

# Sustainable airports: the burning need

## A Primer

As passenger traffic continues to soar, airports worldwide will face the challenge of flying an additional 43%(3.7 billion) passengers by 2035. Modernization and rehabilitation of their infrastructure and services are in order and could leave an impact on the environment. Airports are taking proactive measures, much more needs to be done.

### WHAT'S INSIDE!

1 Establishing the need for  
sustainability

2 Several areas of impact-  
not just carbon emissions

3 Top areas to focus

4 New initiatives to optimize  
footprint



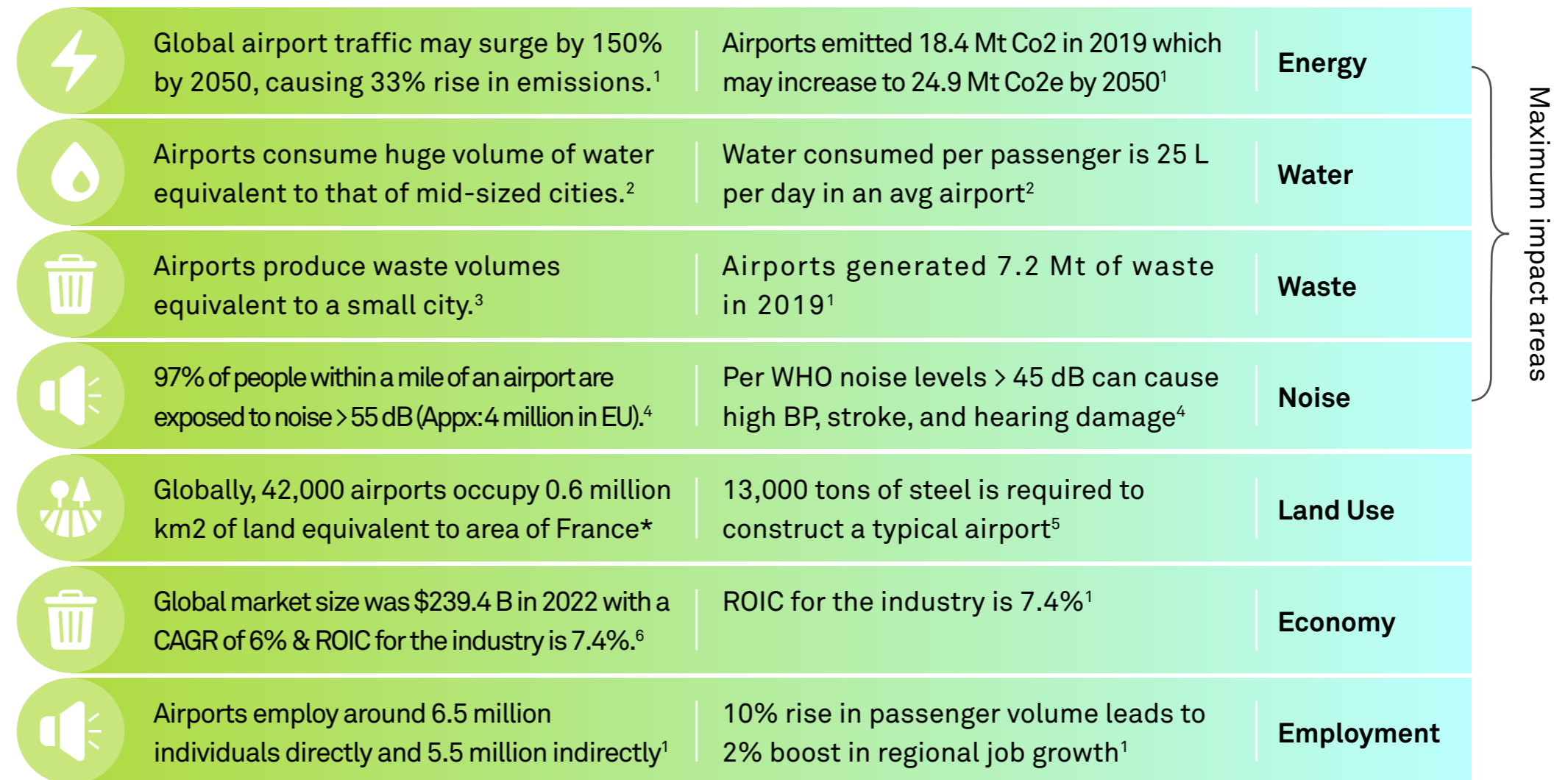
# The need for sustainable airports

As concerns about climate change grow, it is crucial for everyone to work together globally to reduce the harmful effects of the expected impact on the atmosphere, water and other natural resources. **The aviation industry contributes about 2-3%<sup>1</sup> of the carbon emissions caused by humans, and airports account for around 2%<sup>2</sup> of that contribution.**

Aviation's contribution to overall emissions will rise as air traffic continues to expand, especially as other sectors work towards decarbonization. Hence, it is imperative for this industry to prioritize decarbonization efforts to promote sustainability. Some organizations have enforced mandatory accreditations and certifications pertaining to carbon emissions and sustainable practices that airports must adhere to.

However, carbon emissions represent just one of the environmental effects of airports. There exist numerous other impacts stemming from their operations, outlined in the graphic (figure 1). **The major ones being Energy, Water, Waste and Noise.**

**300+ airports around the world have committed to reducing their carbon emissions to zero by 2050. 90+ Airports in Europe alone are on track to achieve Netzero by 2030.**



1 Schneider Electric | 2 Electroind | 3 ScienceDirect | 4 Airport Council International | 5 FAA | 6 WHO | 7 Statista | \*Calculations by Lab45

Figure 1: Environmental Impacts of Airports: A Statistical Overview

## Energy usage (Electricity & Emissions)



Airports have a high energy demand mostly met by on-site and off-site electricity generation, with purchased off-site electricity being the largest contributor to carbon emissions. **Cooling and lighting needs account for 46% of energy usage, with terminal buildings and other airport functions being major contributors<sup>3</sup>.**

## Water consumption



Overuse of water for airport operations can harm ecological habitats, and runoff water can pollute nearby water bodies with de-icing chemicals and fuel residues. **Toxic drinking water near Heathrow and Gatwick airports contained high levels of trichloroethylene, possibly from de-icing fluids, a 2023 survey found<sup>4</sup>.**

## Waste generation



Airports generate various types of waste streams including food waste, hazardous substances, and plastic waste. **Of these waste categories, plastic waste is the most abundant, leading to a yearly disposal of 1326 tons<sup>5</sup>.** Improper waste management can result in pollution and mismanagement of hazardous materials.

## Noise pollution



Airport noise disrupts nearby communities' sleep patterns and can cause health issues, arising from aircraft, construction, passenger traffic, and supporting equipment noise. **In 2021, Belgium government had to pay \$27 million fines due to air traffic noise generated by Brussels airport<sup>6</sup>.**

## Land use and habitat disruption



Airports require a lot of land for infrastructure like runways, terminals, retail spaces and parking. Expansion can lead to deforestation, habitat destruction, and biodiversity loss in surrounding areas. **A survey found that building an international airport in the forest of Nijgadh, Nepal, will require chopping down 2.4 million trees<sup>7</sup>.**

## Economic growth



Airports function as gateways that connect regions and countries, promoting economic exchanges and attracting investments. **Toronto airport has announced an investment of \$700,000 towards local organizations breaking down employment barriers<sup>8</sup>.**

## Employment



Airports stimulate economic growth through trade, tourism, job opportunities, support for local businesses, and regional development. **London Gatwick airport has opened a new STEM centre to teach school children about STEM and aviation<sup>9</sup>.**

## Materials use



The construction of airport infrastructure requires substantial amounts of construction materials, such as concrete, steel, asphalt, and other resources. **The extraction and production of these materials can lead to habitat destruction, increased energy consumption, and emissions of pollutants.**

# Areas to focus for maximum impact

In the pursuit of a more sustainable future, airports around the world are increasingly recognizing the critical importance of addressing key environmental challenges. Sustainability is surfacing as a top priority for major airports worldwide.

Among the myriad sustainability concerns, four key areas have emerged as focal points for airports aiming to maximize their impact.



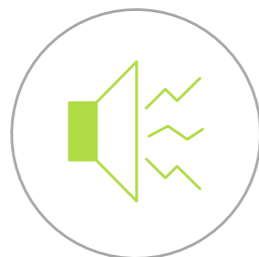
**Energy**



**Water**



**Waste**



**Noise**

These areas not only hold the potential to significantly reduce the ecological footprint of aviation hubs but also enhance the well-being of nearby communities and ecosystems. Airports can take a host of initiatives to reduce their footprint in each of these areas.

In addition to the operational activities of airports, it's crucial to recognize that retail services and spaces within airports also have a notable environmental impact. Therefore, retailers can also explore the following initiatives to enhance the airport's overall sustainability and promote adopting environmentally friendly practices such as minimizing single-use plastics, sourcing sustainable products and sustainable packaging. This collaborative effort not only strengthens the airport's commitment to sustainability but also promotes a broader culture of environmental stewardship throughout the aviation ecosystem.

## Some sustainable initiatives taken by leading airports worldwide:

**1** In 2023, Hyderabad Airport in India launched a

**Sustainable practices such as renewable energy sources, efficient buildings, water reuse and waste management have resulted in a 16% increase in employee productivity.**

biodiesel fueling station that emits 80% less CO<sub>2</sub> and almost 100% less SO<sub>2</sub> emissions.

- 2** The Galápagos Ecological Airport used recycled materials for 80% of its construction, including repurposed steel pipes from the Amazon.
- 3** Since 2018, the Hong Kong International Airport has mandated that food and beverage vendors must use reusable tableware for customers who dine in at their establishments.

**Sustainability efforts will require a pragmatic approach assessing the current realities, customizing the transformation, and adopting an iterative and continuous approach.**

Some of these initiatives will have greater impact while others may not impact significantly but will be easier or less expensive to implement.

Each airport will need to assess their current state and take steps, that will most suit their situation.

Implementation timeframe	Energy	Water	Waste	Noise
	Long term	<ul style="list-style-type: none"> <li>Hydrogen fuel cells</li> <li>Biofuels and Synthetic fuels</li> <li>Virtual power plants</li> <li>Solar roadways</li> </ul>	<ul style="list-style-type: none"> <li>AI for water usage pattern prediction</li> <li>Sensor based drip irrigation</li> <li>Desalination and water treatment innovation</li> </ul>	<ul style="list-style-type: none"> <li>Hydrothermal liquefaction</li> <li>AL/ML to identify recyclables</li> <li>Closed loop system</li> </ul>
Medium term	<ul style="list-style-type: none"> <li>AI based Lighting system</li> <li>Smart energy grid</li> <li>concentrated solar power plants</li> <li>sustainable aviation fuel</li> <li>Energy efficient terminal design</li> </ul>	<ul style="list-style-type: none"> <li>Aircraft deicing fluid recycling</li> <li>Sustainable landscaping</li> <li>Permeable pavements</li> </ul>	<ul style="list-style-type: none"> <li>Use of sustainable materials</li> <li>Smart bins</li> <li>E-waste collection system</li> </ul>	<ul style="list-style-type: none"> <li>Incorporating biophilic design elements</li> <li>Advanced air quality monitoring</li> <li>Noise mapping technology</li> </ul>
Short term	<ul style="list-style-type: none"> <li>Electric/hybrid ground equipment</li> <li>Smart lightning</li> <li>Natural light/ventilation</li> </ul>	<ul style="list-style-type: none"> <li>Low water fixtures</li> <li>Recycling greywater</li> <li>Collection of rainwater</li> <li>Water audit and leak detection</li> </ul>	<ul style="list-style-type: none"> <li>Waste segregation stations</li> <li>Reuse and upcycling waste streams</li> <li>Composting programs</li> </ul>	<ul style="list-style-type: none"> <li>Implementing noise-reducing structures such as “sound walls”</li> <li>Nighttime curfew</li> <li>Flight path adjustment</li> </ul>

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