身近で、こころ満たす空港

ITM

OSAKA INTERNATIONAL AIRPORT

Osaka International Airport

Eco-Airport Report *2016*

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1. Basic policies of the ITM Environmental Plan

■ Eco-Airport

An eco-airport can be defined as an airport that implements measures to protect the environment and create a good environment at the airport and in the surrounding region. In concrete terms, such measures can include conserving energy (reducing CO_2 emissions) and water, reducing waste, and taking other environmental measures in region of the airport.

Reference: Civil Aviation Bureau (http://www.mlit.go.jp/common/001031696.pdf, in Japanese)

■ Outline of ITM Environmental Plan

Osaka International Airport established the ITM Eco-Airport Council based on the eco-friendly airport concept. Its members are airport-related partners (35 businesses and 3 municipal governments). The Council produced the ITM Environmental Plan in March 2007 and revised it in March 2012. The Plan covers the current status of each environmental parameter, environmental targets, concrete measures, implementation schedules, and more, and aims include conserving energy (reduce emissions CO2 emissions) and water, reducing waste at the airport, etc.

Outline of ITM Environmental Plan

- Target year: FY2015
  (Targets are for Year 10, with Year 1 being the year the Plan was adopted.)
  - An interim assessment was done based on data to FY2010. A final report is planned for FY2016 (a year after the target year).
- Target activities: All activities at the airport, including activities of people, aircraft, vehicles, monorails, facility operations, and more
- Area covered: ITM airport and region
- Environmental parameters: air, energy, noise, water, soil, waste, natural environment, other
- Assessment and reporting: Environment report is to be released every year, covering status of Plan implementation status and assessments.

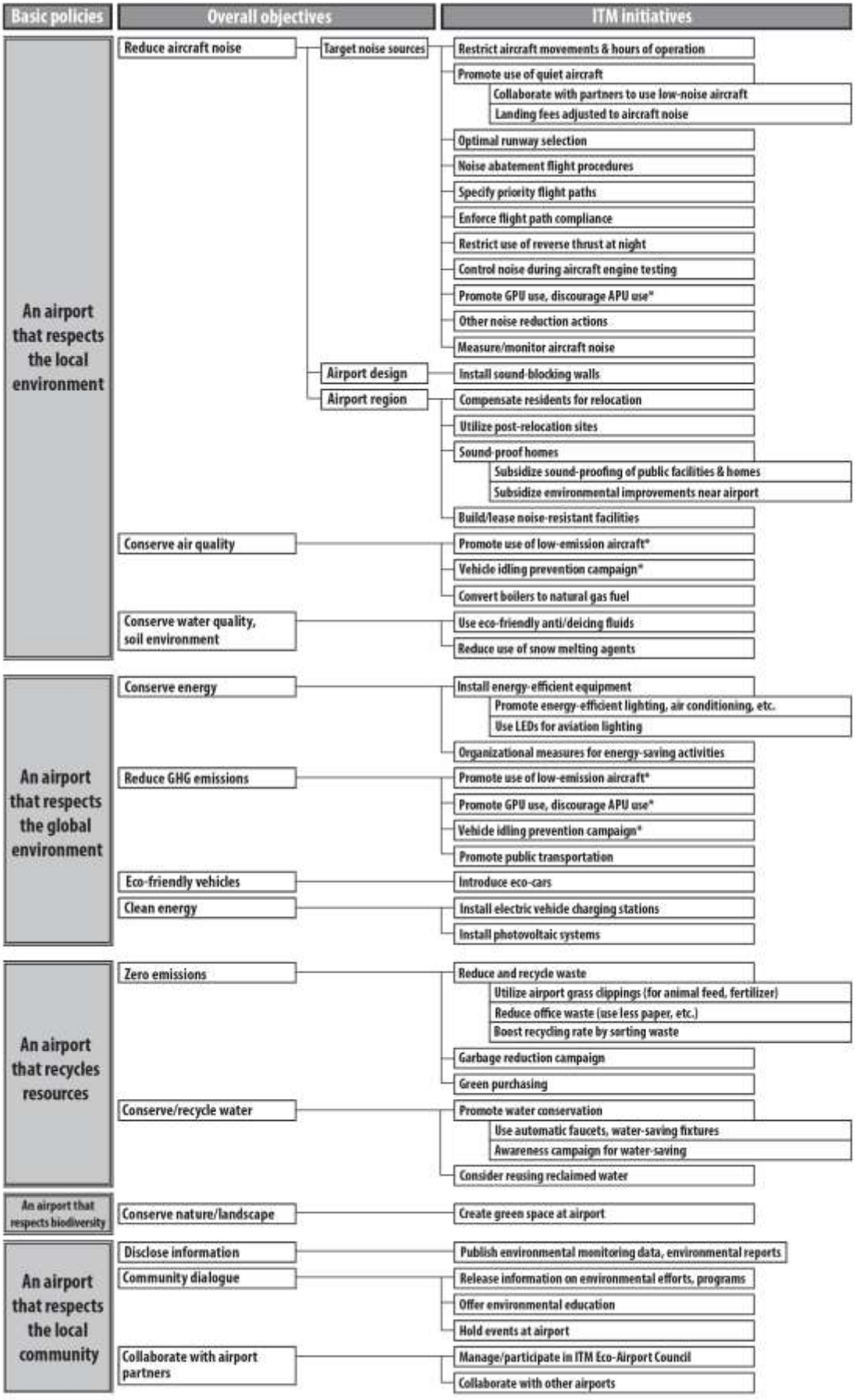
■ Measures by ITM in the surrounding region

For years, ITM has been taking measures to reduce aircraft noise in the region around the airport and be “an airport that respects the local community,” including identifying noise sources and reducing the impacts of noise. These measures include soundproofing upgrades for housing, projects to expand greenspace, monitoring and reporting of data on aircraft noise, and more.

■ Evolution of ITM Environmental Plan

In July 2012, Kansai International Airport (KIX) and Osaka International Airport (ITM) were integrated, and a decision was also made to integrate their eco-airport policies. As part of efforts to make KIX an eco-airport, the airport’s third environmental plan was developed, dubbed the “Smart Island Plan.” It covers environmental measures that can be implemented sustainably as an “environmentally-advanced airport.” The Smart Island Plan includes measures and environmental targets based on the five basic policies shown below.

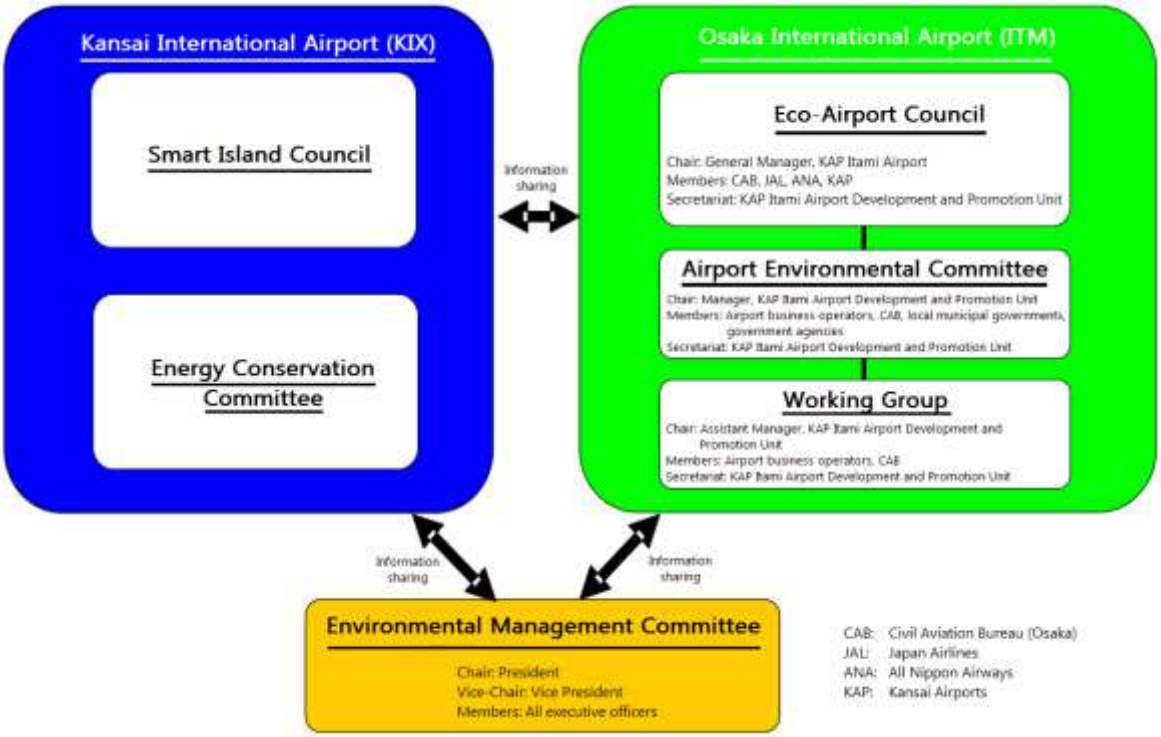
■ Structure of five basic policies and specific initiatives



Note: Asterisk (*) indicates an initiative that applies to more than one objective.

2. Environmental management structure

To implement the Eco-Airport Plan, the Osaka International Airport Eco-Airport Council was created, with the Osaka Civil Aviation Bureau (Ministry of Land, Infrastructure, Transport and Tourism), airline companies, and other airport businesses. Its function is to establish environmental targets and promote environmental activities in a unified way. The environmental management structure is designed as shown below.

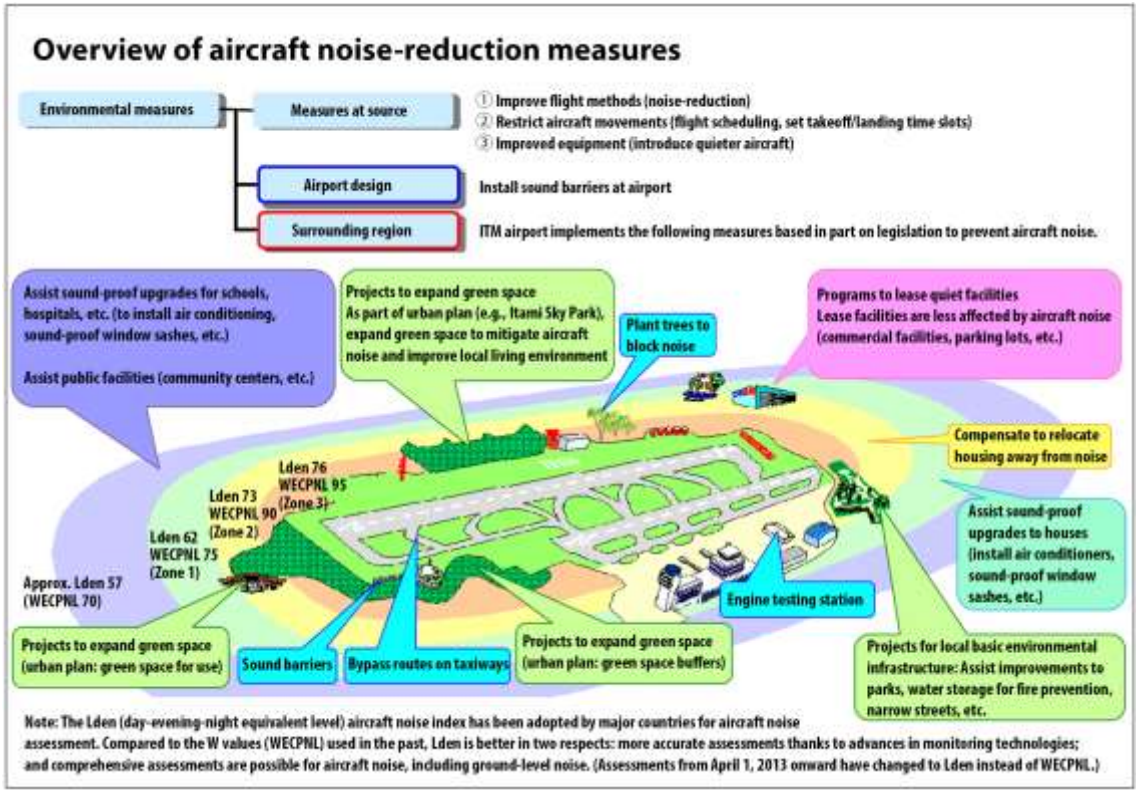


3. Environmental initiatives

(1) An airport that respects the local environment

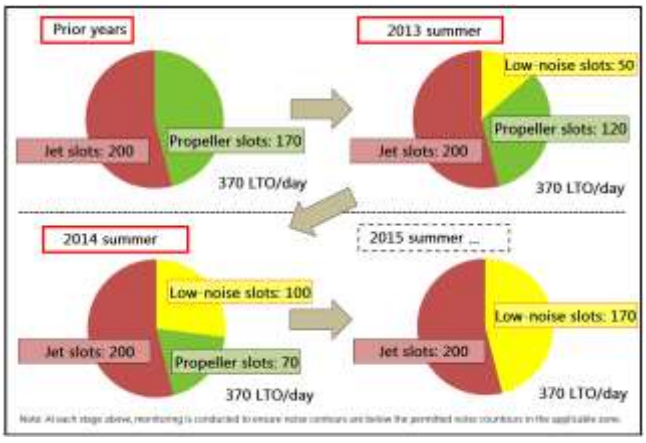
Reducing aircraft noise

ITM implements various measures to reduce aircraft noise, including restricting the number of aircraft movements and hours of operation time, as well as encouraging the use of quieter aircraft, establishing flight routines that mitigate noise impacts, and constantly monitoring aircraft noise.



■ Measures at noise source

(Restricting flight movements and hours of operation)



Until further notice, KIX restricts aircraft moments (landing-takeoff cycles) to 370 per day, in consideration of noise and other impacts of aircraft on the region around the airport. In addition, starting with the summer schedule of 2015, the shift was made toward quieter propeller aircraft, with a ratio of 200 slots for jets versus 170 for low-noise aircraft, increasing convenience. We are appealing to airline companies to introduce low-noise aircraft to make use of these slots. In addition, airport operation is 14 hours per day, from 7 a.m. to 9 p.m., and we strive to keep operations within those hours, in cooperation with airline companies.

Osaka International Airport gets top rank for on-time performance two years in a row (OAG Punctuality League 2015)

OAG gave Osaka International Airport the top rank for on-time performance in the small airports worldwide category of the OAG Punctuality League 2015 (see notes 1, 2, 3). This is the second year ranking as best airport, with on-time performance increasing from 93.2% in 2014 to 93.85% in 2015. A trophy and certificate were presented at ITM on February 18, 2016.

Notes
1. OAG Aviation Worldwide Limited: A U.K.-based air travel intelligence company that gathers and publishes data on worldwide aviation, including the Official Airline Guide.
2. OAG Punctuality League 2015: Rankings are calculated as the ratio of departure and arrival flights with less than 15 minutes of delay from scheduled times. On-time performance is ranked by category, based on 2015 world flight data.
3. Small airports: Airports with less than 10 million scheduled departure seats per annum.

Source: New Kansai International Airport news release February 25, 2016.

Encouraging the use of quieter aircraft

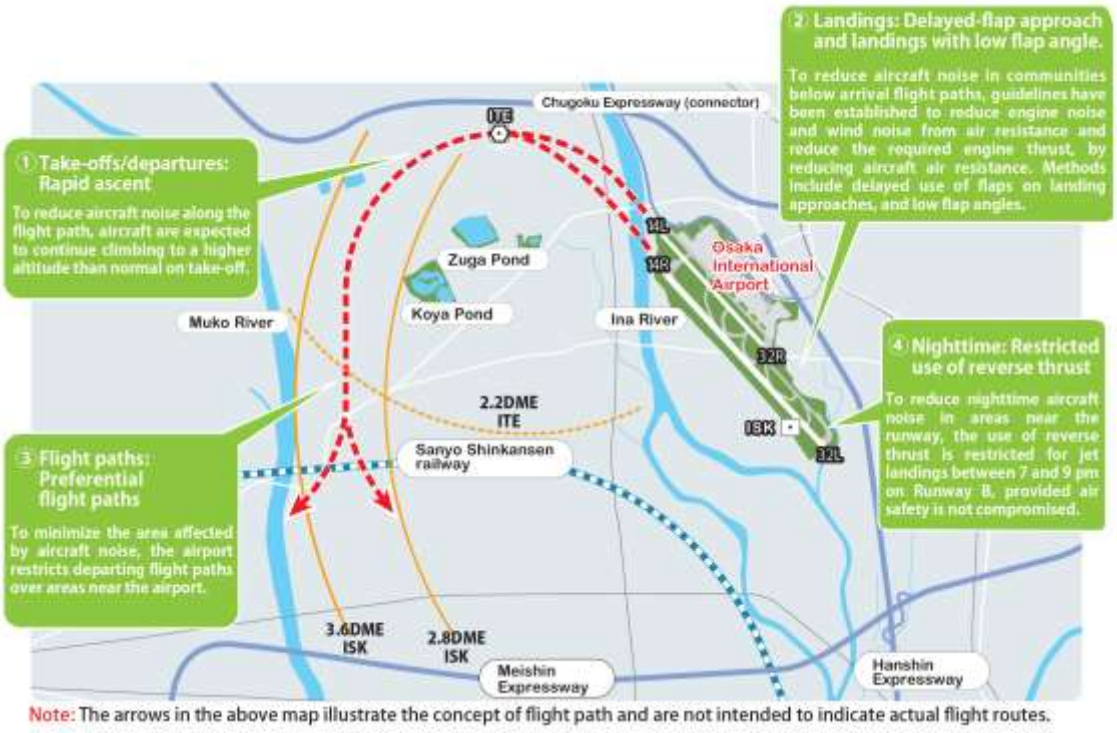
Osaka International Airport promotes the introduction of low-noise aircraft through a unique landing fee system, with discounts for low-noise aircraft and surcharges for high-noise aircraft, based on actual noise levels measured around the airport.

Optimizing runway use

It is normally preferred that aircraft take off and land into the wind, but to reduce the impacts of aircraft noise on the ground, Runway 32 is normally operated at ITM until the southerly tailwind reaches ten knots (5 meters per second), as long conditions are safe (see photo for flight direction).

Noise abatement flight procedures

As shown in the graphic below, we also make an effort to mitigate the impacts of aircraft noise by adopting noise abatement flight procedures.

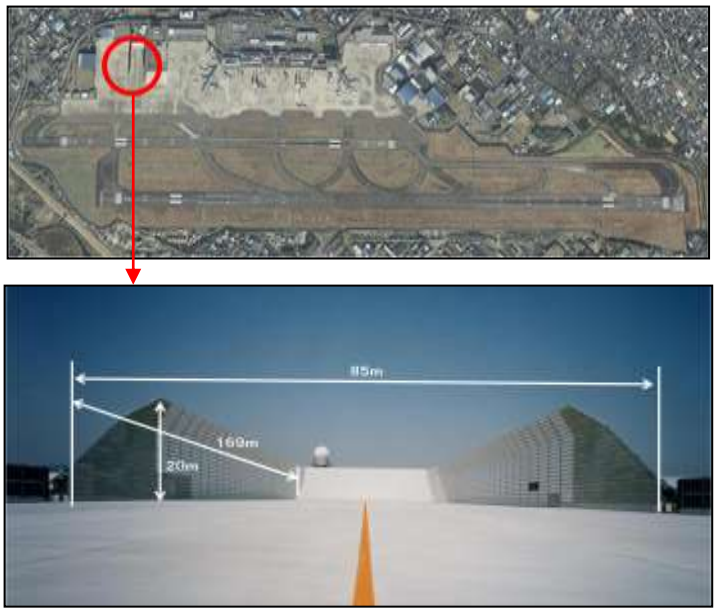


Note: The arrows in the above map illustrate the concept of flight path and are not intended to indicate actual flight routes.

Noise reduction at the airport

○ Noise reduction measures during aircraft engine testing

To reduce the impacts of noise emitted during aircraft engine testing, a large sound-blocking wall was installed at the engine testing site, and rules are in place for the location, timing, and methods of testing.



■ Aircraft engine testing site

The noise blocking effect reduces the noise level of a B747-400 (take-off power) to below 65 dB in the vicinity of the airport.

○ **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).

■ GPU usage status

GPUs supply electricity and air conditioning.
(Photo: GPU in use at ITM. Electricity is provided as soon as aircraft arrives.)

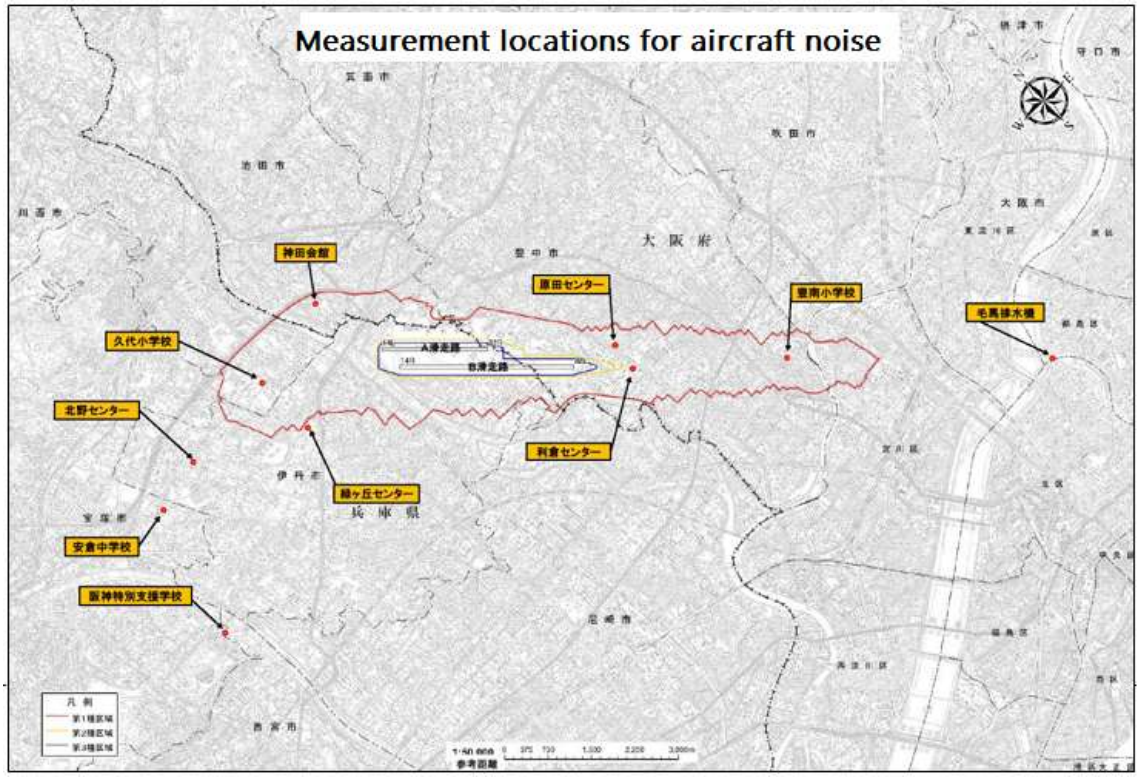
E.g., in the case of a Boeing 777, an APU at a distance of 20 meters has noise level of 92 dBA, while a GPU is not audible even at a distance of one meter.
Source: AGP Corp.
(http://www.agpgroup.co.jp/agp/airport.html)

○ **Other measures to reduce noise**

Besides aircraft, noise is also emitted from ground support equipment (GSE) vehicles. We are working to reduce noise levels at the airport by introducing low-noise equipment such as electric vehicles and electric-powered forklifts.

Measurement and monitoring of aircraft noise

To monitor aircraft noise, ITM conducts continuous monitoring of noise levels at 10 locations in the airport region, and releases the results publicly. Noise levels are also measured on an irregular and short-term basis as required.



■ **Improving airport design**

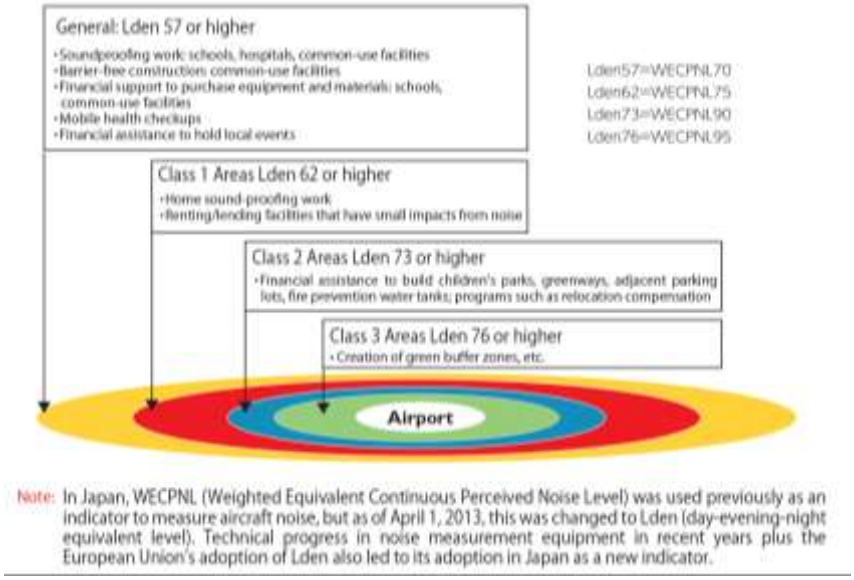
We have installed noise barrier walls and built noise barrier berms around the airport to mitigate noise impacts from aircraft on the runway, etc.

Noise barrier wall

Noise barrier berm

■ **Measures in the region of the airport**

Kansai Airports implements the following measures around the airport to reduce the noise in the region of Osaka International Airport and improve the living environment. Relocation compensation is applied to areas significantly affected by aircraft noise (Class 2 and 3 areas), and land obtained through this means is used to build parks and green space, in an effort to mitigate noise impacts. In Class 1 areas and their vicinity, upgrades are provided to make housing more sound proof.



Note: In Japan, WECPNL (Weighted Equivalent Continuous Perceived Noise Level) was used previously as an indicator to measure aircraft noise, but as of April 1, 2013, this was changed to Lden (day-evening-night equivalent level). Technical progress in noise measurement equipment in recent years plus the European Union's adoption of Lden also led to its adoption in Japan as a new indicator.

■ Overview of measures in the region of the airport

Relocation compensation programs

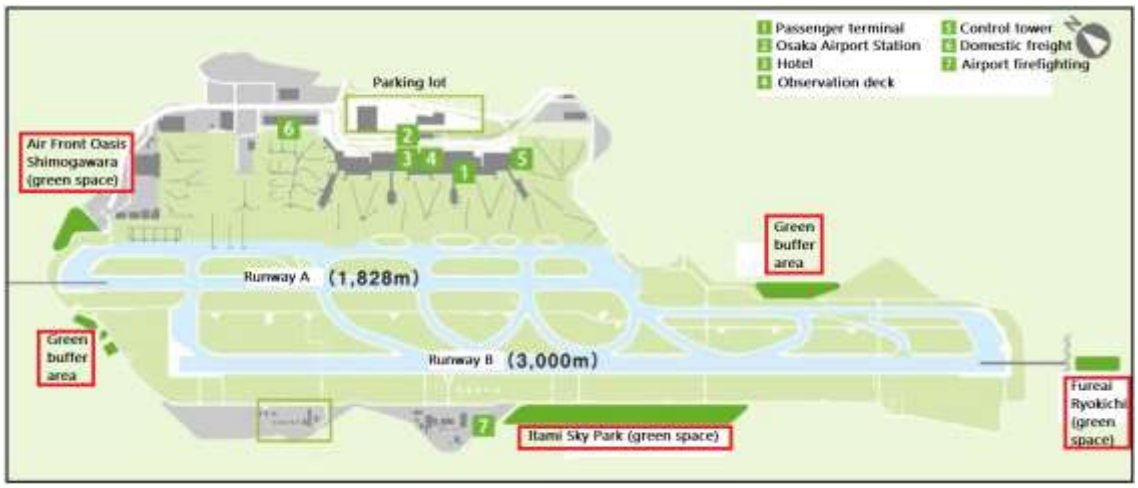
For buildings and land located in a zone when it is designated a Class 2 area, the airport has a program to provide compensation for buildings and purchase the land based on an owner's request to relocate outside the Class 2 area.

Utilization of land acquired by compensated relocation program

To prevent new negative impacts of aircraft noise in Class 3 zones around the airport and improve the living environment in the area, we create green spaces as buffer zones (see photos below) between the airport and surrounding areas, through landscaping and planting of vegetation in areas obtained through our relocation compensation program.

With the progress of the relocation compensation program in Class 2 and 3 zones, 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 in a planned and integrated way, by having Class 2 and 3 zones and surrounding areas designated as green space, as defined under the nation's City Planning Act. Examples include the Itami Sora Park on the Hyogo Prefecture side and Fureai Ryokichi (public green space) on the Osaka Prefecture side of the airport.

Also, with the aims of letting local residents become familiar with the airport through greenery and positive experiences as well as contributing to disaster prevention in the region, the Air Front Oasis Shimogawara was designed to improve the living environment for local residents and also have disaster prevention features included in the green space, and adjacent to this, Itami City developed the Shimogawara Green Area (photos on next page).



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

Itami Sky Park

This green space opened in 2008 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), Toyonaka City

This is green space for use by the local community, designed with public input, with sports and recreational facilities. It includes biotopes (see page 23), a multi-purpose square, tennis courts, heated swimming pool, grass areas, a playing field, and more.

Air Front Oasis Shimogawara and Shimogawara Green Area

Air Front Oasis Shimogawara is well-located with a view of Osaka International Airport. 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.

Air Front Oasis

Shimogawara Green Area

We lease these areas to local governments at no charge for various uses including children's play and for fire prevention water tanks.

Sound-proofing upgrade program in airport region

Below are examples of sound-proofing upgrade and other programs offered in the airport region.

Category		Outline
Soundproofing 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 surrounding local governments and other bodies for work (soundproofing, installation of upgraded air conditioning) to prevent or reduce aircraft noise in facilities including schools, child care centers, and hospitals, etc.
	Improvement of shared or common-use facilities	Based on legislation,* a subsidy is provided to municipal governments where noise reaches Lden 57 (or W70), 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, etc.
Soundproofing of housing	Soundproofing of housing	Based on legislation,* a subsidy is provided for work to prevent or mitigate aircraft noise (soundproofing, installation of upgraded air conditioning) on housing that was located in Class 1 zones when the national government made the designation.

- Act on Prevention of Damage caused by Aircraft Noise in Areas around Public Airports (Act No. 110 of 1967)

Other programs

Category		Outline
Other	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 for efforts of the surrounding local governments, to improve noise-measuring equipment, parks, and local facilities, improve convenience, revitalize the area, and other activities.

Developing and leasing noise-resistant facilities

In addition to the programs described above, based on the Osaka International Airport Regional Improvement Plan established by the governors of Osaka and Hyogo prefectures, we develop and lease “noise-resistant facilities” (including commercial facilities, car parking lots, etc.) whose functioning is less likely to be affected by aircraft noise, while also considering the living environment around the airport. The purpose of this program is to effectively utilize sites once residents have relocated away after receiving compensation.

Conserving air quality

■ **Converting building boilers to gas**

In November 2011, we converted boilers in the terminal building from heating oil A to gas. This contributes to air quality conservation by reducing emissions of hazardous substances generated from burning heavy oil.

● Gas-fired hot water boiler

Boilers are being converted from heavy heating oil (containing sulfur, other pollutants), reducing air pollution.

Conserving water quality

■ **Conversion to eco-friendly snow-melting agent**

In the past, ITM used snow-melting agent of urea type, but large runoff of this agent could lead to eutrophication of water bodies. We have therefore switched to acetate-based snow melting agents, which are expected to have lower impacts on water quality.

■ **Conversion to anti-icing and deicing fluid**

The consumption of anti-icing and deicing fluid depends largely on weather conditions and fluctuates from year to year. Some businesses have upgraded to better spraying equipment, boosting the efficiency of spraying operations.

(2) An airport that respects the global environment

Promoting energy conservation

■ Introducing energy-saving equipment

ITM encourages all businesses and contractors aim for high energy efficiency, including the use of energy-saving types of lighting and air conditioning equipment.

●Escalators with motion sensors (passenger terminal, monorail station, and connecting bridge)

We have installed motion sensors to reduce electrical consumption at times and locations with fewer users.

Passenger terminal

Monorail station

●Lighting control based on light sensors (passenger terminal)

Electricity consumption is reduced by outside light sensors that turn lights on automatically when darkness is sensed, and off when brightness is sensed.

Mercury lights in building

Light sensors

Sensitivity control

• Control can be set to turn on in range from below 5 Lx to over 300 Lx.

● Mist shower (concourse)

• Cooling mist showers installed to keep temperature from rising on hot summer days.

● Bicycle trailers (ANA)

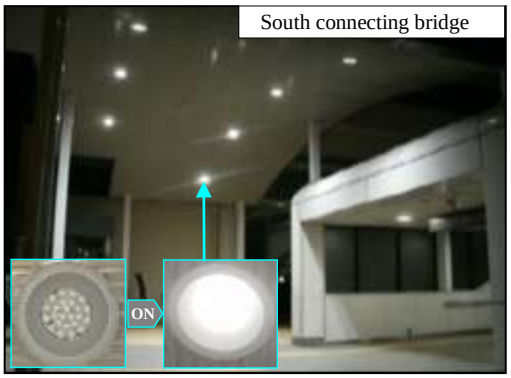
• Eco-friendly hauling: Electric-powered bicycle pulling a trailer.

● Heat-reflecting film on windows (passenger terminal)

• Heat-reflecting film on windows reflects sunlight and reduces increases in indoor temperature.

● LED lighting (south connecting bridge, north taxi stand)

• LEDs last long, are efficient light sources, and use little electricity, reducing power consumption.



● Eco-friendly automatic door system (passenger terminal)

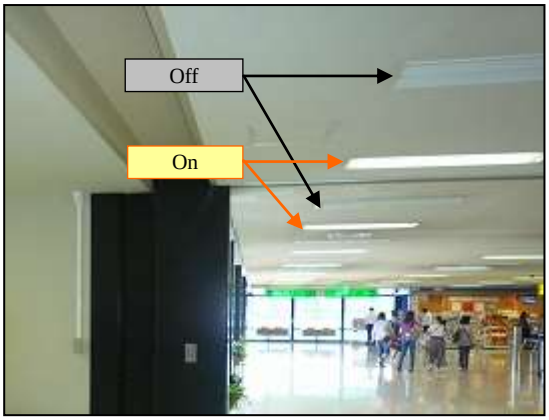
• Conventional automatic doors tend to slide open unnecessarily if a person simply walks past the door. We have now installed sensors that determine whether a person intends to walk past or through the door. This reduces unneeded door opening, saving door power consumption and interior air conditioning. Locations include all north-facing vestibules in the north terminal.

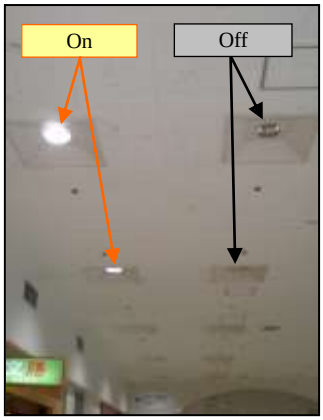
■ **Institutional measures for energy-saving**

We make an effort to get everyone involved in energy saving. Here are some examples:

- JAL flight attendants ask passengers to lower window shades when aircraft are parked.
- Airport businesses reported the following efforts: Encourage staff to wear lighter clothing during the national "Coolbiz" energy-saving campaign each summer (22 businesses), turn off lights when not needed (22), use window blinds (21), turn off office equipment when not in use (19), intentionally space out lights being used (17), adjust air conditioner heating/cooling to save energy, (15) selectively turn air conditioners on or off (12).

● Intentionally spacing out lights being used





• Electrical circuits and switches designed to improve selection of which lights to turn on/off.

● Signage and messaging asks for cooperation to save electricity.

• Lights, air conditioning (top left)
• Elevators (above)
• Vending machines (left)
• Everywhere (right)

Reducing greenhouse gas emissions

■ **Promoting the use of low-emission aircraft**

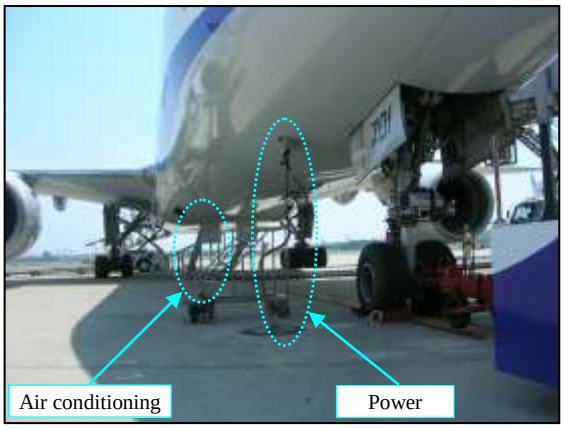
Thanks to their high-performance engines and lower weight due to the use of composite materials, the latest Boeing 787 aircraft are approximately 20% more fuel-efficient than other aircraft of similar size, resulting in approximately 20% reduced greenhouse gas emissions. For other aircraft as well, airline companies are making an effort to use low-emission engines when acquiring new equipment.

■ **Promoting GPU use, discouraging APU use**

Carbon dioxide emissions can be significantly reduced if power and other services are provided by a ground power unit (GPU) instead of onboard auxiliary power unit (APU) while the aircraft is parked. The use of GPUs at ITM is on the rise, with the number of hours used increasing by 12% between fiscal 2011 and 2015.

●Use of GPUs

GPUs provide electrical power and air conditioning to parked aircraft (as depicted in photo below, taken at ITM).



As example of significant benefits, a Boeing 777 emits 1,166 kg/hr of CO_2 when using an APU, but only 50.8 kg/hr with a GPU, resulting in a large reduction in emissions.
Source: AGP Group
(http://www.agpgroup.co.jp/agp/airport.html)

■ **Vehicle idling prevention campaign**

We are also helping to reduce CO_2 emissions by reducing vehicle fuel consumption, through awareness campaigns to promote eco-friendly driving habits, including encouraging drivers not to idle their vehicle engines while stopped. ITM airport businesses that use vehicles report that they are conducting idling prevention campaigns (9 businesses) and eco-driving practices (6 businesses).

■ **Promoting the use of public transportation**

To promote the use of public transportation by our airport users, we offer connecting passengers free limousine bus services between ITM and KIX airports, and work with public transportation companies to improve long-distance bus services.

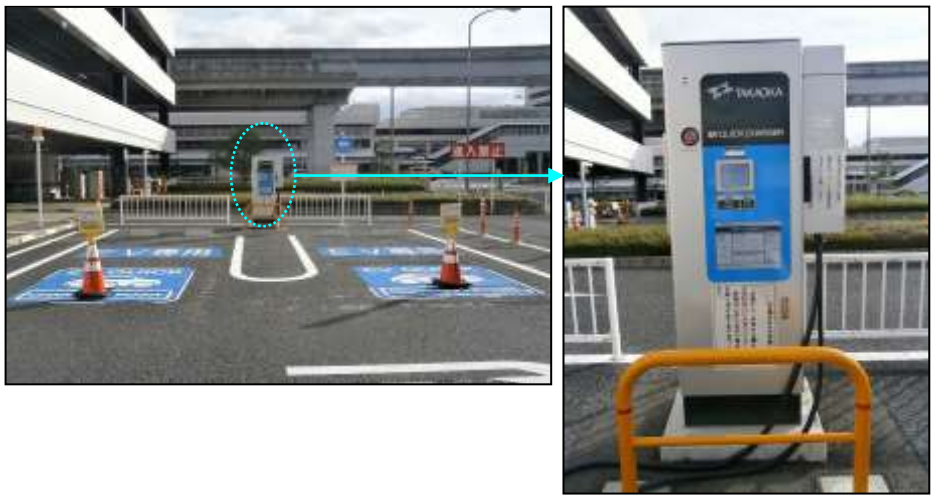
Promoting the use of eco-vehicles

■ **Introducing eco-vehicles**

Airports typically use many vehicles as ground support equipment (GSE) for aircraft operations, and transporters (passenger vehicles) to move people around, so the use of "eco-cars" or eco-friendly vehicles can help to reduce their CO2 emissions. It takes time to add eco-cars to fleets, but ITM is gradually increasing their number. In addition, it is important to provide chargers in order to promote the spread of electric vehicles, and ITM has been installing these electric chargers to airport parking lots.

● Charging station for electric vehicles

Quick charging stations have been installed in ITM parking lots



Promoting the use of clean energy

■ **Installing photovoltaic systems**

ITM has installed photovoltaic systems (solar power generation) to promote clean energy.

● Photovoltaic panels

Solar panels installed on roof of ITM administrative building

(3) An airport that recycles resources

Zero emissions

■ **Reducing and recycling waste as a resource**

At ITM we are working to limit the amount of waste generated, by putting runway grass clippings to practical uses as animal feed and compost (see next page), re-using office materials, and recovering useful waste, etc. We also strive to increase the recycling rate by carefully sorting waste, and have a number of other initiatives to reduce the use of copy paper.

● Separate bins to sort waste, and a scene of separated garbage before being hauled away
Separation of waste is an important step in recycling.

●Preparation before resource recovery (examples of deconstructing, breakdown and sorting)

■ **Garbage reduction campaign**

There is a high awareness of the need to reduce the amount of waste generated at ITM. Only a small number of airport businesses are conducting garbage reduction campaigns, but most have related efforts, such as reducing the use of copy paper, and reusing office supplies and equipment.

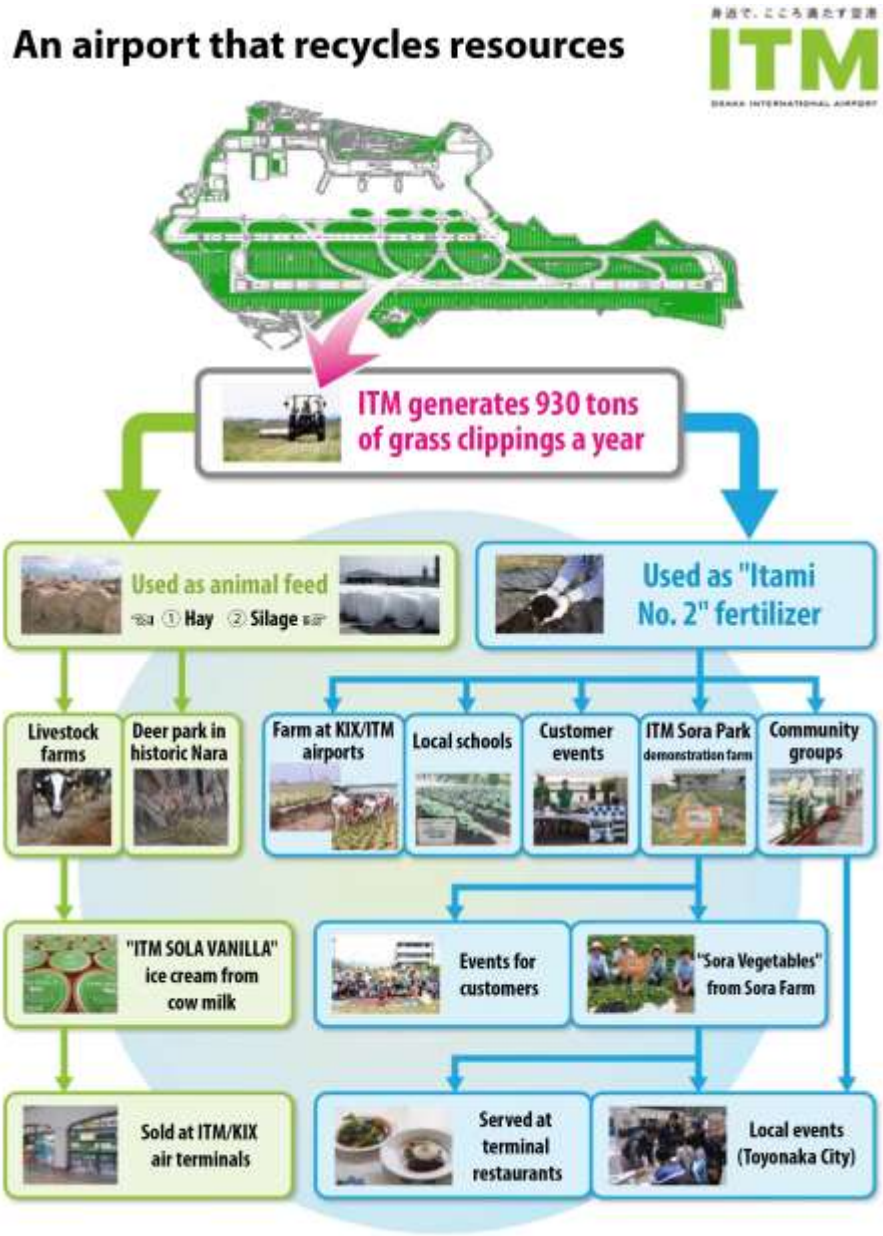
■ **Promoting green purchasing**

We promote green purchasing based on the Act on Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities, and on guidelines provided by Japan's Green Purchasing Network (GPN). Many businesses at the airport are engaged in green purchasing.

● Green purchasing
This means giving a preference for products with lower environmental impacts, including the impacts of manufacturing processes.

ITM Sora Farm Project

- Osaka International Airport produces about 930 tons of grass clippings annually from maintenance along the runways.
  - →Clippings are processed into organic fertilizer and used at ITM Sora Farm.
  - →Clippings are also fermented to produce silage and provided as feed at no cost to livestock farms and the Foundation for the Protection of Deer in Nara Park.
- The fertilizer from grass clippings has been registered by the Ministry of Agriculture, Forestry and Fisheries as "Itami Airport 1 and 2" brand (October 25, 2015). This is first case of any Japanese airport registering a pesticide-free organic fertilizer.
- ITM has received considerable media coverage and corporate interest for these efforts, which earn Osaka International Airport a reputation as an environmentally-advanced airport.



Conserving and recycling water

■ **Promoting water conservation**

Businesses at ITM airport are promoting water conservation through various means, including the use of automatic faucets in sinks for handwashing, and noise generators in women's toilets that reduce the need to flush. Additional approaches include adjusting water pressure and flow rates of toilets and hand washers, using displays and notices, and applying stickers as reminders for users to conserve water.

■ **Using captured/reclaimed water**

Some businesses at ITM reduce clean water consumption by collecting rainwater for uses such as sprinkling and watering (surfaces, plants, etc.).

● Rainwater storage tanks

Rainwater falling on airport facilities is captured, stored, and then pumped out for other uses. This helps to reduce the consumption of clean water.

Other initiatives

■ Donation of used ground support equipment (GSE)

Hand-over ceremony

Handover Ceremony of Airport Chemical Fire Engines to Republic of the Union of Myanmar

Osaka International Airport processed a request for assistance from the Republic of the Union of Myanmar (Civil Aviation Bureau, Transport Ministry) to provide through a grant assistance program two airport chemical fire engines (12,500 and 3,000 cubic meter capacity) which had retired from service at the end of March 2015 (FY2014). The equipment arrived in Myanmar recently and the event was commemorated by a hand-over ceremony. This transfer was realized thanks to Grant Assistance for Grass-Roots Human Security Projects (GGP), a program under Japan's Ministry of Foreign Affairs.

About GCP (excerpt from Ministry of Foreign Affairs website): This is a program launched in 1989 to respond to various needs of developing countries. Overseas diplomatic offices with local knowledge play a central role in securing funds for relatively small projects (generally 10 million yen or less) that are implemented locally in developing countries by the community, educational or medical institutions, or international or local non-governmental organizations.

Source: NKIAC News Release, October 26, 2015

8,000 m^3 fire engine (retired Dec. 2015)

Rescue lighting truck (retired Feb 2016)

Retired fire engines provided through grant assistance

Two fire engines retired from service in fiscal 2015, and as Japan had already received requests from developing countries, we decided to provide them as an international contribution under the government's grant assistance program. The Society for Promotion of Japanese Diplomacy, introduced by Japan's Civil Aviation Bureau, will hand all procedures after we have transferred the vehicles to that society, including selection of recipient countries, preparation, and delivery.

Recipient(s): To be determined (candidates include Bhutan, Djibouti, etc.)
Schedule: Delivery: August or September
Press release: Issued once recipient country is determined.
CSR Report (February)
Note: There are plans to revise the markings from NKIAC to Osaka International Airport.

(4) An airport that recycles resources

Creating natural environments

■ **Parks and green spaces near the airport**

Around the airport are parks and other areas developed using vacant sites after residents have relocated away with compensation. A particular example is the Fureai Ryokuchi (Friendship Green Square), which has an open area containing a biotope, creating a space for visitors to have contact with nature.

● Biotopes in the Fureai Ryokuchi

- Urban biotope features water's edge, attracts dragonflies and other life.
- The biotope supports diversity of habitat, with flowing water and pond, rocky banks, and aquatic plants.

■ **Creating green space at the airport**

Osaka International Airport has planted green areas and a “Flower Campus" on the roof of the passenger terminal building. The planting of flower beds instead of grass helps reduce the need to cut grass and also improves the scenery.

● Greenery at the airport (passenger terminal building)

- Green roof on terminal building (upper left) helps regulate temperature inside the building.
- Greenery on roof deck (upper right) creates a place to relax and contributes to better scenery.
- Green walls (left) can be found in many locations.

Pulling weeds

The result

• Greening the airport (around buildings): “Flower Campus”

• Designs are developed by students of Osaka Prefectural Engei High School (specializing in horticulture), and teachers, students and airport staff cooperate to manage the greenery twice each year.

● Greening the airport (around buildings): “Butterfly Garden”

• As one type of “biotope,” the same school helped to develop the “Butterfly Garden,” which features plants that attract butterflies and other insects. To celebrate the garden, we hold “ITM Butterfly Garden Nature Seminars.”

● Greening the airport (around buildings)

• We install greenery in many places in the terminal building, creating comforting spaces.

(5) An airport that respects the local community

Information disclosure

■ **Publishing environmental monitoring data and environmental reports**

ITM publishes environmental monitoring data and environmental reports.

- Environmental monitoring data (aircraft noise measurements):
  http://www.kansai-airports.co.jp/efforts/environment/itm/monitoring/
- Environmental reports (Osaka International Airport, Eco-Airport Report):
  http://www.kansai-airports.co.jp/efforts/environment/itm/ecoairport/

Dialogue with the local community

Osaka International Airport aims for good communication through information sharing and interactions with local communities. Below are some examples:

■ **Exchanging views with local governments**

Kansai Airports works to provide suitable forums for dialogue with local communities, and holds regular meetings with the "Council of Local Cities Near the Osaka International Airport" (consisting of ten cities) to promote measures to address aircraft noise and safety, and discuss urban planning issues in the airport area.

■ **Releasing information on environmental efforts and programs**

Kansai Airports actively uses every opportunity and medium to introduce to others its efforts to conserve the environment, including environmental initiatives around the airport, soundproofing upgrades, and more. Details are available from the website indicated below. (Nearby local governments also release information through their own websites and other means.)

http://www.kansai-airports.co.jp/efforts/environment/itm/taisaku/

■ **Providing opportunities to learn about the environment**

Kansai Airports regularly offers science classes and other opportunities to learn about the environment. Also, biotopes and green areas around Osaka International Airport offer great opportunities to learn about the environment. (For more information about nearby green spaces, please contact the local governments managing them.)

■ **Events at the airport**

Osaka International Airport holds a variety of events at the airport as shown below.

- Osaka International Airport: Kuuraku Festa
- 16th La Sora Sketching Competition for primary school children
- ITM Airport Academy: Drawing, Security and Environment classes
- Other: Concerts (live jazz, etc.), photo exhibitions, etc.

Mascots “Kankun” (KIX), “Sorayan” (ITM)

● Kuuraku Festa 2015 (stage event)

Festa features products from ITM airport destinations, food stalls, and exciting booth presented by airlines.

● Kuuraku Festa 2015 (outdoor booths)

● Environmental class

● Sketching competition for primary school children

Cooperating with airport-related businesses

Osaka International Airport cooperates with airport-related businesses to promote environmental conservation, learning and education.

・Osaka International Airport Eco-Airport Council

The airport also exchanges information with other Japanese airports regarding efforts to conserve the environment.

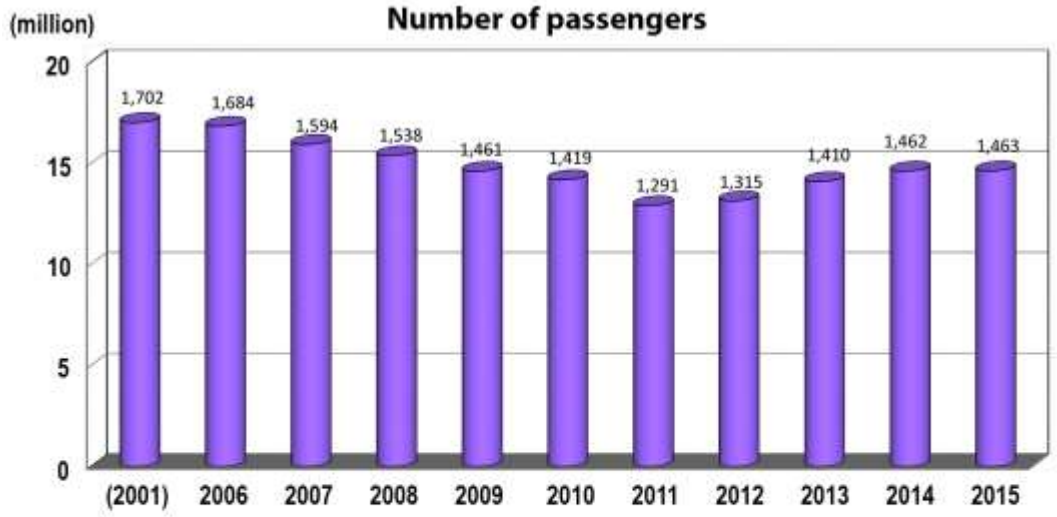
4. Outline of Osaka International Airport

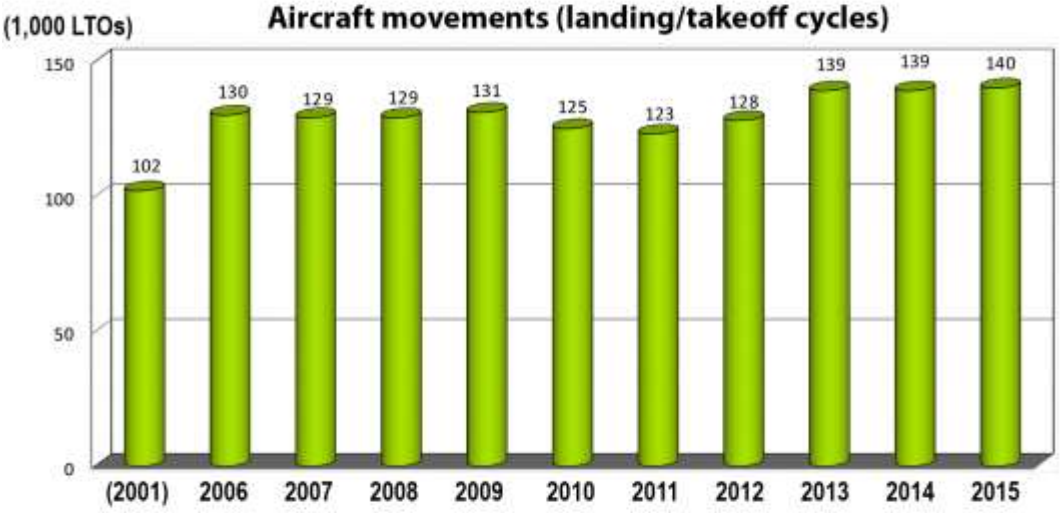
Opened	March 17, 1958
Location	Itami City, Hyogo Prefecture
Scale	Area: Approx. 310 ha Runway A: 1,828 m long by 45 m wide Runway B: 3,000 m long by 60 m wide

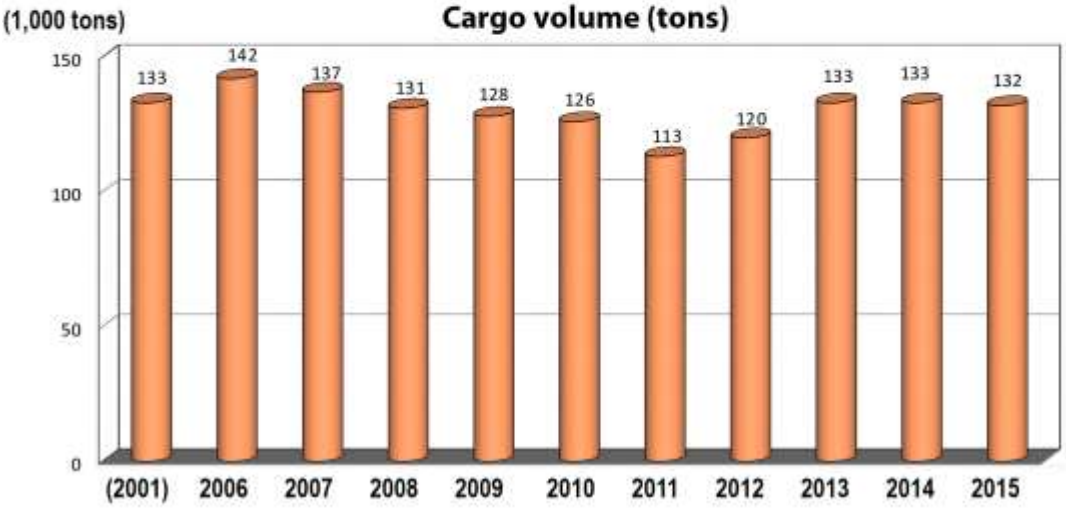
Osaka International Airport from the air

Chronology of Osaka International Airport

Year	Month	Event
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 based on Civil Airport Development Law and 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.
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.
2012	4	New Kansai International Airport Company established.
	7	Management of Osaka International Airport and Kansai International Airport is integrated.
2015	12	Kansai Airports established.
2016	4	Kansai Airports starts operations.


(million)
Number of passengers
20
15
10
5
0
1,702
1,684
1,594
1,538
1,461
1,419
1,291
1,315
1,410
1,462
1,463
(2001)
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


(1,000 LTOs)
Aircraft movements (landing/takeoff cycles)
150
100
50
0
102
130
129
129
131
125
123
128
139
139
140
(2001)
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015


(1,000 tons)
Cargo volume (tons)
150
100
50
0
133
142
137
131
128
126
113
120
133
133
132
(2001)
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

Appendices

Major targets and status of achievement

This page summarizes, for each environmental parameter, the major targets and status of achievement at Osaka International Airport.

Parameter	Target	Status	Details	Progress	Evaluation
Air and energy	■ Reduce CO_2 emission as much as possible Note: Calculated emissions may increase or decrease from reference year depending on CO_2 conversion factor used for electricity. Target has therefore been set as having little change from reference year.	B	1. Promote the use of low-emission aircraft engines	4	☺
			2. Expand GPU usage as much as operations permit	4	
			3. Promote the use of eco-vehicles for ground support equipment (GSE), considering technological development	3	
			4. Promote the adoption and efficient use of energy-efficient lighting and air conditioning	4	
			5. Use thorough organizational approach to energy-saving behavior	4	
			6. Convert building boilers to gas fuel	5	
			7. Organizationally promote idling prevention campaigns	4	
Noise and vibration	■ Reduce noise and vibration by using low-noise equipment/ vehicles and ground power units (GPUs)	A	1. Promote the introduction of low-noise aircraft	4	☺
			2. Promote the use of GPUs	4	
			3. Convert to low-noise vehicles for GSE-related functions	4	
Water	■ Reduce clean water use continuously by 2% annually from FY2006 ■ Consider using reclaimed water by installing advanced treatment facilities at the time of new construction, additions or upgrades to buildings.	B	1. Promote water-conservation by installing automatic faucets for handwashing, water-conserving equipment and parts	4	☺
		B	2. Raise water conservation awareness of airport users and others through awareness campaigns	4	
			3. Continue investigating the use of clean water as part of total clean water consumption at the airport	4	
Soil	■ 100% ratio of use of acetic acid, formic acid-based snow-melting agent ■ Use less anti-icing/deicing fluid	A	1. Shift from urea type to acetic acid, formic acid-based snow-melting agent, which is more eco-friendly	5	☺
		B	2. Consider measuring water quality when there is an increase in use or change in type of chemicals used	3	
Waste	■ As target for waste reduction, do not generate more general waste than in FY2001 ■ Exceed 30% as the recycling rate for general waste ■ Exceed 32% as the recycling rate for industrial waste	A	1. Raise environmental awareness through campaigns and promote environmental literacy	4	☺
		A	2. Regularly and continuously investigate and analyze the amount of industrial waste generated	4	
		B	3. Encourage proactive reuse of used products	4	
			4. Reduce volume and improve recycling rates of industrial waste	4	
			5. Promote green purchasing	4	
Nature	■ Maintain the existing area of green space on the airport grounds and promote more greening and conservation to the extent possible	A	1. Continuously care for and maintain greenery at the airport	4	☺
Other	■ Steadily increase the utilization ratio rate of public transportation	B	1. Promote public awareness activities targeting travelers and travel agencies, based on cooperation and collaboration	3	😐
			2. Encourage drivers to use public transportation instead of private cars	3	

Progress of initiatives \ Progress toward targets	A	B	C
Average ≥ 3.5	☺	☺	😐
Average 2.5 < 3.5	☺	😐	☹
Average < 2.5	😐	☹	☹

Progress toward targets

A: Steadily progressing toward target
B: Little change from reference year
C: Worse than the reference year
Note: Reference year FY2006 for clean water use & soil. Others: FY2001.

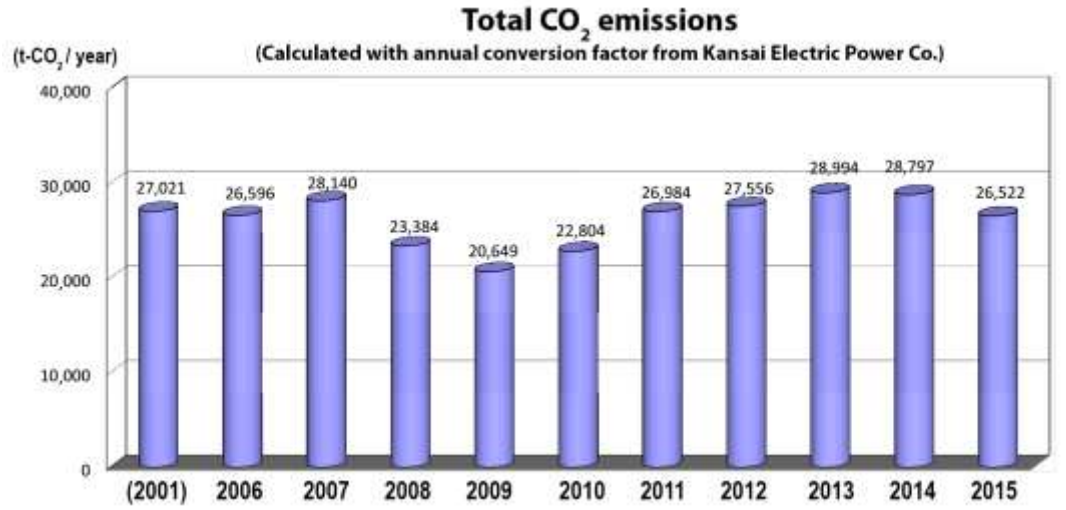
Progress of initiatives

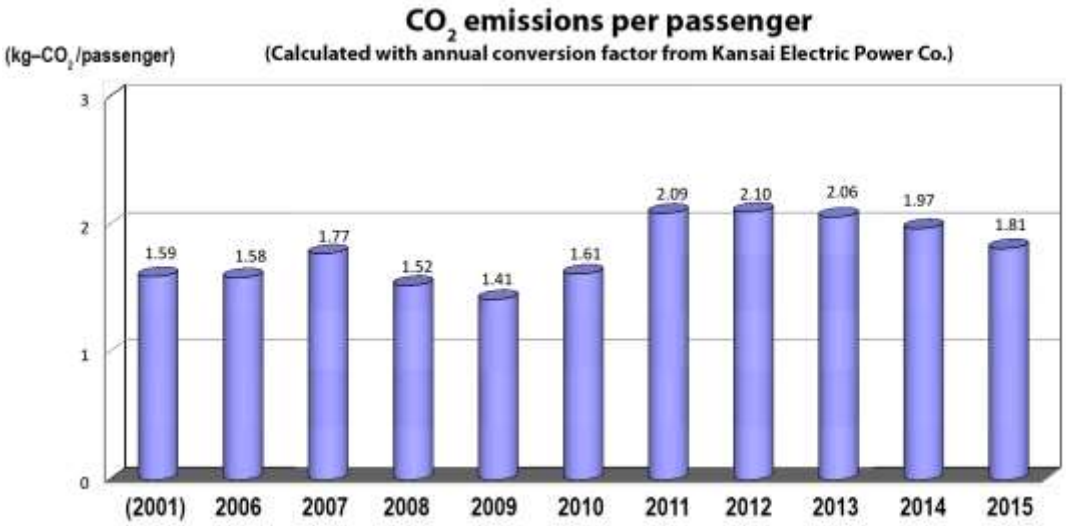
5: Achieved, or expected to be achieved earlier than planned
4: Progressing steadily
3. Progressing but with delays
2: Moving away from target
1: Far from achieving target

■ **CO_2 emissions (Air)**

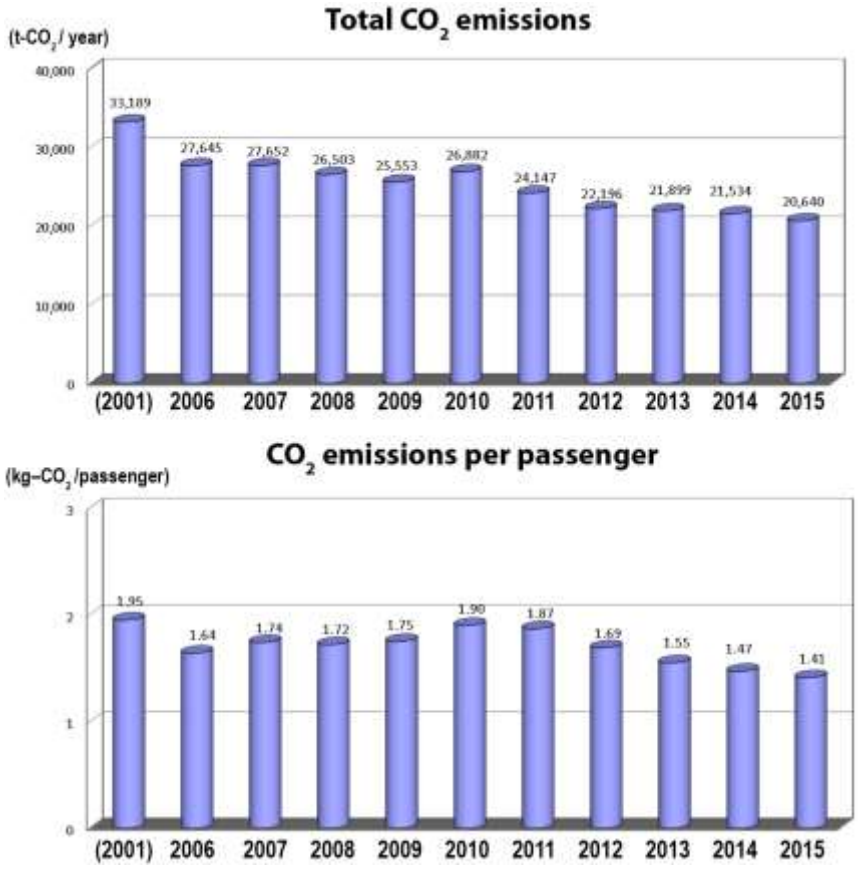
Annual carbon dioxide emissions were on declining trend from the reference year FY2001 to FY2009, then increased until FY2013, but were lower again in FY2015 at 26,522 t-CO_2 (roughly the same level as the reference year). Emissions per passenger jumped significantly in FY2011, but thereafter were level or decreasing slightly. The jump in FY2011 was due to a major increase in the CO_2 emission factor for electricity (due to nuclear power plants being halted) and a reduction in passenger traffic, and these are likely a result of the Great East Japan Earthquake in March 2011. Airports typically consume a large amount of electricity, so the amount of CO_2 emissions is significantly affected by changes in the CO_2 emission factor (with which emissions are calculated).

For comparison, the graphs on the next page show how emissions would have been calculated if the CO_2 emission factor for electricity had remained the same as when the ITM Environmental Plan was adopted. The graphs show total CO_2 emissions on a declining trend since the reference year, and emissions per passenger also declining steadily after FY2010.





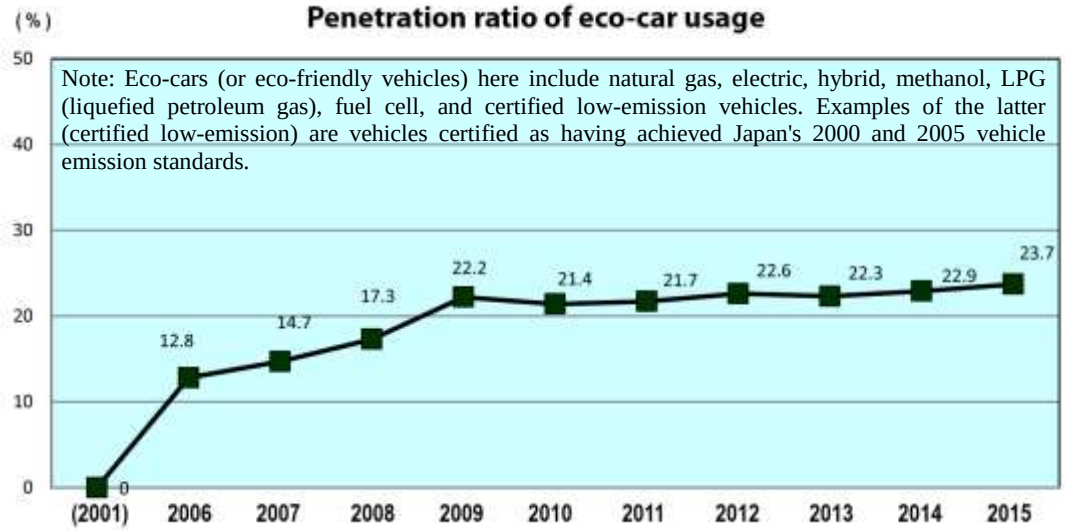
For comparison: Emissions as calculated using CO_2 emission factor from year of adoption of ITM Environmental Plan



Note: CO_2 emission factors in the year when the ITM Environmental Plan was adopted are from a report from the Panel Committee on GHG Emission Calculation Methods (Ministry of the Environment, Japan, 2010).

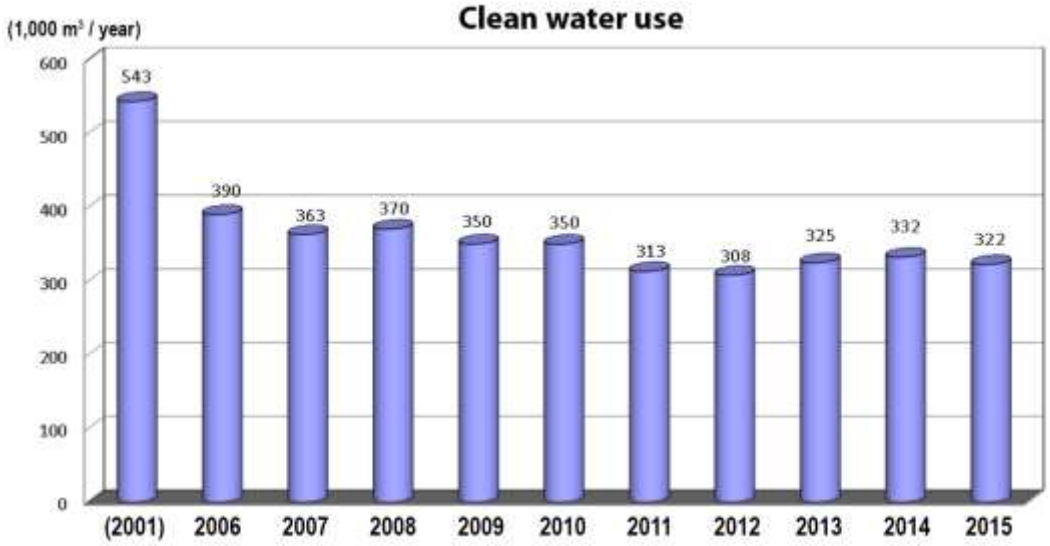
■ **Eco-friendly vehicle use (air)**

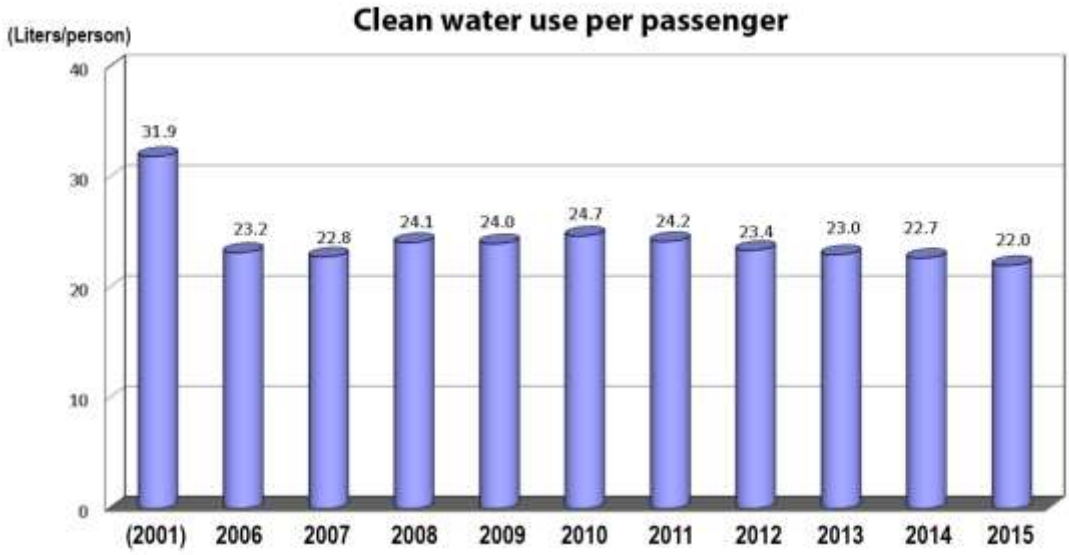
The penetration ratio of eco-friendly vehicles was increasing steadily from the reference year FY2001 to FY2009, but has been generally unchanged since then. The ratio is affected by the timing of new additions to the vehicle fleets, and this is likely an explanation for the relative lack of change.



■ **Clean water use (water)**

The amount of clean water used varies slightly year to year, but in FY2015 it was about 83% below FY2006 consumption, and about 59% below FY2001. (The average annual reduction from FY2006 to FY2015 is about 1.9%, calculated from the reduction to 322,000 m^3 (FY2015) from 390,000 m^3 (FY2006), or 17.0% for the period. Our environmental target is for a 2% annual reduction, so we need to make an effort for further reductions.) The trend over time shows a steady decline in consumption from FY2008 to FY2012, but an increase from FY2012 to FY2014. (The first graph below shows total clean water use.) The increase in total clean water consumption is likely due to an increase in passenger traffic, but as the second graph shows, the consumption per passenger has been steadily declining since FY2010 as passenger traffic increases.

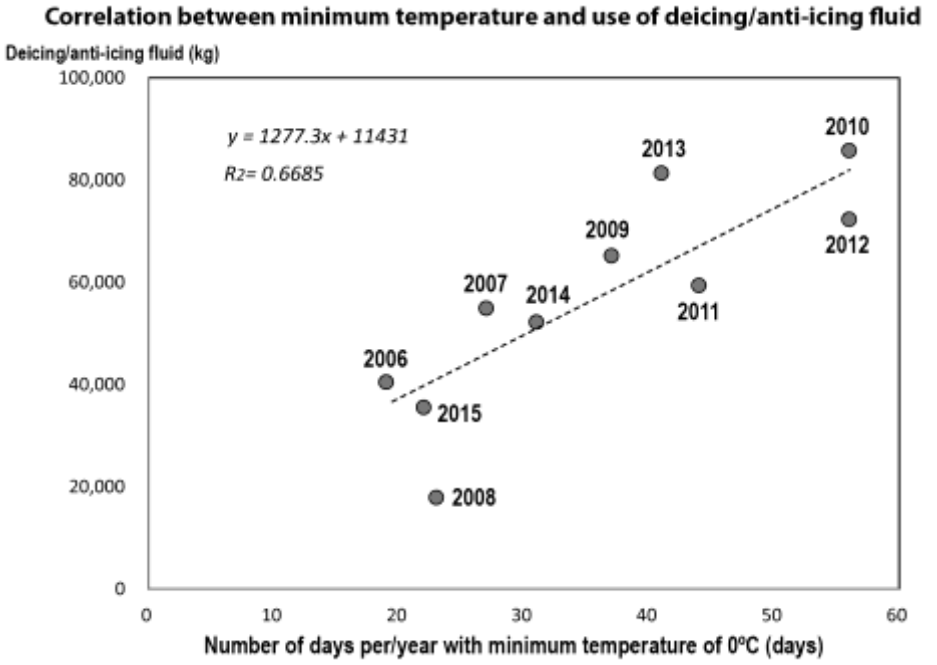


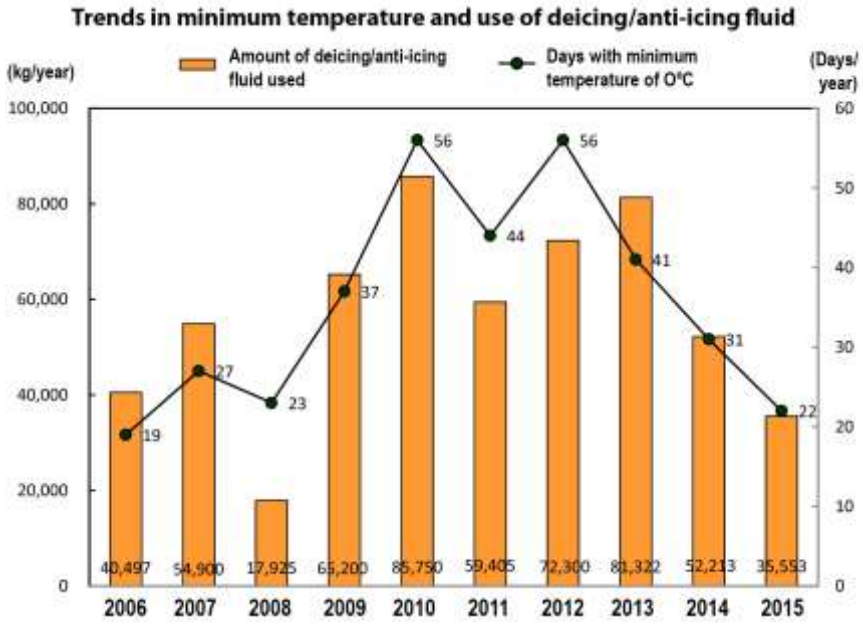


■ **The use of snow-melting agent and deicing/anti-icing fluid (soil)**

No snow-melting agent was used from FY2006 to FY2011. It was used from FY2012 onward, but the entire amount was the acetic-acid type, which has low impacts on water quality.

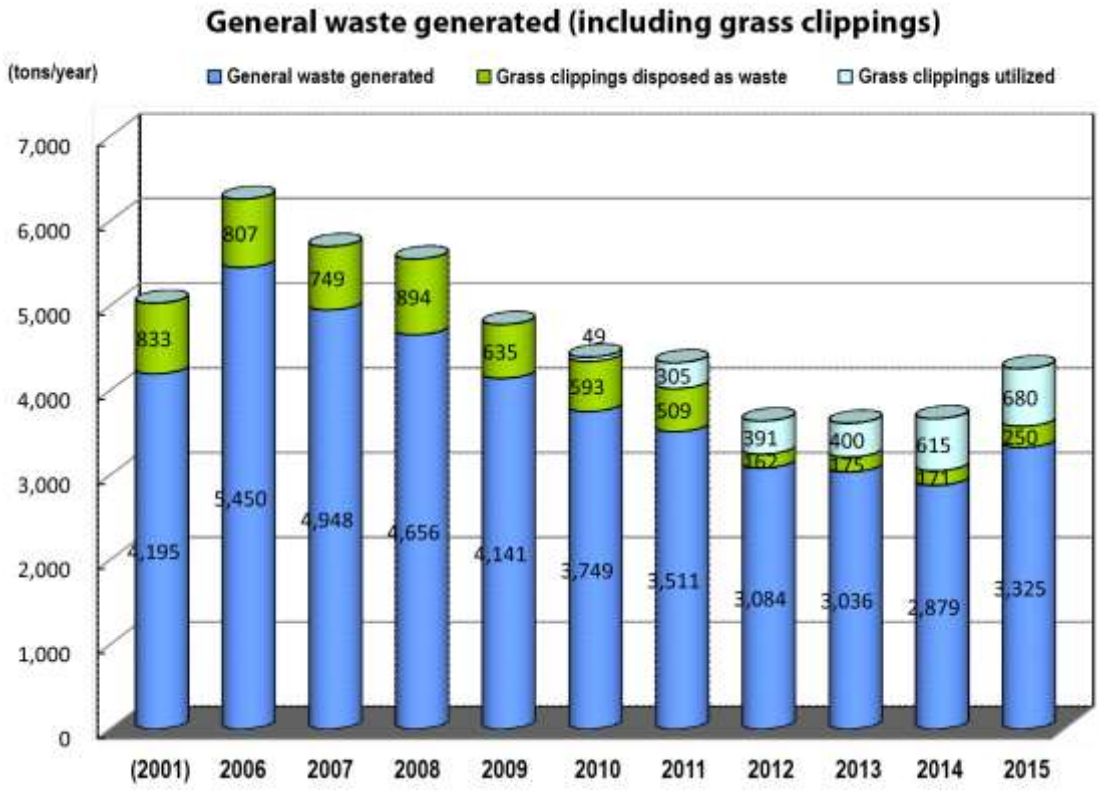
As for anti-icing/deicing fluid, consumption is affected by weather (minimum temperatures at the Toyonaka weather station), but also by factors such as patterns of continued low temperatures, and hours of operation, so general assessments are difficult. Therefore there are no special variations in the assessment of anti-icing/deicing fluid use.





■ **Waste generation (waste)**

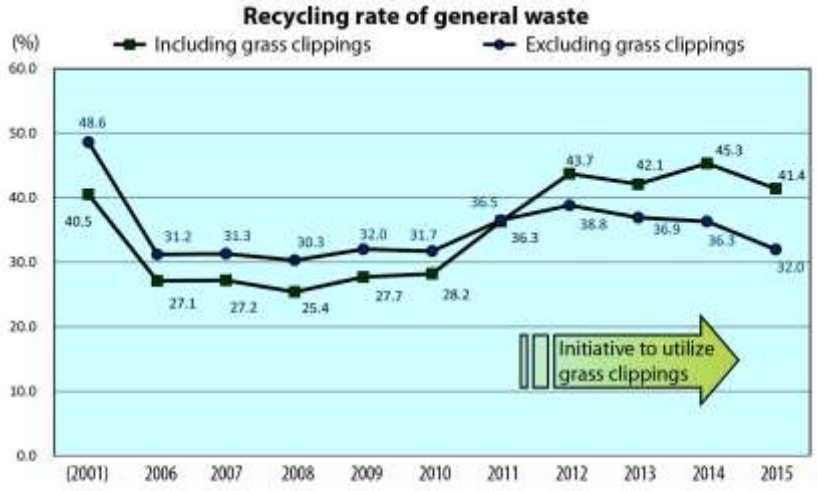
The amount of general waste (including waste grass clippings) increased temporarily but then declined steadily, and in FY2015 was about 85% of the amount in the reference year FY2001. The amount of general waste (excluding grass clippings) has been declining steadily year after year. The graph shows the impact to reduce the general waste amount due to effective utilization of grass clippings (to make animal feed and fertilizer) since FY2010.

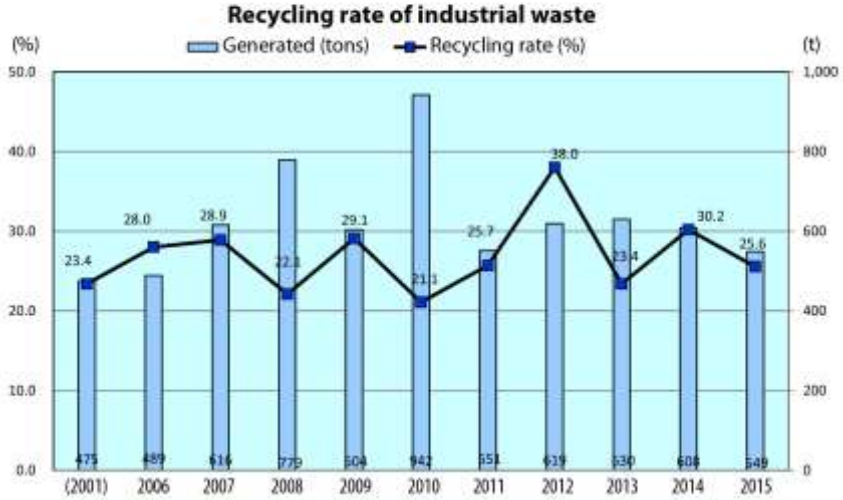


■ **Recycling rate of waste (waste)**

The recycling rate of general waste (excluding grass clippings) was slightly above 30% from FY2006 to FY2010, and over 35% from FY2011 onward. The recycling rate of general waste including grass clippings temporarily dropped below 30%, increased as grass clippings started to be utilized more from FY2011, and has surpassed 40% since FY2012. The recycling rate for industrial waste temporarily increased to 38% in FY2012 but has generally fluctuated between 20% and 30%. Our environmental target for the industrial recycling rate is 32%, so more effort is needed in this area.

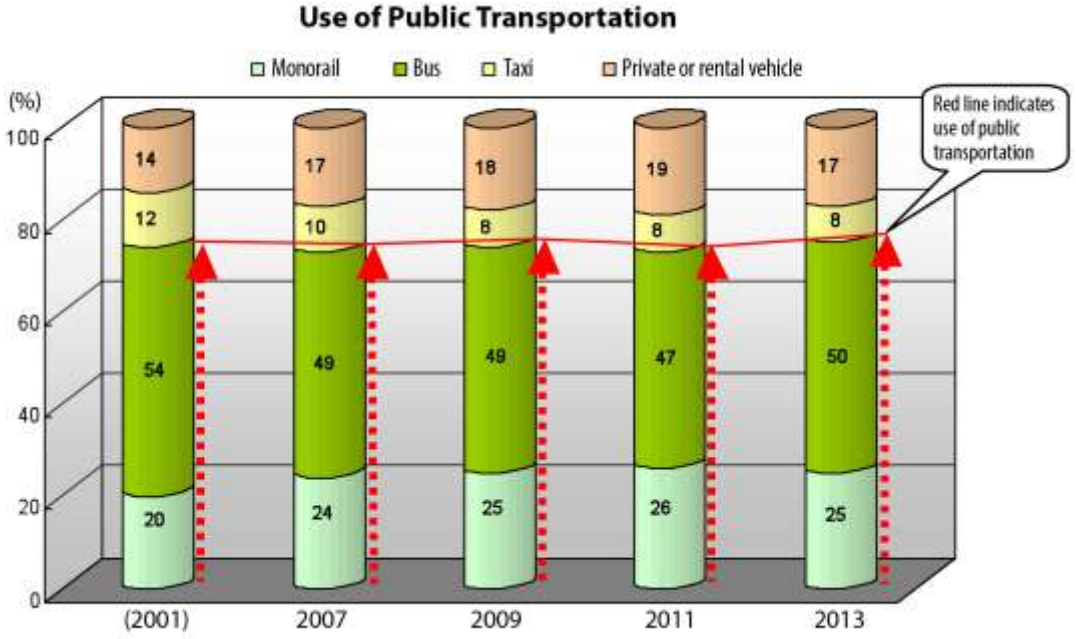
Note: Our quantity of industrial waste generated fluctuates significantly from year to year, and the amount by sub-category can vary considerably, changing the relative proportion of that category that year.





■ **Use of public transportation (other)**

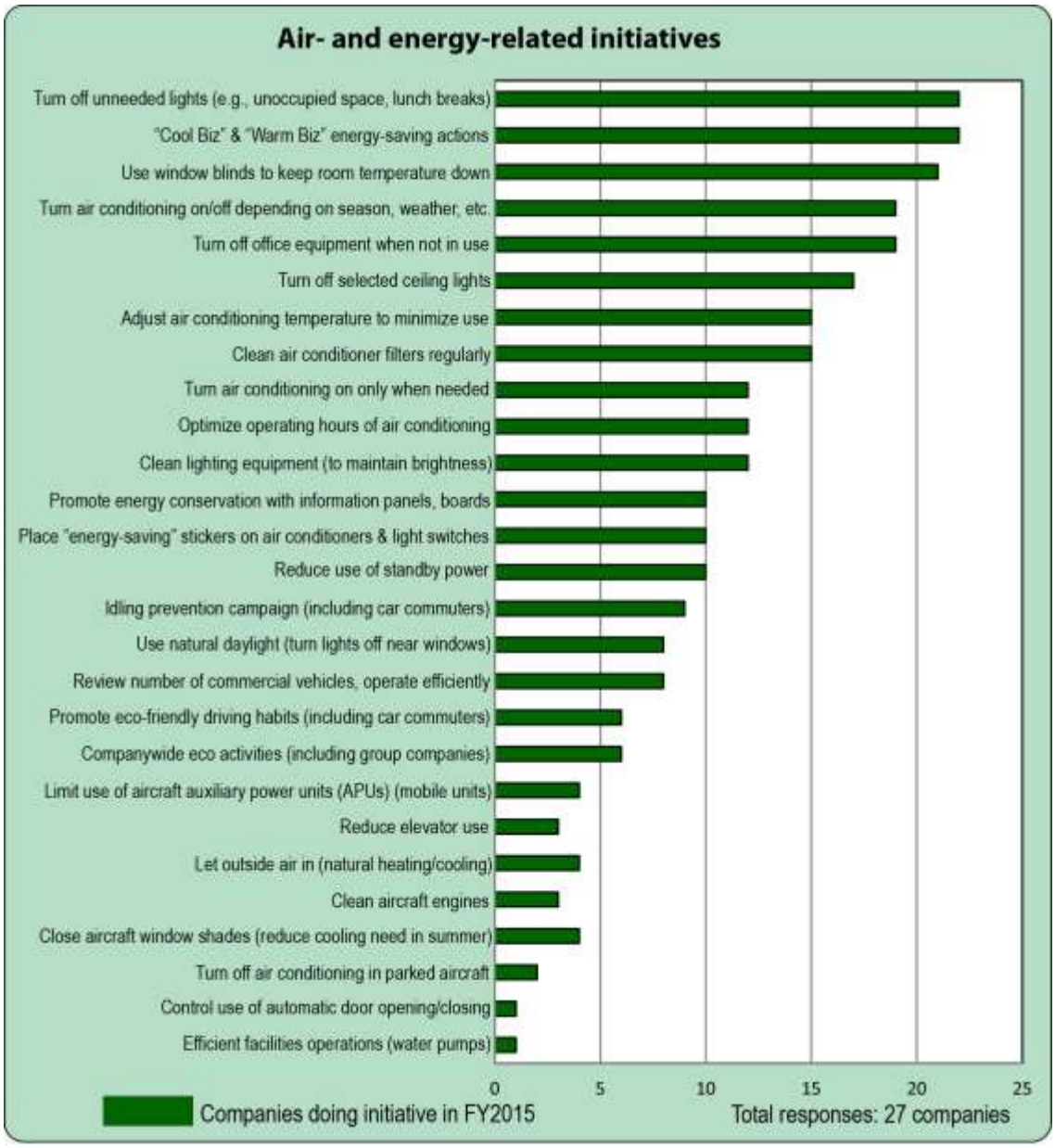
Transportation access to Osaka International Airport is highly convenient, and the use of public transportation (monorail and bus in graph below) has been steady for many years, in the range of 70% to 80%.



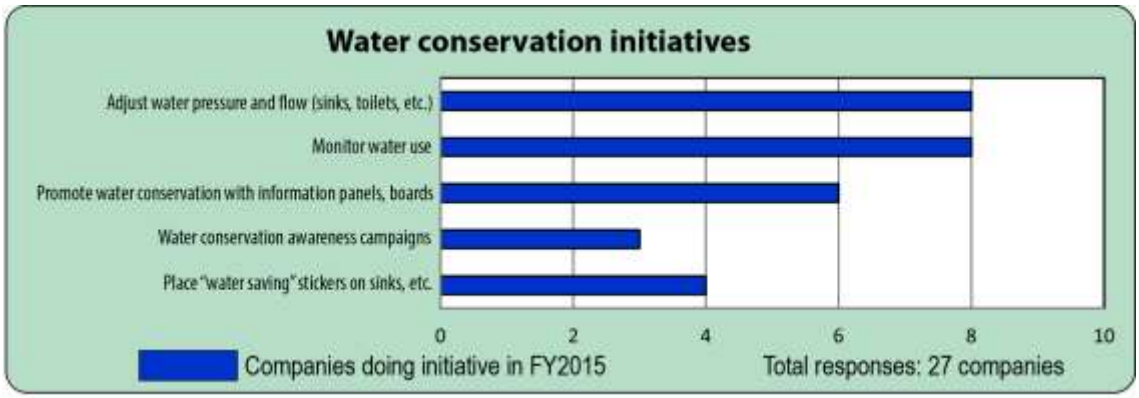
■ **Status of implementation of initiatives**

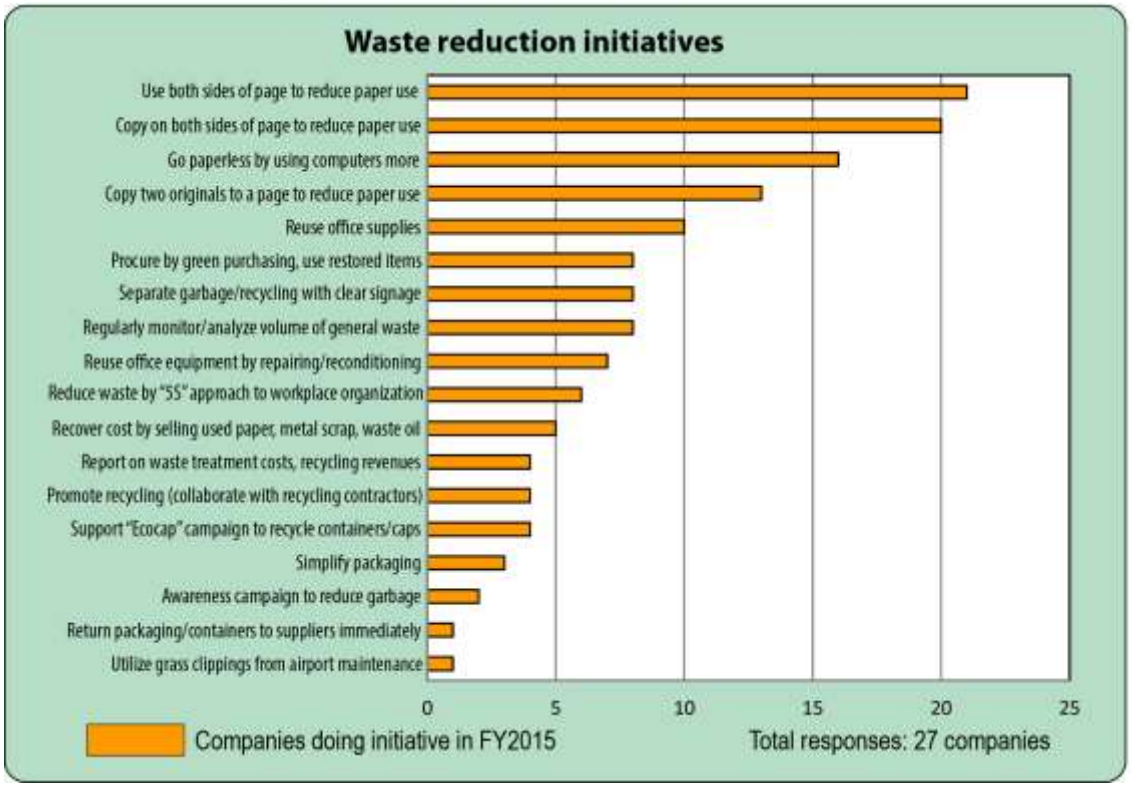
We surveyed businesses at ITM regarding which environmental initiatives they are implementing. The graphs on the following pages summarize their responses, from the most to least common actions. "Soft" measures are institutional, operational, and behavioral activities, while "hard" measures involve physical equipment and infrastructure, including the installation of facilities, equipment, and systems.

Soft measures (1)

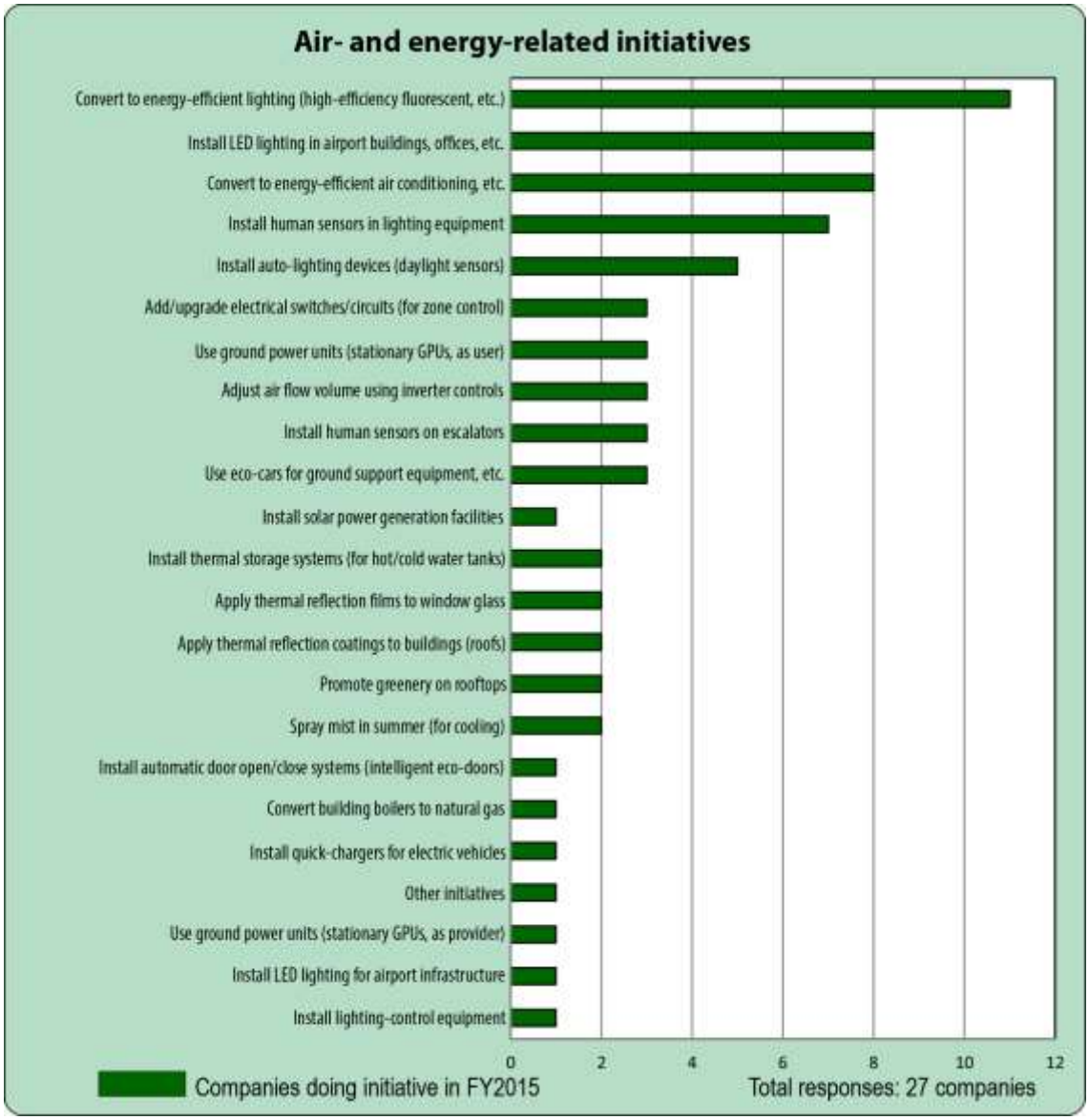


Soft measures (2)

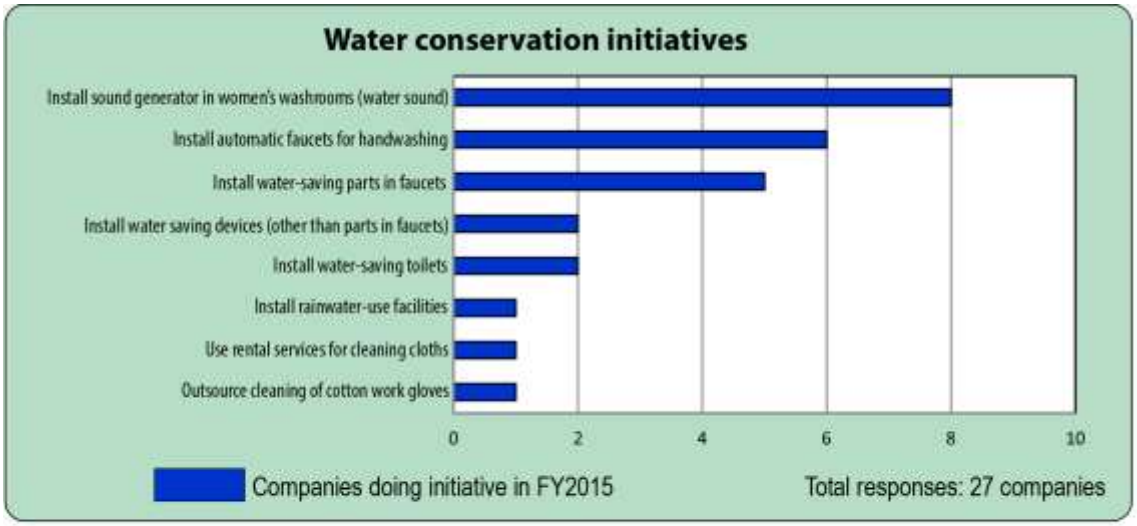


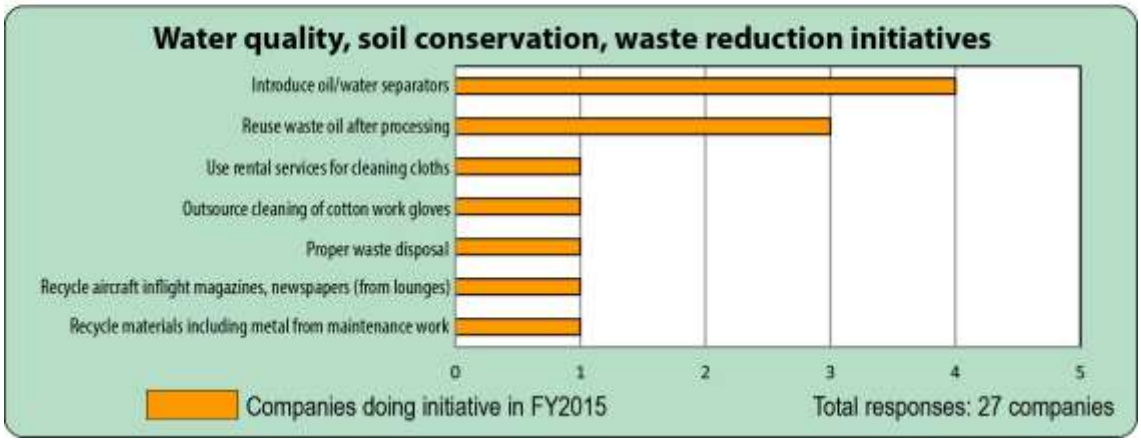


Hard measures (1)



Hard measures (2)





■ Water, energy, waste

					FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
Energy Use	Facilities	Electricity	From grid	kWh／年	55,203,891	54,141,511	53,782,296	53,297,296	53,657,180	49,757,239	45,422,959	44,623,981	43,751,338	42,314,587
			Self generated	kWh／年	0	0	0	0	0	0	0	0	0	0
		Gas	City gas	m3/yr	1,329,443	1,254,497	1,074,364	899,702	1,070,047	1,161,421	1,051,597	1,045,743	992,832	890,282
			Propane gas	m3/yr	729	843	631	839	795	762	755	639	639	613
		Other	Kerosene	ℓ/yr	55,543	80,360	76,238	54,307	54,465	55,251	55,232	60,805	50,541	46,450
			Heavy oil A	ℓ/yr	638,700	652,200	492,700	294,000	364,000	89,000	68,000	62,000	55,000	22,822
			Gasoline	ℓ/yr	0	0	0	0	0	0	0	0	0	0
			Light oil	ℓ/yr	0	0	0	484	920	1,047	1,128	1,303	1,578	5,357
	Vehicles		Gasoline	ℓ/yr	120,724	122,944	137,069	104,399	113,814	94,075	107,193	101,586	103,293	88,296
			Light oil	ℓ/yr	1,092,247	1,266,660	1,185,986	1,293,937	1,529,715	1,236,169	1,184,747	1,191,247	1,231,753	1,220,203
Water use	Clean water		Tap water	m3/yr	390,020	362,890	370,326	350,229	349,870	312,973	307,657	324,640	332,194	322,275
			Well water	m3/yr	0	0	0	0	0	0	0	0	0	0
			Other	m3/yr	0	0	0	0	0	0	0	0	0	0
	Reclaimed water			m3/yr	0	0	0	0	0	0	0	0	0	0
	Wastewater treated			m3/yr	363,604	337,909	336,603	324,206	335,328	308,351	298,327	316,383	323,937	312,394
Waste emissions	General (excl grass clip)			t/yr	5,450	4,948	4,656	4,141	3,749	3,511	3,084	2,987	2,879	3,131
	Industrial			t/yr	489	616	779	604	942	551	619	528	608	549
	Construction			t/yr	25,797	29,789	4,968	60,783	3,528	2,846	810	288	240	494
	Grass clippings (disposed)			t/yr	807	749	894	581	381	509	152	224	171	250
	Controlled industrial			t/yr	35	67	155	28	14	21	11	7	15	18

■ CO_2 conversion factors

	City gas	Propane	Kerosene	Heavy oil A	Gasoline	Light oil
Conversion factor	0.00223	0.0066	2.49	2.71	2.32	2.58
(Units)	t-CO_2/m^3	t-CO_2/m^3	t-CO_2/kℓ	t-CO_2/kℓ	t-CO_2/kℓ	t-CO_2/kℓ

Electricity to CO_2 conversion factors (kg-CO_2/kWh)	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FH2014	FY2015
	0.338	0.366	0.299	0.265	0.281	0.414	0.475	0.516	0.523	0.496

■ CO_2 emissions

	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FH2014	FY2015
CO_2 emissions (t-CO_2/yr)	26,596	28,140	23,384	20,649	22,804	26,984	27,556	28,994	28,797	26,522
Number of passengers	16,842,868	15,937,494	15,382,431	14,606,951	14,193,277	12,909,665	13,147,345	14,101,239	14,620,934	14,626,431
CO_2 emissions per person (kg-CO_2/person)	1.58	1.77	1.52	1.41	1.61	2.09	2.10	2.06	1.97	1.81

■ Vehicles

				FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FH2014	FY2015
Number of vehicles	Eco-friendly vehicles	Electric	台	11	11	10	9	9	11	11	11	11	9
		Hybrid	台	1	1	2	1	1	0	1	1	3	2
		Natural gas	台	0	0	0	0	0	0	0	0	0	0
		LP gas	台	0	0	0	0	0	0	0	0	0	0
		Other	台	63	73	88	100	114	107	113	113	114	113
	Other	Diesel	台	396	387	373	300	372	79	85	82	74	67
		Gasoline	台	105	95	94	75	73	341	339	349	357	330
		Other	台	10	10	10	10	10	5	5	5	1	2
	Total		台	586	577	577	495	579	543	554	561	560	523
	Ratio of eco-friendly veh.		%	12.8	14.7	17.3	22.2	21.4	21.7	22.6	22.3	22.9	23.7

Queries about this pamphlet:

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