24時間、こころ動かす空港

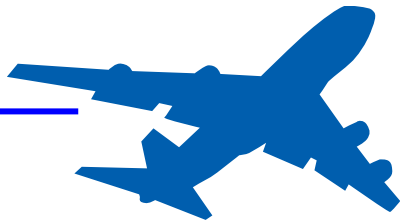
KIX

KANSAI INTERNATIONAL AIRPORT

Kansai International Airport

Environmental Report

ECO Island



KIX Environmental Report 2013

新関西国際空港株式会社

About the KIX Environmental Report

The "*KIX Environmental Report 2013*" covers a range of information corresponding to the major policies and measures identified in the "Kansai International Airport (KIX) Environmental Plan", adopted in March 2008. It provides detailed data on environmental initiatives on the airport island in fiscal 2012 that could not be included in the *Kansai International Airport CSR Report 2013*.

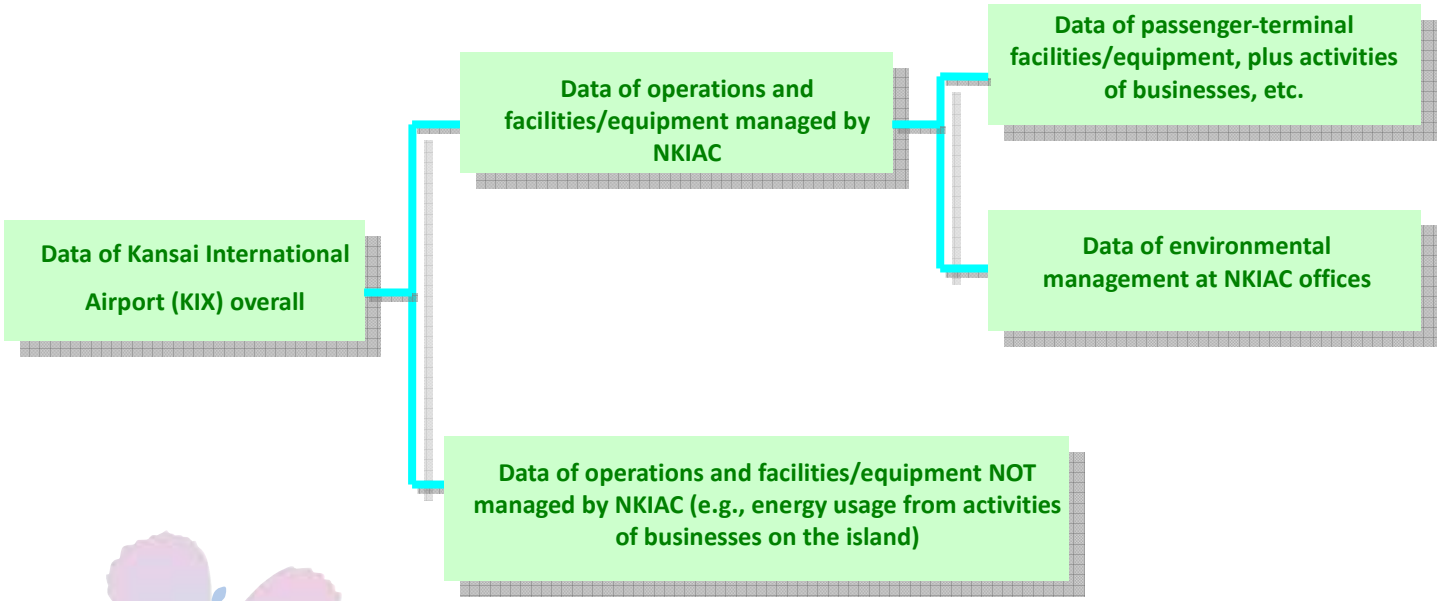
Evolving beyond our original Eco Island initiatives as a minimum standard, in April 2013 we began acting on our Smart Island Plan, which aims to make this a "smart" airport – good for people and good for the planet. This we will accomplish through the use of clean energy, better energy efficiency by the use of advanced information technologies, and other efforts.

Scope of this Report

The scope of the report includes the activities of the New Kansai International Airport Company, Ltd. and group companies as well as businesses operating on the island who are members of the "Kansai International Airport Eco-Island Council" (renamed in March 2013 as the "Kansai International Airport Smart Island Council").

Data sources

Data presented in this report comes from the following sources.



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1. Environmental management plan

■KIX Environmental Plan

At the Kansai International Airport, we have been working to achieve thirty environmental targets to minimize impacts on the environment (air, water, etc.) for the entire airport island, based on the Kansai International Airport Environmental Plan (dubbed the Eco-Island Plan) adopted in June 2001 .

With the start-service of the second runway in August 2007, the planning period for the Eco-Island Plan came to an end, and to continue efforts and develop the plan, in March 2008 we then adopted the KIX Environmental Plan in March 2008. Fiscal 2012 is the final year of this Plan.

Key components of the Plan

1. Planning period

Five fiscal years from 2008 to 2012.

2. Target activities and area

The Plan includes the entire airport island, and all the activities of users and operator involved in airport operations.

For activities outside the scope of management or control by the Kansai International Airport Company, efforts are to be promoted while actively seeking cooperation from businesses and other entities operating on the island.

3. Targets

Targets are to be established to evaluate the level of achievement of the plan, and the status of achievement is to be published regularly.

Targets are to be revised as appropriate, depending on progress with the plan, international circumstances relating to climate change, etc.

4. Organizational structure

The Environmental Management Committee will advance and manage (including revisions, improvements) the plan. An Eco-Island Council is to be established, to advance initiatives in cooperation with businesses and other entities operating on the island.

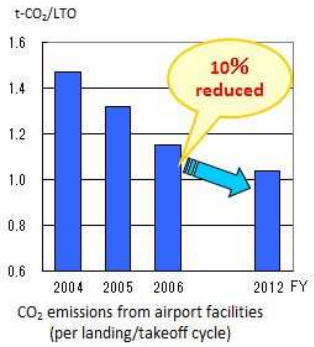
■Basic policies of the Plan

1. An airport that protects a comfortable local environment	Strive to reduce aircraft noise, adopt measures to deal with electromagnetic interference, protect atmosphere and water environment, etc.
2. An airport with minimal impact on the global environment	Cooperate with the relevant contractors and businesses to show leadership in reducing greenhouse gas emissions arising from activities. Protect the ozone layer by continuing efforts for proper management of equipment that uses CFCs.
3. An airport that recycles resources	Be a resource-recycling airport by minimizing material waste, making effective use of any waste generated, recycling water resources by using reclaimed water, and other initiatives.
4. An airport that values and promotes contact with nature	Make the most of the airport's unique character of being surrounded by water, by maintaining seaweed beds along the seawalls, creating green spaces and water features on the island, and promoting spatial designs that give airport users a feeling of comfort and relaxation.
5. An airport in harmony with local communities and users	Provide information to the public about environmental aspects of airport operations in order to promote public understanding and cooperation. Also, promote environmental efforts with the cooperation of airport users.

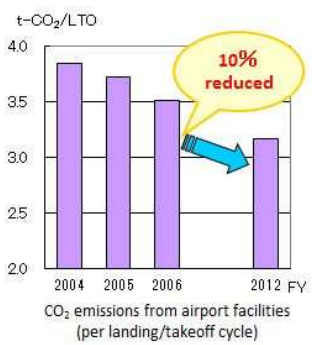
■ Numerical targets

We establish targets in order to advance initiatives and evaluate the progress toward achievements stipulated in the Plan. Where possible, we establish numerical targets (e.g., air quality, water quality, energy usage, greenhouse gas emissions, recycling rates, ets) for quantifiable categories. For categories where numerical targets are more difficult to establish, will still make our best effort to quantify the status of our initiatives.

Examples of quantitative targets



CO_2 emissions from airport facilities (per landing/takeoff cycle)



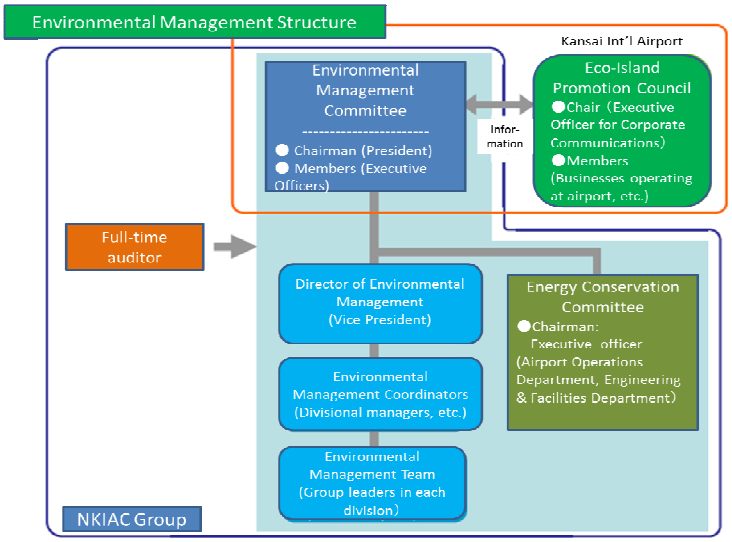
CO_2 emissions from airport facilities (per landing/takeoff cycle)

2. Environmental management structure and environmental monitoring system

■Corporate structure for environmental management

To advance the KIX Environmental Plan in an effective way, the president of the New Kansai International Airport Co. (NKIAC) serves as the chairman of the Environmental Management Committee, which evaluates and makes improvements on the plan. The entire organization is involved in the system, as each corporate division has an Environmental Management Director.

The Energy Conservation Committee is also part of the environmental management structure and aims to effectively promote energy conservation and CO_2 emission reductions. Auditors conduct environmental auditing .



Note: Committee was restructured March 2013.

■Broader support structure on the island

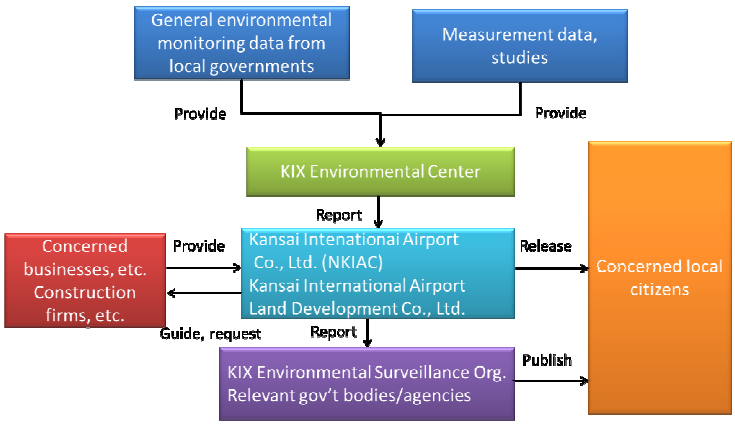
In order to further expand the environmental efforts at KIX, we established the Kansai International Airport Eco-Island Council in March 2008, with the purpose of advancing the KIX Environmental Plan. The Council has 42 members, including subsidiaries in our corporate group, plus governmental organizations, business operators, and private sector organizations.

The Council promotes environmental and related publicity activities at KIX. In fiscal 2012, it carried out a variety of activities, including an idling prevention campaign targeting vehicles, ceremonial planting of olive trees, an event to recognize best practices, and study tours to environmental facilities.

■Environmental monitoring system

The environmental conditions around KIX are monitored in order to track the impacts of airport-related operations, construction, and so on. An environmental monitoring plan has been developed under the guidance and direction of the Kansai International Airport Environmental Surveillance Organization (members include the governor of Osaka Prefecture and mayors of nine cities and four towns in the nearby Senshu District). Aircraft noise, air quality, water quality, aquatic life and other environmental parameters are checked regularly.

The results of monitoring are reported to the relevant governmental organizations in the form of monthly and annual reports and are also available at the Kansai International Airport Environmental Center.



3. Major measures, targets, and achievements

Item		Objective	FY2012 achievements (vs. FY2006)	Description	Rated	Page
(1) An Airport that protects a comfortable local environment	**Aircraft noise**					
	Reduce aircraft noise, introduce low-noise aircraft	Maintain 100% achievement of environmental standards	Maintained 100% (max. WECPNL 70)	• Continued implementing environmental monitoring		7
	Ensure compliance with proper flight paths			• Contacted concerned local governments by fax, and so on, on deviations from flight path due to weather.		
	Consider runway operations, make requests to concerned organizations			•Requested KIX Airline Operations Council (AOC),and so on, to observe proper flight paths.		
	Study low-frequency sound vibrations	Continue implementation	•Continued data collection			8
	Contribute to reduction of aircraft noise in Kansai region	Continue implementation	•Implemented efforts to improve access to KIX (such as parking fee policies) • Succeeded with various ticket sales programs (e.g., Kanku Chikatoku Kippu tickets) in collaboration with transportation access providers.			
	Electromagnetic interference					
	Address electromagnetic interference from aircraft	Maintain 100% implementation of improvement measures	Maintained 100%	• Measures/equipment to reduce television signal interference completed in FY2001, maintenance continued (until national adoption of digital transmissions July 2011).		8
	Air quality protection					
	Encourage the introduction of aircraft with low emissions of air pollutants	Make appropriate appeals	•Communicated with KIX Airline Operations Council (AOC).			
	Take emission reduction measures at incineration plant	Voluntary target of 70 ppm or lower concentration of NOx emissions (Government standard is 187 ppm)	32 ppm (average)	• Maintained efforts to ensure that actual nitrogen oxide emissions from incinceration plan were well below regulated standards.		9
	Improve quality of tanker fuel	100% is good quality Bunker A fuel or better	100% good quality fuel is being used	•We have been shifting to Bunker A tanker fuel since FY2000.		
	Encourage use of construction equipment equipped/designed for lower emissions.	Provide stipulations in 100% of cases	Provide stipulations in 100% of cases	•In project specifications, stipulate the use of construction equipment equipped/designed to have lower emissions.		
	Encourage the introduction of low-emission vehicles	At least 35% of vehicles in restricted area are low-emission vehicles (vehicles meeting 2005 standards, hybrids, electric vehicles, etc.)	Introduction ratio 28.6%	•KIX Eco-Island Promotion Council awareness efforts • Installed rapid chargers for electric vehicles in parking lot of Observation Hall at end March 2011. •Introduced 2 electric vehicles in FY2011.		11
	Promote use of low-emission type limousine buses	Make best effort	•Encouraged efforts by bus companies, related organizations. One company now operates hybrid bus.			
	Introduce CNG vehicles, and use of CNG fueling stations	Implement in cooperation with related organizations	• In March 2013, in cooperation with Smart Eco Logi Council held ceremony for launch of 20 large CNG trucks in international freight zone, and held CNG symposium.			
	Water quality protection					
	Reduce impacts of wastewater	COD level of treated wastewater discharge: daily average 12 mg/L or lower	COD daily average 7.3 mg/L	• Maintained quality of treated water discharge to be significantly better than regulated standards.		10
		Daily COD load never over 30 kg/day (i.e., 1/6th of level predicted by env. impact assessments.)	Daily COD load 6.9 kg/day	• Reused as reclaimed water some discharge from wastewater treatment plant.		

 Fully achieved target (110% or greater)

 Generally achieved target (90% to 110%)

 More effort needed next year (achieved below 90%)

Note: These targets were to be achieved in FY2012.

Item		Objective	FY2012 achievements (vs. FY2006)	Description	Rated	Page
(2) An Airport with minimal impact on the global environment	**Energy conservation measures**					
	Introduce energy-efficient equipment, keeping in mind the life-cycle cost	Reduce energy consumption (per aircraft landing-takeoff cycle) under our (NKIAC) control by 5% vs. FY2006	Reduced 14.7% (crude oil equivalent) (reduced from 0.373 kl to 0.318 kl per cycle) Note: In terms of energy consumption (crude oil equivalent), down 5.6% from FY2006 (reduced from 43,501 kl to 41,018 kl)	・Conducted "Energy Conservation Patrols," removed some lights to reduce lighting, adjusted air conditioning settings, etc. ・In FY2012, turned off air conditioners in passenger terminal building, controlled operation of aeration pumps. Installed LEDs as guide lights between passenger terminal building, Aeroplaza, and parkade.		12 14 15
	Promote energy conservation in facilities operations					
	Promote energy conservation in offices					
	Develop energy conservation technology for airports					
	Promote the use of new type of energy such as renewable energy	Make best effort	・Now conducting trial operation of hydrogen-powered vehicles, using hydrogen filling stations (installed in May 2007) on airport island. ・Conducting trial operation of hydrogen fuel cell bus since Oct. 2012. ・Using photovoltaic power generation system in temperature-controlled building for medical products since Sept. 2010. ・Installed one rapid-charging station for electric vehicles in the Observation Hall parking lot in March 2011, and a total of four regular chargers in two multistory car parking (P1 and P2) in Dec. 2012. ・Installed three small wind turbines in KIX Sora Park in Oct. 2012.			13
	Reducing greenhouse gas emissions					
	Make taxiways more efficient	Reduce greenhouse gas emissions (per aircraft landing-takeoff cycle) by 10% compared to FY2006	Reduced 26.1%	・Increased ratio of fuel-efficient aircraft (ratio of smaller aircraft is increasing).		16
	Promote the use of more fuel-efficient aircraft		(reduced from 3.52 t/cycle to 2.60 t/cycle)			
	Promote the use of ground power units (GPUs)	GPU usage ratio of at least 75% GPUs installed at 100% of stationary aircraft stands at Phase 2 island	GPU usage ratio of 71.8%	・Changes made to parts of Aeronautical Information Publications (AIP) since Jan. 2010, reducing time aircraft can use auxiliary power unit (APU) (was 30 minutes before scheduled departure, now 15 minutes)		17
	Conduct idling prevention awareness campaigns	Make appropriate appeals	・Installed signage in parking areas. ・ Displayed posters from Osaka Prefecture on airport island. ・KIX Eco-Island Promotion Council conducted intensive campaign on June 6, 2012.			18
	Enhance convenience and promote use of public transportation	Make appropriate appeals Use buses less than 100 times/year as substitute when trains are stopped	Replaced 92 buses in FY2012	・Extended windbreak fence along airport access bridge in April 2008, improving convenience of public transportation.		
	Reduce greenhouse gas emissions(GHG) from incineration plant	Reduce plastics content to below 10%	Plastics content 17.2%			
	Reduce GHG emissions from airport facilities	Reduce GHG emissions (measured per landing-takeoff cycle) from airport facilities (excluding aircraft) by 10% compared to FY2006	Reduced 13.0% (Reduced from 1.15 t to 1.00 t per cycle)			16
	Management of CFCs, etc.					
	Proper handling of equipment that uses CFCs, etc.	Conduct regular inspections	・For emergency chillers, package air conditioners, and room air conditioners that use CFCs, conducted regular annual inspections, and ensured no refrigerant leaks were occurring. When replacing coolant system parts due to failure or other cause, refrigerant is collected with proper equipment.			

 Fully achieved target (110% or greater)

 Generally achieved target (90% to 110%)

 More effort needed next year (achieved below 90%)

Note: These targets were to be achieved in FY2012.

Item		Objective	FY2012 achievements (vs. FY2006)	Description	Rated	Page
(3) An Airport that recycles resources	**Efficient use of resources**					
	Reduction of general waste volume, recycling of resources	Recycle at least 10% of general waste	Recycling ratio 11.7% Note: General waste volume reduced 32.4% compared to FY2006 (from 12,327 t to 8,336 t)	・Issued rules for waste separation in "Regulations Governing the Use of Waste Processing Facilities." ・Introduced separated waste collection by airline companies for garbage from aircraft.		19
	Reduction of industrial waste volume, recycling of resources	Appeal to businesses operated on airport island, and other actions	・Implemented separated waste collection of international air freight. Implemented recycling. ・Requested delivery companies to take back and re-use packing materials arising at the time of product purchase in direct duty-free shops. ・Used ultrasonic cleaning equipment for air conditioning filters. Cleaned, re-used neutral filters, etc.			19
	Effective use of construction by products	100% recycling of dirt/sand from projects on the island (i.e., only for reusable dirt/sand)	・No reusable dirt/sand was generated in FY2012.		—	
	Purchasing of environmentally-friendly products	Continue implementation	・Selected green products as much as possible when purchasing products			14
	Water reclamation					
	Advanced treatment and reclamation/reuse of wastewater Promotion of water conservation actions	Reduce freshwater usage by 5% compared to FY2006 (per aircraft landing-takeoff cycle)	Reduced 28.7% (Reduced from 8.76 to 6.25 m3/cycle)	・Used reclaimed water for flush toilets, plant watering, etc. ・Promoted water conservation actions, such as use of automatic faucets.		20
(4) An Airport that values and promotes contact with nature	**Natural environment**					
	Monitoring of seaweed beds along sloping rock-fill seawalls	Maintain seaweed beds	・Seaweed bed area: 55 ha (about 10% of total seaweed bed area in Osaka Bay: 2013 study)			21
	Expand greenery on airport island	Continue implementation	・Opened KIX Sky Park in area adjacent to Terminal 2 in October 2012. ・Planted olive trees (50 olive trees along walking path connecting to Phase 2). ・Conducted maintenance, such as mowing, watering, pruning, fertilizing, etc.			22
	Landscape protection					
	Landscape protection of airport island	Continue implementation	・On Phase 2 airport island, areas created for native plant species *Dianthus japonicus Thunb.* (hamanadeshiko) and *Lysimachia mauritiana Lam.* (hamabossu) behind seawall as space to enjoy waterside facing inner water section.			22

 Fully achieved target (110% or greater)

 Generally achieved target (90% to 110%)

 More effort needed next year (achieved below 90%)

Note: These targets were to be achieved in FY2012.

Item		Objective	FY2012 achievements (vs. FY2006)	Description	Rated	Page
(5)An Airport in good relations with the local community airport and users	**Information provision**					
	Have good systems for handling noise complaints	Maintain 100% response ratio for complaints, and so on.	・Accepted and responded 24 hours a day, 365 days a year to any complaints about noise, flight paths, altitude, etc.		☺	8
	Publish environmental monitoring data	Continuous release of information	・Released environmental monitoring data on websites of NKIAC and Kansai International Airport Land Development Co., and at Environmental Center		☺	23
	Prepare and publish reports on the environment	Publish every year	・In the Eco-Island Report (Kansai International Airport Environmental Report), released information about status of environmental efforts based on the KIX Environmental Plan. ・Have published CSR Reports since FY2008.		☺	
	Dialogue, cooperation with local community					
	Increase diversity of information-provision opportunities, involve local communities	Provide website, reports, pamphlets	・Included environmental management plans, Eco-Island Reports, environmental monitoring data, etc. on company website.		☺	23
	Provide venues for environmental education	Continue implementation	・Provided environment-related public relations materials at KIX Environmental Centre at the KIX Observation Hall (32,651 visitors in FY2012) ・Conducted KIX Science Class in Nov. 2012 (40 primary school students and parents participated) ・Provided guest speakers and airport tours for primary school students (16 schools in FY2012).		☺	23 24
	Conduct social contribution activities	Continue implementation	・Held 9th KIX Dragon Boat Festival in water section between airport Phase 1 and Phase 2 areas.		☺	24
	Promote environmental conservation activities in collaboration with airport users	Continue implementation	・Eco-Island Promotion Council implemented idling prevention awareness campaign, etc.		☺	18
	Collaboration with other airports in Japan and overseas					
	Collaboration with other airports in Japan and overseas	Continue implementation	・Carried out information exchanges and dialogue with Narita International Airport and Chubu Centrair International Airport through the Environmental Liaison Committee for Major Airports. ・Organized displays at Eco-Products 2012 in Dec. 2012, in collaboration with other airports.		☺	25

☺ Fully achieved target (110% or greater)

☺ Generally achieved target (90% to 110%)

☹ More effort needed next year (achieved below 90%)

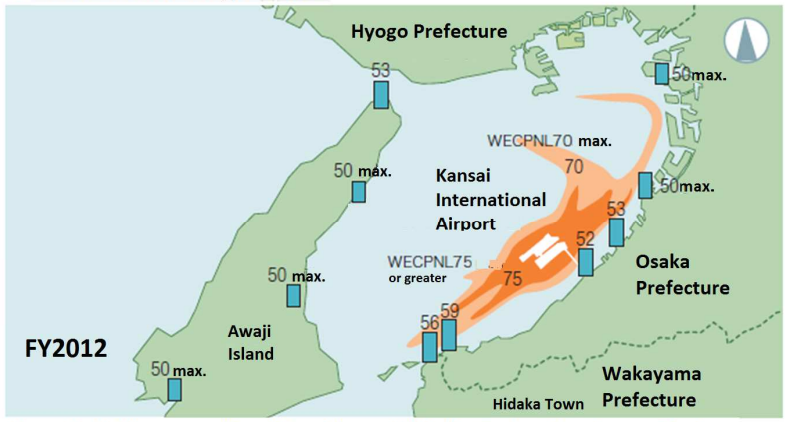
Note: These targets were to be achieved in FY2012.

4. Environmental initiatives (1) Protecting a comfortable local environment

KIX was built five kilometers off the coast of the Senshu District in order to minimize the impacts of aircraft noise. Measurements of aircraft noise have shown that environmental standards are being met at all monitoring sites. For emissions from our incineration plant and wastewater from our wastewater treatment plant, we have voluntarily set more stringent standards than required by regulation, in our effort to minimize impacts on the environment.

■ Efforts to minimize the impacts of aircraft noise

An environmental assessment of aircraft noise, based on flight paths and aircraft operations designed to minimize aircraft noise, found that noise levels exceeding WECPNL 70 occurred only over water (Note 1).
KIX conducts both continuous and regular monitoring of aircraft noise, and publishes the findings. For fiscal 2012, noise levels complied with environmental standards (maximum 70 WECPNL) at all land-based continuous monitoring stations and regular monitoring sites.



Note: WECPNL contour lines (Note 1) near KIX indicate aircraft noise monitoring results in environmental assessment for airport Phase 2.

Efforts to minimize the impacts of aircraft noise

○ Measures at noise sources

- Use quieter aircraft (Note 2)

○ Flight paths and aircraft operation

- 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.
- Flight procedures have been adopted to minimize noise from aircraft approaching the airport from Kitan Strait (Note 3).
- Continuous descent flight procedures have been adopted (Note 4).

○ NKIAC initiatives

- Continue monitoring for compliance with established flight paths and altitudes.
- Communicate with KIX Airline Operations Council to request that members observe established flight paths and give due consideration to the need to minimize noise, etc.

For Notes 1 to 4, please see page 29.

■ Prevention of television signal interference

The potential for television signal interference has become significantly lower with Japan's complete adoption of digital terrestrial broadcasting in July 2011. Measures addressing that problem have therefore ended.

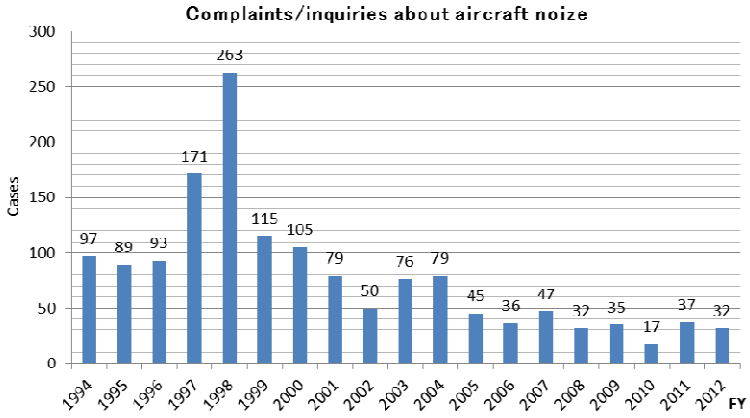
■ Complaints and inquiries

Aircraft noise

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.

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. We study these issues in cooperation with the Civil Aviation Bureau (under the Japanese Ministry of Land, Infrastructure and Transport) and publish our findings.

We will continue to respond appropriately to complaints and inquiries.



◆ **Contacts**

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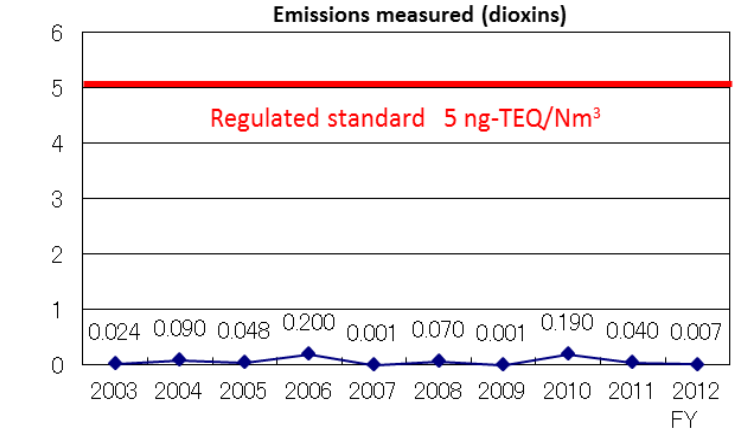
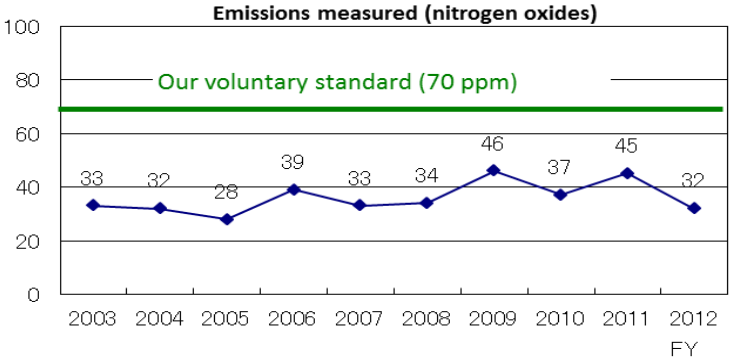
Measures to reduce emissions from incineration plant





General waste from the airport island is separated into combustibles and recyclables. Combustible waste is then incinerated at our incineration plant.

Emissions from incineration go through a filter-type precipitator.

The installation of a garbage shredder has significantly improved the furnace's incineration efficiency and ensured that the concentration of air pollutants such as nitrogen oxides in emissions is below regulated standards under Japan's Air Pollution Control Act. Dioxin emissions are also well below established standards.

Heat from incineration serves as a heat source for air heaters used to prevent white smoke (Note 5), and hot water generators provide heat for room heating and tap water at the incineration plant.

Incineration plant

Plant Features

This plant is designed with a fluidized bed furnace and is well-equipped with pollution-prevention equipment. In particular, flu-gas treatment equipment includes a filter-type precipitator that uses catalysts to remove nitrogen oxides, and humidity-regulated fly ash stabilizing equipment. Consideration is also given to ensure the plant fits in with the local surroundings.

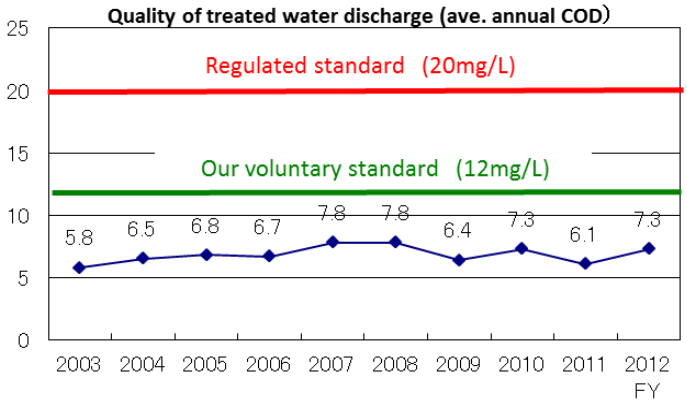
Exhaust gas flow

Incineration emissions at temperatures of 800°C to 950°C in the furnace are directed into a cooling chamber through air heaters designed to prevent white smoke, and then 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 have voluntarily adopted strict standards at the stack outlets for dust, sulfur oxides, hydrogen chlorides, and nitrogen oxides, with maximums of 0.02 g/Nm^3, 20 ppm, 30 ppm and 70 ppm, respectively.

Incineration plant

■ Advanced wastewater treatment

Wastewater from airport-related facilities is discharged after undergoing advanced treatment at the wastewater treatment plant. The treated water discharged is significantly better than regulated standards, as we have set our own stringent voluntary standards (e.g., COD daily average 12 mg/L). Our laboratory is equipped with a variety of testing equipment, and rigorously controls water quality, including everything from the airport's water supply to wastewater discharged into Osaka Bay. We also strive to maximize the effective use of water resources, such as by using reclaimed water for flush toilets and watering of plants.



Wastewater treatment plant

Wastewater from the passenger terminal buildings and other airport facilities is treated separately as either general wastewater or special wastewater from industrial sources, etc. The general wastewater is treated using advanced methods such as activated-sludge circulation nitrification/denitrification, chemical clarification (coagulation/sedimentation), and rapid sand filtration. Certain types of wastewater first undergo onsite pre-processing to remove hazardous substances, and then undergo advanced treatment at the wastewater treatment plant, through chemical coagulation/sedimentation, and rapid sand filtration methods, etc. Treated wastewater is reused as reclaimed water, such as in airport flush toilets, and for watering plants; surplus water is discharged into the sea.

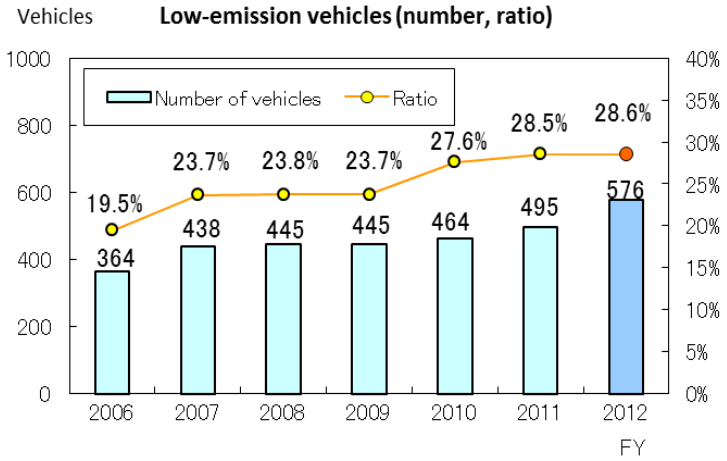
Treatment capacity	General wastewater:	10,050 m^3/day
	Special wastewater:	3,300 m^3/day

Fiscal 2012 processed volumes: 1,848 m^3/day (general wastewater), 236 m^3/day (special wastewater).

Wastewater treatment plant

Introduction of low-emission vehicles

When opportunities arise, such as when we upgrade our vehicles, we are gradually introducing more low-emission vehicles. We are also encouraging businesses and operators on the airport island to make the same shift. Low-emission vehicles (meeting 2005 standards) accounted for 576 (or 28.6%) of the vehicles authorized to operate inside the airport's restricted area (Note 6). Included in this number were 205 electric vehicles.



Use of low-emission vehicles (as of March 2013)

Vehicles authorized in restricted area: **2,017**

Of which, low-emission vehicles: 576

Electric	205
Hydrogen-powered	1
Hybrid	8
Meeting 2005 standards (50-70% reduction)	287
Meeting 2007 standards	56
Meeting post new long-term standards	19

Installation of electric vehicle charging stations

We installed rapid-charging stations for electric vehicles in the Observation Hall parking lot in March 2011, and operation started the following month. Chargers for household use typically take eight to ten hours to charge a vehicle, but the rapid chargers can charge a vehicle battery to about 80% of capacity within about thirty minutes. In December 2012, we installed two regular chargers (plug-in type) each in two airport car parking (P1 and P2). With these additions, customers can now come to KIX airport facilities knowing they can charge their electric vehicles. We will continue with these initiatives to be not only more environmentally friendly, but also more convenient for customers.

Rapid-charging station

Regular charging station

Introduction of hydrogen fuel-cell buses

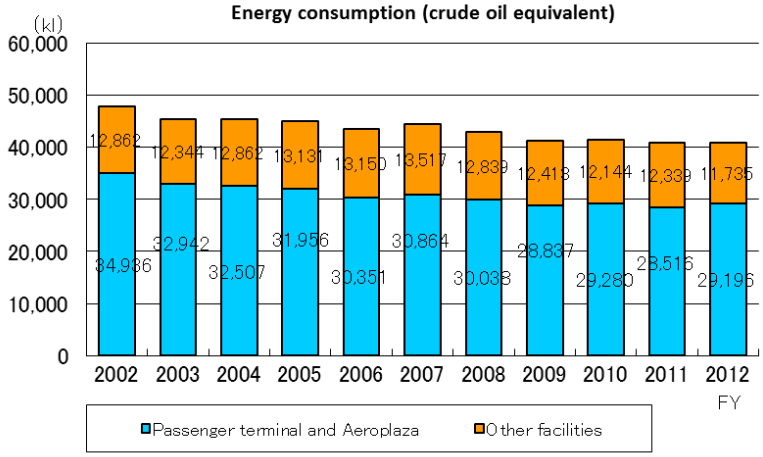
In October 2012, we began trial use of a hydrogen fuel-cell bus for the route from the Aeroplaza to Terminal 2.

Hydrogen-powered fuel-cell bus

(2) An airport with minimal impact on the global environment

Our Energy Conservation Committee is working to promote energy efficiency at KIX, including consideration of ways to boost the efficiency of energy use. Guided by our "Office Environmental Management Manual," we are making advances in green purchasing and energy conservation, and going paperless in our offices. We are also working to reduce CO_2 emissions through various initiatives, including the use of hydrogen fuel cells and renewable energy such as solar power, promoting the use of GPUs, and discouraging vehicle idling.

■ Promoting energy conservation



Since establishing the Energy Conservation Committee in fiscal 2002 we have been engaged in investigation, analysis, action, and program development to conserve energy, and since September 2006 have been implementing a medium and long-term plan based on Japan's Energy Conservation Act (enacted April 2006). To date, we have implemented a number of institutional initiatives, such as introducing a control system for the air conditioning in the lounges at passenger terminal gates that incorporates information about aircraft arrivals and departures.

We also started the practice of "Energy Conservation Patrols" and based on their findings have made renovations as well as changes in the operation of air conditioning and lighting, in order to conserve energy. In fiscal 2012, we were able to avoid about 554 tons per year in CO_2 emissions, through initiatives including stopping the operation of some air conditioners in passenger terminal buildings, alternating the operation of air conditioners, controlling the operation of aerator pumps, and installing LED lighting for guide lights between the passenger terminal building, Aeroplaza, and parkade.

In response to requests to conserve energy during electricity shortages, in fiscal 2012 we were able to reduce electricity consumption by about 11% in summer and about 6% in winter compared to the previous year, by initiatives that included turning off some lighting, and halting some air conditioner fans in equipment rooms.

Our consumption of municipal water was up 4.6% compared to the previous year.

Airport users received Japanese hand-held fans during energy conservation campaigns

	Annual energy consumption				Crude oil equivalent	Water
	Electricity	Cooling	Heating	Gas		
	(MWh)	(GJ)	(GJ)	(m^3)	(kl)	(m^3)
FY2002	122,677	295,737	162,451	142,805	47,798	551,249
FY2003	119,772	261,328	146,154	154,637	45,286	446,067
FY2004	116,404	289,243	145,967	139,110	45,374	417,804
FY2005	115,577	274,901	157,774	151,495	45,087	406,514
FY2006	113,080	261,073	144,850	147,364	43,501	425,216
FY2007	114,743	267,063	151,919	142,277	44,381	455,390
FY2008	110,052	270,467	140,386	131,792	42,877	428,806
FY2009	106,740	246,420	142,484	127,824	41,250	406,541
FY2010	104,717	257,685	151,056	125,902	41,424	389,835
FY2011	102,270	249,918	161,025	111,204	40,855	400,833
FY2012	102,872	246,304	162,491	108,591	40,931	419,237
vs. FY2006	91%	94%	112%	74%	94%	99%

Promoting renewable energy

Trial use of hydrogen-powered vehicles and hydrogen fuel-cell buses

Expectations are high for hydrogen as the ultimate clean energy and to fight global warming, as water is its only by-product of combustion. A hydrogen fueling station was installed at KIX in May 2007. Hydrogen-powered vehicles are being operated for commercial use, and since October 2012, buses powered by fuel cells running on hydrogen have been in trial operation as shuttle buses between the Phase 1 Aeroplaza and Terminal 2.

Hydrogen-powered vehicle

Hydrogen fueling station and bus powered by hydrogen fuel cell

Hydrogen fuel-cell power truck

Since fiscal 2010, we have conducted trial operation of a mobile power supply truck equipped with fuel cells that run on pure hydrogen. This truck has been used during dragon boat competitions and other outdoor events.

Hydrogen fuel-cell power-supply truck

Installation of photovoltaic systems

A photovoltaic system with 358 panels was installed on the roof of the temperature-controlled building for medical products, built in September 2010 in the international freight zone. The system generated about 54,000 kilowatt-hours in fiscal 2012, reducing CO_2 emissions by about 22.4 tons.

In fiscal 2012, with the aim of being an environmental leader among airports, we invited for applications from electricity venders to install solar panels on the roofs of cargo buildings and on land adjacent to runways. Winning applications were decided in April 2013. Panels are now being installed along planned taxiways expansions on the south side of Runway B and on cargo building roofs, with the first operation expected to begin in early 2014 and a total output of 10 megawatts.

Planned location of solar cells

Installation of outdoor lighting powered by small wind turbines

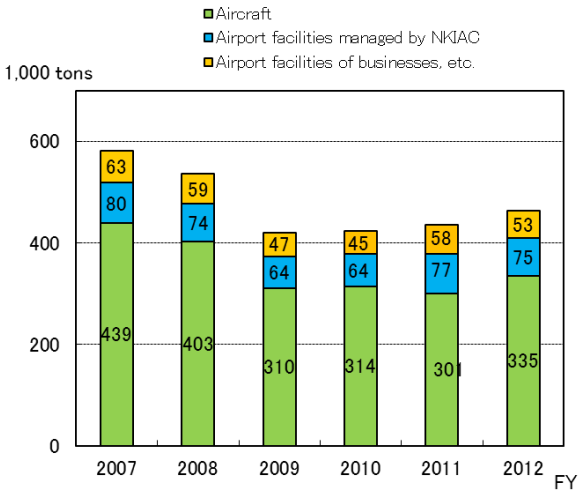
We have installed three outdoor lights in KIX Sky Park, powered by wind turbines and solar panels.

Outdoor lights powered by small wind turbine

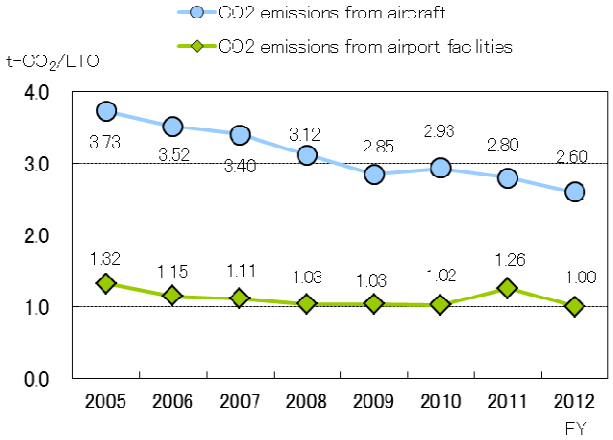
Climate change countermeasures

The CO_2 emissions from operations at KIX amounted to 463,000 tons in fiscal 2012. The largest share of this amount is from aircraft, at 72.3% of the total, followed by 16.2% from passenger terminals and other airport facilities. From the perspective of the global environment, the KIX Environmental Plan includes measures to combat global warming, including increased use of ground power units (GPUs) and efforts to stop vehicle idling (see page 16). We intend to intensify such efforts in the coming years.

Airport CO_2 emissions (total)

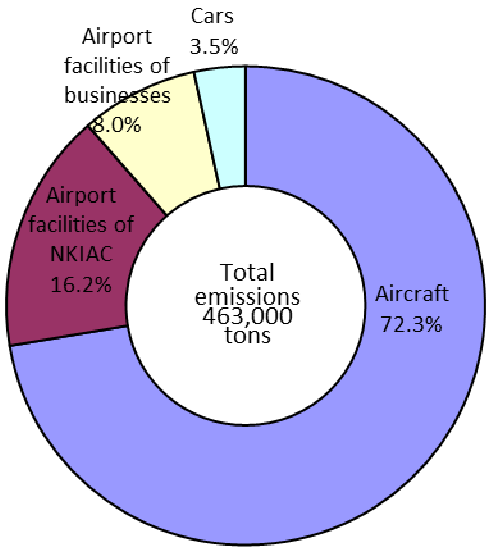


Airport's CO_2 emissions (per landing/takeoff cycle)



Note: Figures are per aircraft landing/takeoff cycle. CO_2 emission factors associated with procured electricity are calculated from Kansai Electric Power Co. coefficients for each year.

Breakdown of CO_2 emissions (2012)

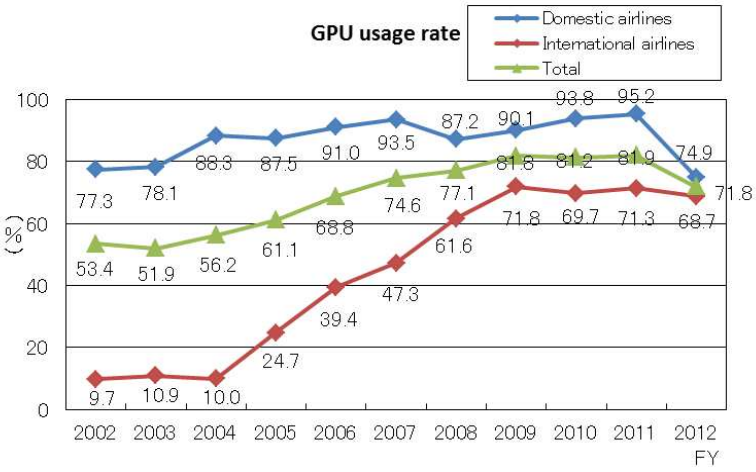


Criteria for calculation of emissions:

- Emissions from aircraft are calculated to include the airport-related portion of the aircraft landing/takeoff (LTO) cycle as defined by the International Civil Aviation Organization (i.e., movement of the aircraft between an altitude of 3,000 feet and the ground for both landing and take-off).
- Emissions from vehicles are from vehicles operating within the airport's restricted areas. Figures exclude trains, ships, and vehicles travelling to and from the airport.

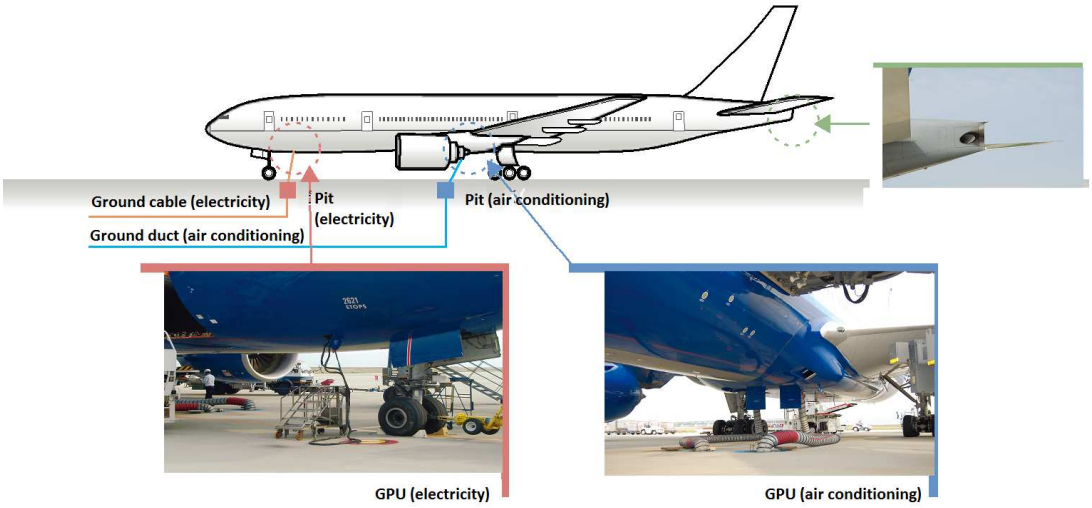
Promoting the use of ground power units (GPUs, Note 7)

The electricity required by parked aircraft to run air conditioning and other systems is usually provided by an onboard auxiliary power unit (APU). To reduce air pollution from APUs, we have installed ground power units (GPUs) to provide electricity and air conditioning at aircraft parking spots, and are asking airlines at KIX to use them. Also, KIX was the first in Japan to have changes made to the Aeronautical Information Publications (AIP, see Note 8) pertaining to GPU usage, reducing the period of time an aircraft can use its APU – from 30 minutes prior to scheduled departure to the shorter time of 15 minutes.



Note: Graph indicates the ratio of actual number of times (i.e., flights) GPUs were provided compared to number of opportunities to provide (i.e., flights). For fiscal 2001 to 2008, the ratio indicates only stationary GPUs, while from 2009 onward it also includes mobile units.

In fiscal 2012 the ratio of GPU usage (including mobile units) is 71.8% overall.



Benefits of GPUs at KIX (see note):

CO_2 emissions reduced by use of GPUs in FY2012:

46,000 tons

Note: Reduction is calculated as the difference between CO_2 emissions from GPU use and the emissions that would have occurred if only APUs were used.

Idling prevention campaign

To reduce the idling of vehicles, signs and posters are displayed in parking lots. During international Environment Month in June each year, the Eco-Island Council conducts an idling-prevention awareness campaign targeting drivers and users of the airport (June 7 in 2012).
Also, as a business specified under Japan's Act concerning Special Measures for Total Emission Reduction of Nitrogen Oxides and Particulate Matter from Automobiles in Special Areas (known as the NOx and PM Act), we prepare a Vehicle-Use Management Plan to reduce those emissions, take voluntary efforts such as reducing traffic volume, and report annually to Osaka Prefecture.

Awareness campaign to stop idling

(3) An airport that recycles resources

We are working for proper management of waste generated on the airport island, including recycling and the reduction of waste volume. By using reclaimed water, we are also promoting the efficient use of water resources.

Waste reduction, recycling

The more than 10,000 tons of general waste generated at KIX each year come mainly from aircraft, airline catering plants, and passenger terminal buildings, etc.

In order to recycle and reduce this volume of general waste, NKIAC has written rules for waste separation in "Regulations Governing the Use of Waste Processing Facilities" and has reached out to businesses operating at the airport, urging them to sort their waste. The result is a reduction down to 8,300 tons of waste generated at the airport in fiscal 2012, and a recycling ratio of 11.7% for general waste.

Waste category	Description
Combustibles	Kitchen waste, wood waste, non-recyclable paper, rags, other
Recyclables	Cans: Steel, aluminium
	Glass bottles: Bottles (unbroken)
	PET bottles
	Waste paper: Newspaper (excluding advertising), magazines
	High-quality used paper: Copy paper, office paper
	Documents (excluding confidential materials)
	Cardboard
Non-combustibles	Glass dishes, ceramic dishes, glass bottles (broken), metal waste
Large combustible items	Wood waste, cloth, briefcases, grass clippings, wooden products

As for industrial waste, we have been encouraging businesses operating at the airport to make efforts to manage waste properly, avoid waste generation, and recycle.

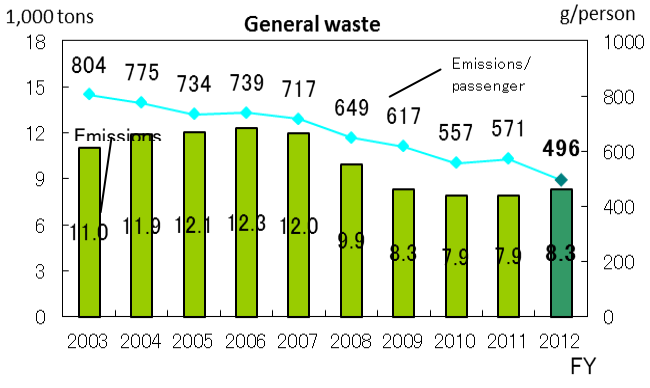
Waste collection	8,336
Combustibles	7,126
Recylables Non-combustibles	1,210

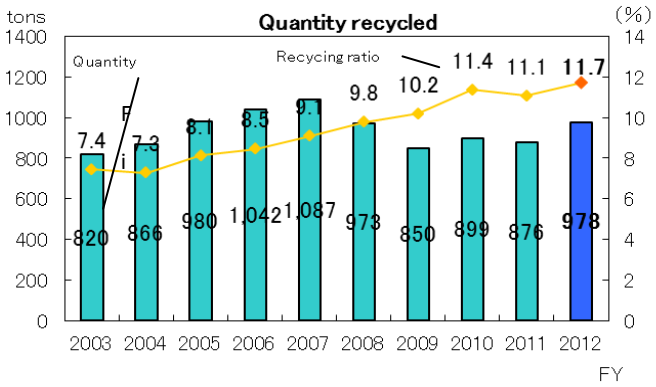
Units: Tons/year

Clean Center (incineration plant)

Final disposal in landfill	994
Quantity recycled	978

Units: Tons/year



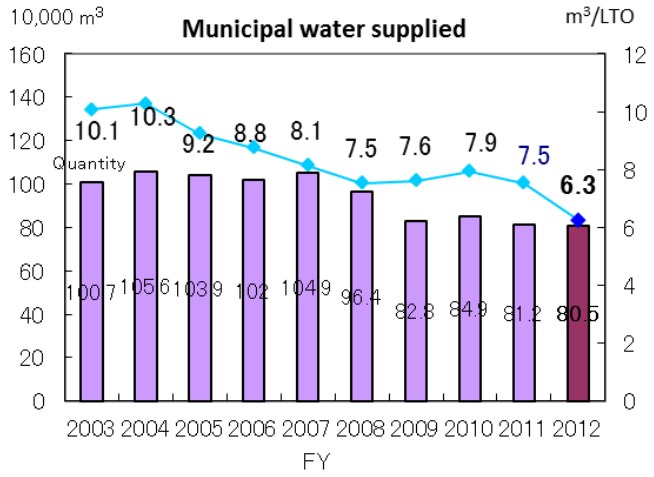


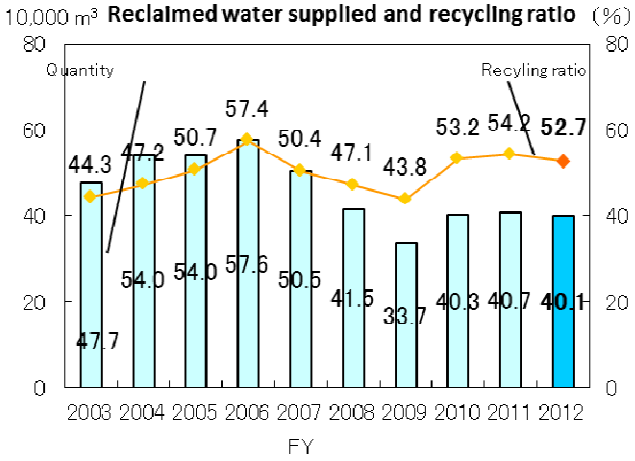
Efforts to reduce waste by businesses operating at KIX

Domestic airlines: About 20% of the total amount of waste generated at KIX comes from aircraft. Recognizing the need to reduce waste by sorting it and reducing its volume, JAL and ANA sort garbage coming from aircraft passenger cabins. They are also separating out newspapers from aircraft passengers. A large quantity of packing material (plastic) is used in air cargo operations to prevent leakage, etc., so an effort is being made to recycle it rather than treating it as waste.

Reducing water usage, using reclaimed water

In fiscal 2012, a total of 805,000 cubic ㎥ meters of water was supplied to the airport (equivalent to 6.3 cubic ㎥ meters per landing/take-off cycle). On the airport island, reclaimed water is used for flush toilets and for watering plants, as well as for cleaning road surfaces and tarmacs. In fiscal 2012, we used 401,000 cubic ㎥ meters of reclaimed water, putting our water recycling rate at 52.7%.





Note: Recycling ratio here is reclaimed water supplied divided by wastewater volume.

(4) An airport that values and promotes contact with nature

Seaweed beds have been planted to help create marine habitat in Osaka Bay and we have been monitoring their growth. An effort was made to provide better growing conditions for seaweed by installing special blocks on the sloping rock-fill seawalls built for the Phase 2 airport island construction, and a number of other approaches were attempted, including seaweed seeding. As a result, compared to the seven years needed for seaweed beds to become established around the Phase 1 airport island, the beds were established around the Phase 2 island in just three years. We are also increasing the amount of greenery on the island through tree-planting ceremonies and other activities.

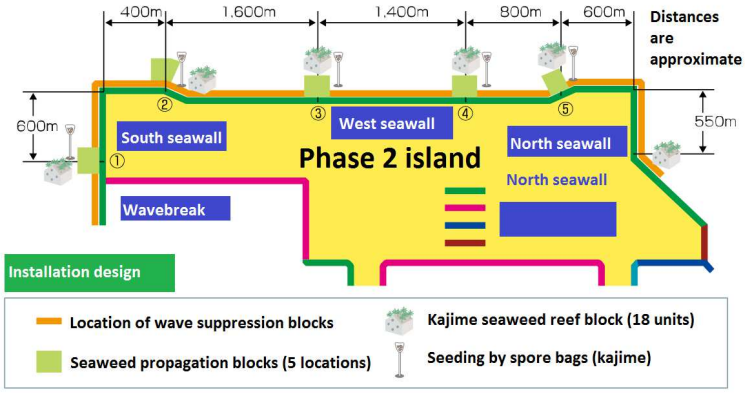
Supplying seaweed seedlings

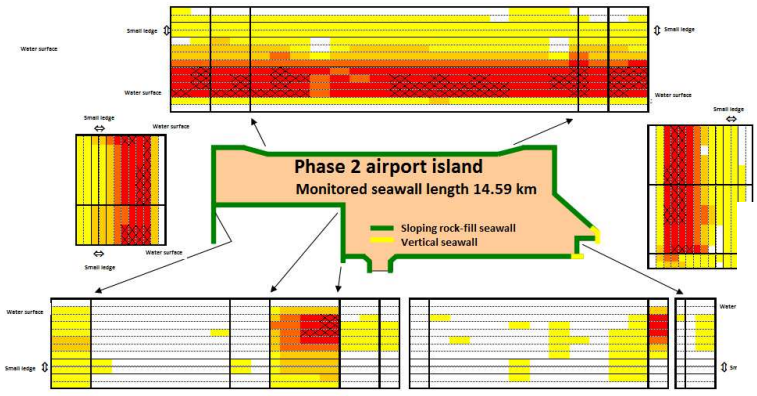
Based on the results of monitoring the Phase 1 airport island seawall, a total of 3,200 wave-dissipating blocks with grooves (developed for the construction of the Phase 2 airport island) were placed at five locations along the Phase 1 airport island seawall for use in seaweed formation. Ongoing efforts to foster quick formation of the seaweed beds focus on supplying of seaweed seedlings by a variety of means, including the placement of spore bags containing seaweed species such as *Sargassum filicinum* (*shidamoku* in Japanese) and *Eisenia bicyclis* (*kajime* in Japanese).

In addition, the transfer of 18 algal blocks with significant *Eisenia bicyclis* growth from the Phase 1 airport island seawall in March 2002 to six locations on the Phase 2 seawall helped maintain a consistent supply of seedlings from the core seaweed bed.

By fiscal 2012 these efforts had established a total of about 55 hectares of seaweed beds around the Phase 1 and Phase 2 airport islands.

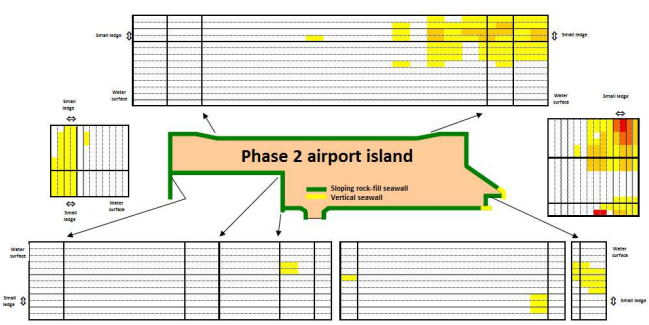
A study in March 2012 found the distribution of *Ecklonia cava Kjellman* (*wakame* in Japanese) and *Undaria pinnatifida*) (*kajime* in Japanese) species of seaweed to be as indicated in these images.





Distribution of wakame at Phase 2 airport island (March)

Rating	Coverage	Condition
	81～100%	Very dense
	51～80%	Dense
	21～50%	Sparse
	5～20%	Spot by spot
	Less than 5%	Traces only



Distribution of kajime at Phase 2 airport island (March)

Island greening projects

Opening of KIX Sky Park

The KIX Sky Park, Kansai International Airport's first major green park, is now open in the area adjacent to the Terminal Building 2. The park covers a total of about four hectares, including the green arena shoreline along the between the two islands at KIX.

Olive tree-planting ceremony

To mark the opening of the Terminal Building 2, the Kansai International Airport Eco-Island Council held an olive tree planting ceremony along the walking path.

Vegetation restoration and protection

On the Phase 2 airport island, we have created an area for some autochthonous plants such as *Dianthus japonicus Thunb*. (*hamanadeshiko* in Japanese), *Lysimachia mauritiana Lam*. (*hamabossu* in Japanese), *Calystegia soldanella* (*hamahirugao* in Japanese) and *Vitex rotundifolia* (*hamagou* in Japanese) in order to restore and conserve the shoreline vegetation of the Osaka Bay area.

Dianthus japonicus Thunb.

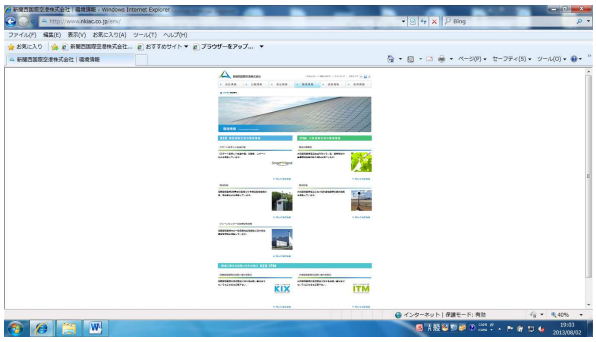
Lysimachia mauritiana Lam.

(5) An airport in good relations with the local community and airport users

We have cooperated with others' efforts to boost interactions with local communities, and have been pleased to have many people come to the airport island as a result of events and incentives here to create interest and excitement about KIX. To promote good relations with KIX, since fiscal 2002 we have been providing guest speakers and offering airport tours to introduce participants to the various kinds of work done at the airport.
We provide environment-related information via an environmental section on the KIX website. The Kansai International Airport Environmental Center, located in the Observation Hall, has been designed for communication with local communities, including the provision of a variety of environmental information.
We will continue our efforts to convey information in ways that appeal to various audiences.

Diversification of information provision

Environmental information about KIX operations and projects is available on a dedicated section of our website. We provide environmental monitoring results from airport operations online and in our corporate social responsibility (CSR) reports, and also at the Environmental Center.
We have also made an effort to spread the word about our environmental efforts, seaweed beds, and so on, such as with displays at the annual Eco-Products exhibition at the Tokyo Big Sight international exhibition center.


Environmental information pages on NKIAC website

CSR reports

Environmental education

Environmental Center

In July 2011, we redesigned the display at the Center to show the airport's environmental initiatives on informative panels. In April 2012, we launched the "Professor KIXeco" quiz system, which lets users have fun while learning environmental information.
People can also experience actual sound levels, and observe scenes of independent organizations that work to analyze noise.

Community relations

KIX Science Class

We have offered the KIX Science Class for local elementary school students to help children learn about environmental and science-related topics relating to the airport. The class had 40 participants, including leaders.

They had the opportunity to learn about global warming, experiment with hydrogen, ride a hydrogen fuel cell-powered bus, and build a model airplane.

Guest speakers and airport tours

We offer guest speakers and airport tours to introduce older students of elementary schools to the airport and the world of aircraft. In fiscal 2012, 1,512 students from 16 schools participated.

With the opening event for the KIX Sky Park, first-grade students from local elementary schools participated in the planting of cosmos and pansy flowers and in the release of flounder fish into the sea.

KIX summer festival and other events

KIX has hosted many annual events at KIX including a dragon boat festival, stage event, local products fair, street fair, and on Marine Day, an opportunity to ride on a patrol vessel of Japan's Coast Guard.

We will continue working to involve the local communities so that a growing number of people feel KIX is and accessible and enjoyable place to visit.

Environmental awards received

For outstanding achievements in environmental efforts and innovations, KIX was recognized by the Airports Council International (ACI) Asia-Pacific 2011 Green Airports Recognition awards. KIX was the only Japanese airport to receive this honor.

In August 2012, for its efforts to cultivate seaweed beds, KIX was awarded a runner-up award in the 2012 Osaka Environmental Awards, which Osaka Prefecture presents to individuals and organizations for their efforts to protect or restore the environment.

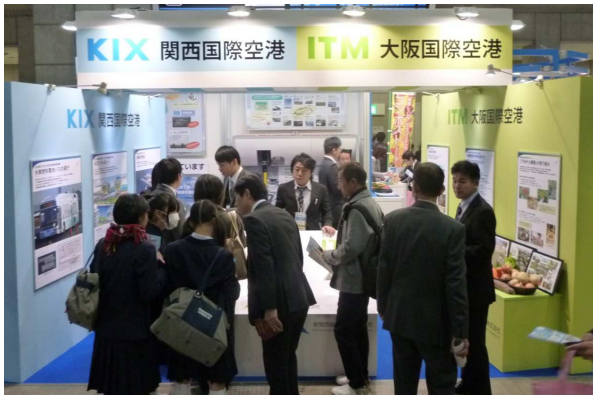
Connecting with other airports in Japan and worldwide

Environmental Liaison Committee for Major Airports

To tackle common issues and challenges, three airports (Kansai International Airport, Narita International Airport, Chubu International Airport) and two companies (Japan Airport Terminal Co., and Hokkaido Airport Terminal Co.) together launched the Environmental Liaison Committee for Major Airports in September 2007. Meetings were held in June 2012 and January 2013 to exchange information about each airport's environmental management plans and initiatives as well as efforts to promote eco-friendly vehicles, such as electric vehicles and compressed natural gas-powered vehicles.

Exhibit at Eco-Products 2012 exhibition

Since 2004, KIX has been participating in Japan's largest environmental exhibition, the annual Eco-Products Exhibition at the Tokyo Big Sight. In 2012, our exhibit featured environmental initiatives such as composting and recycling of cut grass from the airport grounds, hydrogen fuel-cell buses, and other examples of our efforts.



5. Environmental management at NKIAC offices

To reduce the environmental impacts of its administrative functions, the New Kansai International Airport Company adopted an "Office Environmental Management Manual" to reduce the consumption of electricity, water and heat, etc.

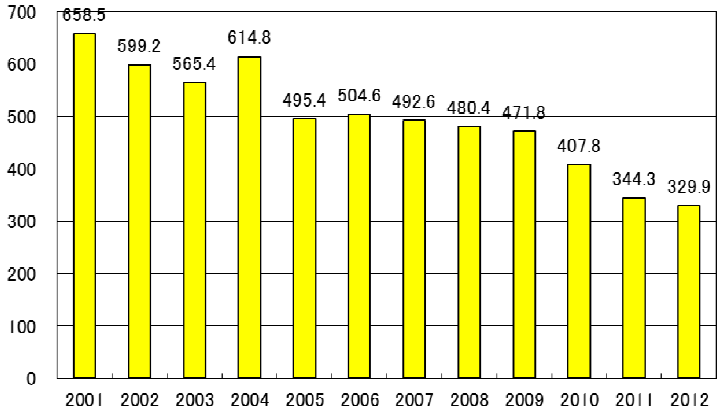
In fiscal 2012, consumption was down in all categories compared to fiscal 2006, including electricity, heating and cooling, water, gasoline, diesel, and office paper. The amount of waste disposed was also reduced.

NKIAC and group companies have been conducting what we call the "Paper Diet Challenge," to dramatically reduce paper consumption. It resulted in a 62% reduction in the amount of paper consumed, from 9.40 million sheets of paper in fiscal 2008 before the campaign began to 5.84 million sheets in fiscal 2012.

In February 2010, we adopted "Green Purchasing Guidelines" and have been implementing them.

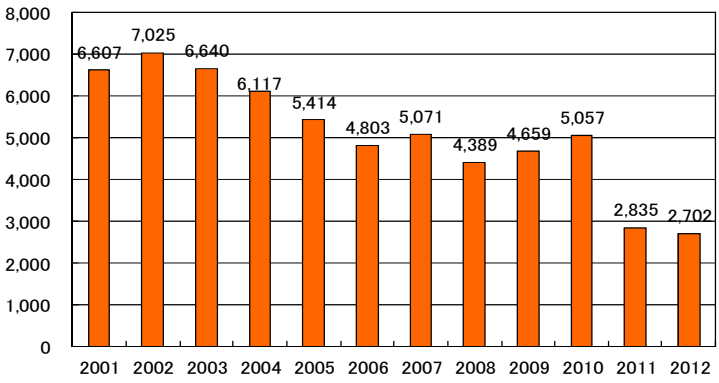
Compared to FY2006

(1) Electricity consumption 1.75 million kWh (34.6%) reduction



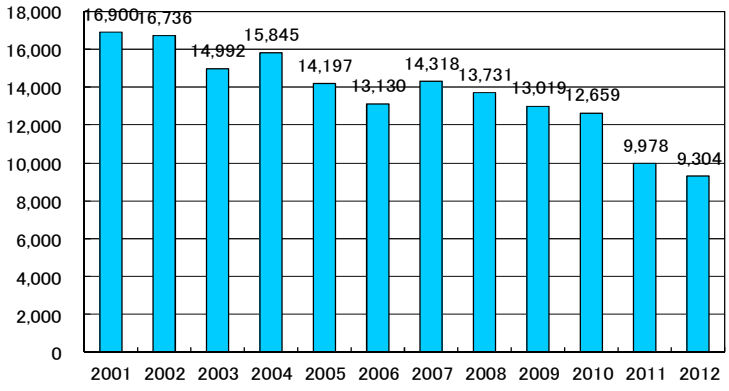
Data are from total consumption at NKIAC building, construction/office buildings and maintenance center.

(2) Heating 2,101 GJ (47.3%) reduction



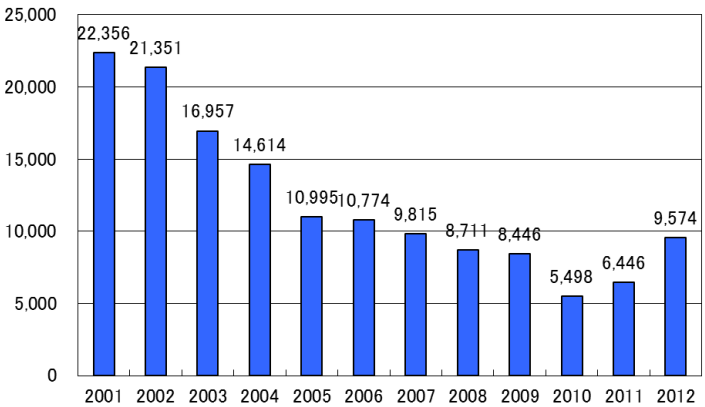
Data are from total consumption at NKIAC building, construction/office buildings and maintenance center.

(3) Cooling 3,826 GJ (29.1%) reduction



Data are from total consumption at NKIAC building, construction/office buildings and maintenance center.

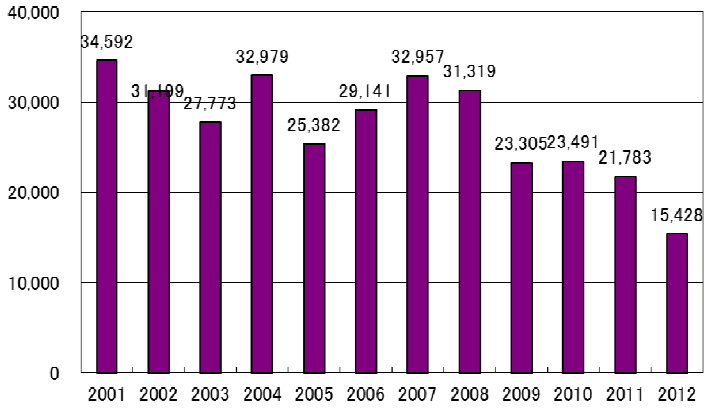
(4) Municipal water 1,200 m^3 (11.1%) reduction



Data are from total consumption at NKIAC building, construction/office buildings and maintenance center.

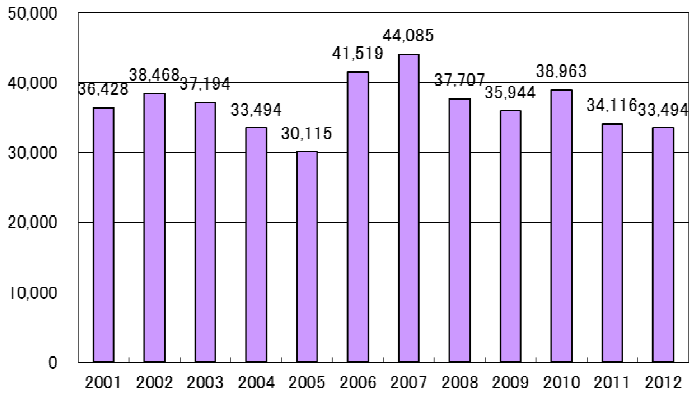
(5) Gasoline

13,713 L (47.1%) reduction



(6) Diesel

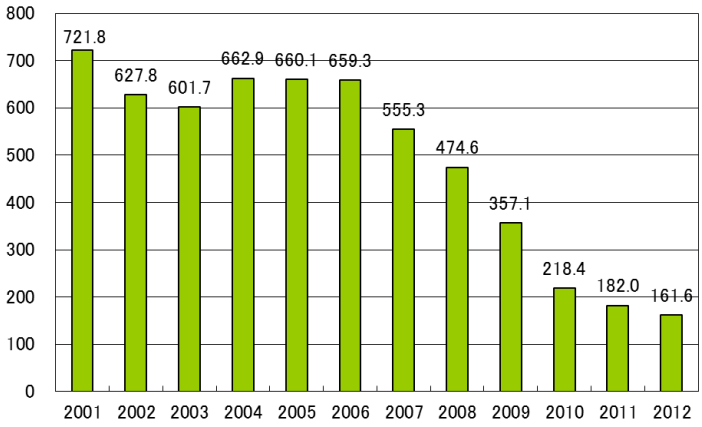
8,025 L (19.3%) reduction



Note: Quantity purchased by NKIAC

(7) Office paper

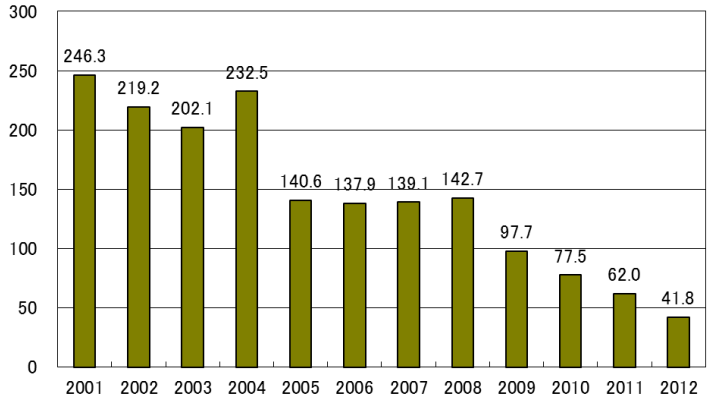
4.98 million sheets (75.5%) reduction



Note: Quantity purchased by NKIAC

(8) Waste

96 tons (68.3%) reduction



Data are from total consumption at NKIAC building, construction/office buildings and maintenance center.

Office Environmental Management Manual (adopted March 2001)

● Objectives:

(1) Reduce energy consumption. (2) Reduce municipal water consumption. (3) Reduce energy consumption for heating and cooling. (4) Reduce gasoline consumption. (5) Reduce office paper consumption. (6) Reduce waste, sort waste. (7) Encourage green purchasing (environment-friendly products). (8) Introduce low-emission vehicles.

6. Environmental performance data (1) Environmental accounting

Environmental accounting

Since fiscal 2002, we have been developing an environmental accounting system to evaluate the costs and benefits of our environmental initiatives, in order to further enhance their effectiveness and efficiency.

The greatest cost for environmental protection would be the cost of building the airport on an artificial island five kilometers off the coast of the Senshu area to reduce the impacts of aircraft noise. However, as no methodology has yet been well-established to quantify the environmental benefits of reducing noise, our accounting efforts have focused on categories for which quantitative methods do exist, such as wastewater treatment and waste management.

Accounting method

- Scope of accounting: New Kansai International Airport Company, Ltd.
- Accounting period: April 1, 2012, to March 31, 2013
- Environmental cost categories: Based on "Environmental Accounting Guidelines 2005" (Ministry of the Environment), considering specific conditions of NKIAC.
- Environmental cost details:
  - Business area cost – Land costs related to incineration plant and sewage treatment plant; facilities costs; maintenance/facilities costs related to energy and water-conservation; other maintenance costs
  - Administrative costs – Environment-related social contribution costs, environmental studies

The total environmental protection costs in fiscal 2012 amounted to 3,851 million yen, down 712 million yen from the previous year.

To calculate environmental benefits (based on physical quantities), for the wastewater treatment plant we chose total nitrogen (T-N) as a representative indicator for water quality and reduction of the pollution load flowing into Osaka Bay. For the incineration plant, as a representative indicator of environmental benefits we selected NOx from among other air pollutants in the waste incineration. We then calculated the quantity of reduced environmental loads from the difference between legislated/regulatory standards and actual emission quantities, and attempted converting this to a monetary measure using an integrated coefficient based on LIME (see Note). The resulting environmental benefits (based on physical quantities) came to 13 million yen.

We estimate cost savings from environmental initiatives to be 663 million yen.

Note: LIME (Life cycle Impact assessment Method based on Endpoint modeling) is a methodology to integrate multiple environmental indicators into one, to evaluate environmental benefits.

Accounting category		Cost (million yen)	
Business area costs	Pollution prevention	2,102	(1,986)
	Energy/water conservation	77	(848)
	Treatment/disposal of general waste	1,524	(1,577)
	Subtotal	3,703	(4,412)
Administrative costs	Social contributions relating to environment	21	(27)
	Environmental studies	127	(125)
	Subtotal	148	(152)
Total environmental costs		3,851	(4,563)

Figures in parentheses are in FY 2011.

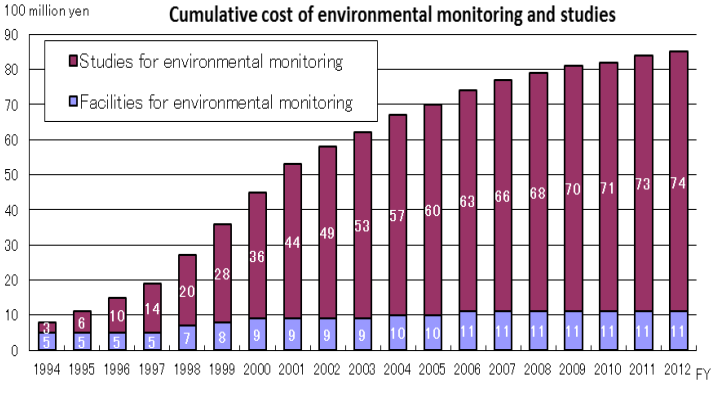
Environmental benefits	Env. impact reduced	Monetary equiv.
Wastewater plant	T-N: 77.23 tons	6 million yen
	(T-N: 77.83 tons)	(6 million yen)
Incineration plant	NOx: 35.02 tons	6 million yen
	(NOx: 34.55 tons)	(6 million yen)

Savings (benefits) from environmental measures

1 Reduced municipal water use, due to reclaimed water use: 156 million yen
2 Reduced public sewage treatment fees due to treatment at KIX: 231 million yen
3 Reduced incineration costs off island due to incineration at KIX: 267 million yen
4 Reduced economic cost due to energy saving: 16 million yen
Total: 663 million yen

Cumulative cost of environmental monitoring and studies

Totally about 8.5 billion yen has been spent on environmental monitoring and studies between the year the airport opened and fiscal 2012, for major areas of concern such as aircraft noise, flight paths and altitude, air quality, water quality, bottom sediment, and aquatic life. The figure includes the cost of maintenance and upgrading of monitoring facilities.



(2) Environmental performance data

Item	Units	Fiscal year											Comparison to base year (FY2006)				Scope of data used
		FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012					
Primary energy managed by KIAC																	
Electricity consumption	(Mwh)	122,677	119,772	116,404	115,577	113,079	114,743	110,000	106,740	104,717	102,270	102,872	10,207	Mwh	(8.9%)	Down	
Energy consumption for cooling	(GJ)	295,737	261,328	289,243	274,901	261,073	267,063	270,467	246,420	257,685	249,918	246,304	14,769	GJ	(5.5%)	Down	
Energy consumption for heating	(GJ)	162,451	146,154	145,967	157,774	144,850	151,919	140,386	142,484	151,056	161,025	162,491	17,641	GJ	(11.6%)	Down	
Natural gas consumption	(m3)	142,805	154,637	139,110	151,495	147,364	142,277	131,792	127,824	125,902	111,204	108,591	38,773	m^3	(27.3%)	Down	
Crude oil equivalent	(Kl)	47,798	45,286	45,374	45,087	43,501	44,381	42,877	41,250	41,424	40,855	40,931	2,570	Kl	(5.8%)	Down	
Total greenhouse gas emissions from KIX																	
Carbon dioxide (CO2)	(10,000 t-CO2)	—	—	—	—	54.4	58.1	53.6	42.1	42.3	43.7	46.3	11.8	10,000 t-CO_2	(20.3%)	Down	・Emissions from aircraft are calculated to include the airport's portion of the aircraft "landing and take-off" (LTO) cycle as defined by ICAO (movement of the aircraft between an altitude of 3,000 feet and the ground for both landing and take-off). ・Emissions from vehicles are from vehicles operating within the restricted areas, and exclude through-traffic of trains, ships, and vehicles."
(per aircraft landing/takeoff)	(t-CO2)	—	—	—	—	4.65	4.52	4.19	3.88	3.95	4.06	3.6	0.92	t-CO2	(20.4%)	Down	
Methane	(t-CO2)	—	—	—	—	361	406	420	357	351	354	419	13	t-CO2	(3.2%)	Down	
N_2O	(t-CO2)	—	—	—	—	2,840	2,963	2,874	2,540	2,431	2,431	2,800	163	t-CO2	(5.5%)	Down	
Total	(10,000 t-CO2)	—	—	—	—	54.8	58.5	53.9	42.4	42.5	44.0	46.7	11.8	10,000 t-CO_2	(20.2%)	Down	
(per aircraft landing/takeoff)	(t-CO2)	—	—	—	—	4.68	4.54	4.21	3.90	3.98	4.08	3.62	0.92	t-CO2	(20.3%)	Down	
Concentrations, measures for air and water pollution																	
Dioxins	(ng-TEQ/m3N)	0.12	0.024	0.090	0.048	0.20	0.00061	0.070	0.00097	0.19	0.04	0.00685	—				Concentrations in incineration plant emissions
Nitrogen oxides (Nox)	(ppm)	36	33	32	28	39	33	34	46	37	45	32	—				
Soot and dust	(g/Nm3)	0.005	0.005	0.002	*	*	*	*	*	*	*	*	—				
COD	(mg/L)	5.5	5.8	6.5	6.8	6.7	7.8	7.8	6.4	7.3	6.1	7.3	—				Water quality of discharge from wastewater treatment plant
T-N	(mg/L)	1.6	1.1	1.4	2.3	1.9	3.5	1.7	2.4	3.9	3.7	5.1	—				
T-P	(mg/L)	0.029	0.030	0.12	0.084	0.084	0.19	0.15	0.1	0.1	0.1	0.1	—				
Waste disposal																	
Total disposal – general waste	(t)	12,311	11,038	11,891	12,058	12,327	11,962	9,945	8,337	7,902	7,919	8,336	3,991	t	(33.4%)	Down	Volume handled by incineration plant
Total landfilled – general waste	(t)	1,732	1,511	1,561	1,557	1,580	1,480	1,264	1,091	1,092	1,019	994	586	t	(39.6%)	Down	
Quantity recycled	(t)	949	820	866	980	1,042	1,087	973	850	899	876	978	64	t	(5.9%)	Down	
Water resources																	
Municipal water supplied	(1,000 m3)	1,149	1,007	1,056	1,039	1,020	1,049	964	828	849	812	805	215	1,000 m^3	(20.5%)	Down	Amount supplied to airport island
Reclaimed water	(1,000 m3)	505	477	540	540	576	505	415	337	403	407	401	175	1,000 m^3	(34.7%)	Down	Volume handled by wastewater treatment plant
Wastewater treated	(1,000 m3)	1,128	1,078	1,150	1,066	1,003	1,002	882	769	758	750	761	242	1,000 m^3	(24.2%)	Down	
Wastewater discharged	(1,000 m3)	574	541	563	475	389	438	392	365	315	315	329	60	1,000 m^3	(13.7%)	Down	
【Reference】airport operation																	
No. aircraft landings-takeoffs	(10,000 LTOs)	10.8	10.0	10.3	11.3	11.6	12.9	12.9	10.9	10.7	10.8	12.9	—				Overall measures of KIX operations
Air passenger traffic	(10,000 persons)	1,695.6	1,372.2	1,534.1	1,642.8	1,669.0	1,669.5	1,533.0	1,351.6	1,418.2	1,385.7	1,679.9	—				
Cargo volume	(10,000 tons)	76.7	78.6	85.6	84.3	80.2	84.7	72.6	63.4	75.0	71.2	68.7	—				

* Indicates below minimum measurement threshold

7 Chronology of environmental efforts

Year	Month	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 International Airport Environmental Monitoring Organization established (Osaka Prefectural 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 (Sept. 4). Monitoring begins for aircraft noise, low-frequency air vibration
1995	8	Council for Civil Aviation releasese Basic Approach to 7th Airport Preparatory 5-Year Plan (mid-term report)
1996	6	Kansai International Airport Land Development Co. (KALD) established, designated by Minister of Transport as the 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 for Phase 2 construction, which starts July 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
	11	International Airport Symposium 2001 hosted, Phase 2 airport island seawall completed
2002	10	KIAC adopts Regulations Governing the Use of Waste Processing Facilities
	12	KIAC establishes Energy Conservation Committee KIAC releases first Eco-Island Report (2002 edition)
2004	9	International Airport Symposium 2004 hosted
	12	KIAC, KALD mount their first display 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 Minister of Economy, Trade and Industry Award at FY2006 National Energy-Efficiency Best Practices Conference, for information-systems-based air conditioning 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
	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 (to March 2012)
	11	KIX Science Classes held
2010	1	Partial changes to aircraft auxiliary power unit (APU) usage restrictions (use reduced from 30 to just 15 minutes before scheduled departure)
	9	Photovoltaic system installed for temperature-controlled building for medical products
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 end
	9	Electricity-powered commercial shuttle vehicles introduced (two vehicles by fiscal year end)

Year	Month	Event
2012	4	Professor KIXeco quiz system launches at Environmental Center
	5	KIX wins judges' special award at Airports Council International (ACI) Asia-Pacific 2011 Green Airports Recognition Awards
	6	Phase 2 airport island construction almost completed, land development work by KALD is completed
	7	KIAC is incorporated into New Kansai International Airport Co.
	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
	12	Display at Eco-Products 2012, and four regular chargers installed in parkade for electric vehicles
2013	2	International Strategy Comprehensive Special Area expanded by Kansai Innovation to include KIX (green innovation theme)
	3	Smart Eco Logi Council holds ceremony for launch of 20 large CNG trucks in international freight zone
	3	KIX Eco-Island Promotion Council changes name to KIX Smart Island Council
	4	KIX Smart Island Plan adopted

● Notes

1. WECPNL (Weighted Equivalent Continuous Perceived Noise Level): An aircraft noise index used in Japan. It is used as an environment standard for aircraft noise. A maximum WECPNL of 70 applies to strictly residential areas, and a maximum of 75 applies to other areas where normal living conditions need to be protected.

2. Moving to quieter aircraft: KIX made an effort to move toward quieter aircraft by instituting a complete ban starting in April 2002 on flights by any aircraft not complying with Chapter III of the Convention on International Civil Aviation, Annex 16 (Environmental Protection) on aircraft noise standards of the International Civil Aviation Organization (ICAO).

3. 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.

4. 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. Benefits of the method include reduced fuel consumption and reduced CO_2 emissions.

5. Air heater used to prevent white smoke: An air heater is used to reduce moisture content in emissions by introducing heated air into the flow, to ensure that white smoke being emitted from exhaust stacks does not reduce visibility for aircraft or control towers.

6. Restricted areas: Runways and other landing/takeoff areas, taxiways, aprons, and other areas where entry has been restricted by signage.

7. GPU (ground power unit): Stationary or mobile equipment/facilities that supply air conditioning or electricity to parked aircraft. The use of GPUs can reduce the amount of fuel consumption by aircraft onboard auxiliary power units (APUs).

8. AIP: Aeronautical Information Publications (AIP) contain essential information for aircraft operation. In Japan they are compiled by the Civil Aviation Bureau (Ministry of Land, Infrastructure and Transport and Tourism).

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