Towards Net Zero Carbon Emissions

daa

Carbon Reduction Strategy

AIRBIZ

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May 2021

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Executive Summary

Dublin Airport is Ireland's largest and busiest airport handling around 32 million passengers in 2019 with air services operated by almost 50 airlines to 200 destinations in 42 countries. The sustainable growth of the airport is a vital driver of connectivity between Ireland and key global markets for both business and leisure travel. The size and scale of Dublin Airport supports the direct employment of more than 20,000 people and over 100,000 jobs nationally. As the aviation industry recovers from the COVID-19 pandemic and air transport services resume, our forecasts indicate a return to growth beyond 2019 pre-COVID levels by the mid-2020s.

Over this decade, Dublin Airport can keep growing sustainably and develop its role as the gateway to Ireland. We continue to invest in the airport's infrastructure to meet predicted traffic demand over the 2020s and provide our passengers and airlines with an improved airport experience. This is done through our Capital Investment Programme (CIP) that prioritises spending on the expansion, reconfiguration and enhancement of Dublin Airport's terminal, airfield, and landside infrastructure over the next five years and beyond.

Dublin Airport is currently restricted under existing planning permissions from growing beyond 32 million passengers per annum (mppa). To accommodate the growth forecast for Dublin Airport, we plan to maximise the use of current infrastructure and invest in new or refurbished facilities to maintain a safe, secure, and sustainable airport. We recognise that some areas of the airport are at or approaching their capacity.

In looking to the future, we will continue to make significant investments that improve the built environment across Dublin Airport through a programme of incremental infrastructure replacement and upgrades. This will be delivered in a sustainable manner to enable Dublin Airport to accommodate up to 40mppa.

To support the amendment of the existing passenger cap from 32mppa to 40mppa, we will submit an Infrastructure Application (IA) to Fingal County Council (FCC). The IA submission seeks permission to develop the infrastructure needed to enhance the airport's capacity and is accompanied by this Carbon Reduction Strategy (CRS). The CRS describes the carbon management initiatives, performance, and future reduction plans for Dublin Airport out to 2030 and beyond.

In December 2015, the Conference of the Parties (COP) 21st meeting of the United Nations Framework Convention on Climate Change (UNFCCC) in Paris agreed to significant global action on climate change. Over 195 national participants signed the Paris Agreement, committing to a pathway to limit average global temperature increase to +2°C above pre-industrial levels, with an aspirational target to limit this temperature increase to +1.5°C. Both the European Commission and Irish government are signatories to the Paris Agreement and have aligned their policy frameworks to limit global warming to +1.5°C and transition to climate neutral economies by 2050. At COP21, the Airports Council International (ACI) announced 50 airports in Europe are to be carbon neutral by 2030. This voluntary commitment was doubled to 100 airports.

The Intergovernmental Panel on Climate Change (IPCC) published its Special Report in October 2018, on the impacts of global warming of +1.5°C above pre-industrial levels and related greenhouse gas (GHG) emission pathways. The findings of this report called for drastic reductions in global human-induced carbon emissions and were supported by an extensive body of scientific evidence.

In response to the IPCC's Special Report (2018), ACI Europe announced a Net Zero Carbon by 2050 (NZC50) commitment in June 2019. This was signed by more than 200 airports including Dublin Airport. Through the Irish Climate Action Plan (CAP) 2019 and the new *Climate Action and Low Carbon Development (Amendment) Bill 2021*, which is soon to be enacted into law, the Irish government has proposed an ambitious set of targets to transition Ireland to a climate neutral economy by 2050.

Almost 20 years ago we began implementing carbon management practices at Dublin Airport. Since 2010, we have reduced our carbon emissions footprint by -26% whilst welcoming an additional 14.4mppa. In 2020, Dublin Airport was accredited at the Neutrality level (3+) under ACI's *Airport Carbon Accreditation* programme. This was achieved by purchasing 100% of our electricity through a renewable energy guarantee of origin (REGO) backed supply contract and compensating our residual emissions through an offset scheme.

To reach our long-term NZC50 goal, we are working towards reducing absolute Scope 1+2 emissions by -30% below a 2019 baseline by 2030. Achieving this 2030 target relies on the deployment of mature, affordable, and effective emission reduction measures. These measures include the use of 100% renewable electricity, electrification of our vehicle fleets, fuel-switching and eventual electrification of our onsite thermal energy plant, energy efficiency measures and circular economy practices.

Our emissions blueprint opposite is focussed on the initial top 15 actions to help us achieve our 2030 carbon reduction target.

GOAL Decarbonise all aspects of our operations and future development, and continue to work with our partners, passengers and other stakeholders to reduce or even eliminate their emissions

	Improvement Measure	Scope Saving	Target Effect	Timeframe
1	Maintain and renew our *Airport Carbon Accreditation* at the Neutrality level (3+) and compensate residual emissions by offsets	1 2	Indirect	
2	Evaluate the feasibility of an onsite anaerobic digestor to support our circular economy transition and supply low-grade renewable heat	1	Medium	
3	Replace and upgrade end-of-life lights with energy efficient Light Emitting Diodes (LED)	2	Medium	
4	Deliver new Near Zero Energy Buildings across the airport in line with latest Irish Part L Building Regulations	2	Medium	
5	Replace and upgrade end-of-life ventilation and building control systems with high efficiency and intelligent technologies	2	Medium	
6	Continue to purchase 100% renewable electricity through REGO backed supply contracts from Irish electricity retailer(s)	2	Indirect	
7	Replace and upgrade all street, car park and high-mast apron lights with LEDs	2	Low	
8	Complete the transition of our light vehicle fleet to 100% LEVs and acquire biodiesel or electric buses following trials/feasibility	1	Low	
9	Install more EV chargers across the airport for daa, tenant and customer vehicles	1	Low	
11	Install a new onsite ground-level solar PV system with generating capacity up to 7.5MWp	2	High	
12	Replace all airfield ground lights and signage with more efficient LEDs	2	Low	
13	Upgrade our Airport Carbon Accreditation to the Transition level (4+), the highest level under the programme	1 2	Indirect	
14	Evaluate the feasibility of installing additional onsite solar PV capacity paired with battery storage	2	Medium	
15	Optimise the thermal energy storage capacity of the CHP 4 plant and upgrade its heat exchanger and LPHW pipe system	1	High	


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Strategic Context – A Carbon Reduction Blueprint

This Carbon Reduction Strategy is an essential part of our Infrastructure Application to deliver new infrastructure with capacity to meet future traffic demand up to 40 million passengers a year, whilst also meeting our responsibility to combat climate change in line with international, national and Fingal County Council commitments and objectives. Our plan to support the sustainable growth of Dublin Airport and reduce our carbon emissions by 30% in 2030 compared to 2019 levels is outlined in this strategy.

2030 Carbon Reduction Target

Minimum Carbon Performance Levels (Capital Projects)

Net Zero Carbon 2050
Paris Agreement & IPCC 1.5°C Limit

Strategic Partnerships & Collaboration

Climate change is arguably the greatest existential threat we currently face despite this being temporarily eclipsed by the COVID-19 pandemic which struck in early 2020. Despite the unprecedented disruption caused by the COVID-19 pandemic resulting in a dramatic downturn in passenger numbers and an uncertain recovery, we are taking action to operate and grow with less carbon.

Our approach to reduce carbon emissions at Dublin Airport is all about ensuring our business can continue to grow sustainably long into the future for the benefit of all our stakeholders and communities while protecting the environment.

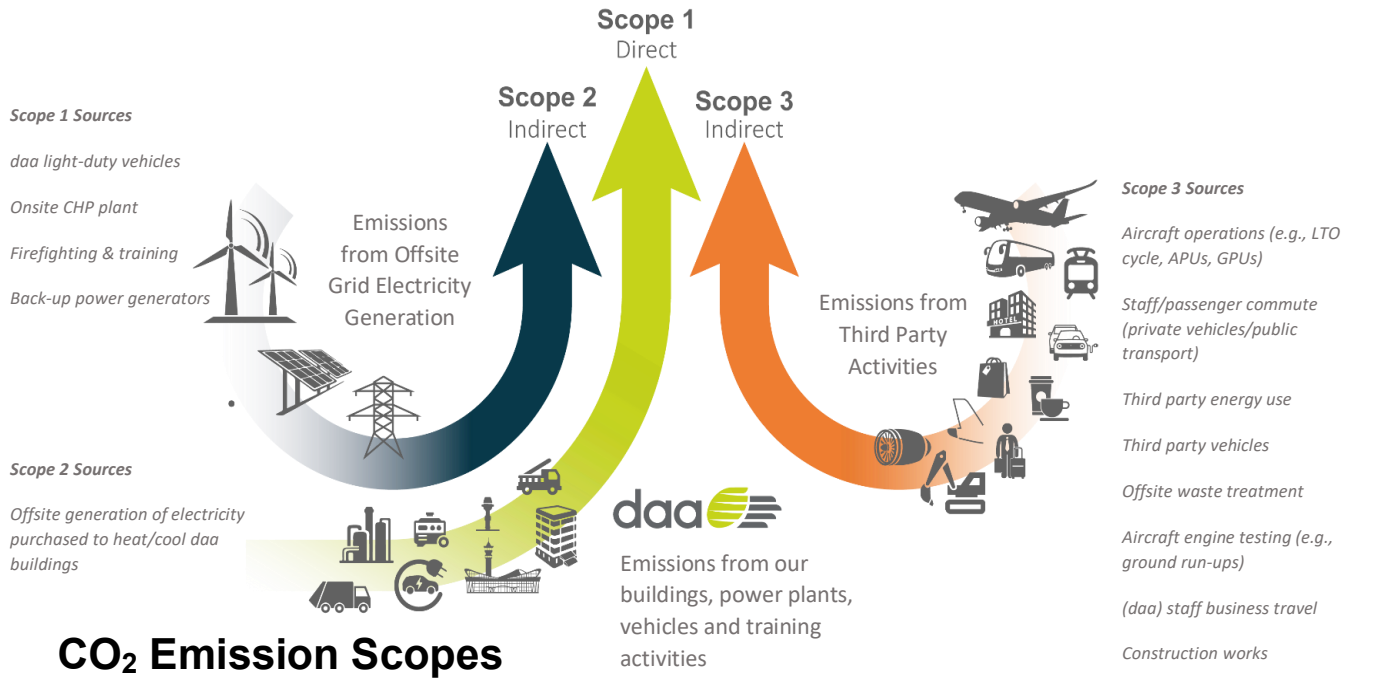
This Carbon Reduction Strategy (CRS) presents our approach to decarbonise Dublin Airport. It charts an emissions reduction pathway to 2030 as part of an interim step in our transition to Net Zero Carbon emissions by 2050 (NZC50).

For us, NZC50 means that all carbon emitted from our activities annually will be balanced out by an equivalent amount of carbon removed from the atmosphere.

Our long-term NZC50 goal for Dublin Airport covers Scope 1+2 emissions only.

Spearheading our efforts are:

- An ambitious but achievable 2030 absolute carbon reduction target;
- A set of minimum carbon performance requirements embedded into our Capital Investment Programme (CIP);
- A long-term transition to NZC50; and,
- Strategic partnerships and information sharing to help our business partners reduce the emissions they are responsible for.



CO_2 Emission Scopes

Infrastructure Application

This CRS accompanies our Infrastructure Application (IA) submission to Fingal County Council (FCC), to increase the existing annual passenger cap for Dublin Airport from 32 million passengers per annum (mppa) to 40mppa.

Reducing carbon emissions across the airport is pivotal to the re-establishment of our business as we prepare for growth beyond the COVID-19 pandemic in a balanced and sustainable manner. Taking action to decarbonise in the 2020s is consistent with worldwide and national efforts to limit average global temperature increase to +1.5°C above pre-industrial levels.

We understand that the purpose of the existing annual passenger cap is to limit the airport's impact on climate change, surrounding communities and the environment. This CRS sets out our commitments, aspirations, and plans to deliver new airport infrastructure and replace and upgrade existing facilities with less carbon.

The CRS is required under the Dublin Airport Local Area Plan (LAP) 2020. The LAP is an essential planning instrument to guide the sustainable development of Dublin Airport for the next six years, translating national directives and targets into local airport specific objectives and requirements. Any plans that facilitate increased passenger numbers at Dublin Airport must give prominence to the reduction of carbon emissions and safeguard the environment in which the airport operates. FCC has aligned the LAP to reflect the targets set out in Ireland's Climate Action Plan (CAP) 2019.

Emission Categories

There are many sources of carbon emissions in the aviation sector, and responsibilities are shared amongst numerous stakeholders. As an airport operator, we do not have the same level of control and responsibility towards each emission source across the airport. It is therefore important to clearly identify the sources of emissions we are responsible for and implement measures to manage and reduce them.

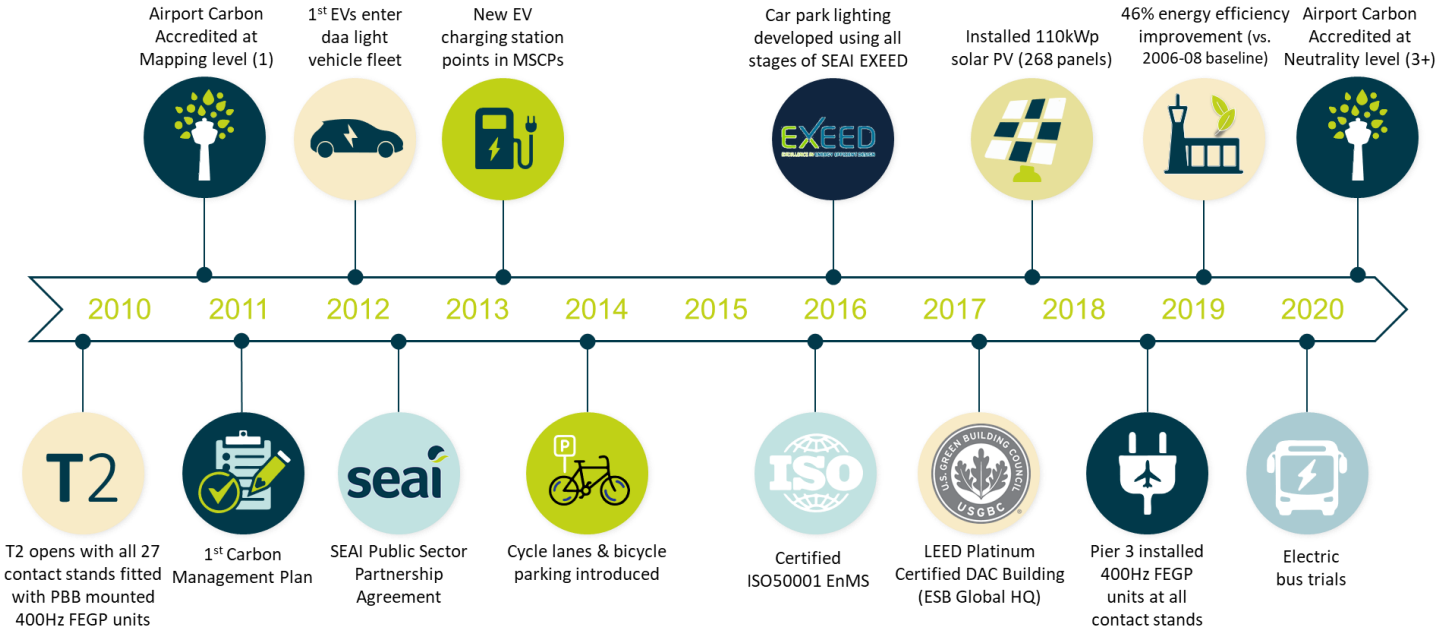
The World Resources Institute (WRI) Greenhouse Gas (GHG) Protocol (2004) sets best practice guidance on how to calculate and report carbon emissions. It constitutes the technical basis of *Airport Carbon Accreditation* and classifies carbon emissions into three broad categories:

- **Scope 1:** direct emissions from sources that are owned or controlled by an airport operator;
- **Scope 2:** indirect emissions from the consumption of purchased electricity that is generated offsite; and,
- **Scope 3:** indirect emissions from the airport-related services and activities that are not owned or controlled by an airport operator.

We calculate Dublin Airport's carbon footprint in accordance with the GHG Protocol and ISO14064 principles. A distinction is made between the three sources of emissions (scopes) listed above with our footprint results that are reported annually under three different schemes:

1. ACI's *Airport Carbon Accreditation* programme.
2. Sustainable Energy Authority of Ireland's (SEAI) Monitoring and Reporting (M&R) System.
3. European Union's (EU) Emissions Trading Scheme (ETS) through the Irish Environmental Protection Agency (EPA).

A Decade of Initiative



Building on Momentum

In late 2020, Dublin Airport was accredited at the Neutrality level (3+) under the *Airport Carbon Accreditation* programme. This marked a significant milestone reflecting the effectiveness and strength of our carbon management programme since joining *Airport Carbon Accreditation* back in 2011 at the Mapping level (1).

In 2012, we purchased our first electric vehicle (EV) and since then we have progressively renewed our vehicle fleet with more LEVs to help reduce our Scope 1 emissions. We are currently testing the operational capabilities and performance of electric buses on their suitability for passenger transfers.

Since 2012, we have participated in the SEAI's Public Sector Partnership Programme. In accordance with the National Energy Efficiency Action Plan (NEEAP) 2009-2020, we were required to improve energy efficiency by at least 33% by 2020 from a 2006-2008 baseline. We met this objective in 2013 and had reduced the amount of primary energy used on a floor space basis by 48% in 2019 (kWh/m^2).

In 2015, we became one of the world's first airports to certify our energy management system (EnMS) under ISO50001. Our EnMS provides a strong framework for developing and implementing our energy policy, setting objectives and targets, identifying, and managing energy use across the airport. This is done against a cycle of continual review of energy practices at the airport and initiatives to improve our performance.

We were the first organisation in Ireland to be awarded LEED Platinum certification, the highest level of sustainability performance that can be achieved under this internationally recognised rating scheme, for One Dublin Central. The refurbishment of One Dublin Central, a six storey, 8,300m^2 former 1960s office building, transformed into some of Ireland's most sustainable commercial office accommodation. It is the current headquarters of ESB International housing up to 500 staff.

We were one of the first organisations in Ireland to successfully deliver a project across all three stages of the SEAI Excellence in Energy Efficient Design (EXEED) – Design, Verify and Manage. The project was completed in 2018 and involved a major lighting upgrade of our Terminal 1 multi-storey and surface carparks. We installed 690 new LED lights saving 964,500kWh of electricity annually.

In 2018, we also installed a small-scale solar PV system at Dublin Airport in 2018. This generates onsite renewable electricity which helps to reduce the amount of electricity we need to purchase from the grid network as well as reducing our carbon emissions.

Alongside the significant reductions we have made in Scope 1+2 emissions over the past decade, we have also helped our business partners to reduce their emissions (our Scope 3 emissions) through the installation of new EV charging stations across the airport. The first landside EV charger was installed in 2013. All contact gates at Terminal 2 have been equipped with 400Hz Fixed Electrical Ground Power (FEGP) units since its opening in 2010. In 2019, FEGP units were installed at all Terminal 3 contact gates.

We recognise the achievements of the last decade in reducing the carbon emissions under our direct control. In the 2020s, we will emphasise areas for improvement including how we engage

with our airlines and other business partners to reduce emissions from their operations on the ground. We will also continue to target deeper reductions of our Scope 1+2 emissions through energy efficiency measures, increased onsite renewable energy generation and upgrading of our combined heat and power (CHP) plants and thermal energy storage capability.

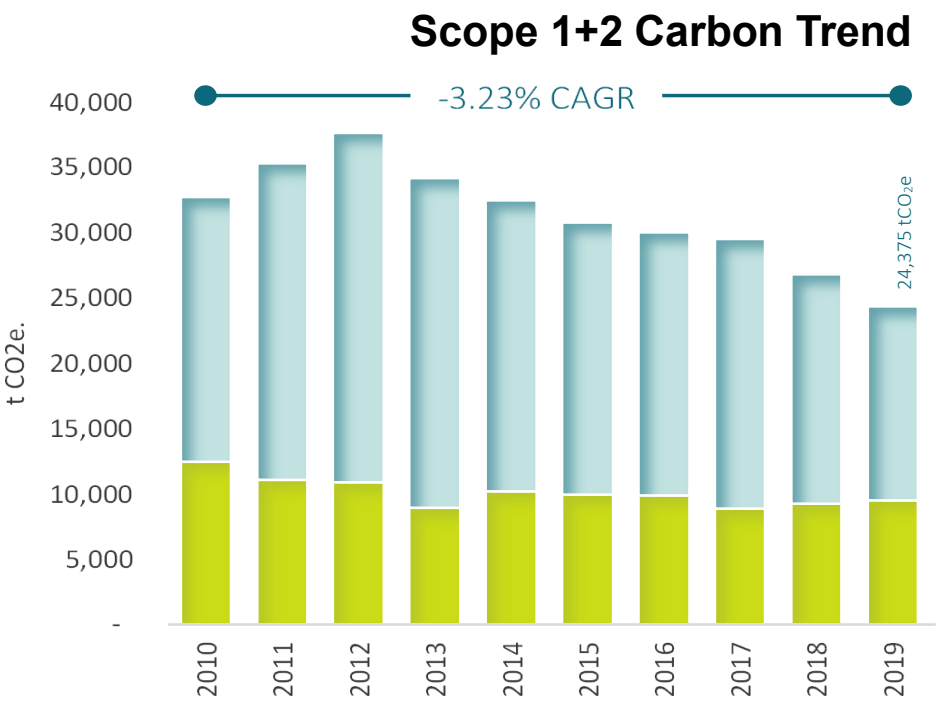
Carbon Management Plan

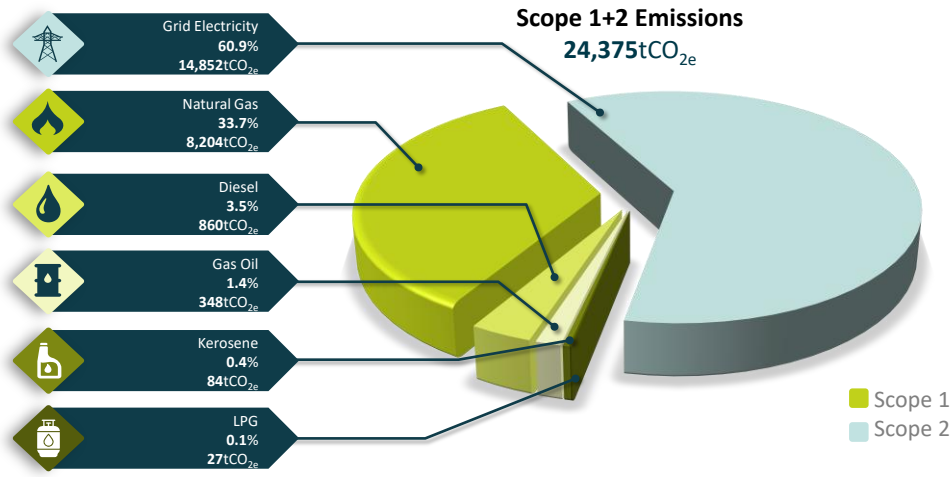
In accordance with the requirements of the *Airport Carbon Accreditation* programme, we have had in place a Carbon Management Plan (CMP) for Dublin Airport since 2012. The CMP sets out the management framework, protocols, and measures to reduce, monitor and report Scope 1+2 emissions across the airport. It is updated every three years in line with our corporate policies and *Airport Carbon Accreditation* requirements.

The CMP contains the following information:

- Staff responsibilities, resource allocations and organisational structure;
- Carbon management initiatives;
- Implementation plan and timetable;
- Communication, awareness, and training requirements; and,
- Self-assessment and auditing arrangements.

This helps to provide our internal departments, tenants, and users with consistent information on our carbon management programme.





Our Baseline Performance

As an airport operator, we are responsible for the management of Scope 1+2 emissions. These sources of emissions fall under our direct control or ownership. They include the emissions from the energy we generate onsite to heat and cool our buildings, liquid fuels used by our vehicles and in fire training and the electricity purchased from offsite sources to light and condition our terminals and offices.

We have measured and reported our Scope 1+2 emissions since 2006. This has enabled us to identify and manage the sources of our emissions through the deployment of effective reduction measures. The implementation of our carbon management programme has also enabled us to better understand the airport's exposure to climate-related risks including transitional and physical risks and the opportunities to address them.

Through our participation in *Airport Carbon Accreditation*, we have strengthened our climate action commitments and implemented numerous measures to reduce our operational carbon footprint. In late 2020, Dublin Airport was accredited at

the Neutrality level (3+). This was achieved by purchasing 100% of our electricity from renewable sources and compensating residual emissions through the purchase of carbon credits. We worked with the global climate finance and neutrality specialist, Natural Capital Partners to purchase carbon credits.

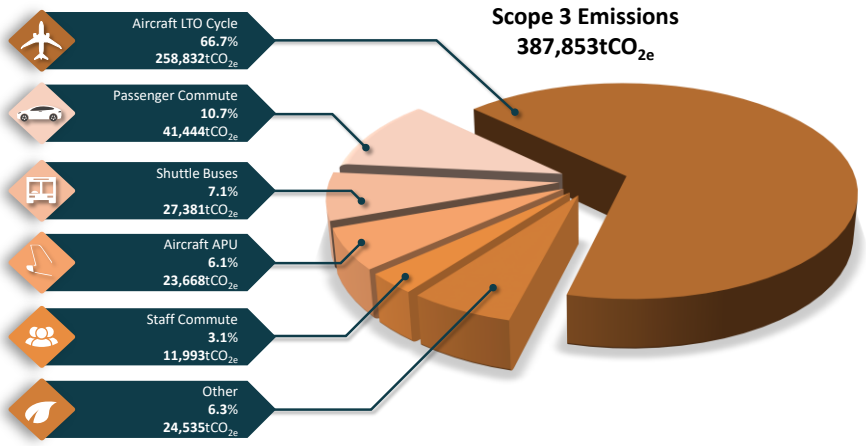
Airport Carbon Accreditation, the voluntary global carbon management standard for airports helps to facilitate the implementation of best practices and achieve emissions reductions. Accreditation provides airports with the opportunity to gain public recognition for their achievements, across six levels of accreditation which are independently verified by an approved third party.

In 2011, Dublin Airport joined *Airport Carbon Accreditation* at the Mapping level (1). The following year, 2012, Dublin Airport upgraded to the Reduction level (2) and held that accreditation until 2020. Since 2012, we have set emissions reduction targets, implemented a CMP to achieve the targets and reduced the airport's Scope 1+2 emissions versus the three-year rolling average. This has coincided with a decoupling of the airport's traffic growth from our absolute Scope 1+2 emissions.

Between 2010 and 2019, our absolute Scope 1+2 emissions reduced by 8,382tCO_2e (-26%), from 32,757tCO_2e down to 24,375tCO_2e annually. During this period, the number of passengers travelling through the airport increased from 18.4mppa in 2010 to 32.9mppa in 2019, an increase of 79%. A breakdown of our Scope 1+2 emissions at Dublin Airport from 2019 is shown on the previous page.

This has also translated into a significant reduction in emissions per passenger from 1.78kgCO_2e per passenger in 2010, down to 0.74kgCO_2e in 2019.

Scope 2 emissions accounted for the largest source of annual reductions, decreasing by 5,433tCO_2e/yr. These results were driven by our investment in new facilities such as Terminal 2 and the refurbishment, replacement and upgrading of other infrastructure across the airport. They were supported by ongoing investment in lighting and ventilation system improvements, additional LEVs entering our vehicle fleet, the installation of a small-scale onsite solar PV system and indirectly through the gradual decarbonisation of the Irish electricity grid.



Third Party Emissions

In 2019, Scope 3 emissions generated by third party activities accounted for more than 93% of Dublin Airport's total carbon footprint with 387,853tCO_2e. As shown above, the five largest sources of emissions are responsible for 94% of the airport's Scope 3 footprint. These are:

1. Aircraft LTO cycle – 258,832tCO_2e.
2. Passenger commute – 41,444tCO_2e.
3. Shuttle buses – 27,381tCO_2e.
4. Aircraft APU use – 23,668tCO_2e.
5. Staff commute – 11,993tCO_2e.

Whilst we are not directly responsible for Scope 3 emissions, we are committed to working closely with our business partners to help them reduce their emissions on the ground.

For example, we are making it easier for the vehicles our business partners operate at the airport to meet the new zero- and low-emission carbon performance standards set under the revised European Clean Vehicles Directive (CVD) 2019/1161.

We continue to identify ways in which to enhance access to Dublin Airport through incentives, promotion, and improvements to the range of sustainable travel choices. Through our Mobily Management Plan (MMP) we implement various initiatives to encourage our staff, passengers, and partners to travel to the airport on more sustainable modes of transport, including active travel (i.e., walking and cycling). These aim to reduce traffic congestion on the road network serving the airport, relieve pressure on airport carparks and lower emissions. In 2019, the sustainable transport mode share of the airport was 35% for passengers and 32% for staff.

We also continue to equip all contact gates at the airport with 400Hz FEGP units to help our airlines minimise the use of their aircraft auxiliary power units (APUs) when parked during turnarounds.

A Call to Action: Towards Net Zero Carbon by 2050

Carbon emissions contribute to climate change. Managing and reducing carbon emissions is important for airports to mitigate their climate change impacts. Ultimately, the IPCC recommends that to limit global warming to +1.5°C, we need to reach Net Zero Carbon emissions by 2050. Intermediate milestones for 2030 and 2040 have also been identified to drive early action. Our Carbon Reduction Strategy is fully aligned with the IPCC's recommendations as well as the commitments made by all levels of government including those of FCC set out in the Dublin Airport Local Area Plan.

Climate Change Impacts

Climate change and more disruptive weather events have widespread repercussions for airports worldwide. Torrential rain, powerful storms, flash floods, warmer temperatures, storm surges and sea level rise are expected to continue and increase in frequency amid rising global temperatures. Based on current global efforts and agreed plans, average global temperatures are projected to rise by +2.4°C to +3.4°C in 2100 above pre-industrial levels.

For an airport, this will potentially damage physical infrastructure, disrupt operations and impact utility and ground transport networks. This means frequent, significant disruption to scheduled flights and potentially significant costs to airport operators, airlines, and passengers. Climate forces and trends are changing the airport business environment, creating uncertainties and influencing the way we operate.

UN SDG Carbon Goals

Goal 7
Affordable, Clean Energy
Develop affordable, reliable renewable energy onsite for future resilience and use 100% renewable electricity through onsite generation and REGO-backed contracts

Goal 12
Responsible Consumption & Production
Drive the sustainable consumption and procurement of natural resources and materials across the airport

Goal 9
Industry, Innovation & Infrastructure
Build climate resilient buildings and infrastructure using innovation, new technology and best available practices

Goal 13
Climate Action
Take urgent action to combat climate change through the design of adaptive, resilient infrastructure and emission reduction measures

Goal 11
Sustainable Cities & Communities
Make Dublin Airport more sustainable and socially inclusive

Goal 17
Partnerships for The Goals
Collaborate closely with tenants, key partners and stakeholders on airport sustainability and chart a path to Net Zero Carbon emissions by 2050

UN SDGs

In September 2015, the UN General Assembly adopted the 2030 Agenda on Sustainable Development to stimulate action in the areas of critical importance to global society and the environment. This Agenda is framed by 17 overarching Sustainable Development Goals (SDGs) and 169 targets.

We have mapped the UN SDG framework against our carbon management priorities and identified six SDGs that are most appropriate to our business based on the ability to make contributions and/or to influence change.

Global Action

Currently 195 countries have signed, and 189 countries have already ratified the Paris Agreement, including Ireland. At the national level, Ireland has prepared and committed Nationally Determined Contributions (NDCs) to strengthen its response to the threat of climate change. Domestic aviation is covered by these NDCs.

The main objective enshrined in the Paris Agreement is to limit the average global temperature rise to well below +2°C above pre-industrial levels and pursue efforts to limit this increase to +1.5°C by 2100.

The Intergovernmental Panel on Climate Change's (IPCC) Special Report published in October 2018 on the impacts of global warming of +1.5°C above pre-industrial levels called for a drastic reduction of global carbon emissions. The findings of this report were supported by scientific evidence to limit global warming to +1.5°C. Against this backdrop, emissions should be reduced by 45% from 2010 levels in 2030 and reach Net Zero Carbon by 2050 (NZC50).

The decades ahead are critical to tackling climate change. It is our responsibility to take decisive steps for Dublin Airport to transition to climate resilience and NZC50. This will require strong advocacy with government, industry and other stakeholders, partnerships, and leadership to decarbonise not just our activities but, to work with our business partners to help them reduce their own environmental footprints.

European Green Deal

The EU aims to be a climate-neutral economy by 2050, with NZC emissions. This objective is at the heart of the European Green Deal and aligns with the EU's commitment to global climate action under the Paris Agreement. The Green Deal provides a roadmap to boost the efficient use of resources by moving to a clean, circular economy, restore biodiversity and cut pollution.

To achieve the NZC50 target, interim 2030 climate and energy targets have been established, including a -40% reduction in carbon emissions, a +32.5% increase in energy efficiency and an increase in renewable energy sourcing of at least +32%.

Integral to the Green Deal is the EU ETS, which is used as a key tool for cutting GHG emissions from large-scale facilities in the power and industrial sectors, as well as the aviation sector.

We participate in the EU ETS and hold a permit under the Irish *Environmental Protection Agency Act 1992*, as amended. The permit, administered by the Irish EPA authorises us to emit a given quantity of GHGs annually from our onsite CHP plants that exceed a generating capacity of 20MW to heat buildings across the airport.

Under the EU ETS we are required to purchase emission allowances (EUAs) where 1 EUA = 1tCO_2. Our current free allocation of EUAs means that we will not have to purchase any EUAs until 2027. Nonetheless, we will continue to monitor carbon prices within the ETS to minimise our future risk exposure to significant price premiums (€/tCO_2) and market valuation under a +1.5°C limit.

Ireland's Climate Plan

Climate action is a top priority for Ireland's future and resulted in the publication of the National Climate Action Plan (CAP) 2019. This defines Ireland's roadmap to reduce carbon emissions in line with key policy actions and incentives needed to drive progress. The National CAP 2019 reflects the Paris Agreement climate goals, EU targets and sets the direction to NZC50.

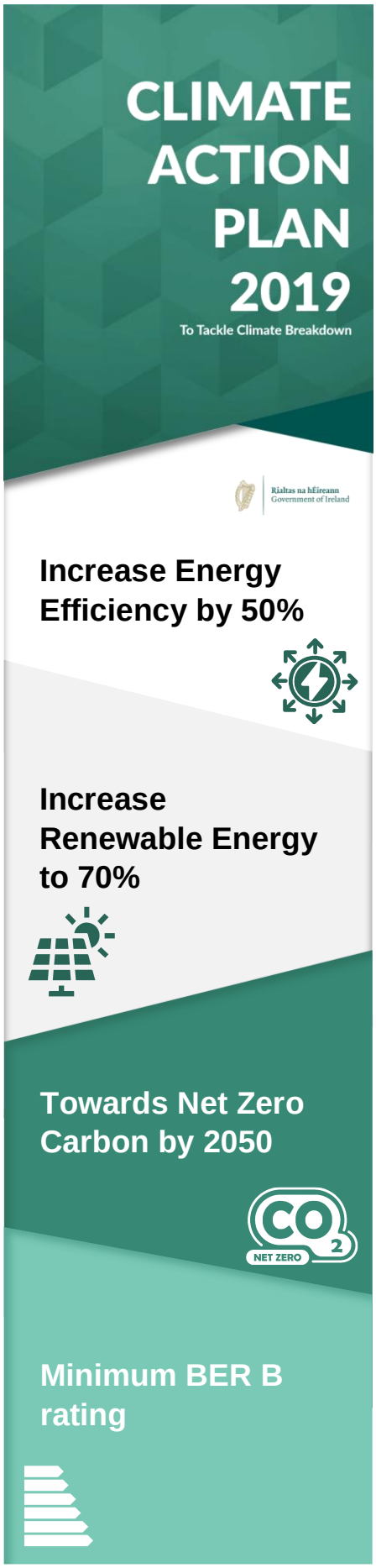
Looking to 2030, the National CAP 2019 set targets measured against a 2019 baseline to:

1. Reduce public sector carbon emissions by -30%.
2. Increase public sector energy efficiency by +50%.
3. Increase the renewable share of electricity generated to +70% and requires all public sector buildings to achieve a minimum BER B rating.

New climate legislation, to be enacted this year through the *Climate Action and Low Carbon Development (Amendment) Bill 2021* ("Bill"), commits Ireland to achieve NZC emissions by 2050 at the latest. The Bill provides that the first two five-year carbon budgets proposed by the Climate Change Advisory Council should equate to a total emissions reduction of 51% over the period to 2030, relative to a 2018 baseline.

These targets are some of the most ambitious of any developed country providing the framework for Ireland to meet its international and EU climate commitments and to become a leader in addressing climate change.

The new National CAP 2021 is under development. Public consultation, running until 18 May 2021, is currently seeking views on the Irish government's climate action to support future initiatives on how to best transition Ireland to a climate neutral and resilient society by 2050.



Fingal County Council

Through the '2017-23 Fingal Development Plan', effective measures were set to reduce carbon emissions, improve energy efficiency, and increase renewable sources for all public sector buildings and infrastructure at the local level. This includes a target to reduce carbon emissions by 40% compared to a 1990 baseline by 2030.

With Dublin Airport, we operate a critical piece of infrastructure not just for Fingal County but all of Ireland. The way we operate the airport could have major consequences on a wide range of activities around the airport. Hence, FCC has developed the Dublin Airport Local Area Plan (LAP) to ensure consistency between the airport activities and the best interest of local communities.

The Dublin Airport LAP 2020 is aligned to international and national climate action goals and commitments. It supports the reduction of airport carbon emissions and transition to NZC50. All future development at Dublin Airport must include renewable energy-based solutions and use low emissions technologies to help reduce the airport's operational carbon footprint.
The Dublin Airport LAP 2020 contains six Climate Action (CA) objectives which development proposals must address as part of any planning application to FCC. These are shown in the graphic to the right and through this CRS we demonstrate how each of these CA objectives will be achieved in support of our IA submission.

Policy makers continue to sharpen the focus on carbon emissions, spurred on by growing worldwide concern on climate change. In recent years various policies and regulations have emerged to which we must comply. For now, the main policies, plans and legislation relevant to reducing our carbon emissions at Dublin Airport are shown on the opposite page.

DUBLIN AIRPORT LOCAL AREA PLAN

JANUARY 2020

Fingal Development Plan 2017-2023 | www.fingal.ie | Comhairle Contae Fhine Gall Fingal County Council

Objective CA01

Support relevant provisions contained in relevant Fingal County Council and National policies, plans and any subsequent plan(s).

Objective CA02

Major applications for aviation related expansion at Dublin Airport shall be supported by a carbon reduction strategy to include mitigation measures for implementation as part of development proposals.

Objective CA03

Require that all new developments at Dublin Airport incorporate design solutions to reduce carbon emissions, including the incorporation of renewable energy and energy saving technologies where practicable, including the use of district heating/cooling systems.

Objective CA04

Facilitate, where appropriate, sustainable energy development proposals and projects at Dublin Airport.

Objective CA05

Facilitate improved public transport links to and from Dublin Airport and require that all traffic generating applications at the Airport demonstrate measures to maximise non-motorised and public transport use while minimising the use of the private car

Objective CA06

All planning applications including proposals for more than 20 car parking spaces shall demonstrate provision and installation of Electric Vehicle charging infrastructure.

The Policy Backdrop

- Kyoto Protocol - 1997
- Paris Agreement (COP 21) - 2015
- UN SDGs – Agenda 2030
- IPCC Special Report 1.5 - 2018
- IATA 3-Climate Goals | Industry-wide Strategy - 2009
- ACI *Airport Carbon Accreditation* Programme - 2009
- ICAO CORSIA MBM – 2021-35

- Climate Law & Policies
- Energy Performance of Buildings Directive (2010/30)
- Energy Efficiency Directive (2021/27)
- Renewable Energy Directive (2018/2001)
- Clean Vehicles Directive (2019/1161)
- EU Emissions Trading System (ETS)
- Clean Energy for all Europeans
- The European Green Deal - 2019
- EU Climate Law – 2020
- Climate Target Plan - 2030
- ACI Europe Net Zero Carbon 2050 Resolution
- ACI Europe 100 Carbon Neutral Airports 2030 Commitment

- Climate Action Plan 2019
- Project Ireland 2040
- National Energy Efficiency Action Plan
- National Energy & Climate Plan
- National Mitigation Plan 2017
- Action Plan for Aviation Emissions Reduction 2019
- Climate Action & Low Carbon Development Act 2015
- Climate Action & Low Carbon Development (Amendment) Bill 2021
- 2017 nZEB Part L Regulations
- NASI IS393
- NASI IS399 EED Management
- SEAI EXEED Certification
- Display Energy Certificate

- Dublin Airport Local Area Plan 2020
- Climate Change Action Plan 2019-24
- Fingal Development Plan 2017-23
- Eastern & Midland Region Spatial & Economic Strategy 2019-31

- Sustainability Policies
- Sustainability Strategy
- Sustainability Targets
- EU ETS Permit (Irish EPA)
- Mobility Management Plan
- Carbon Reduction Strategy
- Airport Carbon Accredited at Neutrality level (3+)
- Sustainability Guidelines
- Sustainability Certifications
- Sustainable Procurement
- ISO 14001:2015
- ISO 50001:2018
- ISO 55001:2014

- Planning Permission
- Project Approval Documentation
- Environmental Permits and Licenses
- Project Sustainability Statement
- Sustainability Rating System
- Minimum Sustainability Requirements (MSRs)
- Project Sustainability Measures/Initiatives

Aviation Industry Response and Initiatives

New Aircraft technology | Improved Operations | Efficient Infrastructure | Sustainable Aviation Fuels | Global Market-Based Measure

The aviation sector is working hard to address the threat of climate change. Airports and airlines will play key roles, with decisive action required over the 2020s to accelerate the decarbonisation of airports worldwide. No individual airport or airline can combat the threat of climate change on its own. That is why significant effort is being made to unify climate action objectives through the various initiatives being led by aviation bodies like ICAO, IATA, ACI and others.

Global Air Transport

Air transport connects countries, economies and cultures worldwide facilitating vital flows of trade, investment and tourism.

According to the IPCC, global air travel is currently responsible for between 2-3% of total human-induced carbon emissions with airports accounting for less than 1% of this global share. Whilst this percentage of carbon emissions from aviation has not changed significantly since 1992, aviation's share of global emissions is expected to increase as other industries decarbonise.

As air travel demand increases it will be more difficult to limit the consequences of global warming. Hence, the global aviation industry, including airports, is committed to transitioning towards a lower carbon future.

Sustainable Aviation

The largest source of aviation industry emissions is from aircraft operations which contribute approximately 98% of all air transport sector emissions.

In 2008, leaders from across the aviation industry gathered at the Air Transport Action Group's (ATAG) Aviation and Environment Summit in Geneva to deliver a strategic vision on how to tackle climate change and other environmental challenges, signing the Commitment to Action on Climate Change. This call to action, one of the first industries to do so at the global level, launched three climate change goals in 2009. They were developed by the ATAG Board with the support of airports, airlines, air traffic navigation service providers and aircraft manufacturers.

The goals are:

1. Improve fleet fuel efficiency by an annual average of 1.5% between 2009-20.
2. From 2020 stabilise, net carbon emissions from international aviation (carbon neutral growth).
3. Reduce net aviation carbon emissions by 50% in 2050 relative to 2005 levels.

These goals are underpinned by an industry-wide strategy of:

1. New aircraft technology.
2. Improved operations.
3. Efficient infrastructure.
4. Sustainable aviation fuels.
5. A Global Market-Based Measure.

Airport Carbon Accreditation Levels

Over the last decade many airports and airlines have started to integrate sustainability and climate-related risk into their business strategies. They acknowledge their societal and environmental responsibilities and embed these as key pillars for success and public acceptance moving forward.

Airports and airlines are also encouraged by economic and financial drivers, such as carbon pricing. These costs must now be factored into business cases, infrastructure investment plans, fleet purchases, flight procedure and route network decisions.

In Montreal in 2016, the International Civil Aviation Organisation (ICAO) adopted the Carbon Offsetting Scheme for International Aviation (CORSIA). CORSIA is a global, route-based carbon offsetting scheme to address carbon emissions and holds airlines accountable for their climate impact.

The first phases of CORSIA are voluntary (pilot and phase 1), running from 1 January 2021 to 31 December 2026. From 2027 it will be mandatory for most countries, including Ireland. Flight emissions will need to be offset if both 'origin and destination' states participate in CORSIA.

CORSIA applies to all registered international aircraft operators (commercial and private) where their operations emit more than 10,000tCO_2e/year.

Under CORSIA:

1. All aircraft operators must monitor, report, and verify their fuel use and carbon emissions on all international flights.

2. All aircraft operators will be required to purchase "emissions units" to offset any growth in emissions after 2020.

We will therefore work closely with our airlines already participating in CORSIA, and advocate involvement of those that do not (yet).

Reducing Airport Emissions

Whilst airports make up a relatively small portion of the total global share of carbon emissions, less than 1%, they are still large contributors within their regional environment due to the size and scale of property, infrastructure, and operations.

We understand our responsibility to combat climate change through reducing our Scope 1+2 emissions, and ultimately through continuing to operate as a carbon neutral airport. Meaningful emission reductions are achievable through new technology, improved operations, and efficient infrastructure. Using best available practices and innovation we can support the stewardship of natural resources, future-proof against climate-related risk to create a more adaptive, resilient airport.

A supportive, consistent policy and regulatory framework will be necessary to guide and enforce the sustainable development of airports. The Irish Building Standards and Part L nearly Zero Energy Building (nZEB) Regulations 2017 set minimum requirements for energy efficiency, renewable energy, material choices, and carbon performance.

Complementing the suite of Irish climate policies, plans and the Part L nZEB Regulations 2017 is ACI's *Airport Carbon Accreditation* programme, to measure, promote and reward airport carbon management worldwide.

Airport Carbon Accreditation was developed and launched by ACI Europe in 2009, initially for European airports and went global in November 2014. There are currently 340 airports operating out of 74 countries that participate in the programme, including Dublin and Cork Airports in Ireland. Around 45% of annual global passenger passengers are welcomed by accredited airports, and this continues to grow as more airports join the programme.

Airport Carbon Accreditation is unique as it is the only voluntary, institutionally endorsed, global carbon management standard for airports. It provides a common framework for active carbon management and relies on internationally recognised methodologies, including the Greenhouse Gas Protocol and ISO14064 to independently assess and recognise the efforts of airports to manage and reduce their carbon emissions.

Airport Carbon Accreditation provides six progressively ambitious levels of certification as shown in the graphic at the top of the previous page.

Dublin Airport is currently one of 60 airports worldwide accredited at the Neutrality level (3+) in the programme. Accreditation at the highest levels, Transformation (4) and Transition (4+) requires airports to:

- Align with the climate goals of the Paris Agreement to limit global warming to +2°C above pre-industrial levels and pursue efforts to meet the +1.5°C warming limit;
- Reduce absolute emissions in line with the IPCC's recommended 1.5°C warming limit to transition to NZC50;
- Commit to absolute emissions reduction without relying on the purchase of carbon offsets;
- Extend the carbon footprint boundary to include additional Scope 1+3 emissions; and,
- Collaborate actively with stakeholders and build strong partnerships.

Global Airport Leaders

Airports worldwide are paving the way to a low carbon future as they work towards ambitious absolute carbon emissions reduction targets.

In late 2020, Swedavia became the world's first airport operator to run facilities across its ten airports on fossil-free power. This has been a decade long mission to progressively reduce its operational carbon footprint of 8,000tCO_2e to "zero".

All ten airports, including Sweden's largest, Stockholm-Arlanda (ARN) handling 26.8mppa in 2019, are powered by, heated, and cooled with renewable energy including the back-up power generators. Between 2015-2020, Swedavia invested over €60 million to run its entire vehicle fleet on electricity or biogas.

Several other airports have accelerated their pathways to NZC to within this decade, with Hamburg (HAM) in 2022, Athens (ATH) and Bristol (BRS) in 2025, and Christchurch (CHC), Dallas Fort-Worth (DFW) and Delhi (DEL) in 2030.

Other sustainable airport leaders across Europe, including Amsterdam Schiphol (AMS), Copenhagen Airport (CPH) and Oslo Gardermoen (OSL) have all committed to targets of NZC by 2030.

These demonstrate that reaching NZC is an ambitious but achievable goal and highlights that airports of any size can operate with a minimal carbon footprint.

Becoming a NZC airport requires steps to be taken to prioritise emissions reduction actions by considering:

- Carbon emissions sources, particularly the infrastructure, plant and equipment which consumes large amounts of energy and fuels; and,
- Opportunities to deliver emissions reduction through electrification, fuel switching, building and plants upgrades.

The benefits of airports moving towards NZC are significant. Some of the best practice initiatives and innovation being implemented at other international airports, include:

- Low- and ultra-low energy lighting and ventilation systems;
- Airfield lighting and control system upgrades;
- Energy efficient baggage handling systems and vertical transport;
- Onsite solar photovoltaic (PV) and battery energy storage;
- Ground and air source heat pumps;
- Electrification of onsite thermal energy plant, vehicle fleets and ground support equipment;
- Fixed electrical ground power (FEGP) and pre-conditioned air (PCA) units;
- Surface access improvements with more sustainable travel choices including walking and cycling access;
- Energy from waste (e.g., using an onsite anaerobic converter);
- Sustainable, low- to nearly Zero Energy Buildings (nZEBs);
- Electricity purchases through renewable guarantees of origin (REGO) backed supply contracts; and,
- Carbon offset purchases as an interim measure to compensate residual emissions until new carbon removal technologies are proven, certified and fully commercialised.

Our Carbon Strategy

daa is committed to support a successful roadmap to a net zero society by 2050. Our long-term strategy is to tackle all elements of our airport's operation, mitigating carbon emissions throughout. We want to drive this change sooner not later, and have set ourselves 2030 targets, achieving a 30% absolute reduction compared to 2019, even with all expansions planned. Thereby, we want to improve energy efficient operations and increase onsite renewables.

Our Strategic Vision

The ongoing management and reduction of carbon emissions at Dublin Airport is part of our strategic vision and longer-term plans **"to be a national exemplar and European airport leader in sustainability on the way towards achieving our NZC50 goal"**. We are therefore focused on measurable, performance-based outcomes to drive our capital programme, and prioritise future actions and resources accordingly. For that purpose, we have set three targets to reduce our carbon emissions.

The target date is 2030 and we will measure change against a 2019 baseline as listed below:

1. Absolute **Carbon** Reduction by 30% (tCO_2e/year).
2. Improve **Energy** Efficiency by 15% (kWh/m^2/year).
3. Increase **Onsite Renewables** by 10%.

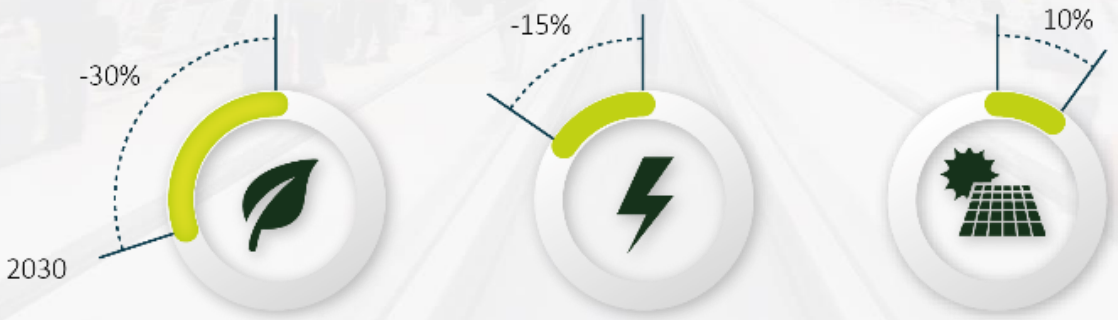
The primary objective of these targets is to optimise and, where practicable, reduce the inevitable increase in energy use, consumption of materials, emissions and associated cost of expanding, modernising and improving Dublin Airport. They align with worldwide and national efforts to meet the 1.5°C global warming limit and current work by the global aviation industry to secure a NZC target at the 41st ICAO Assembly scheduled for 2022.

When measuring against the IPCC's 2010 baseline, our 2030 target will position Dublin Airport ahead of IPCC's recommended interim target milestone of -45% reduction of emissions to provide acceptable alignment with the IPPC 1.5°C limit.

Three 2030 Carbon Reduction Targets

The scale and size of Dublin Airport means that our staff, passengers, airlines, and the business itself, can make important contributions to reducing the carbon emissions for which they are responsible for. The measures and initiatives outlined in this CRS form an integral part of our plans to decarbonise Dublin Airport.

To monitor the effectiveness of our emission reduction measures, we have developed Key Performance Indicators (KPIs) to measure our progress to meeting these goals and targets through to 2030 compared to a 2019 baseline.



Globally and in Ireland, governments, businesses, investors, airlines and airports have already taken steps to align their policies, plans and strategies with NZC emissions. This is reflected in the EU's Green Deal, the Irish (Climate Action Plan 2019 (2021 plan currently under development) and the Dublin Airport LAP commitments and objectives.

Committing to a NZC50 goal or earlier is fast becoming the norm in support of the Paris Agreement climate goals and efforts to limit global warming to +1.5oC.

In response to the IPCC's Special Report (2018), ACI Europe announced a Net Zero Carbon by 2050 (NZC50) commitment in June 2019. This was signed by more than 200 airports including Dublin Airport.

We will continue to show leadership in our carbon management programme. Meeting our 2030 targets will strongly position Dublin Airport on the IPCC's +1.5°C pathway supporting a smoother transition to our long-term NZC50 goal.

Our initial priority is to focus on managing and reducing emissions under our control or ownership. As we advance towards 2030, we want to be transparent in the way we measure and report progress especially with FCC, other levels of government, national regulators including CAR, and our local community.

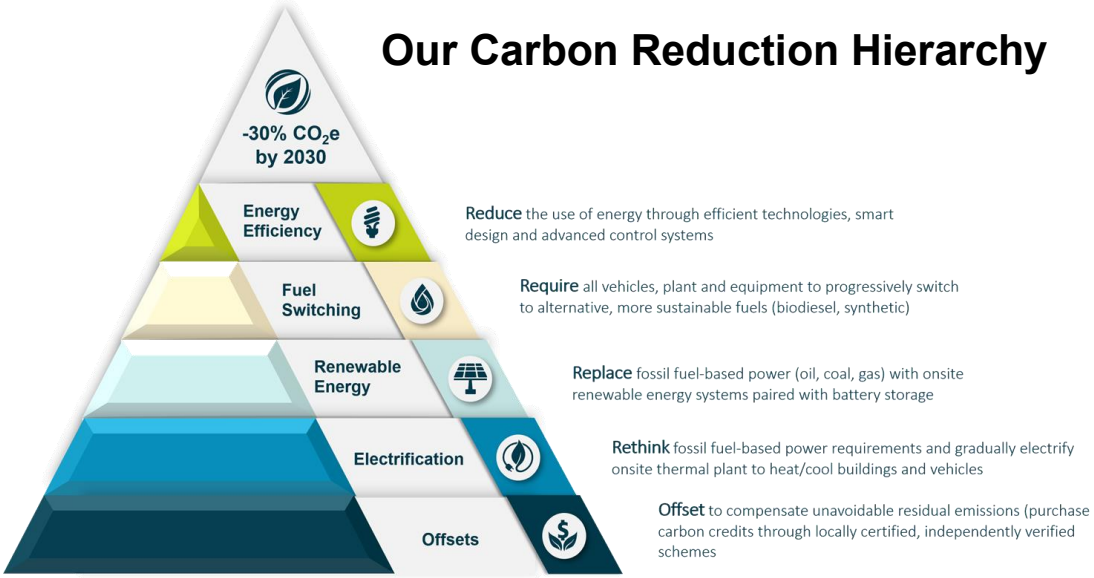
Through collaboration and strong partnerships with stakeholders at the airport, local communities around the airport and our supply chain, we will work closely with them all to help reduce emissions for which they are responsible and to keep them informed of the steps being taken to improve the overall carbon emissions performance of Dublin Airport.

This will put Dublin Airport on track to meet our longer-term ambitions and continued sustainable growth. This is realistic considering that over the past decade we reduced our emissions by an average of -3.23% per year and which if continued over this decade would enable us to meet our 2030 carbon reduction target.

To build on the momentum of the last decade, we also plan to upgrade to the Transition level (4+), the highest level of certification in the *Airport Carbon Accreditation* programme by 2026 whilst maintaining our Neutrality level (3+) certification until then.

Our Carbon Reduction Action Plan

We are committed to operating and developing Dublin Airport is the most sustainable manner possible. This requires is to consider the specific opportunities and challenges to decarbonise our activities and those across the airport for which third parties are responsible all the while we harmonise our carbon management practices and plans to operate a safe, secure, and efficient airport.

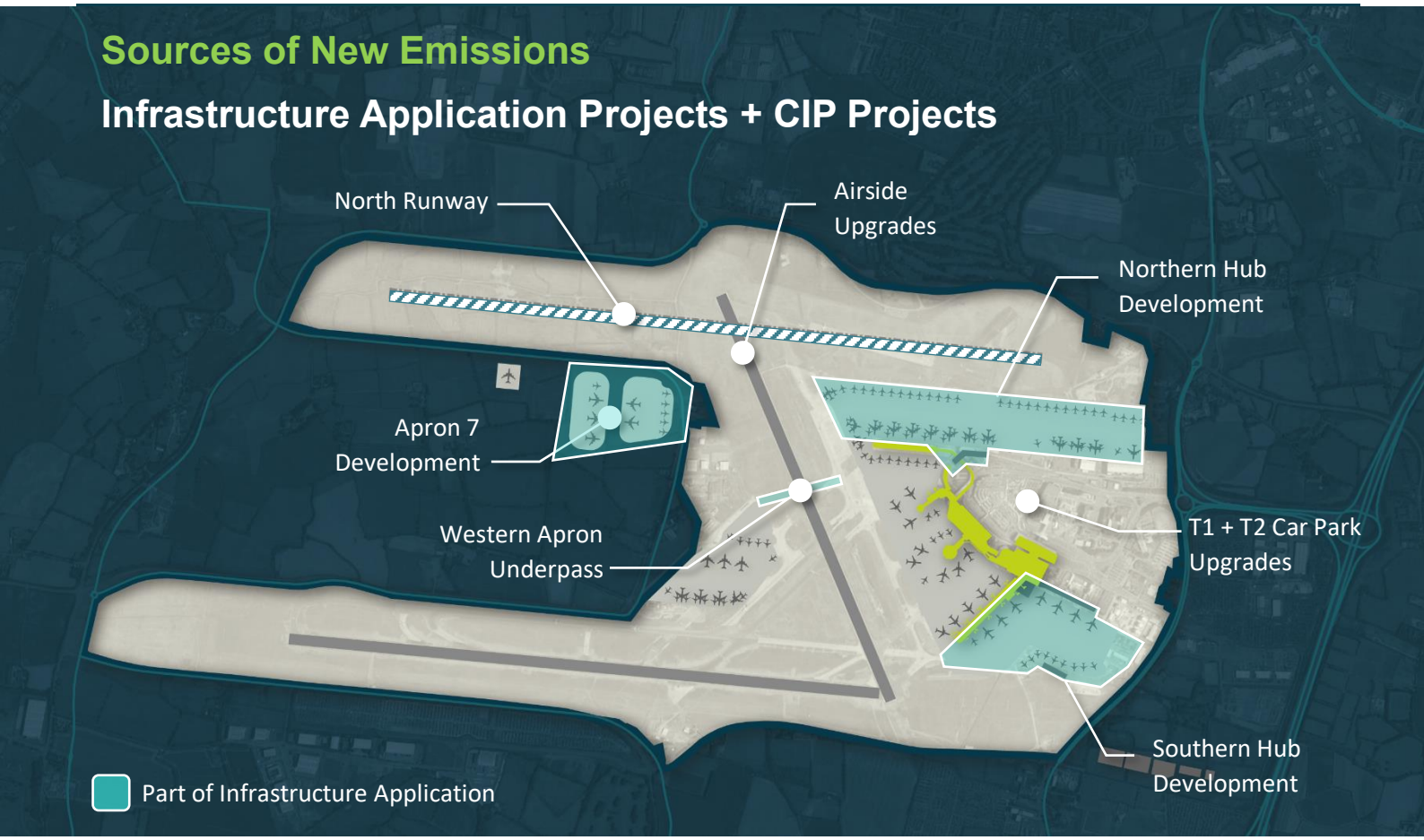


Our carbon reduction strategy builds on our existing carbon management practices and initiatives. We have formulated a stepwise approach to ensure we can grow Dublin Airport sustainably, whilst also keeping on track to reducing carbon emissions on our way meeting our long-term NZC50 goal.

We have committed to reducing emissions over which we control or own (Scope 1+2 sources). A priority-based hierarchy to reduce emissions has been developed for the airport as shown above. It classifies the complementary options which support progress towards the management of our Scope 1+2 emissions. Together the measures from each of the above layers can simultaneously reduce our carbon footprint and operating costs.

For each project we will apply this hierarchy but recognise that no two projects are the same and this approach may not represent the best strategy for every project.

Embedded into the planning and design phase of our capital projects are minimum carbon performance requirements. These are performance-based targets to drive innovation and project lifecycle cost savings.



We will measure the carbon performance of each our projects against the following minimum carbon performance requirements:

- 20-40kgCO_2e/m^2/year for all new buildings;
- 40-60kgCO_2e/m^2/year for all building refurbishments;
- 10-20% of primary energy demand for all new buildings to be supplied from onsite renewable energy;
- Minimum BER B3 rating for all new buildings; and,
- All new buildings to be nearly Zero Energy Buildings (nZEB).

Annual Emission Inventories

We measure and report our Scope 1+2+3 carbon emissions annually under *Airport Carbon Accreditation* with the help of our business partners. This is done by producing an inventory that allows us to better understand, monitor, and manage our activities and energy consumption across the airport. We also use the inventory to develop policies, strategies, and measures to reduce our emissions, and encourage our business partners to do the same.

Airport Carbon Accreditation accounting conventions follow a set of strict rules that facilitates relative comparison across airports.

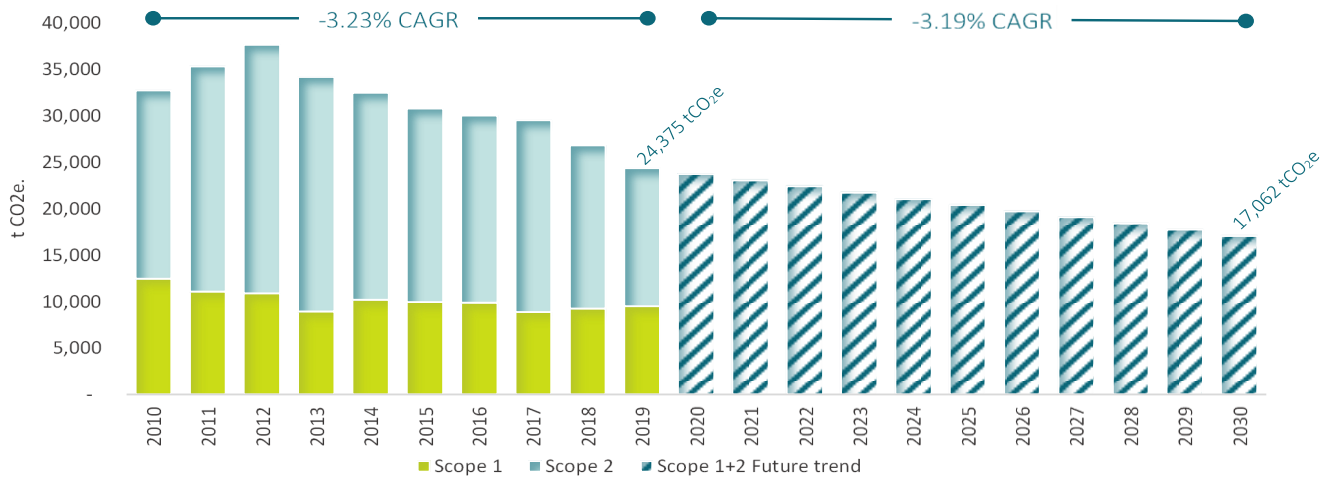
The SEAI, a government body responsible for transforming Ireland's energy structure, technologies, and practices, prescribes carbon monitoring and reporting methodology which we use to disclose annually our energy performance and Scope 1+2 emissions.

This does not mean that one method is necessarily better than another.

However, it is important to ensure consistency, especially when comparing methodologies. Thus, unless otherwise stated, all CO_2e figures and graphs shown in this document are for Scope 1+2 emissions based on the SEAI Monitoring and Reporting (M&R) System. All the data directly linked to *Airport Carbon Accreditation*, Scope 3 emissions, is based on the programme's carbon accounting methodology.

Emissions Forecast

To better serve our community, we are planning for sustainable growth at Dublin Airport as part of a post-COVID recovery. We have in place a rolling 5-year CIP which identifies upcoming projects, including 13 projects directly related to the infrastructure development to increase the airport's capacity to handle 40mppa safely, efficiently, and sustainably.



These 13 projects are the main development components of this IA submission and together introduce an additional 32,345m^2 of floorspace to be lit and conditioned. They comprise:

- More aircraft parking stands;
- Extra and improved terminal capacity;
- Expanded and improved security arrangements within the airport;
- More carpark spaces and better surface transport access to the airport; and,
- Upgraded ancillary utility infrastructure (water, sewerage, and drainage).

Additional projects including the opening of the new 3,110m north runway 10L/28R (granted permission to build by An Bord Pleanála in 2007) in 2022, the refurbishment of levels 4 and 5 in Terminal 1 for office accommodation and others under our current CIP are also scheduled to be delivered this decade.

Without appropriate emission reduction measures, the new infrastructure projects in this IA could increase our Scope 1+2 emissions above the 2019 baseline by **4,326 tCO$_2$e** to **28,701**tCO$_2$e. This is attributable to increases in both annual energy consumption and peak demands.

To limit the impacts of the new infrastructure development we will implement a basket of complementary measures that balances opportunities to conserve, generate, and control energy across the airport.

The most recent energy efficiency measures will be implemented to new constructions and refurbished buildings based on our ambitious sustainability guidelines. By ensuring all our new builds meet the Part L nZEB Regulations 2017, we expect to reduce the energy demand of planned terminal capacity enhancements. The Part L nZEB 2017 requirements not only cover energy performance but also require us to power our buildings with 10% to 20% renewable energy depending on the building's CPC and EPC performance.

The Part L nZEB Regulations 2017 also cover our refurbishment projects. While technical requirements may vary, the end goal remains the same – reduce our operational carbon footprint.

At Dublin Airport, our buildings are required to meet a minimum Building Energy Rating (BER) B3 rating. The BER ranks buildings according to their energy efficiency and covers energy use for space and water heating as well as lighting. The primary energy needs are calculated per unit floor area per year (kWh/m^2/year). We have developed sustainability guidelines that set minimum values to be achieved for a wide range of criteria including materials selection lighting and ventilation, potable water use, waste minimisation and recycling. These apply to all our capital projects and will be regularly reviewed and updated.

Our Reduction Target

In line with the IPCC's recommendations and goals set by the EU, Irish government, and FCC, we have committed to reach **NZC50** through the absolute reduction of our organisation carbon footprint (i.e., Scope 1+2 emissions) without the use of offsets.

Because achieving NZC50 is going to significantly change how we do business, we have set a short term 2030 carbon reduction target. This target requires us to reduce absolute Scope 1+2 emissions by -30% below a 2019 baseline by 2030. The 2019 baseline year is the most recent pre-COVID-19 pandemic year with a full set of available data and reflects the baseline year set under the National CAP 2019.

Our 2030 carbon reduction target is ambitious and fully aligns with the IPCC's recommended acceptable range to reduce emissions by -45% below 2010 levels by 2030.

To achieve our 2030 target, we will need to reduce our annual Scope 1+2 emissions by **11,639tCO$_2$e** (after applying the uplift) over the next 10 years down to **17,062tCO$_2$e**.

By achieving this short-term target, we will ensure Dublin Airport is well placed and prepared to pursue our longer-term NZC50 goal whilst avoiding any major disruption to the airport's financial and operational interests.

Emission Reduction Measures

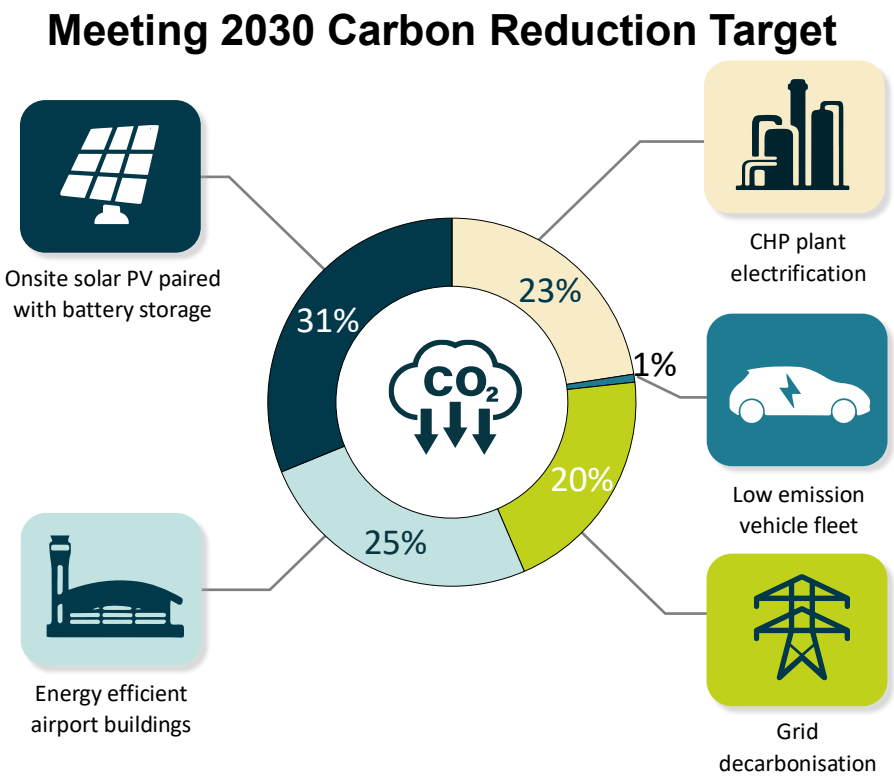
A basket of emissions reduction measures has been developed to help us reduce the projected uplift in our Scope 1+2 emissions from **28,701tCO_2e** by **11,639tCO_2e** to achieve our -30% reduction target of **17,062tCO_2e** by 2030.

The reduction of our Scope 1+2 emissions will be underpinned by five core measures:

1. Energy efficiency measures.
2. Zero to low emission vehicles.
3. Onsite renewables.
4. Fuel switching and electrification.
5. Grid decarbonisation.

We are committed to act on multiple fronts simultaneously. We will implement proven emission reduction measures at a suitable scale including:

- Onsite renewables using solar PV and battery energy storage when the technology matures, is more commercially viable and our airport network has the capacity to generate and distribute more onsite renewable electricity;
- Lighting upgrades to LED luminaires with smart controls;
- Chiller upgrades to high efficiency systems under full and part load conditions using low global warming potential and zero ozone depletion potential refrigerants across our terminals (i.e., series counterflow);
- High efficiency air-source heat pumps to regulate thermal comfort across in our terminals and buildings;
- 100% Low Emission Vehicles (LEVs) operating in our light-duty vehicle fleet;
- Renewable electricity purchases through 'guarantees of origin' backed supply contracts;
- nZEBs for all new buildings across the airport achieving a minimum BER B rating;
- Energy efficient baggage handling system motors and belts;
- Energy efficient vertical transport systems (i.e., lifts, escalators);
- Minimum BREEAM (Very Good) and/or LEED (Gold) certification for major refurbishments and BREEAM "Excellent" or LEED "Platinum" for new major new builds);
- Sustainable construction techniques and practices that minimise emissions through material choices and transport/logistics; and,
- Continuous engagement with our tenants and business partners to try and find ways in which to support them in making decisions that help to reduce their emissions.



These measures are already widely deployed by airports worldwide, including at Dublin Airport. These measures will be vital for us to reduce our carbon emissions by -30% by 2030.

Based on a high-level emissions assessment of each project, we expect our 2030 target will be met by contributions from the measures shown in the graphic above which total 11,636tCO_2e/year of emissions reduction.

Grid Decarbonisation

Along with the predicted decarbonisation of the Irish electricity grid from the continual uptake of renewables in the national energy mix, there will be a progressive shift away from fossil fuel-based power dependency. The goal is to transition towards carbon neutral solutions, like wind energy, solar energy, potentially supported by battery storage, which will reduce the carbon emissions factor of the grid electricity we use.

To avoid overreliance on the uptake of renewables in the national electricity grid, we have adopted a more conservative assumption than the CAP 2019 objective of a 70% renewable grid mix by 2030. Should Ireland reach this objective, our emissions could significantly drop below our 2030 target.

Continuous Improvement

In pursuit of our 2030 target and longer term NZC50 commitment, we plan to evaluate the technical and financial feasibility and suitability of additional measures to implement between 2026-2030, including:

- Installation of new onsite solar PV systems and upgrade of the airport's generation and distribution networks and grid connection for additional renewable power capacity;
- Continual investment in new energy efficient equipment and control systems such as LED lights and telemetry/automatic monitoring systems to improve energy consumption across the airport, reduce energy costs and carbon emissions;
- Replace and upgrade end-of-life HVAC systems across Terminal 1 and Terminal 2 with new high-efficiency boilers, water heaters, controls, chillers, pumps and other equipment as they reach the end of their planned service life;
- Improve thermal energy storage and efficiency through the upgrade of plant heat generating and distribution systems and the possible electrification of Terminal 2's CHP 4 plant; and,
- Evaluate the feasibility of an onsite anaerobic digestor to convert waste into low-grade renewable heat to power airport buildings on the northern part of the airport.

Emissions Blueprint

In the emissions blueprint opposite, details are provided on the key actions and initiatives to guide the reduction of our Scope 1+2 emissions for this decade.

GOAL Decarbonise all aspects of our operations and future development, and continue to work with our partners, passengers and other stakeholders to reduce or even eliminate their emissions

-30% CO_2e

2019 → 2030

	Improvement Measure	Scope Saving	Target Effect	Timeframe
1	Maintain and renew our *Airport Carbon Accreditation* at the Neutrality level (3+) and compensate residual emissions by offsets	1 2	Indirect	
2	Evaluate the feasibility of an onsite anaerobic digestor to support our circular economy transition and supply low-grade renewable heat	1	Medium	
3	Replace and upgrade end-of-life lights with energy efficient Light Emitting Diodes (LED)	2	Medium	
4	Deliver new Near Zero Energy Buildings across the airport in line with latest Irish Part L Building Regulations	2	Medium	
5	Replace and upgrade end-of-life ventilation and building control systems with high efficiency and intelligent technologies	2	Medium	
6	Continue to purchase 100% renewable electricity through REGO backed supply contracts from Irish electricity retailer(s)	2	Indirect	
7	Replace and upgrade all street, car park and high-mast apron lights with LEDs	2	Low	
8	Complete the transition of our light vehicle fleet to 100% LEVs and acquire biodiesel or electric buses following trials/feasibility	1	Low	
9	Install more EV chargers across the airport for daa, tenant and customer vehicles	1	Low	
11	Install a new onsite ground-level solar PV system with generating capacity up to 7.5MWp	2	High	
12	Replace all airfield ground lights and signage with more efficient LEDs	2	Low	
13	Upgrade our Airport Carbon Accreditation to the Transition level (4+), the highest level under the programme	1 2	Indirect	
14	Evaluate the feasibility of installing additional onsite solar PV capacity paired with battery storage	2	Medium	
15	Optimise the thermal energy storage capacity of the CHP 4 plant and upgrade its heat exchanger and LPHW pipe system	1	High	

Total Airport Approach

The largest source of emissions at Dublin Airport is from aircraft landing and taking-off (LTO), followed by ground-based staff and passenger travel to and from the airport. To reduce emissions on a total airport basis, we must continue to develop strong partnerships and have effective dialogue with all stakeholders. Each stakeholder emits carbon and is responsible for the reduction of emissions under their control (Scope 1+2 sources).

For the aviation industry to tackle climate change as effectively as possible and reduce industry carbon emissions, all stakeholders must recognise the high level of interaction and inter-dependence between each other. At daa, we believe the infrastructure we provide for use by other stakeholders will play a key role in decarbonising their operations.

Recognising these interactions, we commit to not only reducing our own carbon emissions but also to help facilitate emission reductions across the airport rather than just focusing on what we can achieve in isolation as the airport operator.

While objectives mainly focus on the varied aspects of aircraft operations, we are also committing to help passengers and staff travelling to the airport use more sustainable and active modes of transport, including by bus, bike, foot, and train in the future.

Through strong partnerships and working closely with our tenants and business partners we will identify areas where emissions can be reduced across the airport. For example, 400Hz FEGP units are progressively being installed at all contact gates across the airport. This will help aircraft to minimise the use of their auxiliary power units (APUs) during turnarounds. For the most common aircraft operating at Dublin Airport, the Boeing B738, one minute less run time of its onboard APU saves between 6-7kgCO_2e subject to engine type, idle thrust setting, and weather conditions.

We should also regulate third parties who emit carbon at the airport as a prerequisite of all operating agreements. For example, renewable energy purchases could form part of each agreement signed with us.

Carbon Reduction Focus Areas

To reduce Dublin Airport's carbon emissions and reach NZC50, we have access to a wide range of measures to implement across all parts of the airport. External stakeholders can also play a role in reducing the airport's carbon emissions. Some of the measures identified in this section have already helped to decarbonise Dublin Airport. Continued efforts complemented by additional new measures will further cut emissions.

Scope 1+2 Emissions

Low Emission Vehicles
-116 tCO_2e
(1% of reductions))

EU legislation defines LEVs as vehicles having tailpipe emissions below 50g CO_2e/km. Following a trial completed in 2019, our entire fleet of light-duty vehicles, 122 will be 100% LEVs by 2024. Today, around 22% of our light-duty vehicle fleet are LEVs all of which are electric vehicles (EVs) with zero tailpipe emissions. In line with the requirements of the EU Clean Vehicles Directive, LEVs will also be mandated for airside operators by 2022, including all tenant and business partner vehicle fleets. For our staff and passengers, we plan to increase the number of EV chargers across the airport, especially in our landside car parks. These measures will not only reduce our Scope 1 emissions but also improve local air quality.

For our fleet of heavy-duty vehicles, we aim to convert our buses to LEV alternatives in line with the EU Clean Vehicles Directive. Even though heavy-duty LEVs have shortcomings, they are a reliable and efficient alternative for airport operations as proven at Brisbane Airport (BNE) in Australia. BNE operates a fleet of 11 electric buses with a driving range of 600km on a single charge and zero tailpipe emissions saving around 250tCO_2e every year.

Amsterdam Schiphol airport (AMS) is currently served by 211 electric buses, the largest zero-emissions bus fleet in Europe. They operate 24-hours a day with a battery capacity of 170kWh that when fully charged can drive up to 80km, based on an assumed power use of 2kWh/km.

Onsite CHP Plant
-2,677 tCO_2e
(23% of reduction)

The airport is currently served by three gas-fired CHP plants. They heat the space inside our two existing terminals:

1. CHP 2 – Terminal 1 Energy Centre.
2. CHP 3 – Terminal 1 Energy Centre.
3. CHP 4 – Terminal 2 Energy Centre.

During the summer months (June-September) we switch-off our CHP plants. For optimum performance, CHP plants should be sized to the heat load demand of the airport. Currently our CHP plants operate at reduced output dumping up to 30% of heat annually.

To improve the thermal efficiency of our CHP plants, we will upgrade the thermal energy storage capability of CHP 4, all heat exchangers and low-pressure hot water (LPHW) piping systems to distribute the heat. This will be complemented by the installation of heat meters to monitor in near real-time the thermal performance (heat utilisation/dumping) of our CHP plants.

As we continue to invest in new infrastructure at Dublin Airport and implement emissions reduction measures, our greatest source of Scope 1+2 emissions will be natural gas combustion for space and water heating from the CHP plants. In the absence of replacing natural gas with renewable/biogas, we will need to evaluate the feasibility of electrifying our onsite CHP plants.

Grid Energy
-2,328 tCO_2e
(20% of reductions)

We currently purchase 100% of our electricity through a REGO-backed supply contract. We hold a REGO certificate issued by our electricity retailer that confirms 100% of our electricity is supplied from renewable sources.

We report our Scope 2 emissions using both the location-based and market-based methods. Using the market-based method enables us to account for the carbon intensity of the renewable electricity purchases from our supplier. In this case our Scope 2 emissions are reported as $0tCO_2e$. Th location-based method accounts for the emissions based on the carbon intensity of the national electricity grid. However, the SEAI does not recognise the market-based method and requires us to use the location-based method to calculate our Scope 2 emissions from the electricity we purchase.

To combat climate change, all industries are asked to reduce their carbon emissions and the energy sector is no exception. The SEAI expects energy-related carbon emissions from the national grid to fall by almost 14% between 2019 and 2030. If Ireland were to produce 70% of its electricity from renewable sources in 2030, our rate and level of decarbonisation from a cleaner grid would be accelerated.

Notably in 2019, the SEAI had predicted the Irish grid emissions factor to drop below $325gCO_2/kWh$ by 2025. However, this threshold was reached earlier than anticipated. The 2019 Irish grid emissions factor was $324.5gCO_2/kWh$.

Solar Photovoltaic
-**3,608** tCO_2e
(31% of reductions)

In 2018, we installed a small-scale 109kWp solar PV array consisting of 268 panels to provide more than half the power needed to operate the airport's reservoir (i.e., pumps and controls). The solar PV system connects directly to the reservoir which supplies 500 million litres of water to both terminals, offices and business across the airport.

As we add new terminal capacity to serve growing demand, the nZEB Part L Regulations 2017 require us to source at least 20% of any new building's energy from onsite renewables. Hence, we have plans to develop a large, centralised ground-level 7.5MWp solar PV system on the southern part of the airport. This new solar PV system is scheduled to be operational around 2024.

Dublin Airport can operate up to approximately 12MWp of installed solar PV to generate onsite renewable electricity before it reaches a point of over-generation. This is where more electricity is generated than can be used at peak output. While there is available land and rooftop space where solar PV could be installed, the airport's two independent 110kV grid transmission connections that supply electricity would require upgrading. These upgrades would be needed to connect additional onsite solar PV systems into the airport distribution network to supply electricity for our use as well as third parties.

As a proven technology, many airports located at all latitudes from Canada and Scandinavia to Australia and New Zealand already use solar PV. Over time, solar PV will allow us to reduce our emissions and strengthen our energy security and resilience to grid instability, power outages and uncertain and volatile energy prices. With the maturation and commercialisation of battery energy storage technology, solar PV can bring Dublin Airport additional benefit from carbon-free energy even when the sun is not shining.

Energy Efficiency
-**2,910** tCO_2e
(25% of reductions)

In 2020, we approved a Part L nZEB Policy to be developed and implemented for a wide range of our capital projects. This gives our design teams a comprehensive framework to develop airport infrastructure in line with the most recent technology and to minimise the related energy needs. Included in this framework are targets for energy use intensity, surface reflectance, air tightness and heating plant efficiency.

Upgrade all lighting in all our terminals and offices, carparks, along airside/landside roads, across the airfield and on the aircraft parking aprons to more reliable, energy efficient LEDs.

We have installed a network of digital smart meters across the airport. This has automated our metering, reporting, and billing information to a wide range of tenants and business partners.

The metering system records the use of grid electricity imports and onsite energy generated by our CHP plants and solar PV system. It records energy use across the airport in 15-minute intervals. Access to detailed near real-time energy use profiles helps us to better measure when, where and how much energy is being used across the airport. This data also enables us to pin-point any surges or outages across the airport's grid network and resolve immediately. More accurate data benefits our longer-term strategy to reduce energy demand and track performance of our 2030 targets.

Circular Economy

Variable Impact

Dublin Airport (inclusive of business partners) produces more than 5,400t of operational, non-hazardous solid waste per year. The management of this waste represents a significant annual cost to our business. As part of our commitment to minimise waste and increase recycling, there is an opportunity to reuse biodegradable waste.

An onsite anaerobic digestor could allow us to manage part of the airport's waste stream onsite and convert it into low-grade renewable energy to heat buildings across the airport. This would not only reduce the costs of waste management but also deliver additional benefits in energy cost savings and less carbon emissions. Other airports including London Gatwick (LGW) and London Heathrow (LHR) have already proven this to be an efficient and reliable source of energy that brings other benefits to the airport's environmental performance.

Scope 3 Emissions

We have developed an Environment and Sustainability Document for Users which requires all our tenants and business partners to conserve energy in line with our energy efficiency program. This forms part of their licensing and contractual obligations with us and is treated as a set of binding rules. All our business partners are also encouraged to go beyond this and target additional carbon emissions reductions.

We also promote active transport to passengers and staff. There are currently 6km of cycleways at Dublin Airport with 250 bicycle parking spaces. For staff who cannot commute by bike, the Commuter Tax saver Scheme was introduced in 2007 and allows our employees to save up to 47% on the cost of travelling to and from the airport by bus.

Car sharing is also encouraged and facilitated at Dublin Airport. In parallel, we have partnered with the National Transport Authority's Smarter Travel initiative to promote and support greater travel choice away from the private car in favour of more sustainable transport means for all our staff – offering Bike to Work schemes.

Investments have also been made to improve public transport at the airport benefiting both employees and passengers. The coach parking and bus lanes have recently been enhanced. This has resulted in a drop in private car usage from 44% of passengers in 2006 to 33% in 2018 while the bus mode share has increased from 24% to 32%.

Fixed Ground Services

In 2019, the running of aircraft APUs during turnarounds whilst parked at contact gates and on remote stands were responsible for around 6% (23,668tCO_2e) of total airport emissions. This is almost the equivalent of our 2019 Scope 1+2 emissions (24,375tCO_2e).

To limit the use of aircraft APU or Ground Power Units (GPUs) both powered by fossil fuel (jet A-1, avgas, or diesel), we have installed passenger boarding bridge mounted 400Hz FEGP units at contact stands across Piers 1, 3 and 4. Currently there are 46 contact gates equipped with 400Hz FEGP across the airport. This reduces carbon emissions for the airlines and ground handling agents (GHAs) and reduces costs associated with the purchase of fuel and equipment maintenance.

In the short term, we must continue to equip all contact stands across the airport with 400Hz FEGP units to help airlines minimise the use of their aircraft APUs whilst parked on-stand during turnarounds. This will not only help reduce Scope 3 emissions across the airport but will also improve local air quality. Even though pre-conditioned air (PCA) is currently not available at Dublin Airport, we will continuously consider the feasibility and use of PCA at our gates through engaging our airlines to help them reduce fuel consumption and emissions during turnarounds.

Efficient Airfield Layout

As we improve and optimise the airfield system, we must configure new taxiways, stands and aprons for maximum efficiency for aircraft operating on the ground. Efficient connections from aircraft gates to/from the runways particularly during peak traffic periods will help to reduce congestion, delays, and conflicts between inbound/outbound aircraft. In turn this will reduce taxi times and related fuel burn and carbon emissions. A one-minute efficiency gain on the airfield for a Boeing B738 aircraft taxiing to/from the runway could save approximately 35-40kgCO_2e per movement depending on the engine type, piloting, taxiway route and weather conditions. An efficiently designed airfield combined with that Airport-Collaborative Decision Making (A-CDM) will help airlines optimise their taxi journeys (outbound/inbound) saving time, distance travelled, fuel and carbon emissions.

As navigation technology improves on the ground and onboard aircraft, Eurocontrol continues to explore how to best reduce flight times, delays, and associated carbon emissions. Eurocontrol and EASA estimate that gate-to-gate inefficiency is about 6% and aim to cut this in half by 2035.

A-CDM

Eurocontrol has estimated that A-CDM allowed airlines to reduce their carbon emissions by 108,072tCO_2e across 17 European airports in 2016. This represents an average saving of around 50kgCO_2e per movement. A-CDM was first implemented at Dublin Airport in 2019.

By sharing information across a wide range of stakeholders, A-CDM allows airlines to reduce their emissions by:

- Reducing average outbound taxi times by up to three minutes by creating a virtual queue of aircraft ready for departure while still at their gate with their engines off;
- Providing pilots with better take-off time estimates allowing them to better time the second engine start-up without impacting airport capacity or causing delay;
- Making the most of available infrastructure and with more efficient operations potentially delay or cancel construction projects; and,
- Reducing delays throughout the network allowing airlines to minimise flight durations and reduce emissions which are not even counted as airports' Scope 3 emissions produced at an altitude higher than 3,000ft above aerodrome ground level (aagl).

Reduced Engine Taxiing

The use of a single engine for inbound and outbound taxiing to/from the runway is on the rise as one method to reduce fuel burn and emission on the ground. By shutting down a single engine of the aircraft after it lands and exits the runway, airlines can reduce carbon emissions from taxiing operations by 20-40%.

The technique has been adopted by many airlines including Air France-KLM, British Airways, easyJet, Finnair, Iberia Airlines, Ryanair, and Scandinavian Airlines.

We will work closely with our airlines to encourage the use of reduced engine taxi operations where it is safe to do so across the airfield system.

Ground Service Equipment

The ground handling agents (GHAs) at Dublin Airport are independent businesses contracted directly by the airlines to safely and efficiently service aircraft on the ramp. Some of their primary services include the loading/unloading of aircraft, baggage handling and aircraft cleaning. All GHAs operating at Dublin Airport must comply

with the safety standards and operational protocols of our Airside Manual. This is important given the complex, time-critical and interdependent processes in the ramp area and requirement for all GHAs to constantly exercise caution. The carbon emitted from the ground services of GHAs sit outside of our direct control and, therefore, we must work closely with them to help them decarbonise their activities.

Many of our GHAs recognise that sustainable business practices contribute to positive results in the long-term and these have been integrated into their strategic and operational objectives and decision-making. However, we do encourage all airside operators, including GHAs, to use LEVs wherever possible. By 2022, the use of LEVs will be mandatory for all airside operators, including GHAs, wherever possible.

As GHAs operate a wide range of vehicles (including refuelers, tugs, buses, cargo loaders, catering vehicles, belt loaders) the transition of vehicle fleets and GSE to LEVs is likely to occur progressively as some vehicles/equipment will be easier to replace or upgrade than others.

Multiple trials have already been conducted by GHAs in partnership with airlines to use electric-GSE (e-GSE). For instance, Air France has recently tested an e-GSE fleet to handle an A350 flying from Paris to Delhi. Some vehicles were retrofitted vehicles where the combustion engine had been replaced by an electric engine and batteries. Retrofitting could allow GHAs' fleet to transition faster as it would not depend on the normal renewal cycle to introduce e-GSE.

Major European airports like London Heathrow (LHR), Munich (MUC), Madrid Barajas (MAD)and Barcelona El-Prat (BCN) have started to use full-electric towbarless aircraft pushback tractors. British Airways operates 28 of these electric tractors at Heathrow Terminal 5 to manoeuvre its short-haul fleet of 140 narrow-body aircraft (A320/A321). Each tractor is powered by 80V batteries performing 25-30 pushbacks per battery charge while serving three aircraft parking positions. Over 110,000 pushbacks have been performed using these remote-controlled tractors reducing delays by 54% and saving around 20-25tCO_2e/tractor/year.

Some GHAs have already made commitments to drastically reduce their carbon emissions. Swissport operates at Dublin Airport and has committed to electrify 50% of its global GSE fleet by 2025.

We will continue to invest in EV charging stations across the airport to enable GHAs and other third parties to charge their vehicles and equipment.

Sustainable Mobility

From 2021 onwards, the BusConnects initiative will provide more options to move around the city of Dublin and its surroundings with better service, cleaner vehicles, and increased frequencies. With a dedicated Bus Rapid Transit (BRT) service, Dublin Airport will directly benefit from this initiative that should ultimately reduce traffic congestion, travel time delays, and improve connectivity for the public. A BRT service is an enhanced public transit offer for higher volume routes that provide passengers with a faster and more reliable alternative to conventional bus routes. BusConnects has resulted from the multiple government policies including the CAP 2019 (which is currently being updated).

We also predict Metrolink to be operational in 2027 adding a critical rail connection to Ireland's busiest airport. As passengers and staff are responsible for more than 13% of the airport's total Scope 1+2+3 emissions, this new public transport system should further assist the shift away from the use of private cars to and from Dublin Airport with around 20% of trips by car today to transferring to Metrolink when opened.

In parallel, we must ensure the public transit offer and choices still matches staff and passengers' needs. Hence, the reliability, capacity, frequency, and cost of the services will be constantly adjusted in line with demand.

For those who have no other choice but to drive their car to get to the airport, we will continue to progressively install more EV chargers in our multi-storey car parks (MSCP). The provision of new EV chargers will reflect the EV market share in Ireland. Ultimately, we would like to enable EV owners to travel to the airport to recharge during their workday or trip abroad.

Aircraft Technology

We do not design or fly aircraft or make aviation fuel and do not control the businesses that do.

Aircraft manufacturers made huge strides in aircraft efficiency over the decades. Between 1968 and 2014, the average fuel burn of aircraft has reduced by 45% representing an average annual reduction of 1.3%.

We expect airlines to continue to renew their fleets and introduce more new generation, fuel efficient cleaner aircraft. As more airlines equip themselves with the latest technology available, the average fuel burn rate is expected to drop even further. Trials are already underway with 100% carbon-free electric aircraft. This could be reality for small aircraft operating short-haul regional and domestic routes by the end of this decade. Norway for instance, targets an early introduction of electrified aircraft for short-haul segments, potentially before 2025.

In September 2020, European aircraft manufacturer, Airbus revealed three zero emissions aircraft concepts. All codenamed, ZEROe, rely on hydrogen as the primary power source and could enter service in world airline fleets by 2035. One of the concepts, a modified turb-fan design running on hydrogen, could transport up to 200 passengers over more than 2,000nm. Putting this in perspective, this would cover almost 95% of flights departing from Dublin Airport flew in 2019.

Source: Airbus

The Royal Schiphol Group is championing electric aircraft. It announced in May 2021 that Eindhoven (EIN), Rotterdam The Hague (RTM) and Groningen Eelde (GRQ) airports are planning to test the feasibility of electric flights, with the objective of facilitating scheduled flights operated by electric aircraft to connect regions and create a dense network within Europe. Depending on the results of these trials, the first electric passenger flights could be operating between airports in the Netherlands within five years.

These improvements will need to be supported not only by airlines and aircraft manufacturers but also by the airports. We must therefore align our infrastructure projects with these emerging technologies through flexible, adaptive design to prevent reimagining our infrastructure at significant, avoidable cost. For example, we can already anticipate that EV chargers will be required for future electric aircraft to recharge their onboard battery packs without impacting the typical turnaround times.

Sustainable Aviation Fuels

If hydrogen and electric aircraft represent a tremendous long-term opportunity for the aviation industry, there are still many hurdles to overcome for these technologies to be fully commercialised and made available at scale. These include airworthiness certification, aeronautical safety considerations, range limitations and payload restrictions among other factors. Aircraft delivered today will not be decommissioned for another 25 years which could slow down the future rate of adoption of cleaner aircraft. Hence, Sustainable Aviation Fuels (SAFs) represent a very interesting alternative to conventional fuels that can be easily introduced in today's aircraft without any major upgrade to either the airport infrastructure or the aircraft themselves.

SAF also have a very high potential to decarbonise long-haul flights that hydrogen or batteries cannot power given today's technology. They are already in use today but in small quantities. SAF is not yet at a scale or commercially competitive to trigger a surge in use. There are also challenges around securing reliable quantities of feedstock.

Norway is paving the way with a minimum 0.5% biofuel blend as a portion of all aviation fuel sold in the country since 2020. This value is expected to grow progressively to 30% by 2030 which is fully aligned with Norway's objective to have a fossil-free aviation sector by 2050. Other European countries have either already implemented a minimum blending rate of SAF for jet fuel or are considering it for the short-term future (France and Spain - minimum 2% SAF required by 2025, Sweden – minimum 1% in 2021 and 30% SAF in 2030).

Swedavia's strategic goal is for at least 5% renewable aviation fuel to be used for refuelling across their 10 airports by 2025.

British Airways is the first airline in Europe to invest in building a waste to fuel plant with renewable fuels company, Velocys. The plant will convert household and commercial waste into SAF. The technology, built by Velocys, will reduce carbon emissions by 70% for every tonne of SAF that replaces a tonne of conventional Jet A-1.

We do not anticipate SAF to have any major impact on our operations. However, we will work with our airlines to support the availability and use of SAF at Dublin Airport.

Statement of Consistency

Through the commitments made in this CRS and the implementation of emission reduction measures to support our existing carbon management programme and delivery of new infrastructure required to enable us to accommodate 40mppa, we demonstrate consistency with the six Climate Action (CA) objectives of the Dublin Airport LAP.

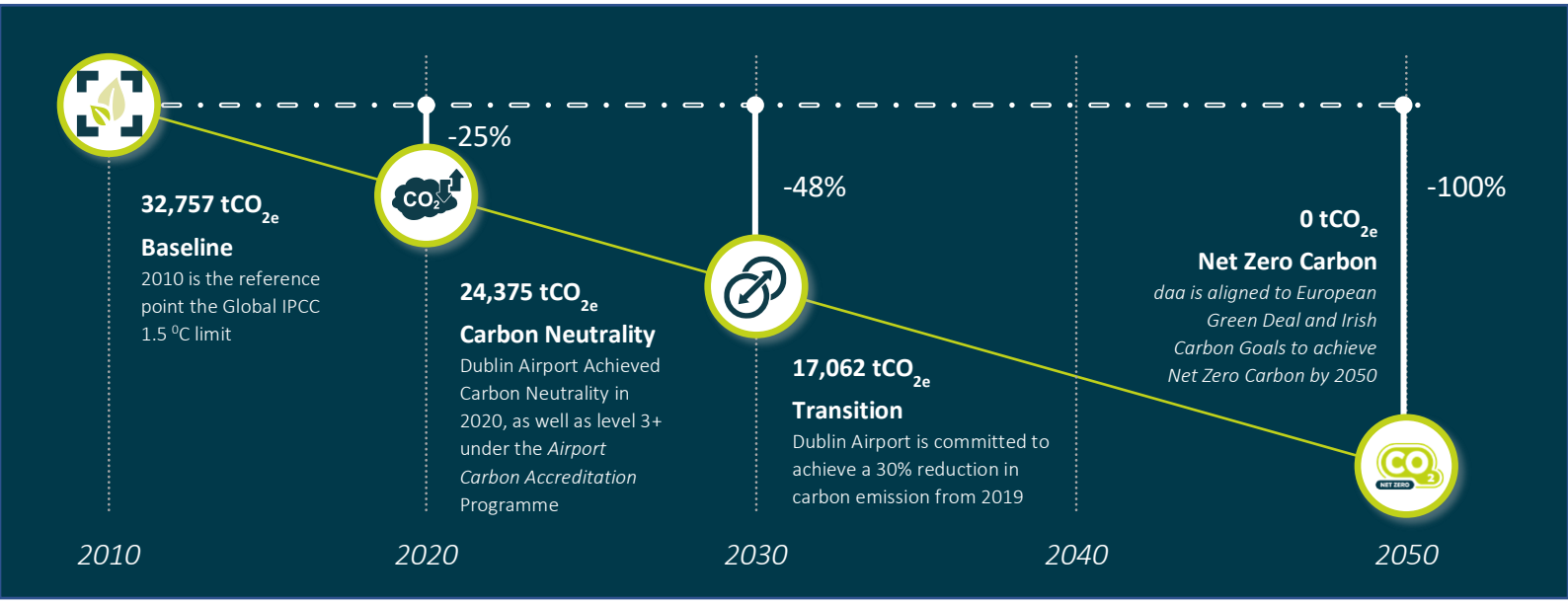
Our consistency with the Climate Action objectives of the Dublin Airport LAP is outlined on the next page.

Dublin Airport Local Area Plan Statement of Consistency

Climate Action Objective 1	Appropriate steps to be taken to support the airport's NZC50 transition in line with FCC/National goals
Climate Action Objective 2	An emissions reduction blueprint is provided containing an initial basket of measures to achieve our 2030 carbon reduction target
Climate Action Objective 3	All major new capital projects to incorporate appropriate zero-/low-carbon technologies, renewable energy and ESD measures
Climate Action Objective 4	Centralised onsite solar PV systems, battery storage & optimisation of onsite thermal energy storage/plant under evaluation
Climate Action Objective 5	Mobility Management Plan supporting the progressive shift to more sustainable and active transport for staff and passengers
Climate Action Objective 6	Planned transition of our vehicle fleet underway to 100% LEVs by 2023 and increasing the number of chargers available for daa and third party vehicles

Beyond 2030 and Towards Net Zero

As described in previous chapters, we are going to implement a range of emission reduction measures over the next 10 years that will reduce our carbon footprint by 30% below a 2019 baseline. It is an ambitious step on our transitioning of Dublin Airport to Net Zero Carbon by 2050.



Despite the unprecedented impact of the COVID-19 pandemic that plunged the global economy and aviation into crisis, we remain focused on reducing our carbon emissions across Dublin Airport there and limit global warming to 1.5°C.

Maintaining the status quo is not an option as Dublin Airport's carbon footprint will increase in response to planned expansion and forecast growth. To achieve our long-term NZC50 goal, we have set ourselves a clear roadmap of short-, medium- and long-term initiatives that address our Scope 1+2 emissions.

In the short-term this includes continuing to innovate and invest in energy efficiency projects across the built environment of the airport, completing the transition of our light-duty vehicle fleet to 100% LEVs by 2024, acquiring new electric buses to transfer our staff/passenger on and around the airport and increasing the installed capacity of onsite renewable energy systems. This will require us to increase the capacity of our onsite distribution networks and grid connections to handle more onsite renewable energy generation. We will continue to procure 100% renewable electricity through REGO backed supply contracts to reduce our Scope 2 emission. Offsets will be purchased to compensate any residual emissions.

We will work closely with our airlines to support the implementation and adoption of CORSIA and identify measures to help them reduce emissions from aircraft operations on the ground. This will include a focus on the initiatives and infrastructure needed to deliver, distribute and store SAFs. We will also start to factor carbon price forecasts into business decisions and delivery of our capital investment programme (CIP).

Embedding minimum carbon performance requirements into business planning, capital project delivery and operational decision-making will be a top priority. This will be complemented by the effective communication of climate actions and carbon reduction measures to our staff, passengers and business partners.

In the medium term, 2026-2030, we will continue to identify opportunities to improve the lighting, ventilation and air tightness of our terminals and buildings. Priority will be given to the deployment of additional onsite solar PV generating capacity and battery energy storage along with the improved thermal efficiency and energy storage capabilities of our onsite CHP plants. We will participate in active collaborations, pilots and research and development consortiums to support the accelerated development and scaling of new and emerging technologies in smart-grids,

carbon capture storage, green hydrogen, advanced AI-driven control systems and new generation electric or hybrid aircraft.

We will also continue to evaluate the practicality and feasibility of an onsite waste-to-energy plant, electrification of our onsite CHP plants and an upgrade to the Transition level (4+) in the *Airport Carbon Accreditation* programme.

To get to NZC50, we will take steps to decarbonise Dublin Airport:

1. Operate a 100% zero carbon-low emissions vehicle fleet.
2. Use 100% renewable electricity.
3. Phase out diesel and natural gas in our operations.
4. Electrify our onsite CHP plants.
5. Prepare for new generation technologies including carbon capture storage, green hydrogen, electric and hybrid aircraft.
6. Collaborate with our tenants and business partners to set pathways to NZC50.

To conclude, this CRS provides the emissions reduction blueprint to guide future infrastructure development at Dublin Airport. Emission reduction measures to reach our short-term 2030 target as well as our longer-term NZC50 goal whilst serving future levels of demand have been presented. All the details and assumptions are based on the latest and most relevant information available at the time of writing. As the policy/regulatory, technology and economic frameworks continue to evolve, we will update the CRS every 5 years and adjust our carbon reduction measures accordingly so we never compromise on our goal: NZC50.

Zero Carbon Energy
Use electricity from 100% renewable sources through onsite generating systems with battery storage or REGO backed supply contracts to power vehicles/buildings.

Fuel Switching
Replace fossil fuel-based power with cleaner alternatives like renewable natural gas (biogenic methane).

Sustainable Mobility
Increase active and public transport mode share among both passengers and staff through more sustainable travel choices and improved surface access infrastructure.

Electrification
Electrify all light-duty vehicles and buses, onsite CHP plant and install electric heat pumps to replace gas boilers for space/water heating.

Electric | Hybrid Aircraft
Prepare for new electric/zero emissions commercial aircraft to enter service on short-haul routes and deliver infrastructure to support electric/hydrogen aircraft.

Hydrogen
Produce clean energy using renewable energy and electrolysis to split water to power fuel cells (vehicles and power units) and onsite CHP plants.

Carbon Capture Storage
New technology (direct air capture and bioenergy plants) deployed to capture, transport and store carbon removed from the atmosphere.

Natural Carbon Sinks
Nature-based projects that either preserve or restore forests, peatlands and other landscapes to absorb and store atmospheric carbon.

List of Acronyms

AAGL	Above Aerodrome Ground Level
ACA	Airport Carbon Accreditation
A-CDM	Airport Collaborative Decision Making
ACI	Airport Council International
APU	Auxiliary Power Unit
BER	Building Energy Rating
CA	Climate Action
CAGR	Compound Annual Growth Rate
CAP	Climate Action Plan
CAR	Commission for Aviation Regulation
CCAC	Climate Change Advisory Council
CCS	Carbon Capture and Storage
CHP	Combined Heat and Power
CIP	Capital Investment Programme
CMP	Carbon Management Plan
CNG	Carbon Neutral Growth
CO_2e	Carbon dioxide equivalent
CORSIA	Carbon Offsetting Scheme for International Aviation
CPC	Carbon Performance Coefficient
CRS	Carbon Reduction Strategy
DAC	Direct Air Capture
EASA	European Union Aviation Safety Agency
EPA	Environmental Protection Agency
EPC	Energy Performance Coefficient
ESD	Environmentally Sustainable Design
EU	European Union
EU ETS	European Union Emissions Trading System
EUA	Emissions Allowance (under EU ETS)
EV	Electric Vehicle
F&B	Food & Beverage
FCC	Fingal County Council
FEGP	Fixed Electrical Ground Power
GHA	Ground Handling Agent
GHG	Greenhouse Gas
GPU	Ground Power Unit
GSE	Ground Support Equipment
HVAC	Heating, Ventilation, and Air Conditioning
IA	Infrastructure Application
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt hour
LAP	Local Airport Plan
LEV	Low Emission Vehicle
LPG	Liquefied Petroleum Gas
LPHW	Low Pressure Hot Water
LTO	Landing and Take-off cycle (up to 3,000ft)
MSCP	Multi-Storey Car Park
M&R	Monitoring and Reporting
MRV	Monitor, Report, Verify
NDC	Nationally Determined Contributions
NECP	National Energy and Climate Plan
NEEAP	National Energy Efficiency Action Plan
nm	Nautical Mile
NZC	Net Zero Carbon
nZEB	Nearly Zero Energy Building
PBB	Passenger Boarding Bridge
PCA	Preconditioned Air
PV	Photovoltaic
REGO	Renewable Energy Guarantees Origin
SAF	Sustainable Aviation Fuels
SDG	Sustainable Development Goals
SEAI	Sustainable Energy Authority of Ireland
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WRI	World Resources Institute