ACI EUROPE

AIRPORTS COUNCIL INTERNATIONAL

Developing an Airport Net Zero Carbon Roadmap

Guidance document

to70

October 2021

Introduction

Climate change is one of the greatest challenges facing the world. Scientists are observing changes in the Earth's climate in every region and across the whole climate system. According to the latest Intergovernmental Panel on Climate Change (IPCC) Report (https://www.ipcc.ch/), emissions of Greenhouse Gases from human activities are responsible for approximately 1.1°C of warming from pre-industrial levels. The report provides new estimates of the risks of crossing the global warming level of 1.5°C in the coming decades and finds that unless there are immediate, rapid and large-scale reductions in Greenhouse Gas emissions, limiting global warming to close to 1.5°C or even 2°C, as per the goals of the Paris Agreement, will be beyond reach. Stabilising the climate will require strong, rapid and sustained reductions in Greenhouse Gas emissions, and ultimately Net Zero Greenhouse Gas emissions.

Climate action is one of the key priorities on the airport agendas. It is needed to safeguard the viability of the airport industry. The most significant Greenhouse Gas (GHG) associated with activities at an airport is CO_2. Since 2008, Airports Council International (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. Despite the effects of the COVID-19 crisis, ACI EUROPE has, at the second Aviation Sustainability Summit in May 2021, reconfirmed its commitment and even accelerated many of the Net Zero Carbon targets - more than 90 airports are already set to achieve Net Zero Carbon emissions by 2030.

In accordance with these commitments, airports are drafting roadmaps to identify and implement the measures and actions needed to reach Net Zero Carbon. This document provides airports with guidance on the preparation of an actionable Net Zero Carbon roadmap in five easy steps.

In addition to this guidance, ACI EUROPE has developed an online repository of Net Zero Carbon roadmaps from those airports that have already made their roadmap publicly available.

Frequently Asked Questions

What does Net Zero Carbon emissions mean?

- Globally, Net Zero Carbon emissions will be achieved when all CO_2 emissions released by humans are counterbalanced by removing CO2 from the atmosphere through negative emissions technologies (i.e. nature-based or technology solutions).
- At an airport, achieving Net Zero Carbon will involve two main elements. Firstly, the airport reduces carbon emissions from its own operations (Scope 1 and Scope 2 emissions) as a minimum to as close to zero as possible. Secondly, any remaining emissions that are difficult to avoid are neutralised through carbon removal.

What is the difference between Carbon Neutrality as defined under *Airport Carbon Accreditation* and Net Zero Carbon?

- To achieve Carbon Neutrality, airports reduce carbon emissions and compensate for the remaining carbon emissions through the purchase of certified carbon offset credits - i.e. by investing in emissions reductions or removals elsewhere (in other sectors/organisations).
- To achieve Net Zero Carbon, airports reduce carbon emissions as close to zero as possible and any residual emissions can only be addressed by carbon removals. This does not allow for offsetting through carbon reductions in other sectors/organisations.

What constitutes a Net Zero Carbon target?

- A Net Zero Carbon Target should be built on two quantified targets (twin target); one for the absolute emissions reduction and the second for the carbon removal (if any residual emissions are to be addressed).

What are the key components of the roadmap?

- Consistency, clarity and accuracy are essential. The roadmap should have certain key components in place and contain at least
  - a high level of commitment from all members of the organisation, especially leadership from senior management;
  - a Net Zero Carbon Target including a reference year, a target date and a trajectory with intermediate targets (if needed);
  - immediate emissions-cutting measures and identified medium-long term measures and
  - a periodical (annual) reporting mechanism.
- If Scope 3 emissions are included, make sure to have the commitment from all the parties involved.

How to build a credible trajectory?

- To build a trajectory, you need to analyse different pathways to achieve your target. Pathways are based on different assumptions, such as the different timing and selection of the reduction measures.
- To assess if the pathways are credible, it is essential to
  - quantify your emissions and reduction objectives in as detailed a way as possible and
  - make sure the selected measures are technically feasible and affordable.
- Based on this analysis, the trajectory is selected to be in accordance with the objectives and goals of the airport as well as its surrounding environment.

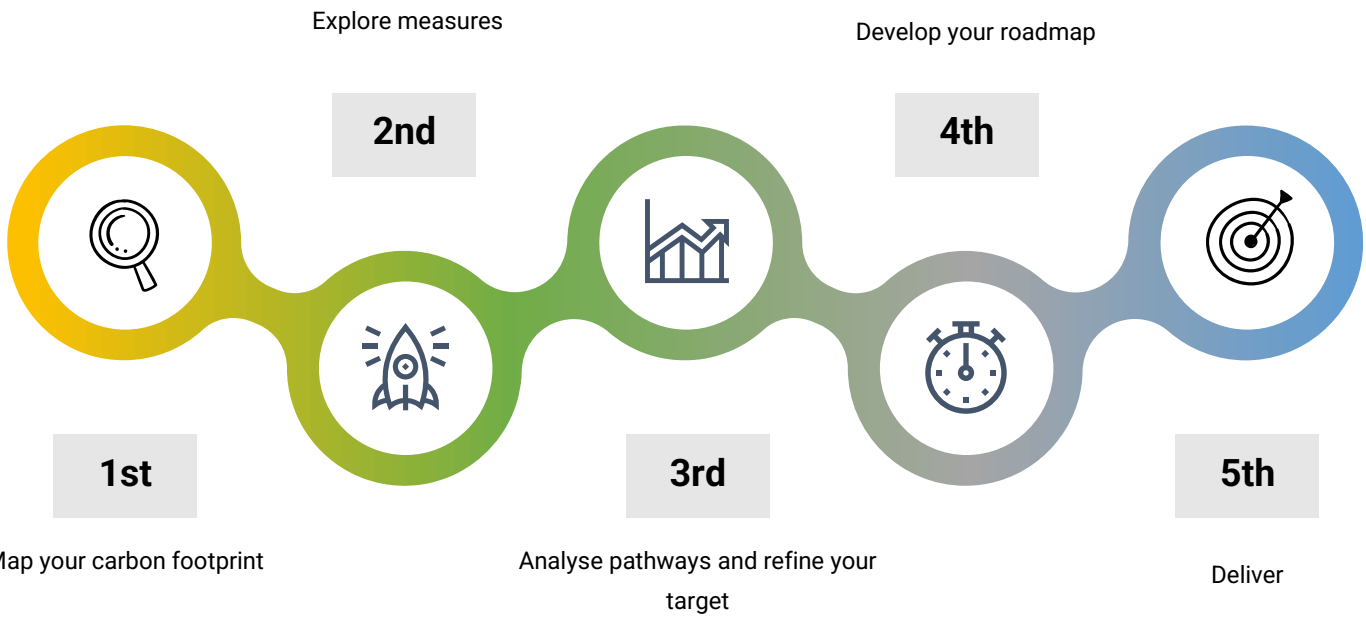
How to deal with uncertainties?

- As the Net Zero Carbon target is a long-term goal, airports need to deal with uncertainties. However, it is possible to manage these uncertainties by:
  - specifying what assumptions your roadmap relies upon;
  - creating interim target(s);
  - implementing a governance board, and
  - closely monitoring progress.

A methodology in 5 steps

There are five key steps that airports can take to accelerate progress towards Net Zero Carbon. These steps are partially derived from existing airport Net Zero Carbon roadmaps, but also take input from other industries.

Timely climate action will make airport operations more cost-efficient and resilient. Cutting carbon emissions is becoming increasingly affordable and often results in reduced energy consumption. Using renewable energy also contributes to making airport operations more resilient to disruptions by protecting energy supply and delivering price certainty. The airport also legitimises its position within society, maintaining a so-called 'license to operate'.



Zurich Airport

Step 1 – Map your carbon footprint

The starting point is to measure your past and current emissions so that you can scope your roadmap. This will allow you to understand the emissions impact of the various activities across the airport and the value chain. It also provides a basis from which to set targets.


Tallinn Airport

Define the target scope

The ***Greenhouse Gas (GHG) Protocol*** standard has been developed **to enable businesses to calculate their Greenhouse Gas emissions**. The ***Airport Carbon Accreditation*** program has adopted the principles of the GHG Protocol, as it **sets a framework and key principles** to develop the carbon footprint and identify projects to reduce emissions at airports. Sources of emissions are categorised as Scope 1, Scope 2 or Scope 3.

The boundary for GHG inventories and targets should be **as comprehensive and accurate as possible**. Emissions not covered by a quantified target cannot be responsibly managed or reduced. **All Scope 1 and Scope 2 emissions are to be included** in the Net Zero Carbon target and consequently, roadmap. An airport may also incorporate one or more sources of Scope 3 emissions in its target and thus partially or entirely cover the airport as a system. The option of setting a third-party inclusive emission reduction target allows airports to identify and pursue the most effective emissions reduction opportunities, recognising that they may relate to the airport operator's Scope 3 sources.

Select the reference year

To facilitate target setting in line with the IPCC decarbonisation scenarios, **it is recommended to use 2010 as the reference year** - i.e. the year against which emissions reductions required to reach Net Zero Carbon will be calculated. However, an airport can select a different reference year, provided that it justifies its choice.

Measure your carbon footprint

In parallel to defining your target scope and reference year, you calculate your carbon footprint. This calculation involves two main steps and concerns your reference and latest activity year:

1. **Collecting the relevant business activity data** related to Scope 1 and Scope 2 (such as fuel or electricity used) and, if identified as part of the target, relevant Scope 3 emission sources (such as fuel used by aircraft handlers),
2. **Applying CO_2 emissions factors** to convert this activity data into CO_2 emissions.

The data should be **sufficiently detailed** to be able to identify the type of emissions and its sources. This will ease the categorisation of your emissions, help define adequate measures to be taken and, at a later stage, determine what activities and which measures are prioritised in order to reach your target.

Recommendations

Building a solid baseline is fundamental to refining your targets and preparing your roadmap. Your baseline should contain as much detail as possible when mapping your carbon footprint and deciding which emission sources to include into your target scope.

Step 2 – Explore measures

Once you have a good overview of your past and current emissions, identifying the measures to reduce your emissions is the next step.

Generally speaking, you will be looking for improved efficiency of technology and operations, clean energy sources as well as innovations to reduce your emissions. Ideas can be gathered through consultation with the airport community and benchmarking against other airports.

After a successful carbon footprint analysis, the next step towards defining a Net Zero Carbon roadmap is to explore effective and **cost-efficient emissions reduction measures** and, if needed, removals. You can reach Net Zero Carbon by using contractual solutions (such as procurement of green electricity or green gas) or on-site technical solutions (such as renewable energy production on-site the airport). Generally speaking, the latter help ensuring the highest additionality of the associated emissions reductions and can offer a strong link to local development.

Involve the airport community and other stakeholders

Your community and stakeholders know the airport well and, therefore, will have ideas and initiatives that will help define measures. Moreover, some of the measures that will be implemented might have an impact on your community and stakeholders. Therefore, it is important that your roadmap is **acknowledged by your community and stakeholders**. Involving and including them in your journey as early as possible is highly recommended. This can be done through workshops, consultative meetings with key stakeholders, including airport employees, airlines, ground handlers, energy providers, and organisations such as local council, government and transport authority. Such a broad engagement is encouraged even if your target encompasses only Scope 1 and Scope 2 emissions.

After the consultation, **create a list of possible measures** and actions together with the expected results.

Perform benchmarking

Many airports and other businesses are already implementing effective measures. A **systematic benchmarking exercise** will provide you **with an overview of examples** that have proven to be successful or that are being trialled elsewhere. These measures and actions might also be applicable to your airport. The ACI EUROPE Net Zero Carbon Roadmap repository gives you access to a large number of existing roadmaps and is a very good source of measures that can be assessed for their application at your airport.


Munich Airport

Create an extensive list of possible measures and actions

Thanks to the consultation and the benchmark analysis, **best practices and actions will have been gathered**. They can now be **classified within groups of measures**. It is recommended to identify some groups or domains to better understand where the actions will have an impact. An indicative categorisation can be found in the ACI World Long Term Goal Study.

Select measures

The measures identified in the extensive list might not all be suitable for your airport; a technical solution might not be sufficiently mature to be implemented; the logistics and supply might not be available in and around the airport, or the implementation costs might be too high. This is why a selection of the measures needs to **be mapped against the emissions calculated** in the Step 1 and analysed with respect to:

- Relevance to the airport, regarding its location, the airport's operations and its emissions scope;
- Status, maturity and associated risks (technology in development for example);
- Timeframe and requirements to implement;
- Financial estimation and Return on Investment (ROI), and
- CO_2, energy savings and other related-benefits.

Recommendations

A good and broad understanding of sustainability, goals and actions taken elsewhere, inside and outside the airport sector, extends the list of initiatives and ideas that might be replicated at your airport.

Step 3 – Analyse pathways and refine your target

With the baseline calculated and a list of identified measures, the next step is to model different emissions reduction pathways. They are based on scenarios with different assumptions and projections on energy use, carbon emissions and costs to give greater certainty on the impact of various mitigation measures and investment timelines.

Identify and evaluate pathways

With the list of measures established in Step 2, different pathways can be identified through the ***creation of multiple scenarios.*** These scenarios are based on factors that include:

- The mix of projects to achieve an emissions reduction;
- The impact and feasibility for the airport;
- The level of investment required;
- The maturity of the technology, and
- The applicable regulations.

Each scenario results in a pathway relying on a set of measures, the investment required and the target years for achieving the associated reductions that will ultimately enable the airport to reach Net Zero Carbon.

The *Airport Carbon Accreditation* programme, and especially the guidance it provides on defining emissions reduction targets under level 4/4+, can also help to build emission pathways towards Net Zero Carbon.

Break down target and define trajectory

Once the different pathways have been evaluated, one of them can be selected, becoming the airports' planned emissions trajectory. It will be the backbone of your roadmap. Based on this trajectory, the airport will also be able to identify a specific year in which it aims to reach Net Zero Carbon, thus potentially refining an initial commitment to reach that goal by 2050 at the latest.

For the target year, the airport should then split the Net Zero Carbon goal into a "twin target" - including a quantified, absolute emissions reduction target, complemented by, if required, a quantified removal target for any remaining emissions.

Carbon removal is achieved through negative emissions technologies. Examples include afforestation and reforestation, soil carbon enhancement or direct air capture. Related solutions and associated international quality and accounting standards are under development. It should be seen as the last step of your roadmap and used with great caution.

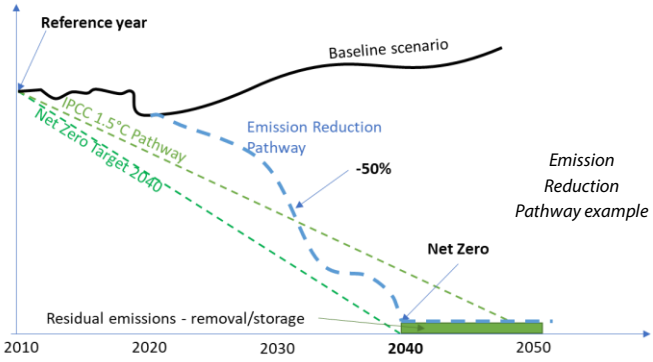
The set-up of the target and the trajectory should be ***done in coordination with the entire organisation and especially with your executive management.*** The measures and actions that are derived from this target and trajectory will impact and affect the entire airport, its employees and stakeholders. It is therefore important that they feel included and are committed.

Define interim targets

Your roadmap is often ***built to cover a 15-30 year period and intermediate steps of 5-10 years are recommended***.

Some interim targets might include:

- A global target emission such as reaching 2010 emission levels by 2030 or reducing the emissions levels by 40% by 2030 compared to your baseline;
- Being carbon neutral by balancing residual emissions of CO_2 through offsetting, and
- Planned achievements such as a percentage of renewable energy used, renewal of a fleet, etc.



Recommendations

When setting intermediate targets, you should align your level of ambition with the IPCC 1.5°C scenario, ensuring consistency between your long-term goal and the trajectory, as well as recognising that early action is critical to limit global warming.

Step 4 – Develop your roadmap

Your Net Zero Carbon target is a long-term goal – progress towards it can be difficult to monitor. When building your roadmap, you will combine all the elements gathered in the previous steps to turn them into an actionable plan.

Build your roadmap

Your roadmap consolidates the outputs of the previous steps and as such, should contain an overview as well as a **detailed analysis on how to reach Net Zero Carbon**. The key components of your roadmap are

- a high level of commitment from all members of the organisation, especially leadership from senior management;
- a Net Zero Carbon Target (including a reference year, a target year and a trajectory with intermediate targets, leading to a quantified "twin target", as per Step 3);
- immediate emissions-cutting measures and identified medium-long term measures and
- a periodical (annual) reporting mechanism.

The more information you have, the easier it is to build your roadmap.

Implement a governance plan

Many of your stakeholders may not have had any prior involvement in carbon reduction activities. This may present challenges. Therefore, it is important to **build a strong governance structure** to take your Net Zero Carbon initiative forward. It is therefore recommended to create a governance board, **including members from different departments of the airport and from different employee levels**. The members should all **have clearly identified roles**. Together you set concrete goals and objectives, and you hold periodic meetings.

In addition to the governance board, the next step is to transform your roadmap into an action plan.

Some good practices to build your action plan are:

- Present your Net Zero Carbon roadmap to your management board for signoff;
- Work with an internal lead to drive implementation
- Set action owners to work;
- Monitor and report the progress.

Communicate using a public document

Your roadmap is primarily dedicated to your airport but addresses a broader audience. **Communication to the public** about your objectives, measures, actions, commitments, etc. is also important. A public roadmap document can take **multiple formats**. From simple tables to a PowerPoint or a technical report; the most important point is to be concise and precise. This document will be updated along your journey with your achievements, new measures, updated forecast, etc. The ACI EUROPE Net Zero Carbon Roadmap repository is the perfect place to get some inspiration on how to build this document and highlight what is important for you.

Recommendations

Your roadmap is a long journey that covers a long-term period. In this sense, many uncertainties might appear and assumptions will have to be taken in the first years. Your roadmap will thus be a living document. Acknowledge this uncertainty - and it should not prevent you from making your roadmap public.

AENA Madrid-Barajas Adolfo Suárez Airport

Step 5 – Deliver

Your roadmap is now ready to be implemented. Through feasibility and design studies for individual measures, you will be able to consolidate your roadmap and the delivery. In the meantime, periodic/yearly reviews will allow assessing the impact of the measures, the evolution of your carbon footprint and, when needed, identifying additional changes to be made.

Develop feasibility studies and design

All along the journey, the development of the market, the maturity and the cost of a solution will evolve. This is why the initial feasibility analysis, performed in Step 2, needs to be updated and consolidated. This will also allow you to better design the selected measures and consolidate the implementation of your solutions.

During a **feasibility study**, you will examine all your options for energy efficiency, decarbonisation of electricity, heating/cooling and transport. This to ensure that your Net Zero Carbon targets can be met while minimising risks and cost, following as closely as possible the emissions trajectory established under Step 3.

The **timing of implementation is a critical component** of the roadmap. Therefore, it will include the planned timescale for each major measure and the critical path to implementation, taking into account their priority, urgency and interplay with other measures as well as the technology and commercial readiness.

Communicate, train and engage with your community

The success of any management plan is highly dependent on the competencies and participation of employees and other stakeholders. When assessing training and information needs, you should consider:

- the level of understanding of the business risks presented by climate change;
- job-specific knowledge and skills required by those whose activities have a direct impact on the airport's carbon footprint;
- the need for a general level of awareness of the airport's progress, and
- and any specific behavioural changes required.

Monitor through regular progress reporting

The **governance board meetings and periodic project meetings** allow you to update your roadmap regularly, assess the impact of the measures taken and the evolution of your carbon footprint.

It is common to **update your roadmap** every 2-3 years. A quarterly meeting with the governance board can be planned to closer monitor the measures and actions.

Recommendations

The monitoring process is an important measure to help manage uncertainties. It allows you to proactively keep the roadmap up to date and plan the feasibility/design studies for a successful delivery.

Munich Airport

Definitions

Terms	Definition
Absolute CO_2 emissions	Absolute emissions refers to the total quantity of carbon emissions being emitted, thus without comparing the amount of emissions to some unit of economic output.
Absolute Target	A target defined by a reduction in absolute emissions over time (e.g., reduce CO_2 emissions by 25% below 2015 levels by 2020 or reduce CO_2 emissions by 10.000 tonnes below 2015 levels by 2020)
Absolute Zero	When no CO_2 emissions are attributable to an actor's activities across all scopes.
Carbon Negative	When an actor's carbon removals, internal and external, exceed its emissions and any removals are "like for like."
Carbon Neutral	Reduce Scope 1 and Scope 2 CO_2 emissions and compensate the remaining CO_2 emissions through the purchase of certified carbon offset credits.
CO_2	Carbon dioxide
Greenhouse Gases (GHG)	Gases in the atmosphere that absorb and emit radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect and increases in anthropogenic GHGs have been linked to increases in global average temperatures since the mid-20th century known as climate change. The most significant GHG associated with an airport is CO_2. Other GHGs included in the Kyoto Protocol are methane (CH_4), nitrous oxide (N2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulphur hexafluoride (SF_6).
Net Zero Carbon	Reduce Scope 1 and Scope 2 CO_2 emissions to as close to zero as possible and neutralise the remaining emissions that are difficult to avoid through carbon removal and storage.
Neutralisation	CO_2 removals outside an actor's emissions inventory, that balance residual CO_2 emissions such that an actor's net contribution to global emissions is reduced or eliminated. Neutralisation claims are only valid under a rigorous set of conditions, including that the removals involved are additional, not over-estimated, exclusively claimed, and like for like.
Offsetting (or compensation)	Reducing CO_2 emissions (including through avoided emissions), or increasing CO_2 removals through activities external to an actor, in order to compensate for CO_2 emissions, such that an actor's net contribution to global emissions is reduced. Offsetting is typically arranged through a marketplace for carbon credits or other exchange mechanism. Offsetting claims are only valid under a rigorous set of conditions, including that the reductions/removals involved are additional, not over-estimated, and exclusively claimed.
Pathways	While roadmapping is a normative approach in which attempts are made to sketch out detailed plans and processes for achieving a desired future state of development, pathways depict a range of alternative routes to a desirable vision. They represent scenarios based on different assumptions such as the different timing and selection of the reduction measures.
SBTi	Science Based Target initiative
Scope 1	Direct emissions from sources or processes and activities controlled by the airport operator at its facilities.
Scope 2	Indirect emissions produced by the generation of electricity or thermal energy acquired and consumed at the airport.

Terms	Definition
Scope 3	Indirect emissions from airport-related activities from sources not owned or controlled by the airport operator. Examples include emissions from airline and other tenant activities, and ground transport vehicles not owned and controlled by the airport operator.
Trajectory	The pathway followed to reach Net Zero Carbon.

Additional resources and related documents

- ACI World Long Term Carbon Goal Study - https://aci.aero/about-aci/priorities/environment/long-term-carbon-goal-study/
- ACI EUROPE FAQ on Net Zero commitment - https://www.aci-europe.org/netzero/faq.html
- *Airport Carbon Accreditation* Application Manual - https://www.airportcarbonaccreditation.org/airport/technical-documents.html
- UN Race to Zero campaign - https://racetozero.unfccc.int/
- Science Based Targets initiative (SBTi) - https://sciencebasedtargets.org/

AENA – Gran Canaria Airport

We sincerely hope that this document proves useful to airport operators worldwide who are considering developing their Net Zero Carbon Roadmap. Please reach out should you have questions or feedback.

About ACI EUROPE

Airports Council International (ACI) 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 represents the European region of 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