Narita International Airport

Environmental Report 2018

NAA
NARITA AIRPORT

CONTENTS

About This Report

- This report is compiled in order to report on Eco-Airport promotion initiatives conducted by Narita International Airport Corporation (NAA), both independently and in collaboration with the many airport-related business entities.
- This report incorporates increased diagrams, maps, tables and photographs, augmented by interviews and glossaries, so as to make the information more understandable to a wider section of people.
- In the descriptions of environmental strategies, the report also includes objective data such as monitoring results and achievement levels.

Reporting Period

Data are actual figures from fiscal 2017 (April 2017 to March 2018). However, activity details are, in principle, current as of September 30, 2018.

Scope of Report

The scope of this report covers all environment activities throughout the airport, including those conducted by NAA and by companies and organizations which carry on business at the airport. Data concerning electricity, gas, water, waste, and greenhouse gas is provided from figures for the airport overall, including usage and emissions for those companies and organizations. Other data are provided by NAA.

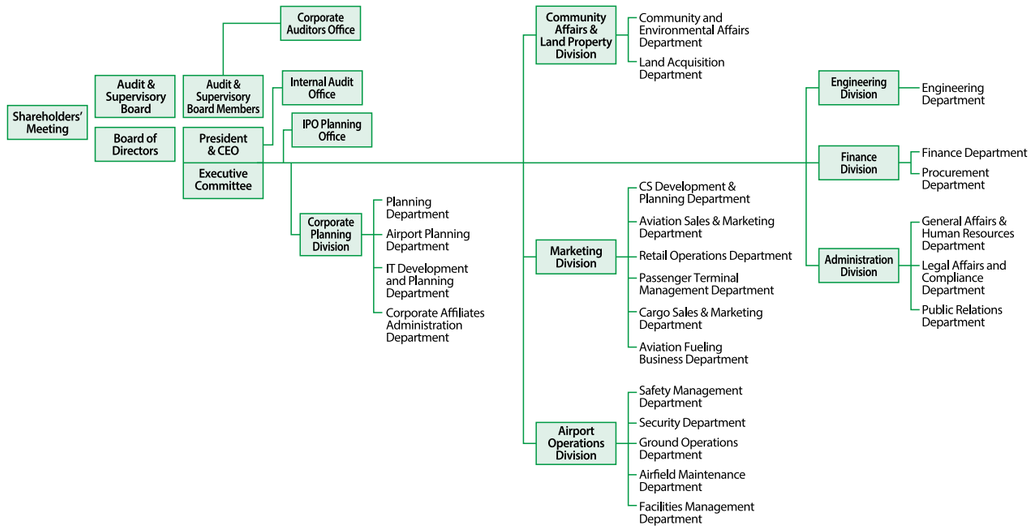
In this report, "NAA" refers to Narita International Airport Corporation. However, "Narita International Airport" and "Narita Airport" refer to the airport as a whole, including on-site companies and organization.

Company Profile

Company Name	Narita International Airport Corporation (NAA)
President & CEO	Makoto Natsume
Headquarters	NAA-Bldg., Narita International Airport, Narita City, Chiba 282-8601, Japan
Establishment	July 30, 1966: New Tokyo International Airport Authority April 1, 2004: Narita International Airport Corporation
Employees	734 (as of September 1, 2018)
Business Objectives	To improve air travel for its users and contribute to the overall development of the air transport industry through efficient airport operation and management, while at the same time helping to enhance the nation's competitive strength in industry and tourism.

NAA NARITA AIRPORT

Organizational Structure



Group Companies

Company Name	Main Business
Airport Maintenance Service Corporation	Maintenance and administration of airport civil engineering and structural facilities, and tenant interior construction
NARITA AIRPORT TECHNO CORPORATION	Maintenance and administration of passenger terminal ancillary facilities and special equipment
NARITA AIRPORT FACILITIES CORPORATION	Maintenance and administration of aviation lighting and facilities in and around the airport
Airport Intelligent Communications Service Co., Ltd.	Maintenance and administration of airport networks, flight information services, and radio navigational facilities, software development, and telephone services
NAA Fueling Facilities Corporation	Maintenance and administration of aviation fuel facilities
NAA Safety Support Corporation	Security, firefighting and rescue, airfield management at Narita Airport, information service for airport users, and maintenance of security system
NARITA AIRPORT BUSINESS CO., LTD.	Terminal baggage cart services, temporary staff services, and planting business
NAA Retailing Corporation	Sales of duty free goods, food items, folk craft and other gifts, electric appliances, travel goods, pharmaceuticals, etc., under the Fa-So-La brand, and management of food and beverage shops in passenger terminals
Greenport Agency Co. Ltd.	Provision of various services including overseas travelers insurance, delivery services, currency exchange, bus ticket sales, sale of airport advertising, event planning and operation, leasing of office buildings in the airport maintenance area, management and leasing of noise buffer sites around Narita Airport, and sales of soft drinks, etc., from vending machines
Shibayama Railway Co., Ltd.	Operation of Shibayama Railway (between Higashi Narita and Shibayama-Chiyoda Stations)
Narita Rapid Rail Access Co., Ltd.	Leasing and administration of railway facilities for the Narita Rapid Railway Access Line
JAPAN AIRPORT FUELING SERVICE CO., LTD.*	Refueling of aircraft at Narita Airport

*Equity method affiliated company

Message from President & CEO

Thanks to your support, Narita International Airport celebrates its 40th anniversary as we continue to grow and evolve

Through the efforts of our many stakeholders, Narita International Airport was able to overcome many difficulties and celebrate this year the 40th anniversary of the opening of the airport on May 20, 1978. Over these 40 years, as the gateway of Japan, we have linked Japan to many countries around the world, and with safety as our top priority, we have been growing and evolving, playing an important social infrastructure role through these times. In fiscal 2017, the number of aircraft movements exceeded 252,000 and the number of passengers reached approximately 40.94 million, both of which are record highs since the airport opened. Further, as of the end of September 2018, Narita has extended its network to 119 overseas destinations and 20 in Japan, thus 139 cities in total, likewise a record high since the opening of the airport.
I would like to express our gratitude to all of you who participated in Narita Airport over these 40 years.

Final agreement for the further enhancement of Narita Airport, seeking symbiosis and co-prosperity between the community and Narita Airport

To meet air travel demand at Tokyo metropolitan airports, which is expected to rise in the future, we have been proposing "further functional improvements of Narita Airport" including the construction of an additional runway. In March of this year, a final agreement was reached by the Four Party Council on Narita Airport made up of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Chiba Prefectural Government, the nine municipal governments around Narita Airport, and NAA. In seeking further functional improvements, we will strive to enhance environmental and regional symbiosis measures in a bid to achieve further coexistence and co-prosperity between the local community and Narita Airport.
We will also carry out environmental impact assessments as part of an initiative to create a better business plan from the viewpoint of environmental conservation, and we are currently working on the preparation of a Draft Environmental Impact Statement. This report introduces some of our environmental conservation initiatives in the Special Features section, and we are committed to the earnest pursuit of these goals.

Promoting mutual dialogue with all our Stakeholders

To promote environmental efforts throughout the airport, NAA established "Eco-Airport Vision 2030" in fiscal 2016, which sets the reduction of airport CO_2 emissions per flight by 30% by fiscal 2030 as our long-term goal, using fiscal 2015 as the baseline year. For achieving this vision, the Eco-Airport Master Plan (fiscal 2016–2020) specifies three initiatives, as well as goals and measures for the promotion of environmental management. We have been working along with all airport-related business entities toward the realization of these goals.

Our fiscal 2017 achievements in relation to the Master Plan are described also in this report, and overall good results have been obtained over the past fiscal year thanks in no small part to the cooperation of all the parties involved. Furthermore, for more effective environmental management throughout the airport, one of our new initiatives is the participation in the *Airport Carbon Accreditation** program. We will strive for further reductions in carbon emissions, with verification by an independent third party through the program.
To make our "Eco-Airport Vision 2030" message, namely "In collaboration with stakeholders, Narita Airport will pursue the development of a sustainable society by taking measures to reduce the environmental impact of airport operations on local communities and addressing global-scale environmental issues," into reality, NAA will dedicatedly continue its efforts, recognizing the expectations of society and the impact of our business activities, along with all our airport-related stakeholders, including airlines and airport-related business entities, local residents, and airport users.
As we redouble our efforts to make Narita Airport an airport that is well loved by the local community and chosen by customers, we look forward to your continued cooperation and support.

* ***Airport Carbon Accreditation***
A program adopted by Airports Council International (ACI), the trade association of the world's airports. It independently assesses and recognizes the efforts of airports to manage and reduce their carbon emissions through four levels of certification. For details, see page 49.

Makoto Natsume
President & CEO
Narita International Airport Corporation

Management Philosophy

NAA is committed to ensuring that Narita International Airport maintain its status as one of the world's leading airports, contributing to the growth of the global transport network.

Management Vision

① A Trusted Airport Where Safety is Paramount
② Customer Satisfaction Exceeding Expectations
③ Environment-Friendly Airport Contributing to Community Growth
④ Sound Management and Growth through Efficiency and Transparency
⑤ Sensitive, Flexible, Speedy and Responsive to Society's Needs

Environmental Master Policy

Through a series of environmental initiatives and by incorporating a global perspective, we will strive to achieve an environment-friendly recycling-oriented airport (Eco-Airport), build a relationship of trust with the community as one of its members, and contribute to the attainment of an affluent 21st century society. We will:

1 Actively address environmental issues from a global perspective, limiting the environmental impact from airport construction and operation as well as reducing the effect on the regional environment.

2 Formulate basic plans for improved environmental conservation for all business activities, through strict adherence to environmental laws and regulations, as well as establishment and regular review of independent targets.

3 Set up a system to ensure environmental conservation activities function effectively, and implement continuous improvements.

4 Raise awareness at all staff levels through intercommunication on our fundamental commitments to the environment and community, and provide education and support so that each employee is motivated to take responsibility for and share in environmental conservation activities.

5 Encourage environmental conservation activities throughout the NAA group and extend activities to airport-related business entities so as to promote an environment-friendly recycling-oriented airport (Eco-Airport).

6 Actively disseminate information on environmental conservation activities, and maintain close communication on environmental issues with the local community as well as the world at large.

Environmental Vision

In collaboration with stakeholders, Narita Airport will pursue the development of a sustainable society by taking measures to reduce the environmental impact of airport operations on local communities and addressing global-scale environmental issues.

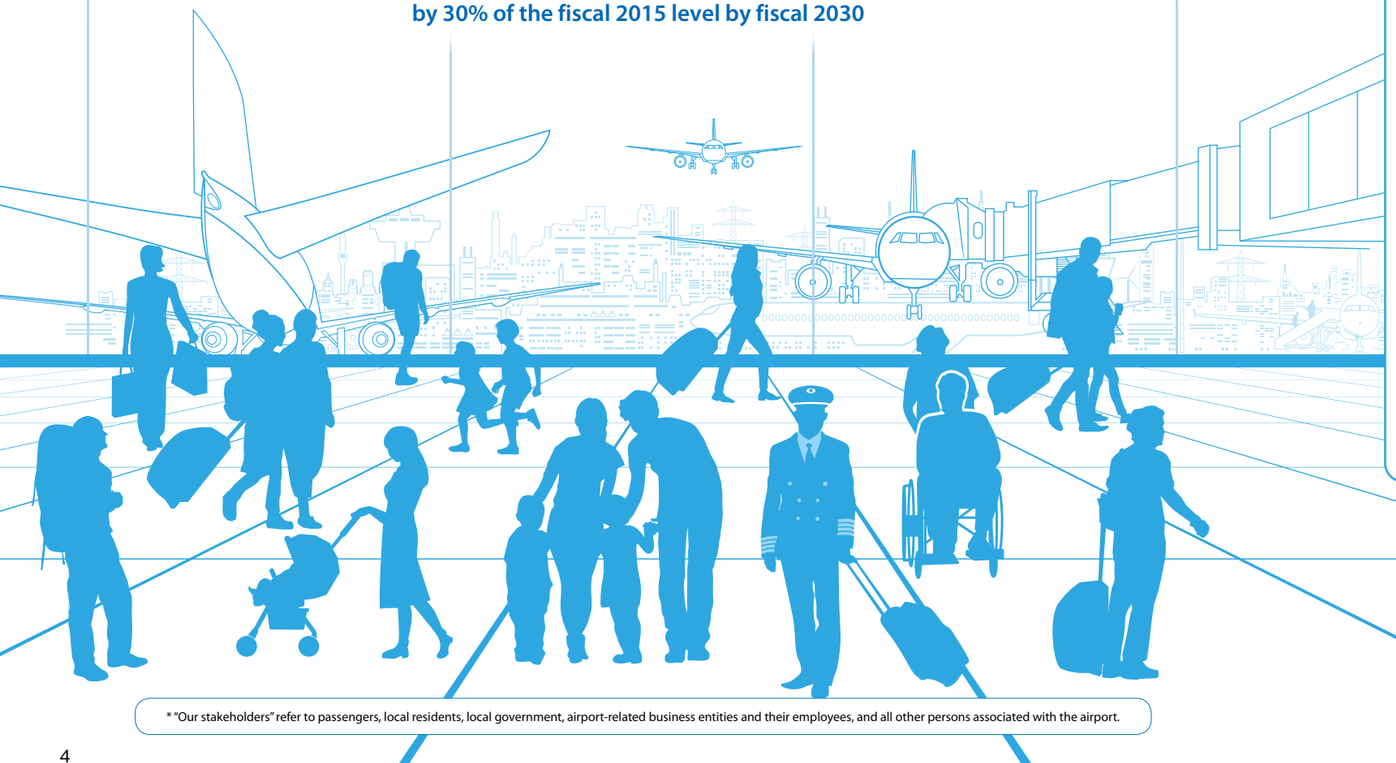
Pursuing Sustainable Development by the Community and the Airport

Addressing Global-Scale Environmental Issues

Promoting an Eco-Airport in Collaboration with Stakeholders

Eco-Airport Vision 2030

We aim to reduce airport carbon dioxide (CO_2) emissions per flight by 30% of the fiscal 2015 level by fiscal 2030



* "Our stakeholders" refer to passengers, local residents, local government, airport-related business entities and their employees, and all other persons associated with the airport.

Master Plan to Achieve "Eco-Airport Vision 2030"

Toward the realization of Eco-Airport Vision 2030, we have defined our objectives to promote three initiatives and environmental management over the five years from fiscal 2016 to 2020.

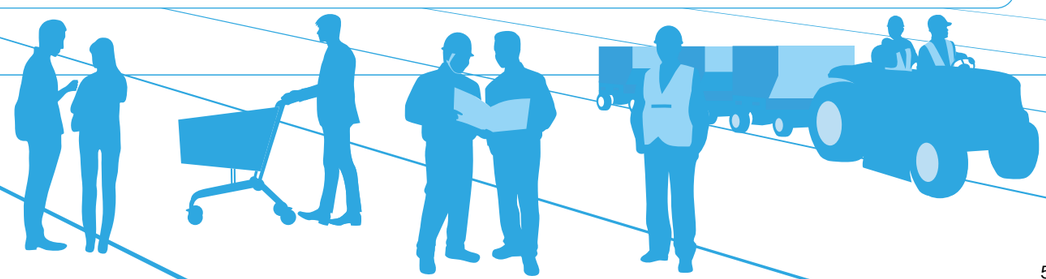
Eco-Airport Master Plan
(FY 2016-2020)

- **Community Environment Initiatives** pp. 16–27
- **Climate Change Initiatives** pp. 34–39
- **Resource Recycling Initiatives** pp. 28–33
- **Environment Management** pp. 40–49

Narita International Airport Eco-Airport Development and Planning Council

Coordination between NAA and airport-related business entities

NAA and the Eco-Airport Development and Planning Council, an organization representing airport-related business entities, play a central role in promotion of environmental initiatives throughout the airport as a whole (for the Council, see p. 41).



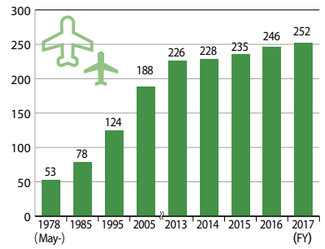
Airport Operations

Narita International Airport celebrated its 40th anniversary on May 20, 2018. In fiscal 2017, the airport handled approximately 252,000 flights and 40.94 million passengers, both record highs since the airport opened. International cargo volume reached approximately 2.28 million tons, the airport's second highest level on record after the 2.3 million tons in 2004. Compared to figures when the airport opened, the airport handled 4.8 times more flights, 5.8 times more passengers, and 6.9 times more cargo.

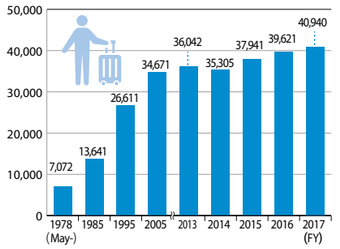
Owing to the addition of new routes and increase in the number of flights throughout the year, the airport posted a record high in the number of aircraft movements for the sixth consecutive year, topping 250,000 for the first time in a fiscal year. The number of passengers continued to be strong and we posted our highest ever number of passengers for the third consecutive year, exceeding 40 million passengers for the first time in a fiscal year.

Operations Report (FY 1978-2017)

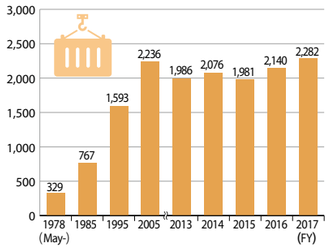
Aircraft Movements (1,000 flights)



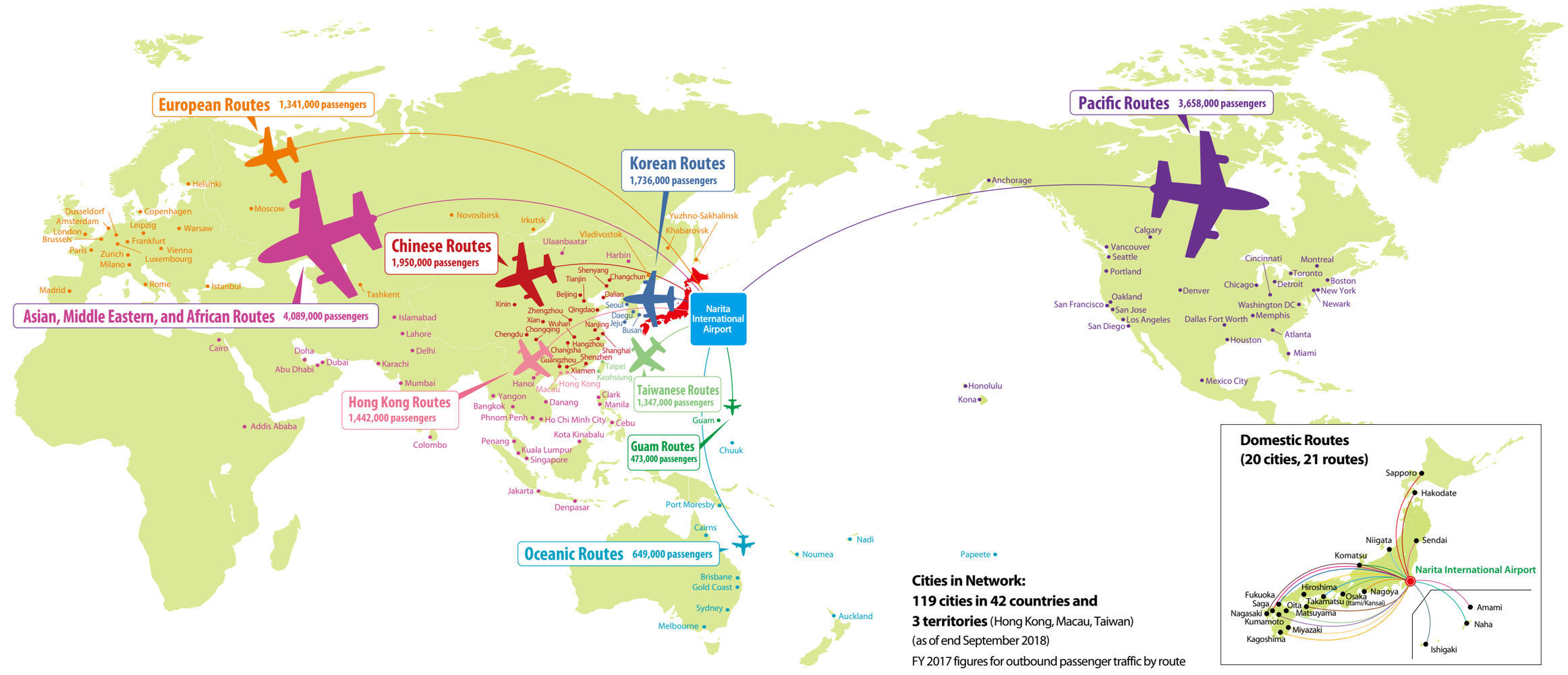
Passenger Traffic (1,000 people)



International Cargo (1,000 tons)



Narita International Airport: Linking the World



Cities in Network:
119 cities in 42 countries and
3 territories (Hong Kong, Macau, Taiwan)
(as of end September 2018)
FY 2017 figures for outbound passenger traffic by route

Eco Airport Digest Map

—Principal Environmental Initiatives at a Glance—

In Passenger Terminals

1 General Waste Sorting (p. 29)

Waste is sorted for recycling into six categories in passenger terminal lobbies, and 10 categories in office areas.

2 Solar Power Panels (p. 36)

Solar power panels are installed at passenger terminal buildings and NAA Building. The generated electricity is used for lighting and other applications in those buildings.

3 Kitchen Wastewater Treatment Facilities and Grey Water Production Facilities (p. 32)

Waste water from restaurants in terminal buildings is treated to be reused as flushing water in airport toilets.

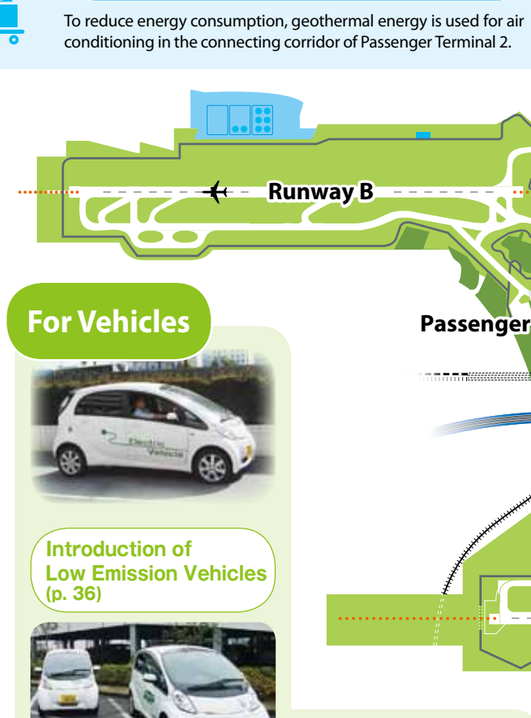
4 Use of Geothermal Energy (p. 38)

To reduce energy consumption, geothermal energy is used for air conditioning in the connecting corridor of Passenger Terminal 2.

On Taxiways

5 LED Lighting (p. 37)

Highly energy-efficient LED lights have been installed for taxiways and some parts of lighting in passenger terminal buildings.



For Vehicles

Introduction of Low Emission Vehicles (p. 36)

We promote the introduction of low emission vehicles such as electric vehicles (EVs) as well as fuel-efficient and low-exhaust cars.

6 Fast Chargers for Electric Cars (p. 36)

In convenience for customers driving EVs and for airport-related business entities, fast chargers are installed in parking lots P1 and P2.

7 Hydrogen Station (p. 36)

This station supports drivers of fuel cell vehicles, which are becoming popular in recent years.

Narita International Airport Main Facilities and Development Plans (as of September 2018)

Main Facilities	Overall Plan	Facilities in Use as of September 30, 2018
Airport site	1,198ha	1,137ha
Runways	Runway A: 4,000 m × 60 m Runway B: 2,500 m × 60 m	Runway A: 4,000 m × 60 m Runway B: 2,500 m × 60 m
Taxiways	Total length: 36.4 km Width: 30 m, 25 m, 23 m	Total length: 31.4 km Width: 30 m, 25 m, 23 m
Radio navigation aids	4 ILS systems 2 VOR/DME systems	4 ILS systems 2 VOR/DME systems
Aprons*	Area: Approx. 294 ha	Area: Approx. 243 ha
Aircraft parking stands	—	171 stands
Passenger handling facilities	3 terminals	Terminal 1 (approx. 463,000 m^2) Terminal 2 (approx. 391,000 m^2) Terminal 3 (approx. 67,000 m^2)
Cargo facilities	21 buildings	Cargo Terminal Buildings, etc. (approx. 284,000 m^2) Cargo Building Nos. 1–7, JAL Cargo Building, Common Import Warehouse, Maintenance Area Warehouse, Cargo Agent Buildings No. 1, No. 2, Cargo Administration Building, Fumigation Shed, Southern Cargo Building Nos. 1–6, etc.

*A defined area on an airport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance.

Around the Airport

Noise Mitigation Embankments (p. 20)

Mitigation embankments and wooded buffer zones have been constructed to reduce aircraft noise.

Environmental Monitoring (pp. 18, 19, 22, 23)

To understand environmental impact from the airport, year-round and short-term noise, air quality and water quality measurements are taken. The measurement data is disclosed on the NAA website.

Greenport Eco-Agripark (p. 26)

We maintain a hands-on nature conservation park, located on the noise mitigation land. The park features a rich diversity of natural life.

At Airport Facilities

9 Recycling Plant (p. 30)

Asphalt, concrete and other construction waste is crushed and recycled into paving material.

10 Rainwater Treatment Facility (p. 33)

Rainwater from a holding pond is treated and reused for cooling water in the Central Heating and Cooling Plant and for flushing water in the passenger terminal toilets.

For Aircraft

8 Noise Reduction Hangar (NRH) (p. 20)

A hangar-type noise reduction facility drastically decreases sound levels of aircraft engine testing.

Landing Charge System for International Flights Based Based on Narita Aircraft Noise Index (p. 17)

To encourage low-noise aircraft, we have introduced a noise-related landing charge system. At the same time, they also contribute to the reduction of CO_2 emissions.

On Aprons

Construction Waste Management (p. 30)

We reduce construction waste for apron pavement repair work through our in-house developed technique called "Bonded Overlay Method."

GPU (Ground Power Units) (p. 35)

Quiet, zero-emission GPUs have been installed at all fixed stands of passenger terminals to provide electric power and air conditioning to parked aircraft.

Upper left: Narita International Airport
Bottom right: NARIKOH Clean Center, a waste disposal facility

Special Feature 1

Waste Recycling Initiatives at Narita International Airport

Thermal Recycling Power Generation and Composting

Narita International Airport generates about 70 tons of waste every day!

In Special feature One, we introduce the methods to dispose of daily generated waste and the recycling system based on the practice of the 3Rs (Reduce, Reuse, Recycle).

NARIKOH Clean Center,
which handles waste disposal at the airport

Seventy Tons of Daily Waste, Where From and Where To?

Narita International Airport handles every day more than 110,000 passengers and more than 6,000 tons of international air cargo. A lot of **waste (garbage)** is discharged from various places in the airport, amounting to **about 70 tons per day.**

❶General Waste from Passenger Terminal Buildings

The passenger terminals are used by many passengers, airport staff, and plenty of tenants, including restaurants. Consequently, a variety of waste is generated. To promote selective recycling, sorted recycling bins are installed in various places. General waste discarded there is collected in waste processing rooms in the basement, where it is sorted into burnables and recyclables consisting of glass bottles, cans, plastic bottles, newspapers, magazines, cardboard, and shredded paper.

Sorted recycling bins in terminal building

❷Inflight Waste

The greatest volume of general waste produced at Narita International Airport is unloaded from aircraft, which comprises about half of the total amount. General waste is discharged not only from passenger aircraft but also from cargo aircraft. For animals and plants entering Japan from abroad, a strict quarantine and sanitary control system has been put in place to prevent ingress of harmful organisms into Japan. Inflight meal leftovers from international flights must be incinerated by law because they are potential biosecurity risks owing to their overseas provenance.

❸Destination of the Collected General Waste

Like the general waste from passenger terminals, the general waste discharged from the airport, such as aircraft, the cargo area, and the maintenance area, is gathered by type at specified locations, and then trucked to **NARIKOH Clean Center adjacent to the airport.** Approximately 50 truckloads of general waste are discharged from the airport every day. Upon arrival of a truck at NARIKOH Clean Center, the general waste it carries is weighed while still on the truck, and the waste is then taken from the platform of the general waste disposal facility to a waste pit, where a crane feeds the waste to an incinerator. Waste incineration is done a fixed amount at a time. After about one and a half hours, the waste completely turns into ash, which is ultimately disposed of at a landfill.
All recyclable general waste gets recycled according to its type. For example, plastic bottles are turned into plastic containers and fibers, while glass bottles are recycled into construction materials.

Weighing of general waste on board truck

Raising Awareness of Children, Leaders of Next Generation, about Recycling

Third Eco-Tour Program of Eco-Kids Club 2017

"Narita Airport Eco-Kids Club" for fifth and sixth graders organizes an eco-tour three times a year. To the children who will lead the next generation, we offer the opportunity to learn about the environmental initiatives being implemented at Narita International Airport, and realize the importance of protecting the environment by experiencing the natural environment around the airport.
In March 2018, under Eco-Kids Club 2017's Third Eco-Tour Program, 45 children visited Narikoh Clean Center to deepen their understanding of waste disposal and recycling.
After receiving an explanation about the treatment of the waste discharged from the airport, the Eco-Kids actually visited the central control room of the waste disposal facility and looked at the garbage collection trucks, and then visited the composting facility that makes compost out of the kitchen waste generated by Narita International Airport. The latter facility was filled with kids' voices saying things such as "This is my first time seeing kitchen waste turned into fertilizer!" and "Compost has a nostalgic smell."

Experiencing empty can recycling

Listening to an explanation of thermal recycling

Special Feature 1

Waste Recycling Initiatives at Narita International Airport

Thermal Recycling Power Generation and Composting

Efficient Use of Generated Thermal Energy and Generating Power through Thermal Recycling

Narita International Airport promotes the **3Rs of waste** (Reduce, Reuse, Recycle) to minimize the burden on the environment. As part of this approach, NARIKOH Clean Center conducts **thermal recycling** through the incineration of general waste. Thermal recycling refers to **the collection and use of the thermal energy generated by the incineration** of general waste, and NARIKOH Clean Center makes efficient use of the **generated thermal energy to produce electricity.**

As shown below, the collected general waste is carried from the platform to the waste pit (marked with "START" in the flow sheet), where a crane operated from the central control room mixes, stirs, and fluffs the waste for better air flow and **uniform combustibility.** Then the well mixed general waste is loaded into the waste hopper and burned in the incinerator at temperatures of 850 degrees Celsius (°C) or higher. The incineration of waste at these high temperatures **breaks down any harmful substances** emitted by the waste. General waste incinerated at high temperatures turns into ashes weighing just 12% of the pre-incineration weight. After the ashes are treated to minimize dust outflow, they are loaded from the ash bunker onto trucks and taken to landfills.

Steam turbines and generators

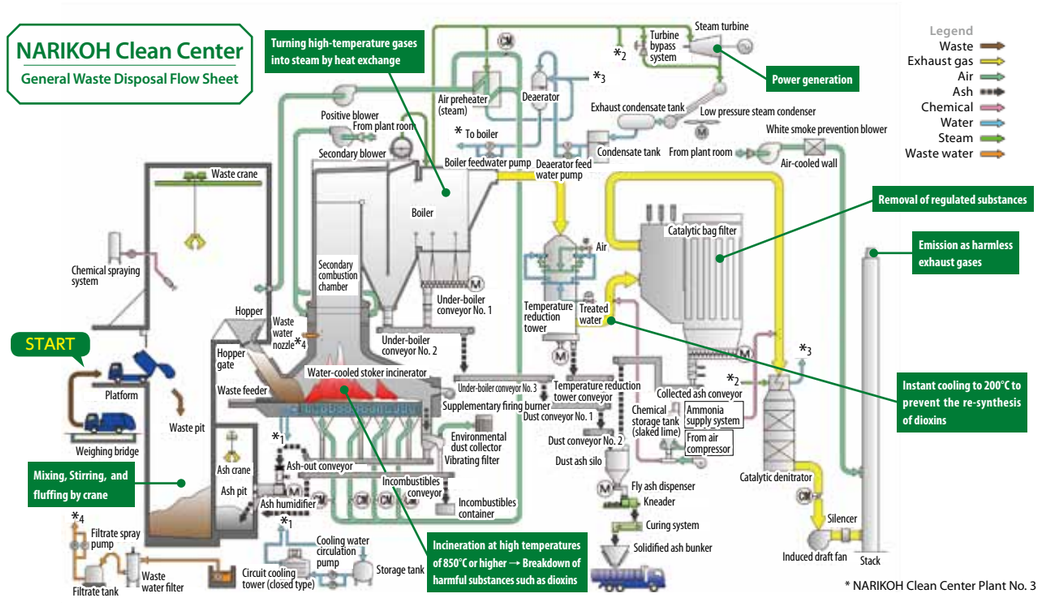
The high-temperature gases of 850°C or higher generated during the incineration of waste are transferred to the waste heat boiler, where the heat is used to produce steam in a process called heat exchange, and this **steam is in turn used to produce electricity.** Following its use for electricity generation, the steam is converted back into water for circulation and reuse.

The exhaust gases that leave the boiler are sprayed with water in the temperature reduction tower, which instantly lowers their temperature to below 200°C to **prevent the re-synthesis of harmful dioxins.** Next, harmful substances are removed with a catalytic bag filter or catalytic denitrator, and the resulting **harmless exhaust gases** are discharged from the stack. NARIKOH Clean Center uses a **closed system** that employs used water as spray water in the temperature reduction tower to prevent any discharges outside the center.

Moreover, as part of its strict efforts to prevent the release of harmful substances, the center has **adopted numerical values far more stringent than the national standard** for the exhaust gases it releases into the atmosphere.

Stirring general waste with a crane to facilitate combustion

In the central control room, the state of the facility is constantly checked with multiple monitors.



* NARIKOH Clean Center Plant No. 3

Compost Made from Pure "Kitchen Waste" Popular for Growing Crops

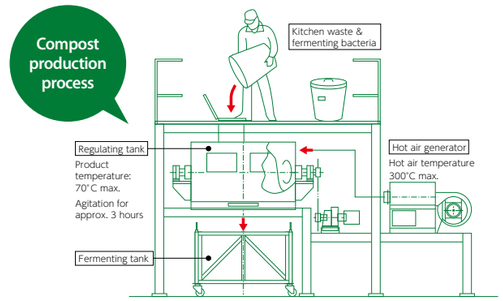
In addition to thermal recycling, Narita International Airport runs an initiative to make **compost** out of kitchen waste. With the cooperation of airport restaurants and the NAA staff cafeteria, we collect **pure "kitchen waste"** separately from ordinary waste.

When kitchen waste is brought to NARIKOH Clean Center, it is placed in a special machine that agitates it for three hours with sawdust and fermentation bacteria. It is then transferred to a fermenting tank where it undergoes fermentation at 60°C. After maturing for three months in a maturing tank, **the compost has a fine texture.** In fiscal 2017, we produced approximately three tons of compost from 14 tons of kitchen waste. Besides being used at greening projects both inside and outside the airport, this compost is given out for free in dedicated bags to local residents and at airport events, and receives excellent reviews as a great fertilizer.

Kitchen waste is inserted from the top of this machine where it is fermented for three hours.

Finished compost. It is finely textured and easy to use.

Compost in a special bag



Voices from NARIKOH Clean Center

From the left: Naoaki Koike, Technical Advisor
Kunihiko Tsubaki, Operating Officer
Yoshinori Sekiguchi, Manager

Keeping Narita International Airport Clean While Promoting Efficient Recycling

NARIKOH Co., Ltd.

Clean Center
Kunihiko Tsubaki, Operating Officer
Naoaki Koike, Technical Advisor
Yoshinori Sekiguchi, Manager

NARIKOH Clean Center was founded in 1969, and we began incinerating waste when Narita International Airport opened in 1978. Currently, as a member of the Narita International Airport Eco-Airport Development and Planning Council, we attend Council meetings twice a year. We exchange opinions with the various departments in charge, aiming for an even more environmentally friendly waste disposal facility.

At present, we have three plants, and we run three general waste incinerators, two at Plant No. 1, and one at Plant No. 3. Plant No. 2 processes industrial waste and industrial waste subject to special control. Plant No. 3, which is equipped for thermal recycling power generation, can incinerate 90 tons of general waste a day. Currently, approximately 70 tons of waste generated by the airport daily is incinerated at Plant No. 3. In the past, power generation was difficult unless using a large 100-ton class furnace, but in recent years, technology that allows stable power generation even with small furnaces of about 90 tons has been established. Thus, looking to the future global environment, we set up a power generation facility at Plant No. 3 and began thermal recycling.

Securing final disposal sites for waste has become difficult in recent years. So we thought that incinerating waste to reduce its volume and weight would be an effective way to extend the use of existing waste disposal sites. At the Clean Center, in addition to practicing safe incineration, we use the highly calorific waste discharged daily from the airport as a source of thermal energy. We believe thermal recycling power generation utilizing this heat is also effective to reduce our greenhouse gas emissions.

Since further airport expansion is under consideration, the amount of general waste is expected to increase as well. While considering the construction of a new facility, we are going to promote recycling to reduce general waste and keep the Airport clean.

Special Feature 2

Restoring Rich Nature of *Satoyama* (Countryside Forests)

Initiatives for Conservation of Precious Plants

Narita International Airport is located in the northern area of Chiba Prefecture. This area has a unique natural habitat called *yatsuda*, consisting of paddy fields below hill slopes, and a wide variety of animals and plants inhabit it. NAA runs various initiatives to preserve this rich environment of the *satoyama*, which was partially lost due to the construction of the airport.
This special feature introduces our efforts to preserve precious plants, such as the golden orchid (*kinran*) which are listed in the Red List published by the Ministry of the Environment.*1

The *yatsuda* habitat nurturing a rich and diverse fauna and flora

Narita International Airport implemented a northern extension development of a parallel runway (Runway B) from 2006 to 2009. During this project, it became necessary to fell trees including a species of the beech family known locally as *konara*. A preliminary field survey found that the planned construction site contained a number of protected species, including the golden orchid (*Kinran, Cephalanthera falcata*), and another species of orchids called *ebine* (*Calanthe discolor*), both of which are listed in the Red List*1 published by the Ministry of the Environment, as well as Japanese buckthorn (*Kuroumemodoki, Rhamnus japonica var. decipien*), which is listed in the Red List of Chiba Prefecture.*2
To preserve these precious plants, we transplanted them under the guidance of experts.
The transplantation of golden orchids, which was considered the most difficult, is described below.

*1 **Red List of the Ministry of the Environment** (list of endangered wildlife species) was compiled by experts on the wildlife inhabiting or growing in Japan, based on the scientific evaluation of the risk of extinction from a biological perspective.

*2 **Red List of Chiba Prefecture** is a table that summarizes the state of wildlife in danger of extinction and the measures for its protection.

Local Orchid in Need of Protection

Golden Orchid with Bright Yellow Petals

The golden orchid or *kinran* (*Cephalanthera falcata*) is a perennial herb that is found in well-managed mixed forests in *satoyama* (countryside forest) areas. They wake up from winter dormancy in early spring, and their yellow flowers bloom around the airport in early May. This flower's beauty makes it a popular target of observation during nature walks, but its ecology is also special.
In addition to photosynthesis, *kinran* is nourished by symbiotic soil fungi (ectomycorrhizal fungi) that reside on its roots. These symbiotic fungi include members of the Thelephoraceae family and the Russulaceae family, and coexist in a symbiotic relationship on the roots of trees of the beech family such as the *konara* (*Quercus serrata*). In other words, the *kinran* orchid gets part of its nutrients from the roots of trees via fungi, and may not survive on photosynthesis alone. Gardeners consider *kinran* to be difficult to cultivate owing to the complex interactions required for their growth.
In recent years, due to the destruction of *satoyama* forest areas, which is their habitat, *kinran* has been designated as an endangered type II (VU) species in the Red List of the Ministry of the Environment, and as an organism under general protection in the Red List of Chiba Prefecture.

Kinran

Transplantation of Golden Orchids

Golden orchids (*kinran*) have a symbiotic relationship with soil fungi and the roots of trees, and digging up the tubers breaks this relationship established over many years. Further, it is necessary to reestablish a new symbiotic relationships in the soil at the transplantation destination. If this relationship does not recover after transplantation, the plants will have to rely solely on photosynthesis, and eventually wither due to lack of nutrition. To reduce this risk as much as possible, we devised various means for transplantation.

Digging Up Tubers

To maximize the chances that the dug up material would include also the symbiotic ectomycorrhizal fungi, we dug up tubers with the surrounding soil along a circumference of 20 centimeters and a depth of 30 centimeters. Moreover, for some of the bulbs, we secured the soil around the roots with a transplantation container with diameter of 30 centimeters and depth of 40 centimeters, and dug up the whole container. In all cases, the dug up plants were transported carefully to prevent the soil around them from falling away.

Forest where plants were transplanted

Transplantation container

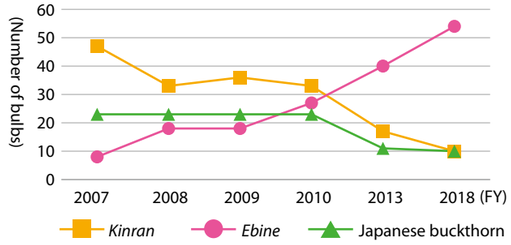
Transplanting to New Location

To minimize the burden on the plant during transportation, we looked for a new spot near the current location.
We selected an environment with *konara* trees offering similar conditions in terms of solar radiation and soil moisture. A *konara* forest was expected to supply *kinran* with the necessary ectomycorrhizal fungi to reestablish a symbiotic relationship. In the selected forest, planting holes were made to keep soil alteration at a minimum, then filled with the brought-in bulbs.

Transplantation spot

Post-Transplantation Monitoring

Our work continued even after the transplantation. Until the third year after the transplantation, monitoring and maintenance such as removal of deciduous branches and grass cuttings were carried out every year. This work was conducted in the sixth and 11th year of transplantation as well.



The graph above shows the number of bulbs monitored over the past 10 years or so.
Ebine have been reproducing steadily, and the number of bulbs is now nearly seven times the initial value. Growth conditions are satisfactory, with stable flowering and seeding. On the other hand, the number of Japanese buckthorn plants has fallen by close to 40% from the original number. However, the remaining plants have grown big, their growth continues to be good, and they are even producing fruits.
Kinran were expected to be the most problematic. Indeed, their number declined significantly after the third year due to the difficulty of reestablishing their symbiotic relationships. However, even now more than ten years later, about 20% of the orchids are growing satisfactorily, and they have been observed to flower and seed. Further, they are propagating, with new *kinran* being observed away from the transplanted locations. The spontaneous appearance of *kinran* could indicate that the environment at the transplanted locations is indeed suitable for its growth. Based on this, we believe that the surviving plants have reestablished new symbiotic relationships in the soil at the new locations.

Transplanted *Kinran*

Transplanted *Ebine*

Transplanted Japanese buckthorn

In Conclusion

Narita International Airport has been conducting environmental assessments as the airport considers further functional enhancements. The assessment results made us realize the necessity to protect various precious plants from the effects of functional enhancements of the airport through transplantation and other means.

Each target plant such as *kinran*, *ebine*, and Japanese buckthorn, has its own character. Utilizing the knowledge gained from the conservation initiative described above, we will pursue the conservation of precious species by careful treatment according to their ecological characteristics.

Hikoki no Oka (Airplane Hill)

Community Environment Initiatives

Targets

- **Reduce environmental impact from aircraft noise**
- **Air quality conservation** (Reduce the emission of air pollutants)
- **Maintain water quality of rainwater runoff**
- **Conserve natural environments that nurture biodiversity**
- **Implement and reinforce environmental initiatives in collaboration with local communities**

Noise Mitigation Measures

As a landlocked airport, Narita International Airport has implemented steadfast and detailed measures to mitigate aircraft noise, the largest factor affecting the local community since the airport opened.

The Eco-Airport Master Plan (FY 2016–2020) also aims to further enhance measures to reduce the environmental impact of aircraft noise.

In 2005, we instituted a unique landing charge system for international flights that offers preferential charges to quieter aircraft, encouraging airlines to introduce such aircraft. As a result, the ratio of quieter aircraft has been increasing each year since then. In April 2013, landing charges for international flights were reduced even further. The ratio of low-noise aircraft in 2017 was 93.0%, making steady progress.

The noise mitigation measures are split into three categories: Reducing Noise at Source; Improved Airport Layout; and Community Programs. The main components of our community programs include subsidies, compensation, and land use. They are implemented according to the Law Concerning Prevention of Disturbance Arising from Aircraft Noise, etc., around Public Aerodromes*1 (Aircraft Noise Prevention Law), and the Special Measures Law Concerning Aircraft Noise Prevention Strategies around Specified Airports*2 (Special Act for Aircraft Noise Prevention).

*1 **The Law Concerning Prevention of Disturbance Arising from Aircraft Noise, etc., around Public Aerodromes** was introduced to assist affected residents in improving the stability of their lifestyles and welfare by setting out provisions for prevention of disturbance arising from aircraft noise; compensation for losses due to frequent takeoffs and landings; and establishment of other essential measures. In this law, zones are categorized according to the noise level as follows:
*L*den*3 62 dB or higher: Class 1 zone
*L*den 73 dB or higher: Class 2 zone
*L*den 76 dB or higher: Class 3 zone (see p. 60)

*2 **The Special Measures Law Concerning Aircraft Noise Prevention Strategies around Specified Airports** was introduced to prevent disturbance arising from aircraft noise and ensure rational, appropriate land use through the formulation of basic guidelines for aircraft noise mitigation, setting out regulations for land use and other special steps. Under this law, zones are categorized based on the level of disturbance arising from noise (see p. 60).
*L*den 66 dB or higher: Special noise prevention areas
*L*den 62 dB or higher: Aircraft noise mitigation areas

*3 ***L*den:** The Day-Evening-Night Averaged Sound Level (weighted by time of day). *L*den is a daily equivalent noise level, with evening and nighttime noise weighted as louder.

Reducing Noise at Source

Introducing Quieter Aircraft

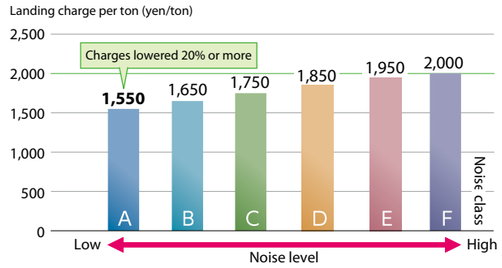
As part of the global movement towards quieter aircraft, in fiscal 2002, Japan prohibited the operation of aircraft that do not meet the provisions for noise standards set out in Chapter*4 3 Noise Standard by the International Civil Aviation Organization (ICAO)*5. To encourage the use of Chapter 4 aircraft, which come under more stringent noise standards, we have introduced a landing charge system for international flights that gives preferential treatment to quieter aircraft since fiscal 2005. The system offers lower landing charges for international flights based on the noise level (Class A to F) of the aircraft according to the Narita Aircraft Noise Index. The quietest Class A aircraft are charged at least 20% less than Class F aircraft. As the graph on the right shows, Class A to C aircraft, which satisfy Chapter 4 standards, have gradually increased since fiscal 2002 when Chapter 2 aircraft were prohibited. The ratio increased after fiscal 2005 when new charge system was introduced, and the proportion of Class A aircraft has been increasing since fiscal 2013, when further price reductions went into effect.

Recently, airlines have been promoting the introduction of new aircraft with state-of-art technology for their fleet renewal. These aircraft make substantial contributions to reducing environmental impacts such as noise and greenhouse gas.

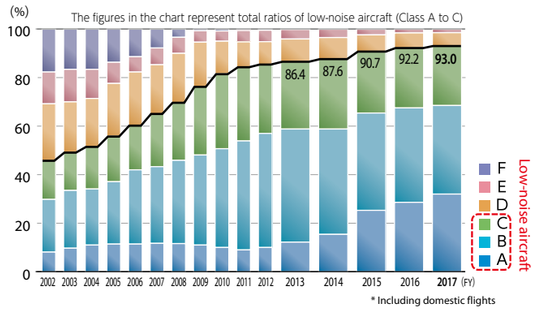
*4 **Chapters** are noise certification standards for aircraft set by the International Civil Aviation Organization (ICAO). Upper-limits for noise levels measured at approach, takeoff, and lateral certification points are set out in accordance with the maximum takeoff weight of an aircraft.

*5 **The International Civil Aviation Organization (ICAO)** is a UN (United Nations) specialized agency under the Economic and Social Council. It was established in 1947, and its headquarters is in Montreal, Canada.

International Landing Charges Based on the Narita Aircraft Noise Index



Ratio of Aircraft per Noise Category



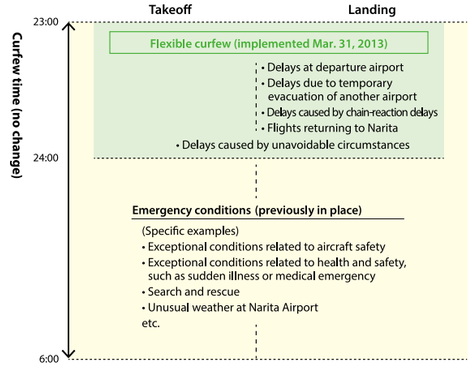
* Including domestic flights

Night Flight Restrictions (Airport Curfew)

Since opening in 1978, takeoffs and landings at Narita International Airport have been restricted in principle during the curfew period between 11:00 p.m. and 6:00 a.m., except under emergency conditions or unavoidable circumstances, such as in times of typhoon, heavy snowfall or other unusual weather conditions, or conditions that affect the safety of flight operation, as well as sudden/serious medical cases.

In addition to the above exceptions, since March 31, 2013, the curfew system has been further relaxed. The "flexible curfew system" permits flight operation from 11:00 p.m. to midnight in situations that are deemed beyond the control of airlines, such as unusual weather condition at the departure airport. In fiscal 2017, night-time operating restrictions were relaxed 98 times.

Information on flights operated after airport curfew is released the following day on the NAA website, “Information on Flights After Curfew” (http://www.naa.jp/jp/csr/curfew/ [Japanese version only]).

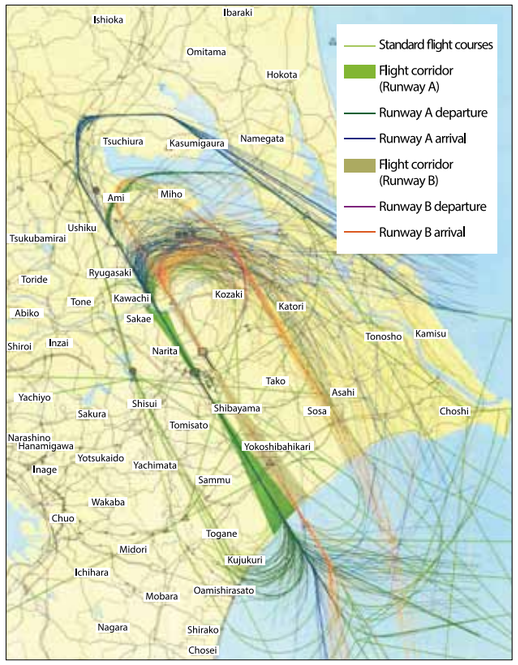


Establishing and Monitoring Flight Corridors (Monitoring Zones)

To minimize the impact of aircraft noise, flight corridors (monitoring zones) for direct ascent and descent have been established from the Tonegawa River to the Kujukuri Coastline. They are monitored to ensure that aircraft do not deviate from these corridors.

In case of deviation without any valid reasons such as weather or safety, their flight numbers and reasons are disclosed to the public. Also, the Ministry of Land, Infrastructure, Transport and Tourism issues a directive to the airlines concerned as necessary. In fiscal 2017, the number of aircraft deviating without valid reason was 16 (0.003%).

Aircraft Tracking Map with Flight Corridors (Example)



Aircraft in Violation

Fiscal year	2013	2014	2015	2016	2017
Number of aircraft deviating without valid reason (percentage of total flights)	2 (0.001%)	5 (0.002%)	7 (0.003%)	16 (0.007%)	7 (0.003%)
Number of flights	226,182	228,220	235,190	245,705	252,447

Aircraft Noise Measurements

Year-Round Monitoring

To measure noise of takeoff and landing aircraft, we have been monitoring aircraft noise since opening in 1978, presently with 33 monitoring stations around the airport throughout the year.

In fiscal 2017, all yearly values of aircraft noise evaluation indicators L_{den}*1 measured by each monitoring station met the area designated standards based on the Aircraft Noise Prevention Law.

In addition to monitoring stations mentioned above, there are also 23 stations installed by Chiba Prefectural Government, 10 by Ibaraki Prefectural Government and 36 by local municipal governments (as of April 2018). In total, 102 stations around the airport monitor aircraft noise continuously. Data from our 33 stations can be viewed in real time on our environmental information website, "the Narita Airport Environmental Community."*2

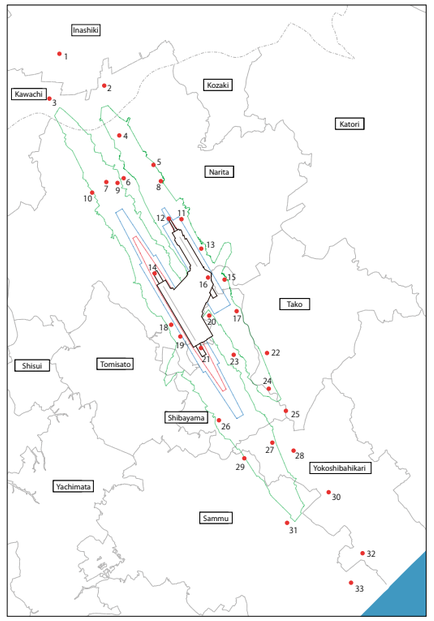
*1 ***L_{den}:** The Day-Evening-Night Averaged Sound Level (weighted by time of day). L_{den} is a daily equivalent noise level, with evening and nighttime noise weighted as louder.

*2 **Narita Airport Environmental Community** publishes environmental research results like flight tracking data using air traffic control information, aircraft noise, air quality, and water quality, as well as the status of environmental measure implementation.

web http://airport-community.naa.jp/ (Japanese version only)

Location of Aircraft Noise Monitoring Stations

Class 1 zone for Aircraft Noise Prevention Law
Class 2 zone for Aircraft Noise Prevention Law
Class 3 zone for Aircraft Noise Prevention Law
Monitoring station



Year-Round Monitoring Results for FY 2017

Station no.	Station name	L_{den} (dB)	Comparison with prior year
1	Shintone	54.0	-0.2
2	Shimokano	53.7	0.0
3	Kawachi	55.4	-0.2
4	Nishiosuka	59.6	0.3
5	Uchijuku	54.1	-0.6
6	Kuzumi	57.1	-0.5
7	Araumi	61.5	-0.2
8	Tsuchimuro (NAA)	55.8	-0.8
9	Inooka	59.2	-0.5
10	Ashida (NAA)	56.9	-0.7
11	Omuro (NAA)	58.0	-1.0
12	16L	69.7	-0.3
13	Shinden (NAA)	55.5	0.9
14	16R	71.2	-0.3
15	Hitokuwata	53.5	0.1
16	34R*	(70.4)	—
17	Hishida-higashi	55.7	0.1
18	Sanrizuka Elementary School	60.0	0.0
19	Sanrizuka Ground	63.9	0.0
20	Shibayama-Chiyoda	56.7	0.2
21	34L	72.8	-0.5
22	Kita	52.6	0.6
23	Shibayama-higashi	56.5	0.5
24	Chida	58.5	0.4
25	Ushino	57.6	0.1
26	Shibayama	56.0	0.3
27	Nakadai (NAA)	56.7	0.0
28	Ofusa	56.5	0.3
29	Yamamuro	53.8	0.0
30	Yokoshiba	56.3	0.4
31	Matsuo	56.5	0.1
32	Kamisakai	55.8	0.5
33	Hasunuma	54.6	-0.1

* There is no comparison with the previous year because the station was moved this fiscal year.

Short-Term Monitoring

Short-term monitoring is carried out by NAA to verify noise zone specifications according to the Aircraft Noise Prevention Law. Aircraft noise is monitored at 58 locations along the boundary of Class 1, 2, and 3 zones over a period of seven consecutive days, mainly in summer and winter. In locations where particularly detailed information is required, monitoring is also conducted in spring and autumn. L_{den} values in fiscal 2017 were within the criteria for the specified zones under the Aircraft Noise Prevention Law at all short-term monitoring locations (see p. 61).

Airport Ground Noise Monitoring

We have installed five ground noise monitoring stations in and around the airport and conduct continuous monitoring to measure airport noise* generated from various sources other than taking off and landing aircraft.

* Noise caused by airport construction, taxiing aircraft, engine testing, using of auxiliary power units (APUs), and so on. Of these, noise from taxiing aircraft, engine testing, and using of APUs are subject to aircraft noise reference values (L_{den}).

Exhaust port of an auxiliary power unit (APU)

Engine Run-Up Noise Mitigation

When the maintenance on an aircraft is completed, an engine run-up is necessary for safe operation. To minimize engine run-up noise, we constructed a Noise Reduction Hangar in cooperation with airlines in 1999.

This facility intakes air from the ceiling, allowing engine tests to be carried out at any time regardless of wind direction. Also, thanks to its hangar-type structure, the noise mitigation effect has been improved dramatically compared with conventional facilities.

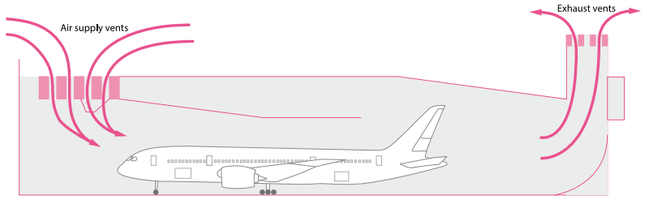
This facility reduces the noise level in the vicinity of the airport boundary (400 meters away) to under 60 decibels (dB), the same loudness as normal conversation.

In fiscal 2017, jet engines were tested 831 times, including 787 times (94.7%) in this hangar.

Noise Reduction Hangar (NRH)

Features of the Noise Reduction Hangar (NRH)

The NRH uses an upper inlet system whereby streamlined air is taken in from the ceiling.
The inner walls and ceilings are constructed of materials with excellent sound absorption and sound insulation characteristics.



Improvement of Airport Layout

Development of Noise Mitigation Embankments and Wooded Buffer Zones

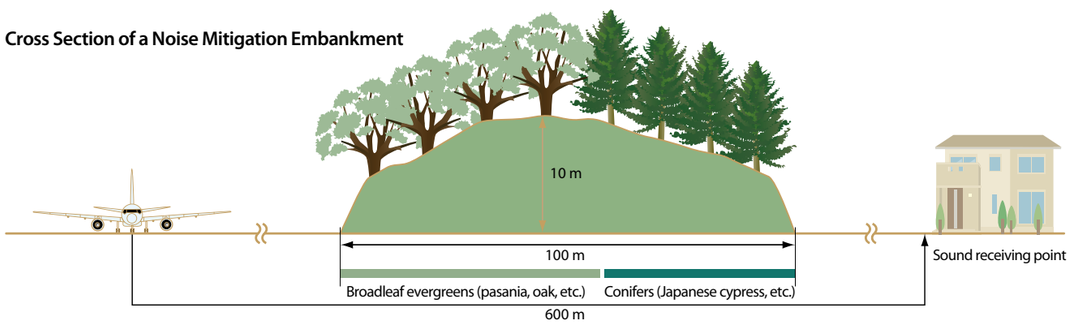
We maintain noise mitigation embankments and wooded buffer zones around the airport to reduce aircraft noise during takeoff and landing.

For example, an embankment 100 meters wide and ten meters high reduces the noise level of taxiing aircraft to 10-12 dB on the other side of the embankment 600 meters away.

In areas where trees have been growing in adequate numbers for a suitable length of time, we take full advantage of their value as natural assets and their noise mitigation effects by creating wooded buffer zones.

Noise mitigation embankment

Cross Section of a Noise Mitigation Embankment



Community Programs

Soundproofing

In order to prevent or mitigate the impact of aircraft noise, we provide subsidies for soundproofing of housing and public facilities under the Aircraft Noise Prevention Law.

Residential Soundproofing

When an area is classified as Class 1 under the Aircraft Noise Prevention Law, residences in that area receive grants for soundproofing and air conditioning according to their noise level. For air conditioning that shows deterioration over a specified period of time, we also give support for replacement.

School and Public Facility Soundproofing

Under the Aircraft Noise Prevention Law, facilities such as schools, nursery schools, kindergartens, hospitals, pediatric hospitals, special nursing homes for the elderly and other public facilities also receive subsidies for soundproofing and air conditioning according to their noise level.

As with private housing, grants are offered to upgrade deteriorated air conditioning after a specified period of time.

Residential Soundproofing Subsidy Report (until FY 2017)

	Eligible houses	Soundproofed houses
Runway A	3,580	3,425
Runway B, crosswind runway	1,892	1,344

Residential Soundproofing Example

Before soundproofing

After soundproofing
(Replaced of doors, sashes, etc., with soundproof ones)

Relocation Compensation

Under the provisions of the Aircraft Noise Prevention Law and Special Act for Aircraft Noise Prevention, compensation for relocation is provided for residences in areas that are particularly susceptible to the impact of aircraft noise. In addition to the relocation of individual households, we also offer group relocation in order to preserve local communities and settlements that have a long history of social ties.

Relocation Compensation Report (until FY 2017)

	Eligible houses	Relocated households
Aircraft Noise Prevention Law	503	503
Special Act for Aircraft Noise Prevention	591	492
Total	1,094	995

Narita International Airport Noise Mitigation Committee

The Narita International Airport Noise Mitigation Committee is a forum to discuss measures to prevent or mitigate disturbances caused by aircraft noise. The committee is comprised of local municipal leaders, chairpersons, academic experts, community representatives, the Ministry of Land, Infrastructure, Transport and Tourism, Chiba prefectural government, the airlines, and NAA. Regional working groups have been set up under the committee for the individual areas around the airport to discuss issues presented in order to improve noise mitigation and achieve safe and proper airport operations. The committee was founded in 1972 and had its 44th meeting in March 2018.

Narita International Airport Noise Mitigation Committee

Grants for Community Programs

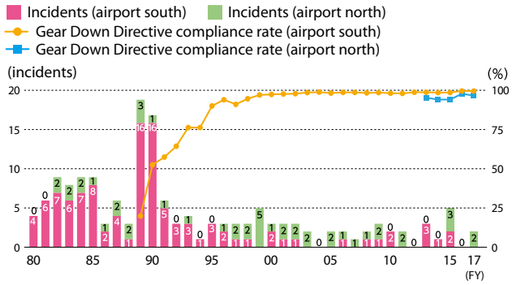
We contribute to the cost of measures taken to prevent disturbances caused by aircraft noise in the vicinity of the airport and development work in the surrounding community. Subsidies are provided for regional countermeasures in Chiba Prefecture, Ibaraki Prefecture, and the ten cities and towns surrounding the airport. Since opening in 1978, we have contributed a total of approximately JPY 125.6 billion in subsidies, as of March 31, 2018. We contribute to the maintenance of soundproofed public facilities as well as roads, parks, firefighting facilities, and community facilities around the airport.

Prevention of Falling Objects from Aircraft

We consider falling objects from aircraft such as airframe parts and ice blocks to be serious issues. To date, aircraft approaching from south of Narita International Airport have been asked to complete gear down over the sea in order to free any accumulated ice. Other steps that are also taken include requests for thorough maintenance and inspection, inquiries into the causes of falling objects, and careful monitoring. As a result, there has been a drastic reduction in the number of incidents involving ice blocks and other falling objects.

We will continue to work with all relevant parties to eliminate such incidents completely, introducing new policies such as cautioning aircraft approaching from north of the airport to avoid gear down over concentrated residential areas, and periodically checking approaching aircraft. In cooperation with related organizations, we will aim to completely eliminate incidents of falling objects from aircraft.

Reported Incidents and Gear Down Directive Compliance Rate



History of Prevention of Falling Objects from Aircraft

Date	Measure
March 1983	Establishment of system for relief of damage caused by falling objects from aircraft (a system to provide relief to victims of damage when it is not possible to identify the aircraft that caused the falling objects)
January 1991	The Ministry of Transport (now the Ministry of Land, Infrastructure, Transport and Tourism [MLIT]) orders airlines to increase maintenance and inspection, and to complete gear down over the sea on southern approaches.
May 1993	MLIT issues gear down directives published in the AIP (Aeronautical Information Publication).
May 1996	MLIT issues gear down directives to be included in ATIS (Automatic Terminal Information Service).
From FY 1997	MLIT and NAA conduct studies on ice attached to arriving aircraft.
May 1999	MLIT issues airworthiness amendment notices ordering improvement of aircraft structure.
July 2012	MLIT advises on new policies, such as cautioning aircraft approaching from north of the airport to avoid gear down over concentrated residential areas.
May 2017	MLIT and NAA launch an "aircraft inspection system" for landing aircraft to periodically examine essential parts of the plane.
November 2017 to March 2018	MLIT holds a meeting for the promotion of comprehensive measures related to the prevention of falling objects and other issues.
April 2018	NAA commences operation of a system for relief aid for damage caused by objects falling from aircraft ("Payment of consolation money", "Payment of advances", "Various kinds of support, such as coordination with airlines, etc.").

Air Quality Conservation

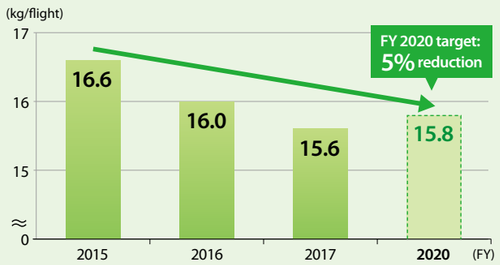
Monitoring is carried out at Narita International Airport to grasp the impact on air quality surrounding the airport due to emissions created by aircraft operations and other airportwide activities. We work to limit air pollution from aircraft, from vehicles traveling within the airport, from operation of the Central Heating and Cooling Plant, and so on.

The Eco-Airport Master Plan (FY 2016–2020) called for reduction of nitrogen oxide (NOx) emissions per flight by 5% compared to fiscal 2015 (16.6 kg/flight) by fiscal 2020.

In fiscal 2017, we achieved a 6.0% reduction of NOx emissions, to 15.8 kg per flight.

Goals and Performance

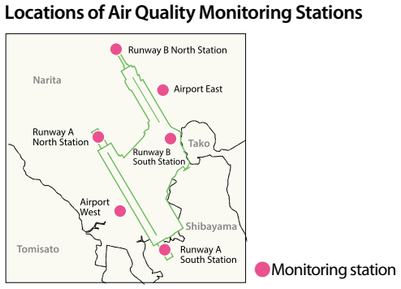
Reduce NOx emissions (per flight)



Air Quality Monitoring

We have six year-round air quality monitoring stations in and around the airport. They continuously monitor concentrations of sulfur dioxide (SO_2), nitrogen oxide (NOx), carbon monoxide (CO), photochemical oxidants, suspended particulate matter, and hydrocarbons (see p. 63). In fiscal 2017, all items except photochemical oxidants achieved the environmental quality standards. Photochemical oxidants failed to meet the criteria, but the monitoring stations of local governments observed the same concentrations. Thus, it is believed that the concentrations were not limited to just the airport but were a more widespread occurrence.

Locations of Air Quality Monitoring Stations



Water Quality Conservation

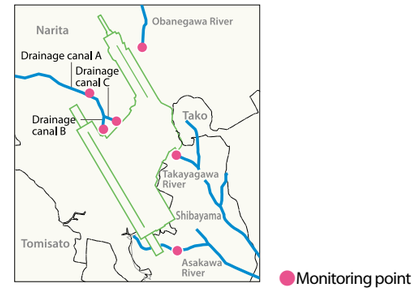
We take various measures to preserve water quality. For example, monitoring water quality to grasp the effect of rainwater runoff from Narita International Airport on the surrounding rivers and streams; adequate installation and operation of water treatment facilities; and installation of facilities to separate oil and water so as to avoid any trouble in case of oil spillage in the aviation fuel tank farms.

Water Quality Monitoring

We regularly monitor the surrounding rivers and streams in six locations once a month, and monitors 24 hours a day in three locations, including drainage canals. While storm drainage levels do fluctuate, care is taken to prevent a negative impact on rivers downstream (see p. 64). Slightly elevated coliform bacteria levels were observed in prior years, but the increases were found to be due to natural causes, and confirmation was made that there was no adverse impact on health and sanitation.

Groundwater levels are monitored continuously in the vicinity of the airport and the water quality is measured once a year. Monitoring results of fiscal 2017 confirmed that underground water quality met environmental standards.

Locations of Water Quality Monitoring Points



De-Icing

When snow accumulates on the wings and tail fins of aircraft, or frost and ice occur, it affects the lift required for takeoff as well as control functions. As this can cause accidents, de-icing—spraying down the planes with de-icing agent*1 —is essential in cold winter months or when snow falls. The main component of de-icing agent is propylene glycol. It is not harmful to humans and is even used in foods, but once it flows into rivers and streams, it may cause organic pollution.*2

We provide de-icing aircraft bays where de-icing agent that falls onto the apron can be collected in holding ponds. Water containing deicing agent is carried from the apron via storm drains for treatment at a de-icing effluent treatment facility. Also, if de-icing is operated at other parking stands, de-icing agent is collected in special vehicles and treated in the same manner.

De-icing effluent treatment facility

De-icing operation

*1 **De-icing agent** is a substance to prevent snow, frost or ice build-up on critical aircraft surfaces.

*2 **Organic pollution** is water pollution caused by organic substances entering a body of water. They consume oxygen during decomposition which leads to hypoxia (oxygen deficiency).

Natural Environment Conservation

We are promoting initiatives to bring back the abundant nature that had been lost with the construction of the airport. The Greening Master Plan for Narita Airport and Environs is a greening program (see pp. 24–26). It aims to create organically-linked, managed green areas with appropriate distributions of sound mitigation, natural environment conservation, aesthetic appeal and recreational function. Consideration is given to the vegetation and scenery when managing these areas, and they are tailored to the unique topographical features of the region.
Areas such as Shibayama Mizube no Sato (Waterside Park) make optimum use of the functions possessed by green areas. Following a philosophy of mitigation,* we not only preserve natural environments but also restore and conserve those once lost.

* **Mitigation** is the concept of reducing or alleviating the environmental impact of development through specific measures. It also aims to restore lost environments to prior levels and maintain them.

Greening Master Plan for Narita Airport and Environs

Greenery Functions
- Noise absorption
- Natural environment conservation
- Aesthetic improvement
- Recreation

→ Airport Environs Greening Program

→ Development Plan for Noise Mitigation Embankments and Wooded Buffer Zones

Greening Projects

According to the Greening Master Plan for Narita Airport and Environs, we develop green areas in consideration of vegetation, aesthetic value, and unique topographical features.

Orchard Development

Chestnut trees have been planted which allow people to enjoy nature with chestnuts picking. In autumn, local children are invited to their harvest.

Toyomi Shinonome no Oka (Hill of Dawn)

An outlook for observing planes, opened on a noise embankment in the Toyomi district. The hill is a favorite spot for aircraft enthusiasts and local families alike.

Shibayama Mizube no Sato (Waterside Park)

Many water plants, including iris sanguinea, iris pseudacorus, and water lilies have been planted in the park. Walking trails and benches in place allow people to relax and appreciate the surroundings.

Asakura Yasuragi no Mori (Tranquil Forest)

Trails are provided in the existing forestry where people can relax and enjoy nature and forest bathing.

7 Greenport Eco-Agripark (see p. 26)

Development of Drainage Ways and Waterside Environments

Environmental work on off-site drainage ways connecting to the Tokkogawa River north of the airport is being carried out, creating concrete canals that closely follow natural streams. Cherry blossom trees donated by local residents and others are thriving successfully on the banks, and provide a colorful spectacle in spring.

Satoyama (Countryside Forest) Development

Utilizing existing forestry, natural environments are conserved as *satoyama* (cultivated countryside forests). For more effective use of *satoyama*, in 2005, in conjunction with Chiba Prefectural Government, Narita City, the Narita Local Hotels Association and the Narita Satoyama Development Association, we created walking trails extending to four kilometers from off-site drainage ways. The trails allow visitors to jog or walk through pristine natural environments while enjoying the seasonal colors.

Narita Sakura no Yama (Cherry Blossom Mountain)

Cherry blossom trees were planted with the assistance of Narita City restoring those lost due to airport construction. In spring, the area is crowded with people enjoying the blooming flowers.

Sanrizuka Sakura no Oka (Cherry Blossom Hill)

Minami Sanrizuka Nature Trail

In order to create an area for relaxation in the region, cherry blossom trees as well as azaleas have been planted at Sanrizuka Sakura no Oka. People can watch aircraft taking off and landing from a grassy knoll. The Minami Sanrizuka Nature Trail, which extends from Sakura no Oka, is a wood chip path through existing forestry, wonderful for strolling and forest bathing.

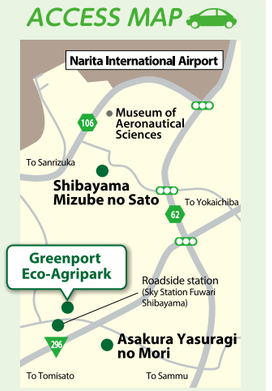
Natural Parkland Development

Greenport Eco-Agripark is a pristine natural adventure park on a 17 hectares tract of our company's property which adjoins Shibayama Mizube no Sato Waterside Park, south of the airport (in the Iwayama district of Shibayama). The park opened in 2007 and features low hills and vales, typical of the Hokuso region, and a richly varied environment which is home to many species of insect and varied flora and fauna. Our aim is to restore the *satoyama* landscape, and to protect an environment rich in biodiversity.
The Agripark offers not only a strolling spot for local residents but also hands-on experiences in rice cultivation in collaboration with Shibayama Town near the airport and nature observation classes by the Narita Airport Eco-Kids Club.

In the Greenport Eco-Agripark

Narita Airport Eco-Kids Club nature observation class

Greenport Eco-Agripark



Address: 1864–2 Iwayama, Shibayama Town
Parking 30 vehicles; toilets available
Opening hours: 8 a.m. to 5 p.m.
Ten minutes from the airport by car

COLUMN

Precious Plants Growing in Wooded Buffer Zones
—Creating New Habitats—

The wooded buffer zones created around the airport are planted with trees of the beech family, such as *matebashii* (*Lithocarpus edulis*) and *shirakashi* (*Quercus myrsinaefolia*) in addition to Japanese cypresses. Thinning, grass cutting, and other maintenance are regularly carried out to maintain these zones in good condition. Some of the trees were planted 40 or more years ago and have reached majestic proportions, and these zones do not look like man-made woods.
A plant survey conducted in fiscal 2017 found precious plants such as the golden orchid (*kinran, Cephalanthera falcata*), and *sasabaginran* (*Cephalanthera longibracteata Blume*) at the wooded buffer zones. Through judicious selection of the tree species to plant and regular maintenance, these man-made woods have grown into new habitats for precious plants.

Wooded buffer zone

Sasabaginran

Cooperation with Revival of Regional Agriculture

The Hokuso region, in which Narita International Airport is located, is the center of Chiba Prefecture's agricultural industry—one of the foremost vegetable production centers in Japan, and a leading organic farming region.

We properly manage and lease the farming land around the airport which was vacated by relocations. We also work to revive local agriculture through organic farming courses and other measures.

Use of the Land after Relocation

We make effective use of farming land vacated by relocation in order to promote local agriculture. Suitable land is leased to local farmers, with the assistance of municipal governments in the area. Unleased land is regularly cultivated and mowed, and Chinese milk vetch is planted to sustain and improve soil fertility so that the land can be used for future farming. Meanwhile, residential and other non-farming land vacated by relocation is being planted with poppies, cosmos and other wildflowers to preserve the beauty of the landscape and prevent depredation. In fiscal 2017, 0.5 hectares of Chinese milk vetch and 2.7 hectares of wildflowers were sown.

Chinese milk vetch planted in an unused rice paddy

Wildflowers planted in residential land vacated due to relocation

Organic Farming Trainees

We began offering support for organic farming courses in fiscal 2005. The classes are conducted in organic JAS-certified fields with the cooperation of local farmers.
So far, 44 students have been accepted to the course. Graduates take up farming in various areas, including regions around the airport, contributing to the vitality of farming in those areas. Some also work as tutors in the project and instruct new students. The advantage of the project is that it puts idle land to new use and nurtures the development of newcomers to the farming industry who will carry on into the next generation.
Organic vegetables produced by the trainees are available for sale at Sky Station Fuwari Shibayama (see Access Map, p. 26).

Aircraft parked at gates of Passenger Terminal 1

Resource Recycling Initiatives

3Rs of Waste

Targets

- **Recycle resources (Reduce general waste incinerated)**
- **Recycle water resources (Reduce potable water usage)**

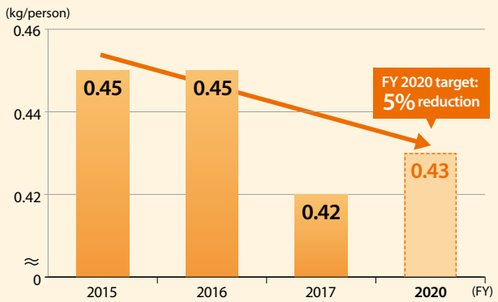
To reduce environmental impact, the 3Rs (Reduce, Reuse, Recycle) are actively encouraged when handling waste produced by operations at Narita International Airport.

In the Eco-Airport Master Plan (FY 2016–2020), we aim to reduce general waste incinerated (per airport user) by 5% of fiscal 2015 levels (0.45 kilograms/person) by 2020. The total amount of general waste disposed of in fiscal 2017 was 22,900 tons, thus lower than the previous fiscal year in spite of a greater number of aircraft movements and passengers. The amount per airport user was 0.42 kilograms. The total recycling rate in fiscal 2017 was 27.8%.

While promoting our waste reduction initiatives, we will develop new areas of recycling and perform comprehensive waste sorting.

Goals and Performance

Reduce general waste incinerated (per airport user)



General Waste Sorting

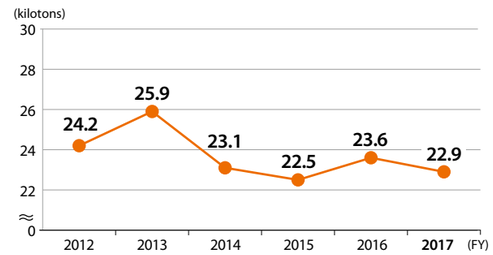
The greatest volume of general waste produced at Narita International Airport is unloaded from aircraft, which comprises about half of the total amount. Some of this waste, catering waste must be incinerated under quarantine laws. For other waste, while adverse conditions such as limited onboard sorting space and time available for cabin cleaning exist, a portion of airlines do sort and recycle waste such as inflight magazines, bottles, cans and plastic bottles.

Meanwhile, general waste from passenger terminals, the cargo area, the office area and other facilities is sorted into bottles, cans, plastic bottles and so on, ensuring that reusable items are recycled. In an effort to reduce general waste and increase the recycling rate of plastic bottles, waste receptacles for plastic bottles with leftover beverages have been installed in front of security checkpoints since fiscal 2015.

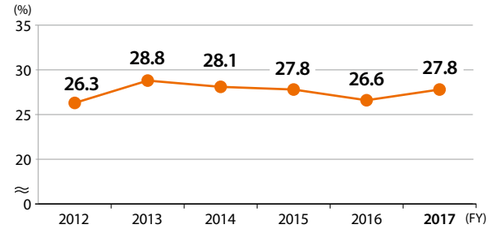
We also recycle paper that is shredded at the airport, and about 200 tons of shredded paper were recovered in fiscal 2017.

Led by the Eco-Airport Development and Planning Council (see p. 41), recycling initiatives have been expanded to include the airport as a whole. We will pursue the reduction of waste and promote our recycling initiatives in cooperation with airport-related business entities.

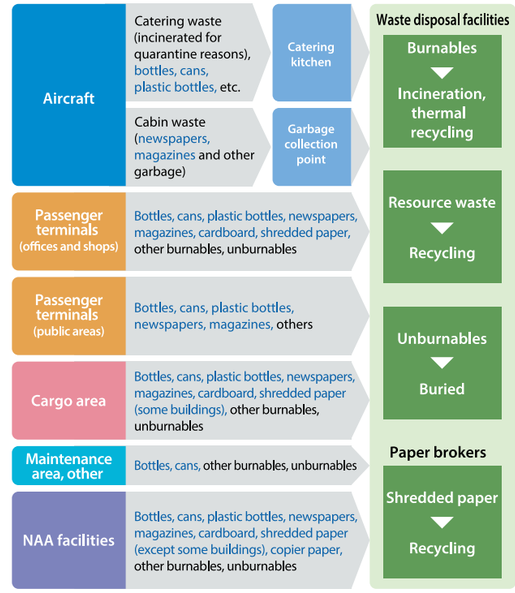
Change in General Waste Incinerated (Total)



Change in Waste Recycling Rate



Flowchart for Disposal and Recycling of General Waste from Narita International Airport



Sorted recycling bins in passenger terminals

* **Blue text :** Recyclable materials

Composting of Kitchen Waste

Some of the food waste from airport restaurants and the NAA cafeteria is composted. In fiscal 2017, approximately three tons of compost from about 14 tons of raw garbage was produced. Compost is then used in greening projects in and around the airport, or given away to the public at events in the airport or local community. Many people look forward to this annual supply.

Reducing and Reusing Construction Waste

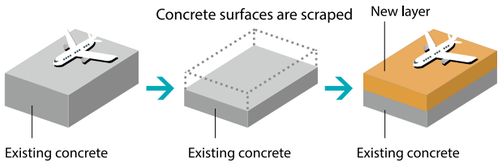
Overlay Method Reduces Construction Waste

The aircraft parking area (apron) is paved with solid concrete, but must be repaved occasionally due to deterioration. During such major pavement projects, conventional methods call for existing pavement to be torn up completely. Replacing the pavement with new concrete is a long-term project and generates a vast quantity of waste material.

Consequently, we developed its own method known as the Bonded Overlay Method. This involves scraping the existing concrete surface, overlaying a thin layer of concrete on it, and bonding the new material. Compared with conventional methods, this technique decreases much construction waste and the amount of concrete used.

Repair work using the bonded overlay method

Bonded Overlay Method



Advantage 1
Waste reduction
Concrete rubble reduced to 1/20th
* Compared to full replacement of concrete paving slabs with a thickness of 30 cm

Advantage 2
Shorter construction period
No need to remove existing concrete

Advantage 3
Cost reduction
Enables less concrete to be used

Recycling Construction Waste

Concrete and asphalt rubble produced by upgrading the aprons and runways is crushed at the airport recycling plant and used as aggregate in airport projects. Approximately 79,000 tons of construction waste were processed in fiscal 2017.

Recycling plant

Effective Utilization of Grass Cuttings

The green spaces around the runways are mowed several times a year, generating approximately 4,200 tons of grass cuttings in fiscal 2017.

The grass cuttings are given to farmers around the airport, and some of them are used effectively as feed.

A round bale of grass mowed around a runway

Sorting and Recycling at NAA Office

At the NAA Head Office Building, waste is sorted into ten categories (bottles, cans, plastic bottles, newspapers, magazines, cardboard, copier paper, shredded paper, burnables, and unburnables). Of these, all are recycled except for burnables and some of the unburnables.

Special locked boxes are placed in the copy rooms in the building and other offices to collect used paper. Approximately 19 tons of used paper was collected in fiscal 2017. The paper was recycled at pulp mills into toilet paper for use in restrooms at the NAA Building and other locations.

We have taken other recycling measures such as collecting spent tape cartridges from label printers for return to manufacturers.

We will pursue an increase in our recycling rate through waste reduction measures such as steps toward a more paperless office and in-house awareness programs.

Tape cartridge collection box set up in the office

Recycling bin

Green Purchasing

We promote green purchasing, in accordance with the Green Purchasing Law,* when procuring products or ordering construction. In addition to quality and price concerns, we also select items and services that place the least possible burden on the environment.

In fiscal 2018, green purchasing was followed for 222 designated procurement items, including goods such as copy paper, stationery, and office equipment, as well as services. In addition to these items, we also call for selecting eco-friendly products such as Eco Mark products and those listed on the eco-product database of Green Purchase Network (GPN).

* **The Green Purchasing Law (Law Concerning the Promotion of Eco-Friendly Goods and Services by the State and Other Entities)** encourages the procurement of eco-products (items and services that reduce environmental impact) and provides information on eco-product procurement, aiming for a society based in sustainable development.

Eco-products
(NAA work uniforms)

Eco-products (stationery)

Water Conservation & Recycling

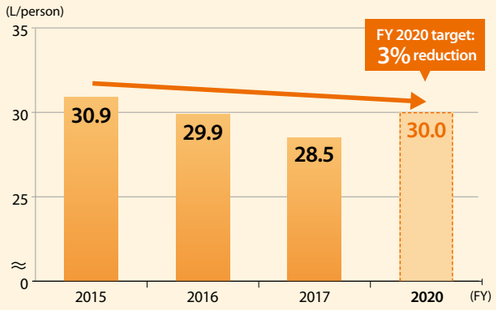
At Narita International Airport, which is used by a huge number of customers, 2.18 billion liters*1 of water (equivalent to the volume of 6,130 25-meter pools) is consumed per year.
In passenger terminals and other facilities, we strive to conserve water through motion sensor faucets, water-saving toilets, and so on. Also, we reduce the amount of potable water usage by utilizing grey water*2 (recycled water) that is treated rainwater and kitchen wastewater. In fiscal 2017, 620 million liters of grey water were produced and consumed. This accounts for about 30% of the water spent in Narita Airport.
The Eco-Airport Master Plan (FY 2016–2020) sets a target of reducing potable water usage per airport user by 3% from the fiscal 2015 level (30.9 liters/person) by 2020. As a result of these initiatives, water usage decreased to 28.5 liters per person in fiscal 2017.
Going forward we will continue promoting the reduction of potable water usage.

*1 Includes aviation fuel facilities, etc., outside of the airport site

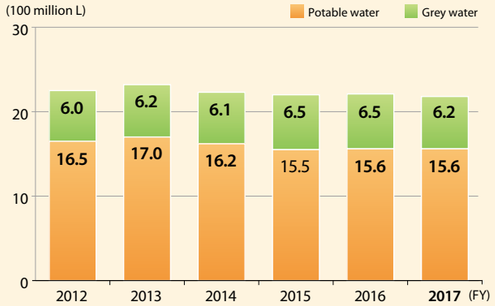
*2 **Grey water** is treated rainwater and wastewater for recycling. It is called "grey water" because it is midway between potable water and wastewater.

Goals and Performance

Reduction of Potable Water Use (per airport user)



Total Water Consumption



Recycling Wastewater from Restaurant Kitchens

Kitchen wastewater from restaurants in passenger terminals contains many impurities such as fat and organic substances. Therefore, it is treated at the Kitchen Wastewater Treatment Facilities to remove impurities through biodegradation. Afterwards, water is taken to the Grey Water Production Facilities where it is disinfected and purified through membrane separation and activated carbon absorption, allowing it to be reused as grey water.
Grey water is reused for flushing toilets in passenger terminals and at the NAA Building. Approximately 180 million liters of grey water was generated from restaurant wastewater in fiscal 2017.

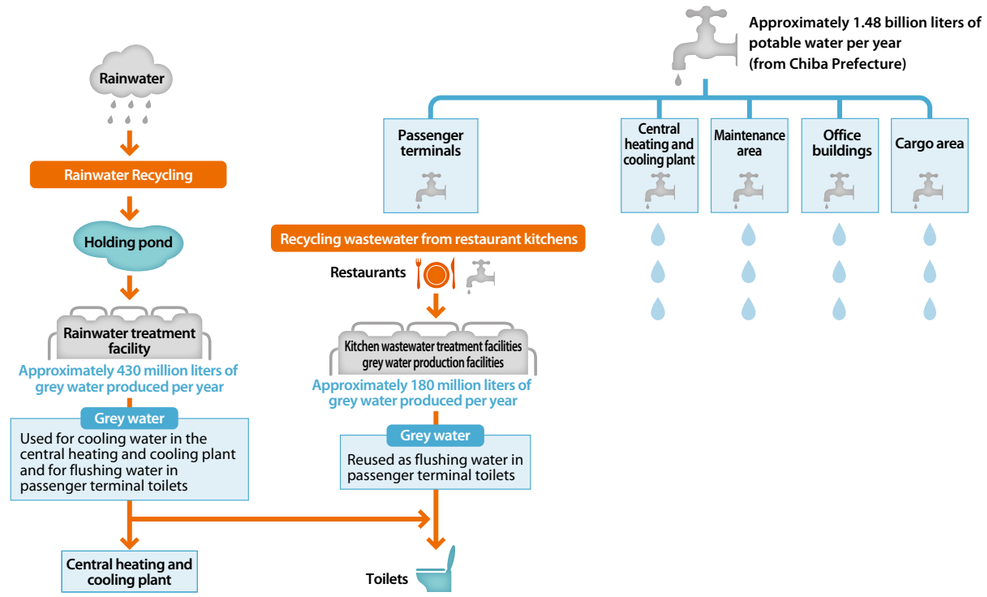

Kitchen wastewater treatment facility

Rainwater Recycling

Oil separation plant and holding pond have been installed at Narita International Airport to prevent rainwater runoff from affecting the quality and volume of water at downstream waterways. Rainwater is collected in a holding pond with a capacity of approximately 610,000 cubic meters located on the western side of Runway A and flows out from there into drainage canals outside the airport.
In order to use rainwater effectively, we operate a treatment facility that purifies rainwater runoff.
Rainwater is collected in the pond, converted into grey water at the facility, and used as cooling water in the Central Heating and Cooling Plant as well as flushing water in passenger terminal toilets. In fiscal 2017, the rainwater treatment facility produced about 430 million liters of grey water.


Holding pond

Water Consumption at Narita International Airport* (Actual results for FY 2017)



Approximately 10 million liters of grey water produced from rainwater is provided by other facilities (ANA maintenance center, NCA maintenance hangar, the government agency building in the cargo area, and so on).

* This chart shows water flow within the airport site. No off-site facilities such as aviation fuel facilities are included.

Night view of Passenger Terminal 2

Climate Change Initiatives

Global Warming Countermeasures

Targets

- **Reduce CO_2 emissions from the airport**
- **Reduce energy consumption**
- **Implement countermeasures to adapt to climate change associated with global warming**

To conserve the global environment, Narita International Airport is striving to reduce greenhouse gas (GHG) and air pollutant emissions caused by airport operations.

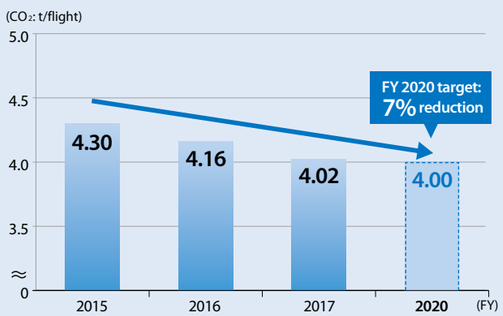
The Eco-Airport Master Plan (FY 2016–2020) has set the goal of cutting airport carbon dioxide (CO_2) emissions per flight by 7% of the fiscal 2015 level (4.30 t CO_2 per flight) by fiscal 2020.

A large percentage of total CO_2 emissions of the airport as a whole comes from aircraft operations. Emissions from aircraft operation are declining as a result of the increased introduction of fuel-efficient aircraft thanks to the efforts of airlines, installation of Ground Power Units (GPUs)*1 and limiting Auxiliary Power Unit (APU)*2 usage by parked aircraft. Additionally, a variety of energy conservation methods are underway to reduce CO_2 emissions from airport facilities.

CO_2 emissions in fiscal 2017 decreased to 4.02 tons per flight, a 6.5% reduction from fiscal 2015, as we are making steady progress in this area.

Goals and Performance

Reducing Airport CO_2 Emissions (per flight)

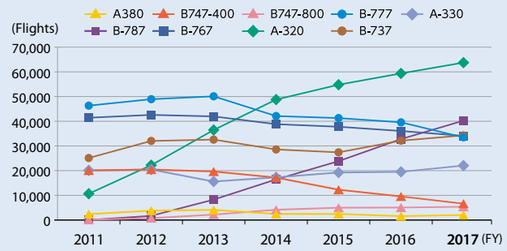


*1 **A Ground Power Unit (GPU)** is equipment for supplying necessary air conditioning and electrical power to aircraft parked on the ground. It can be either mobile or stationary.

*2 **An Auxiliary Power Unit (APU)** is used as a power source for air conditioning and electrical systems.

We will continue to promote the introduction of fuel-efficient aircraft, and work to reduce energy consumption at airport facilities as well.

Number of Flights by Aircraft Type



Encouraging GPU Usage

When aircraft are parked on the apron and engines are shut off, essential power and air conditioning can be provided by a small engine fitted to the aircraft known as an APU. APU operation, however, generates noise and emits substances that cause global warming and air pollution. Consequently, the use of APUs is restricted and the use of GPUs is encouraged at Narita International Airport.

GPUs enable us to reduce greenhouse gas and air pollutant emissions as they provide power and air conditioning from ground facilities.

Currently, GPUs have been installed at all fixed stands in Passenger Terminals 1 and 2. They are also installed at most stands in Passenger Terminal 3 and cargo area (power supply only).

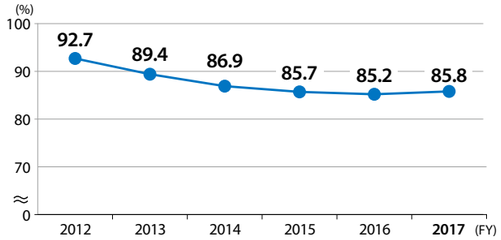
Additionally, since state-of-the-art aircraft such as the B787 and A380 power requirements exceed the capacity of existing GPUs, we have been increasing their power output.

In recent years, the number of aircraft that do not use a GPU because of short turnaround time has been increasing, and GPU utilization has generally been declining. However, as the result of boosting the capacity of GPUs and encouraging their use by airlines, the GPU usage rate in fiscal 2017 was 85.8%. We will continue our efforts to improve the GPU usage rate.

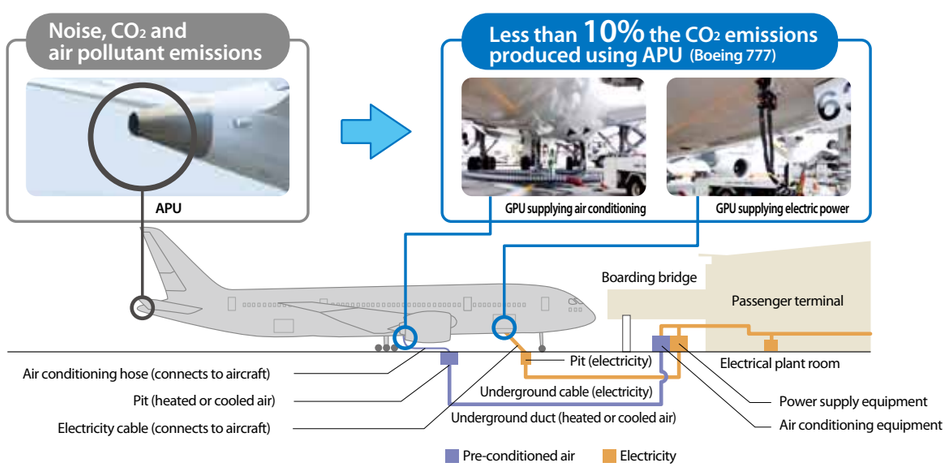
Measures to Limit APU Usage

- APU usage is limited within 30 minutes of scheduled departure time at stands where GPUs are available.
- Aircraft must switch over to GPU shortly after arrival.
- APUs may only be used for the minimum length of time when required for aircraft inspection and maintenance.

Changes in GPU (electric power) Usage Rate (including portable GPUs)



GPU and Supply Channels



Introduction of Low Emission Vehicles

Narita International Airport promotes the introduction of low emission vehicles (LEVs)* for service vehicles. A survey conducted in June 2018 shows that 45.2% of the 6,700 vehicles owned by airport-related business entities are LEVs, an improvement from 35.4% in fiscal 2015.

In fiscal 2017, our LEVs accounted for 35.4% of service vehicles, an improvement from 26.0% in fiscal 2015. To promote the introduction of LEVs we are also introducing advanced eco-friendly vehicles such as fuel cell vehicles.

Also, we are developing our infrastructure for LEVs to encourage the introduction of LEVs and their use for travel to the airport. Currently, in addition to fast chargers for electric cars installed in two airport parking lots (in P1 and P2), a hydrogen station has been installed for fuel cell vehicles.

We will continue to develop infrastructure to facilitate the use of LEVs by visitors and airport-related business entities.

Location of Fast Chargers and Hydrogen Station

*** Low Emission Vehicles (LEVs):** Electric, hybrid, plug-in hybrid, natural gas, fuel cell, clean diesel, certified fuel efficient/low emission vehicles (gasoline, diesel, LPG)

Renewable Energy

Solar Power Generation

For efficient use of natural energy, we have introduced solar power generation systems since 1999. Solar panels with capacity of 120 kilowatts (kW) have been installed on the roofs of Passenger Terminal 1 and the NAA Head Office Building. These systems provide about 120,000 kilowatt-hours (kWh) of electricity per year, and the produced power is used for lighting and other purposes in passenger terminals and the NAA Building.

In addition, the approximately 2,000 kW Sanrizuka Solar Power Plant was constructed adjacent to the airport with a renewable energy feed-in tariff system in March 2015.

Outside of the company as well, solar panels have been installed on the rooftop of a government agency building in the cargo area for its power supply.

Solar panels on the NAA Head Office Building

Sanrizuka Solar Power Plant

Green Power Certificates

For the purpose of promoting the reduction of greenhouse gas (GHG) emissions and the introduction of renewable energy, we purchased a "Green Power Certificate" for wind power generation of 125,000 kWh in fiscal 2017. This amount is equivalent to the energy consumed for continuous real-time monitoring of aircraft noise, air quality, and water quality around the airport in one year.

Green power refers to electricity produced from renewable energy such as hydroelectric, wind, solar, biomass, and geothermal. It is environmentally friendly as it produces little to no emissions unlike fossil fuel energy.

The Green Power Certification scheme promotes the spread and expansion of renewable energy use through the issue of tradable certificates certifying the environmental value of clean power.

Narita International Airport also uses Green Power Certificates at events within the airport. We will continue to promote the introduction of renewable energy and reduce GHG emissions through various initiatives.

Certificate of Green Power

LED Lighting

LED Taxiway Lighting

We have been promoting the shift of taxiway lights to navigate aircraft from halogen lamps to LEDs (light emitting diodes).

LED lamps have a longer life than halogen lamps and reduce the replacement frequency of lighting components. LEDs consume 1/10 of the power of halogen bulbs and are four times more energy efficient even when including the lighting device. As of the end of fiscal 2017, LED lighting accounted for 57.9% of all the lighting used for taxiways.

LED taxiway lighting

Use in Passenger Terminals

LEDs are also used for the backlights in advertising boards and information signs in passenger terminal buildings. LED backlighting offers a distinct display and provides many other advantages in terms of convenience, running cost, and the environment such as lower heat emission, significantly less power consumption, and longer life. In conjunction with renovation of the international arrival lobby in Passenger Terminal 2, which was completed in March 2016, we replaced lighting fixtures with LED lighting. As a result, about 1,270 LED lights were installed, cutting annual power consumption by approximately 40% compared to before the renovation.

Moreover, traditional lighting at the passenger terminal buildings is gradually being replaced with LED lighting.

We will expand the introduction of high-efficiency lighting fixtures such as LED lighting in conjunction with future facility renovation plans.

LED lights on the ceiling of international arrival lobby in Passenger Terminal 2

COLUMN

Switching to LEDs for Neon Signs in Passenger Terminal Buildings

In December 2017, Narita International Airport switched to LED lighting for the neon signs at nine locations outside Passenger Terminals 1 and 2.

As a result, we achieved a reduction in power consumption of about 50%.

The neon signs installed on the outer walls of the terminals are welcoming everyone ever more brightly with less power than before.

Energy Conservation Measures in Passenger Terminal Buildings

Due to its immense facilities, Narita International Airport consumes a large amount of energy. Including aviation fuel facilities in the Port of Chiba and Yotsukaido, the electricity and gas consumption of fiscal 2017 amounted to 4,705 TJ (terajoules)*, when converted to thermal energy.

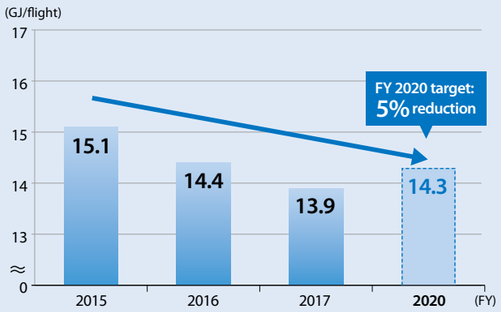
More than half of the electricity consumed at the airport is for the operation of air conditioners, and other equipment used in the passenger terminals. We strive to save energy through fine control of lighting and air conditioning according to the conditions in each area, including areas for passengers, office areas, and retail areas. For example, boarding gate areas are divided into zones based on flight schedules, and air conditioning is run in each zone only when necessary. Further, daylight sensors have been installed in various parts of the terminal buildings, and the lighting is turned on and off automatically according to the light level in those areas. Motion sensors in restrooms reduce lighting when no one is present for a certain period.

In addition to these measures, a Building and Energy Management System (BEMS) was introduced in Passenger Terminal 2. The system monitors the operation of the air conditioning, power, and heating/cooling systems across a wide and complex area. The data are collected for analysis to visualize and optimize the operation of these systems.

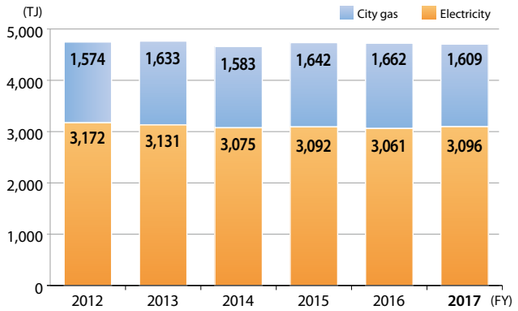
Also, energy-saving measures such as optimizing the amount of outside air brought in by air conditioning units, adjusting the output of air conditioning unit fan inverters, and reconsidering the running time of ventilation supply/exhaust fans are implemented on a large scale. In large spaces such as passenger terminals departure lobbies, we have implemented all-return control to reduce the volume of outside air introduced by heating/cooling systems. Also, the air conditioning operation load has been reduced while maintaining the interior environment by measurement of temperature, humidity, CO_2 concentrations, and so on. These measures achieve both energy savings and comfort.

Goals and Performance

Reducing Airport CO_2 Emissions (per fligh



Energy Consumption (TJ) at Narita International Airport (Electricity & Gas)



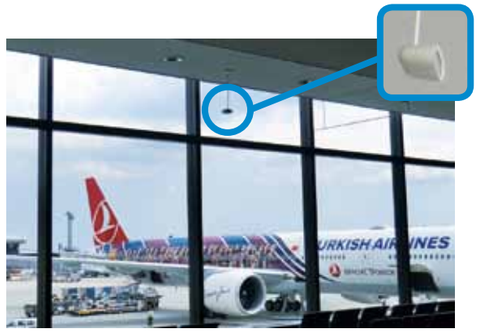
Another measure to reduce energy consumption is the use of geothermal heat, which maintains a constant temperature throughout the year. It is used for the air conditioning facility of the connecting corridor between the Passenger Terminal 2 main building and satellite.

The Eco-Airport Master Plan (FY 2016–2020) has set a target of cutting energy consumption (per flight) in the airport facilities managed by NAA by 5% of fiscal 2015, by fiscal 2020. As energy-saving measures have progressed throughout all airport facilities, energy usage in fiscal 2017 was 13.9 GJ (gigajoules)* per flight, a reduction of 7.9% from 15.1 GJ per flight in fiscal 2015.

CO_2 emissions at NAA-managed facilities were 0.67 tons per flight, a decrease from 0.72 tons per flight for the previous fiscal year, thanks to the process of energy consumption reduction.

We will continue to pursue further efficiency of air conditioning, electricity, and heating by implementing energy-saving strategies.

*** TJ (terajoule) and GJ (gigajoule):**
1 TJ = 10^{12} J (joules) ; 1 GJ = 10^{9} J. Joule is the SI unit of work or energy.


Sanrizuka Solar Power Plant


Sanrizuka Solar Power Plant

Cogeneration System

Generally, thermal power stations burn fossil fuels such as oil or coal to generate electricity. However, the process wastes large amounts of energy in the form of unused waste heat and electrical transfer losses. If this wasted heat can be recovered and used for hot water supplies and heating and cooling requirements, energy efficiency can be greatly increased. Our cogeneration system has made this possible.

It was introduced at the Central Heating and Cooling Plant of the airport in 2000. Fueled by low emission gas, it provides approximately 20% of the power used in the airport and 50% of the steam for heating and cooling requirements.


Cogeneration System

First Tour of Eco-Kids Club 2018

Environment Management

Targets

- Dialogue with stakeholders
- Pursue the creation of value by taking measures in collaboration with stakeholders to reduce the environmental impact of airport activities throughout society as a whole
- Reducing the environmental impacts in coordination with airports in Japan and abroad
- Environmental conservation through environmental assessments and verification
- Environmental management that uses environmental certification programs
- In the lead up to the 2020 Tokyo Olympic and Paralympic Games, take various measures, conduct trials of and introduce new technologies, and present our vision of an eco-airport to the world

Environmental Management System

Based on an original management vision, we formulated an Environmental Master Policy, later establishing the Eco-Airport Vision, as well as the Eco-Airport Master Plan, which contains specific targets for airport-wide initiatives (see pp. 3–5).
As a framework for expediting progress in the Eco- Airport Master Plan, we also set up the Eco-Airport Promotion Committee,*1 composed of executives, and the Eco-Airport Promotion Council,*2 a subordinate body composed of department heads, as well as Eco-Leaders*3 in each department.
Additionally, a Regional Environmental Committee comprised of academics and experts has also been established as an advisory body to the NAA President and CEO, in order to investigate and discuss important issues such as environmental management systems and environmental strategies at Narita International Airport.

With the Eco-Airport Development and Planning Council at its center, this airport-wide framework promotes the implementation of various environmental initiatives.
To achieve the overall objective of the Master Plan, it is important that we strengthen the promotion framework in cooperation with all stakeholders through proactive communication. We are committed to promoting Environmental management based on this concept.

*1 **The Eco-Airport Promotion Committee** is a committee of NAA executives under the leadership of the Senior Vice President in charge of environment issues.

*2 **The Eco-Airport Promotion Council** is a subordinate body to the Eco-Airport Promotion Committee, composed of Eco-Airport Promotion Personnel (department heads).

*3 **Eco-Leaders** carry out environmental initiatives in each department and play a leading role in ensuring that those initiatives permeate and expand both inside and outside NAA.

Working with Stakeholders

Airport Communications

Narita International Airport Eco-Airport Development and Planning Council

Narita Airport is operated by around 700 companies, related government agencies, and other bodies. It is crucial to share information and work with these airport-related business entities to alleviate environmental impact of the airport.
In 2005, we set up the Narita International Airport Eco-Airport Development and Planning Council in conjunction with these companies and organizations to further airport-wide environmental initiatives. The council comprises 21 companies, seven organizations, and nine governmental agencies, including airline and airfreight forwarder associations, all sharing the objective of promoting eco-airport activities.

The council meets about twice a year to hold progress reports on initiatives and their progress towards achieving the targets of the Eco-Airport Master Plan. The specific measures under the individual initiatives are examined and implemented by the Council's three subcommittees.

Eco-Airport Development and Planning Council

Eco-Airport Development and Planning Council

Waste Material Committee
- Promote waste recycling
- Reduce general waste
- Raise awareness about 3Rs

Air Quality Committee
- Implement countermeasures against global warming
- Reduce emissions of air pollutant

Public Relations Committee
- Implement awareness program among airport-related business entities
- Run the Council website
- Public relations regarding Council initiatives

Eco-Airport Development and Planning Council Members (as of September 1, 2018)

Narita International Airport Airline Operators' Committee	NARIKOH Co., Ltd.	Narita International Airport Taxi Operators Committee	Narita Airport District Immigration Office
Japan Airlines Co., Ltd.	Narita Airport Security Company Liaison Council	TOKYO GAS Co., Ltd.	Narita Airport Quarantine
All Nippon Airways Co., Ltd.	Narita Airport Facilities Corporation	TEPCO Energy Partner, Incorporated	Narita Office, Yokohama Plant Quarantine Station
Nippon Cargo Airlines Co., Ltd.	Greenport Agency Co. Ltd.	Narita Chapter, Japan Air Cargo Forwarders Association	Animal Quarantine Service, Narita Branch
JAL Ground Service Co., Ltd.	JAL Airtech Co., Ltd.	Narita Bonded Forwarders Association	Narita International Airport Police Station, Chiba Prefectural Police
ANA Narita Airport Services Co., Ltd.	Narita Local Hotels Association	Narita International Airport Terminal Tenants Association	Japan Post Co., Ltd., Narita Office
AGP Corporation	East Japan Railway Company	Narita Airport Office, Tokyo Civil Aviation Bureau, Ministry of Land, Infrastructure, Transport and Tourism	NAA
Japan Airport Service Co., Ltd.	Keisei Electric Railway Co., Ltd.	Narita Aviation Weather Service Center, Ministry of Land, Infrastructure, Transport and Tourism	
TFK Corporation	Airport Transport Service Co., Ltd.	Narita Branch Customs	
Narita Kuko Biseisha Co., Ltd.	Keisei Bus Co., Ltd.	Tokyo Customs Narita Air Cargo Sub-branch	

Waste Material Committee

The Waste Material Committee conducts activities aimed at promoting the 3Rs of waste for the recycling of resources. In fiscal 2017, the Committee redistributed the poster "Waste Sorting and Disposal" and re-notified tenants about sorting methods to raise awareness about the adequate disposal of waste.
The Committee carries out various programs throughout the airport such as posting signs for saving potable water on restroom sinks and encouraging green purchasing to reduce the environmental burden related to airport activities.

"Waste Sorting and Disposal" poster

Air Quality Committee

The Air Quality Committee takes measures to address global warming and reduce air pollution.
In fiscal 2017, the Committee worked to raise awareness among airport staff by encouraging them to participate in the Light Down Campaign, which calls for nighttime illumination to be reduced and to save energy in other ways with the aim of cutting CO_2 emissions.
The committee also conducted two Eco-Drive Campaigns in June and November, encouraging people driving to the airport to engage in the eco-driving and minimize idling times as a means of decreasing CO_2 and air pollutants.

Eco-Drive Campaign

Public Relations Committee

As publicity activities to raise awareness among airport staff, the Public Relations Committee holds annual events such as the Narita Airport Eco-Festa and Airport Cleanup Drives.
In March 2018, the Committee held a lecture for airport staff on the theme of measures against global warming that the airport can take, which attracted about 100 participants.
The Committee also enhanced the content of the Council's website and the content of PR materials displayed in the passenger terminal buildings, and it solicited submissions of Narita Eco-haiku (short Japanese poems on ecology and the environment) and eco-photographs to make even more people aware of environmental initiatives at Narita International Airport and the activities of the Council.

The environmental lecture

Eco-Airport Development and Planning Council website (Japanese version only)
https://www.naa.jp/eco/

PR display in passenger terminal

COLUMN

Narita Eco-Haiku and Eco-Photo Gallery 2018

Eco-Photo Gallery and Narita Eco-Haiku, which began as projects to allow people to familiarize themselves with environmental initiatives and have fun participating in them, marked their sixth year. Eco-Photo Gallery solicits submissions of photographs on themes such as the beauty of the nature around the airport, as well as aircraft, the airport, and ecology. This year, 456 works were received. A selection of submissions including the Chairman's Prize winning photograph can be viewed on the Council's website and are displayed at the NAA Art Gallery in Passenger Terminal 1.
As for Eco-Haiku, we receive many submissions from around the country every year. They express a high level eco-awareness by their ecological ideas in daily life, putting emphasis on the importance of environmental conservation. This time, which marked the 10th time the event was held, we solicited works on the theme of the "sky."

Eco-Airport Development and Planning Council Chairman's Prize
Pen name: Lotus Frog
Location: North side of Runway B

Eco-Airport Development and Planning Council (Japanese version only)
web https://www.naa.jp/eco/fun/index.html

Connecting with the Community

In line with our management vision that aims for Narita International Airport to coexist in harmony with the local community with respect for the environment, we have been maintaining environmental communication with residents in the surrounding area. We strive to maintain close relations with relevant persons in charge in the surrounding municipal governments, and to exchange views through the Narita Airport Noise Mitigation Committee, municipal government meetings, residential briefings, and regional events.

Participating in Events

To strengthen communication with local residents, we participate in events held at the airport and its surrounding areas. On these occasions, we introduce our environmental initiatives through panel displays and quizzes, and we also distribute compost made from airport kitchen waste (see p. 29).

Airport Event

Regional Consultation Centers

We have established five regional consultation centers to receive requests and opinions regarding airport operations and environmental problems such as aircraft noise, and to promote interactive dialogue with local residents: the North Area Consultation Center (Narita City, Chiba Pref.), the South Area Consultation Center (Shibayama Town, Chiba Pref.), the East Area Consultation Center (Tako Town, Chiba Pref.), the Sanbu Area Consultation Center (Yokoshibahikari Town, Chiba Pref.), and the Ibaraki Area Consultation Center (Kawachi Town, Ibaraki Pref.) (see p. 65). The comments received from the public are shared with relevant departments and reflected in our environmental measures.

COLUMN

Opening of New East Area Consultation Center

The new East Area Consultation Center was opened in April 2018 as a consultation center for local residents.
This center offers consultations on aircraft noise and soundproofing work supported by NAA, as well as various information about airport operations, mainly to residents of Tako Town.
In addition to the existing four centers, this fifth center allows us to respond to opinions and inquiries from many people in surrounding areas, making them feel more familiar with our airport.

East Area Consultation Center

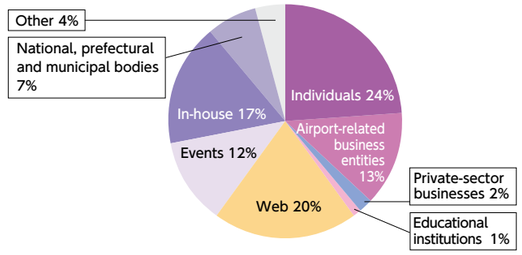
Communicating with the Public

We make every effort to have the environmental initiatives at Narita International Airport known by a wider circle of residents around the airport and by the public in general. In addition to environmental education for children, who hold our future in their hands, we pursue a wide variety of PR opportunities such as environmental exhibitions to introduce our environmental measures in place at Narita International Airport. We also participate in academic conferences on environmental topics such as noise and air quality, and exchange information about the latest trends.

Publishing Environmental Information

We proactively disseminate information to encourage a broader understanding of the environmental measures taken at Narita International Airport and the results achieved as a result.
Our environmental report is posted on the NAA website, distributed to airport-related business entities and local residents, and sent to libraries and universities throughout the nation. It is also registered on a free distribution site which can be either browsed online or mailed on request.
To introduce customers about our environmental initiatives, a digest version of the report is also available in passenger terminals.

Environment Report FY 2017 Distribution



Environmental Report

We present progress reports on environmental measures and initiatives in an easy-to-understand format, each year incorporating a special features section that deals with current issues. Six thousand booklets in Japanese and 500 in English were published in fiscal 2018. Additionally, 12,000 Japanese booklets and 2,000 English booklets of the digest version were distributed at information counters in passenger terminals.


Websites

Our environmental report can be read on the NAA website, along with progress reports on a wide range of environmental initiatives. Also, flight tracking data, aircraft noise, air quality, and water quality measurement results are available at Narita Airport Environmental Community, an environmental information website.


NAA homepage:
https://www.naa.jp/en/index.html


Narita Airport Environmental Community:
http://airport-community.naa.jp/
(Japanese version only)


Narita International Airport website:
https://www.narita-airport.jp/en

Eco-Airport Corner

The Eco-Airport Corner is located in the Museum of Aeronautical Sciences (see p. 65). The corner allows children to see, touch and feel first-hand, introducing them to Eco-Airport activities through such kid-friendly means as fun quizzes and noise adventure rooms. Around 200,000 people visit the museum every year.


Museum of Aeronautical Sciences


Eco-Airport Corner

Airport Information Corner

The Airport Information Corner (see p. 65) in the Narita Airport Historical Museum enables local residents to drop in and view information on the airport, environmental measurements, and aircraft tracking data.

Regional Consultation Centers

There are five regional consultation centers located around the airport to respond to inquiries from local residents. For details, see pages 43 and 65.

NAA Information Room

The NAA Information Room (see p. 65) located on the first floor of the NAA Head Office Building provides access to the Narita Airport Environmental Community as well as panels about the airport and our publications.


NAA Information Room

Narita Airport Eco-Kids Club

In 2005, we opened the Narita Airport Eco-Kids Club for children in the fifth and sixth grades of elementary school. The club's aim is for the next generation to learn about environmental initiatives at Narita International Airport, experience the natural environment surrounding the airport firsthand, and understand the importance of protecting nature. Its eco-tours are held three times a year, and some 700 children have participated so far.
In fiscal 2018, 55 elementary school students from the Kanto area including Tokyo and Chiba are participating as the 14th holding of Eco-Kids.

COLUMN

Eco-Kids Club 2018 First Eco-Tour Report

On August 21, during the summer vacation, we held the first Eco-Tour of Narita Airport Eco-Kids Club 2018. Fifty-one elementary school students learned about the environment from various perspectives such as observing the supply of power and air conditioning from a GPU (ground power plant) to an aircraft, experiencing noise measurement first hand, visiting the NCA Crew Training Center, and attending a touring classroom by Tokyo Gas Co., Ltd. The lively Eco-Kids showed an eager disposition toward learning about the environmental initiatives.

Tour of NCA Crew Training Center

At the NCA Crew Training Center, the children toured the facilities that pilots and mechanics used for their training, thanks to our collaboration with Nippon Cargo Airlines Co., Ltd. The staff explained about a highly technical level of flight simulator (full flight simulator) and emergency equipment, and various kids proactively asked questions while taking notes.

Noise Measurement Experiment

In the noise measurement experiment, the kids measured the sound level of aircraft taking off and landing with actual measuring instruments, near the Flower Clock by Runway A. After that, they carried out a "yelling competition" to see which team could yell the loudest, using the noise measuring instruments to judge actual loudness levels. Everyone did their best cheerfully yelling out loud.

GPU Tour

With the cooperation of AGP CORPORATION, the kids visited GPU facilities that supply aircraft with power and air conditioning directly from the ground. They were introduced to our initiatives to reduce noise generated by parked aircraft, greenhouse gas, and air pollutants by encouraging the use of GPUs at Narita International Airport. When they experienced the strong flow of air cooled down to 2–3 degrees Celsius blowing out of the hose, the participants cried out with excitement.

Touring Classroom by Tokyo Gas

Tokyo Gas Co., Ltd. conducted a lecture on the themes of "What is a fuel cell" and "The secret of yellow gas pipes." The participants learned about the mechanism of eco-friendly fuel cells in a fun way through experiments. When making kaleidoscopes from used yellow gas pipes, the children were keen to choose colorful beads.

Comments from Eco-Kids

Here are some of the comments from the participants:
"During this tour, I got interested in the environment and especially airplanes. It was great."
"I got along well with kids I did not know, I learned about a lot of things besides airplanes, and it was a lot of fun."
"I learned lots of things I didn't know. I'm going to teach my mother various things when I go home."

Touring Environmental Classrooms

For the purpose of introducing our environmental initiatives and providing better understanding of them, we offer the Touring Environmental Classrooms for junior high school students in the surrounding area, hosted by the Narita Airport Regional Symbiosis Promotion Foundation. Using presentation slides, we explained about our recycling activities, the switch to LED lighting, and measures to reduce aircraft noise.
Staff members were also dispatched to a university in Chiba Prefecture to give a lecture on our environmental management and measures implemented at Narita International Airport.

Lecture for junior high school students

Environment lecture at a university

Participation in Eco-Products Exhibition

We have been participating in "EcoPro: International Exhibition on Environment and Energy" since 2004. It is the largest environmental exhibition in Japan and is held in Tokyo every December. In fiscal 2017, we set up an airport booth together with Japan Airport Terminal Co., Ltd., Kansai Airports and others, and displayed panels introducing the measures at the airports regarding CO_2 emissions, recycling, noise and so forth. The airport booth attracted some 5,000 visitors, including environment staff and students. The exhibition provided a good opportunity to acquaint people with the environmental measures conducted at Narita International Airport.

EcoPro 2017

COLUMN

Cleanup Drives in and around the Airport

In fiscal 2004, in cooperation with Shibayama Town, we began a roadside beautification and cleanup drive in the southern area of the airport, taking place each summer and winter, in order to provide a more pleasant airport environment for our customers.
The program was expanded in fiscal 2005 including roads within the airport and was held jointly by the Eco-Airport Development and Planning Council and Narita Airport CS Council* in cooperation with other airport-related business entities. In fiscal 2012, the campaign was expanded to include airport apron areas.
Every year, many airport-related business entities participate, and in the 36th cleanup drive held in July 2018, more than 500 staff took part, as well as the mayor of Shibayama, and the President and CEO of NAA.

Cleanup drive at the southern area of the airport

Cleanup drive within the airport site

* **Narita Airport CS (Customer Satisfaction) Council** is comprised of organizations which deal directly in customer service. It is responsible for improvement of CS throughout Narita International Airport and pursues a variety of activities.

INTER-NOISE 2018

INTER-NOISE, under the organization of the International Institute of Noise Control Engineering (I-INCE), is the world's largest international conference on noise and vibration control, held every year in rotation by participating nation organizations since 1972. Experts from universities and research institutions from around the world gather to present papers and hold discussions about a wide range of topics, including not only aircraft noise, but other transportation noise and general environmental noise. INTER-NOISE 2018, hosted by Institute of Noise Control Engineering of the USA (INCE-USA), was held in Chicago in August on the main theme of "the impact of noise control engineering." NAA employees were in attendance and made a presentation regarding further functionality enhancement of Narita International Airport. Not a few airports in Europe and the United States face similar noise issues, and the presentation was received with a lot of interest.

INTER-NOISE 2018

Communication with Airports in Japan and Abroad

We believe that collaboration with other airports in Japan and abroad toward common tasks will lead to the resolution of airport environmental issues on a global scale. In addition to strengthening our partnership with major international airports in Japan, we exchange ideas and information with overseas airports through the ACI* Regional Environment Committee and through personnel exchanges with sister airports.

* **ACI (Airports Council International)** is a trade association of the world's airports who work together to promote environmental conservation as well as safety, convenience, and efficiency in international air transport.

ACI Activities

We are a member of ACI, which is an organization of 641 bodies (as of January 2018) managing 1,953 airports in 176 countries and regions. Presently, we contribute a member to the Environment Standing Committee, which is one of the expert committees. In June 2018, the 37th Environment Standing Committee was held in Oslo, Norway, and saw the active exchange of opinions and views concerning issues such as aircraft noise and adaptation to climate change.
NAA also belongs to the Asia-Pacific Regional Environment Committee, which is made up of representatives from ACI member airports in Asia, Middle East, and Oceania. In March 2008, the 9th Regional Environmental Committee was held in Brisbane, Australia. We shared information and discussed topics on environmental measures implemented by member airports such as waste management methods. As for NAA, we made presentations on environmental measures and environmental assessment within the context of further functional enhancements of Narita International Airport.

Environmental Liaison Conference with Major Airports in Japan

The "Environmental Liaison Conference with Major Airports in Japan," which was formed in 2007, currently includes NAA, Kansai Airports, Central Japan International Airport Co., Ltd., Japan Airport Terminal Co., Ltd., and New Chitose Airport Terminal Building Co., Ltd. The conference is held several times a year at member airports having information exchanges and facility tours.
Through this conference, we exchange information on best practices at each airport, deepen mutual collaboration, and tackle issues that are difficult to solve at a given airport, such as measures against global warming.

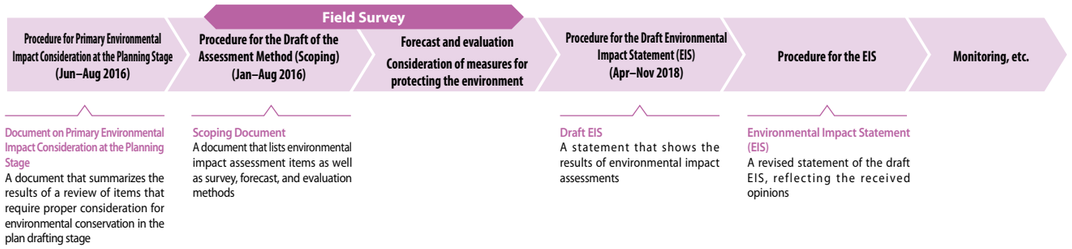
Implementation of Environmental Assessments

Environmental Impact Assessment

Environmental Impact Assessment (EIA) is a system to provide for the environmental impacts of development projects to be surveyed, forecasted, and evaluated by proponents in the process of designing the project. The results are opened to the public to obtain opinions, both from citizens and from local governments. The best project scheme can be developed incorporating these various viewpoints and addressing the issue of environmental protection. This system was enacted in the Environmental Impact Assessment Law (EIA Law) in 1997.
Up to now, Narita Airport has implemented various plans, including “Development Related to Initial Plan," “Development of 2,180-meter Interim Runway B,” “Development of Expanding Runway B to 2,500 meters by Extension to the North,” and “Apron and Taxiway Development for Expansion of Airport Capacity to 300,000 aircraft movements." However, these projects were based on the master plan developed in 1966 before the EIA Law was enacted. Although EIAs for the projects were not required, NAA voluntarily conducted them.
In March 2018, the Four Party Council on Narita International Airport, which is made up of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Chiba Prefectural Government, the nine municipal governments around Narita Airport, and NAA, reached a final agreement on "further functional enhancements of Narita International Airport," including construction of an additional runway.
Further functional enhancements are new projects based on the new master plan. According to their business scale, they are subject to environmental assessments based on the EIA Law.

* **Projects applicable to environmental assessments (airfield) :** Construction of a new runway 2,500 meter-long or more; extension of a runway by 500 meters or more.

Environmental Impact Assessment Procedure



As of October 2018, we are proceeding with the preparation of a Draft Environmental Impact Statement. Next, we will prepare an Environmental Impact Statement, reflecting the views received from the general public and related municipal bodies.

Assessment Items

Evaluation items are selected by consideration of the business plan and regional characteristics.

Environmental Factor	Impact Factor	Under Construction	In Operation	Impact to be Assessed
Keeping natural environmental elements in good condition	Air quality	○	○	Construction equipment operation during construction, and increased aircraft movements when in service
	Noise	○	○	
	Low frequency noise		○	
	Vibration	○	○	
	Water quality	○	○	Turbid water during construction, and waste water containing de-icing agent when in service (see p. 23)
	Hydrological environment	○	○	Land conversion on groundwater
Sustaining biodiversity and systematically conserving the natural environment	Animals	○	○	Conversion to the habitats of plants and animals
	Plants	○	○	
	Ecology	○	○	
Communing with nature	Scenery		○	Changes to the scenery, and to places where humans interact with nature
	Places for people to connect with nature		○	
Burden on the environment	Waste matter	○	○	Increased waste matter from felling trees during construction and an increase in air passengers when in service
	Greenhouse gas	○	○	Construction equipment operation during construction, and increased aircraft movements when in service

Environmental Management through Environmental Certification Programs

Participation in *Airport Carbon Accreditation* Program and Achievement at Level 2

Participation in the *Airport Carbon Accreditation* program is expanding within Airports Council International (ACI), the trade association of the world's airports. This program was launched by one of ACI's five regions, ACI Europe, in 2009. ACI Asia Pacific, which Japan is a member of, joined in 2011, and the remaining regions followed suit, with global adoption of the program achieved in the second half of 2014.
It independently assesses and recognizes the efforts of airports to manage and reduce their carbon emissions through four levels of certification.
As worldwide efforts to combat global warming are progressing, Narita International Airport has formulated an Eco-Airport Master Plan to promote environmental initiatives throughout the airport as an environmentally friendly, recycling-oriented “eco-airport” from a global perspective. According to the original plan, we are committed and actively working to reduce airport CO_2 emissions, along with airport-related business entities, including airlines and cargo operators.
To accelerate our efforts, we participate in the Program, and Narita International Airport was accredited at Level 2 in January 2018. The achievement of Level 2 was attributed that CO_2 emissions from NAA and its subsidiary companies had been reduced.
Narita International Airport will continue using the *Airport Carbon Accreditation* program, pursuing higher levels, to work with airport-related business entities in achieving further reduction in CO_2 emissions and pushing forward with global warming countermeasures.

Airport Carbon Accreditation Certificate Presentation Ceremony

Certificate of Accreditation at Level 2, Reduction

Four Levels of Accreditation

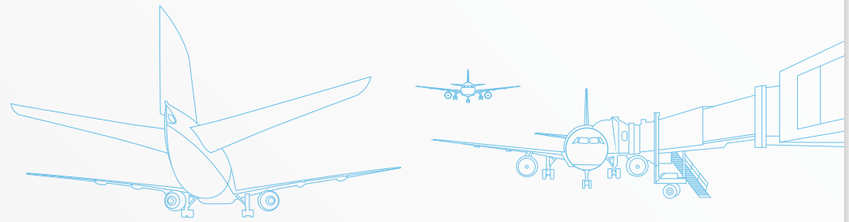
Level 1 Mapping
Carbon footprint measurement

Level 2 Reduction
Carbon management towards a reduced carbon footprint

Level 3 Optimisation
Third party engagement in carbon footprint reduction

Level 3+ Neutrality
Carbon neutrality for direct emissions by offsetting

Eco-Airport Master Plan (FY 2016–2020) and Evaluation of FY 2017 Results



***1 Quieter aircraft:** Aircraft classified as Class A to C according to the Narita Aircraft Noise Index.

***2 Low emission vehicles:** Electric, hybrid, plug-in hybrid, natural gas, fuel cell, clean diesel, and low fuel consumption, low emission certified vehicles (gasoline, diesel, and LPG)

Community Environment Initiatives

Action Items	Description	Targets (FY 2020)	Results (FY 2017)
Reduce environmental impact from aircraft noise	● Encourage the introduction of quieter aircraft*1 ● Limit the use of auxiliary power units (APU) and encourage use of ground power units (GPU) ● Strengthen noise mitigation measures ● Enhance aircraft noise monitoring and disclosure of results	Reduce environmental impact from aircraft noise	Improvement of the ratio of quieter aircraft Adequate official announcement of aircraft noise measurement results
Conserve air quality	● Encourage the introduction of low emission aircraft ● Implement measures to reduce aircraft taxiing times ● Limit the use of auxiliary power units (APU) and encourage use of ground power units (GPU) ● Promote energy saving at airport-related facilities ● Encourage the introduction of low emission vehicles*2 ● Enhance air quality monitoring in the vicinity of the airport and disclosure of results	Conserve air quality Reduce air pollution (NOx) per flight by 5% compared to the benchmark year (FY 2015) FY 2015: 16.6 kg/flight	Air pollution (NOx) output 6.0% reduction relative to FY 2015 (15.6 kg/flight)
Maintain water quality of rainwater runoff	● Properly use, collect, and process de-icing agent ● Take measures to prevent release of turbid water, etc. ● Create retention areas and settling grit chambers in construction areas during construction to prevent release of turbid water ● Divide construction zones to limit the occurrence of turbid water ● Enhance water quality monitoring in rivers, etc., in the vicinity of the airport and disclosure of results	Maintain water quality of rain water runoff	Some fluctuation, but maintaining water quality of an average year for rain water runoff Achievement of environmental standards for underground water
Conserve natural environments that nurture biodiversity	● Ascertain the status of the natural environment and take preservation measures for rare species ● Preserve agricultural environments ● Restore the *satoyama* (countryside forest) landscape ● Preserve the Greenport Eco-Agripark and use it for educational programs, etc.	Conserve natural environments that nurture biodiversity	Suitable management of greening projects in airport area Greenport Eco-Agripark preservation and use
Implement and reinforce environmental initiatives in collaboration with local communities	● Use noise control areas tailored to local conditions ● Encourage environmental conservation initiatives in collaboration with local communities	Implement and reinforce environmental initiatives in collaboration with local communities	Suitable management of land vacated by relocation and lease of agricultural land implementation

Resource Recycling Initiatives

Action Items	Description	Targets (FY 2020)	Results (FY 2017)
Recycle resources	● Reduce general waste and encourage recycling at airport-related facilities ● Encourage recycling of industrial waste (packaging material, wooden skids, and other waste) ● Encourage measures to reduce inflight waste from aircraft ● Take measures to raise awareness among passengers, employees, and other airport users ● Recycle concrete and asphalt waste material generated by the airport ● Take measures for the effective use of grass clippings, cut trees, etc. ● Encourage green procurement	Recycle resources Reduce general waste incinerated per airport user by 5% compared to the benchmark year (FY 2015) FY 2015: 0.45 kg/person	General waste incinerated 6.7% reduction compared to FY 2015 (0.42 kg/person)
Recycle water resources	● Implement potable water saving measures based on an analysis of water usage conditions by building and by season ● Encourage the installation of water-saving equipment when facilities are updated ● Reduce potable water usage by utilizing grey water ● Conduct activities to raise awareness among passengers, employees, and other airport users	Recycle water resources Reduce potable water usage per airport user by 3% compared to the benchmark year (FY 2015) FY 2015: 30.9 L/person	Potable water usage 7.8% reduction compared to FY 2015 (28.5 L/person)

Eco-Airport Master Plan (FY 2016–2020) and Evaluation of FY 2017 Results

Climate Change Initiatives

*** COOL BIZ and WARM BIZ:** A way of living in comfort while keeping room tempreture at 28˚C in summer and 20˚C in winter.

Action Items	Description	Targets (FY 2020)	Results (FY 2017)
Reduce CO_2 emissions from the airport	● Encourage the introduction of low emission aircraft ● Implement measures to reduce aircraft taxiing times ● Limit the use of auxiliary power units (APU) and encourage use of ground power units (GPU) ● Take measures for the introduction of next-generation aviation fuels ● Encourage travel to the airport in low emission vehicles (install EV charging stations, natural gas and hydrogen stations) ● Encourage the introduction of low emission vehicles and eco-driving ● Generate electricity when incinerating waste through thermal recycling (thermal recovery) ● Select low carbon electric power sources when purchasing electric power ● Encourage the introduction of renewable energy	Reduce airport CO_2 emissions Reduce airport CO_2 emissions per flight by 7% compared to the benchmark year (FY 2015) FY 2015: 4.30 t/flight	Airport CO_2 emissions Reduced by 6.5% of FY 2015 levels (4.02 t/flight)
Reduce energy consumption	● Increase installation of LED lights on taxiways ● Encourage energy-saving measures through energy management ● Conduct energy conservation programs (raise awareness of energy conservation, "COOL BIZ" and "WARM BIZ,"* etc.) ● Encourage installation of energy-saving equipment when constructing new facilities and renovating existing facilities	Reduce energy consumption Reduce energy consumption by NAA-managed airport facilities per flight by 5% compared to the benchmark year (FY 2015) FY 2015: 15.1 GJ/flight	Energy consumption at NAA-managed airport facilities Reduced by 7.9% of FY 2015 levels (13.9 GJ/flight)
Take countermeasures to adapt to climate change in conjunction with global warming	● Take appropriate preventive measures to address storms and other abnormal natural events	Promote countermeasures for adaptation to climate change accompanying global warming	Review of snow and ice management system adapting to weather conditions in recent years

Environment Management

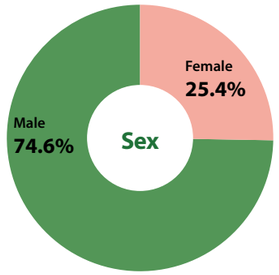
Action Items	Description	Targets (FY 2020)	Results (FY 2017)
Engage in dialogue with stakeholders	● Promote dialogue with stakeholders ● Implement environmental conservation programs centered on the Eco-Airport Development and Planning Council ● Conduct environmental education and awareness activities for airport employees ● Publicly release environmental information such as noise, air quality, and water quality measurement results and flight routes ● Give presentations at environment-related conferences on noise, air quality, and other topics ● Conduct Eco-Kids Club programs, participate in environmental exhibitions, and conduct Touring Environmental Classrooms	Engage in active dialogues with stakeholders	Held interactive dialogues with airport-related business entities through the council Held interactive dialogues with stakeholders through hosting the Eco-Kids Club and participating in environmental exhibitions Promoted interactive dialogues with local communities through establishment of a new regional consultation center
Pursue the creation of value by taking measures in collaboration with stakeholders to reduce the environmental impact of airport activities throughout society as a whole	● Encourage activities to reduce environmental impact in collaboration with stakeholders ● Encourage procurement that takes the environment into consideration	Pursue the creation of value by taking measures in collaboration with stakeholders to reduce the environmental impact of airport activities throughout society as a whole	Encouraged green procurement through the Council
Reduce environmental impact in collaboration with airports in Japan and abroad	● Encourage information exchanges and joint environmental conservation activities through liaison conferences with other leading airports in Japan ● Exchange information with and express opinions to the Airports Council International (ACI) ● Exchange information with and provide technology to overseas airports	Contribute to reducing the environmental impact in cooperation with airports in Japan and abroad	Exchanged information through the Environmental Liaison Conference with Major Airports in Japan Exchanged information through ACI activities
Environmental conservation through environmental assessments and verification	● Conduct environmental assessments based on the Environmental Impact Assessment Act toward improvement of airport functionalities ● Conduct voluntary environmental assessments	Conserve the environment by conducting environmental assessments and inspections	In line with the Environmental Impact Scoping Document, conducted surveys, forecasts, evaluations, study of environmental conservation measures, and so on Publicly disclosed voluntary environmental assessment (environmental findings) regarding the development of a taxiway (aircraft holding bay) on the north side of Runway A
Conduct environmental management using environmental certification programs	● Encourage environmental management using environmental certification programs	Conduct environmental management using environmental certification programs	Achieved *Airport Carbon Accreditation* Level 2 and promoted environmental management using methods of the program
In the lead up to the 2020 Tokyo Olympic and Paralympic Games, take various measures and conduct trials of and introduce new technologies and present our vision of an eco-airport to the world	● Promote environmental measures to support low carbon, good air quality, and the 3Rs (reduce, reuse, recycle) ● Take measures toward the use of hydrogen energy at Narita Airport ● Take measures toward the introduction of next-generation aviation fuels ● Disseminate information on the eco-airport	In the lead up to the 2020 Tokyo Olympic and Paralympic Games, trial and introduce various measures and new technologies, and present our vision of an eco-airport to the world	Utilized fuel cell vehicles as service vehicles for NAA

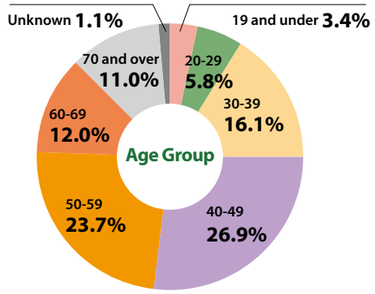
Environment Report 2017

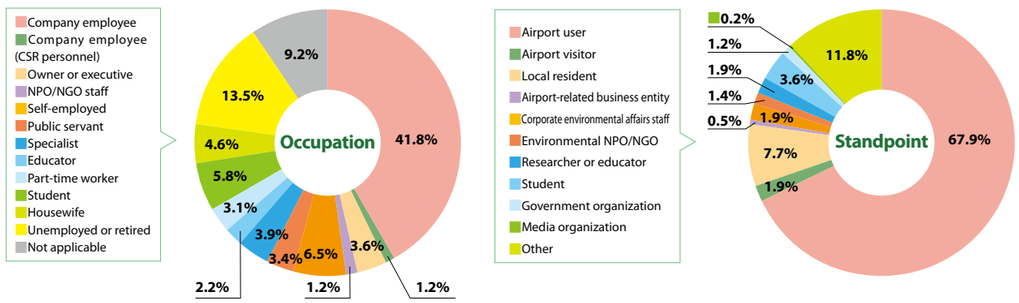
Readers' Survey

The Environment Report 2017 was released with 6,000 copies of the Japanese edition and 500 copies of English edition. To collect a broader range of views and comments, besides running the survey as a conventional paper survey, we also ran it as an online survey. In total, we received 400 responses, generally expressing a high level of satisfaction with the overall report. We thank all those who sent us their valuable comments.

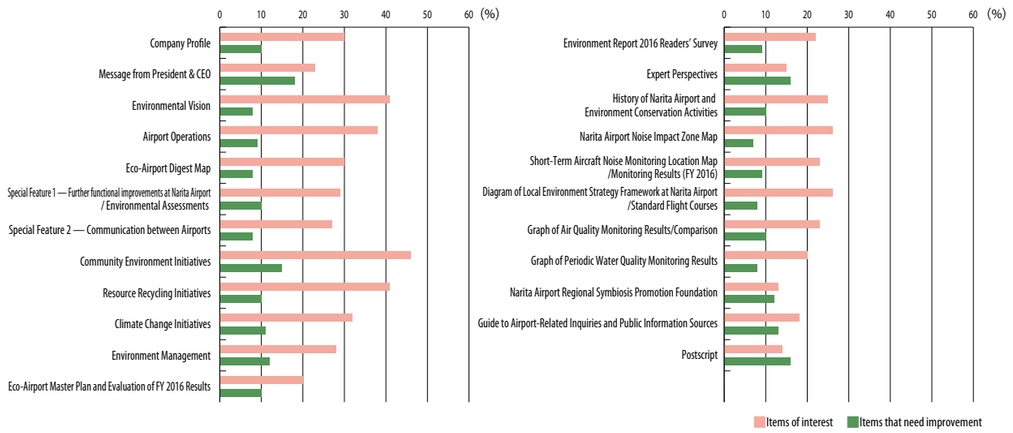
Respondent Attributes



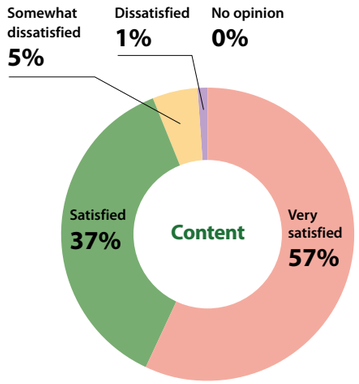


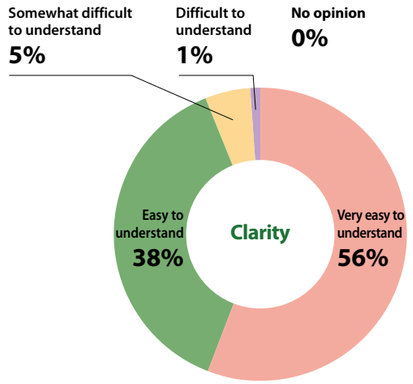


Items of Interest and Items that Need Improvement



Content and Clarity





Opinion

Company employee

It was a huge amount of material and I wished if it could have been made a bit more concise in some parts. However, I felt the seriousness of their commitment to the environment. Please keep it up.

This report aims to report the initiatives by Narita International Airport and NAA to promote the Eco-Airport, and these activities are described as carefully as possible. Along with this report, there is also a "digest version" that covers only more accessible topics. Please visit our website; https://www.naa.jp/en/environment/index.html.

Self-employed

I learned that, as an inland airport, the airport works not only on noise and falling objects but also various environmental aspects. I suppose some parts of nature are actually protected thanks to Narita Airport. I look forward to your finely targeted initiatives.

At Narita International Airport, we have been striving to preserve the surrounding natural environment for a long time as we implement our Master Plan, including the construction and extension of runways. Special Feature 2 in this report (pp.14-15) introduces examples of the transplantation of valuable plants as part of an airport improvement project.

Company employee

I hope that you can spread Narita Airport's practices such as the composting of waste.

We give out our compost to the general public free of charge at events held at the airport and its surrounding areas. People love it, saying that it makes "plants grow well" and "brings drooping plants back to life."We will continue these efforts to raise awareness.

Our Response to the Results

We have received a variety of opinions from many different perspectives regarding our Environment Reports. Many have praised our efforts with regard to noise and falling objects from aircraft and expressed wishes for even further improvement, reminding us of the rising level of interest people have in our activities.
Others have expressed the desire for comments from airport staff and other stakeholders as well. In response to these views, in this special feature, we covered NARIKOH Co., Ltd., which is responsible for waste treatment at the airport, and introduced our eco-related activities. From now on, we plan on introducing initiatives and comments by business entities at the airport.
The views we received from all those who responded to this survey will be given serious consideration. While seeking to apply them to our future activities, we will strive to enhance our Environmental Report. We look forward to your continued support.

Expert Perspectives

Executive Director, CSO (Civil Society Organization) Network Japan
Kaori Kuroda

After working for a private company, Ms. Kuroda worked at the Columbia Business School Center on Japanese Economy and Business and the Asia Foundation in the United States, and has been in her current position since 2004.
Since 2010, Ms. Kuroda has also served as Japan Director for the Asia Foundation.
She participated in the adoption of ISO 26000 (social responsibility guidance standard) as a representative of Japanese NGOs.
Ms. Kuroda is currently involved in drafting the sustainable sourcing code for the 2020 Tokyo Olympic and Paralympic Games. She is also a board member of the Japan Civil Society Network on SDGs, and a member of the SDGs (Sustainable Development Goals) Promotion Round Table Meeting, the Saitama City CSR Promotion Committee, the Japan Football Association Committee for Social Responsibility, and other bodies. Member of the American Institute of CPAs.

The heavy rains that hit a wide area of western Japan in July 2018 caused great damage, including overflowing rivers and landslides, marking Japan's worst weather-related disaster in decades. In September, a powerful typhoon caused enormous damage in the Kinki district, including at Kansai International Airport. A week later, the Hokkaido Eastern Iburi earthquake occurred. The World Meteorological Organization (WMO) announced that abnormal weather is occurring in the world, and in recent years, large typhoons and heavy rains have been occurring more frequently, and the scale of such events has been increasing even in Japan. Measures against climate change and for the prevention or mitigation of disasters have become urgent issues.
Visitors to Japan from overseas are increasing year by year, and in 2017, the number of passengers at Narita International Airport exceeded 40 million. A further increase is expected for the 2020 Tokyo Olympic and Paralympic Games. As demand for air transport increases, I feel that the functions and expected roles of international airports are growing.
Eco-Airport Vision 2030 was formulated precisely in view of such changes and conditions in the domestic and overseas environments. Environmental Report 2018 describes in detail the progress made in the second year of the Eco-Airport Master Plan (FY 2016 – FY 2020), NAA's midterm plan for realizing that vision. As the plan enters its third year, I would like to present my thoughts and opinions, as a third party, regarding Environmental Report 2018.

About the Report Overall

The report opens clearly with a message about Eco-Airport Vision 2030 from NAA President & CEO Makoto Natsume, followed by detailed descriptions of the various initiatives taken to realize that vision and their progress, including key performance indicators (KPIs). The order of contents is easy to understand for readers. I also found it a good idea to include the results of the Readers' Survey at the end of the report.

Climate Change Initiatives

The fact that the airport's CO_2 emissions were reduced by 6.5% in fiscal 2017 toward the ultimate goal of a 7% reduction per flight by fiscal 2020, using fiscal 2015 as the reference level, deserves high praise. I expect the airport to work toward further reduction without stopping at 7%.
NAA has been promoting the use of ground power units (GPUs) for parking aircraft as a noise control and global warming countermeasure, and its active call to airlines has resulted in a rebound in the GPU usage rate in fiscal 2017. The achievement of Level 2 in *Airport Carbon Accreditation* program of Airports Council International (ACI) is also meaningful in terms of international dissemination. I look forward to further initiatives of this kind.

Resource Recycling Initiatives

Regarding the 3Rs of waste (Reduce, Reuse, and Recycle), NAA set the target of reducing the amount of general waste per airport user discharged from the airport by 5% compared to fiscal 2015 before fiscal 2020, and a significant reduction of 6.7% was achieved in fiscal 2017. I expect you to continue your efforts in this area.
As regards the reduction of general waste, various discussions and efforts have already been conducted at the Narita International Airport Eco-Airport Development and Planning Council. However, it would be preferable to involve also passengers and airport users in addition to airport-related business entities. The Public Relations Committee is conducting PR activities on a website and at terminals, but it should consider also dissemination activities from the viewpoint of environmental education.

Connecting with the Community

Toward the further enhancement of Narita International Airport, NAA is focusing on continuous communication and environmental management through the Four Party Council involving the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Chiba Prefectural Government, and the municipal governments around Narita Airport. With regard to regional development around the airport, you have been promoting collaboration, including PR to airport users about surrounding areas and their specialties. I hope you will foster harmonious relationship with local communities.

黒田かをり

Our Response

We thank you for your precious comments regarding our environmental report for the third year in a row.

Thanks to all our stakeholders, our activities within the framework of the Eco-Airport Master Plan (FY 2016–2020) have made satisfactory progress overall like last year. That said, we will closely follow changes in the environment around Narita International Airport and strengthen our various initiatives without resting on our laurels. We will also seek other initiatives to take things further as you suggested.
This year marked the 40th anniversary of the opening of Narita International Airport, and as such it was a year of strengthened awareness of our philosophy of symbiosis and co-prosperity with the local community, as expressed by our motto, "Airport building is community building." Following the direction indicated in Eco-Airport Vision 2030, we will promote Eco-Airport initiatives with local residents and all other stakeholders, aiming for sustainable development of the region and the airport.

Junichi Sekiguchi
Vice President
Community and Environmental Affairs Department
NAA

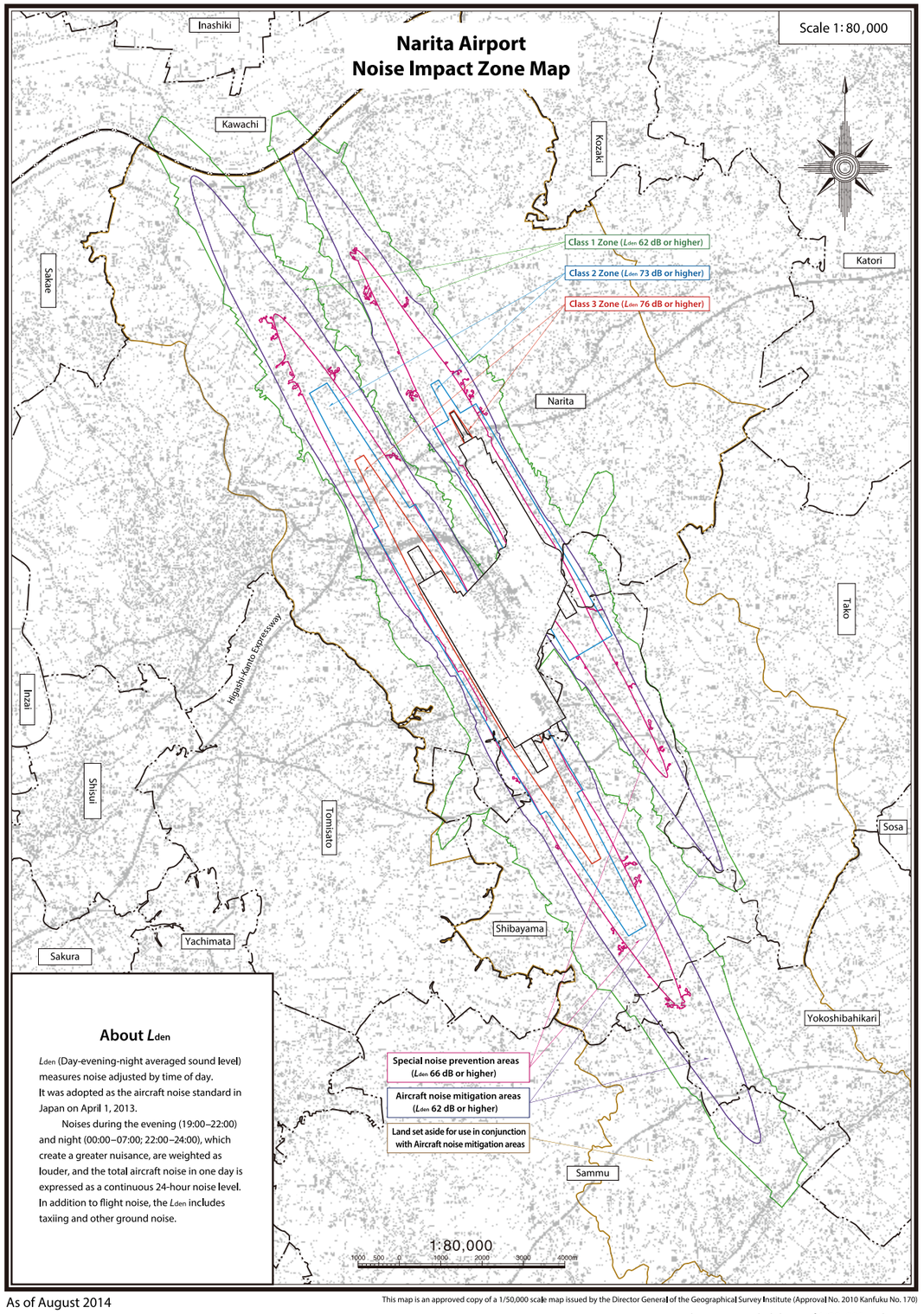
Reference Material

History of Narita International Airport and Environment Conservation Activities

Item	Year	Environment & Community Relations
Minister of Transport refers question of prospective sites and scale of New Tokyo International Airport to Council for Civil Aviation (Aug), Council for Civil Aviation responds to Minister (Dec)	1963	
New Tokyo International Airport Authority Law promulgated (Jun)	1965	
Ordinance issued designating site of New Tokyo International Airport (Jul), New Tokyo International Airport Authority established (Jul), Master Plan released (Dec)	1966	
Action approved under Land Expropriation Act (Dec)	1969	
First expropriation action (Feb), Second expropriation action (Sep)	1971	
	1976	Noise impact zones designated (Class 1: WECPNL 85 dB; Class 2: WECPNL 90 dB; Class 3: WECPNL 95 dB) (Jan)
Aerodrome and navigation aids certification (Nov)	1977	
Left wing extremists destroy 16th floor of air traffic control tower (Mar), Airport opens (May 20th)	1978	Promulgation of Special Measures Law Concerning Aircraft Noise Prevention Strategies Around Specified Airports (Apr), Applications open for complete residential soundproofing (Sep)
	1979	Expansion of Class 1 noise impact zone (WECPNL 80 dB) announced (Jul)
	1982	Expansion of Class 1 noise impact zone (WECPNL 75 dB) announced (Mar)
	1985	Noise impact zones announced for Runways B & C (Jul)
Commencement of Phase II of airport development project (Nov)	1986	
Kitahara opposition group disbands, amalgamates with Ogawa group (Sep)	1987	
	1990	Minister of Transport Eto meets with Atsuta opposition group farmers (Jan), Slots increase from 340 a day to 350 (Mar), Regional Promotion Liaison Council established (Nov), Slots increase from 350 a day to 360 (Dec)
Direct rail service to Narita Airport Station launched (Mar)	1991	Local federation calls for public symposium (Feb), 1st Symposium on Narita Airport Issues (Nov)
Opening of Terminal 2 (Dec)	1992	
	1993	15th Symposium on Narita Airport Issues (May), Government withdraws application to courts for seizure of unacquired land (Jun), 1st Roundtable Conference on Narita Issues (Sep), Narita TV relay tower begins transmission (Nov)
	1994	Community consultation centers opened (Apr), 12th Roundtable Conference on Narita Issues (final conference) (Oct), All participants accept final recommendations of Sumiya Board of Inquiry, Roundtable Conference retires (Oct), Expanded Roundtable Conference Steering Committee (Dec)
	1995	1st session of Committee for Symbiosis between the Airport and the Local Community, Sawara TV relay tower begins transmission (Jan), 1st session of Concept Implementation Committee for an Experimental Village Encompassing Global Issues (Jan), 1st session of Regional Environmental Committee (Jan), Edosaki TV relay tower begins transmission (Feb), Airport Information Center, Area Consultation Office and Symbiosis Committee consultation offices open (Mar), Shimofusa Hikari TV relay tower begins transmission, Greening Master Plan for Narita Airport and Environs announced (Mar), Subsidy system launched to provide additional soundproofing for reconstruction of soundproofed houses (Oct)
Narita Airport Authority headquarters moves to Narita Airport (Jul)	1996	Environmental Report Volume 1 released (Apr), Committee for Symbiosis between the Airport and the Local Community asks for blueprint and schedule or integrated development of airport and region (Aug), Ministry of Transport releases Fundamental Concept on Symbiosis Between Narita Airport and the Local Community in the Future and the Development of the Airport and the Local Community (Oct)
	1997	Aircraft noise monitor system operational, NAA Information Room opens on 1st floor of NAA Building (Apr), Regional Symbiosis Promotion Headquarters and Airport Development Promotion Headquarters established, North Area Consultation Center opened (Jun), Narita Airport Regional Symbiosis Promotion Foundation established (Jul), Weather information available by fax and telephone (Sep)
Opening of Satellite 1 in Terminal 1 (Feb)	1998	Eco-Airport Promotion Workgroup establishment (Feb), Improved flight tracking information service at Airport Information Center (Mar), Environment Information System online, restrictions imposed on APUs (Apr), Daily slots increase from 360 to 370 (Apr), 22nd and final session of Concept Implementation Committee for an Experimental Village Encompassing Global Issues; final report (May), Fundamental Blueprint for an Eco-Airport announced (May), Outline of Airport Construction Geared to Symbiosis announced by Ministry of Transport and NAA (Jul), Outline of Airport Construction Geared to Symbiosis released by Ministry of Transport and NAA (Dec)
North Wing and new Central Building section opened in Terminal 1, South Wing closed (Mar), The Ministry of Transport announces abandonment of FY2000 target for parallel runway (May), Council to promote prompt completion of Narita Airport submits petition with 260,000 signatures to Minister of Transport (May), Ministry issues new directive to NAA President & CEO on parallel runway project (May), Ministry of Transport and NAA announce change in direction on construction of parallel runway (Jun), Parallel runway policy change incorporated in Environmental Impact Statements (Part 2) (Aug), Application lodged to modify works program for parallel runway construction (Sep), Public hearing held concerning application to modify works program for parallel runway construction (Oct), Change of work program for parallel runway was approved, and work on parallel runway commences after ceremony for safety of project (Dec)	1999	Low pollution vehicle plan drawn up (Feb), NRH (Noise Reduction Hangar) completed (Apr), Solar power generation system commissioned (Oct)
Opening of Satellite 2 in Terminal 1 (Jul)	2000	Eco-Airport Corner opened in Museum of Aeronautical Sciences (Apr)
Construction of interim parallel runway completed (Oct)	2001	Narita Airport Eco Station opens (Mar), Two air quality monitoring stations opened on interim parallel runway (Apr), Special Noise Prevention Areas and Noise Prevention Areas allocated (May)
Opening of interim parallel runway (Apr), Narita Airport South Gate opened, Shibayama Railway opened (Oct), Satellite 3 in Terminal 1 opened (Dec)	2002	Development of discharge canals and wetland environments begins (Mar), Sixteen unattended noise monitoring stations for interim parallel runway become operational (Apr), Environmental Information System and Flight Tracking Information Display System revamped (Apr), Noise demonstration rooms opened in Airport Information Center and Museum of Aeronautical Sciences (Apr), Thermal Storage System commissioned (Jul)
Tennami cargo warehouse opened (Apr), Narita International Airport Corporation Law promulgated (Jul), Airport South Cargo Bldg. opened (Aug)	2003	Opening of new observation platform Sanrizuka Sakura no Oka (Cherry Blossom Hill) (Mar), opening of Minami Sanrizuka Nature Trail (Apr)
Narita International Airport Corporation (NAA) founded (Apr), Opening of Satellite 4 in Terminal 1 (Nov)	2004	Eco-Airport Promotion Office establishment (Feb), Eco-Airport Promotion Committee establishment and Eco Airport Promotion Council establishment (Apr), Environmental Master Policy establishment (September)
NAA reports to Minister of Land, Infrastructure, Transport and Tourism on northern extension option for parallel runway (Jul), Minister issues development directive for 2,500-meter parallel runway under northern extension proposal (Aug)	2005	Development of neighborhood forest walking trails in conjunction with Chiba Prefecture, Narita City and Narita Local Hotels Association (Jan), Eco-Airport Development and Planning Council established (Jan), Greenport Eco-Agripark announced (Jan), Eco-Airport Master Plan (FY2005–2010) formulated (Mar), Narita Airport Eco-Festa, Narita Airport Eco-Kids Club founded (Jun), Organic farming course opens (Jul), New landing charges for international flights based on aircraft noise levels (Oct), Northern extension proposal for parallel runway put to local communities (Oct), Waste sorting in passenger terminals expanded (Dec)
South Wing/Satellite 5 in Terminal 1 open (Jun), Application for airfield change for parallel runway development (Jul), Public meeting held on application for airfield change (Aug), Application for airfield change approved (Sep)	2006	Release of Environmental Impact Statements for parallel runway development (Jul)
NAA headquarters moves to new building (Apr)	2007	Additional noise impact zones announced for northern extension (Class 1: WECPNL 75 dB; Class 2: WECPNL 90 dB; Class 3: WECPNL 95 dB) (Mar), Announcement of partial amendment to Environmental Quality Standards for Aircraft Noise Change in noise index: WECPNL→*L*den (commencing: April 1, 2013) (Dec), Change in special noise prevention areas and aircraft noise prevention areas for northern extension (Dec)
	2008	Narita International Airport City Planning Promotion Council announces possibility of expanding airport capacity to 300,000 movements a year and releases provisional calculations (Mar), Decision to end late-night/early morning curfew on parallel runway (Nov)
FedEx freighter overturns while landing, killing 2 pilots (Mar), Runway B (2,500 m) opened 5 months ahead of schedule (Oct)	2009	Confirmation document on further capacity expansion of Narita Airport signed at meeting of Four Party Council on Narita Airport (Mar), Environmental information website, Narita Airport Environmental Community, revamped (Apr), External power supply system installed in truck parking yard (Jul), Four Party Council on Narita Airport announces expected noise contours for 300,000 movements, fundamental stance on environment and community integration measures, and facility development plans for capacity expansion (Dec)
Annual slots expanded to 220,000 aircraft movements (Mar), Application for airport change regarding construction of taxiways on western side of Runway B and Yokobori district (Apr), Public meeting held on application for airport change regarding construction of taxiways on western side of Runway B and Yokobori district (May), Application for airport change regarding construction of taxiways on western side of Runway B and Yokobori district approved (Jun), Narita Sky Access opened, minimum traveling time between Tokyo and Narita Airport shortened to 36 minutes (Jul), Work commences on western taxiway for Runway B (Jul), Additional corporate jet bays assigned and permissible layover time extended (Dec)	2010	Release of Environmental Impact Statements for construction of taxiways on western side of Runway B (Apr), Four Party Council on Narita Airport signs Note of Confirmation on Capacity Expansion (300,000 movements a year) (Oct)
Great East Japan Earthquake (Mar), Airport capacity increased to 250,000 movements (Mar), Commencement of simultaneous departures and approaches (Oct)	2011	Release of Environmental Impact Statements for construction of taxiways on Yokobori district(Feb), Additional external power supply systems for trucks installed in truck parking lots, Airport South Cargo Area (Mar), Eco-Airport Vision 2020 and Eco-Airport Master Plan (FY2011–2015) formulated (Apr), Notification of additional noise impact zones in conjunction with capacity expansion (300,000 movements) (Class 1: WECPNL 75 dB; Class 2: WECPNL 90 dB; Class 3: WECPNL 95 dB) (Apr), Narita Airport Historical Museum opens (Jun), Alterations to aircraft noise control zones and aircraft noise control special zones in conjunction with capacity expansion (300,000 movements) (Nov)
4,000 m operation of Runway A begins for aircraft landing from south (Dec)	2012	Expansion of flight tracking information disclosure (Mar), Commencement of fast chargers for electric vehicles (Oct)
Airport capacity expands to 270,000 movements, Open Skies adopted, operation of taxiway and Yokobori apron on west side of Runway B begins, relaxation of night-time operation restrictions (Mar)	2013	Reduction of international landing charges, Revision of Aircraft Noise Index from WECPNL to *L*den (Apr), Establishment of Narita International Airport Promotion Association (Jul)
Application submitted for airfield change relating to development of LCC satellite north side apron (Jan), Hearings conducted on application for airfield change relating to development of LCC satellite north side apron (Apr), Application for airfield change relating to development of LCC satellite north side apron approved (Apr)	2014	Release of Environmental Impact Statements for development of LCC satellite north side apron (Feb)
Airport capacity increased to 300,000 aircraft movements annually, non-stop entry gate admissions implemented (Mar), Opening of Passenger Terminal 3 (Apr)	2015	Narita Airport Environmental Community, airport's social environmental information website updated; Sanrizuka Solar Power Plant began operations (Mar), Opening of Japanese Lotus Garden in front of Passenger Terminal 1 (Jun), Posting flight tracking information online (Sep)
Application for airfield change regarding development of Runway B south side apron (Dec)	2016	Narita Hydrogen Station began operations (Mar), Eco-Airport Vision 2030 and Eco-Airport Master Plan (FY 2016–2020) adopted (Apr), Release of Document on Primary Environmental Impact Consideration at Planning Stage for Further Functional Improvements of Narita Airport (Jun), Airport Information Corner opened in Narita Airport Historical Museum (Jul), Confirmation document on investigation of further capacity expansion of Narita Airport signed at meeting of Four Party Council on Narita Airport (Sep), Release of Environmental Impact Statements for development of Runway B south side apron; Introduction of FCV for business use (Dec)
Public hearing on application for airfield change regarding development of Runway B south side apron (Jan), Application for airfield change regarding development of Runway B south side apron approved (Mar)	2017	Official Announcement of Environmental Impact Scoping Document for Further Functional Improvements of Narita Airport (Jan), Meeting of Four Party Council on Narita Airport held, and confirmation document on investigation of further functional improvements of Narita Airport signed (Jun)
Application for airfield change regarding the development of a taxiway (aircraft holding bay) on the north side of Runway A (Mar), Public hearing on application for airfield change regarding the development of a taxiway (aircraft holding bay) on the north side of Runway A (holding bay) (May), Application for airfield change regarding the development of a taxiway (aircraft holding bay) on the north side of Runway A approved (Jun)	2018	Achievement by Narita International Airport of Level 2 in the *Airport Carbon Accreditation* program by Airports Council International (ACI) (Jan), Signing of "Confirmation on Further Functional Improvements of Narita International Airport" at "Meeting of Four Party Council on Narita Airport" (March), Release of Environmental Impact Statements for development of Runway A north side holding bay, etc. (Mar), Release of Draft Environmental Impact Statement on Further Functional Improvements of Narita Airport (Apr)

* From 2009, the parallel runway is referred to as Runway B.

Narita International Airport Noise Impact Zone Map



About *L*den

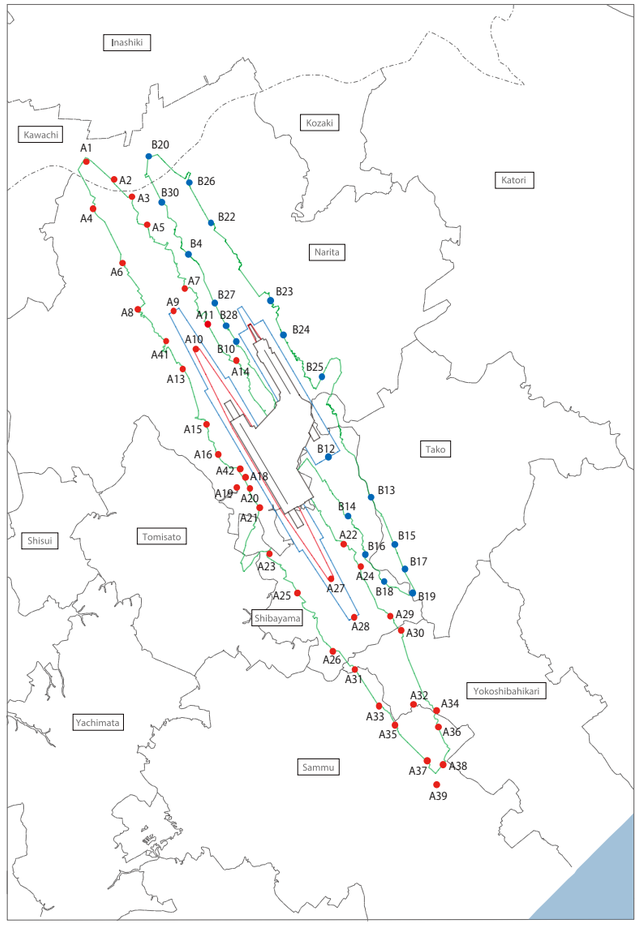
*L*den (Day-evening-night averaged sound level) measures noise adjusted by time of day. It was adopted as the aircraft noise standard in Japan on April 1, 2013.

Noises during the evening (19:00–22:00) and night (00:00–07:00; 22:00–24:00), which create a greater nuisance, are weighted as louder, and the total aircraft noise in one day is expressed as a continuous 24-hour noise level. In addition to flight noise, the *L*den includes taxiing and other ground noise.

As of August 2014

*This map is scaled down of 1/80,000 scale map.

Short-Term Aircraft Noise Monitoring Location Map



Specified zones under the Aircraft Noise Prevention Law

- Class 1 noise zone (*L*den 62 db or higher)
- Class 2 noise zone (*L*den 73 db or higher)
- Class 3 noise zone (*L*den 76 db or higher)
- Monitoring points

Locations

A 1: Tagawa
A 2: Shimotagawa
A 3: Ansai
A 4: Kitahadori
A 5: Isobe
A 6: Naganuma
A 7: Oou
A 8: Ashida
A 9: Nishi-Izumi
A10: Nogedaira
A11: Nogedaira Industrial Park
A41: Akaogi
A13: Kume
A14: Toyomi (A)
A15: Kosuge
A16: Hatakeda
A42: Honsanrizuka
A18: Sanrizuka (elementary school)
A19: Sanrizuka (Goryo)
A20: Sanrizuka (nursery school)
A21: Sanrizuka (Public Housing Estate)
A22: Ibitsu
A23: Makino
A24: Kamifukiire
A25: Takada-Higashi
A26: Dedo
A27: Shibayama Industrial Park
A28: Koike Ground
A29: Nekoya
A30: Ushikuma
A31: Yamamuro
A32: Ubayama
A33: Yatsu
A34: Nagakura
A35: Kaburaki
A36: Omoteba
A37: Keneijutakushita
A38: Saruo
A39: Gotanda

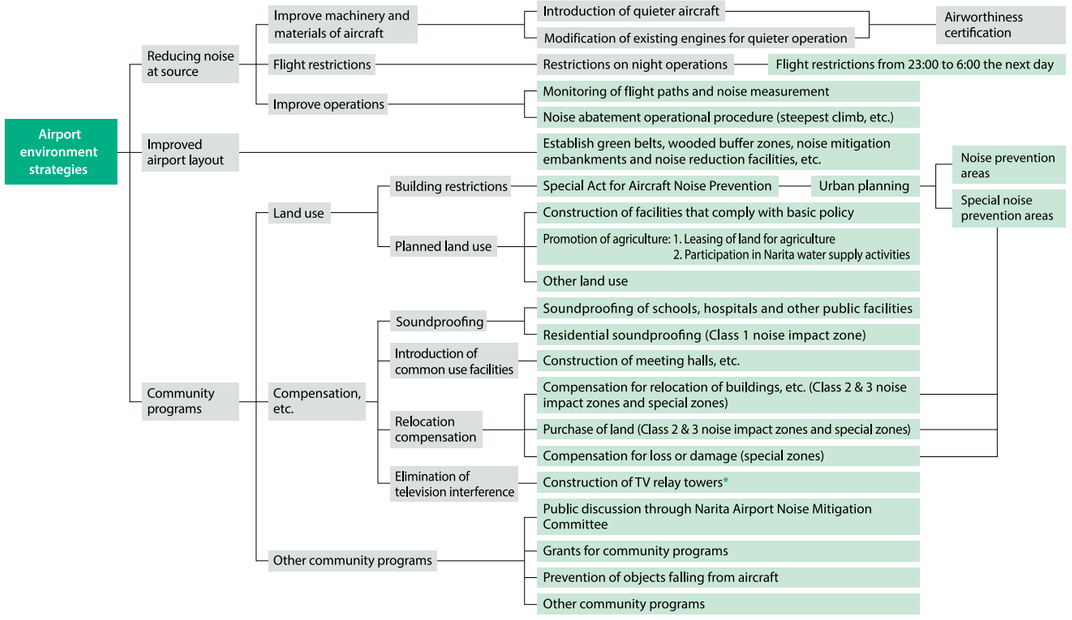
Locations

B20: Kanaetsu
B26: Namegawa
B30: Nishiosuka
B22: Nagoya
B4: Hataya
B27: Naruge
B23: Shiba
B28: Koizumi
B24: Inarimine
B10: Toyomi (B)
B25: Kawakami
B12: Hishida
B13: Kamo
B14: Shiramasu
B15: Hayashi
B16: Obaraku
B17: Mito
B18: Shimofukiire
B19: Ushino

Short-Term Aircraft Noise Monitoring Results (FY 2017)

Runway A				Runway B	
Location No.	*L*den	Location No.	*L*den	Location No.	*L*den
A1	56.6	A21	60.1	B20	56.5
A2	57.3	A22	57.7	B26	53.6
A3	57.2	A23	54.1	B30	56.3
A4	56.7	A24	57.4	B22	54.7
A5	57.6	A25	54.8	B4	57.8
A6	57.4	A26	52.9	B27	57.7
A7	57.7	A27	65.3	B23	50.8
A8	57.1	A28	62.1	B28	58.2
A9	62.2	A29	56.3	B24	53.3
A10	64.4	A30	56.5	B10	58.8
A11	60.7	A31	55.6	B25	52.2
A41	59.0	A32	57.2	B12	65.0
A13	57.9	A33	56.1	B13	56.0
A14	59.5	A34	55.8	B14	58.6
A15	57.5	A35	55.9	B15	55.5
A16	54.7	A36	56.4	B16	57.7
A42	54.1	A37	56.2	B17	57.0
A18	55.3	A38	55.9	B18	56.2
A19	53.1	A39	55.5	B19	57.7
A20	56.7				

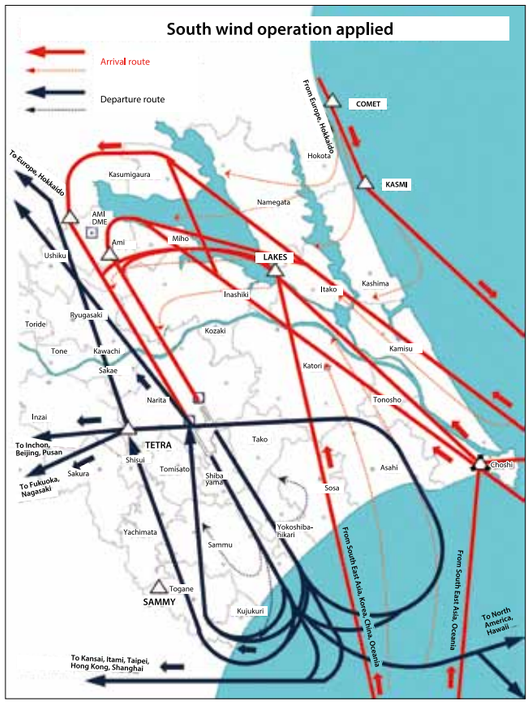
Diagram of Local Environment Strategy Framework at Narita International Airport



* This strategy was brought to an end with the transition to digital terrestrial television in July 2011.

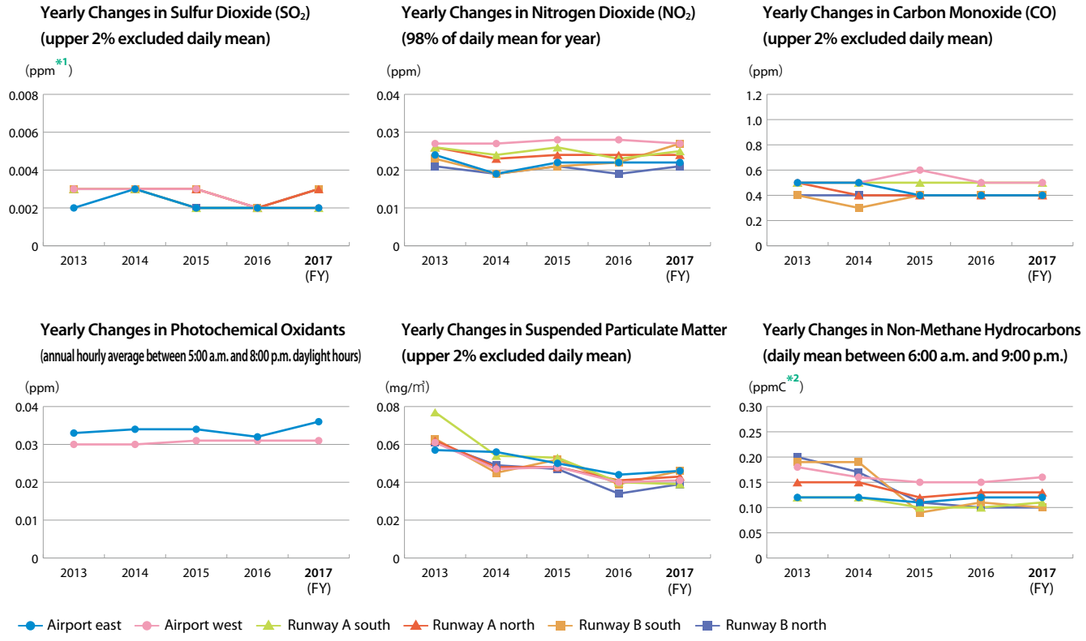
Denotes our strategies

Standard Flight Courses



* Aircraft occasionally deviate from standard flight courses due to high level cross winds, bad weather, and for separation purposes.

Graph of Air Quality Monitoring Results (see p. 22)



***1 ppm:** Parts per million. 1 ppm is 1 cubic centimeter of a given type of matter in 1 cubic meter of air.

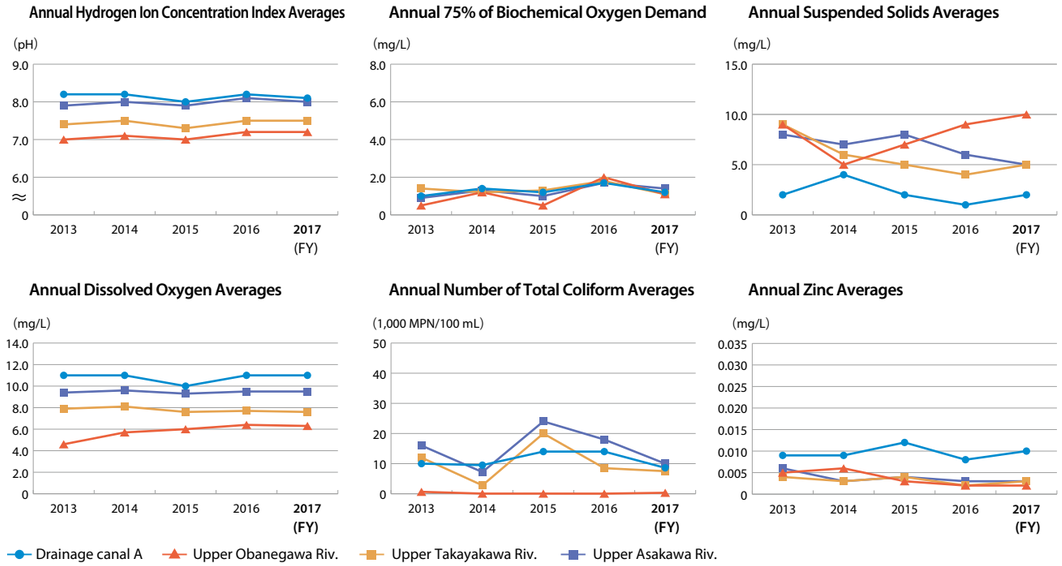
***2 ppmC:** Similar in meaning to ppm. This unit is the concentration of carbon when converting the hydrocarbon to methane. For example, when converting 1 ppm of benzene to methane, benzene contains 6 atoms of carbon, so it will be 6 ppmC.

Air Quality Monitoring Results (FY 2017) As Compared with Assessment Methods of Environmental Standards

Items monitored		Sulfur dioxide (SO_2)			Nitrogen dioxide (NO_2)			Carbon monoxide (CO)			Photochemical oxidants			Suspended particulate matter		
Assessment methods using environmental standards		The upper 2% excluded daily mean is a maximum of 0.04 ppm and the daily mean does not exceed 0.04 ppm on any two consecutive days.			98% of daily mean is a maximum of 0.06 ppm.			The upper 2% excluded daily mean is a maximum of 10 ppm and the daily mean does not exceed 10 ppm on any two consecutive days.			The hourly value is a maximum of 0.06 ppm.			The upper 2% excluded daily mean is a maximum of 0.1 mg/m³ and the daily mean does not exceed 0.1 mg/m³ on any two consecutive days.		
Chiba Prefecture targets					98% of daily average 0.04 ppm											
Description		Upper 2% excluded daily mean	Daily mean exceeds or does not exceed 0.04 ppm on any two consecutive days	Comparison with environmental standards	98% of yearly daily mean	Comparison with environmental standards	Comparison with Chiba Prefecture targets	Upper 2% excluded daily mean	Daily mean exceeds or does not exceed 10 ppm on any two consecutive days	Comparison with environmental standards	Number of days and hours when daytime hourly figures exceed 0.06 ppm		Comparison with environmental standards	Upper 2% excluded daily mean	Daily mean exceeds or does not exceed 0.1mg/m³ on any two consecutive days	Comparison with environmental standards
		(ppm)			(ppm)			(ppm)			(Days)	(Hours)		(mg/m³)		
Station name	Airport east	0.002	N/A	○	0.022	○	○	0.4	N/A	○	76	373	×	0.046	N/A	○
	Airport west	0.002	N/A	○	0.027	○	○	0.5	N/A	○	47	226	×	0.041	N/A	○
	Runway A south	0.002	N/A	○	0.025	○	○	0.5	N/A	○				0.039	N/A	○
	Runway A north	0.003	N/A	○	0.024	○	○	0.4	N/A	○				0.043	N/A	○
	Runway B south	0.003	N/A	○	0.027	○	○	0.4	N/A	○				0.046	N/A	○
	Runway B north	0.003	N/A	○	0.021	○	○	0.4	N/A	○				0.039	N/A	○

Note 1: In the comparison with environmental standards, a circle (○) denotes the value is within the standards and a cross (x) denotes the value has exceeded the standards.
Note 2: Photochemical oxidants are for daylight hours (between 5:00 a.m. and 8:00 p.m.).
Note 3: Readings for all items result from long-term monitoring over a valid period of 6,000 hours.

Graph of Periodic Water Quality Monitoring Results (see p. 23)



* Only includes values from monitoring stations under Narita International Airport control, published on the Narita Airport Environmental Community website.
URL：http://airport-community.naa.jp/ (Japanese version only)

Narita Airport Regional Symbiosis Promotion Foundation

Narita Airport Regional Symbiosis Promotion Foundation was established in July and began operating in October of 1997. It aims to provide more closely tailored solutions in addition to the community relations policies implemented by NAA, and bring Narita International Airport and the local community closer together.

(a) Soundproofing of residential buildings

Partially subsidizes the costs to soundproof designated houses of residents living in or adjacent to Class 1 noise impact zones or living in noise prevention area per the Special Act for Aircraft Noise Prevention.

Category	Activity	Recipients
Adjacent Area	Residential soundproofing in adjacent areas	Dwellings used for residential purposes as of October 1, 1997 in areas designated by the foundation as adjacent to Class 1 noise impact zone.
Class 1 Noise Impact Zone	Soundproofing for refurbished dwellings	Dwellings used for residential purposes as of October 1, 1997, which have been soundproofed using subsidies from NAA and which were renovated before March 31, 1995 (crosswind runway Class 1 noise impact zone only).
	Soundproofing on dwellings erected after enactment	Dwellings used for residential purposes as of October 1, 1997, which were constructed on or after July 2, 1985 (crosswind runway Class 1 noise impact zone only).
	Additional Air Conditioning unit construction	Dwellings in which air conditioning units installed during NAA soundproofing did not meet the prescribed number according to the method used at the time of soundproofing and according to the number of people in the household as of October 1, 1997.
	Soundproofing for houses of heirs	Dwellings built to house the children or heirs of the residents in the current domicile as of October 1, 1997.
	Window frame replacement	Dwellings which were soundproofed using subsidies from NAA or related municipal subsidies and which had soundproof sashing installed; for which two or more years have passed since installation; and which need sashing elements replaced due to damage, etc. (includes valley/semi-valley areas).
	Soundproof sash replacement	Dwellings which were soundproofed using subsidies from NAA or related municipal subsidies and which had soundproof sashing installed; for which ten or more years have passed since installation; and which need sashing elements replaced due to damage, etc. (includes valley/semi-valley areas).
	Extensions (wall/ceiling soundproofing)	Dwellings which have or will be soundproofed using subsidies from NAA, related municipal or foundation subsidies (excludes the crosswind runway for areas between L_{den} 62 dB–L_{den} 66 dB, includes area between two runways, excludes adjacent areas).
Special Noise Mitigation Area per the Special Act for Aircraft Noise Prevention (Runway A)	Inner window installation	Dwellings used as residences as of October 1, 2018 which have or will be soundproofed using subsidies from NAA, related municipal or foundation subsidies.

(b) Local noise prevention projects

Involved with three projects designed to contribute to building a healthy local environment.
- Resident health related matters derived from aircraft noise exposure
- Lectures, courses and similar activities related to environmental problems
- Assistance with residential environment improvements associated with relocation

(c) Aircraft noise measurement

Compiles aircraft noise level data from local governments and NAA, provides a central, objective assessment point and releases that information to the public.

(d) Studies and research on aircraft noise, etc.

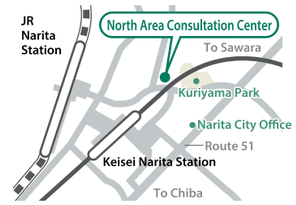
Undertakes studies and research for more precise aircraft noise measurement.

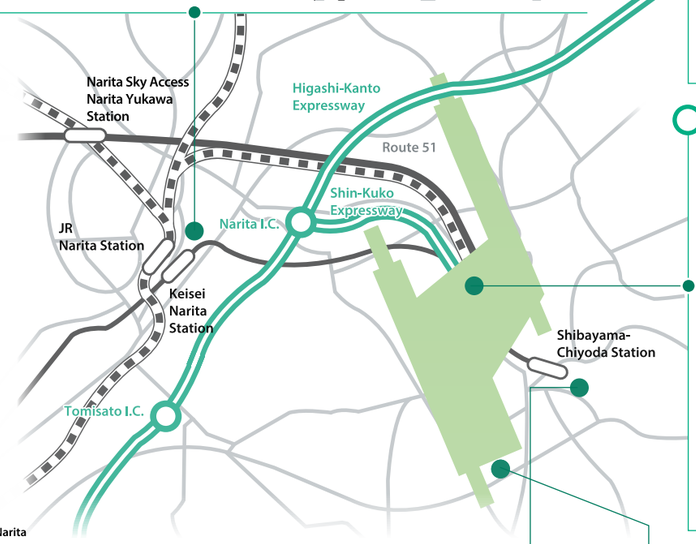
Guide to Airport-Related Inquiries and Public Information Sources

Please visit the following facilities for your inquiries on Narita International Airport, browsing or requests for released information.

North Area Consultation Center

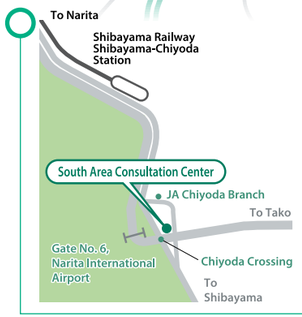
Address: 3rd Floor, Chiba Kotsu Bldg., 750-1 Hanazaki, Narita, Chiba
Tel: +81-476-24-5361
0120-06-6543 (domestic only)
Fax: +81-476-24-5370
Business hours: Mon.–Fri., 9:00 a.m.–5:00 p.m.
Closed: Sat., Sun., Pub. Hols., New Year Hols.





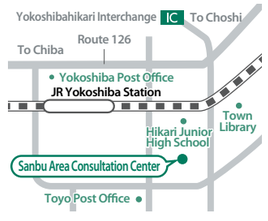
South Area Consultation Center

Address: 2nd Floor, Chiyoda Annex
Shibayama Central Community Center
18-52 Osato, Shibayama-machi Sanbu-gun, Chiba
Tel: +81-479-78-1394
0120-06-6554 (domestic only)
Fax: +81-479-78-1398
Business hours: Mon.–Fri., 9:00 a.m.–5:00 p.m.
Closed: Sat., Sun., Pub. Hols., New Year Hols.



Sanbu Area Consultation Center

Address: 2nd Floor,
Main Building Yokoshibahikari Town Office
11902 Miyagawa, Yokoshibahikari, Sanbu, Chiba
Tel: +81-479-84-1226
0120-84-1226 (domestic only)
Fax: +81-479-84-1228
Business hours: Mon.–Fri., 9:00 a.m.–5:00 p.m.
Closed: Sat., Sun., Pub. Hols., New Year Hols.

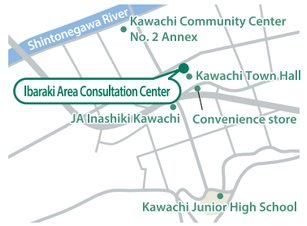


East Area Consultation Center

Address: 1st floor, Tako Town Office,
584 Tako, Tako-machi, Sanbu, Chiba
Tel: +81-0479-74-8882
0120-74-8881 (domestic only)
Fax: +81-479-74-8889
Business hours: Mon.–Fri., 9:00 a.m.–5:00 p.m.
Closed: Sat., Sun., Pub. Hols., New Year Hols.

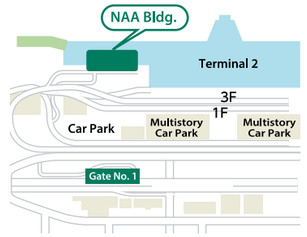
Ibaraki Area Consultation Center

Address: North Building, Kawachi Town Hall
1183 Genseida, Kawachi, Inashiki, Ibaraki
Tel: +81-297-84-5017
0120-84-5013 (domestic only)
Fax: +81-297-84-5013
Business hours: Mon.–Fri., 9:00 a.m.–4:00 p.m.
Closed: Sat., Sun., Pub. Hols., New Year Hols.



NAA Information Room

Address: 1st Floor, NAA Bldg.
Narita International Airport, Narita, Chiba
Tel: +81-476-34-5058 (Public Relations Office)
Fax: +81-476-34-5030 (Public Relations Office)
Business hours: Mon.–Fri., 9:30 a.m.–5:00 p.m.
Closed: Sat., Sun., Pub. Hols., New Year Hols.

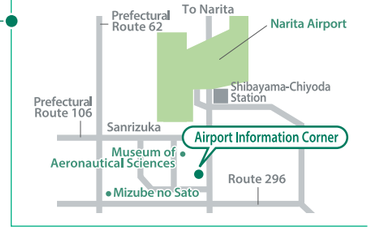


Museum of Aeronautical Sciences Eco-Airport Corner

Address: 111-3 Iwayama, Shibayama, Sanbu, Chiba
Tel: +81-479-78-0557
Fax: +81-479-78-0560
Business hours: 10:00 a.m.–5:00 p.m.
(No entry after 4:30 p.m.)
Closed: Every Monday (or following day if Monday is a public holiday)
Year end (29–31 Dec.)
* Open every day during summer hols. * Closed Dec. 1–31, 2018

Airport Information Corner

Address: 113-2 Iwayama, Shibayama, Sanbu, Chiba
(Located in the Narita Airport Historical Museum)
Tel: +81-476-34-5818 (Community and Environmental Affairs Department)
Business hours: 10:00 a.m.–5:00 p.m.
(No entry after 4:30 p.m.)
Closed: Every Monday (or following day if Monday is a public holiday)



NARITA INTERNATIONAL AIRPORT CORPORATION

Eco-Airport Development and Planning
Community and Environmental Affairs Department
NAA-Bldg., Narita International Airport, Narita City, Chiba
282-8601, Japan
Tel: +81-476-34-5609 Fax: +81-476-30-1561
URL: https://www.naa.jp/en/