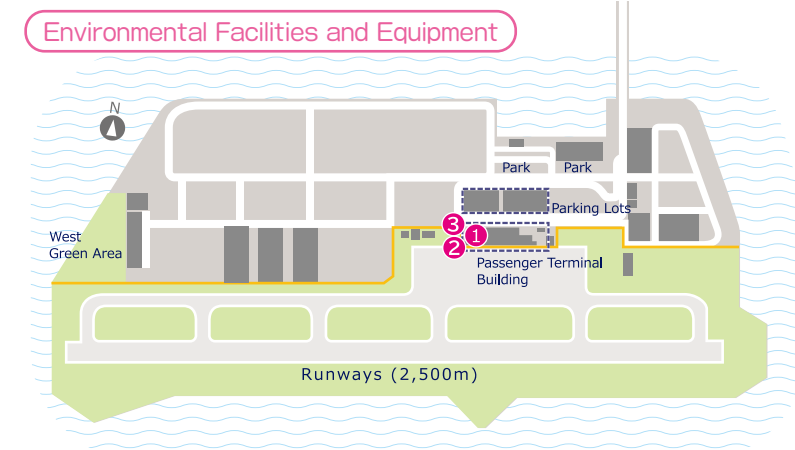
3 EV charging stations
EV charging stations are available to encourage the use of eco-friendly vehicles



4 Hydrogen station
A station serves fuel-cell vehicles.



Runways	Operating Hours	Aircraft Parking Stands	Size
1	7 a.m. to 23 p.m. (※From the summer of 2020)	10	approximately 156 ha



1 EV charging stations
EV charging stations are available to encourage the use 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.



One Eco-Airport Plan

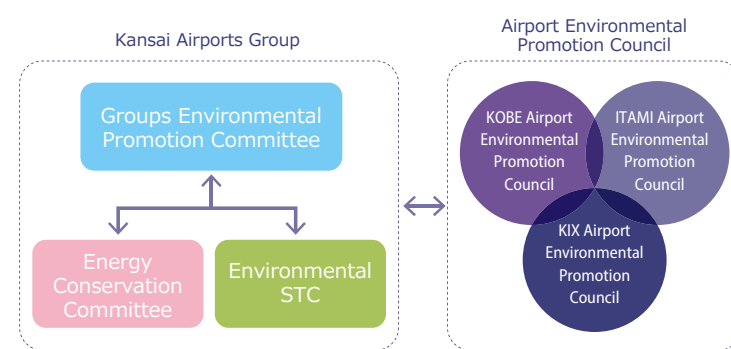
We established the One Eco-Airport Plan, an environmental plan covering the three airports of Kansai International Airport, Osaka International Airport, and Kobe Airport. This plan, which got underway in fiscal 2018, spans the five-year period up to fiscal 2022, using four policies to promote activities across all three major airports in the Kansai region aimed at reducing our environmental impacts.

Committed to Operating Eco Friendly, Smart Airports



Environmental Promotion System Working in conjunction with airport-related businesses

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 actions aimed at conserving energy and reducing greenhouse gas emissions. We also established the Environmental STC* in March 2022 to proceed with more specific activities. Further, each of the three airports has its own Airport Environmental Promotion Council, as a vehicle for promoting cooperation, collaboration and initiatives with airport-related businesses.



* A committee engaging in the current activities.

● Leaflets and introductory movies of One Eco-Airport Plan are available from:
<http://www.kansai-airports.co.jp/efforts/environment/efforts/oneecoairport.html>



Initiatives in 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.

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
[Strategic Goal] By fiscal 2022 : CO ₂ emissions	[Strategic Goal] By fiscal 2022 : energy usage
5 % reduction (compared to fiscal 2016, per traffic unit)	5 % reduction (compared to fiscal 2016, per traffic unit)

[Corresponding SDGs]



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
[Strategic Goal] By fiscal 2022 : Clean water usage	[Strategic Goal] By fiscal 2022 : Waste recycling rate : 35% Amount of one-way plastics waste: 25% reduced
10 % reduction (compared to fiscal 2016, per PAX)	

[Corresponding SDGs]



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
[Strategic Goal] Measure environmental parameters	[Strategic Goal] Increase biodiversity

[Corresponding SDGs]



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
[Strategic Goal] Acquire environmental certification	[Strategic Goal] Establish management framework

[Corresponding SDGs]



Zero Emission Airport

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

Kansai Airports Group's CO₂ emissions

Scope 1 and Scope 2 *1

FY2016 (Baseline)

116 thousand tons CO₂*2

FY2030

40% reduction

FY2050

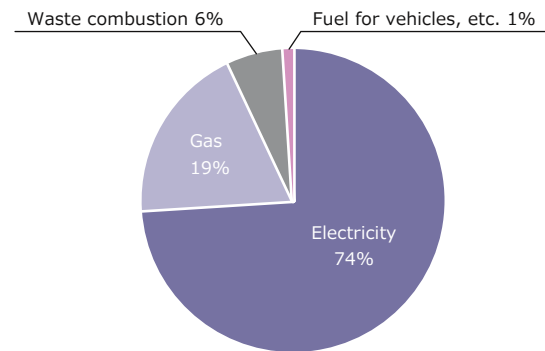
Net Zero*3

*1: Scope 1: Direct emissions from fuel combustion, etc. Scope 2: Indirect emissions through the purchase of electricity.
*2: Calculated based on the Airport Carbon Accreditation (ACA) Level 4 emission calculation scope.
*3: Includes the purchase of green energy, etc.

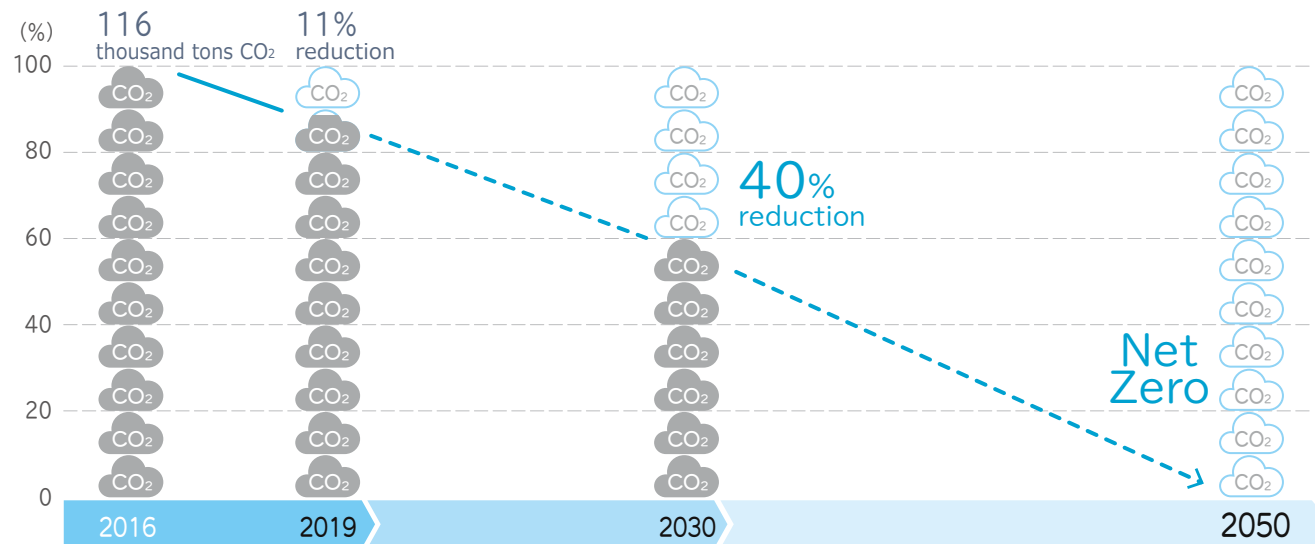
Kansai Airports Group is pleased to announce that it has set a long-term target to reach net zero greenhouse gas emissions by 2050.

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.

Breakdown of Kansai Airports Group's CO₂ emission sources (Scope 1 and 2)*4



*4: For the period from October 2018 to September 2019



● Current reduction

● Major initiatives

● Further energy saving

Promote Energy Conservation
Utilize Renewable Energy and Hydrogen

● Purchase of green energy

Promote ZEVs*

○ Technological innovation

* ZEV: Zero-Emission Vehicle

- 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

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

[Lighting]

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

[Operations]

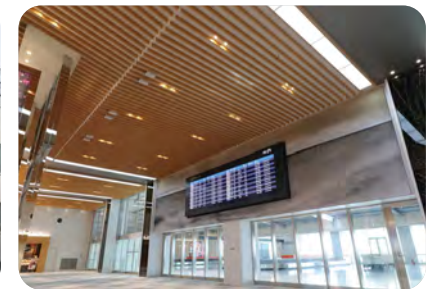
- Visualizing and analyzing energy usage with BEMS*
- Optimizing operations using AI



Improve efficiency of air-conditioning equipment



Insulation and solar radiation protection



Introduce LEDs in terminal buildings

Utilize Renewable Energy and Hydrogen

- Install more solar panels
- Promote the Hydrogen Grid Project



Install solar panels on the roof of terminal buildings



Promote the hydrogen project

Promote ZEVs

- Replace existing service vehicles with electric and fuel-cell vehicles



Introduce EVs and FCVs



Introduce fuel-cell forklifts

* BEMS: Building Energy Management System

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 working with the Airport Environmental Promotion Council, which represents airport-related businesses, to reduce CO₂ emissions. In April 2022, each of the three airports also enacted environmental standards regulations to ensure

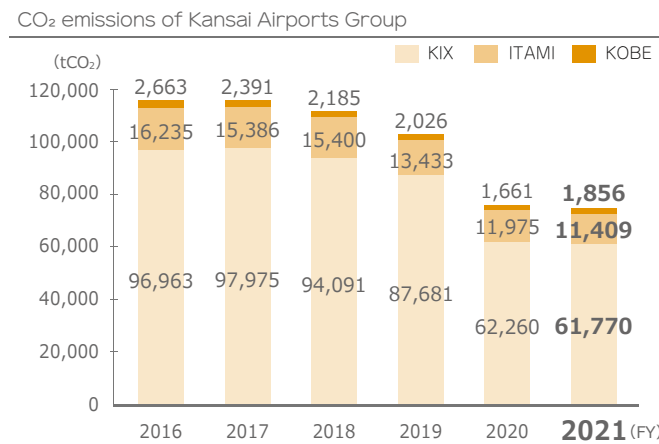
eco-friendly operation of its business partners in the airport. We aim to calculate CO₂ emissions by categorizing them into Scopes 1 to 3 in line with the GHG protocol concept.

- **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.

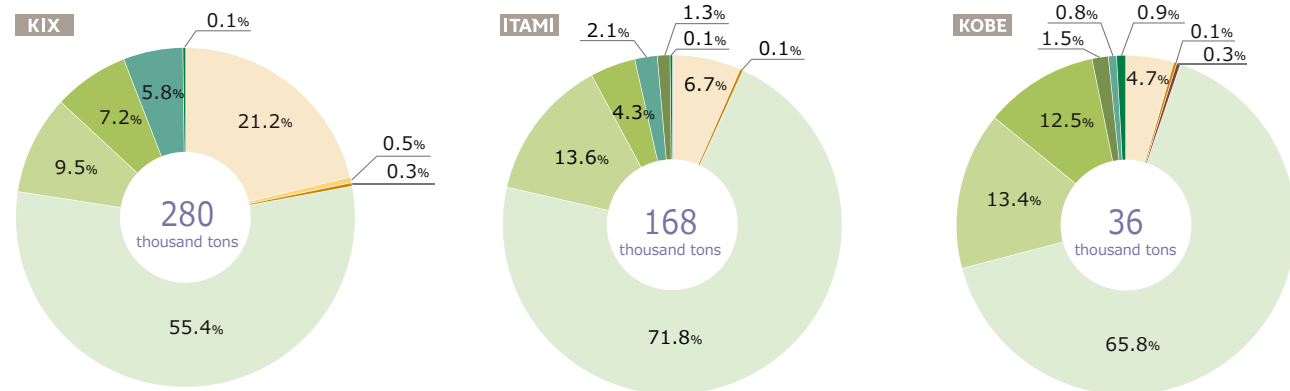
CO₂ emissions from airports

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. A year later, in fiscal 2020, overall CO₂ emissions fell even more sharply due to the impact of COVID-19. Amid the ongoing impact of COVID-19, overall CO₂ emissions in fiscal 2021 were unchanged from the previous year. The CO₂ emissions of the Kansai Airports Group also decreased thanks to its emission-reduction efforts. Going forward, we will strive to reduce energy consumption further and boost overall energy efficiency at our airports via the Airport Environmental Promotion Council.



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

CO₂ emissions from all the three airports (in fiscal 2020)



- Note: 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.
- | Scope | Category | Color |
|-----------|---------------------------------------|--------------|
| Scope 1,2 | Facilities managed by Kansai Airports | Light Orange |
| | Vehicles managed by Kansai Airports | Dark Orange |
| | Waste/wastewater | Yellow |
| Scope 3 | Aircraft | Light Green |
| | Accessing the airport, etc. | Medium Green |
| | Business facilities | Dark Green |
| | Others | Dark Green |

Promote Energy Conservation

At Kansai Airports Group, we have compiled a promotion system, reduction targets, medium to long-term plans to rein in CO₂ emissions to reduce our carbon footprint.

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**

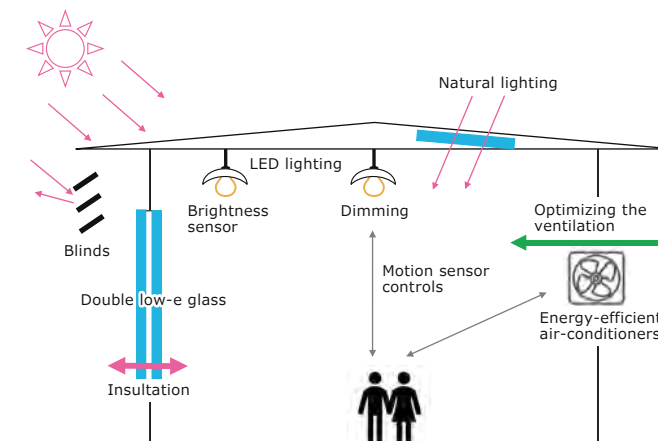
As well as introducing energy-efficient equipment, we further promote energy conservation efforts in our air-conditioning system by reducing the air-conditioning load. This is done by utilizing ambient air-cooling methods, controlling the inflow of ambient air while the air-conditioning is active, window 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.

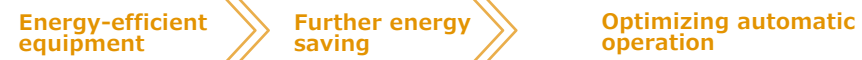
1 Adaptation to climate change

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.

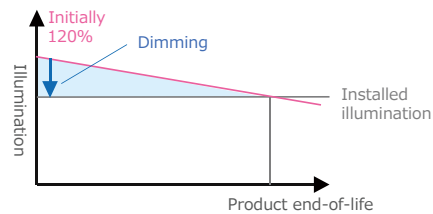
The Kansai Airport Group will promote its basic energy conservation measures as planned, while aiming to collaborate with universities; pursuing advanced AI-centric solutions and further optimizing energy conservation and efficient operations.

Seeking advanced solutions /

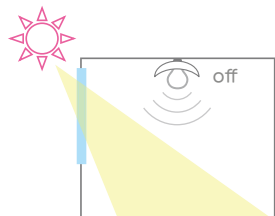


Automatically optimizing LED brightness

Initial illumination correction



Brightness sensor



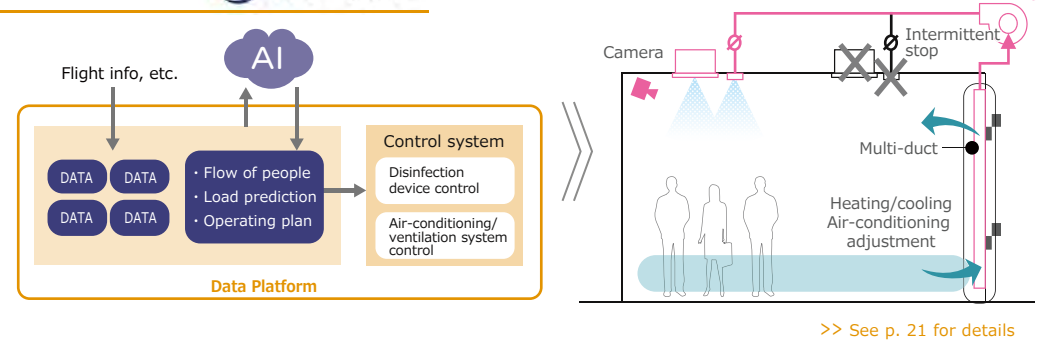
Human sensor



Seeking advanced solutions

Energy saving by smart air-conditioning

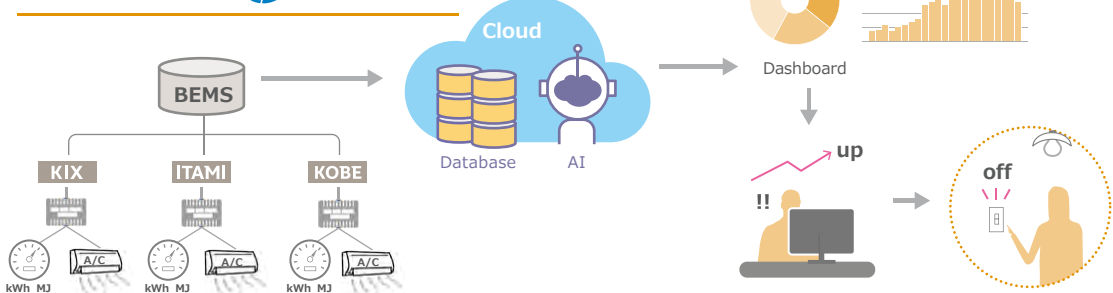
Joint research with 神戸大学



>> See p. 21 for details

BEMS x AI = Energy-efficiency

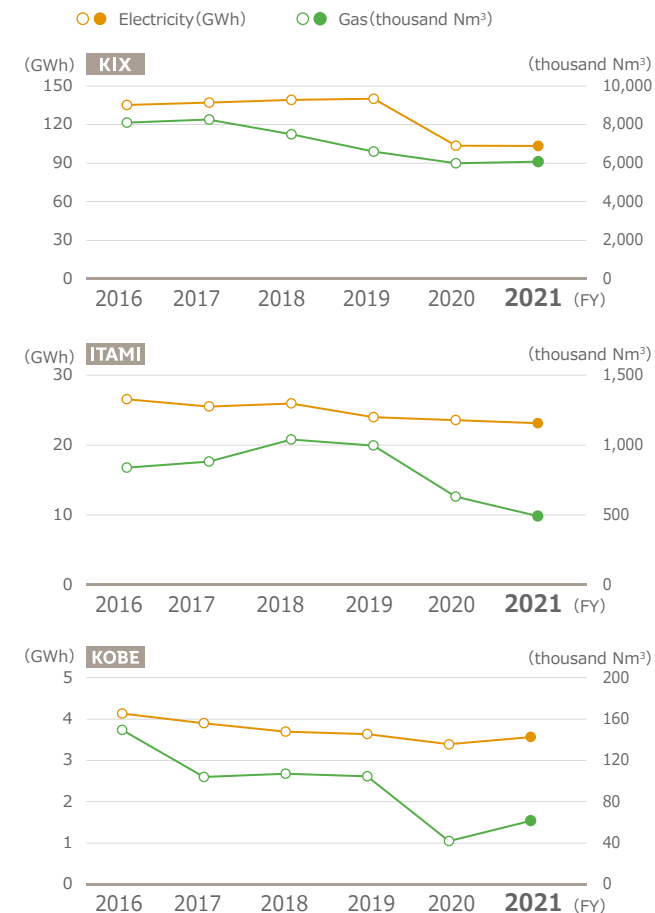
Joint research with 東京大学 THE UNIVERSITY OF TOKYO



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 2021, given the declining demand for international travel, KIX continued reviewing the scope of partial facility closure, although ITAMI and KOBE airports have recovered their operation to almost pre-crisis levels, reflecting a resurgence in demand for national airlines. Electricity and gas consumption in KIX for fiscal 2021 declined due to the COVID crisis. Meanwhile, although the operation of ITAMI and KOBE airports are almost back to 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 2021 period, electricity and gas consumption declined by around 10% and 40-60%, respectively. 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.

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.

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

Joint research with  神戸大学

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-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.



Energy-efficient transformer



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 when renovating the ITAMI terminal building, which reopened in August 2020. Meanwhile, we have been renovating the ceiling of the terminal building in KOBE in FY 2021 and the T1 renovation in KIX is underway and set to continue until 2026.



Apron LED lighting (ITAMI)



LED lighting in the terminal building (ITAMI)



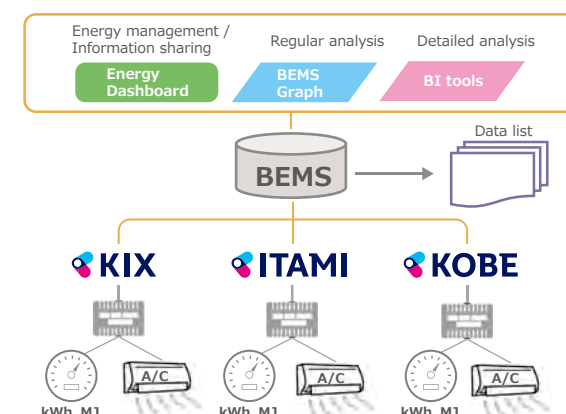
Brightness control by sensor (KIX)

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 in September 2021. The task of analyzing data, which was conducted from winter onward, allowed 250 or so tons of CO₂ to be reduced by improving the pump operation in air-conditioning systems. We will also introduce BEMS to the KOBE terminal building in 2022. We strive to optimize automatic BEMS operation by incorporating AI.



T2 Smart Air-Conditioning Demonstration Experiment

In July 2021, a demonstration experiment of an air-conditioning system promoting energy-saving and infection-control was launched in Terminal 2 at KIX.

The system helps control infections as well as reducing the energy used for air-conditioning by efficiently combining an anti-infection installation alongside the existing air-conditioning system. The infection-control technology eliminates viruses by directly applying UV light to circulating ambient air.

It also inactivates existing viruses by disseminating low-level ozone generated by the UV application. Finally, with energy-saving in mind, the system carefully controls the areas, timing and volume of air-conditioning on an as-required basis, based on the amount of human traffic and other indoor environmental conditions to ensure efficient air-conditioning.

Reducing the amount of building ventilation is generally an effective way to save energy.

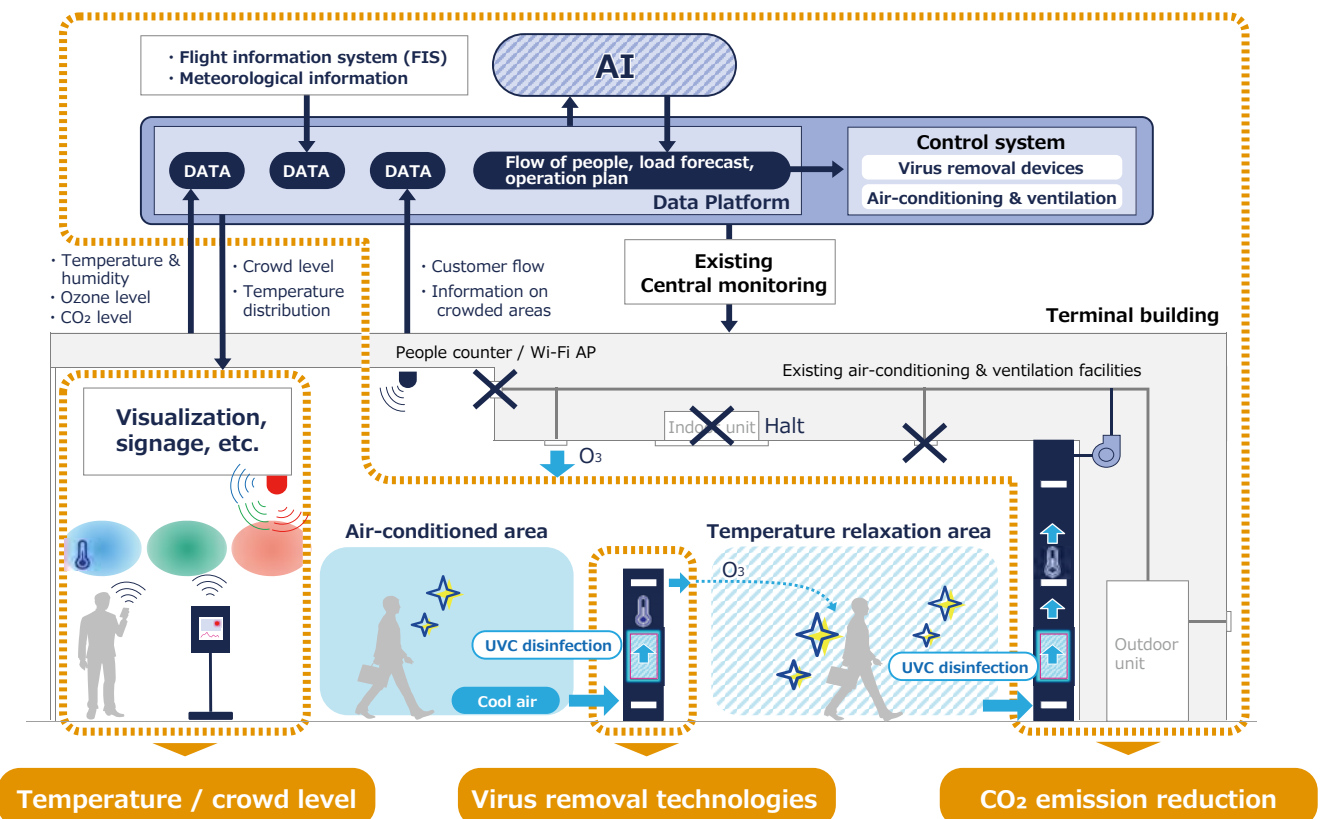
However, given the need for constant circulation of fresh air to prevent the spread of COVID-19, it is currently infeasible. Even so, this system manages to reduce ventilation, help control infection and save energy consumed by air-conditioning all simultaneously, by efficiently disseminating disinfected air over a wider space.

We strive to reduce the energy used for air-conditioning and virus infection risk by 50% and 95%, respectively, by operating these technologies and incorporating AI.

We have implemented this demonstration project commissioned by the Ministry of the Environment jointly with Kobe University.

Project outline

Project title	FY 2020 Demonstration project for accelerating the practical application of innovative, CO ₂ -saving infection control technologies
Issues	The need to visualize infection risk at the airport and develop & demonstrate innovative technologies allowing both air-conditioning and disinfection
Duration	FY 2021 - FY 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.

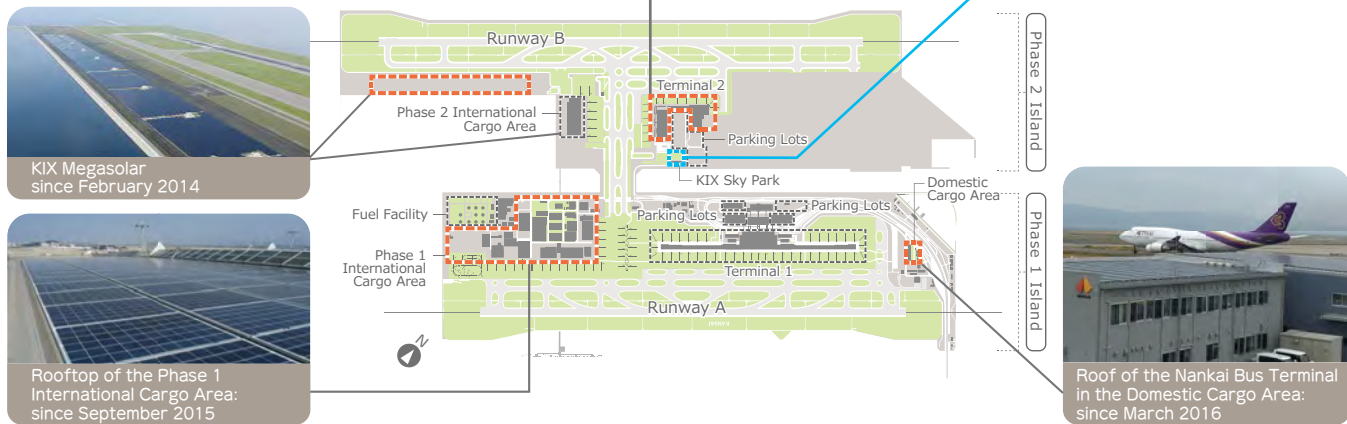
KIX

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. This clean energy installation now generates sufficient power to cover around 10% of total electricity use in KIX.

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 ITAMI

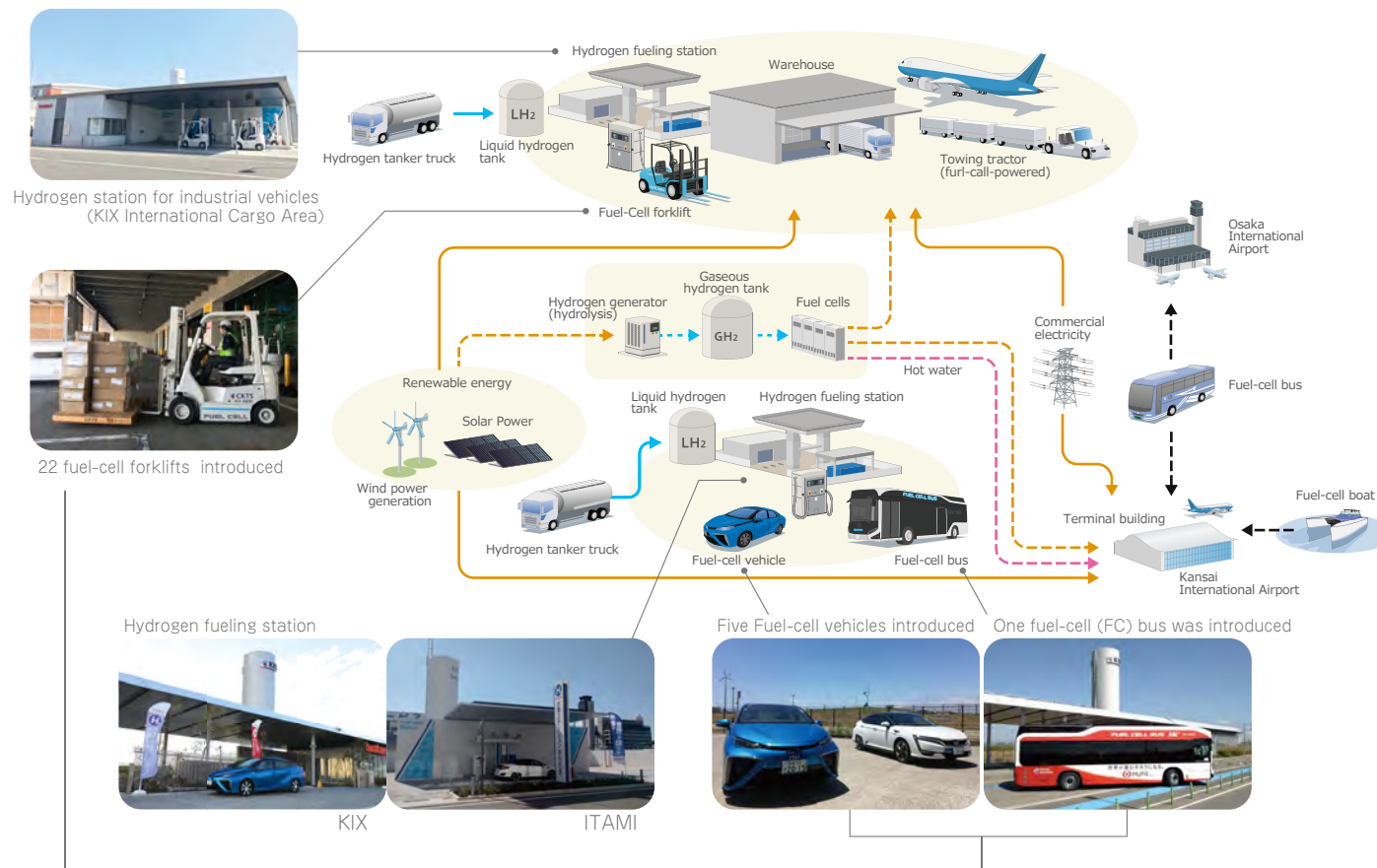
Hydrogen Energy

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 large-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 five FCVs 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 on a full scale.

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

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



[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

[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.

- 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.

1 Adaptation to climate change

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

The first introduction of hydrogen-powered FC bus

KIX

In March 2022, we 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. Kansai Airports also support this initiative to capitalize on hydrogen. In the runup to the 2025 Osaka-Kansai Expo, hydrogen is expected to attract more attention as a form of next-generation energy. This will also be the first time a fuel-cell bus service is available in Osaka.



A ceremony to mark the operational launch was held at the Iwatani Hydrogen Station on March 15, 2022. We had the chance to launch the bus in grand style, with many distinguished guests in attendance, including Mr. Yoshimura, the Osaka Prefectural Governor.

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



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.



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* 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 2022, within the Kansai Airports Group fleet, 59.4% of passenger vehicles and 26.5% of GSE vehicles were classed as eco-friendly. Alongside these measures, we will also keep calling on airport-based businesses to follow suit.



- * 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.
- 1) Gasoline vehicles
Emissions: 75% less than 2005 standards
Fuel economy: At least 2015 standards or 25% above 2010 standards
 - 2) Diesel vehicles
Emissions: Post new long-term regulation
Fuel economy: At least 2015 standards

Installation of EV Charging Stations

KIX ITAMI KOBE

Our three airports have a full complement of electric vehicle charging stations to encourage the use of eco-friendly vehicles. Given the expected rise in the number of EVs, we plan to roll out additional stations over time, to meet demand.



EV Charging Stations

1 Adaptation to climate change

Other Activities

Promoting the use of GPUs

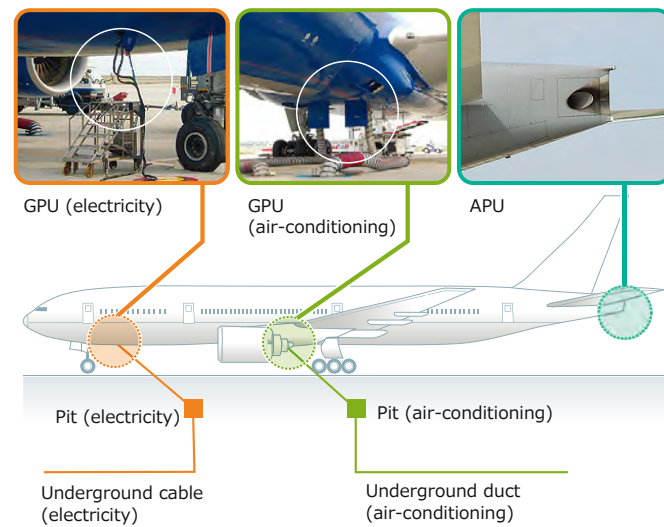
KIX ITAMI KOBE

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.

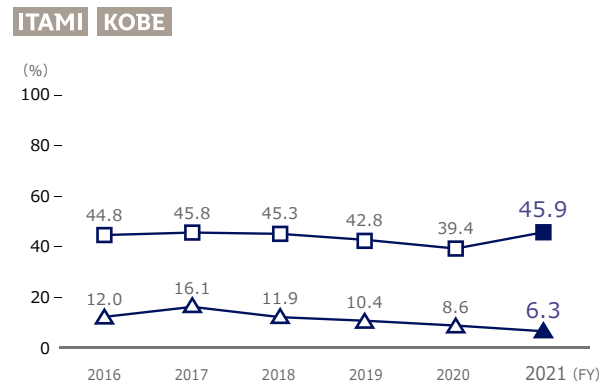
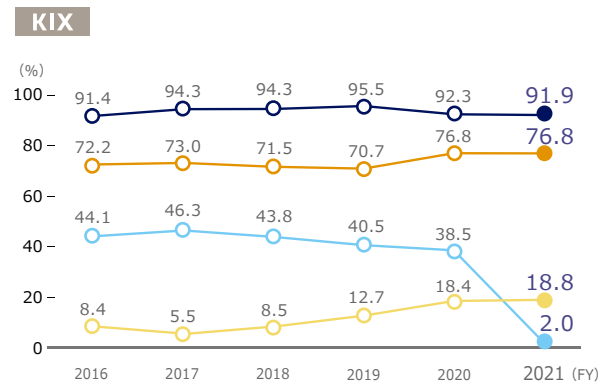
Outline of GPU



GPU utilization rate

These 16 airlines below (in alphabetical order), have a GPU utilization rate of over 95% in 2021.

- | | | |
|------------------|----------------------|----------------------------|
| Air China Cargo | Hawaiian Airlines | Sichuan Airlines |
| Air France | Japan Transocean Air | Thai Airways International |
| Emirates | Lufthansa Cargo AG | United Parcel Service |
| FedEx | Malaysia Airlines | Vietnam Airlines |
| Finnair | Philippine Airlines | |
| Garuda Indonesia | Qatar Airways Cargo | |



Japanese airlines: ● F S C ● L C C
Foreign airlines: ● F S C ● L C C

* F S C: Full Service Carrier
* L C C: Low Cost Carrier

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

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

To utilize Sustainable Aviation Fuel (SAF)

KIX ITAMI KOBE

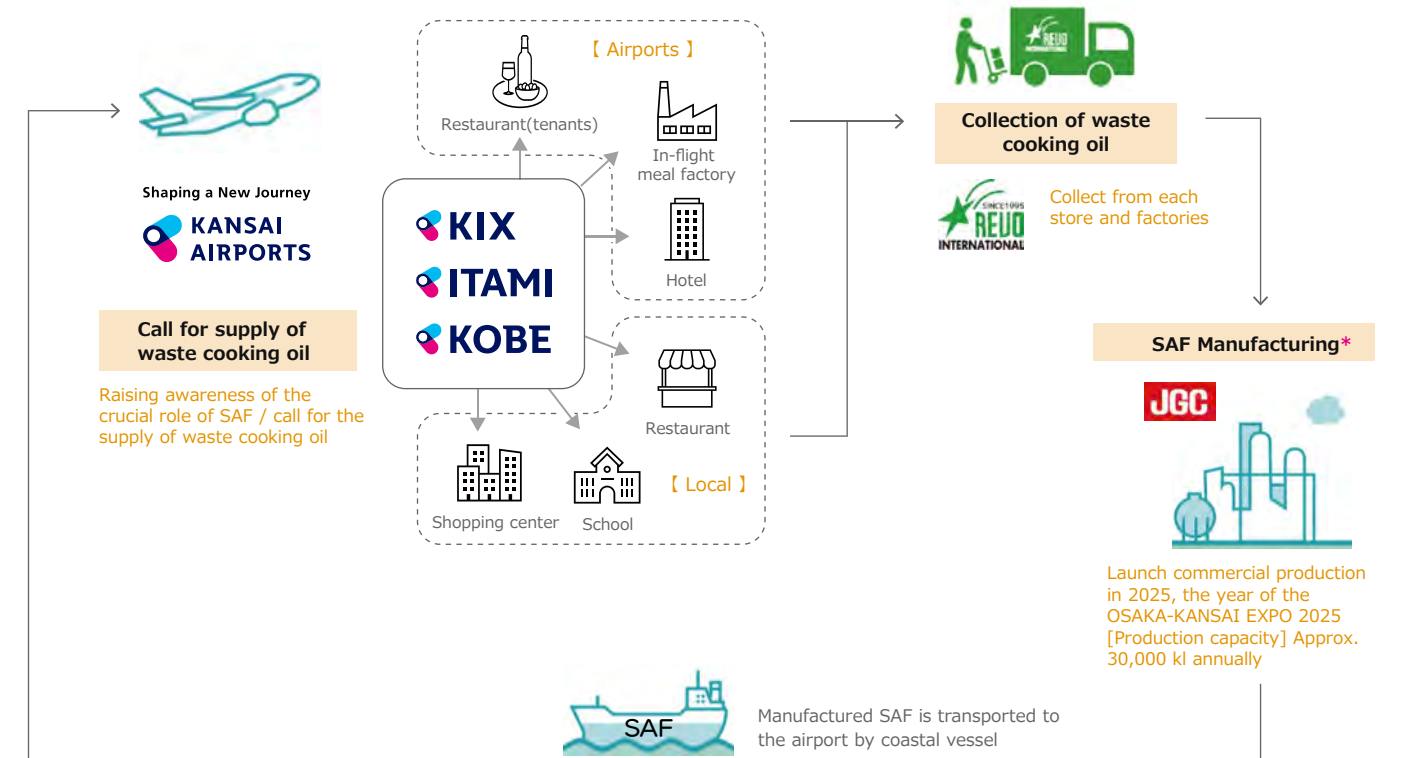
Since aircraft generate the majority of CO₂ emissions associated with airports, each airline has also introduced low-emission aircraft when upgrading. Given the global need for airlines to minimize CO₂ emissions, demand for Sustainable Aviation Fuel (SAF)* is climbing ever higher. In Japan, a stable 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.

* 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



KANSAI AIRPORTS KANSAI AIRPORTS

JGC JGC HOLDINGS CORPORATION

REVO INTERNATIONAL INC. REVO INTERNATIONAL INC.

* Joint venture with Cosmo oil and REVO International

2

Resource Usage

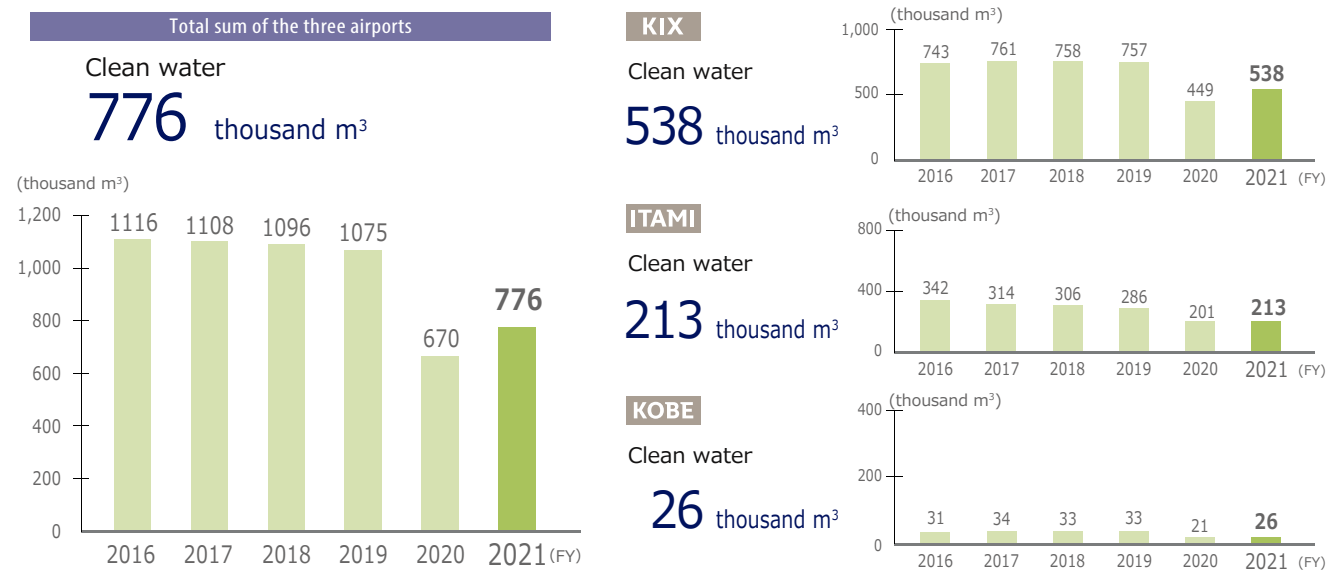
KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport

Reduction of Clean Water Consumption



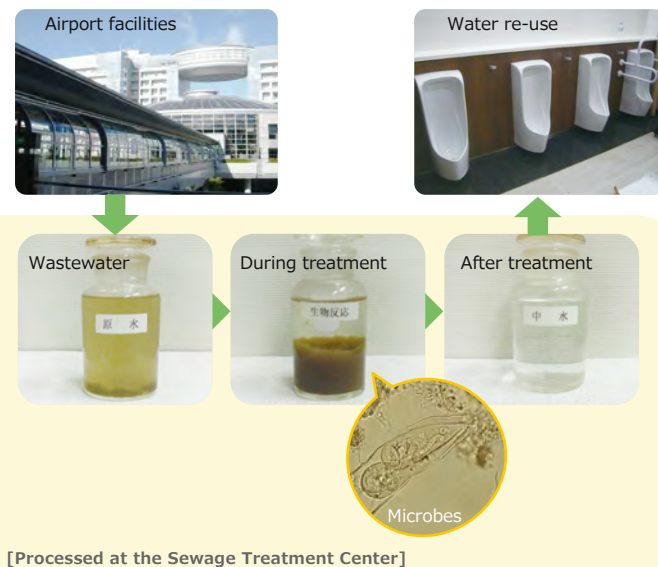
We have initiated various efforts to reduce clean water consumption at our airports. The total consumption figures for the three airports in fiscal 2021 declined at the same level as the previous year, reflecting a significant decrease in the number of passengers due to COVID-19. At KIX and KOBE, we 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.

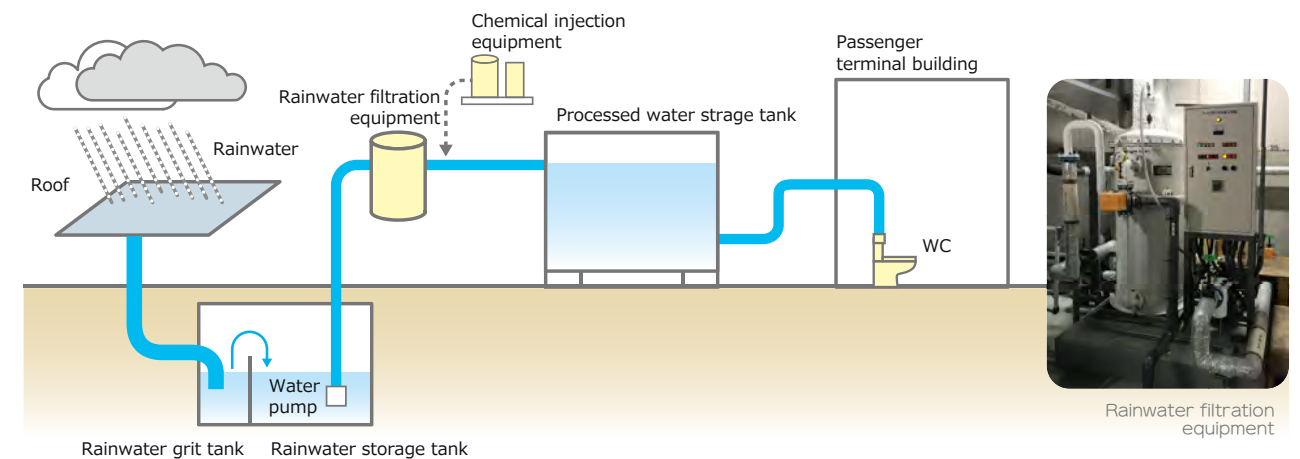


[Processed at the Sewage Treatment Center]

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

Kansai Airports is spearheading a number of initiatives to conserve water, including installing low flowtoilets when remodeling terminal buildings. In FY 2020, 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.

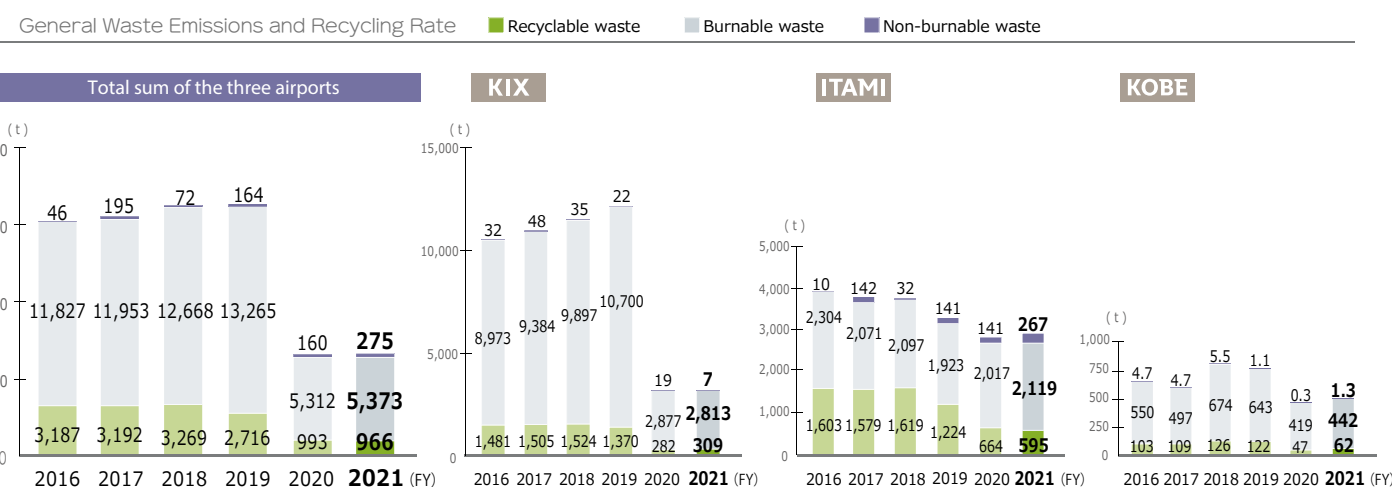


2 Resource Usage

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 2021, 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 will continue striving to minimize the amount of waste generated and further boost our recycling rate by considering how best to handle food waste and how to recycle waste plastics and grass clippings.



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

ITAMI
Annual amount of general waste generated **2,981 t** Recycling rate for general waste **20.0%**

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, two airport shops are 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 generated **505 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)

Introducing the use of a food waste disposer in restaurants

KIX ITAMI
As part of efforts to reduce and recycle waste, we introduced a food waste disposer in KIX's restaurant and ITAMI's restaurant "Oasis". Although the restaurant in KIX is was temporarily closed due to the COVID-19 crisis, the restaurant it reopened in June 2022 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.



Reducing waste and recycling

KIX
Annual amount of general waste generated **3,129 t** Recycling rate for general waste **9.9%**

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.



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 planning how to propose initiatives to the KIX Airline Operators Committee (KIXAOC) to help airlines mitigate their environmental impacts.

Towards 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, eco-friendly and smart 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

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 2021, 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

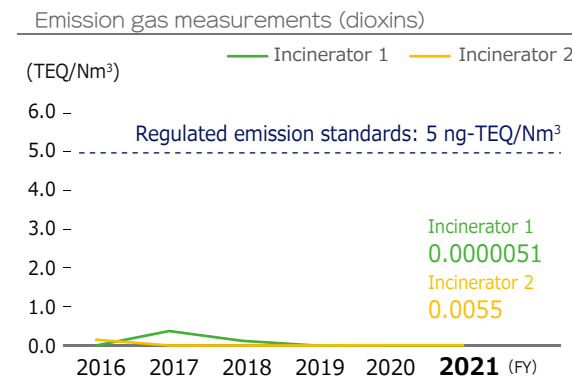
The annual number of complaints and inquiries peaked at 263 in fiscal 1998 when new flight paths were introduced in airspace over the Osaka Prefecture region, and since then have been on a declining trend. In fiscal 2021, the airport received a total of 20 complaints and inquiries.

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.



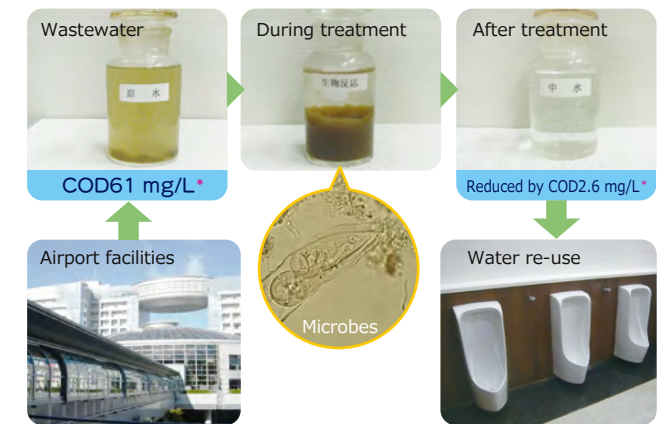
Waste Disposal Center



Advanced treatment of general wastewater

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.



* Monthly average in August 2021

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 2021 (daily average)

General wastewater: 990 m³ Industrial wastewater: 94 m³



Sewage Treatment Center



Sand filtration



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.



* The above map is a conceptual diagram of flight paths. Not all aircraft fly along this line.

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

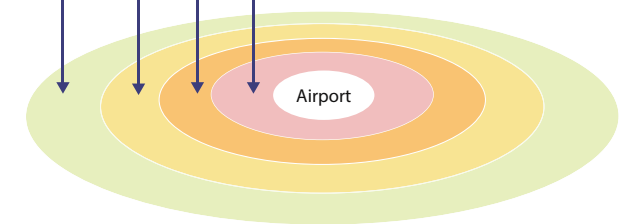
- Financial assistance for soundproofing of housing

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.

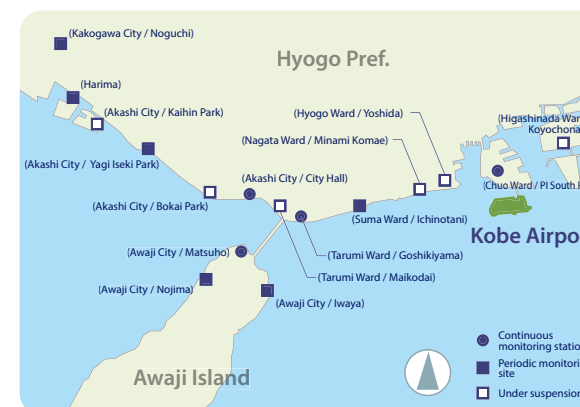
Complaints, inquiries, and responses

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 102 complaints/inquiries about aircraft noise and flight paths in fiscal 2021.

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 2021, 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 32 complaints and inquiries about aircraft noise and flight paths in fiscal 2021.





Preserve Biodiversity

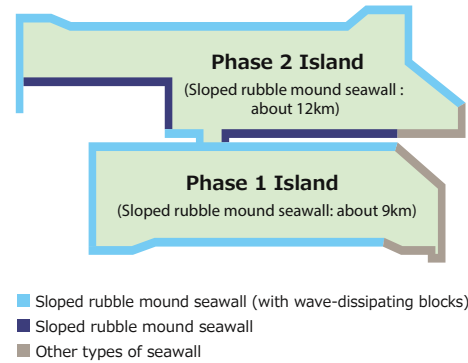


Establishing Seaweed Beds

KIX

At Kansai International Airport, we take an active approach to establishing vibrant seaweed beds surrounding the airport island to provide additional habitat for marine life in Osaka Bay. At the time of the airport island construction, sloping rock-fill seawalls were primarily used and efforts were put into developing the reclaimed shallow areas. As a result, there is rich growth of seaweed around the airport island which serves as habitat for various species of fish and shellfish. At present, 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.

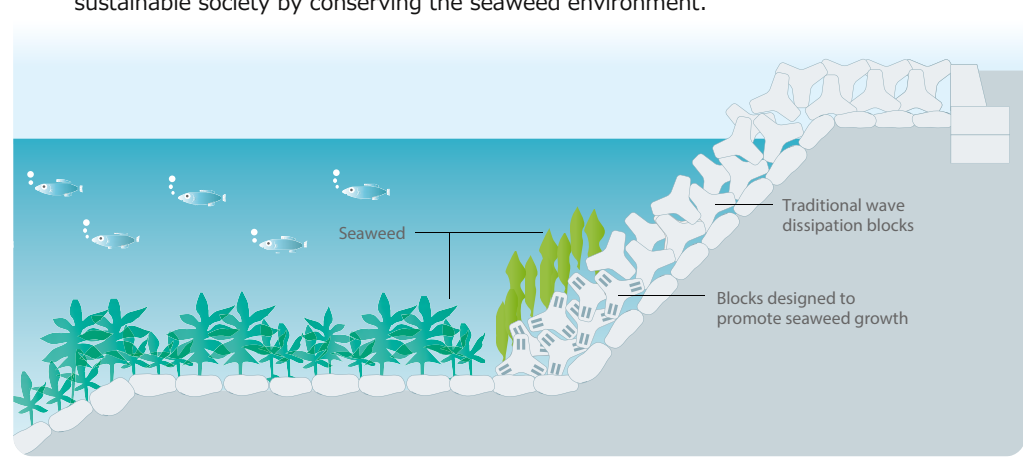
In the monitoring survey conducted in March 2022, we observed **54 hectares of seaweed bed area** which is equivalent to about 20% of all seaweed bed areas in the Osaka Bay. To conserve preferable seaweed beds, we consider it important to consider/carry out measures taken in accordance with changes in the surrounding environment and circumstances, as well as regular monitoring. Recently, the key role of blue carbon incorporated in seaweed beds, shallow areas and other marine ecosystems has been acknowledged as one of the effective CO₂ sink-enhancing measures to achieve a decarbonized society. Accordingly, we continue to help build a sustainable society by conserving the seaweed environment.



Ecklonia cava



Sargassum filicinum and others

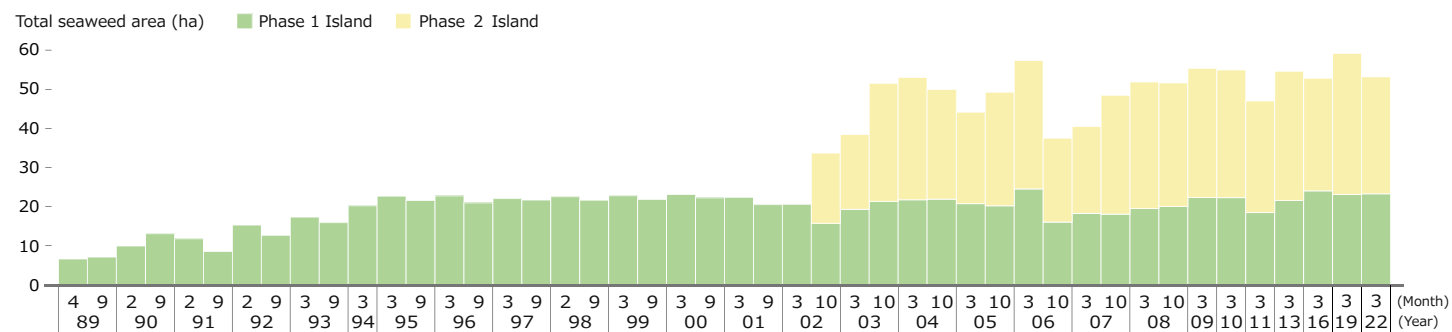


Sloped rubble mound seawall



Juvenile rockfish gathered in the Garamo field

Extent of seaweed bed



KIX

Seaweed bed recovery installed on wave-dissipation blocks

In response to the damage caused by Typhoon No. 21 in 2018, wave-dissipation blocks were installed on the south and east sides of the first-phase airport island as part of disaster-prevention measures. Since it was envisaged that some existing seaweed beds would be lost in the process, we launched a seaweed bed recovery project to restore the seaweed environment as early as possible after the block installation; initiating measures as early as FY 2019, a whole year before starting installation. For three years until fiscal 2021 when the block installation was completed, we proceeded with the project commensurate with work progress and the life cycle of seaweed taking all relevant measures into consideration.

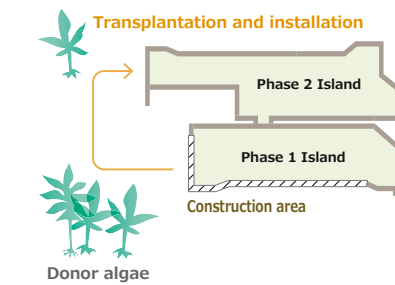
[FY 2019]

Environmentally friendly blocks were selected to promote seaweed growth. The installation works not only boosted the disaster-prevention functions but also helped create the seaweed environment. We also considered the marine environments by using all-natural materials to transplant donor algae.



Donor algae from Ecklonia cava

Transplantation of Ecklonia cava (From September to October 2019)



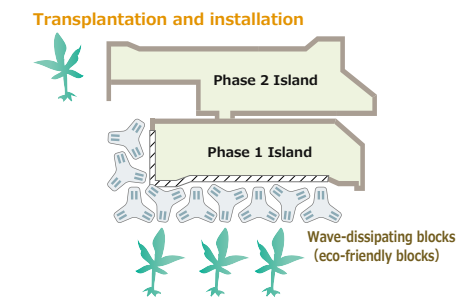
Transplantation

[FY 2020 - FY 2021]

Ultimately aiming to secure seaweed bed areas under construction and pave the way for seaweed of the next generation to thrive, we collected donor algae of Ecklonia cava (a brown seaweed native to Japan) inhabiting seawalls in areas housing wave-dissipation walls and transplanted them to the phase 2 airport island.

We then seeded the installed blocks using donor algae from Ecklonia cava and Sargassum inhabiting the installation site for the wave-dissipation blocks. As well as using eco-friendly blocks designed to promote seaweed growth, the work we performed alongside them not only involved striving to improve the disaster-prevention functions but also to create a seaweed bed environment. We used all-natural materials to transplant donor algae and promote an eco-friendly project. In 2020 we also tried to provide seeds using biodegradable spore bags. Despite the seaweed bed recovery being impacted by external factors and involving repeated trial and error, we promote our activities utilizing the PDCA cycle. During a September 2021 survey, Ecklonia cava was observed on the new wave-dissipation blocks. However, 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.

Transplantation of Ecklonia cava (October 2019, September 2021)



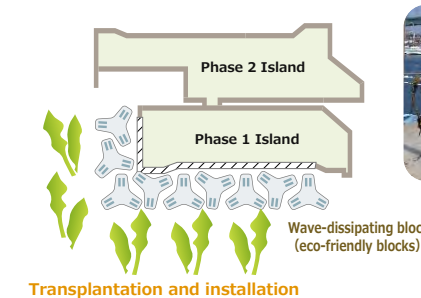
Providing seeds using biodegradable spore bags

Transplantation and installation



Ecklonia cava grows on new blocks

Transplantation of Sargassum (March 2020, March 2022)



Donor algae from Sargassum

Transplantation and installation



Transplantation

3 Environmental Harmony

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 improve the flower spots.

Moreover, on the phase 2 airport island, we have created areas for plants such as seashore pink, coastal moneywort, shore bindweed and beach vitex to restore and protect the shoreline vegetation of the Osaka Bay area.

The airport has also created a large-scale green space over approximately four hectares called KIX Sky Park that is open to the public to allow visitors enjoy watching aircraft taxi, take off and land.



Flower spots

KIX Sky Park

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

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 wide-open 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

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.



Rooftop deck

Greening to prevent heatstroke

KIX

As part of efforts to improve the heat environment within outdoor spaces, March 2021 saw us install 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.



Planters



Dry mist device

4

Environmental Management

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



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.

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 Airport Environmental Statement. 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 established a webpage containing environmental information on our website that includes details of environmental monitoring, real-time noise information, reports and events. ITAMI's website provides information about its environmental programs, including noise abatement subsidies offered to businesses and residents near the airport.

KIX has installed monitors in the terminal buildings and Observation Hall to display the status of electricity generation (KIX Megasolar) and provided an environment area in the Observation Hall to broadly share our environmental initiatives.



Environmental learning events

KIX

Learning SDGs linking Hawaii and Japan

On May 5, 2022, Kansai Airports collaborated with Hawaiian Airlines to organize an Exciting Kansai Airport Tour Plan – Hawaiian Airlines Special Flight, in which elementary schoolchildren and their parents and guardians participated. One of the program contents included an SDGs seminar to introduce our sea-cleaning activity at Kansai Airports.



KIX: Parent-child Environmental Tour

On August 5, 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 mega solar power plant, hydrogen station, sewage treatment center and other facilities.



4 Environmental Management

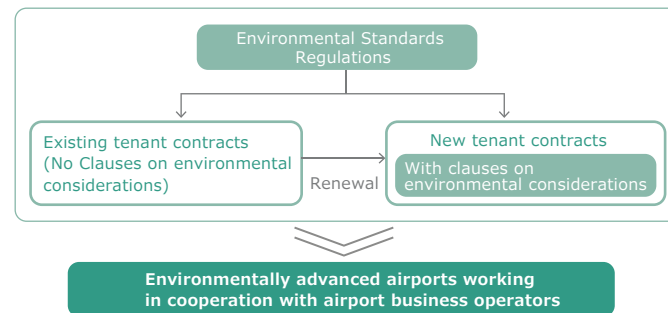
KIX : Kansai International Airport ITAMI : Osaka International Airport KOBE : Kobe Airport

Cooperation with airport-related businesses

We cooperate with airport-related businesses and domestic/international airports and reflect these efforts in our airport activities.
The COVID-19 crisis made FY 2021 persistently challenging for cooperation. Even so, we continued striving to share information and dialog via online meetings.

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.



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.

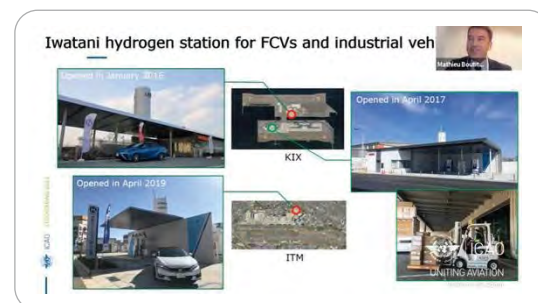
Participation in Airports Council International (ACI)

Kansai Airports is a member of Airports Council International, an organization representing 717 organizations that manage 1,950 airports in 185 countries and regions worldwide (at the time of writing). It is also a member of the ACI Asia-Pacific Regional Environment Committee. This committee met for the 14th and 15th times in March 2021 and March and April 2022, respectively, in virtual online events, at which attendees actively discussed airport environmental initiatives.
In seminars held during the committee and stakeholder meeting hosted by ACI World, the Kansai Airport Group presented its decarbonization efforts centering on the introduction of renewable energy and the use of hydrogen and shared case studies with members and stakeholders.

Presentation at the ICAO Stocktaking Seminar

During the ICAO* Stocktaking Seminar held in September 2021, the Kansai Airport Group showcased a range of initiatives centering on a roadmap towards decarbonization and the use of hydrogen energy in airports and shared information with airport-related and aviation-related stakeholders.

* 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.



Presentation during a dialog session of a platform to bring the Kansai Hydrogen Supply Chain Initiative to fruition

Kansai Airports is a member of a platform to materialize the Kansai Hydrogen Supply Chain Initiative which was established to share issues and consider their solutions and specific hydrogen implementation under the collaboration between businesses and supporting organizations to materialize the Kansai Hydrogen Supply Chain Initiative. During a FC forklift dialog session held in March 2022 to promote information-sharing, discussion and interaction among stakeholders, we provided participants with our cases of introducing and utilizing FCFL at KIX.

Partnership with the government

Participation to the "Priority Survey Airport" program

In July 2021, the Civil Aviation Bureau of the Ministry of Land, Infrastructure, Transport and Tourism invited a public offering and selected "Priority Survey Airport" to advance efforts to reduce CO₂ emissions from airport facilities and vehicles as well as engaging in specific consideration to make airports renewable energy bases to promote their decarbonization. KIX, ITAMI and KOBE operated by the Kansai Airports Group were selected, and case studies were conducted to verify our environmental activities.

In-house environmental education

Environmental Ambassador Initiatives

Kansai Airports Group has introduced Environment Ambassador Initiatives to raise the environmental awareness of all employees, Environmental Ambassadors are members assigned by the individual sections of each group company who oversee the task of sharing the knowledge and insights they have obtained through initiatives with all other employees.
We will continue awareness-raising activities, including regularly disseminating environmental information and creating learning content to help evangelize our environmental initiatives.



Environmental initiatives through an In-house Award Program

We invited ideas for the environment from Kansai Airport Group employees and commended the best of them. Over 50 wide-ranging proposals were received, the best of which were honored with the CEO Prize, Co-CEO Prize and other prizes. Award-winning ideas are being brought to fruition by a project team. Some, such as introducing internal carbon pricing (ICP), have already been realized.



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
	9	Kansai International Airport (KIX) opens for service (Sep 4). Monitoring begins: Aircraft noise, low-freq. air vibration
1995	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
2001	11	International Airport Symposium 2001 hosted, Phase 2 airport island seawall completed
	10	KIAC adopts Regulations Governing the Use of Waste Processing Facilities
2002	12	<ul style="list-style-type: none"> 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	Full-scale 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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
	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
2014	1	KIX announces event for EAAA Environmental Relay
	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
2014	7	<ul style="list-style-type: none"> "Megasolar Observatory" and "Visualization Monitor" start operating Small wind turbine power generator installed—a first for any Japanese airport
	2	Trial operations launched for first fuel-cell forklift at any airport in Asia, plus demonstration trial of hydrogen grid
2015	8	"Hydrogen and Fuel Cell" Family Eco Classes held
	9	Megasolar system starts operating on roof of air freight warehouse in international freight zone
	10	Exhibit at Biwako Environmental Business Exhibition 2015
	12	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Awarded 2015 Kansai Eco Office Grand Prize from Union of Kansai Governments Two new model fuel-cell forklifts added for demonstration trials
	4	<ul style="list-style-type: none"> Kansai Airports begins operating Kansai International Airport Four more regular chargers installed for electric vehicles in parkade
	6	<ul style="list-style-type: none"> 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	<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	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
	12	<ul style="list-style-type: none"> • Airport Carbon Accreditation (ACA) Level 3 obtained • Exhibit at 2018 EcoPro International Exhibition on Environment and Energy • Holds the Fuel-Cell Bus Trial Ride in KIX
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 • A basic agreement on cooperation concluded to commercialize Sustainable Aviation Fuel (SAF)

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
2013	10	Successfully produces fertilizer made of grass clippings from the airport's landing strips
	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)
2016	10	Receives the Chairman's Prize at the 2014 Reduce, Reuse, Recycle Promotion Merit Awards (for recycling grass clippings as fertilizer and feed)
	4	Kansai Airports begins operating Osaka International Airport and Kansai International Airport
2017	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
	5	Constructs warehouse for storing grass clipping feed

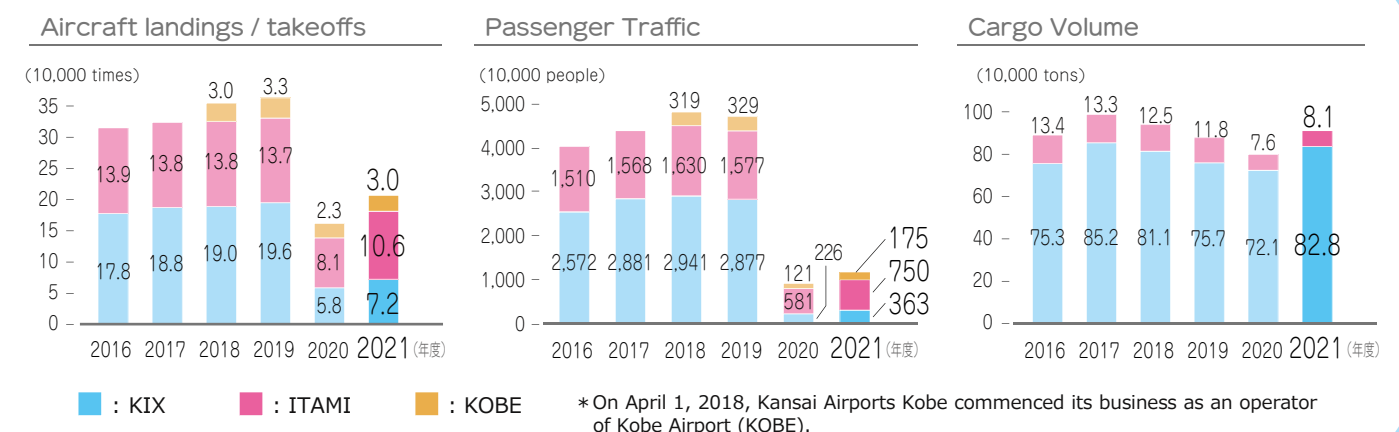
ITAMI : Osaka International Airport (2/2)

Year	Mo.	Event
2017	6	Holds idling stop campaign
	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
2020	10	One rapid charger is installed
	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.
2022	11	Airport Carbon Accreditation (ACA) Level 4 obtained
	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

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
2020	5	The limit on aircraft movements for regularly scheduled flights is expanded to 80 movements per day
	3	Operating hours extended to 16 hours between 7:00 am and 11:00 pm
2021	4	Plastic shopping bags used in shops directly managed by the Kansai Airports Group are replaced with paper bags
	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.
2022	11	Airport Carbon Accreditation (ACA) Level 4 obtained
	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)

Number of passengers and flights

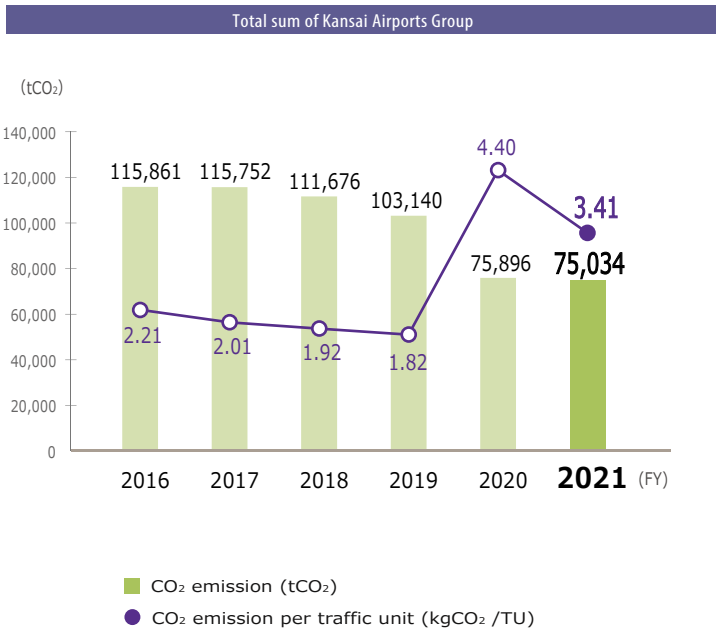


Reference Data

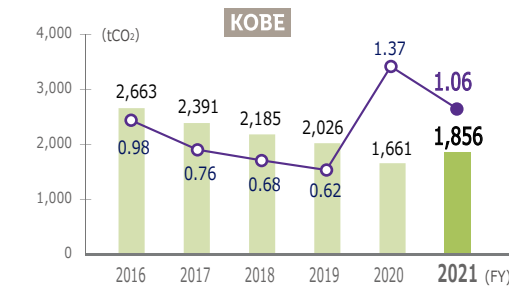
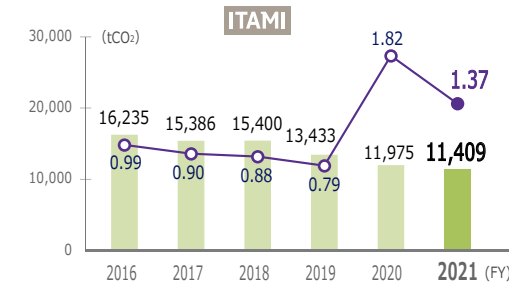
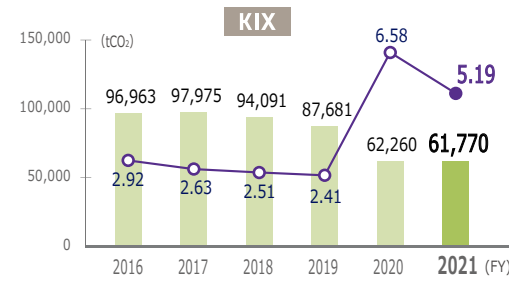
Following the spread of COVID-19 infections, 2021 saw domestic and international travel, air passenger numbers and flights in KIX, ITAMI and KOBE decline even further from 2020 compared to 2019 and pre-pandemic. Eventually, CO₂ emissions, clean water consumption and general waste amount have decreased while the units of traffic and amount per passenger remain high. 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)

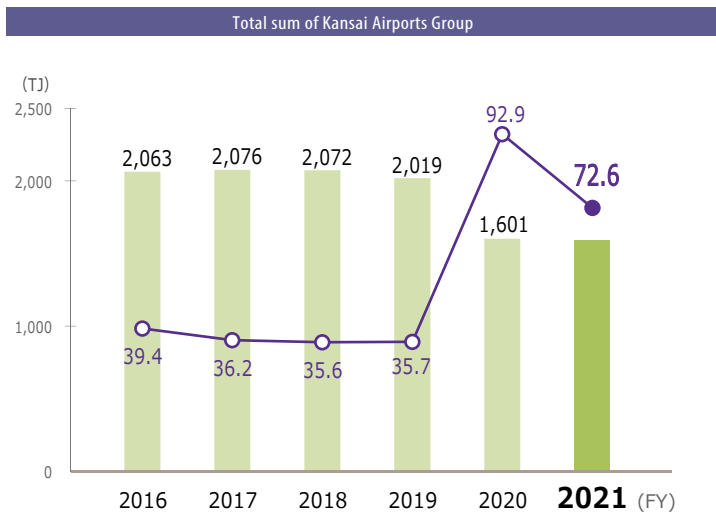
CO₂ emissions of Kansai Airports Group



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.

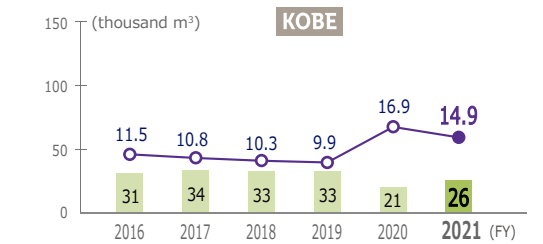
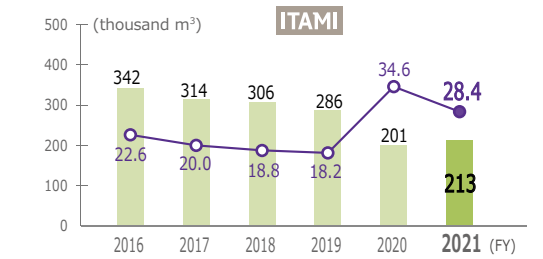
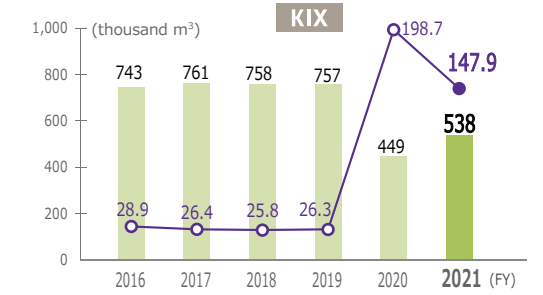
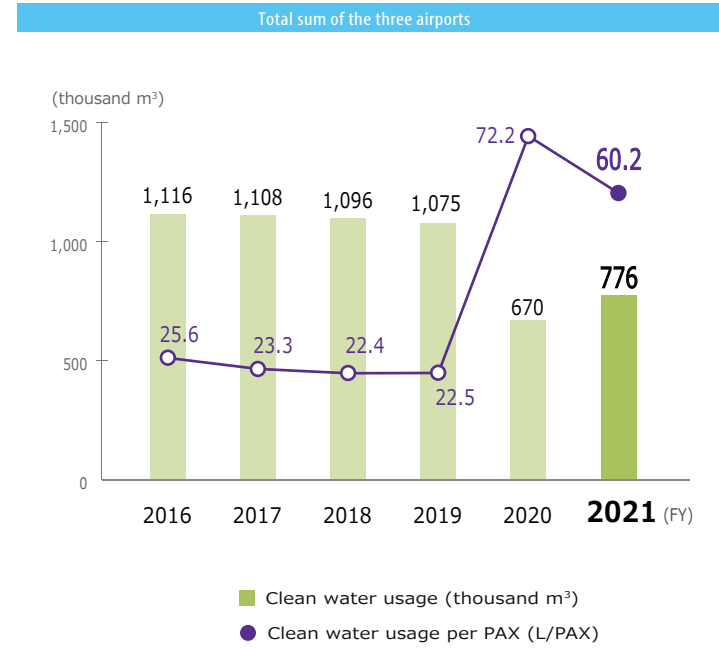


Energy usage of Kansai Airports Group



Note:
 • Terajoules (TJ) : 1 TJ = 1012 J
 • Megajoules (MJ) : 1 MJ = 106 J
 • Traffic unit (TU) : Passengers (persons) + cargo volume (per 100 kg)
 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

