ACI Asia-Pacific

# Environmental Survey Report 2017

## REPORT ABSTRACT

This is a report abstract for the ACI Asia-Pacific Environmental Survey Report 2017. The purpose of this report abstract is to publish high level findings of the ACI Asia-Pacific Environmental Survey for airports in the region. The full version of the report has been distributed to participating airports, which included customized results against aggregated data enabling participants to reference the experience of other airports. We would like to thank all participating airports for their efforts.

# Disclaimer

This report is the result of the analysis of the responses received from the airports that answered the ***Airports Council International (ACI) Asia-Pacific Environmental Survey 2017***. All the data, figures, numbers, statements, and/or any other information contained in this report are only indicative, intended solely for reference purposes, and do not necessarily represent those of airports in general.

No reader should act on the basis of any such information without referring to applicable national laws and regulations and/or without taking appropriate professional advice. Although every effort has been made to ensure accuracy, ACI Asia-Pacific shall not be held responsible for loss or damage caused by errors, omissions, misprints or misinterpretation of the contents hereof.



January 2018
ACI Asia-Pacific

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# Executive Summary

## Background

After the first ACI Asia-Pacific Environmental Survey was conducted as a pilot project in 2014-2015, it was further developed by ACI Asia-Pacific Regional Environment Committee (REC) with the objective of establishing a database of the ongoing environmental activities and policies of the 10-core airport environmental aspects of the airports in the region, namely:
**Environmental policy & management**; **noise**; **air quality**; **waste**; **water**; **energy**; **carbon**; **biodiversity**; **ground transportation**; **land & water contamination**.

The first survey was conducted in 2015 and received responses from 39 airports, representing about 30% of Asia-Pacific (including Middle East) airport passenger traffic. In this latest 2017 survey, we received **43 airports responses***, representing about **30%** of Asia-Pacific airport passenger traffic.
*Include 27 airports continuously participating since the 2015 survey, while 16 airports newly joined from 2017.

## Survey results

The results show that **water**, and **energy** management continue to be the top priorities among the responding airports. The majority of responding airports are taking measures to save scarce water resources through controlling water flow settings and monitoring water usage. Energy monitoring systems are widely deployed, and many airports are actively seeking opportunities to maximize efficient energy use through installation of efficient lighting (e.g. LEDs) and automatic monitoring/smart metering systems.

Over half of the respondents also place a high priority on **environmental policy & management**, **waste**, **carbon**, and **noise**. Waste reduction is most commonly implemented through the means of source separation and waste recycling. Carbon emission reduction is attempted through implementing energy saving measures, and a few have also begun carbon offsetting. This year's report shows improvement in aircraft noise data disclosure, and continuous efforts have been made to cooperate with airlines to enforce noise-preferred operational procedures during aircraft departures and arrivals.

**Ground transportation**, **biodiversity**, and **air quality** remain less of a priority among the respondents. Only a few airports have direct responsibility for ground transportation. Relatively few airports have the means to manage ground aircraft operations through reduced engine taxiing and banning APU usage. The average installation rate of ground power units (GPUs) and preconditioned air units were about 50% and 30% respectively.

Although the 2017 survey does not cover 100% of airports participating in the 2015 survey, we saw improvements in airports developing environmental targets, installing data monitoring systems and environmental data disclosure in many environmental aspects. However, it is always important to note that the survey results are only indicative, with limited samples available so far, and each airport has different priorities and environmental policies depending on their ownership model, geographical location, and the political or regulatory context of different jurisdictions. ACI hopes this report will continue to encourage participating airports to learn from one another for best practice sharing and assist environmental managers to have a better understanding of the current industry trends in this vastly diverse region.

# Introduction

Developed by ACI Asia-Pacific Regional Environment Committee (REC), the ACI Asia-Pacific Environmental Survey 2017 is the second airport environmental survey conducted by ACI Asia-Pacific.

## The objectives of the survey are:

- To develop an environmental activity database of ACI Asia-Pacific airport members; and
- To assist environmental managers in engaging with senior management and seeking the approval of senior management for their environmental initiatives.

## 10 core environmental aspects

This survey report is structured in relation to the ten core environmental aspects in the survey that airports need to manage.

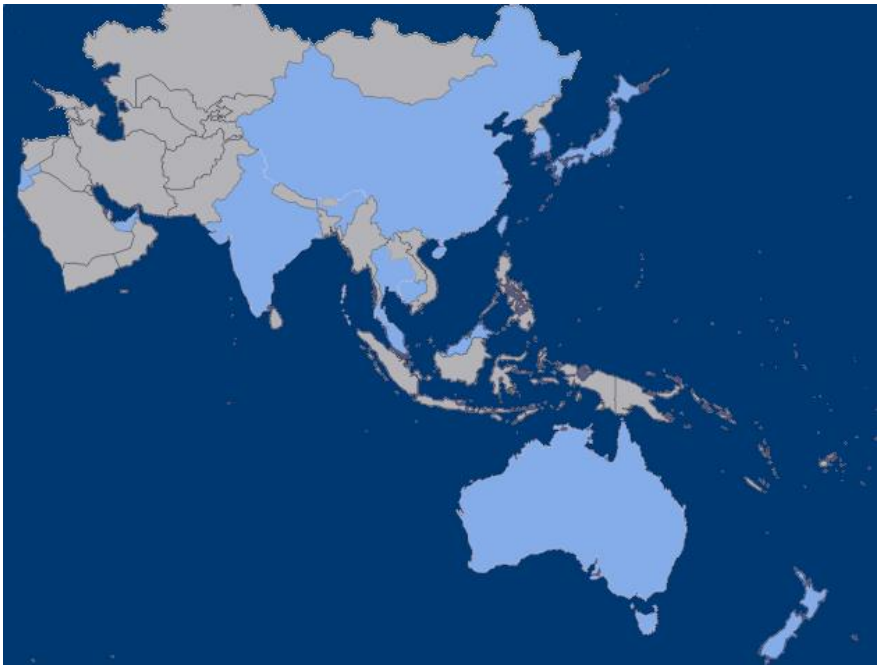
1. **Environmental policy and management** (Environmental Commitment)
2. **Noise** (Aircraft Noise Management)
3. **Air quality** (Local Air Quality Control)
4. **Waste** (Solid Waste Management)
5. **Water** (Water Conservation and Management)
6. **Energy** (Energy Management)
7. **Carbon** (Carbon Dioxide and Greenhouse Gas Emissions Reduction)
8. **Biodiversity** (Biodiversity Preservation)
9. **Ground transportation** (Public Transport Promotion)
10. **Land & water contamination** (Environmental Contamination Prevention)

## Basic rules

Information provided by each respondent are kept strictly confidential and not disclosed to any other party without the respondent's prior consent. The performance information of individual airport was used only for analysis, and presented on aggregated level in this summary report. Only aggregated results could be used by ACI Asia-Pacific for survey promotion and environmental advocacy purposes. No ranking of individual airport was generated from this survey or shown in the summary report.

## Statistics

- This report is generated from the responses to the ACI Asia-Pacific Environmental Survey 2017 from 43 participating airports from 16 countries and economies representing about 30% of Asia-Pacific and Middle East airport passenger traffic. It should be noted that not all airports that participated in the previous 2015 survey continuously participated the survey this year. In addition, several airports are participating for the first time. As a result, comparative analysis of the two years is not possible.



(Light blue indicates countries covered by the survey)

## Acknowledgement


- ACI Asia-Pacific would like to extend its gratitude to all participating airports for their continued support to ACI. They are:

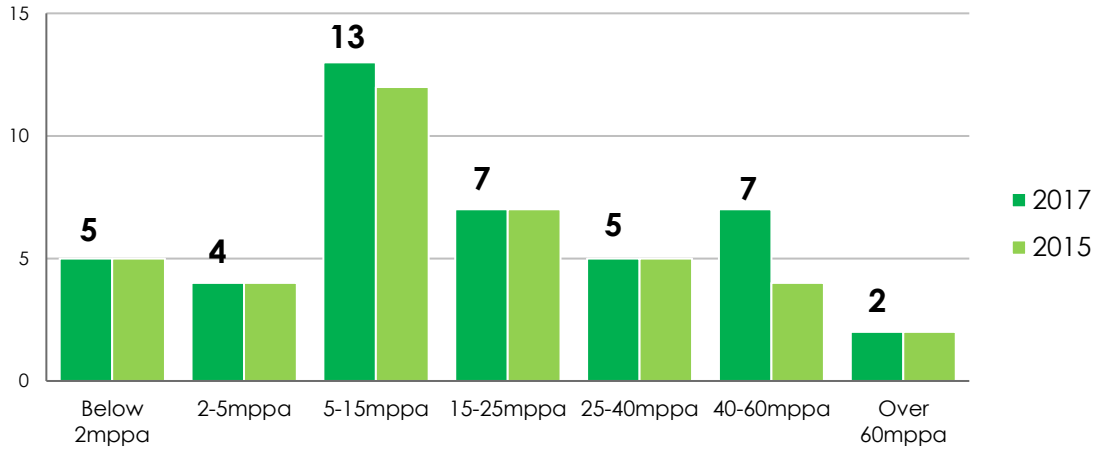
| Asia-Pacific (40 Airports) | |
|---|---|
| **Australia** | **South Korea** |
| Alice Springs Airport | Gimpo International Airport |
| Brisbane International Airport | Incheon International Airport |
| Cairns Airport | **Macau** |
| Darwin International Airport | Macau International Airport |
| Gold Coast Airport | **Malaysia** |
| Perth Airport | Kuala Lumpur International Airport |
| Melbourne Airport | **New Zealand** |
| Newcastle Airport | Auckland International Airport |
| Sydney Airport | Christchurch International Airport |
| Tennant Creek Airport | **Chinese Taipei (Taiwan)** |
| **Cambodia** | Kaohsiung International Airport |
| Phnom Penh International Airport | Taiwan Taoyuan International Airport |
| Siem Reap International Airport | **Thailand** |
| Sihanouk International Airport | Chiang Mai International Airport |
| **China** | Chiang Rai International Airport |
| Haikou Meilan International Airport | Don Mueang International Airport |
| **Hong Kong** | Hat Yai International Airport |
| Hong Kong International Airport | Phuket International Airport |
| **India** | Suvarnabhumi International Airport |
| Chhatrapati Shivaji International Airport | **United States of America (Guam)** |
| Indira Gandhi International Airport | Guam International Airport |
| Kempegowda International Airport | **Tonga** |
| Rajiv Gandhi International Airport | Fua'amotu International Airport |
| **Japan** | **Middle East (3 Airports)** |
| Chubu Centrair International Airport | **Jordan** |
| Kansai International Airport | Queen Alia International Airport |
| Narita International Airport | **United Arab Emirates** |
| Osaka International Airport | Abu Dhabi International Airport |
| Tokyo (Haneda) International Airport | Sharjah International Airport |

Special thanks to Hong Kong International Airport for taking the lead in proposing, drafting and reviewing this survey.

Each participating airport are provided with a tailor-made analysis report enabling them to compare their responses to the aggregated results.

# General Information

## Airport size - Passenger traffic in million passengers per annum (mppa)



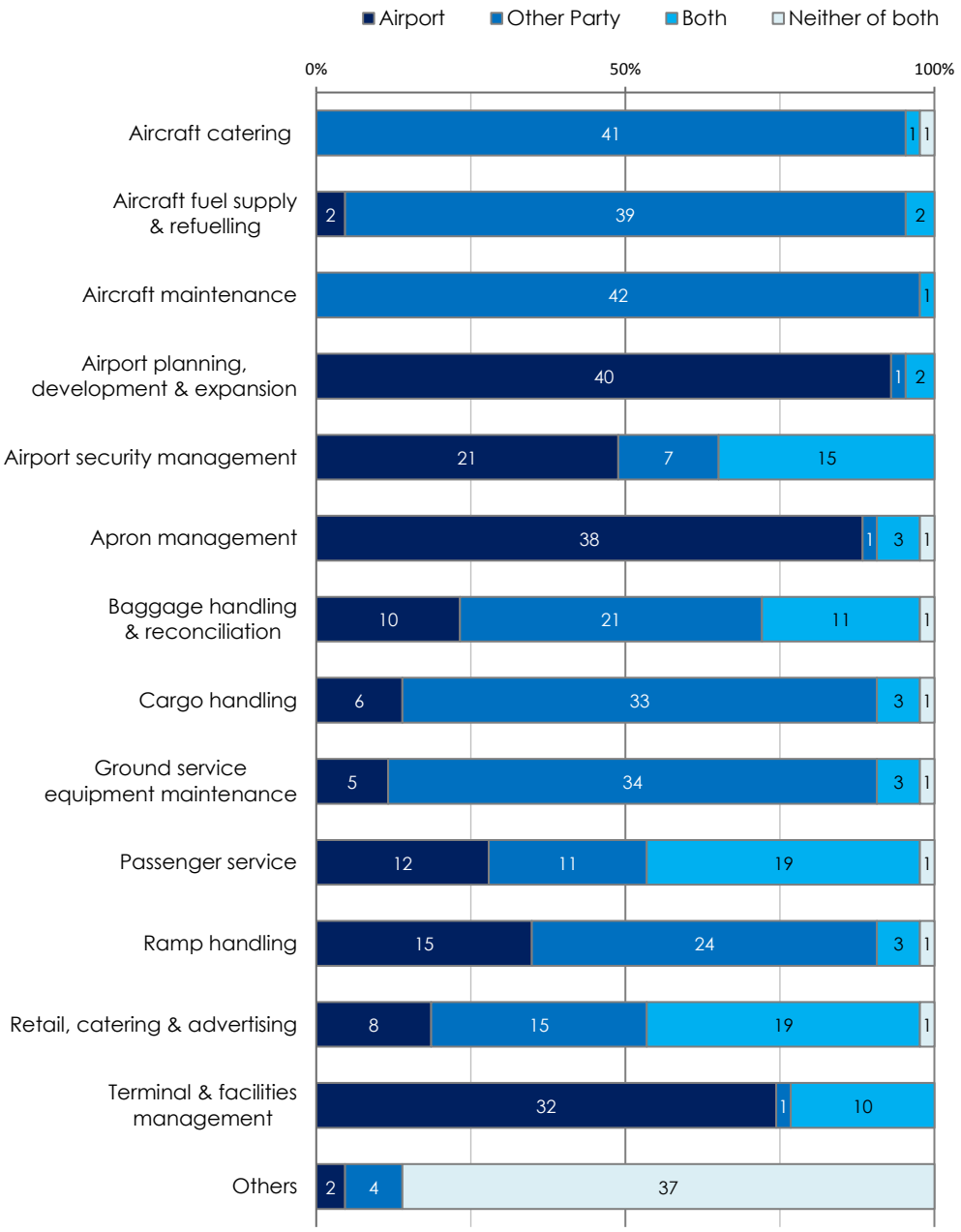

- Total responses: **43** airports (additional four responses compared to 2015 survey)
  → represent **30%** of total passenger traffic and **26%** of total aircraft movements in Asia-Pacific and Middle East region.

- Well-distributed samples in terms of airport size, covering both small and large airports
  → the largest group is airports with traffic of **5-15mppa**.

## Scope of responsibility

*Please indicate the party(ies) responsible for delivering the following services*

*Examples for other parties include airlines, aviation service providers, business partners, government authorities, etc.

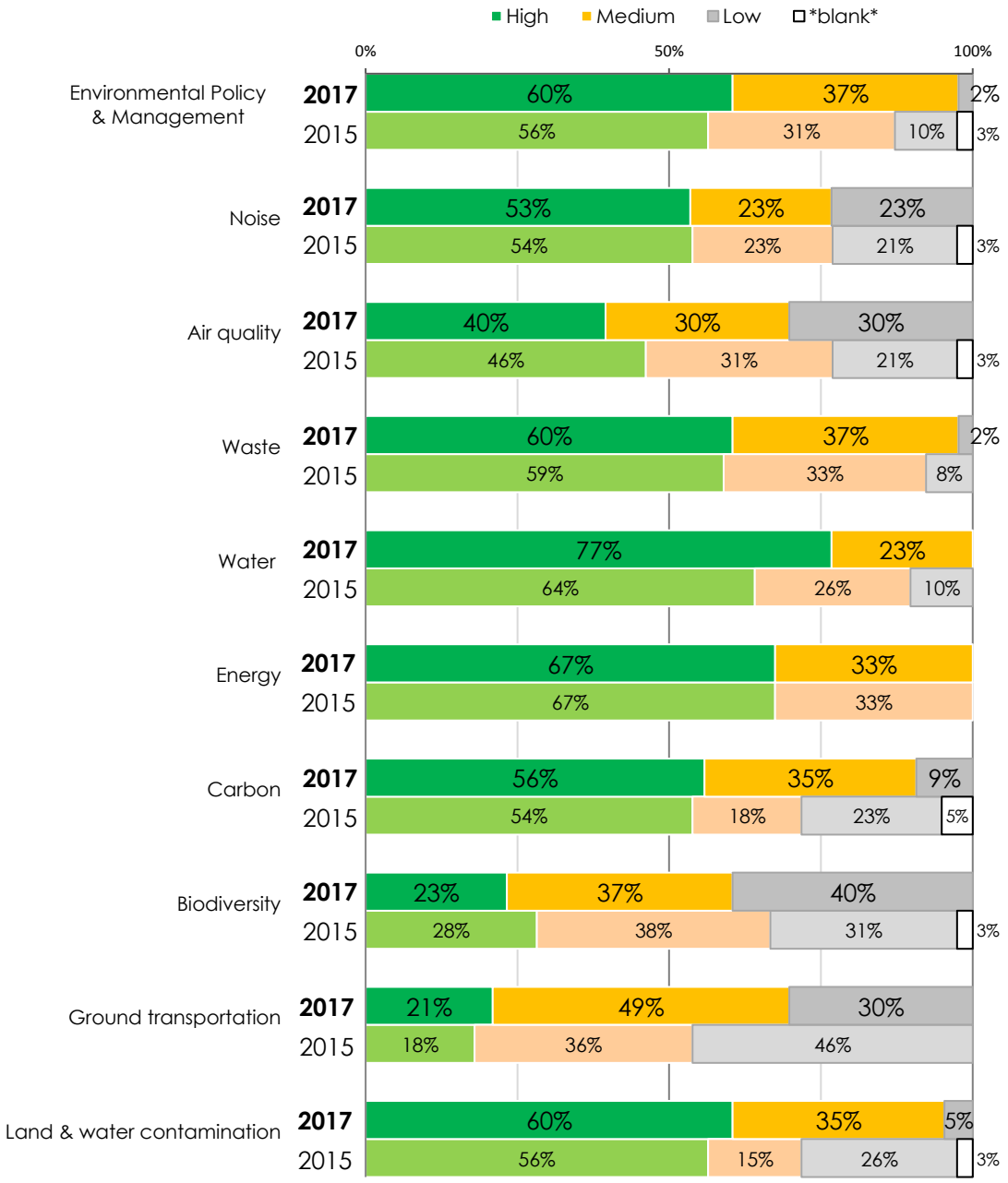



- In general, airport operators take full responsibility for activities directly related to managing and developing the airport premises and facilities, including **airport planning**, **development & expansion**, **terminal and apron management & facilities management**.
- Airports rarely involve directly in services related to aircraft/airline related activities, including aircraft maintenance, aircraft catering, aircraft fuel supply & refueling, ground service equipment maintenance, and cargo handling.

# Overview

## Management priority

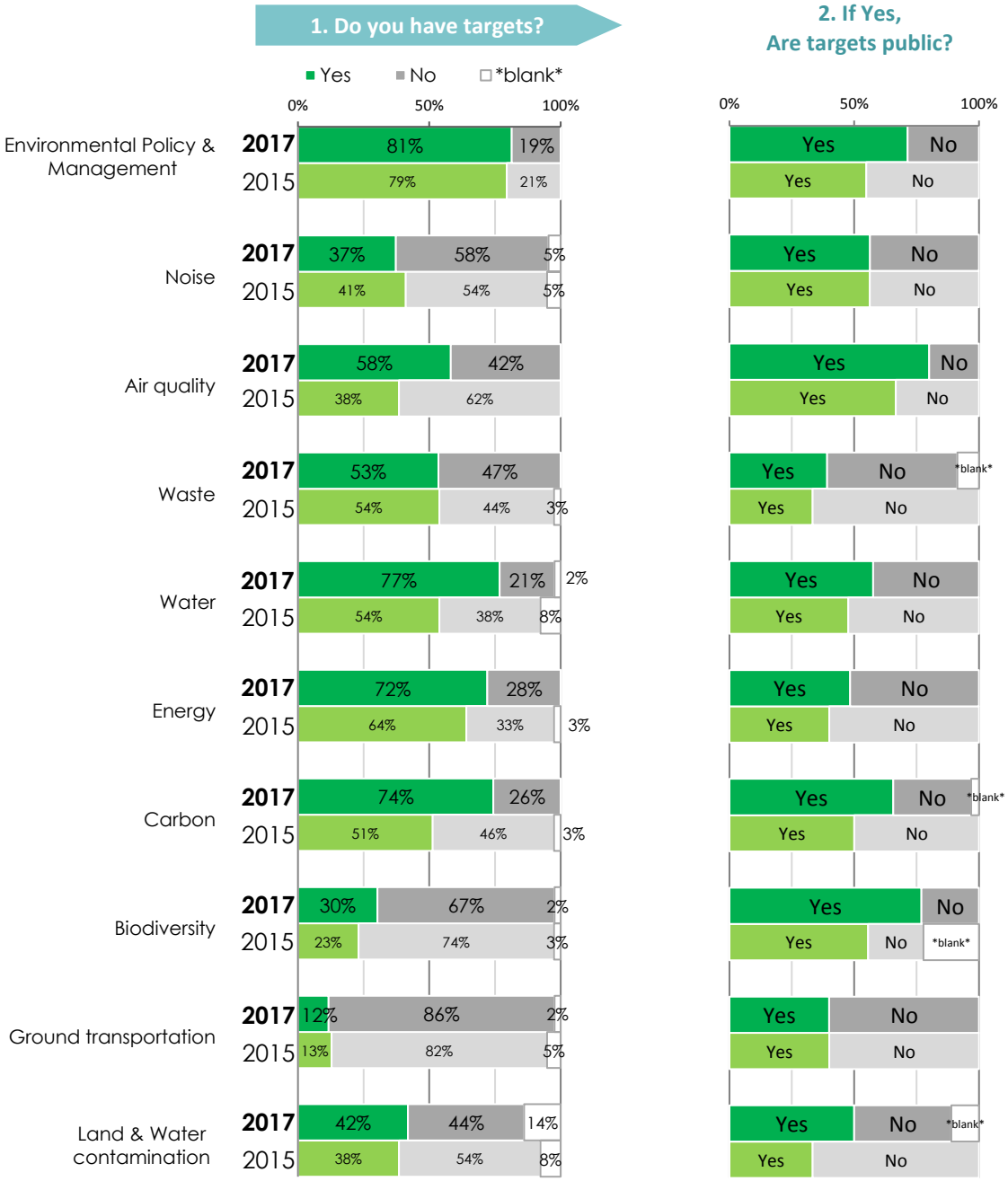
Please indicate the management priority of your airport for the 10 environmental aspects covered in this survey.




- **Water**, and **energy management** are considered **top priorities** among responding airports.
- Over half of the respondents also put **high priority** on **environmental policy & management**, **waste**, **land & water contamination, carbon**, and **noise management**.
- **Air quality**, **biodiversity**, and **ground transportation** are still considered less of a priority among the respondents since the last survey.

## Environmental targets

Does your airport have any targets for the 10 environmental aspects covered in this survey? / Are the targets available to the public?




- **The majority** of responding airports have a target on **environmental policy & management**, **water**, **carbon**, and **energy management**.
- **About half** of the airports also have an environmental target for **air quality** and **waste managements**.
- While less than half of responding airports set a target for **noise** and **biodiversity**, the targets are published publicly in many cases if such information is available.
- Airports rarely set targets for **ground transportation,** an aspect which is also considered less of a priority.

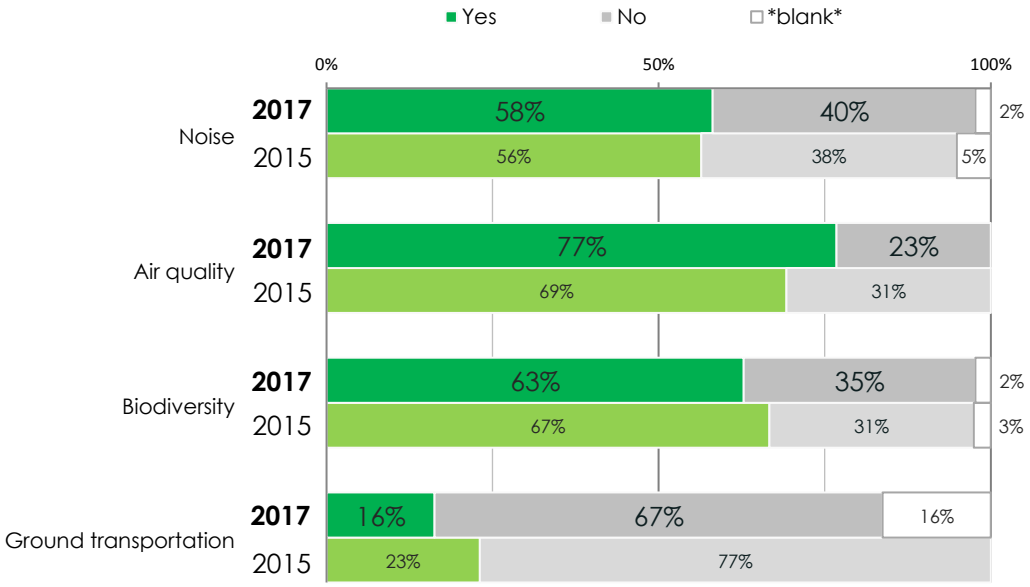
# Monitoring

## Does your airport have any monitoring systems for the following environmental aspects? / Is the data publicly disclosed?


- **The majority** of responding airports have a monitoring system for **energy**, **waste**, and **wastewater quality**.
- **Nearly half** of the airports have a monitoring system for **noise** and **land & water contamination**
- **Less than half** of the airports monitor **air quality**.
- Although energy, waste, and wastewater are the most frequently monitored, 50% or fewer airports published their data, while the score for air quality and noise was close to 70%.
- Land & water contamination scored the lowest in public disclosure.

## Direct responsibility

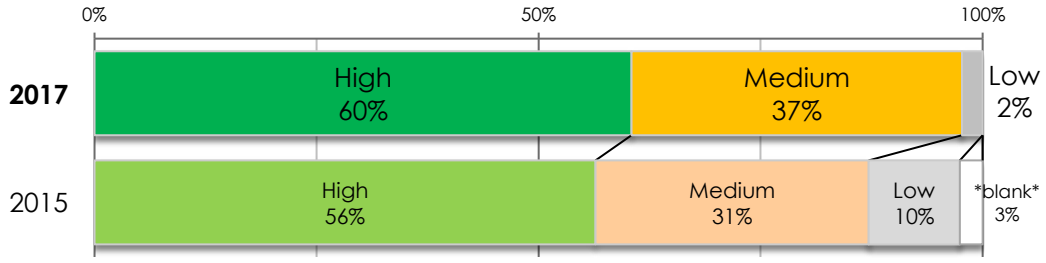
Do you have direct responsibility or control for the following environmental aspects?




- **The majority** of responding airports have direct responsibility / control over **air quality** and **biodiversity**.
- **About half** of the airports have direct responsibility / control over **noise.**
- **Most airports do not** have direct control over **ground transportation**.
- No trend observed since the last survey.

# Part 1. Environmental Policy and Management

## Management priority




Over half of responding airports place high priority on **environmental policy and management**

## Summary

In an effort to maintain sustainable airport management, more and more airports recognize the need and place a high priority on setting environmental policies and rules to govern day-to-day operations. The survey results show that the majority of responding airports have a written **environmental policy**, which is often made available to the public. Setting **environmental objectives and targets** is also a common practice. Both environmental policy, and environmental objectives and targets marked strong improvement in disclosure rates.

The majority of airports have a register of **environmental aspects and legislation** in place to ensure airport activities and operations are compatible with environmental requirements. **Roles and responsibilities** are clearly defined and well communicated both internally and externally to ensure that airport stakeholders recognize what needs to be done at airports.

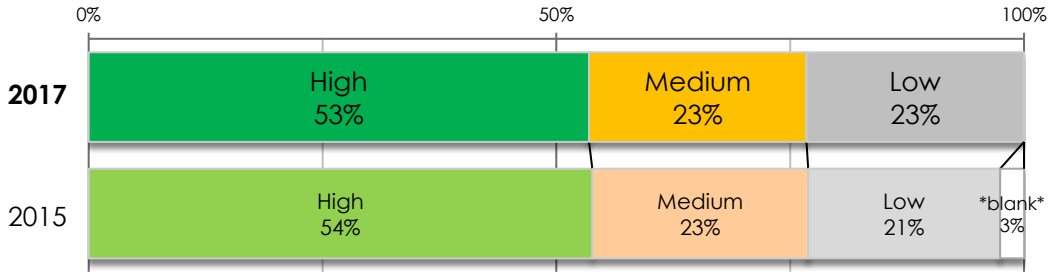
Various internal efforts are being made at a number of airports to provide **environmental training** for employees and to conduct a **review of environmental performance** on a regular basis. Most airports have an **Environmental Management System (EMS)** to address environmental issues based on a defined set of rules, but many of them are not certified under an international standard such as ISO14001.

Other environmental initiatives reported by the respondents included **community engagement** programs to disseminate information on efforts being made by airports to engage with neighboring communities through meetings, forums, social events, etc. **Green procurement** encourages airports to become a "responsible consumer," given that airports are often some of the largest spenders in the economy in terms of volume and variety of items they need to procure. However, initiatives are still uncommon compared with other environmental management initiatives.

**Details to participating airports only**

# Part 2. Noise

## Management priority




Over half of responding airports place a high priority on **Noise**

## Summary

Airports inherently face technical and complex noise issues. Aircraft **Noise** can be one of the highest environmental priorities that airports need to cope with, especially when there are substantial numbers of residents living close to the airport and its flight paths. As most airports answering this year's survey are located in residential areas, it is not surprising that half of the respondents placed a high priority and take direct responsibility on airport noise management.

In order to mitigate potential noise impact, the majority of airports have developed land use compatibility plans/policies to control land use adjacent to the airport. Such plans/policies are usually developed and/or executed by the respective airport operator or civil aviation authority. It is also common for airports to adopt noise contours (e.g. WECPNL, NEF, LDN, etc.) to assess noise impact arising from aircraft operations.

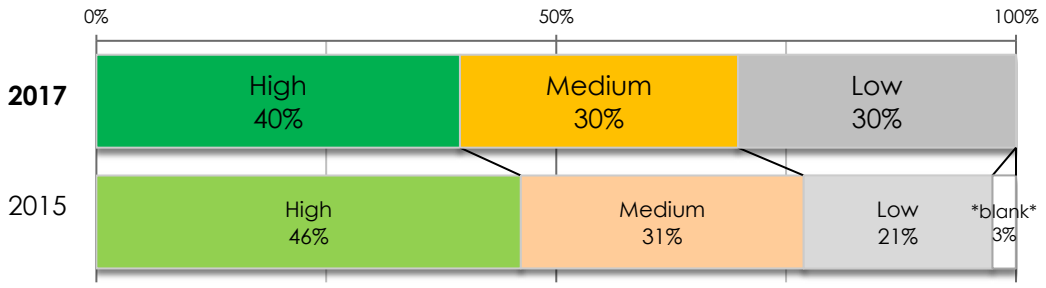
Implementation rates of all noise abatement operational procedures rose since the last survey. One of the highest implementation rates adopted among airports is encouraging airlines to adopt noise-preferred operations such as Noise Abatement Departure Procedures (NADP), Continuous Descent Arrival (CDA).

The survey results show that half of the airports have introduced noise monitors or noise complaints tracking systems. Restrictive or punitive programs are also less preferred among respondents. Over half of the airports do not place any operating restrictions (e.g. curfews, movement caps, etc.). Just a few airports impose noise-related charges. Provision of noise compensation is rarely practiced among responding airports. Such initiatives may not necessarily be required when affected populations or the degree of noise level is limited, typically at smaller airports or those airports located away from populous areas.

**Details to participating airports only**

# Part 3. Air Quality

## Management priority




Less than half of responding airports place high priority on **air quality**

## Summary

The main sources of air pollution at airports are the pollutants emitted from aircraft engines and ground service equipment (GSE) / vehicles and vehicles delivering goods, passenger cargo and services to the airport. Key pollutants include sulfur dioxide ($SO_2$), nitrogen oxides (NOx) and volatile organic compound (VOCs) etc. In 2016, aircraft movements grew 7.5% in Asia-Pacific. Air pollution has become a greater concern as traffic grows, and some airports have begun to monitor and manage air quality. Implementation rates of targets related to air quality management increased since the last survey and improvements can be seen on its data publicity rates as well.

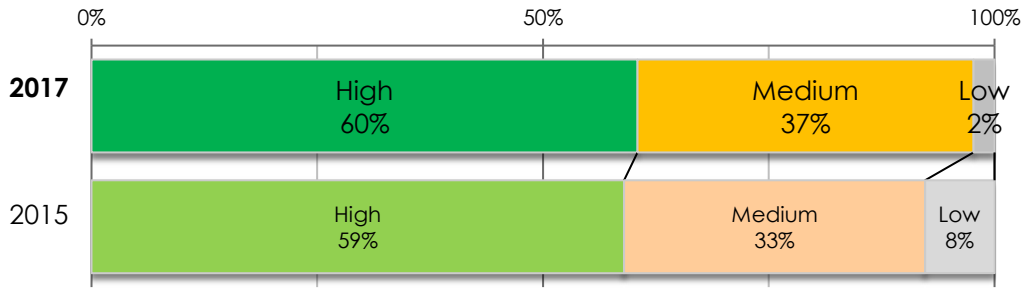
However, the survey results show that less than half of responding airports place high priority on **air quality**.

Airports are making various efforts to reduce emissions. However, the adopted measures vary across different airports, and there appears no standard solution to managing air quality at airports. The use of ground power units and/or air conditioning units are the most implemented air quality control measures among respondents, followed by the use of electric vehicles / GSE.

**Details to participating airports only**

# Part 4. Waste

## Management priority




Over half of responding airports place high priority on **Waste**

## Summary

The amount of waste that airports handle can be enormous. Correspondingly, the disposal costs borne by the airports and the environmental impacts created by the waste disposal are significant. It is no surprise that over half of responding airports continuously place high priority on **waste** management.

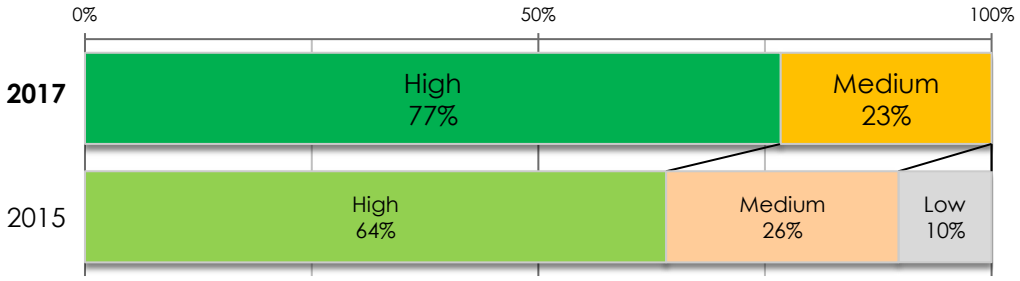
According to the survey results, more than half of the respondents set a target for waste management; the more commonly seen target is increasing the waste recycling rate and reducing waste per airport user.

Improvements were seen with the majority of responding airports implementing at least one waste reduction measure. The most commonly adopted measures were source separation and/or waste recycling measures, while implementation of waste disposal charges remain less common among the responding airports.

**Details to participating airports only**

# Part 5. Water

## Management priority




**The majority** of responding airports place high priority on **water**

## Summary

**Water** conservation and management is the activity of planning, developing, distributing and managing the optimum use of water resources, due to the scarcity of water resources, airports implement water management initiatives to secure sufficient water supply and minimize the environmental damage by overuse and waste water discharge.

Water management is considered one of the most important environmental aspects, with over 75% of respondents placing it as a high priority. This is the highest among all environmental aspects. The demand for water consumption and disposal increase proportionally as traffic grows at airports, where water is consumed for daily operations and activities including potable water consumption at restaurants, running water at bathrooms, aircraft washing, etc. Meanwhile, because of the scarcity of water resources, airports implement water management initiatives to secure sufficient water supply and minimize the environmental damage by overuse and waste water discharge.

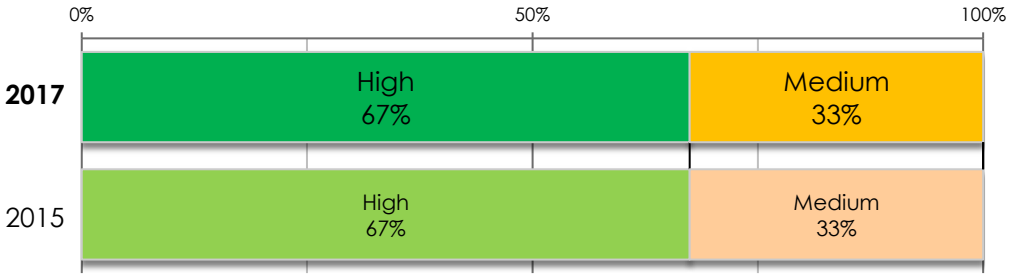
According to the survey results, drastic improvements were seen in responding airports implementing targets related to water & wastewater management and installing systems to monitor potable water consumption and/or the volume of wastewater discharge.

Popular means of water conservations include reduction of the flow setting of taps to control water usage and installation of water meters/leak detection systems to ensure the efficient use of water. Some airports recycle water and/or make use of rainwater or sea water for water conservation.

**Details to participating airports only**

# Part 6. Energy

## Management priority




**The majority** of responding airports place a high priority on **energy**

## Summary

As with other large-scale infrastructure, airports are energy intensive facilities, it is important for airports to manage their energy consumption to achieve reduction in both cost and carbon emission.

According to the survey results, **energy** is still considered one of the highest priorities among the 10 environmental aspects. Operating an airport requires an enormous amount of energy for its various large-scale facilities for lighting and heating, etc., and its environmental and economic impacts can be significant. In correspondence to this, the survey results indicate that most airports are actively seeking opportunities to save energy.

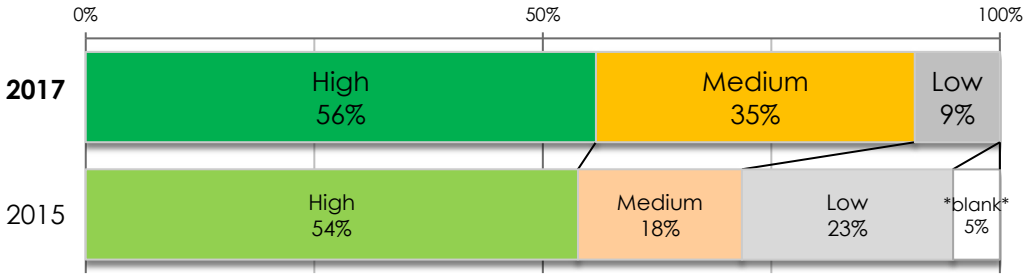
The majority of responding airports showed improvements in both implementing energy reduction targets and introducing energy monitoring systems. However, it is uncommon for airports to be equipped with an energy management system (EnMS).

The most popular energy saving measure adopted by the airports is the use of energy efficient lightings (e.g. LED); all responding airports have already installed them. Automatic monitoring or smart metering systems are also widely installed in airports to help maximize efficient energy use. While the technological advancement and the increased affordability of new technologies clearly have benefited airports, renewable energy has yet to be a major contributing factor in airport energy management.

**Details to participating airports only**

# Part 7. Carbon

## Management priority




About half of responding airports place a high priority on **carbon**

## Summary

Carbon emission is still a main concern among the public as a global issue and has also been addressed at intergovernmental level. As part of the aviation community, airports are also gradually taking more active roles in carbon emission reduction. In this survey, **carbon** is ranked as high priority by about half of the respondents.

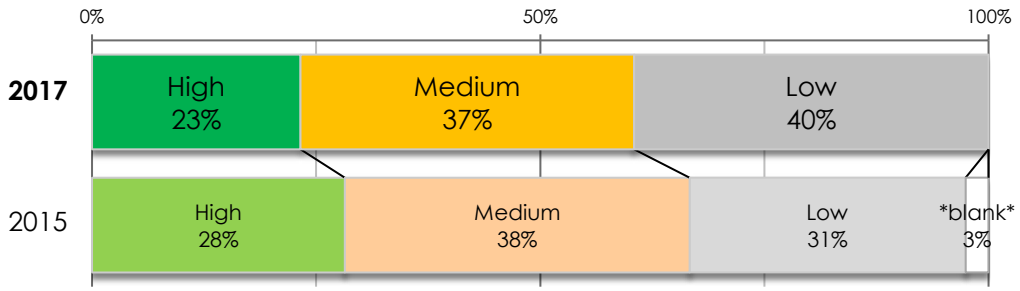
Although half of the responding airports do not place **carbon** as a high priority environmental aspect, robust growth was seen in the implementation greenhouse gas (GHG) / carbon emission reduction targets. More airports have GHG/carbon emission quantification systems, which covers at least direct GHG emissions (Scope 1). More than half of the respondents answered that they have a GHG / carbon emission management system.

The most popular means of GHG / carbon emission reduction measures is to promote energy saving at airports. However, less than half of airports have a program to offset carbon emission. Offsetting carbon emission requires a stronger commitment than reduction such as planting trees, purchasing carbon credit, etc. It is hoped that promotion of various carbon management programs, including ACERT, Airport Carbon Accreditation, will lead to a higher number of airports engaging in carbon management initiatives.

**Details to participating airports only**

# Part 8. Biodiversity

## Management priority




**Less than 25%** of the responded airports place high priority on **biodiversity**

## Summary

**Biodiversity** is the variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable. Airports could impact biodiversity in a number of ways, including loss or degradation of habitats and through impacts on wildlife of light and noise pollution. Airports are usually responsible to manage and conserve biodiversity within or near the airport.

The survey shows that less than 25% of responding airports placed a high priority on **biodiversity**, though improvements were seen on both implementation of targets and data disclosure of biodiversity initiatives.

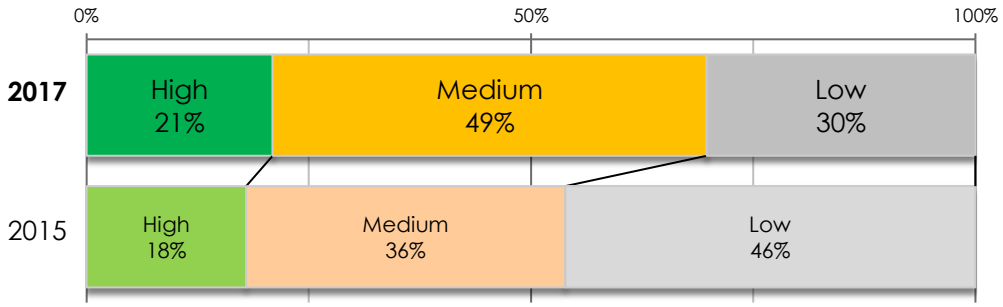
However, airports are often involved in maintaining biodiversity within and/or surrounding the airport premises in order to manage sustainable business and community relations. Nearly 70% of the respondents answered that they have a direct responsibility for airport biodiversity.

Some airports have implemented trainings and/or campaign to raise awareness on illegal wildlife trade. These include training for airport staff, and raising the awareness of stake-holders and the public by using posters and online campaigns through social media and websites.

**Details to participating airports only**

# Part 9. Ground Transportation

## Management priority




Less than 25% of responding airports place a high priority on **ground transportation.**

## Summary

The airport is one of the largest local traffic generators in most metropolitan areas. Airports also have a considerable amount of truck traffic. Airport-generated traffic in combination with other traffic often creates congestion on access roads, in addition, traffic near airports will add the impact in noise, local air quality and Greenhouse gas emission. Most airports have planned public ground transport infrastructures to solve these problems and are looking into new initiatives to encourage public ground transportation.

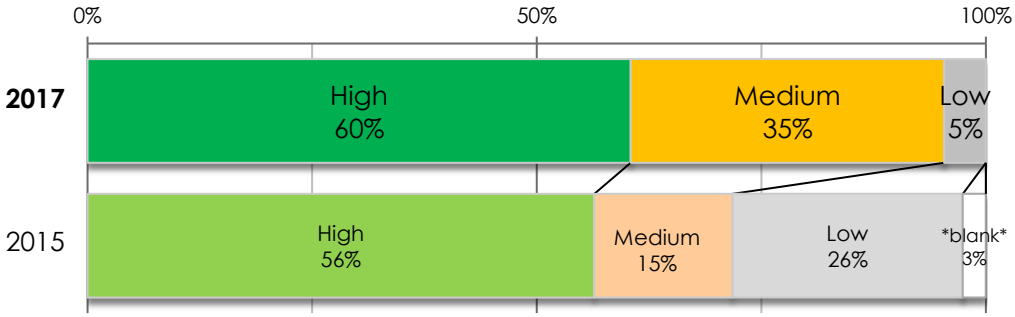
According to the survey results, airports in general do not place a high priority on **ground transportation**; just a few airports have a target related to green ground transportation. This is mainly due to the fact that airports in general do not have direct control over managing transportation from/to airports.

Nevertheless, nearly half of the respondents conduct a transportation mode survey in endeavor to understand passengers' behavioral patterns. The majority of airports also encourage the use of public transportation through various means (e.g. higher parking fees, staff discounts on public transportation, etc.). Promoting staff car sharing is the most common among responding airport.

**Details to participating airports only**

# Part 10. Land & Water Contamination

## Management priority




**Over half** of responding airports place a high priority on **land & water contamination**

## Summary

Airports are subject to possible danger from fuel or other chemical spillage in the course of day-to-day operations, including aircraft fueling, de-icing etc. In the unlikely event when fuel/chemical spillage occurs, the environmental impact can be highly detrimental. Naturally, 60% of responding airports place a high priority on managing **land & water contamination**, marking the same rate as environmental policy and management, and waste.

The survey results show that nearly half of the respondents have a monitoring system for land/water contamination. Moreover, there are procedures in place to manage the release of chemicals at some airports but chemicals dealt at airports vary, and standards on chemical release have yet to be set among the airports.

**Details to participating airports only**


## About ACI Asia-Pacific

ACI Asia-Pacific, one of the five regions of the Airports Council International (ACI), is based in Hong Kong and represents over 100 members operating 603 airports in 49 countries in Asia-Pacific and the Middle-East.

As the only global trade association of the world's airports, ACI represents airports' interests with governments and international organizations, develops standards, policies and recommended practices for airports, and provides information and training opportunities to raise standards around the world. In 2016, ACI Asia-Pacific airports handled 3.1 billion passengers and 52.2 million tonnes of cargo.

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