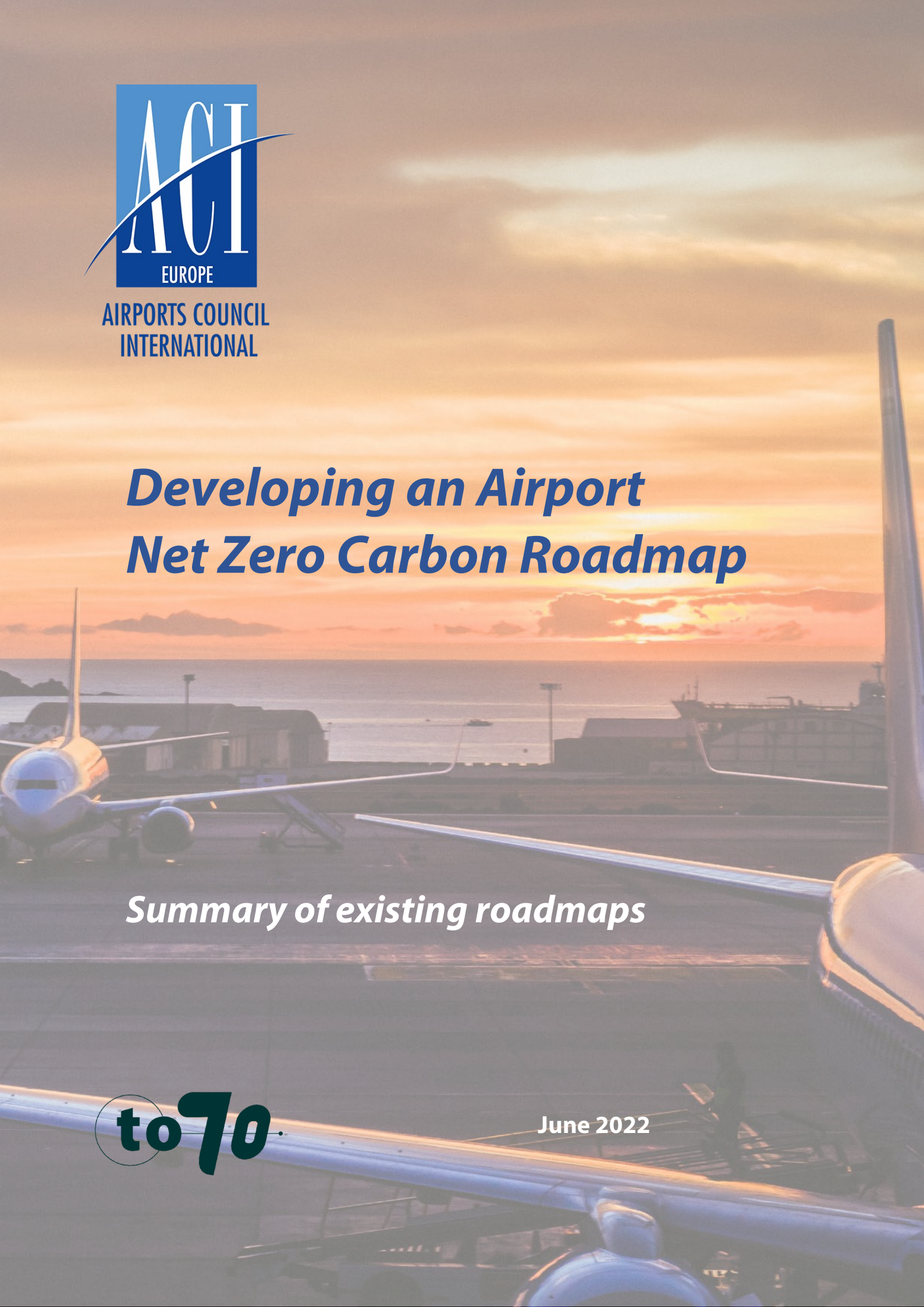


ACI EUROPE

AIRPORTS COUNCIL INTERNATIONAL

Developing an Airport Net Zero Carbon Roadmap

Summary of existing roadmaps

to70

June 2022

Introduction

Climate action is one of the key priorities on airport agendas. It is needed to safeguard the viability of the airport industry. Since 2008, ACI EUROPE and its members have been working to reduce their carbon emissions, supported by the *Airport Carbon Accreditation* programme. In June 2019, ACI EUROPE launched a Sustainability Strategy for Airports, the first-ever systematic approach to sustainability at airports and practical guidance on how to achieve it. As part of this Sustainability Strategy, European airports have committed, through ACI EUROPE, to achieve Net Zero Carbon emissions for operations under their control by 2050 at the latest. An airport can achieve Net Zero Carbon by neutralising any remaining emissions through carbon removal after reducing the emissions from its own operations (Scope 1 and Scope 2) to as close as possible to zero.

Despite the effects of the COVID-19 crisis, ACI EUROPE has, at the second Aviation Sustainability Summit in May 2021, reconfirmed its commitment by accelerating the Net Zero Carbon targets - more than 90 airports are already set to achieve Net Zero carbon emissions by 2030.

Following these commitments, airports are drafting roadmaps to identify and implement measures and actions needed to reach their Net Zero Carbon target. Many airports also make a link between their Net Zero roadmaps and Sustainable Development Goals.

In October 2021, ACI EUROPE issued a guidance document on how to build an airport Net Zero Carbon roadmap and developed a repository to facilitate access to publicly available roadmaps on the ACI EUROPE website. This document presents a **high-level summary of the key elements** of the 19 roadmaps that were made available in October 2021 and **focuses on key examples and good practices** taken by the airports. By doing so, ACI EUROPE facilitates access to already existing roadmaps for its members and the wider public. The repository is available via the ACI EUROPE website.

The airports included in this report are:

1. Aena
2. Aeroporti di Roma (ADR)
3. Aéroports de la Côte d'Azur
4. Athens International Airport S.A. (AIA)
5. Avinor
6. Dublin Airport (daa)
7. Eindhoven Airport
8. Frankfurt Airport (Fraport)
9. Genève Aéroport
10. Groupe ADP
11. Heathrow Airport Ltd
12. Hermes Airports
13. Luxembourg Airport
14. Munich Airport
15. Salzburg Airport
16. Schiphol Airport (Royal Schiphol Group)
17. Tallinn Airport
18. Venezia Airport
19. Zurich Airport

Key elements of airport roadmaps to Net Zero Carbon

Target Definition

Reference year

The reference year is the starting point used to define emissions reductions to be achieved on the way to Net Zero Carbon. The majority of the airports use 2010 as their reference. However, some airports select another year to better reflect their operations.

Reference year	
Frankfurt Airport (Fraport)	1990
Dublin Airport (daa)	2010
Aeroporti di Roma (ADR)	2012
Aéroports de la Côte d'Azur - St Tropez Airport	2013
Aena	2019

Net Zero Target Year

The Net Zero Target Year is the year when the airport aims to reach Net Zero Carbon. By their target year, airports will have reduced all the CO_2 emissions from the operations within the target scope to as close to zero as possible and neutralised any remaining emissions that are difficult to avoid through negative emission technologies (carbon removal and storage solutions). More than 90 airports in Europe are already set to achieve Net Zero carbon emissions by 2030.

Net Zero target year	
Athens International Airport S.A. (AIA)	2025
Eindhoven Airport	2030
Tallinn Airport	2030
Heathrow Airport Ltd	2035
Genève Aéroport	2035-2040
Salzburg Airport	2040

Interim targets

Airport Net Zero Carbon roadmaps are often built to cover a long period. Interim targets are set to monitor and show progress and send a clear signal to other stakeholders to come forward with their own ambitious targets.

Interim targets	
Dublin Airport (daa)	Reduce the airport carbon emissions (Scope 1 and Scope 2) by 30% in 2030 compared to 2019 levels.
Frankfurt Airport (Fraport)	Set up a CO_2 target (Scope 1 and Scope 2) of a maximum of 80,000 $TeqCO_2$ in 2030 (-65% vs 1990).
Hermes Airports	Reduce the airport carbon emissions (Scope 1 and Scope 2) by 96% in 2030 compared to 2010 levels.
Munich Airport	Achieve carbon neutrality in 2030 by reducing CO_2 emissions (Scope 1 and Scope 2) by at least 60% using technical means. The remaining 40% of the emissions will be compensated, with a preference for regional projects.
Salzburg Airport	Increase the ratio of renewable energy to 52% in 2020, 75% in 2030, and 100% in 2040.
Luxembourg Airport	Reduce the airport carbon emissions (Scope 1 and Scope 2) by 25% in 2025 compared to 2019 levels.

Absolute target and target breakdown

To reach Net Zero Carbon, airports set targets to reduce their Scope 1 and Scope 2 CO_2 emissions in absolute terms.

	Target year	Absolute CO_2 emissions reduction target ($TeqCO_2$)
Zurich Airport	2050	30,000
Genève Aéroport	2035-2040	8,000
Venezia Airport	2030	15,000
Aeroporti di Roma (ADR)	2030	65,914
Aéroports de la Côte d'Azur – Nice Airport	2030	5,500

Furthermore, some airports quantify targets for carbon removal, complementing the absolute reduction target.

	Target year	Absolute CO_2 emissions reduction target ($TeqCO_2$)	CO_2 removal target ($TeqCO_2$)
Groupe ADP – Paris Charles de Gaulle Airport	2050	47,800	< 5,600
Groupe ADP – Paris Orly Airport	2050	7,500	4,000
Groupe ADP – Paris Le Bourget Airport	2050	2,000	600
Aéroports de la Côte d'Azur – Cannes Mandelieu Airport	2030	163	40

Scope 3 emissions

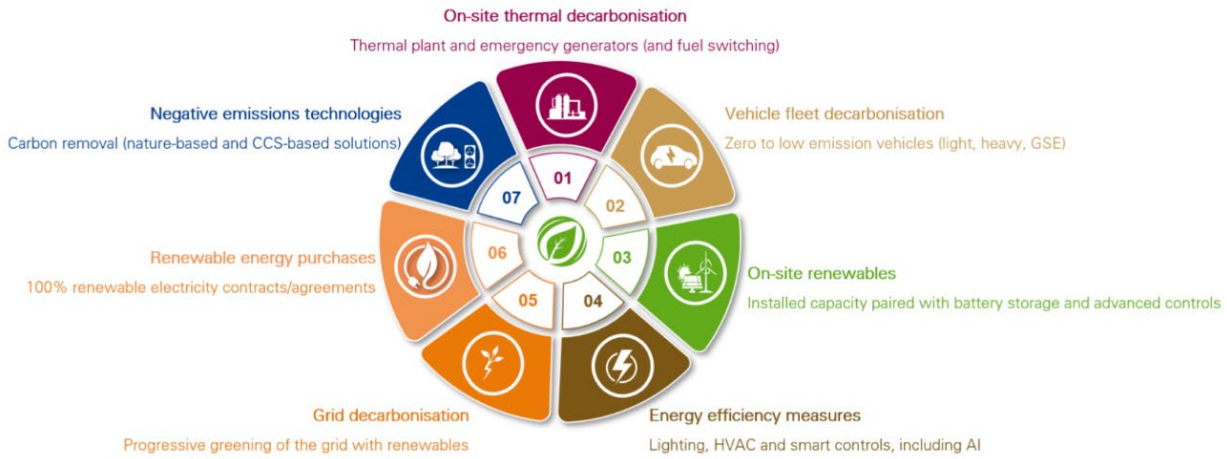
Airports are not only committed to achieving Net Zero Carbon for operations under their control. Some airports also influence and guide their industry partners and passengers to reduce their own Scope 1 and Scope 2 emissions (i.e., the airports' Scope 3 emissions). Airports support initiatives in many areas to help reduce these emissions, including:

Scope 3 emissions – support areas	
Tallinn Airport	• Aircraft operations - Auxiliary Power Units (APU) • Waste management
Avinor	• Staff Business Travel
Dublin Airport (daa)	• Aircraft operations - Landing and Take-Off cycle and Auxiliary Power Units • Ground Power Units • Staff/passenger commute - private vehicles/public transport • Third-party vehicles - Ground Support Equipment
Zurich Airport	• Aircraft operations – support initiatives in uptake of SAF, ground optimisation and Auxiliary Power Units • Third-party vehicles - Ground Support Equipment • Ground transportation – cars and taxis
Aena	• Aircraft operations - Landing and Take-Off cycle • Third-party vehicles - Ground Support Equipment • Ground transportation to/from the airports

Decarbonisation Measures

Measures per Category

The main measures taken by airports to reach Net Zero Carbon are presented below, based on the seven decarbonisation categories detailed in the ACI World Long Term Carbon Goal Study[1].



1. On-site Thermal Decarbonisation This category refers to the decarbonisation of thermal plants and emergency generators at airports, including fuel switching.	
Schiphol Airport (Royal Schiphol Group)	Execute Aquifer Thermal Energy Storage (ATES) strategy for old buildings.
Avinor	Replace fossil fuel used by the backup generators by remodelling the generators to use advanced biodiesel or other energy solutions such as batteries, or batteries combined with a fuel cell.
Zurich Airport	Install heat pumps, cooling plant, combined heat and power (CHP) plant and remote grid.
Aena	Study feasibility for geothermal energy implementation at Madrid, Barcelona and Palma de Mallorca airports by 2026. Purchase of biofuels for air conditioning and heating.
Salzburg Airport	Switch from natural gas and fuel oil to CO_2 neutral district heating.

[1] https://store.aci.aero/product/long-term-carbon-goal-study-for-airports-report-2021/

2. Vehicle Fleet Decarbonisation

This category covers the conversion of vehicle fleets (light, heavy, GSE) to zero or low emission vehicles.

Avinor	Renew the fleet with electric cars, buses and light duty trucks.
Genève Aéroport	Until 2035, electrification and hydrogenation of the fleet of vehicles and equipment on the airside, and use of renewable fuel for vehicles that cannot be electrified (for example snow or Rescue and Fire Fighting System intervention vehicles).
Athens International Airport S.A. (AIA)	Launch of a Vehicle replacement programme for leased vehicles for AIA's management, incentivising replacement of gasoline and diesel vehicles with Plug-in Hybrid Electric Vehicles (PHEV) and fully electric vehicles (EV). In addition, an extensive program to install charging infrastructure for these and other electric vehicles belonging to airport employees, passengers, visitors and Third Parties operating at the airport has been initiated.
Heathrow Airport Ltd	Converting all cars and small vans to electric or plug-in hybrid.
Aéroports de la Côte d'Azur – St Tropez Airport	Replacement of fossil-fuelled business vehicles by hybrid vehicles.
Luxembourg Airport	Invest in electric vehicles.

3. On-site Renewables

This category refers to on-site use of renewable energy sources for electricity generation and heating/cooling purposes, including battery storage and advanced controls where relevant.

Hermes Airports	Completion of two solar plants with a total on-site production of approximately 28% of airports' energy needs.
Avinor - Svalbard Airport	Implementation of a biogas plant at Svalbard in the next couple of years (2022-2023).
Groupe ADP - Paris-Charles de Gaulle Airport	Installation of one geothermal doublet (a geothermal energy production system which consists of a production well, a heat exchanger and a reinjection well, where all the produced and cooled geothermal water is returned to the reservoir is the so-called doublet system) in 2026. Expected renewable energy production: 90GWh. A second doublet is expected to follow in 2030 (timeline to be confirmed).
Groupe ADP – Paris-Orly	Addition of a heat pump in 2024, to boost the existing geothermal energy production. Expected renewable energy production: 12GWh
Athens International Airport S.A. (AIA)	Production of clean electricity within the airport boundaries via solar power for self-consumption purposes, aiming to cover 100% of the airport company's electricity needs, corresponding to 91% of its current carbon footprint. It includes a new photovoltaic park and an energy storage infrastructure.
Tallinn Airport	Building additional solar parks
Luxembourg Airport	Implement thermal and photovoltaic solar panels

4. Energy Efficiency Measures	
This category includes measures aiming to reduce the airport's energy consumption, in particular through improved lighting and HVAC systems, achieved for instance through smart controls and AI.	
Salzburg Airport	Development of an intelligent energy supply network including storage for the building services.
Aeroporti di Roma (ADR)	New Green Buildings: with a view to pursuing "brownfield" development, the infrastructure plan is based on new, existing or refurbished buildings which have received at least one of the following criteria: the LEED Gold, BREEAM Very Good, EPBD A.
Aena	Efficiency in electricity consumption via expansion to 100% LED in terminals in 2026, implementation of LEDs on platforms and beacons by 2030 and extension of the intelligent energy management platform to monitor consumption at 10 airports by 2030.
Munich Airport	Converting the main ventilation units in Munich Airport's Terminal 1 with two central rooftop systems providing fresh air and establishing smart power management systems.
Eindhoven Airport	Replacement of the glazing by high efficiency glazing and installation of LED lighting on the platform and parking.

5. Grid Decarbonisation and 6. Renewable Energy Purchases	
This category covers the procurement of green electricity, either from the grid or through dedicated contracts/agreements.	
Schiphol Airport (Royal Schiphol Group)	Since January 2018, the airports run entirely on Dutch wind power.
Aéroports de la Côte d'Azur – Nice Airport	Since January 2015, fully powered with 100 % renewable electricity from French hydraulic production.
Frankfurt Airport (Fraport)	Plan to procure the needed electricity through a Power Purchase Agreement for wind power.
Genève Aéroport	Purchase of 100% renewable electricity with a low CO_2 emission factor for more than 10 years. This electricity will be gradually replaced by "zero carbon" electricity.
Aena	Purchase of 100% renewable electricity with guarantees of origin since 2020.
Groupe ADP	For its 3 airports, Groupe ADP is engaging in Power Purchase Agreements to decarbonise its purchased electricity. This covers 47 GWh from three French solar power plants that will start operating in 2022 and 2023.

7. Negative Emissions Technologies	
This category includes nature-based and technology-based solutions for carbon removal.	
Groupe ADP	Explore biosequestration projects allowing the capture of atmospheric CO_2 (e.g., green roofs, etc.) / planting of trees or hedgerows in the Ile de France region, as a complement or alternative to CO_2 capture and storage/use technologies under investigation.
Aéroports de la Côte d'Azur – Cannes Mandelieu Airport	Install a carbon sink to absorb the 40Teq CO_2 residual emissions.
Aena	Explore several carbon sequestration project strategies depending on the source of sequestration, grouped into natural projects, technological projects or a combination of both. Reforestation or the use of biochar for the soil are highlighted amongst natural strategies.
Munich Airport	Develop a regional project, called "Klimawald MUC" (Climate Forest MUC) – to adapt existing forest to changing climate conditions.

Offsetting (interim measure)	
This category refers to CO2 emissions reductions (including through avoided emissions) in other organisation/sectors through the purchase of offset credits. It is seen as an interim measure only, because offsetting does not account for the achievement of Net Zero.	
Groupe ADP	Residual carbon emissions offsetting to achieve carbon neutrality by 2030 (Paris-Charles de Gaulle, Paris-Orly, Paris-Le Bourget).
Hermes Airports	Offset 100% of their direct controlled emissions since 2018-19.
Dublin Airport (daa)	Maintain and renew its *Airport Carbon Accreditation* at the Neutrality level (3+) and compensate residual emissions by offsets until 2025.

Measures for Scope 3	
Scope 3 emissions are indirect emissions from airport-related activities from sources not owned or controlled by the airport operator. Examples include emissions from airline and tenant activities, as well as ground transport vehicles not owned and controlled by the airport operator.	
Zurich Airport	Engage and support the airport community in reducing their emissions with guidelines, support for uptake of SAF at airports, implementation of A-CDM, provision of electric charging stations in the public parking garages, promotion of public transportation.
Heathrow Airport Ltd	Raise awareness of offsetting among passengers through a new offsetting platform with partner CHOOOSE, giving users the option to invest in offsetting projects in Kenya and Costa Rica and introduce their own seed fund for Scottish woodland.
Tallinn Airport	Implement measures to optimise Auxiliary Power Units usage, landing and take-off processes, taxi and hold time processes.
Eindhoven Airport	Participate in ATM optimisation and especially route optimalisation and the implementation of Continuous Descent Approaches.
Venezia Airport	Implementation of electric-taxiing concepts based on an electric motor installed in the landing gear to avoid using jet engines for taxiing; and implementation of semi-robotic tow vehicles fully controlled by the aircraft pilots to tow the aircraft from the terminal to the runway and back without using jet engines.

Focus areas for decarbonisation

Airports define focus areas in their roadmaps based on the respective contribution of their activities to the overall airport carbon footprint, to better reflect and monitor their strategy and measures taken to reach Net Zero Carbon. Some airports also make reference to specific stakeholders to define a focus area.

Focus areas	
Munich Airport	• Increase and diversify generation of ***renewable energy*** and enable its ***storage*** • Establish a ***suitable electric infrastructure for e-mobility*** • Establish ***smart power management systems*** • Further increase ***efficiency of all buildings and technical facilities***
Salzburg Airport	• Optimise and self-generate ***electric power*** • Renew the ***equipment and vehicle fleet*** • Improve the energy performance of ***buildings*** • Develop ***building services*** for optimisation of energy efficiency
Avinor	• Renew the ***vehicle fleet*** • Replace ***de-icing chemicals*** • Implement an off-grid biogas plant at ***Svalbard Airport*** • Decrease the carbon content of ***firefighting exercises*** • Phase out fossil fuels for ***thermal energy and backup generators***.
Groupe ADP	• Improve ***energy performance*** • ***Decrease the carbon content*** of consumed energy through the implementation of renewable energy assets on-premises (e.g. geothermal energy), or through market-based measures • Greening the ***vehicle fleet*** • Eliminate ***residual CO_2 emissions*** (technological carbon capture and storage and/or nature-based solution)
Athens International Airport S.A. (AIA)	• Produce and self-consume solar energy to cover 100% of AIA's needs for ***electricity*** • Renew ***vehicle fleet*** • Implement alternatives to ***boilers*** • Use fossil-free fuel for ***generators*** • Engage the ***airport community***

Monitoring

Airports periodically review their roadmaps to monitor progress towards the agreed objectives and update the roadmaps where necessary.

Monitoring	
Groupe ADP	Major review of the roadmap planned in 2022.
Athens International Airport S.A. (AIA)	Every year, a Climate Change Corporate Action Plan is developed following an internal consultation that involves several AIA departments, with the aim of identifying measures needed to reduce carbon emissions and maximise energy efficiency and update the roadmap.
Aena	Every four months, the Climate Action Plan is monitored and reviewed. Every three months, indicators about the degree of progress in achieving the objectives of the Climate Action Plan are reported to the Board of Directors and the Shareholders' Meeting.
Zurich Airport	All relevant data is captured and analysed on an annual basis. Results are published in the annual business reports and, on an ad-hoc basis, through special information papers.
Salzburg Airport	A governance team composed of the CEO, the Division Manager Technique, the Strategy Representative, the Head of Environment, the Head of Legal Affairs and the Facility Manager is implemented. This governance team is monitoring and reviewing periodically the measures, timeline, responsibilities, the assessment, the target achievement and the continuous improvement process.

AENA – Gran Canaria Airport

We sincerely hope that this document proves useful to readers who are looking for key elements airports include in their journey to reach Net Zero Carbon. Please reach out should you have questions or feedback.

About ACI EUROPE

ACI EUROPE (Airports Council International Europe) is the voice of Europe's airports. It is a non-profit organisation, whose prime purpose is to represent and lead the European airport industry as well as to promote professional excellence in airport management and operations. ACI EUROPE is the European region of Airports Council International (ACI), the only worldwide professional association of airport operators. It represents over 500 airports in 55 European countries. Air transport supports 13.5 million jobs, generating €886 billion in European economic activity (4.4% of GDP). In response to the Climate Emergency, in June 2019, members of ACI EUROPE committed to achieving Net Zero Carbon emissions for operations under their control by 2050, without offsetting.

Learn more - https://www.aci-europe.org/netzero

About To70

To70 has a long track record of helping airports with baselining, developing and implementing carbon reduction strategies and policies and responding to environmental legislation. Since 2012, we have completed over 50 *Airport Carbon Accreditation* projects for 20 airports in all ACI regions. In recent years this has been expanded with the wider airport sustainability strategies.

Learn more - www.to70.com