13. Climate

13.1 Introduction

13.1.1 This chapter presents the Principal Assessment of the likely significant effects of the Proposed Order on the climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the Proposed Order to climate change. The Principal Assessment compares the 2029 Permitted Operation (32 mppa) and the 2029 Proposed Operation (40 mppa) in accordance with the project-wide assessment framework described in Chapter 5: Methodology.

13.1.2 For the assessment of GHG emissions, the emissions associated with the Permitted Operation (32 mppa) and Proposed Operation (40 mppa) are projected to 2050 to evaluate the effect of the Proposed Order over its operational lifetime against Ireland's trajectory to net zero. This lifecycle approach reflects the specific requirements of climate assessment and does not alter the 2029 assessment year used for the Principal Assessment.

13.1.3 The Proposed Order does not include any new airport infrastructure or physical development. Consequently, this chapter assesses the likely significant environmental effects arising from changes in airport operations associated with the amendment of the passenger cap, rather than the effects of construction or infrastructure development.

13.1.4 As set out in Chapter 5: Methodology, the Principal Assessment compares the 2029 Permitted Operation (32 mppa) with the 2029 Proposed Operation (40 mppa). Both operational conditions are assessed for the same future year and against the same Future Receiving Environment and other baseline assumptions. The comparison therefore identifies the change in greenhouse gas emissions and associated climate effects arising from the Proposed Order relative to the Permitted Operation. This comparison provides the basis for identifying likely significant effects, determining any additional mitigation measures and reporting residual effects. The assessment therefore focuses on the operational consequences of increasing passenger throughput and associated aircraft movements using the existing and permitted airport infrastructure.

13.1.5 The carbon calculations and greenhouse gas (GHG) reporting inputs that informed this chapter, together with the Climate Change Risk Assessment (CCRA) and In-combination Climate Change Impact (ICCI) assessment presented in Appendices 13-2, 13-3 and 13-4, and the supplementary appendices, were undertaken by Joana Cerejeira BSc (Hons), MRes, PISEP, a Principal Sustainability Consultant in AECOM's Carbon and Environmental Social and Governance (ESG) team with over eight years of experience in consultancy. Joana has worked on multiple GHG and climate change risk assessments, helping to calculate, report and reduce a project's carbon footprint.

13.1.6 The carbon calculations that informed this chapter were reviewed by Adrian Mallory PhD, MEng, an Associate Director from AECOM's Carbon and ESG team with four years' experience in carbon quantification and management, sustainable design and climate change assessment.

13.1.7 This chapter and its supplementary appendices were reviewed by Andrew Steeds, BSc (Hons), MSc, CEnv, MIEnvSc, a Principal Sustainability Consultant in AECOM's Carbon and ESG team with over eight years' experience in consultancy, including a recent Dublin Airport application for a proposed North Runway Relevant Action (NRRA) relating to the night-time use of the runway system.

13.1.8 This chapter and its supplementary appendices were verified by Ian Davies BSc (Hons) MISEP, CEnv, a Technical Director in AECOM's Carbon and ESG team, with over 20 years' experience in the provision of environmental sustainability assessment, specialising in GHG and climate change risk assessments. These include recent applications for the proposed Dublin Airport Underpass and for the proposed NRRA, and for the expansion of London Luton Airport.

13.1.9 The EIA Directive 2014/52/EU[1] describes the importance of considering climate change and GHG emissions when carrying out EIAs: "*Climate change will continue to cause damage to the environment and compromise economic development. In this regard, it is appropriate to assess the impact of projects on climate (for example GHG emissions) and their vulnerability to climate change.*"

13.1.10 The assessment presented in this chapter has been produced in line with the Institute of Sustainability and Environmental Professionals (ISEP) (formerly known as IEMA[2]) guidance[3],[4] and European Union (EU) Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment[5]. To align with EIA reporting requirements, the reporting of climate impacts is divided into three separate assessments:

- Lifecycle greenhouse gas (GHG) impact assessment – quantifying the GHG emissions arising from the Proposed Order over its lifetime to identify the impact of the Proposed Order on the climate.
- Climate Change Resilience Assessment (CCRA) – to identify and mitigate the vulnerability of the Proposed Order to projected climate change impacts.
- In-combination Climate Change Impact (ICCI) assessment – to identify and mitigate the combined impact of the Proposed Order and future climate change on receptors in the surrounding environment.

13.1.11 The assessment outlined above also covers the scope for climate assessment described in the Environmental Protection Agency (EPA) *'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*' (hereafter referred to as the 'EPA Guidelines')[6] - i.e., assessment of GHG emissions and a review of the resilience of the Proposed Order to climate change.

13.1.12 The main body of this chapter presents the findings from carrying out the lifecycle GHG impact assessment on the Proposed Order, which is supported by the text and figures presented in Appendix 13-1. For ease of discussion, the CCRA and ICCI assessments are presented in Appendices.

13.1.13 Appendix 13-2 presents the methodology and outcomes from undertaking the CCRA for the Proposed Order. Appendix 13-3 details the comprehensive Climate Change Risk Register that was completed while undertaking the CCRA.

13.1.14 Appendix 13-4 presents the results of the ICCI assessment, which was carried out for the Proposed Order, and developed in collaboration with different disciplines from other chapters of the EIAR.

13.1.15 Appendix 13-5 presents the mitigation and adaptation measures implemented for the Proposed Order.

13.1.16 The An Coimisiún Pleanála (ACP) Scoping Opinion (presented in Appendix 1-1 of this EIAR) included a number of requirements pertinent to the assessment of climate impacts. The aspects requested to be assessed in the Scoping Opinion have been duly considered and the outcomes detailed within Appendix 13-8.

13.2 Legislation, Policy and Guidance

13.2.1 This section summarises the legislation, policy and guidance which have informed the scope and methodology used for the lifecycle GHG impact assessment, CCRA and ICCI assessments.

13.2.2 Given the global nature of GHG emissions, national and international policy and legislation play a critical role in their management and subsequent impact on the climate. In line with the relevant legislation,

[1] European Union (EU) (2014). Directive 2014/52/EU of the European Parliament and of the Council. [Accessed 09/06/2026]. Available at: https://www.legislation.gov.uk/eudr/2014/52/contents. [Accessed 09/06/2026].
[2] Institute of Environmental Management and Assessment (IEMA)
[3] ISEP (2020). Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation. Available at: https://www.isepglobal.org/content/isep-eia-guide-to-climate-change-resilience-and-adaptation-2020/ [Accessed 14/05/2026].
[4] ISEP (2026). Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance – 2.1 Edition. Available at: https://www.isepglobal.org/content/isep-guide-assessing-greenhouse-gas-emissions-and-evaluating-their-significance/ [Accessed 14/05/2026]
[5] EU Commission (2013). Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment. Available at: https://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf [Accessed: 09/06/2026].
[6] Environmental Protection Agency (EPA) (2022). Guidelines on the information to be contained in environmental impact assessment reports. Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf [Accessed 09/06/2026].

policy and guidance, this assessment evaluates the GHG impact of the Proposed Order in the context of Ireland's carbon budgets, as well as national and EU policy, to provide context and scale in relation to Ireland's trajectory towards net zero. The resilience of the Proposed Order to projected climate change impacts and the in-combination climate change impacts are also assessed.

International Legislation and Policy

Paris Agreement

13.2.3 The Paris Agreement[7] is a legally binding international treaty within the United Nations Framework Convention on Climate Change (UNFCCC) dealing with GHG emissions mitigation, adaptation and finance starting in the year 2020. It requires all signatories to declare their Nationally Determined Contributions (NDC) towards balancing anthropogenic sources and sinks of GHGs in the second half of this century with the objective of keeping global warming to well below 2°C and to pursue efforts to limit global warming to 1.5°C. On the 11 December 2020, the European Council endorsed a new and more ambitious EU climate target for 2030 applicable to the EU and its 27 Member States of “a net domestic reduction of at least 55% in GHG emissions by 2030 compared to 1990” and submitted it to the UNFCCC Secretariat as an updated and enhanced NDC. Building on this commitment and the EU’s legally binding objective of achieving climate neutrality by 2050, on 5 November 2025 the Council of the European Union agreed its position on an amendment to the EU Climate Law. On behalf of the EU and its Member States, the Council submitted a successive NDC ahead of COP30, setting out an indicative target of reducing net GHG emissions by between 66.25% and 72.5% by 2035 compared to 1990 levels. This represents a progression beyond the existing 2030 NDC and aligns with the outcomes of the first Global Stocktake under the Paris Agreement.

Kyoto Protocol

13.2.4 The Kyoto Protocol[8] enforces the UN Framework Convention on Climate Change by requiring industrialised countries and transition economies to meet specific GHG emission reduction targets. It mandates that only developed nations are legally bound to reduce emissions, reflecting the principle of "*common but differentiated responsibility*", which holds these countries more accountable due to their historical contributions to high atmospheric GHG levels. Annex B of the Protocol outlines binding reduction targets for 37 industrialised nations and the EU.

13.2.5 The Kyoto Protocol’s second commitment period (2013–2020) ended on 31 December 2020, after which the Paris Agreement became the primary international framework for countries’ climate commitments through nationally determined contributions (NDCs).

European Climate Law

13.2.6 The European Climate Law[9] writes into law the goal set out in the European Green Deal for Europe's economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net GHG emissions by at least 55% by 2030, compared to 1990 levels, and a 90% reduction in net GHG emissions by 2040.

The European Green Deal

13.2.7 The European Green Deal[10] is a package of policy initiatives, which aims to set the EU on the path to a green transition, with the ultimate goal of reaching climate neutrality by 2050. It supports the transformation of the EU into a fair and prosperous society with a modern and competitive economy.

[7] The Paris Agreement: https://unfccc.int/process-and-meetings/the-paris-agreement
[8] United Nations. What is the Kyoto Protocol? Available at: https://unfccc.int/kyoto_protocol#:~:text=In%20short%2C%20the%20Kyoto%20Protocol,accordance%20with%20agreed%20individual%20targets [Accessed on: 20/05/2026].
[9] European Climate Law: https://climate.ec.europa.eu/eu-action/european-climate-law_en#:~:text=The%20European%20Climate%20Law%20writes,2030%2C%20compared%20to%201990%20levels .
[10] European Green Deal. https://www.consilium.europa.eu/en/policies/green-deal/#:~:text=The%20European%20Green%20Deal%20is%20a%20package%20of%20policy%20initiatives,a%20modern%20and%20competitive%20economy .

EU Emissions Trading Scheme, Directive 2003/87/EC, as amended 2008 and 2018

13.2.8 This Directive[11] establishes a scheme for GHG emission allowance trading within the Community in order to encourage and incentivise reductions of GHG emissions in a cost-effective and economically efficient manner.

13.2.9 The Directive was amended[12] in 2008 to include aviation activities in the scheme for GHG emission allowance trading within the Community, and again in 2018[13] to enhance cost-effective emission reductions and low-carbon investments.

13.2.10 Directive 2023/958[14] amends Directive 2003/87/EC to strengthen emissions reduction measures in the aviation sector, targeting both intra-EU and extra-EU flights. Key changes include:

- Phasing Out Free Allowances: Free emissions allowances for aviation have been gradually phased out from 2024, with full auctioning of allowances mandated since January 2026. This shift was intended to increase the cost of carbon for airlines, incentivising emissions reductions.
- Sustainable Aviation Fuels (SAF) Incentive: To encourage the uptake of SAF, the Directive introduces SAF allowances, allowing operators to cover part of the cost difference between SAF and conventional fuels. This mechanism aims to make SAF adoption financially feasible.
- Extra-EU Flight Emissions through Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) Compliance: For flights to and from non-EU countries participating in the Carbon CORSIA, EU airlines are required to follow CORSIA's offsetting requirements from 2022 to 2027. Once aviation emissions exceed 85% of 2019 levels, airlines will need to offset these excess emissions, supporting projects that reduce emissions in CORSIA-participating countries.
- Non-CO_2 emissions reporting: the revised EU ETS Monitoring and Reporting Regulation introduces monitoring, reporting, and verification (MRV) requirements for non-CO_2 aviation effects, including persistent contrails, NO_x, and soot particles, which together account for about two thirds of aviation's total climate impact.

13.2.11 Directive 2023/959[15] reforms the EU Emissions Trading Scheme (ETS) to enhance emissions reduction targets and expand the scope to new sectors. Key provisions include:

- Increased Emissions Reduction Target: The Directive raises the 2030 emissions reduction goal for sectors under the EU ETS to 62%, up from 43%, intensifying the EU's climate ambition.
- Stricter Allowance Cap and Market Stability: The annual cap on available emissions allowances is further lowered, and the Market Stability Reserve is bolstered to limit allowance supply. These changes aim to drive up the carbon price, encouraging industries to cut emissions.
- Revised Free Allocation Rules and Carbon Leakage Protections: The Directive introduces targeted changes to free allocation of allowances, prioritising sectors most at risk of carbon leakage. To qualify, installations must now meet requirements like conducting energy audits. Free allocation will also be phased out for sectors covered by the Carbon Border Adjustment Mechanism (CBAM) to align with the CBAM's gradual rollout.
- Additional Funds for Low-Carbon Innovation and Modernisation: Additional allowances will be directed to the Innovation and Modernisation Funds to help finance low-carbon technologies and assist lower-income Member States.
- Extended EU ETS Coverage:
    - Maritime Sector Integration: The EU ETS will now cover maritime emissions, with phased-in obligations for shipping companies to surrender allowances for 40% of emissions in 2024, 70% in 2025, and 100% by 2026.

[11] EU Emissions Trading Scheme, Directive 2003/87/EC: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003L0087
[12] EU Directive 2008/101/EC Amending Directive 2003/87/EC: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:008:0003:0021:en:PDF#:~:text=The%20objective%20of%20the%20amendments,activities%20in%20the%20Community%20scheme.
[13] EU Directive 2018/410 amending Directive 2003/87/EC: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0410&qid=1688393817019
[14] Directive (EU) 2023/958: https://eur-lex.europa.eu/eli/dir/2023/958/oj
[15] Directive (EU) 2023/959: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2023.130.01.0134.01.ENG

- New ETS (ETS II): ETS II establishes a separate trading system for Buildings, Road Transport, and additional sectors not previously included, such as small industries and specific industrial processes.

EU Effort Sharing Regulation (ESR)

13.2.12 The EU Effort Sharing Regulation (ESR)[16] establishes binding national GHG reduction targets for sectors outside the EU Emissions Trading System, including transport (excluding aviation), buildings, agriculture and waste. Following its revision in 2023, the ESR aims to achieve a 40% reduction in emissions by 2030 compared with 2005 levels across the sectors it covers. This was increased from the original 30% target and forms part of the EU's broader goal of reducing net greenhouse gas emissions by at least 55% by 2030.

13.2.13 In relation to aviation, Article 2(3) of the ESR specifically provides that CO_2 emissions from the IPCC source category 1.A.3.A (Civil Aviation) shall be treated as zero for the purposes of ESR compliance accounting. Aviation emissions are instead principally addressed through the EU ETS and associated aviation climate policies.

- The ESR assigns for Ireland:
  - A 2030 emissions reduction target of 42% in relation to a 2005 baseline.

13.2.14 Of the principal GHG emission sources associated with the Proposed Order, surface transport and direct fuel combustion associated with airport operations are generally relevant to Ireland's obligations under the ESR, subject to their classification within the national GHG inventory and applicable EU ETS coverage. This includes emissions from road transport accessing the airport and fuel consumption associated with airport buildings, vehicles and equipment. In contrast, civil aviation CO_2 emissions are excluded from ESR compliance accounting.

13.2.15 Ireland's national climate commitments are supported by legally binding carbon budgets and associated sectoral emissions ceilings, established under the Climate Action and Low Carbon Development (Amendment) Act 2021. These ceilings establish the maximum permitted GHG emissions for individual sectors over defined five-year carbon budget periods. The relevant sectoral emissions ceilings are considered within this assessment to provide context for the emissions associated with the Proposed Order, as described in the methodology in Section 13.3.

Market-Based Mechanisms

13.2.16 The EU ETS[17], administered by the European Union, and CORSIA, managed by the International Civil Aviation Organization (ICAO) are two key market-based mechanisms (MBM), used to manage and reduce aviation emissions and fundamental to the sustainable growth of the aviation sector.

13.2.17 MBM are defined as[18]: economic tools designed to incentivise emissions cuts by creating financial value associated with reducing or offsetting emissions. These mechanisms put a price on GHG emissions, encouraging emitters to lower their emissions or pay for allowances or offsets.

13.2.18 These instruments are designed to address the climate impact of aviation by reducing carbon emissions. They go beyond the reductions offered by operational improvements, technological measures or SAF and are instrumental to reach the ambitious goals set for the aviation sector. The underlying concept of an MBM is to internalise the external cost of carbon emissions, thus incentivising investments by the aviation sector to reduce its carbon footprint.

13.2.19 The EU ETS applies for intra-European flights (including departing flights to the United Kingdom and Switzerland), while CORSIA applies to extra-European flights to and from third countries participating in

[16] European Commissions (2025); Effort Sharing: https://climate.ec.europa.eu/areas-action/effort-sharing-member-states-emission-targets/about-effort-sharing_en
[17] European Union (EU), (2018); Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814 (Text with EEA relevance).
[18] C2ES. MARKET MECHANISMS: OPTIONS FOR CLIMATE POLICY: https://www.c2es.org/wp-content/uploads/2020/04/market-mechanisms-options-climate-policy.pdf

CORSIA from 2022 to 2027. The division of responsibilities for managing aviation emissions between the EU ETS and CORSIA is referred to as the 'clean cut'.

13.2.20 In July 2026, the European Commission[19] completed its review of the interaction between the EU ETS and CORSIA. The review concluded that CORSIA does not currently meet the conditions required to justify a full extension of the EU ETS to all extra-European Economic Area flights. As a result, CORSIA will continue to apply to eligible international aviation emissions through to 2035 via the existing offsetting mechanism.

13.2.21 The Commission has instead proposed a targeted expansion of the EU ETS between 2029 and 2032 to include flights departing the European Economic Area (EEA) and arriving at selected neighbouring third countries located within approximately 5,000 km of Frankfurt Airport. This could include destinations such as Istanbul, Riyadh and Dubai. Longer-haul destinations, including flights to the United States, would remain outside the scope of the EU ETS and continue to be regulated under CORSIA.

13.2.22 A further review is scheduled for 2032, at which point the effectiveness, ambition and level of international participation in CORSIA will be reassessed to determine the future relationship between CORSIA and the EU ETS.

European Union Emission Trading System

13.2.23 The aim of the EU ETS is to help EU Member States achieve their commitments to limit or reduce GHG emissions in a cost-effective way by allowing participating installations to buy or sell tradeable emissions allowances. This means savings are made where it is most financially viable to do so.

13.2.24 CO_2 emissions from aviation have been included in the EU Emissions Trading System since 2012. Under the EU ETS all airlines operating within European Economic Area (both European and non-European airlines) are required to monitor, report and verify their emissions from qualifying flights within Europe, and to surrender allowances against those emissions. Airlines used to receive a free allocation of tradeable allowances covering a certain level of permitted emissions from their flights each year, this free allocation was subject to an annual reduction factor and has now been phased out entirely[20]. Since January 2026, airlines no longer receive any free allocation, they must now purchase allowances for 100% of their covered emissions.

13.2.25 Additionally, a European Commission decision adopted in November 2023[21] sets the 2024 emissions cap for aircraft operators at just under 28.9 million tCO_2. This cap declined sharply between 2024 and 2026, dropping to 24.9 million tCO_2. This decrease is due to the 4.3% annual reduction that applies to the 2024–2027 period. This Linear Reduction Factor is set to increase to 4.4% annual reduction from 2028 onwards to align with net zero targets.

13.2.26 Aviation emissions from all intra-EU flights, and therefore those covered by EU ETS, are considered 'traded' emissions.

13.2.27 The EU ETS is discussed further in Section 13.6 in relation to limiting emissions, including from aviation, within the trading system.

Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

13.2.28 CORSIA[22] is a global market-based measure scheme to address CO_2 emissions from international aviation. All EU member states are a part of CORSIA, which offers a harmonised way to reduce emissions from international aviation, minimising market distortion, while respecting the special circumstances and respective capabilities of ICAO Member States.

[19] European Union (EU), (2026). Document 52026PC0616: EUR-Lex - 52026PC0616 - EN - EUR-Lex
[20] European Commission, (2022); European Green Deal: new rules agreed on applying the EU emissions trading system in the aviation sector. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_7609 (Accessed 09/06/2026).
[21] European Commission, (2023); Commission Decision (EU) 2023/2440 of 27 October 2023 on the Union-wide total quantity of allowances to be allocated in respect of aircraft operators under the EU Emissions Trading System for 2024. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202302440
[22] Carbon Offsetting and Reduction Scheme for International Aviation: https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx

13.2.29 Emissions not falling under the EU ETS (non-traded emissions) will be managed through CORSIA, where states have signed up to CORSIA[23], which aims for no net increase in aircraft CO_2 baseline emissions. Ireland, along with all other EU Member States, opted to participate in CORSIA from the pilot phase, which commenced in 2021. Originally, the CORSIA baseline – from which airline offsetting requirements under the agreement are calculated – was agreed to be an average of 2019 and 2020 emissions. However, in 2020 the Covid-19 pandemic caused a precipitous drop in demand for air transport to less than half that of 2019. As a result, the CORSIA baseline would have been significantly reduced, imposing an unexpected and severe economic burden on an already extremely weakened airline industry and contravening the spirit of the CORSIA framework agreed in 2016. Therefore, in June 2020, the ICAO Council agreed to use 2019 emissions only as CORSIA's baseline for the period of 2021-2023. Most recently, at its 41st Assembly, ICAO set 85% of 2019 emissions as CORSIA's baseline from 2024 until the end of the scheme in 2035: a significantly more ambitious target than originally planned, which the industry supported.

13.2.30 CORSIA is discussed further in Section 13.6 in relation to limiting emissions, including from aviation, within the system.

Policy

EU Fit for 55

13.2.31 On July 14, 2021, the European Commission adopted the "Fit for 55"[24] package as part of the European Green Deal, which aims to strengthen the EU's position as a global climate leader. The package aims to modernise existing legislation in line with the EU's 2030 climate target and introduce new policy measures to help bring about the transformative changes needed in the economy, society and industry to achieve climate neutrality by 2050 and to support it, reduce net emissions by at least 55% (compared to 1990) by 2030.

13.2.32 Under the Fit for 55 policy, the ReFuelEU Aviation Initiative will oblige fuel suppliers to blend increasing levels of sustainable aviation fuels in jet fuel taken on-board at EU airports, including synthetic low carbon fuels, known as e-fuels. This sets targets for sustainable aviation fuels (SAF) blending from 2025 onwards to reduce the fuel emissions, with 2% minimum share by 2025, 20% by 2035 and 70% of SAFs are expected to be implemented by 2050.

Single European Sky Initiative (SES)

13.2.33 The EU SES[25] policy's main objective is to reform air traffic management in Europe, in order to cope with sustained air traffic growth and operations under the safest, most cost- and flight-efficient and environmentally friendly conditions. Doing so requires de-fragmenting the European airspace, reducing delays, increasing safety standards and flight efficiency to reduce the aviation environmental footprint, and reducing costs related to service provision.

13.2.34 SESAR (Single European Sky Air Traffic Movement Research) is the technological pillar of SES. It aims to improve air traffic management performance by modernising and harmonising air traffic management systems through the definition, development, validation and deployment of innovative technological and operational air traffic management solutions.

National Legislation and Policy

Climate Action and Low Carbon Development (Amendment) Act 2021

13.2.35 The Climate Action and Low Carbon Development (Amendment) Act 2021[26] supports Ireland's transition to Net Zero and achieving its goal of a climate neutral economy by no later than 2050. It established a legally binding framework with clear targets and commitments set into law, and ensures the necessary

[23] Fact sheet: CORSIA (iata.org) page 4
[24] Fit for 55: Delivering on the proposals: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal/fit-55-delivering-proposals_en
[25] Single European Sky:https://transport.ec.europa.eu/transport-modes/air/single-european-sky_en
[26]Climate Action & Low Carbon Development (Amendment) Act 2021: https://revisedacts.lawreform.ie/eli/2015/act/46/section/4/revised/en/html

structures and processes are embedded on a statutory basis to ensure Ireland achieves its national, EU and international climate goals and obligations in the near and long term.

13.2.36 Section 15 of the Climate Change Act has been disapplied in relation to the Proposed Order. However, the Act remains relevant to the assessment as it establishes the wider statutory framework for Ireland's climate change targets, carbon budgets and emissions reduction commitments.

Minister's Statutory Obligations under the Climate Action and Low Carbon Development Act 2015 (as amended)

13.2.37 Under the Act, the Minister has specific statutory obligations regarding national climate planning, carbon budgeting and reporting. The purpose of this chapter is not to determine compliance with those obligations, but to provide relevant information to assist the Minister in discharging these statutory duties when considering the application. Details on how this chapter provides that information are presented in the Table 13-1.

Table 13-1 Ministerial obligations under Climate Action and Low Carbon Development Act

Ministerial Obligation	Specific Statutory Provision	Key Requirement	How this Chapter Informs the Minister's Consideration of the Statutory Obligation
Climate Action Plans	4(11)	The Minister shall perform actions in a manner consistent with the most recent approved climate action plan and the most recent approved national long term climate action strategy.	This chapter has been prepared having regard to the most recent Climate Action Plan (2025) (the 2026 Climate Action Plan is to be published in November 2026) and Long-term Strategy on GHG Emissions Reduction. The assessment methodology is consistent with the national approach to climate mitigation and assessment of GHG emissions (Section 13.3). The assessment of likely significant effects (Section 13.6) also considers the influence of national climate mitigation measures, including increased renewable energy deployment, decarbonisation of the national electricity grid, and the transition towards lower-carbon transport. In addition, the assessment has regard to measures supporting the decarbonisation of the aviation sector, including improvements in aircraft efficiency, sustainable aviation fuels (SAF), operational efficiencies, air traffic management improvements and other measures identified within national and international aviation climate policy. This provides context for understanding the Proposed Order's GHG emissions within Ireland's wider transition to a low-carbon and climate-resilient economy.
National Adaptation Framework	5(8)	The Minister shall perform functions in a manner consistent with the national adaptation framework.	The chapter includes a Climate Change Risk Assessment (Appendix 13-2) which considers the vulnerability and resilience of the Proposed Development to current and future climate conditions. The assessment identifies climate risks, evaluates their significance and incorporates adaptation measures having regard to the objectives and principles of the National Adaptation Framework.
Carbon Budgets	6B(13)	The Minister shall perform functions in a manner consistent with the carbon budget.	The chapter quantifies the GHG emissions associated with the Proposed Order and assesses their significance within the context of Ireland's carbon budgets (Section 13.6).

Ministerial Obligation	Specific Statutory Provision	Key Requirement	How this Chapter Informs the Minister's Consideration of the Statutory Obligation
Sectoral Emissions Ceilings	6C(9)	The Minister shall perform functions that comply with the sectoral emissions ceiling that applies to the sector.	The chapter assesses the GHG emissions in the context of the relevant sectoral emissions ceilings and examines whether the Proposed Order would materially affect achievement of those ceilings (Section 13.6).
Consultation with the Advisory Council and public bodies	4(2c) and 6B(3)	The Minister must consult with the Advisory Council and public bodies before finalising plans or carbon budgets.	The chapter provides transparent and robust climate evidence, drawing upon national climate policy, carbon budgets and plans that have been developed through the Advisory Council and public bodies consultation processes.
Oireachtas Reporting	14A(1)	The Minister must attend a Joint Oireachtas Committee each year to account for progress under the plan and compliance with carbon budgets.	The chapter transparently documents the Proposed Order's assessment of GHG emissions and assessment of their significance within the context of Ireland's carbon budgets (Section 13.6).

Ireland's Climate Action Plan 2025

13.2.38 The Climate Action Plan (CAP) 2025[27] is the third statutory annual update to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021[28].

13.2.39 It builds on CAP 2024 by redefining and updating the measures and actions required to deliver the carbon budgets and sectoral emissions ceilings and should be read in conjunction with it. The Plan provides a roadmap for taking decisive action to halve Ireland's emissions by 2030 and achieve climate neutrality by no later than 2050, as committed to in the Climate Action and Low Carbon Development (Amendment) Act 2021. These national targets align with Ireland's obligations under EU and international treaties, most notably the Paris Agreement (2015) and the European Green Deal (2020).

13.2.40 The CAP 2024 plan implemented the carbon budgets and sectoral emissions ceilings and set out a roadmap for taking decisive action to halve Ireland's emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government. CAP 2025 builds on CAP 2024 by shifting decisively from broad planning to focused delivery, introducing a streamlined set of high-impact actions designed to accelerate emissions reductions across the economy. Overall, CAP25 narrows the focus to the interventions with the greatest near-term impact, tightening accountability and aligning delivery more closely with Ireland's legally binding carbon budgets.

13.2.41 The CAP 2026 is anticipated to be published in November 2026. However, it had not been published at the time of preparation of this report. The CAP 2026 is anticipated to build upon and enhance the existing measures and commitments established under CAP 2025, maintaining continuity with the policy direction set out in previous Climate Action Plans, including CAP 2024. No major changes are expected from this plan, so it is not anticipated that it will impact the assessments significance or conclusions set out in this chapter.

Ireland's Long-term Strategy on GHG Emissions Reduction

13.2.42 Ireland's Long-term Strategy on Greenhouse Gas Emissions Reductions[29] establishes the national pathway to achieving climate neutrality by 2050 and provides the long-term framework for decarbonisation across all sectors of the Irish economy. The Strategy is aligned with Ireland's National Climate Objective under the Climate Action and Low Carbon Development Act and acts as a bridge

[27] Ireland's Climate Action Plan 2025: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/climate-action-plan-2025/ [Accessed: 14/05/2026]
[28] Climate Action and Low Carbon Development (Amendment) Act 2021. https://www.irishstatutebook.ie/eli/2021/act/32/section/15/enacted/en/html
[29] Ireland's Long-term Strategy on Greenhouse Gas Emissions Reduction 2024: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/long-term-strategy-on-greenhouse-gas-emissions-reductions/

between shorter-term Climate Action Plans and Carbon Budgets and the longer-term requirements of the European Climate Law. It identifies a whole-of-society transition in which GHG emissions are progressively reduced across the transport, industry, energy and built environment sectors, while residual emissions are balanced through carbon removals and sequestration measures.

13.2.43 The Strategy highlights the importance of reducing emissions through a combination of technological innovation, energy efficiency, operational improvements, electrification and the deployment of low-carbon fuels. In the transport sector, decarbonisation is expected to be achieved through a shift towards sustainable mobility, increased electrification of road transport, and reductions in the carbon intensity of transport energy. It highlights that aviation international emissions are a global problem and that Ireland's approach is aligned with international and European initiatives that seek to achieve net-zero aviation emissions by 2050 through advances in aircraft technology, operational efficiencies, sustainable aviation fuels and market-based mechanisms.

Climate Action Framework for the Commercial Semi-State Sector

13.2.44 In 2022, the Irish Government approved the Climate Action Framework (the Framework) for the commercial semi-state (CSS) sector[30], which applies to all CSS companies (including daa) and outlines a series of commitments for delivering on climate action objectives. These commitments, which are outlined below, reflect requirements set out in Ireland's Climate Action Plan 2025:

- Governance of climate action objectives.
- Emission measurement and reduction target.
- Emission valuation in investment appraisal.
- Circular economy and green procurement.
- Climate-related disclosures.

13.2.45 The Framework provides a means for CSS companies to demonstrate how they are meeting their obligations under the Climate Action and Low Carbon Development (Amendment) Act 2021 to operate in a manner consistent with Ireland's national climate ambitions.

Ireland State Action Plan on the Reduction of CO_2 Emissions from Aviation (2025)

13.2.46 Ireland's State Action Plan on the Reduction[31] of CO_2 Emissions from Aviation (2025) sets out the national framework through which Ireland will contribute to reducing GHG emissions from the aviation sector in line with ICAO, EU and national climate objectives. The plan aligns with the ICAO "basket of measures," combining technological improvements, operational efficiencies, Sustainable Aviation Fuel (SAF) deployment, and market-based mechanisms. It also integrates the requirements of the EU Fit for 55 package, including ReFuelEU Aviation and the strengthened EU Emissions Trading System (ETS).

13.2.47 The plan outlines Ireland's expected emissions trajectory under various scenarios and identifies the mitigation potential of each measure. An emphasis is placed on the role of SAF, with Ireland recognising support is needed for the development of a domestic SAF supply chain and to implement the mandatory SAF blending levels required under EU law. Fleet modernisation by Irish-based airlines, improvements in air traffic management, and airport-level energy efficiency initiatives are also highlighted as key contributors to emissions reduction. These include electrification of ground operations, enhanced airport energy management, and participation in the EU's Single European Sky ATM modernisation programme.

13.2.48 In addition to EU-wide measures, the plan details national actions undertaken by Irish aviation stakeholders, including airports, airlines, and regulatory bodies. These actions focus on improving operational performance, reducing ground-based emissions, and supporting research and innovation in

[30] Climate Action Framework for the Commercial Semi-State Sector to address climate action objectives (August 2022): https://www.gov.ie/en/press-release/bd704-government-approves-climate-action-framework-for-the-commercial-semi-state-sector/
[31] Ireland State Action Plan on the Reduction of CO_2 Emissions from Aviation (2025). Available at: https://www.ecac-ceac.org/images/activities/environment/Ireland_State_Action_Plan_Reduction_CO2_Emissions_2025.pdf [Accessed on: 20/05/2026].

low-carbon aviation technologies. Ireland also reaffirms its participation in ICAO's CORSIA, which provides a global market-based mechanism to address residual emissions from international flights.

13.2.49 Overall, the 2025 Action Plan demonstrates Ireland's commitment to a coordinated, multi-layered approach to aviation decarbonisation. It recognises that while technological and operational improvements will deliver incremental gains, the long-term transition to low-carbon aviation will rely heavily on the scaling of SAF and the continued evolution of EU and global climate policy. The plan provides a structured pathway for monitoring progress and updating measures as new technologies and regulatory requirements emerge.

Dublin Airport Local Area Plan 2020

13.2.50 The Local Area Plan (LAP)[32], published by Fingal County Council, sets out the main challenges and opportunities faced by the airport over the plan period. Within Chapter 5: Transition to a Low Carbon Economy, the LAP highlights the importance of the role of International Civil Aviation Organisations (ICAO) and the Carbon Offset and Reduction Scheme for International Aviation (CORSIA), among other key policy documents, in addressing carbon emissions. The LAP "*seeks to pursue climate mitigation in line with global and national targets and support the transition towards a low carbon economy by seeking to reduce CO_2 emissions at the Airport*".

13.2.51 Objective CA01 in the LAP states: "Support relevant provisions contained in the Fingal County Council Climate Change Action Plan 2019-2024, the National Climate Action Plan 2019 and any subsequent plan(s), National Climate Change Adaptation Framework 2018 and any subsequent plan(s) and the National Mitigation Plan 2017 and any subsequent plan(s)".

13.2.52 Objective CA02 in the LAP states "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."

Fingal County Development Plan 2023-2029

13.2.53 The Fingal Development Plan 2023-2029[33] outlines a comprehensive climate action strategy aimed at fostering sustainable growth in the county. It promotes compact, mixed-use developments and encourages the adoption of sustainable transport methods such as cycling, walking, and public transit.

13.2.54 Climate action is a core theme throughout the plan, aligning with the National Planning Framework, the Climate Change Action Plan, and relevant national and European legislation. Key climate action policies include:

- Policy CAP1 – National Climate Action Policy: Support the implementation of national climate objectives, including the Climate Action Plan and Climate Plan for Ireland.
- Objective CAO1 – Climate Action Legislation: Ensure the plan adapts to any new or amended climate action legislation.
- Objective CAO2 – Fingal County Council Climate Change Action Plan: Implement the council's Climate Change Action Plan in collaboration with partners such as the Dublin Metropolitan Climate Action Regional Office (CARO) and Codema (Dublin's Energy Agency).
- Objective CAO3 – Quantification of GHGs: Work with the Eastern and Midland Regional Assembly (EMRA) to establish methods for quantifying GHG impacts of different spatial planning policies.
- Policy CAP2 – Mitigation and Adaptation: Prioritise both mitigation and adaptation measures to address climate change, following best practices and available guidance.

13.2.55 The Fingal Development Plan places a strong focus on reducing emissions by promoting sustainable transport and smart travel for access to and from Dublin Airport. Key policies supporting this goal include:

[32] Fingal County Council (2020). Dublin Airport Local Area Plan 2020. Available at: https://www.fingal.ie/dublin-airport-local-area-plan-2020 [Accessed on: 09/06/2026].
[33] Fingal County Council (2023). Fingal County Development Plan 2023-2029. Available at: https://www.fingal.ie/sites/default/files/2023-10/Fingal%20Development%20Plan%2030.08.23_V4_WEB.pdf [Accessed 09/06/2026].

- Objective DAO2 – Safeguarding Dublin Airport's Needs: Protect the current and future operational, safety, technical, and development needs of Dublin Airport, ensuring its growth aligns with the Dublin Airport Local Area Plan 2020 and subsequent updates, while balancing environmental and economic impacts on local communities and businesses.
- Policy DAP2 – Infrastructure Provision: Ensure that Dublin Airport is equipped with the necessary infrastructure and facilities to operate sustainably and develop further, while considering impacts on the environment, climate change, and local communities.
- Policy DAP4 – Transitioning to a Low Carbon Economy: Ensure all developments at Dublin Airport comply with the Climate Action and Circular Economy Objectives outlined in the Dublin Airport Local Area Plan 2020, fostering a low-carbon and sustainable approach.

Guidance

Guidance on potential policies and coordinated approaches for the deployment of SAF (2022)

13.2.56 This guidance[34] has been developed by the ICAO Committee on Aviation Environmental Protection based on various studies since 2016. The guidance includes assessments of existing policy instruments, identification of potential policies and general recommendations to facilitate their implementation, and techno-economic analysis of policy options to foster the deployment of sustainable aviation fuel ("SAF")[35]. The guidance summarises a subset of potential policies and coordinated approaches for the deployment of SAF. Ireland is a member of ICAO which is an internationally recognised United Nations agency. This assessment relied on ICAO's guidance to inform aircraft emissions specifications, carbon offsets, anticipated improvements in aircraft technology efficiency, and the integration of SAF. These aspects are discussed in detail below in Section 13.6.

Sustainable Energy Authority of Ireland

13.2.57 The SEAI is a government agency dedicated to promoting and supporting the development of sustainable energy in Ireland. SEAI provides conversion factors for specific energy uses, which were utilised in this assessment where applicable.

13.2.58 The SEAI National Energy Projections 2025[36] identify that Ireland is not currently projected to meet a number of its 2030 energy and climate targets. This is relevant to the assessment of the Proposed Order because it demonstrates that achievement of national climate targets cannot be assumed solely on the basis of existing policy commitments. The assessment therefore considers the Proposed Order against the projected emissions trajectories described in Section 13.2, including the EPA 'With Existing Measures' and 'With Additional Measures' scenarios, as appropriate.

UK DEFRA / DESNZ Guidance

13.2.59 The UK Department for Environment, Food and Rural Affairs (DEFRA) and Department for Energy Security and Net Zero (DESNZ) GHG Reporting: Conversion Factors 2025[37] provides a comprehensive set of factors for converting various activities and emissions into equivalent GHG emissions. These conversion factors allow organisations to calculate and report their GHG emissions accurately and consistently, covering sectors such as energy, transport, waste management, and agriculture. The document includes updated emission factors for different fuels (including aviation), energy use and waste disposal methods, enabling businesses and policymakers to assess their environmental impact and develop effective strategies for reducing GHG emissions.

13.2.60 This UK guidance has been used in the absence of relevant GHG emission factor data being available in Ireland. Furthermore, The DEFRA/DESNZ Conversion Factors are appropriate to use in Ireland in the absence of Irish-specific emission factors because they provide a standardised and widely accepted

[34] Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) 2016: https://www.icao.int/CORSIA
[35] Sustainable Aviation Fuel is defined as alternative aviation fuel with similar properties to conventional jet fuel, but with a smaller carbon footprint.
[36] SEAI (2025). National Energy Projections 2025. Available at: https://www.seai.ie/sites/default/files/publications/National-Energy-Projections-Report-2025.pdf [Accessed 09/06/2026].
[37] DEFRA (2026). UK Government GHG Conversion Factors for Company Reporting, Department for Environment, Food and Rural Affairs and Department of Business, Energy and Industrial Strategy. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2025 [Accessed 09/06/2026].

framework for calculating and reporting GHG emissions, ensuring consistency and comparability across different sectors and allowing for a meaningful assessment of environmental impact.

EU Commission Notice (2021/C 373/01)

13.2.61 The EU Commission Guidance (2021/C 373/01) provides technical guidance on the climate proofing of infrastructure covering the period 2021-2027. 'Climate proofing' is defined within the guidance notice as "a process that integrates climate change mitigation and adaptation measures into the development of infrastructure projects".

13.2.62 Climate change mitigation (i.e. GHG emissions reduction) and adaptation (i.e. adapting to projected changes in climate) form the two pillars of climate proofing described within the guidance notice.

13.3 Assessment Methodology

13.3.1 The following section describes the methodology used to quantify the GHG emissions arising as a result of the Proposed Order, as well as the method for determining the significance of these GHG emissions in terms of their impact on the climate. The methodology presented in this section is in accordance with best practice for GHG accounting.

Overall approach

13.3.2 GHG emissions are reported in tonnes of carbon dioxide equivalent (tCO_2e). Where appropriate GHG emissions factors allow[38], the following seven Kyoto Protocol GHGs are to be collectively accounted for under tCO_2e in line with the GHG Protocol:

- Carbon dioxide (CO_2).
- Methane (CH_4).
- Nitrous oxide (N_2O).
- Sulphur hexafluoride (SF_6).
- Hydrofluorocarbons (HFCs).
- Perfluorocarbons (PFCs).
- Nitrogen Trifluoride (NF_3).

13.3.3 Where activity data allows, expected GHG emissions have been quantified using a calculation-based methodology as per the following equation, which is presented in the ISEP guidance supporting the UK DEFRA/DESNZ emissions factors:

Activity data x GHG emissions factor = GHG emissions value

13.3.4 To identify the key contributing GHG emission sources and/or activities associated with the Proposed Order, GHG emissions have been calculated and reported under the following three categories (listed in order of the level of influence daa has over these emissions):

- **Airport operations** – daa has *direct control* over these emissions,
  - These are defined as emissions associated with the operation of existing and permitted airport infrastructure and assets (e.g. electricity use for lighting and building operations, fuel use for airport assets and transportation around the site, and waste disposal).
- **Surface access journeys** – daa has *some influence* over these emissions,
  - For the purposes of the GHG assessment, surface access journeys are defined as passenger and staff journeys to and from the airport as a result of airport operations.

[38] Please note, some emissions factors used do not include all seven of these gases, for example either because certain emissions are not relevant to the specific activity or because the data or science surrounding it is uncertain. For example, the emissions factors used to calculate aviation emissions only account for CO_2 emissions. The impact of non-CO_2 emissions from aviation are qualitatively assessed in Appendix 13-7.

- **Aviation** – daa has *limited influence* over these emissions,
  - Aviation emissions include GHG emissions from departing flights, in line with industry accounting practice. Whilst most emissions are during flight (outside of daa control), there will be emissions from aircraft on the ground/ at stand/ taxiing. Daa has limited influence over these emissions while the aircraft are on the ground, e.g. through an operating procedure to implement single-engine taxiing

13.3.5 Since no specific guidance on reporting airport emissions is available in Ireland, the approach taken aligns with the methodology set out in the UK Airports National Policy Statement[39] for reporting airport emissions in the context of planning. This approach is considered appropriate as it is consistent with current industry best practice regarding the scope and boundary for reporting emissions from comparable airport projects.

Identifying Airport Operations Emissions

13.3.6 This includes GHG emissions from the operation of the airport buildings and associated assets and infrastructure within the Proposed Order, over which the daa has direct control. It also includes emissions from vehicles owned and operated by the daa. Operational energy data were obtained from daa for 2023, 2024 and 2025. The 2025 data have been used as the basis for the assessment because they reflect the current energy performance of the airport estate, including the benefits of the newly installed solar array. Percentage adjustments were then applied across the assessment scenarios for future years (2026 to 2050) to estimate energy demand, assuming a linear relationship between consumption and passenger capacity. For the 2029 Permitted Operation, the 2025 energy demand was scaled down to represent the 32 mppa operational condition, rather than carrying forward the energy demand associated with the 2025 Current Operation at 36.4 mppa. For the 2029 Proposed Operation, this represents a 9.9% increase in passenger throughput from the 2025 Current Operation (36.4 mppa) to 40 mppa. In the forecast of future years (out to 2050), efficiencies such as the decarbonisation of Ireland's electricity grid have been included.

13.3.7 Emissions sources considered under airport operations include:

- GHG emissions from energy and fuel consumption (grid electricity and fuel use e.g., natural gas).
- GHG emissions from the provision and disposal of water.
- GHG emissions from fuel consumption for airside and landside vehicles and ground support equipment.
- GHG emissions from other operational activities e.g., generators.
- Transportation and disposal of operational waste.

13.3.8 Emissions released upstream and downstream of Dublin Airport are under the partial influence of daa and are also influenced at a national level by measures arising from the Climate Action and Low Carbon Development (Amendment) Act 2021 and Ireland's Climate Action Plan 2025 (Section 13.2). For example, these measures may include a transition to renewable energy, which can reduce emissions from both upstream and downstream sources.

13.3.9 In addition, the daa's Carbon Reduction Strategy[40] identifies measures to reduce GHG emissions associated with airport operations. The measures relevant to the Proposed Order and relied upon in this assessment are described in Section 13.3 and Appendix 13-5 (EIAR Volume 4).

13.3.10 To account for the projected decarbonisation of electricity generation and gas supply over time, a year-on-year percentage reduction was applied to GHG emissions associated with grid electricity and natural gas consumption. The reduction was derived from the EPA's Ireland's GHG Emissions Projections 2024–2055[41], using the 'With Existing Measures' scenario. The EPA projections provide an assessment of Ireland's projected GHG emissions to 2055, including progress towards national climate objectives

[39] Gov.uk (2018). *Airports National Policy Statement*. Available at: https://www.gov.uk/government/publications/airports-national-policy-statement [Accessed on: 09/06/2026]
[40] Dublin Airport Carbon Reduction Strategy: dublin-airport-carbon-reduction-strategy.pdf (dublinairport.com)
[41] EPA (2025). *Ireland's GHG Emissions Projections 2024-2055.* Available at: https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-greenhouse-gas-emissions-projections-2024-2055.php [Accessed on: 26/05/2026].

under the Climate Action and Low Carbon Development (Amendment) Act 2021 and EU emissions reduction targets. The 'With Existing Measures' scenario has been adopted as a reasonable worst-case assumption because it reflects a lower rate of future decarbonisation than the 'With Additional Measures' scenario. It therefore results in higher forecast emissions for a given level of activity and provides a conservative basis for assessing the GHG effects of the Proposed Order.

Identifying Surface Access Journeys Emissions

13.3.11 This includes emissions from transportation associated with journeys made by passengers, staff and freight to and from the airport. Surface access journey data was obtained from the traffic assessment.

13.3.12 Daily vehicle movements were provided for 2023, 2025 and 2029. The daily vehicle movements between 2026 and 2029 were assumed to increase linearly. The data was used to estimate GHG emissions associated with additional surface access journeys, based on assumptions[42] made around mode of travel and transportation distances, and applying the relevant DEFRA/DESNZ emissions factors[43]. A percentage reduction derived from Ireland's Greenhouse Gas Emissions Projections 2024-2055 (with existing measures) for road transportation was applied to account for future efficiencies in road transportation.

13.3.13 It is recognised that daa has some influence over surface access emissions through measures to encourage modal shift away from private vehicles towards public transport and other sustainable modes, as described in Chapter 6: Material Assets (Traffic and Transport). However, surface access emissions are predominantly outside the direct control of daa and are also influenced at a national level by measures arising from the Climate Action and Low Carbon Development (Amendment) Act 2021 and Ireland's Climate Action Plan 2025.

13.3.14 The Carbon Reduction Strategy identifies measures through which daa seeks to reduce GHG emissions associated with surface access journeys. These measures are summarised in Section 13.6 and Appendix 13-5. The assessment distinguishes between measures incorporated into the quantitative GHG calculations and wider carbon reduction initiatives which provide context for the assessment.

Identifying Aviation Emissions

13.3.15 Aircraft schedule forecasts for a busy day have been used as a reasonable worst-case basis for estimating annual emissions. This is because the busy-day schedule represents a relatively high level of aircraft activity and, when extrapolated across the year, results in a conservative estimate of annual aircraft movements and associated GHG emissions. The aircraft mix within the busy-day schedule is assumed to be representative of the aircraft mix throughout the year. To calculate annual emissions, the aircraft and Air Traffic Movement (ATM) schedule has been pro-rated up based on the number of ATMs for the busy day and the total annual ATMs (detailed in Appendix 13.1, EIAR Volume 4).

13.3.16 Control of aviation emissions sits principally at international, EU and national levels through aviation policy, with individual airports having limited influence over these emissions. This approach is supported by the Climate Action Plan 2025[44].

13.3.17 GHG emissions from aviation are reported according to two phases of flight, the landing take-off cycle and the climb, cruise and descent phase. This aligns with the calculation methodology developed for the European Monitoring and Evaluation Programme (EMEP) / European Environment Agency (EEA) Aviation Emissions Calculator[45] used for the aviation calculations:

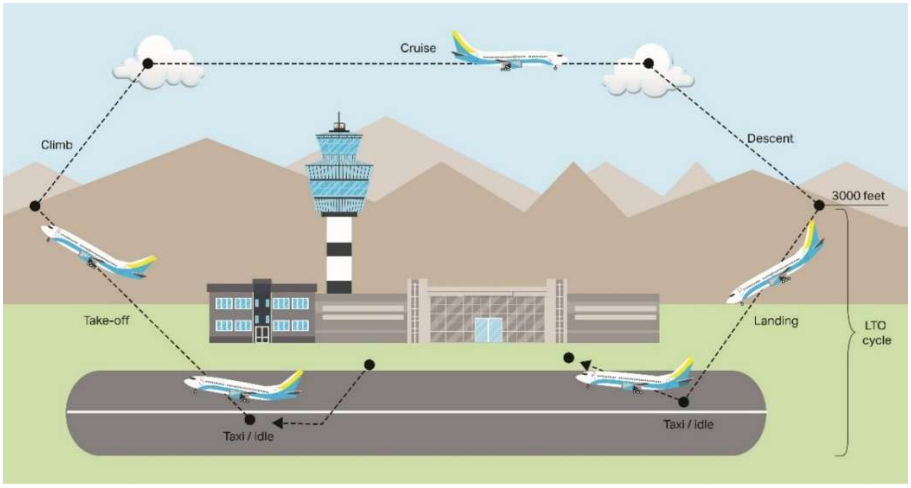
- Landing and take- off (LTO) cycle: this includes aircraft movements during arrival, taxiing, on-stand and departure below 3,000ft[46] (915m).

[42] Specific assumptions are outlined in the *Limitations and Assumptions* section below.
[43] Department for Environment, Food and Rural Affairs and the Department of Business, Energy and Industrial Strategy, (2025); UK Government GHG Conversion Factors for Company Reporting.
[44] Ireland's Climate Action Plan 2025: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/climate-action-plan-2025/ [Accessed: 14/05/2026]
[45] EMEP/EEA, (2019); 1.A.3.a Aviation 1 Master emissions calculator 2019. Available at: https://www.eea.europa.eu/en/analysis/publications/emep-eea-guidebook-2023/part-b-sectoral-guidance-chapters/1-energy/1-a-combustion/1-a-3-a-aviation.3 [Accessed on: 09/06/2026]
[46] The altitude is specified as 3000ft, which is equivalent to approximately 915m.

- Climb, cruise and descent (CCD) this includes departing flights only from 3000ft (915m) to within 3000ft of the destination airport.

13.3.18 A summary of the flight phases modelled is presented in Plate 13-1.

Plate 13-1: ATM phases, including Landing and Take-Off and Climb, Cruise and Descent phases.



13.3.19 This approach aligns with international practice for accounting for international aviation emissions, where emissions for any given country are based on the use of bunkered aviation fuel for departing flights. This approach avoids double counting between countries when calculating global emissions. It also avoids double counting of emissions between airports as emissions associated with the arriving flights will be accounted for within the carbon accounts of the airports of origin. This best-practice approach is described by the UK Climate Change Committee in their Statutory Advice on Inclusion of International Aviation and Shipping[47]. It is also promoted by the UNFCCC[48] in their recommended approach, which is to allocate aviation emissions to the country of departure.

13.3.20 In line with ISEP guidance for assessing the significance of the effect of a project on the climate, GHG emissions are contextualised against an appropriate carbon budget. National carbon budgets generally account for international aviation emissions on the basis of departing flights, consistent with the aviation emissions accounting approach described above. While emissions from inbound international flights could be estimated, their inclusion would not provide a like-for-like comparison with the relevant Irish emissions trajectories, which do not include emissions from inbound international flights. The assessment therefore uses emissions from departing flights for the purposes of comparison and contextualisation against the relevant Irish emissions trajectories. This approach is also consistent with the principles established in R (Finch on behalf of the Weald Action Group) v Surrey County Council [2024] UKSC 20, in that relevant GHG emissions are identified and quantified while their significance is assessed against an appropriate and meaningful benchmark.

13.3.21 Modelling of aviation GHG emissions takes account of forecast future aircraft fuel-efficiency improvements across the global aircraft fleet and the uptake of SAF. The implementation of fuel-efficiency improvements and SAF in the modelling is explained in detail in the Assumptions and Limitations section.

13.3.22 The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is an ICAO global market-based mechanism intended to address CO_2 emissions from international aviation. It is relevant to this assessment because it provides a mechanism for addressing eligible residual international aviation emissions associated with airlines using Dublin Airport. CORSIA is not applied as a reduction to the gross aviation emissions calculated in this assessment; rather, it is considered as a market-based mechanism through which residual aviation emissions may be addressed. While daa cannot directly

[47] Climate Change Committee, (2012); Scope of carbon budgets: Statutory advice on inclusion of international aviation and shipping. Available at: https://www.theccc.org.uk/wp-content/uploads/2012/04/CCC_IAS_Core-ScopeOfBudgets_Interactive.pdf
[48] United Nations Framework Convention on Climate Change, (2005); Compilation of data on emissions from international aviation. Available at: https://unfccc.int/resource/docs/2005/sbsta/eng/misc04.pdf

influence its implementation, CORSIA is supported by the Irish Government as an ICAO member. The European Council and Parliament agreed that after the 42nd Assembly of the ICAO, in 2025, the European Commission would assess if the implementation of CORSIA is sufficient to reduce aviation emissions in light of the objective of the Paris agreement. This review is due this year. If CORSIA delivers on its objectives, the Commission will make a proposal to the Council and Parliament to extend the 'clean cut'. If CORSIA is not sufficient, the Commission will make a proposal to extend the scope of ETS to all flights departing from the EEA.

13.3.23 CO_2 emissions from aviation have been included in the EU Emissions Trading System (EU ETS) since 2012. Under the EU ETS, airlines operating qualifying flights within the European Economic Area are required to monitor, report and verify their emissions and surrender allowances against those emissions. The EU ETS is relevant to this assessment because it provides a market-based mechanism through which eligible residual aviation emissions are managed. As with CORSIA, the EU ETS is not applied as a reduction to the gross aviation emissions calculated in this assessment but is considered in the evaluation of how residual aviation emissions are addressed. The EU ETS is discussed further in Section 13.6.

13.3.24 Projected GHG emissions for aviation have been calculated using the actual and forecast ATM data presented in Table 13-2**.** The Proposed Operation reaches 40 mppa in 2029, with passenger throughput increasing from 32 mppa in 2023, to the 2025 Current Operation (36.4 mppa), reaching 40 mppa in 2029 and remaining at that level thereafter. The Permitted Operation retains the permitted passenger throughput of 32 mppa; the aviation emissions assessment nevertheless reflects the aircraft fleet projected for 2029 to account for future fleet efficiencies. Appendix 13-1 provides projections of annual aviation emissions to 2050.

Table 13-2: Annual Aviation Actual/Forecast ATM Data[49]

Scenario	Assessment Year	ATMs
Baseline Operation (32 mppa)	2023	116,853
Current Operation (36.4 mppa)	2025	128,326
Proposed Operation (40 mppa)	2029	136,082
Permitted Operation (32 mppa)	2029	116,853

13.3.25 Emissions from aviation have been calculated using the EMEP/EEA Aviation Emissions Calculator, based on the specific flight schedule, distance travelled to the destination and aircraft mix provided. ATM forecasts take into account changes in aircraft fleet mix over time as older aircraft are taken out of service and replaced by newer, more efficient models, resulting in increasing future efficiency gains.

13.3.26 The Aviation Emissions Calculator draws on the ICAO Aircraft Engine Emissions Databank[50], which contains information on exhaust emissions from various aircraft engines (provided by engine manufacturers). The calculator models emissions from aircraft types based on their most frequently used engine types and average European taxi times provided by EUROCONTROL's Central Office of Delay Analysis (CODA).

13.3.27 The Aviation Emissions Calculator methodology does not account for emissions from aircraft auxiliary power units (APUs). An APU is a small gas turbine engine typically located in the tail cone of an aircraft and used to provide electrical power to the aircraft while on the ground. APU use is highly variable between airports and can depend on site-specific restrictions, fuel costs and the availability of alternative power sources. To account for APU use, an 8% scaling factor has been applied to the LTO emissions calculated using the Aviation Emissions Calculator. The 8% scaling factor is based on the contribution of APU emissions to overall LTO emissions reported in Heathrow Airport's Emissions Trajectory for 2013–2017 and is applied as a reasonable worst-case estimate in the absence of a Dublin Airport-specific value. This provides a conservative basis for the assessment by avoiding any assumption of a

[49]This table is for illustrative purposes only and is informed by Chapter 9. The annual ATM emissions are calculated by applying uplifts to a busy day.
[50] EASA. (2023) ICAO Aircraft Engine Emissions Databank. Available at: https://www.easa.europa.eu/en/domains/environment/icao-aircraft-engine-emissions-databank

lower APU contribution. It is also conservative for the later assessment years because the planned phase-out of APU use at Dublin Airport by 2030 would be expected to reduce APU-related emissions below the level represented by the 8% scaling factor.

13.3.28 Data from Heathrow Airport have been used as a reasonable worst-case proxy for APU emissions at Dublin Airport in the absence of sufficiently robust airport-specific data. APU use can vary materially between airports, and there is limited published information or guidance that would support a more precise Dublin Airport-specific assumption. Heathrow provides a publicly available estimate of the contribution of APU emissions to overall LTO emissions and has therefore been used as a conservative proxy rather than assuming a lower contribution for Dublin Airport. While Heathrow may not provide a precise representation of APU use at Dublin Airport, both are major European international airports and the data are considered sufficiently representative for the purposes of this assessment. APU emissions also account for only a small proportion of overall aircraft emissions, such that reasonable variation in APU use between the two airports would not be expected to materially affect the conclusions of the assessment.

13.3.29 The flight distance between Dublin Airport and the destination airports has been estimated for each route. Emissions from each ATM have been modelled individually using the Aviation Emissions Calculator. Route distances were obtained from the Great Circle Mapper air distance calculator and an 8% uplift was applied to CCD emissions to account for deviations from the direct route due to inclement weather conditions and stacking above airports, as per the UK DEFRA 2025 emissions factor calculation methodology.

13.3.30 The 8% scaling factor from the UK DEFRA/DESNZ 2025 guidance has been applied here as it is the most up-to-date source available. The guidance states that following recent analysis, this factor is deemed the most appropriate for flights arriving and departing in the UK. It is assumed that, within the context of global airport operations, Dublin Airport's operations are sufficiently similar to those of UK airports to allow relevant comparisons. The DEFRA/DESNZ factor is considered applicable to Dublin Airport given the broadly comparable nature of its aviation operations to those of major UK airports. An alternative uplift of 10% is reported in the IPCC Aviation and the Global Atmosphere report (1999); however, given the age of the underlying data and subsequent changes in aviation operations, the more recent DEFRA/DESNZ factor is considered the more appropriate estimate.

Non-CO_2 Emissions

13.3.31 In addition to the direct climate effects from the combustion of fossil fuels, aviation is known to result in a range of pollutants that can affect the climate in other ways; these include nitrogen oxides and water vapour that can, for example, result in contrails leading to the formation of cirrus clouds.

13.3.32 Non-CO_2 aviation effects are generally shorter-lived than the warming effect associated with CO_2 emissions, which can persist in the atmosphere over much longer timescales.

13.3.33 The methodology for estimating the non-CO_2 effects of aviation activities draws on the European Commission's monitoring, reporting and verification (MRV) framework which came into force in January 2025[51]. This framework introduces the Non-CO_2 Aviation Effects Tracking System (NEATS), an advanced tool designed for aircraft operators to calculate non-CO_2 impacts using detailed, flight-specific inputs. These inputs include flight trajectory networks (e.g. route, distance, latitude and longitude), aircraft and engine characteristics, prevailing meteorological conditions, and fuel properties. While this represents the most comprehensive approach currently available, it is primarily intended for regulatory reporting purposes and requires a high level of data granularity. Application of this flight-specific approach is therefore not considered proportionate or practicable for this assessment. This is due to the scale of total flights involved, the extended modelling timeframe to 2050, and the inclusion of a significant number of international flights beyond EU boundaries, which limits the applicability of the tool.

13.3.34 In place of detailed modelling, a factor-based approach was adopted. This approach is informed by established research, including the European Commission's 2020 report on non-CO_2 aviation impacts, which indicates that non-CO_2 effects contribute significantly to overall aviation-induced climate forcing.

[51] EU Commission. (2020). Updated analysis of the non-CO_2 climate impacts of aviation and potential policy measures pursuant to EU Emissions Trading System. Available at: https://www.easa.europa.eu/en/document-library/research-reports/report-commission-european-parliament-and-council

Specifically, the report estimates that non-CO_2 effects account for approximately 66% of total aviation effective radiative forcing (ERF). This report also acknowledges a high level of uncertainty in the reporting of non CO_2 emissions and that there is on-going research at the EU level to provide more robust understanding of these emissions.

13.3.35 To reflect these findings, a blanket uplift factor of 2.9 times CO_2 emissions has been applied as a reasonable worst-case estimate of total aviation climate impacts, including both CO_2 and non-CO_2 effects such as contrail cirrus, nitrogen oxides, water vapour and particulate matter. The factor is deliberately conservative because it applies a single high-level uplift across all aviation activity rather than allowing for circumstances in which non-CO_2 effects may be lower. It therefore provides a transparent means of capturing the additional warming effects associated with aviation in the absence of detailed flight-level modelling. While this approach does not capture variability arising from factors such as altitude, routing, atmospheric conditions and aircraft performance, it is considered proportionate for the purposes of this assessment and provides a conservative estimate of potential non-CO_2 climate effects.

13.3.36 Fuel composition is also an important consideration in this context. Conventional aviation fuels typically contain higher levels of aromatic compounds, leading to increased emissions of non-volatile particulate matter (nvPM). These particles play a key role in the formation and persistence of contrails, which are a major contributor to non-CO_2 climate effects. In contrast, SAFs generally have lower aromatic content, resulting in reduced nvPM emissions and potentially lower contrail formation. Consequently, the application of a 2.9× factor may therefore overestimate non-CO_2 effects in future scenarios where increasing SAF uptake is assumed.

13.3.37 As a sensitivity analysis, non-CO_2 effects have been assessed using this approach to provide an estimate of the potential total climate impact of aviation. Current carbon budgets are limited to GHG emissions covered under the Kyoto Protocol and do not include these additional non-CO_2 aviation effects. They therefore cannot be directly compared with current carbon budgets on a like-for-like basis. The results are instead presented to illustrate the potential scale of total aviation climate effects and are considered qualitatively in accordance with ISEP GHG assessment guidance.

13.3.38 The results are presented in Appendix 13-6.

Identifying Significant Environmental Effects

13.3.39 The global climate is the receptor for the purposes of the GHG emissions assessment. Ireland's National Emissions Trajectory has been used as a contextual benchmark to consider the scale of GHG emissions associated with the Proposed Order in relation to Ireland's projected trajectory towards decarbonisation. While the National Emissions Trajectory does not include emissions from international aviation, it provides a relevant national context for considering the Proposed Order's GHG emissions and their consistency with Ireland's pathway towards net zero.

13.3.40 This approach reflects the objectives of the Paris Agreement to strengthen the global response to climate change by holding the increase in global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C. The importance of limiting global warming to 1.5°C[52] is also reflected in the findings of the IPCC Special Report on Global Warming of 1.5°C.

13.3.41 To support the Paris Agreement's climate objectives, signatory countries are required to reduce GHG emissions through Nationally Determined Contributions (NDCs), which set out national commitments to emissions reduction. Ireland's National Emissions Trajectory has therefore been used as a national contextual benchmark against which the scale and trajectory of GHG emissions associated with the Proposed Order can be considered. As international aviation emissions are not included within the National Emissions Trajectory (only domestic flights are included in the carbon budgets), this comparison provides a conservative context for the aviation emissions associated with the Proposed Order.

[52] The Intergovernmental Panel on Climate Change (IPCC), (2018); Global warming of 1.5°C. An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global GHG emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

Significance Criteria

13.3.42 EPA guidance[53] states that "when more specific definitions exist within a specialised factor or topic, e.g. biodiversity, these should be used in preference to these generalised definitions". Accordingly, the significance criteria set out in the ISEP guidance Assessing GHG Emissions and Evaluating their Significance have been applied to the assessment of GHG effects.

13.3.43 The ISEP guidance is considered current best practice for the assessment of GHG effects. It states that the crux of assessing significance is "not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050". The trajectory of GHG emissions associated with the Proposed Order has therefore been taken into account in determining significance.

Table 13-3: Definition of Levels of Significance from ISEP

Significance Level	Category of Effect	Description
Significant Adverse	Major adverse	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to Ireland's trajectory towards net zero.
	Moderate adverse	The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to Ireland's trajectory towards net zero.
Not Significant	Minor adverse	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve Ireland's trajectory towards net zero.
	Negligible	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero.
Significant Beneficial	Beneficial	The project's net GHG impacts are below zero and as such it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

Source: ISEP[54] adapted for this project

13.3.44 The significance criteria presented in Table 13-3 were used to determine the significance of GHG emissions arising as a result of the Proposed Order, taking account of their alignment with Ireland's trajectory towards net zero and the mitigation measures incorporated into the Proposed Order.

13.3.45 The conventional approach to determining likely significant effects is challenging to apply where the receptor is the global climate and the effects of GHG emissions are cumulative and not geographically bounded. In this context, significance is appropriately evaluated by considering the Proposed Order's emissions against relevant benchmarks and milestones for progress towards net zero.

[53] Environmental Protection Agency (EPA) (2022). Guidelines on the information to be contained in environmental impact assessment reports. Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/guidelines-on-the-information-to-be-contained-in-environmental-impact-assessment-reports-eiar.php

[54] Table 13-3 has been slightly modified from the ISEP original to make it relevant to Ireland.

13.3.46 The ISEP guidance provides a methodology for evaluating the significance of GHG effects in climate change mitigation assessments and recognises that professional judgement is required to contextualise a project's GHG emissions. In applying that guidance, professional judgement is used to consider the scale of the emissions change, its contribution to relevant carbon budgets and reduction trajectories, the extent to which the Proposed Order is consistent with applicable climate policy and decarbonisation pathways, and whether the resulting effect is significant in the context of the transition to net zero.

13.3.47 Table 13-4Table 13-4 sets out the key factors considered in evaluating the significance of GHG emissions from the three main emissions sources associated with the Proposed Order.

Table 13-4: Trajectories to net zero, policies, and control measures considered when assessing significance of different GHG emissions sources

Emissions Source	Applicable trajectory to net zero	Relevant policies (provided in Section 13.2)	Control measures
Airport operations	Ireland's 2050 Transport Emissions Trajectory	The Climate Action Plan 2025 Climate Action and Low Carbon Development (Amendment) Act 2021	Built environment commercial sectoral emission ceiling
Surface Access Journeys	Ireland's 2050 Transport Emissions Trajectory	The Climate Action Plan 2025 Climate Action and Low Carbon Development (Amendment) Act 2021	Transport sectoral emission ceiling
Aviation	Ireland's 2050 Transport Emissions Trajectory	The Climate Action Plan 2025 Climate Action and Low Carbon Development (Amendment) Act 2021. Ireland State Action Plan on the Reduction of CO2 Emissions from Aviation 2025 EU ETS ReFuelEU Aviation CORSIA	EU ETS ReFuelEU Aviation CORSIA

Assessing Significance

13.3.48 As part of the evaluation of significance, the GHG emissions associated with the Proposed Order for each of the three emissions sources are compared with:

- Airport Operations: the trajectory to net zero provided by Ireland's Transport Emissions Trajectory (Plate 13-2, overleaf), and the built environment commercial sectoral emission ceiling.
- Surface Access: the trajectory to net zero provided by Ireland's Transport Emissions Trajectory, and the transport sectoral emission ceiling.
- Aviation: Ireland's projected total National Emissions Inventory[55], and Ireland's projected total Transport Emissions Trajectory.

13.3.49 Ireland's Transport Emissions Trajectory projections produced by the EPA provide trajectories to 2050 under both a 'With Existing Measures' scenario and a 'With Additional Measures' scenario[56]. The 'With Existing Measures' scenario reflects the implementation of measures already adopted at the time of the projections, whereas the 'With Additional Measures' scenario also incorporates additional planned policies and measures, including those identified in Ireland's Climate Action Plan. The 'With Additional

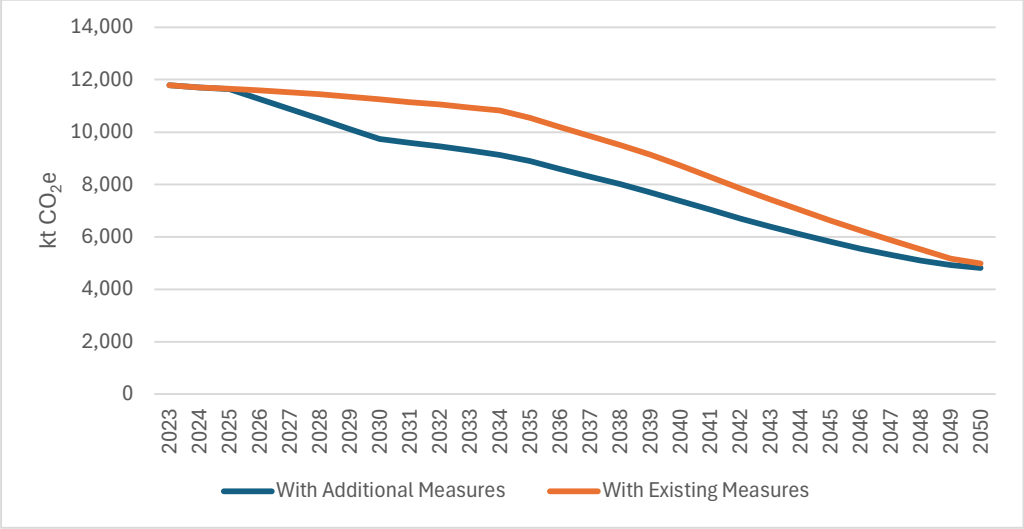
[55] National Emissions Inventory. Available at: https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/irelands-greenhouse-gas-emissions-projections-2024-2055.php [Accessed on: 09/06/2026]
[56] Under the EPA's National and Transport Emissions Trajectory modelling, the With Additional Measures scenario includes all measures in the With Existing Measures scenario plus additional planned policies—primarily those in Ireland's Climate Action Plan (e.g., higher EV uptake, higher biofuel blending rates).

Measures' scenario has been used for the purposes of this assessment as it represents the more ambitious projected pathway towards Ireland's climate targets.

13.3.50 While the EPA inventory projections do not include international aviation emissions, they include domestic aviation emissions and provide a useful national context against which the scale of aviation emissions associated with the Proposed Order can be considered. The 'With Additional Measures' scenario has been used for this comparison because it represents the more ambitious of the two projected decarbonisation pathways. This provides a conservative basis for contextualisation, as the faster reduction in projected national emissions results in a lower comparator against which the aviation emissions are assessed and, consequently, a higher proportionate contribution from those emissions.

13.3.51 The assessment of significance also considers the extent to which the Proposed Order is consistent with existing policy and best practices to drive decarbonisation.

Plate 13-2: GHG Emissions Projections from the Transport Sector under the with Existing Measures and with Additional Measures Scenarios out to 2050



Lifecycle GHG Impact Assessment Summary

13.3.52 Having considered the significance of each of the three specific emissions sources (aviation, airport operations and surface access journeys), the significance of the Proposed Order as a whole is considered and evaluated, with this evaluation carried out in line with the updated guidance as published by ISEP (see Table 13-3).

13.3.53 As explained above, to avoid double-counting international aviation emissions between countries, emissions from arriving international flights are attributed to the country of departure. Accordingly, only emissions from flights departing Dublin Airport are contextualised against Ireland's National and Transport Emissions Inventories for the purposes of evaluating significance.

Application of the Assessment Framework

13.3.54 As set out in Chapter 5: Methodology, the Principal Assessment identifies the likely significant effects of the Proposed Order by comparing GHG emissions predicted for the Permitted Operation (32.0 mppa) with those predicted for the Proposed Operation (40.0 mppa).

13.3.55 Both operational conditions are assessed for the same future year and against the same Future Receiving Environment and other baseline assumptions. The comparison therefore identifies the change in GHG emissions attributable to the Proposed Order relative to the Permitted Operation. This comparison provides the basis for identifying likely significant effects, determining any additional mitigation measures and reporting residual effects.

13.3.56 GHG emissions have been calculated for the Permitted Operation (32.0 mppa) and the Proposed Operation (40.0 mppa) using the assumptions and methodologies described above. The 2023 Baseline Operation (32.0 mppa) and 2025 Current Operation (36.4 mppa) provide additional context for the assessment but do not form the comparator for the Principal Assessment. Further information on GHG emissions associated with the 2023 Baseline Operation and 2025 Current Operation is provided in Section 13.4, while projected GHG emissions for the Permitted Operation are presented in Section 13.5: Future Receiving Environment.

13.3.57 To evaluate the trajectory of GHG emissions and their alignment with Ireland's pathway towards net zero, emissions associated with the assessment scenarios have also been projected to 2050. This allows the assessment to consider not only the difference in emissions in the 2029 assessment year, but also how emissions associated with the Permitted and Proposed Operations are expected to change over time. The projections have been undertaken as follows:

- **Permitted Operation:** the 32.0 mppa Permitted Operation has been projected from 2029 to 2050. The assessment incorporates projected changes in aircraft movements and fleet mix over this period so that future changes in aircraft technology and efficiency are reflected in the aviation carbon modelling.
- **Proposed Operation:** the 40.0 mppa Proposed Operation has been projected from 2029 to 2050, incorporating the same assumptions regarding future changes in aircraft fleet mix and technology as applied to the Permitted Operation.

13.3.58 The following Supporting Assessments have also been undertaken to provide additional context to the Principal Assessment. These Supporting Assessments do not form part of the assessment of likely significant effects of the Proposed Order.

- **Supporting Assessment 1 compares the 2023 Baseline Operation (32.0 mppa) with the 2029 Proposed Operation (40.0 mppa).** This assessment provides context on the overall change in GHG emissions between the 2023 Baseline Operation and the 2029 Proposed Operation.
- **Supporting Assessment 2 compares the 2025 Current Operation (36.4 mppa) with the 2029 Proposed Operation (40.0 mppa).** This assessment provides context on the change in GHG emissions between current airport operations and the 2029 Proposed Operation.
- **Supporting Assessment 3 compares the 2025 Current Operation (36.4 mppa) with the 2029 Permitted Operation (32.0 mppa).** This assessment provides context on the relationship between current airport operations and the future permitted scenario used as the comparator for the Principal Assessment.

Assumptions and Limitations

13.3.59 The assumptions adopted for the GHG assessment are aligned with relevant industry good practice and, where applicable, take account of upstream and downstream emissions. Assumptions have been based on relevant EU and Irish policy and guidance where available. Where specific policy or guidance is not available, appropriate industry data and other published sources have been used, as described below.

Aviation

13.3.60 A study of private aviation in Europe[57] estimated that private aviation in Ireland accounted for approximately 68,000 tCO_2 in 2022, with approximately 58% of private flights associated with Dublin Airport. On this basis, private aviation is estimated to account for less than 2% of total annual aviation emissions from Dublin Airport. More recent airport-specific data on private aviation emissions at Dublin Airport were not available for the purposes of the assessment.

13.3.61 In addition, comparable airports, such as Gatwick Airport in the UK, which had a capacity of 46.6 mppa in 2019, show that non-commercial flights accounted for approximately 1% of Gatwick's movements and are expected to remain at this level[58]. Based on the private aviation data from Greenpeace and Gatwick's

[57]Greenpeace. (2023). CO_2 emissions of private aviation in Europe. Available at: https://greenpeace.at/uploads/2023/03/co2_emissions_of_private_aviation_in_europe_def.pdf
[58]London Gatwick (2023); Gatwick Airport Northern Runway Project [online]. Available at: https://www.gatwickairport.com/on/demandware.static/-/Sites-Gatwick-Library/default/dwd0641852/images/Corporate-PDFs/Northern-Runway/PEIR_VOLUME_3/APPENDIX_4/peir-appendix-4.3.1.pdf

non-commercial flight data, it is anticipated that private aircraft will account for less than 2% of total annual aviation emissions at Dublin Airport. Consequently, private aircraft emissions have been excluded from the GHG Assessment, as it is anticipated to not impact the overall conclusions of the assessment due to their negligible contribution of less than 2% of Dublin's total annual aviation emissions.

13.3.62 Aircraft schedule forecasts for a busy day, as defined in Chapter 9: Aircraft Noise and Vibration, have been used as the basis for estimating annual aircraft emissions. The busy-day schedule is considered to provide a reasonable worst-case representation of aircraft activity because it reflects a relatively high level of daily movements and associated aircraft operations. The aircraft mix represented by the busy-day schedule is assumed to be representative of the year as a whole. Annual emissions have then been calculated by scaling the busy-day schedule according to the relationship between busy-day ATMs and total annual ATMs, as detailed in Appendix 13-1. This approach therefore applies the busy-day aircraft mix across the annual movement total and provides a conservative basis for estimating annual aircraft emissions.

13.3.63 Some aircraft models, typically newer models, were not available within the EMEP/EEA Aviation Emissions Calculator. Where an aircraft model was unavailable in both the Aviation Emissions Calculator and the Atmosfair Flight Emissions Calculator[59], the closest available aircraft model was selected as a proxy. Appendix 13-1 provides the full list of aircraft model substitutions. This assumption affects only a small proportion of the flights modelled and is not expected to materially affect the magnitude of calculated emissions or the conclusions of the assessment.

13.3.64 For flights where the destination airport was recorded as "ZZF", which is a holding code rather than an identified destination airport, the maximum flight range of the relevant aircraft has been assumed. This provides a reasonable worst-case estimate of emissions because it assigns the greatest credible flight distance to those movements rather than assuming a shorter, unidentified destination. As a result, the associated fuel burn and GHG emissions are not understated.

13.3.65 For some flights, the total journey length reported in the aircraft schedule exceeded the upper range limit available for the selected proxy aircraft. In these instances, emissions were calculated for the maximum available journey length within the Aviation Emissions Calculator and scaled proportionately to account for the total journey distance.

13.3.66 Similarly, for some flights, the total journey length reported in the aircraft schedule fell below the minimum journey length available for the selected proxy aircraft. In these instances, emissions were calculated for the minimum available journey length within the Aviation Emissions Calculator and scaled proportionately to account for the actual journey distance.

13.3.67 In accordance with the DEFRA/DESNZ 2025 emissions factors, CO_2 emissions calculated using the EMEP/EEA Aviation Emissions Calculator were converted to CO_2e and a 21.72% uplift was applied to account for Well-to-Tank[60] (WTT) emissions. WTT emissions comprise the upstream GHG emissions associated with the extraction, processing, refining, transportation and distribution of aviation fuel prior to its use. In the absence of Ireland-specific WTT emission factors, this uplift has been applied as an appropriate proxy.

13.3.68 The inclusion of WTT emissions provides a more comprehensive assessment of the GHG emissions associated with aviation fuel use and is consistent with the DEFRA/DESNZ methodology. Their inclusion also provides a conservative assessment by accounting for quantifiable upstream emissions associated with the production and supply of aviation fuel. This approach is consistent with the principles established in the UK Supreme Court judgment in R (Finch on behalf of the Weald Action Group) v Surrey County Council [2024] UKSC 20 regarding the assessment of foreseeable indirect GHG emissions. It is recognised, however, that the Irish Supreme Court adopted a more limited approach to the circumstances in which indirect emissions are required to be included within an EIA in An Taisce v An Bord Pleanála (Kilkenny Cheese Ltd). The inclusion of WTT emissions in this assessment is therefore a methodological choice providing a more comprehensive and conservative assessment and does not imply that this is a requirement of the EIA process.

[59]Atmosfair, (2020); Calculate Flight Emissions [online]. Available at: https://www.atmosfair.de/en/offset/flight/
[60]All GHG emissions from the production, transportation, transformation and distribution of the fuel

13.3.69 For the purposes of considering the application of market-based mechanisms, aviation emissions have been divided into traded and non-traded emissions. Traded emissions comprise those falling within the scope of the EU ETS, including domestic and intra-EEA aviation emissions, while non-traded emissions comprise aviation emissions outside the scope of the EU ETS.

13.3.70 An uptake in sustainable aviation fuel (SAF) has been applied to the aviation emissions in accordance with the mandatory minimum SAF shares established by ReFuelEU Aviation[61]. The assessment assumes SAF uptake of 2% in 2025, increasing to 6% in 2030, 20% in 2035 and 70% by 2050, with a linear increase applied between these milestones.

13.3.71 To account for anticipated improvements in aircraft and engine technology, the assessment assumes an average improvement in emissions efficiency of 1.4% per year, up to a cumulative improvement of 22% by 2040. This assumption is consistent with the Climate Change Committee (CCC) Balanced Pathway[62], which is informed by historical average improvements in aircraft efficiency.

Surface Access Journeys

13.3.72 Table 13-5Table 13-5 sets out the modes of transport included in the assessment, consistent with the mode shares used in the transport modelling, together with the assumptions and DEFRA/DESNZ emission factors applied to calculate GHG emissions associated with surface access passenger journeys.

13.3.73 To provide a reasonable worst-case estimate of emissions, the upper distance within each defined journey-distance band has been applied. This avoids understating emissions by assuming travel at the lower end or midpoint of each band. For journeys recorded as greater than 15 km, an assumed distance of 40 km has been applied. This is considered a reasonable representative distance for the open-ended category while remaining deliberately higher than the distances applied to the lower bands. The following distances have therefore been used:

- For distances <5 km from the raw data, 5 km was assumed.
- For distances 5 - 10 km from the raw data, 10 km was assumed.
- For distances 10 - 15 km from the raw data, 15 km was assumed.
- For distances >15 km from the raw data, 40 km was assumed.

13.3.74 The proportion of journeys within each distance band was derived from the available transport data used to inform the traffic assessment presented in Chapter 6: Material Assets (Traffic and Transport) of this EIAR. For the purposes of calculating total surface access emissions, an equal 50:50 split between inbound and outbound movements has been assumed, reflecting journeys to and from the airport in the absence of evidence of a material directional imbalance over the assessment period.

13.3.75 For cars, LGVs and HGVs, vehicle movements were provided for a busy day used to inform the traffic assessment presented in Chapter 6: Material Assets (Traffic and Transport) of this EIAR. To derive annual vehicle movements, the same annualisation factors used for the aviation assessment were applied to the busy-day surface access movements.

13.3.76 Bus movements were available for a representative day in October 2025 used to inform the traffic assessment presented in Chapter 6: Material Assets (Traffic and Transport) of this EIAR. As scheduled bus services do not vary materially throughout the year, daily bus movements were annualised by multiplying by 365. For the future assessment scenarios, bus movements have been assumed to increase proportionately with passenger throughput. This provides a consistent basis for estimating future bus movements where scenario-specific bus movement data are not available.

13.3.77 The 'With Existing Measures' scenario from Ireland's 2020–2050 Transport Emissions Trajectory has been used to inform the future emissions trajectory for surface access journeys. This provides a reasonable worst-case basis for the assessment because it assumes the lower projected rate of

[61] European Commission. (2023). Final adoption of ReFuelEU Aviation completes 'Fit for 55' legislation, putting EU on track to exceed 2030 targets Available at: https://transport.ec.europa.eu/news-events/news/final-adoption-refueleu-aviation-completes-fit-55-legislation-putting-eu-track-exceed-2030-targets-2023-10-09_en

[62] CCC (2020). *The sixth carbon budget – Aviation*. Available at: https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Aviation.pdf [Accessed on: 27/05/2026].

transport decarbonisation and therefore results in higher future surface access emissions than would be predicted under a scenario with additional decarbonisation measures.

Table 13-5: Assumptions Made for the Calculation of GHG Emissions Associated with Surface Access Passenger Journeys

Mode of Transport	Emissions factor applied	Assumptions Applied
Bus	DEFRA/DESNZ 2023/ 2025 – Average local bus + WTT	An average occupancy of 60[63] passengers per bus has been assumed for the purposes of the assessment based on studies of similar urban centres. This assumption is considered representative of the capacity and operation of buses serving Dublin Airport.
Private Car	DEFRA/DESNZ 2023/ 2025 – Average Diesel Car + WTT	Private car movements have been modelled using the DEFRA/DESNZ emission factor for an average diesel car, including WTT emissions. This provides a reasonable worst-case basis for estimating GHG emissions from private car journeys because it applies a relatively carbon-intensive vehicle type and includes the upstream emissions associated with fuel production and supply, rather than assuming a lower-emission vehicle mix.
Heavy Goods Vehicles (HGVs)	DEFRA/DESNZ 2023/ 2025 – All Rigid HGV, average laden + WTT	HGV movements have been modelled using the DEFRA/DESNZ emission factor for an average-laden rigid HGV, including WTT emissions. This provides a reasonable basis for estimating GHG emissions from HGV movements where detailed information on vehicle type and loading is not available.
Light Goods Vehicles (LGVs)	DEFRA/DESNZ 2023/ 2025 – Average Diesel Van + WTT	LGV movements have been modelled using the DEFRA/DESNZ emission factor for an average diesel van, including WTT emissions. This provides a reasonable basis for estimating GHG emissions from LGV movements where detailed information on vehicle type and fuel type is not available.

Airport Operations

13.3.78 For airport operations, the following assumptions have been applied, with reasonable worst-case assumptions adopted where appropriate and supported by the available data.

13.3.79 To account for the projected decarbonisation of electricity generation and gas supply over time, a year-on-year percentage reduction has been applied to the GHG emissions associated with grid electricity and natural gas consumption. The reduction has been derived from the EPA's Ireland's GHG Emissions Projections 2024–2055 using the 'With Existing Measures' scenario. This provides a reasonable worst-case basis for the assessment because it assumes a lower rate of future decarbonisation than the 'With Additional Measures' scenario and therefore results in higher forecast emissions from electricity and natural gas consumption.

13.3.80 Table 13-6 sets out the emission sources and the SEAI and DEFRA/DESNZ emission factors applied to calculate GHG emissions associated with airport operations. SEAI emission factors have been used

[63] Transport for London (2010); All London buses now taking payments as capacity limits are safely increased. Available at: https://tfl.gov.uk/info-for/media/press-releases/2020/july/all-london-buses-now-taking-payments-as-capacity-limits-are-safely-increased (Accessed 09/06/2026).

where available, as they reflect Ireland-specific energy mixes, fuel characteristics and electricity grid emissions. DEFRA/DESNZ emission factors have been used where an appropriate Ireland-specific factor is not available.

Table 13-6: Assumptions Made for the Calculation of GHG Emissions Associated with Airport Operations

Activity	Emissions factor applied
Electricity	SEAI 2023/2024 electricity consumption & DESNZ 2023/2024/2025 WTT electricity supply and transmission and distribution losses (T&D)
Gas	SEAI 2023/2024 Gas & DESNZ 2023/2024/2025 gas WTT
Water	DESNZ 2023/2024/2025 Water Supply and Water treatment
Waste water	DESNZ 2023/2024/2025 Water Supply and Water treatment
Gas oil (elec. generation)	SEAI 2024 Diesel/gasoil & DESNZ 2023/2024/2025 gas oil WTT
HVO (elec. Generation and heating)	DESNZ 2023/2024/2025 HVO & HVO WTT
LPG (cookers)	SEAI 2024 LPG & DESNZ 2023/2024/2025 LPG WTT
Acetylene (welding)	IPCC
HVO (transport)	DESNZ 2023/2024/2025 HVO & HVO WTT
Road diesel (transport)	SEAI 2024 road diesel & DESNZ 2023/2024/2025 Diesel WTT
Petrol (transport)	SEAI 2024 road petrol & DESNZ 2023/2024/2025 Petrol WTT
Green diesel (Transport)	DESNZ 2023/2024/2025 HVO & HVO WTT
Total waste	DESNZ 2023/2024/2025 Waste disposal

Cumulative Impacts

13.3.81 GHG emissions and their effects are inherently cumulative for the following reasons:

- The environmental impact arising from GHGs is the aggregation and increased concentration of GHGs within the atmosphere.
- The location of the emissions source is not material to the global climate effect arising from those emissions; GHG emissions contribute to climate change irrespective of where they occur.
- Impacts on a given location arise from the aggregated GHG levels in the atmosphere, not from the magnitude of GHG emissions in the local area.

13.3.82 Given the global and cumulative nature of GHG emissions, selecting individual projects for inclusion in a conventional project-specific cumulative assessment would not provide a meaningful basis for evaluating cumulative climate effects. Cumulative GHG emissions are instead addressed through national carbon budgets and emissions reduction targets, which provide the appropriate context for considering the contribution of individual projects.

13.3.83 This approach is consistent with the ISEP GHG assessment guidance, which advises that effects from individual cumulative projects should not be assessed separately, as there is no basis for selecting particular GHG-emitting projects for assessment over others. The cumulative context is therefore addressed through comparison with relevant national carbon budgets and emissions trajectories.

13.3.84 Accordingly, the GHG assessment considers the emissions associated with the Proposed Order in the context of Ireland's national emissions reduction targets, carbon budgets and trajectory towards net zero. This assessment is presented in Section 13.6.

13.4 Current Receiving Environment

13.4.1 The 2023 Baseline Operation has been quantified using reported 2023 operational data and the 2023 aviation schedule. It represents airport operations at 32.0 mppa and provides the historic baseline for the assessment.

13.4.2 The calculation of GHG emissions for the 2023 Baseline Operation draws on a range of data sources, as summarised in Table 13-7. A detailed breakdown of the data sources and calculated emissions is provided in Appendix 13-1.

Table 13-7: GHG emissions associated with the 2023 Baseline Operation by emissions source (tCO_2e)

Emission Source	2023 Baseline Operation Emissions (tCO2e)	Data source
Aviation	3,450,740[64]	Existing aviation operations at Dublin Airport.
Airport Operations	20,855	Existing airport operations (electricity, gas and water) at Dublin Airport based on data from 2023.
Surface Access	236,769	Transport Assessment data (Chapter 6: Material Assets (Traffic and Transport))

Current Design and Management Measures

13.4.3 This section outlines measures currently in place at Dublin Airport to manage and reduce GHG emissions. As described in the Policy section of this chapter, a substantial proportion of the emissions associated with Dublin Airport fall outside the direct control of daa and are principally managed through national, EU and international policy and regulatory mechanisms. This particularly applies to aviation and, to a lesser extent, surface access emissions. daa has greater direct control over emissions arising from airport operations.

13.4.4 For aviation and surface access, the measures described below include relevant national, EU and international policy and regulatory mechanisms, together with measures currently implemented by daa. Future measures identified in the Dublin Airport Carbon Reduction Strategy[65], [66] are considered separately under the Future Receiving Environment.

Aviation Mitigation Measures

13.4.5 Improvements in aircraft and engine technology have historically reduced the CO_2 intensity of aviation, and further improvements are expected over time. The anticipated emissions-efficiency benefits associated with the progressive replacement of older aircraft with newer, more efficient models have been incorporated into the GHG assessment, as described in Section 13.3.

13.4.6 Fundamental to managing and controlling GHG emissions from the aviation sector are two market-based-measures, the EU ETS[67] and CORSIA[68]. CO_2 emissions from aircraft using the airport will fall under one of these two Schemes. The EU ETS provides a legally binding cap on the amount of carbon which participating airlines within intra-EU aviation can emit. Under the updated 'Fit for 55' EU policy[69], there is a requirement that the emissions from sources participating in EU ETS must be cut by 62% by 2030 compared to 2005. Airlines used to receive a free allocation of tradeable allowances covering a certain level of permitted emissions from their flights each year, this free allocation was subject to an annual reduction factor and has now been phased out entirely. Since January 2026, airlines no longer receive any free allocation, they must now purchase allowances for 100% of their covered emissions. This puts a binding cap on the overall emissions within the EU ETS, including from airline operators. Additionally, a European Commission decision adopted in November 2023[70] sets the 2024 emissions cap for aircraft operators at just under 28.9 million tCO_2. This cap declined sharply between 2024 and

[64] Including traded and non-traded EU ETS emissions
[65] Dublin Airport Carbon Reduction Strategy: dublin-airport-carbon-reduction-strategy.pdf (dublinairport.com)
[66] Carbon Reduction Strategy for the Dublin Airport Passenger Cap Bill
[67] European Commission, (2022). EU Emissions Trading System (EU ETS). Available at: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en
[68] ICAO, (2023). Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Available at: https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx
[69] https://www.theccc.org.uk/wp-content/uploads/2020/12/Sector-summary-Aviation.pdf
[70] European Commission, (2023); Commission Decision (EU) 2023/2440 of 27 October 2023 on the Union-wide total quantity of allowances to be allocated in respect of aircraft operators under the EU Emissions Trading System for 2024. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202302440

2026, dropping to 24.9 million tCO_2. This decrease is due to the 4.3% annual reduction that applies to the 2024–2027 period. This Linear Reduction Factor is set to increase to 4.4% annual reduction from 2028 onwards to align with net zero targets. The cost to airline operators of purchasing carbon allowances will ultimately be reflected in the cost of tickets to passengers.

13.4.7 Emissions not falling under the EU ETS (non-traded emissions) will be managed through CORSIA. In June 2020, the ICAO Council agreed to use 2019 emissions only as CORSIA's baseline for the period of 2021-2023. Most recently, at its 41st Assembly, ICAO set 85% of 2019 emissions as CORSIA's baseline from 2024 until the end of the scheme in 2035: a significantly more ambitious target than originally planned, which the industry supported.

13.4.8 In December 2022, the European Council and Parliament reached a provisional political agreement on the revision of the EU ETS rules applying to the aviation sector[71]. Under the agreement, aviation emissions that do not fall under EU ETS (i.e. those therefore managed under CORSIA) will be required to reduce emissions beyond the target defined by CORSIA (as described above). When global aviation emissions reach levels above 85% of baseline levels, European airlines will be required to offset their proportionate share of additional emissions with carbon credits. The intention of this increased carbon reduction is to bring CORSIA in line with meeting the EU objective of a reduction in transport emissions of 90% by 2050.

13.4.9 Aircraft emissions are indirect emissions that fall outside daa's direct operational control. However, daa can influence aspects of aircraft emissions at the airport through the provision and operation of efficient airside infrastructure and services. This includes the provision of Fixed Electrical Ground Power and participation in Airport Collaborative Decision Making (A-CDM), which brings airport stakeholders together to improve the efficiency of airside operations. daa also participates in the Airport Carbon Accreditation scheme, providing a framework for the management and reduction of airport-related carbon emissions.

13.4.10 Additionally, in July 2021, the European Commission adopted a package of proposals to make the EU's climate, energy, land use, transport and taxation policies fit for reducing net GHG emissions by at least 55% by 2030, compared to 1990 levels. Within this package is the Alternative Fuels Infrastructure Regulation, which requires that aircraft have access to clean electricity supply in major airports, thereby reducing emissions from APU usage. Also, the ReFuelEU Aviation Initiative will oblige fuel suppliers to blend increasing levels of sustainable aviation fuels in jet fuel taken on-board at EU airports, including synthetic low carbon fuels, known as e-fuels. This sets targets of SAF blending from 2025 onwards to reduce the fuel emissions, with 2% minimum share by 2025, and 20% by 2035.

13.4.11 A range of technological, operational and fuel-related measures are being developed across the aviation sector to support longer-term decarbonisation. However, the quantitative GHG assessment only incorporates future measures where there is a sufficiently robust basis for doing so, such as mandated SAF uptake under ReFuelEU Aviation and the aircraft efficiency assumptions described in Section 13.3. Potential future technologies or fuels for which the scale or timing of deployment is uncertain have not been relied upon in determining the effects of the Proposed Order.

13.4.12 The Dublin Airport Carbon Reduction Strategy identifies additional measures relating to aviation emissions, including the provision of Fixed Electrical Ground Power, infrastructure to facilitate the uptake of SAF and commitments to support the aviation sector's transition towards net zero. As these measures are to be implemented in advance of the 2029 Proposed Operation, they are considered under Section 13.5: Future Receiving Environment rather than as current management measures.

13.5 Future Receiving Environment

13.5.1 The Future Receiving Environment represents the projected GHG emissions under the Permitted Operation (32.0 mppa), in the absence of the Proposed Order. As described in Chapter 5: Methodology,

[71] European Council and Council of the European Union, (2022); ETS aviation: Council and Parliament strike provisional deal to reduce flight emissions. Available at: https://www.consilium.europa.eu/en/press/press-releases/2022/12/07/ets-aviation-council-and-parliament-strike-provisional-deal-to-reduce-flight-emissions/#:~:text=According%20to%20the%20agreement%2C%20the,')%20from%202022%20to%202027

the Permitted Operation provides the comparator against which the Proposed Operation is assessed in the Principal Assessment.

13.5.2 GHG emissions for the Permitted Operation were calculated assuming that the Proposed Order does not proceed and passenger throughput remains at the permitted capacity of 32.0 mppa. The assessment includes emissions from aviation, airport operations and surface access journeys in accordance with the methodology set out in Section 13.3.

13.5.3 GHG emissions for the Permitted Operation have been calculated using the assumptions described in Section 13.3 and projected to 2050 to allow the future emissions trajectory associated with the Permitted Operation to be evaluated against Ireland's pathway towards net zero.

13.5.4 Projected GHG emissions for the Permitted Operation are presented in Table 13-8 as cumulative totals for five-year periods to 2050, aligned with the periods used for Ireland's carbon budgets. This illustrates the projected emissions trajectory associated with the Permitted Operation and provides context for its consideration against Ireland's pathway towards net zero.

Table 13-8: Projected GHG emissions associated with the Permitted Operation (32.0 mppa), by five-year period and emissions source (tCO_2e) [72]

Year	Aviation	Airport Operations	Surface Access Journeys	Total
2026-2030	15,332,819	57,201	1,170,000	16,560,020
2031-2035	13,248,111	38,732	1,113,858	14,400,701
2036-2040	11,080,810	36,980	961,870	12,079,660
2041-2045	9,982,487	30,817	742,154	10,755,458
2046-2050	8,363,059	27,143	538,842	8,927,044

Planned Management Measures

13.5.5 The following section describes planned measures identified in the Dublin Airport Carbon Reduction Strategy that are to be implemented in advance of the 2029 Proposed Operation, with particular regard to airport operations and surface access.

Airport Operations

13.5.6 The Dublin Airport Carbon Reduction Strategy identifies a range of measures to reduce GHG emissions from airport operations, including:

- Operation of a 100% zero carbon-low emissions vehicle fleet;
- Phasing out diesel and natural gas; and
- Integrating circular economy principles.

13.5.7 The Carbon Reduction Strategy also identifies alignment with the Science Based Targets initiative (SBTi) as part of daa's approach to reducing operational emissions in line with a 1.5°C-compatible trajectory.

Surface Access

13.5.8 daa can influence surface access emissions through measures relating to airport access, infrastructure and its own vehicle operations, although wider decarbonisation of surface transport is principally driven by national transport and climate policy. Relevant policy measures are described in Section 13.2, including the Climate Action and Low Carbon Development (Amendment) Act 2021 and Climate Action Plan 2025.

[72] These numbers were rounded up.

13.5.9 In support of this wider transition, the Dublin Airport Carbon Reduction Strategy[73,74] identifies measures to reduce and facilitate the reduction of surface access emissions. These include:

- Airport light vehicle fleet replacements and augmentation.
- Airport Charging - i) facilities for Dublin Airport fleet and car park bussing ii) airside charging facilities for third parties, iii) charging facilities for carparks, car hire and other areas on the broader campus.
- Install more EV chargers across the airport for daa, tenant and customer vehicles.
- Sustainable Fleet - complete the transition of light vehicle fleet and continue the transition of heavy vehicle fleet to Light Electric Vehicles (LEVs).
- Mobility Improvements - improve access to public transport, cycling and walking.
- Transition to biodiesel or electric buses following trials/feasibility.
- Airport operator to create transition plan and develop initial infrastructure for the future implementation / take up of SAFs.

13.5.10 Further measures identified in the Dublin Airport Carbon Reduction Strategy include improving surface access to the airport, facilitating improved public transport connections, including MetroLink, and requiring traffic-generating applications at the airport to demonstrate measures to maximise travel by public transport, walking and cycling while minimising private car use.

13.6 Assessment of Likely Significant Effects

13.6.1 The Principal Assessment considers the change in GHG emissions between the Permitted Operation (32.0 mppa) and the Proposed Operation (40.0 mppa), taking into account the current and planned management measures and assumptions described above.

13.6.2 The Principal Assessment compares the GHG emissions associated with the 2029 Permitted Operation with those associated with the 2029 Proposed Operation, identifying the change attributable to the Proposed Order for each emissions source: aviation, airport operations and surface access journeys. The respective emissions trajectories are then projected to 2050 to consider longer-term alignment with Ireland's pathway towards net zero. For the purposes of presenting cumulative future emissions, the results are grouped into five-year periods from 2029 to 2050, with the first period comprising 2029 and 2030 only, as follows:

- 2029 – 2030 (when 40 mppa is reached)
- 2031 – 2035
- 2036 – 2040
- 2041 – 2045
- 2046 – 2050

13.6.3 The calculated GHG emissions are contextualised against the relevant Irish National and Transport Emissions Trajectories under the 'With Additional Measures' scenario, as described in the assessment methodology. These trajectories provide national and sector-specific context for evaluating the scale and trajectory of the emissions associated with the Proposed Order.

13.6.4 The overall significance of the GHG impact associated with the Proposed Order is evaluated using the significance criteria set out in Table 13-3.

[73]Dublin Airport Carbon Reduction Strategy: dublin-airport-carbon-reduction-strategy.pdf (dublinairport.com)
[74]Carbon Reduction Strategy for the Dublin Airport Passenger Cap Bill

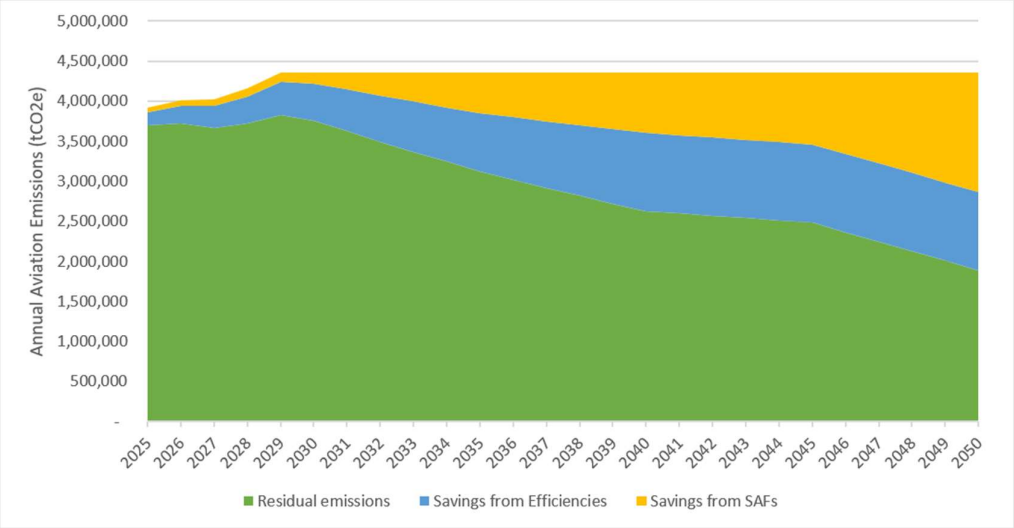
Aviation

13.6.5 The significance of aviation emissions has been evaluated by considering their alignment with relevant policy and good practice and by contextualising the emissions against Ireland's projected National and Transport Emissions Trajectories towards net zero.

13.6.6 The assessment of aviation emissions incorporates the quantified effects of mandated SAF uptake and anticipated improvements in aircraft and engine efficiency, as described in the assessment methodology. The resulting gross aviation emissions are then contextualised against the relevant National and Transport Emissions Trajectories. EU ETS and CORSIA provide additional market-based mechanisms applicable to aviation emissions within their respective scopes; however, their operation has not been used to reduce the gross aviation emissions reported in the assessment.

13.6.7 The quantified effect of the aviation emissions-reduction assumptions is illustrated in Plate 13-3. The measures are presented sequentially to show the incremental effect of aircraft and engine efficiency improvements followed by mandated SAF uptake. Market-based mechanisms, including EU ETS and CORSIA, are not included in the emissions reductions presented in Plate 13-3.

Plate 13-3: The Incremental Effect of Mitigation Policies on Gross Aviation Emissions on the Proposed Order



13.6.8 The assumptions relating to aircraft and engine efficiency improvements and mandated SAF uptake are projected to reduce gross aviation emissions in 2050 by more than 62% relative to a scenario without these measures. Of this reduction, approximately 32 percentage points are attributable to aircraft efficiency improvements and approximately 30 percentage points to SAF uptake.

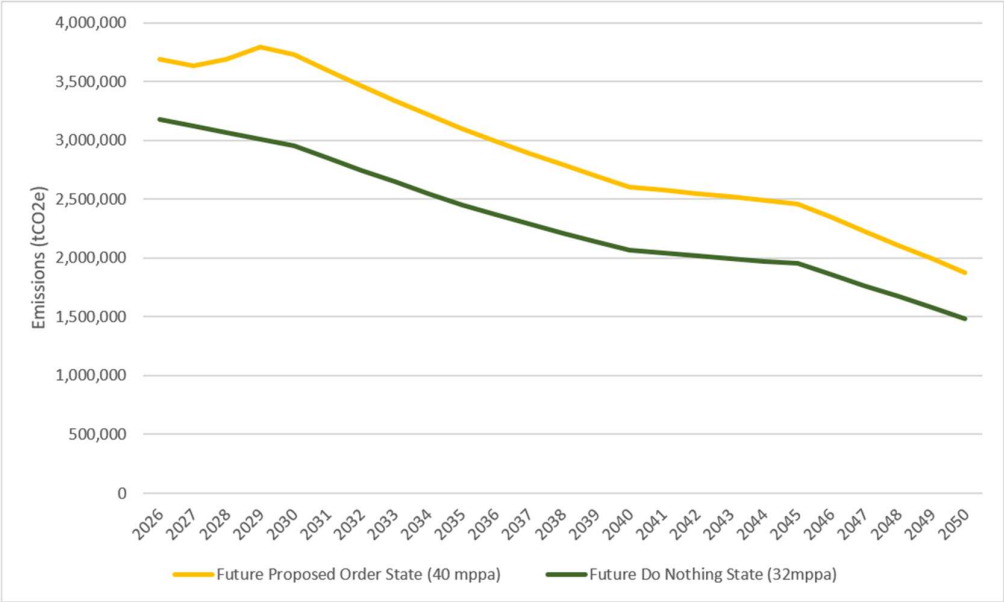
13.6.9 ReFuelEU Aviation[75] establishes mandatory minimum shares of SAF supplied at EU airports, increasing to 70% by 2050. These mandated requirements have been incorporated into the assessment. The assessment also assumes improvements in aircraft and engine efficiency of 1.4% per year, up to the cumulative improvement described in the assessment methodology. Unlike the SAF requirements, these efficiency improvements are not mandated and represent an assessment assumption informed by the evidence described in Section 13.3.

As illustrated in

13.6.10 Plate 13-4, the projected aviation emissions trajectories associated with both the Permitted Operation and the Proposed Operation show substantial reductions to 2050.

[75]European Commission (2023 Final adoption of ReFuelEU Aviation completes 'Fit for 55' legislation, putting EU on track to exceed 2030 targets: https://transport.ec.europa.eu/news-events/news/final-adoption-refueleu-aviation-completes-fit-55-legislation-putting-eu-track-exceed-2030-targets-2023-10-09_en#:~:text=Under%20the%20ReFuelEU%20Aviation%20Regulation,rising%20to%2070%25%20in%202050 .

Plate 13-4: The Trajectory of Gross[76] Aviation Emissions for Permitted Operation (32 mppa) and Proposed Operation (40 mppa) with Mitigation Policies Applied



13.6.11 The projected reduction in aviation emissions to 2050 is driven by cumulative improvements in aircraft and engine efficiency and the uptake of SAF. The assessment assumes an average improvement in aircraft and engine efficiency of 1.4% per year, in accordance with the methodology described in Section 13.3.

13.6.12 The uptake of SAF has been incorporated into the aviation emissions projections in accordance with ReFuelEU Aviation. The assessment assumes the mandatory minimum SAF shares of 2% in 2025, 6% in 2030, 20% in 2035 and 70% by 2050, with a linear increase applied between these milestones.

13.6.13 Together, mandated SAF uptake and assumed improvements in aircraft and engine efficiency result in a declining aviation emissions trajectory to 2050, notwithstanding the higher level of aviation activity associated with the Proposed Operation.

13.6.14 Plate 13-4 shows that aviation emissions associated with the Proposed Operation remain higher than those associated with the Permitted Operation throughout the projected trajectory, reflecting the additional aviation activity associated with the Proposed Order. The resulting difference in emissions is quantified in Table 13-9. EU ETS and CORSIA provide additional market-based mechanisms applicable to aviation emissions within their respective scopes; however, as described above, these mechanisms have not been used to reduce the gross aviation emissions reported in the assessment.

13.6.15 As described under Current Management Measures, the EU ETS places a declining cap on emissions from sectors within its scope, including applicable aviation emissions. It therefore provides an additional market-based mechanism for managing aviation emissions alongside the emissions-reduction measures quantified in this assessment. The effect of the EU ETS has not been deducted from the gross aviation emissions presented in the assessment.

13.6.16 Aviation emissions fall principally outside daa's direct operational control and are managed through a combination of international, EU and national policy and regulatory mechanisms. daa can nevertheless influence aspects of aviation emissions at the airport through the measures described under Current and Planned Management Measures.

[76]This only includes gross emissions with Proposed Order and not net emissions.

13.6.17 Table 13-9 presents the projected emissions associated with the Permitted Operation (32.0 mppa) and Proposed Operation (40.0 mppa) to 2050. The conversion factors used in the calculation of aviation GHG emissions are provided in Appendix 13-1 (EIAR Volume 4).

Table 13-9: Aviation Emissions thousand tonnes (ktonnes) CO2e Against Ireland's Projected Transport and Total National Emissions Trajectories (traded emissions are emissions covered by the EU ETS and non-traded emissions are not covered by the EU ETS)

Year		Permitted Operation (32 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2029-2030	Total	5,964	7,524	1,560	19,864	92,273	8%	2%
	Traded	2,676	3,053	377				
	Non Traded	3,289	4,471	1,183				
2031-2035	Total	13,248	16,713	3,465	46,380	212,458	7%	2%
	Traded	5,943	6,782	838				
	Non Traded	7,305	9,931	2,627				
2036-2040	Total	11,081	13,979	2,898	39,958	197,619	7%	1%
	Traded	4,971	5,672	701				
	Non Traded	6,110	8,307	2,197				
2041-2045	Total	9,982	12,593	2,611	32,034	178,702	8%	1%
	Traded	4,478	5,110	632				
	Non Traded	5,504	7,483	1,979				
2046-2050	Total	8,363	10,550	2,187	25,700	163,169	9%	1%
	Traded	3,752	4,281	529				
	Non Traded	4,611	6,269	1,658				

13.6.18 Table 13-9 contextualises the additional aviation emissions associated with the Proposed Order against Ireland's Transport Emissions Trajectory under the 'With Additional Measures' scenario. As described in the assessment methodology, this provides the more stringent comparator against which to consider the scale of the additional emissions. The additional aviation emissions associated with the Proposed Order represent approximately 7–9% of the projected Transport Emissions Trajectory over the periods assessed.

13.6.19 Table 13-9 also contextualises the additional aviation emissions associated with the Proposed Order against Ireland's National Emissions Trajectory under the 'With Additional Measures' scenario. The additional aviation emissions represent approximately 1–2% of the projected National Emissions Trajectory over the periods assessed.

13.6.20 Notwithstanding the projected reductions associated with aircraft and engine efficiency improvements and mandated SAF uptake, approximately 1,875,248 tCO_2e of residual aviation emissions are projected in 2050. Of these emissions, approximately 760,915 tCO_2e (41%) fall within the scope of the EU ETS, while approximately 1,114,333 tCO_2e (59%) are outside the scope of the EU ETS and may be subject to CORSIA. These market-based mechanisms form part of the wider regulatory framework for aviation emissions but have not been used to reduce the gross aviation emissions reported in this assessment.

13.6.21 In accordance with the significance methodology set out in Section 13.3, the significance of GHG effects is determined by considering whether the emissions associated with the Proposed Order are consistent with a trajectory towards net zero. This requires consideration of the scale and trajectory of the additional emissions, the extent to which quantified emissions-reduction measures have been incorporated into the assessment, and the relevant policy and regulatory framework within which those emissions would arise. The assessment therefore considers whether the Proposed Order would materially impede the achievement of relevant climate objectives, rather than relying on the absolute magnitude of GHG emissions alone.

13.6.22 Aviation is the principal source of additional GHG emissions associated with the Proposed Order. The Proposed Operation results in higher aviation emissions than the Permitted Operation; however, the assessment projects a declining aviation emissions trajectory to 2050 under both scenarios. This decline reflects the quantified effects of mandated SAF uptake and assumed improvements in aircraft and engine efficiency. The additional emissions associated with the Proposed Order have also been contextualised against Ireland's projected Transport and National Emissions Trajectories, as presented in Table 13-9.

13.6.23 The Dublin Airport Carbon Reduction Strategy identifies a range of measures to support the reduction of aircraft-related GHG emissions at the airport. These include the provision of Fixed Electrical Ground Power (FEGP) at terminal contact stands, reducing reliance on aircraft APUs during turnaround by supplying electricity directly to parked aircraft. As the Irish electricity grid decarbonises, emissions associated with FEGP are expected to reduce further relative to APU use. The Strategy also includes measures to facilitate the supply and uptake of SAF, supporting implementation of ReFuelEU Aviation.

13.6.24 The Carbon Reduction Strategy also commits daa to working collaboratively with airlines and other stakeholders to support pathways towards net zero emissions by 2050. The measures identified in the Strategy therefore complement the wider regulatory and technological measures incorporated into the assessment and support the progressive reduction of aircraft-related GHG emissions over the operational lifetime of the Proposed Order.

13.6.25 The Proposed Order would result in additional aviation-related GHG emissions compared with the Permitted Operation. However, the assessment demonstrates that aviation emissions associated with both the Permitted and Proposed Operations are projected to decline substantially to 2050 as a result of the quantified effects of mandated SAF uptake and assumed improvements in aircraft and engine efficiency. The additional emissions associated with the Proposed Order represent approximately 6–8% of Ireland's projected Transport Emissions Trajectory and approximately 1–2% of the projected National Emissions Trajectory over the periods assessed. These emissions would also arise within an established and progressively developing regulatory framework for aviation decarbonisation, including ReFuelEU Aviation, the EU ETS and CORSIA.

13.6.26 Taking these factors together, the additional aviation emissions associated with the Proposed Order would not prevent the overall aviation emissions trajectory from declining towards 2050 and would not significantly impede Ireland's trajectory towards net zero. This conclusion is based on the quantified emissions trajectory, the relative contribution of the additional emissions to Ireland's projected Transport and National Emissions Trajectories, the emissions reductions incorporated directly into the assessment through mandated SAF uptake and assumed aircraft efficiency improvements, and the wider policy and regulatory framework for aviation decarbonisation.

13.6.27 In accordance with the ISEP significance framework, the impacts from aviation emissions as a result of the Proposed Order are deemed to be **minor adverse** and **not significant** when applying the ISEP significance criteria.

Airport Operations

13.6.28 The significance of GHG emissions associated with airport operations has been evaluated by considering the scale and trajectory of the additional emissions associated with the Proposed Order, their alignment with relevant policy and management measures, and their contribution to Ireland's projected emissions trajectory towards net zero.

13.6.29 As described in Section 13.3, the additional airport operations emissions associated with the Proposed Order have been contextualised against Ireland's projected National Emissions Trajectory under the 'With Additional Measures' scenario, with projections extending to 2050. The emissions have also been contextualised against the projected Transport Emissions Trajectory to provide additional context regarding their scale. The 'With Additional Measures' scenario has been used as the more stringent comparator against which to consider the additional emissions associated with the Proposed Order.

13.6.30 Airport operations emissions are primarily driven by natural gas and electricity consumption, which together account for approximately 62% of airport operations emissions in 2050 (Appendix 13-1).

13.6.31 While daa can directly influence the amount of electricity and natural gas consumed through operational energy-efficiency and decarbonisation measures, the carbon intensity of grid electricity and gas supply is principally determined by the wider Irish energy system. Future emissions associated with airport energy consumption are therefore influenced both by measures implemented by daa and by the progressive decarbonisation of national energy supply.

13.6.32 Under the Climate Action and Low Carbon Development (Amendment) Act 2021, Ireland is committed to achieving a climate-neutral economy no later than 2050 and to reducing GHG emissions by 51% by 2030[77]. relative to 2018 levels.

13.6.33 In support of these national targets, the Government's 2022 Sectoral Emissions Ceilings establish emissions-reduction objectives relevant to airport operations, including:

- Electricity: 75% by 2030 relative to 2018.
- Buildings (Commercial and Public): 45% by 2030 relative to 2018.

13.6.34 The Climate Action Plan 2025[78] identifies measures and actions to support achievement of the emissions reductions required across the electricity and buildings sectors, including the progressive decarbonisation of electricity generation and improvements in the energy performance of buildings

13.6.35 For the electricity sector, the Climate Action Plan 2025 identifies a range of measures to support achievement of the required emissions reductions, including:

- accelerating and increasing the deployment of renewable energy to replace fossil fuels;
- delivering a flexible electricity system to support increased renewable generation; and
- managing electricity demand.

[77]Department of the Environment, Climate and Communications (2021). Ireland's ambitious Climate Act signed into law Available at: https://www.gov.ie/en/press-release/9336b-irelands-ambitious-climate-act-signed-into-law/
[78] Ireland's Climate Action Plan 2025: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/climate-action-plan-2025/ [Accessed: 14/05/2026]

13.6.36 These measures are expected to support the progressive decarbonisation of electricity generation in Ireland and, consequently, reduce the carbon intensity of grid electricity consumed at Dublin Airport. This projected decarbonisation is reflected in the future grid electricity emissions assumptions incorporated into the GHG assessment.

13.6.37 The Dublin Airport Carbon Reduction Strategy[79] identifies measures being implemented by daa to reduce GHG emissions associated with airport operations, including energy-efficiency measures, and renewable energy generation. A new solar array became operational at Dublin Airport in 2025 and its contribution to airport energy supply is reflected in the 2025 operational energy data used as the basis for projecting future airport operations emissions.

13.6.38 Table 13-10 presents airport operations emissions associated with the Permitted Operation (32.0 mppa) and the Proposed Operation (40.0 mppa), from 2029 with projections extending to 2050. The conversion factors used in the calculation of airport operations GHG emissions are provided in Appendix 13-1.

Table 13-10: Airport Operation Emissions (ktonnes CO2e) against Ireland's Transport and National Emissions Trajectories

Year	Permitted Operation (32 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2029-2030	23	26	3	19,864	92,273	0.015%	0.003%
2031-2035	39	44	6	46,380	212,458	0.012%	0.003%
2036-2040	37	42	6	39,958	197,619	0.014%	0.003%
2041-2045	31	36	5	32,034	178,702	0.015%	0.003%
2046-2050	27	32	5	25,700	163,169	0.018%	0.003%

13.6.39 As shown in Table 13-10, the additional airport operations emissions associated with the Proposed Order, compared with the 2029 Permitted Operation, represent no more than approximately 0.003% of Ireland's projected National Emissions Trajectory and 0.018% of the projected Transport Emissions Trajectory over the periods assessed.

13.6.40 The Built Environment – Commercial sectoral emissions ceiling is 5 $MtCO_2e$ for the 2026–2030 period. The additional airport operations emissions associated with the Proposed Order represent approximately 0.2% of this sectoral emissions ceiling.

13.6.41 Airport operations emissions are projected to decline to 2050 as a result of the progressive decarbonisation of the Irish energy system and the operational energy and carbon-reduction measures described above. The additional emissions associated with the Proposed Order represent a very small proportion of Ireland's projected National and Transport Emissions Trajectories and of the relevant Built Environment – Commercial sectoral emissions ceiling. Taking account of the scale and projected trajectory of these additional emissions, together with the applicable national decarbonisation framework and measures identified in the Dublin Airport Carbon Reduction Strategy, the Proposed Order is considered to be consistent with a trajectory towards net zero. The effect of airport operations GHG emissions associated with the Proposed Order is therefore assessed as Minor Adverse and Not Significant.

[79] Daa, (2020), Dublin Airport Carbon Reduction Strategy. Available at: https://www.dublinairport.com/corporate/environmental-social-governance/sustainability

Surface Access

13.6.42 The significance of GHG emissions associated with surface access has been evaluated by considering the scale and trajectory of the additional emissions associated with the Proposed Order, their alignment with relevant policy and management measures, and their contribution to Ireland's projected Transport Emissions Trajectory towards net zero.

13.6.43 As described in Section 13.3, the additional surface access emissions associated with the Proposed Order are contextualised against Ireland's projected Transport Emissions Trajectory under the 'With Additional Measures' scenario. The assessment also considers the extent to which the Proposed Order is consistent with relevant transport and climate policy, including the measures set out in the Climate Action Plan 2025.

13.6.44 Future decarbonisation of surface access vehicles has been incorporated into the emissions calculations using the EPA's 'With Existing Measures' scenario. This projects an approximately 11% reduction in transport emissions by 2035 and 61% by 2050, relative to 2023. The 'With Existing Measures' scenario provides a reasonable worst-case basis for the assessment because it assumes a lower rate of future decarbonisation than the 'With Additional Measures' scenario, which projects an approximately 26% reduction by 2035 relative to 2023. It therefore results in higher forecast surface access emissions for both the 2029 Permitted and Proposed Operations. The resulting emissions are then contextualised against the more ambitious 'With Additional Measures' Transport Emissions Trajectory.

13.6.45 The Climate Action Plan 2025 sets out measures to support achievement of Ireland's target of reducing overall GHG emissions by 51% by 2030 relative to 2018, and progressing towards climate neutrality by 2050.

13.6.46 The 2022 Sectoral Emissions Ceilings establish maximum GHG emissions for individual sectors. For transport, the policy framework seeks to achieve a 50% reduction in emissions by 2030 relative to 2018, providing relevant sectoral context for the assessment of surface access emissions associated with the Proposed Order.

13.6.47 The Climate Action Plan 2025 identifies a range of measures to support transport decarbonisation, including reducing the need for travel, shifting journeys towards lower-carbon modes and improving the energy efficiency and emissions performance of vehicles. These measures provide the wider policy context within which future surface access emissions associated with Dublin Airport are expected to reduce.

13.6.48 Table 13-11 presents surface access emissions associated with the Permitted Operation (32.0 mppa) and the Proposed Operation (40.0 mppa), from 2029 with projections extending to 2050. The conversion factors used in the calculation of surface access GHG emissions are provided in Appendix 13-1.

Table 13-11: Surface Access Emissions (ktonnes CO2e) against Ireland's Transport and National Emissions Trajectories

Year	Permitted Operation (32 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2029-2030	463	575	112	52,518	242,333	0.6%	0.1%
2031-2035	1,114	1,384	270	46,380	212,458	0.6%	0.1%

Year	Permitted Operation (32 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2036-2040	962	1,195	233	39,958	197,619	0.6%	0.1%
2041-2045	742	922	180	32,034	178,702	0.6%	0.1%
2046-2050	539	669	131	25,700	163,169	0.5%	0.1%

13.6.49 Table 13-11 contextualises the surface access emissions associated with the Proposed Order against Ireland's projected National Emissions Trajectory and Transport Emissions Trajectory under the 'With Additional Measures' scenario.

13.6.50 As shown in Table 13-11, the additional surface access emissions associated with the Proposed Order, compared with the 2029 Permitted Operation, represent no more than approximately 0.1% of Ireland's projected National Emissions Trajectory and 0.6% of the projected Transport Emissions Trajectory over the periods assessed.

13.6.51 The Transport sectoral emissions ceiling is 37 $MtCO_2e$ for the 2026–2030 period. The additional surface access emissions associated with the Proposed Order represent approximately 0.7% of this sectoral emissions ceiling.

13.6.52 Wider decarbonisation of surface transport is principally driven by national transport and climate policy, although daa can influence surface access emissions through measures relating to airport access, public transport provision, active travel, demand management and its own transport operations. Ireland's statutory climate framework requires progression towards climate neutrality by 2050[80], with transport decarbonisation forming part of that transition.

13.6.53 The assessment adopts a conservative approach to future surface access decarbonisation by applying the EPA's 'With Existing Measures' scenario to the calculation of future emissions, while contextualising the resulting additional emissions against the more ambitious 'With Additional Measures' Transport Emissions Trajectory. In addition, the Dublin Airport Carbon Reduction Strategy identifies measures to support lower-carbon surface access, including improved public transport access and measures to reduce reliance on private car travel. Taking account of the relatively small contribution of the additional surface access emissions to Ireland's projected Transport and National Emissions Trajectories and the Transport sectoral emissions ceiling, together with the conservative decarbonisation assumptions and applicable national and airport-level measures, the surface access GHG effect associated with the Proposed Order is assessed as Minor Adverse and Not Significant.

Lifecycle GHG Impact Assessment Summary

13.6.54 The overall GHG effect associated with the Proposed Order has been evaluated by considering the combined additional emissions from aviation, airport operations and surface access, their projected trajectory to 2050, their scale relative to Ireland's projected emissions trajectories, and their alignment with relevant policy, regulation and management measures.

13.6.55 The combined additional GHG emissions associated with the Proposed Order have been contextualised against Ireland's projected National and Transport Emissions Trajectories under the 'With Additional

[80]Department of the Environment, Climate and Communications (2022). Ireland's ambitious Climate Act signed into law. Available at: https://www.gov.ie/en/press-release/9336b-irelands-ambitious-climate-act-signed-into-law/

Measures' scenario[81]. As described in Section 13.3, this provides a more stringent comparator against which to consider the scale and trajectory of the additional emissions associated with the Proposed Order.

13.6.56 Aviation is the principal source of additional GHG emissions associated with the Proposed Order. The aviation assessment nevertheless projects a declining emissions trajectory to 2050, reflecting the quantified effects of mandated SAF uptake and assumed improvements in aircraft and engine efficiency. Aviation emissions also arise within a wider regulatory framework that includes ReFuelEU Aviation, the EU ETS and CORSIA. As described above, the operation of the EU ETS and CORSIA has not been used to reduce the gross aviation emissions reported in the assessment.

13.6.57 Airport operations emissions are projected to decline to 2050 as a result of the progressive decarbonisation of the Irish energy system and the operational energy and carbon-reduction measures described above. The additional airport operations emissions associated with the Proposed Order represent a very small proportion of Ireland's projected emissions trajectories and of the relevant Built Environment – Commercial sectoral emissions ceiling.

13.6.58 Surface access emissions are also projected to decline to 2050. The assessment adopts a conservative approach by applying the EPA's 'With Existing Measures' scenario to future surface access decarbonisation, while contextualising the resulting emissions against the more ambitious 'With Additional Measures' Transport Emissions Trajectory. Wider transport decarbonisation is principally driven by national policy, complemented by measures identified in the Dublin Airport Carbon Reduction Strategy to support lower-carbon access to the airport.

13.6.59 The combined emissions associated with aviation, airport operations and surface access are presented in Table 13-12. The table contextualises the additional GHG emissions associated with the Proposed Order against Ireland's projected Transport and National Emissions Trajectories. Appendix 13-1 (EIAR Volume 4) presents the conversion factors used in the GHG assessment.

Table 13-12: Total Emissions (ktonnes CO2e) against Ireland's Transport and National Emissions Trajectories

Year	Baseline/ Permitted Operation (32 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2029-2030	6,449	8,124	1,675	19,864	92,273	8%	2%
2031-2035	14,401	18,141	3,741	46,380	212,458	8%	2%
2036-2040	12,080	15,216	3,137	39,958	197,619	8%	2%
2041-2045	10,755	13,551	2,796	32,034	178,702	9%	2%
2046-2050	8,929	11,251	2,322	25,700	163,169	9%	1%

13.6.60 As shown in Table 13-12, the combined additional GHG emissions associated with the Proposed Order, compared with the 2029 Permitted Operation, represent no more than approximately 2% of Ireland's projected National Emissions Trajectory and 9% of the projected Transport Emissions Trajectory over the periods assessed.

13.6.61 The Proposed Order results in additional GHG emissions compared with the 2029 Permitted Operation, with aviation accounting for the substantial majority of this increase. However, the assessment projects a declining overall emissions trajectory to 2050, reflecting the quantified effects of mandated SAF uptake, assumed improvements in aircraft and engine efficiency, decarbonisation of the Irish energy system and surface transport, and the airport-level measures described above. The combined additional emissions represent no more than approximately 2% of Ireland's projected National Emissions Trajectory and 9% of the projected Transport Emissions Trajectory over the periods assessed. Taking these factors together and applying the significance criteria set out in Section 13.3, the overall GHG effect associated with the Proposed Order is assessed as Minor Adverse and Not Significant.

13.7 Mitigation and Monitoring

13.7.1 No additional mitigation or monitoring measures are proposed beyond those described in this chapter and Appendix 13-5 (EIAR Volume 4). The assessment incorporates the quantified emissions-reduction assumptions identified in Section 13.3. Other existing and planned carbon reduction initiatives are described to provide context but have not been relied upon in determining the significance of effects unless expressly identified as incorporated into the assessment. No further mitigation measures are considered necessary in light of the effects identified.

13.8 Residual Effects

13.8.1 The residual GHG effect of the Proposed Order has been evaluated through quantitative comparison of the additional emissions associated with the Proposed Operation (40.0 mppa), relative to the Permitted Operation (32.0 mppa), against relevant trajectories towards net zero, together with qualitative consideration of applicable policy, regulation and good practice. This approach is consistent with the ISEP significance methodology described in Section 13.3.

13.8.2 As described above, airport operations and surface access emissions are projected to decline to 2050, reflecting the progressive decarbonisation of the Irish energy and transport systems together with measures identified in the Dublin Airport Carbon Reduction Strategy. The additional emissions associated with these sources represent a small proportion of the relevant National and Transport Emissions Trajectories and sectoral emissions ceilings.

13.8.3 The Climate Action Plan 2025[82] sets out measures and actions to support the decarbonisation of the electricity, transport and buildings sectors in accordance with Ireland's statutory climate objectives. These measures provide the wider national policy framework within which airport operations and surface access emissions are projected to reduce over time.

13.8.4 Aviation emissions are subject to a wider policy and regulatory framework that includes ReFuelEU Aviation, the EU ETS and CORSIA. The quantified aviation emissions reported in this assessment incorporate the effects of mandated SAF uptake and assumed improvements in aircraft and engine efficiency. EU ETS and CORSIA provide additional market-based mechanisms applicable to aviation emissions within their respective scopes; however, their operation has not been used to reduce the gross aviation emissions reported in the assessment.

13.8.5 Taking account of the quantified emissions trajectories and additional emissions associated with the Proposed Order, together with the applicable policy, regulatory and management measures described above, the residual GHG effect of the Proposed Order is assessed, in accordance with the ISEP significance criteria set out in Section 13.3, as Minor Adverse and Not Significant.

13.9 Cumulative Effects

13.9.1 As discussed in paragraphs 13.3.81 to 13.3.84, separate project-specific cumulative assessment of GHG effects has not been undertaken because GHG emissions contribute to global climate change irrespective of their geographic source. The assessment presented in this chapter is inherently cumulative in nature, as the additional GHG emissions associated with the Proposed Order are

[82] Ireland's Climate Action Plan 2025: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/climate-action-plan-2025/ [Accessed: 14/05/2026]

considered in the context of Ireland's projected National and Transport Emissions Trajectories towards net zero.

13.10 Supporting Assessments and Interpretation

13.10.1 To support the interpretation of the Principal Assessment, three Supporting Assessments have been considered. These provide additional context on the GHG emissions associated with the Proposed Operation when compared with the 2023 Baseline Operation and 2025 Current Operation, and on the emissions associated with the Permitted Operation when compared with the 2025 Current Operation. The Supporting Assessments do not determine likely significant effects and do not replace the Principal Assessment.

13.10.2 The Supporting Assessments comprise:

- Supporting Assessment 1: comparison of the 2023 Baseline Operation (32.0 mppa) with the 2029 Proposed Operation (40.0 mppa);
- Supporting Assessment 2: comparison of the 2025 Current Operation (36.4 mppa) with the 2029 Proposed Operation (40.0 mppa); and
- Supporting Assessment 3: comparison of the 2025 Current Operation (36.4 mppa) with the 2029 Permitted Operation (32.0 mppa).

13.10.3 Each Supporting Assessment provides a different perspective on the operational changes associated with the Proposed Order. Supporting Assessment 1 provides context on the change from the historic 2023 Baseline Operation to the future Proposed Operation; Supporting Assessment 2 provides context on the additional change between the 2025 Current Operation and the future Proposed Operation; and Supporting Assessment 3 provides context on the change that would arise between the 2025 Current Operation and the future Permitted Operation. These assessments provide additional technical context and do not alter the conclusions of the Principal Assessment.

13.10.4 Unless otherwise stated, the methodology applied to the Supporting Assessments is consistent with that used for the Principal Assessment, as described in Section 13.3. Future emissions trajectories are projected to 2050 to allow their longer-term development to be considered in the context of Ireland's pathway towards net zero.

13.10.5 The 2023 Baseline Operation (32.0 mppa) is described in Section 13.4, while the future Permitted Operation (32.0 mppa) and Proposed Operation (40.0 mppa) are assessed in Sections 13.5 and 13.6, respectively. The additional scenario required for the Supporting Assessments is the 2025 Current Operation (36.4 mppa), which provides the comparator for Supporting Assessments 2 and 3. The GHG emissions associated with the 2025 Current Operation are therefore presented in Table 13-13. The 2025 Current Operation emissions comprise aviation, airport operations and surface access emissions, consistent with the emissions sources considered in the Principal Assessment. A full breakdown of the emissions calculations is provided in Appendix 13-1.

Table 13-13: GHG emissions associated with the 2025 Current Operation (36.4 mppa)

Emission Source	2025 Current Operation Emissions (tCO2e)	Data source
Aviation	3,701,895[64]	Existing aviation operations at Dublin Airport.
Airport Operations	17,264[83]	Existing airport operations (electricity, gas and water) at Dublin Airport based on data from 2023 and 2025.
Surface Access	267,497	Transport Assessment data (Chapter 6: Material Assets (Traffic and Transport))

13.10.6 For the Supporting Assessments, the GHG emissions associated with the 2023 Baseline Operation (32.0 mppa) and the 2025 Current Operation (36.4 mppa) have been projected to 2050, applying the future decarbonisation assumptions described in Section 13.3. The projected 2023 Baseline Operation provides the comparator trajectory for Supporting Assessment 1, while the projected 2025 Current

[83] This significant decrease between 2023 and 2025 is linked to the solar array coming online in 2025.

Operation provides the comparator trajectory for Supporting Assessments 2 and 3. These trajectories are presented in Table 13-14.

Table 13-14: Projected GHG emissions associated with the 2023 Baseline Operation and 2025 Current Operation (tCO_2e)

	Aviation		Operations		Surface Transport		Total	
Year	**Baseline Operation (2023)**	**Current Operation (2025)**	**Baseline Operation (32 mppa)**	**Current Operation (36.4 mppa)**	**Baseline Operation (32 mppa)**	**Current Operation (36.4 mppa)**	**Baseline Operation (32 mppa)**	**Current Operation (36.4 mppa)**
2026-2030	15,332,819	17,521,787	57,201	63,003	1,170,000	1,309,140	16,560,021	18,893,930
2031-2035	13,248,111	15,139,458	38,732	40,290	1,113,858	1,244,753	14,400,701	16,424,501
2036-2040	11,080,810	12,662,746	36,980	38,538	961,870	1,074,904	12,079,661	13,776,188
2041-2045	9,982,487	11,407,622	30,817	32,375	742,154	829,369	10,755,458	12,269,366
2046-2050	8,363,059	9,556,998	27,143	28,701	538,842	602,164	8,929,044	10,187,863

Supporting Assessment 1 – 2023 Baseline Operation to Proposed Operation

13.10.7 Supporting Assessment 1 compares the 2023 Baseline Operation (32.0 mppa) with the 2029 Proposed Operation (40.0 mppa). This assessment provides context on the operational and GHG emissions changes associated with the transition from the airport operation represented by the existing passenger cap to the future Proposed Operation.

13.10.8 For the climate assessment, the emissions associated with the 2023 Baseline Operation and 2029 Proposed Operation have been projected to 2050, applying the methodology and future decarbonisation assumptions described in Section 13.3. This allows the longer-term emissions trajectories associated with the two scenarios to be compared in the context of Ireland's pathway towards net zero. The projected emissions associated with the 2023 Baseline Operation are presented in Table 13-14, while those associated with the 2029 Proposed Operation are presented as part of the Principal Assessment above.

Aviation

13.10.9 Aviation emissions associated with the Proposed Operation, compared with the 2023 Baseline Operation represent no more than 9% of Ireland's projected Transport Emissions Trajectory and 2% of the projected National Emissions Trajectory under the 'With Additional Measures' scenario. Both scenarios nevertheless show a declining aviation emissions trajectory to 2050, reflecting the quantified effects of mandated SAF uptake and assumed improvements in aircraft and engine efficiency.

Airport Operations

13.10.10 Airport operations emissions associated with the Proposed Operation, compared with the 2023 Baseline Operation represent no more than 0.019% of Ireland's projected Transport Emissions Trajectory and 0.004% of the projected National Emissions Trajectory over the periods assessed. The projected trajectory reflects the progressive decarbonisation of the Irish energy system and the operational energy and carbon-reduction measures described in the Principal Assessment.

Table 13-15: Airport Operations GHG Emissions – Supporting Assessment 1 ($ktCO_2e$)

Year	Baseline Operation (32 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2023-2025	55	55	0	35,142	161,930	0%	0%
2026-2030	57	67	10	52,518	242,333	0.019%	0.004%
2031-2035	39	44	6	46,380	212,458	0.012%	0.003%
2036-2040	37	42	6	39,958	197,619	0.014%	0.003%
2041-2045	31	36	5	32,034	178,702	0.015%	0.003%
2046-2050	27	32	5	25,700	163,169	0.018%	0.003%

Table 13-16: Aviation GHG Emissions – Supporting Assessment 1 ($ktCO_2e$)

Year		Baseline Operation (32 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2023-2025	Total	10,093	10,093	0	35,142	161,930	0%	0%
	Traded	4,576	4,576	0				
	Non Traded	5,517	5,517	0				
2026-2030	Total	15,333	18,535	3,202	52,518	242,333	6%	1%
	Traded	6,879	7,731	852				
	Non Traded	8,454	10,804	2,350				
2031-2035	Total	13,248	16,713	3,465	46,380	212,458	7%	2%
	Traded	5,943	6,782	838				
	Non Traded	7,305	9,931	2,627				
2036-2040	Total	11,081	13,979	2,898	39,958	197,619	7%	1%
	Traded	4,971	5,672	701				
	Non Traded	6,110	8,307	2,197				
2041-2045	Total	9,982	12,593	2,611	32,034	178,702	8%	1%
	Traded	4,478	5,110	632				
	Non Traded	5,504	7,483	1,979				
2046-2050	Total	8,363	10,550	2,187	25,700	163,169	9%	1%
	Traded	3,752	4,281	529				
	Non Traded	4,611	6,269	1,658				

Surface Access

13.10.11 Surface access emissions associated with the Proposed Operation, compared with the 2023 Baseline Operation represent no more than 0.3% of Ireland's projected Transport Emissions Trajectory and 0.07% of the projected National Emissions Trajectory. Both scenarios incorporate the future decarbonisation assumptions described in Section 13.3.

Table 13-17: Surface Access GHG Emissions – Supporting Assessment 1 ($ktCO_2e$)

Year	Baseline Operation (32 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2023-2025	705	705	0	35,142	161,930	0.0%	0.00%
2026-2030	1,170	1,409	239	52,518	242,333	0.5%	0.10%
2031-2035	1,114	1,384	270	46,380	212,458	0.6%	0.13%
2036-2040	962	1,195	233	39,958	197,619	0.6%	0.12%
2041-2045	742	922	180	32,034	178,702	0.6%	0.10%
2046-2050	539	669	131	25,700	163,169	0.5%	0.08%

Overall GHG Emissions

13.10.12 Overall, the Proposed Operation represents no more than 9% of Ireland's projected Transport Emissions Trajectory and 1% of the projected National Emissions Trajectory. The comparison provides additional context on the change between the historic 2023 Baseline Operation and the future Proposed Operation. As a Supporting Assessment, it does not determine likely significant effects or alter the conclusions of the Principal Assessment.

Table 13-18: Total GHG Emissions – Supporting Assessment 1 ($ktCO_2e$)

Year	Baseline Operation (32 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2023-2025	10,853	10,853	0	35,142	161,930	0.0%	0.00%
2026-2030	16,560	20,011	3,451	52,518	242,333	6.6%	1.42%
2031-2035	14,401	18,141	3,741	46,380	212,458	8.1%	1.76%
2036-2040	12,080	15,216	3,137	39,958	197,619	7.9%	1.59%

2041-2045	10,755	13,551	2,796	32,034	178,702	8.7%	1.56%
2046-2050	8,929	11,251	2,322	25,700	163,169	9.0%	1.42%

Supporting Assessment 2 – 2025 Current Operation to Proposed Operation

13.10.13 Supporting Assessment 2 compares the 2025 Current Operation (36.4 mppa) with the Proposed Operation (40.0 mppa). This assessment provides context on the additional operational and GHG emissions change associated with the Proposed Order relative to the current level of airport operation.

13.10.14 For the climate assessment, the emissions associated with the 2025 Current Operation and Proposed Operation have been projected to 2050, applying the methodology and future decarbonisation assumptions described in Section 13.3. This allows the longer-term emissions trajectories associated with the two scenarios to be compared in the context of Ireland's pathway towards net zero. The projected emissions associated with the 2025 Current Operation are presented in Table 13-14, while those associated with the Proposed Operation are presented as part of the Principal Assessment above.

Aviation

13.10.15 The projected aviation emissions associated with the 2025 Current Operation and Proposed Operation are presented in Table 13-16. The projections incorporate the same assumptions regarding mandated SAF uptake and future improvements in aircraft and engine efficiency as applied in the Principal Assessment. The conversion factors used in the calculation of aviation GHG emissions are provided in Appendix 13-1 (EIAR Volume 4).

13.10.16 Table 13-19 contextualises the additional aviation emissions associated with the Proposed Operation, compared with the 2025 Current Operation, against Ireland's projected Transport and National Emissions Trajectories under the ‘With Additional Measures’ scenario. The additional aviation emissions represent approximately 2–4% of the projected Transport Emissions Trajectory and up to approximately 1% of the projected National Emissions Trajectory over the periods assessed.

Table 13-19: Aviation GHG Emissions – Supporting Assessment 2 ($ktCO_2e$)

Year		Current Operation (36.4 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2026-2030	Total	17,522	18,535	1,013	52,518	242,333	2%	0%
	Traded	7,541	7,731	189				
	Non Traded	9,980	10,804	824				
2031-2035	Total	15,139	16,713	1,574	46,380	212,458	3%	1%
	Traded	6,516	6,782	266				
	Non Traded	8,623	9,931	1,308				
2036-2040	Total	12,663	13,979	1,316	39,958	197,619	3%	1%
	Traded	5,450	5,672	222				
	Non Traded	7,213	8,307	1,094				
2041-2045	Total	11,408	12,593	1,186	32,034	178,702	4%	1%
	Traded	4,910	5,110	200				
	Non Traded	6,498	7,483	986				
2046-2050	Total	9,557	10,550	993	25,700	163,169	4%	1%
	Traded	4,113	4,281	168				
	Non Traded	5,444	6,269	826				

Airport Operations

13.10.17 The 2025 Current Operation provides the basis for projecting airport operations emissions under Supporting Assessment 2. The 2025 data reflect the benefits of the solar array that became operational in that year. To estimate the airport operations emissions associated with the Proposed Operation, a 9.9% uplift has been applied to the 2025 energy demand, corresponding to the increase in passenger throughput from 36.4 mppa to 40.0 mppa. Future emissions have then been projected to 2050 applying the decarbonisation assumptions described in Section 13.3.

13.10.18 The projected airport operations emissions associated with the 2025 Current Operation and 2029 Proposed Operation are presented in Table 13-20Table 13-15. The conversion factors used in the calculation of airport operations GHG emissions are provided in Appendix 13-1.

13.10.19 As shown in Table 13-20Table 13-15, the additional airport operations emissions associated with the 2029 Proposed Operation, compared with the 2025 Current Operation, represent no more than approximately 0.011% of Ireland's projected Transport Emissions Trajectory and 0.002% of the projected National Emissions Trajectory over the periods assessed. The additional emissions represent approximately 0.1% of the Built Environment – Commercial sectoral emissions ceiling for 2026–2030.

Table 13-20: Airport Operations GHG Emissions – Supporting Assessment 2 ($ktCO_2e$)

Year	Current Operation 36.4 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2026-2030	63	67	4	52,518	242,333	0.008%	0.002%
2031-2035	40	44	4	46,380	212,458	0.009%	0.002%
2036-2040	39	42	4	39,958	197,619	0.010%	0.002%
2041-2045	32	36	3	32,034	178,702	0.010%	0.002%
2046-2050	29	32	3	25,700	163,169	0.011%	0.002%

Surface Access

13.10.20 The projected surface access emissions associated with the 2025 Current Operation and Proposed Operation are presented in Table 13-21. The projections incorporate the future surface transport decarbonisation assumptions described in Section 13.3. The conversion factors used in the calculation of surface access GHG emissions are provided in Appendix 13-1.

13.10.21 As shown in Table 13-21, the additional surface access emissions associated with the Proposed Operation, compared with the 2025 Current Operation, represent no more than approximately 0.3% of Ireland's projected Transport Emissions Trajectory and 0.07% of the projected National Emissions Trajectory over the periods assessed. The additional surface access emissions represent approximately 0.3% of the Transport sectoral emissions ceiling for 2026–2030.

Table 13-21: Surface Access GHG Emissions – Supporting Assessment 2 ($ktCO_2e$)

Year	Current Operation (36.4 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2026-2030	1,309	1,409	99	52,518	242,333	0.2%	0.04%
2031-2035	1,245	1,384	139	46,380	212,458	0.3%	0.07%
2036-2040	1,075	1,195	120	39,958	197,619	0.3%	0.06%
2041-2045	829	922	93	32,034	178,702	0.3%	0.05%
2046-2050	602	669	67	25,700	163,169	0.3%	0.04%

Overall GHG Emissions

13.10.22 The combined GHG emissions associated with aviation, airport operations and surface access for the 2025 Current Operation and Proposed Operation are presented in Table 13-22.

13.10.23 As shown in Table 13-22, the combined additional GHG emissions associated with the Proposed Operation, compared with the 2025 Current Operation, represent no more than approximately 4% of Ireland's projected Transport Emissions Trajectory and 1% of the projected National Emissions Trajectory over the periods assessed. The difference is smaller than that identified through the Principal Assessment, reflecting the smaller change in passenger throughput between the 2025 Current Operation (36.4 mppa) and 2029 Proposed Operation (40.0 mppa).

Table 13-22: Total GHG Emissions – Supporting Assessment 2 ($ktCO_2e$)

Year	Current Operation (36.4 mppa)	Proposed Operation (40 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2026-2030	18,894	20,011	1,117	52,518	242,333	2%	0%
2031-2035	16,425	18,141	1,717	46,380	212,458	4%	1%
2036-2040	13,776	15,216	1,440	39,958	197,619	4%	1%
2041-2045	12,269	13,551	1,282	32,034	178,702	4%	1%
2046-2050	10,188	11,251	1,064	25,700	163,169	4%	1%

13.10.24 Supporting Assessment 2 therefore demonstrates that the additional GHG emissions associated with the change from the 2025 Current Operation to the Proposed Operation are smaller than those identified

through the Principal Assessment. This Supporting Assessment provides additional context and does not alter the significance conclusions of the Principal Assessment.

Supporting Assessment 3 – 2025 Current Operation to Permitted Operation

13.10.25 Supporting Assessment 3 compares the 2025 Current Operation (36.4 mppa) with the Permitted Operation (32.0 mppa). This assessment provides context on the change in GHG emissions associated with the reduction in airport operations from the current level of passenger throughput to the level permitted under the existing passenger capacity conditions.

13.10.26 For the climate assessment, the emissions associated with the 2025 Current Operation and Permitted Operation have been projected to 2050, applying the methodology and future decarbonisation assumptions described in Section 13.3. This allows the longer-term emissions trajectories associated with the two scenarios to be compared in the context of Ireland's pathway towards net zero. The projected emissions associated with the 2025 Current Operation are presented in Table 13-14, while those associated with the Permitted Operation are presented as part of the Principal Assessment above.

Aviation

13.10.27 The projected aviation emissions associated with the 2025 Current Operation and Permitted Operation are presented in Table 13-23. The projections incorporate the same assumptions regarding mandated SAF uptake and future improvements in aircraft and engine efficiency as applied in the Principal Assessment. The conversion factors used in the calculation of aviation GHG emissions are provided in Appendix 13-1.

13.10.28 Table 13-23 contextualises the change in aviation emissions associated with the Permitted Operation, compared with the 2025 Current Operation, against Ireland's projected Transport and National Emissions Trajectories under the ‘With Additional Measures’ scenario. Aviation emissions are reduced by approximately 4-5% of the projected Transport Emissions Trajectory and 1% of the projected National Emissions Trajectory over the periods assessed.

Table 13-23: Aviation GHG Emissions – Supporting Assessment 3 ($ktCO_2e$)

Year		Current Operation (36.4 mppa)	Future Permitted Operation (32 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2026-2030	Total	17,522	15,333	-2,189	52,518	242,333	-4%	-1%
	Traded	7,541	6,879	-663				
	Non Traded	9,980	8,454	-1,526				
2031-2035	Total	15,139	13,248	-1,891	46,380	212,458	-4%	-1%
	Traded	6,516	5,943	-573				
	Non Traded	8,623	7,305	-1,319				
2036-2040	Total	12,663	11,081	-1,582	39,958	197,619	-4%	-1%
	Traded	5,450	4,971	-479				
	Non Traded	7,213	6,110	-1,103				
2041-2045	Total	11,408	9,982	-1,425	32,034	178,702	-4%	-1%
	Traded	4,910	4,478	-432				
	Non Traded	6,498	5,504	-994				
2046-2050	Total	9,557	8,363	-1,194	25,700	163,169	-5%	-1%
	Traded	4,113	3,752	-362				
	Non Traded	5,444	4,611	-832				

Airport Operations

13.10.29 The 2025 Current Operation provides the basis for projecting airport operations emissions under Supporting Assessment 3. The 2025 data reflect the benefits of the solar array that became operational in that year. To estimate airport operations emissions associated with the 2029 Permitted Operation, a 12% reduction has been applied to the 2025 energy demand, corresponding to the reduction in passenger throughput from 36.4 mppa to 32.0 mppa. Future emissions have then been projected to 2050 applying the decarbonisation assumptions described in Section 13.3.

13.10.30 The projected airport operations emissions associated with the 2025 Current Operation and Permitted Operation are presented in Table 13-24. The conversion factors used in the calculation of airport operations GHG emissions are provided in Appendix 13-1.

Table 13-24: Airport Operations GHG Emissions – Supporting Assessment 3 ($ktCO_2e$)

Year	Current Operation (36.4 mppa)	Future Permitted Operation (32 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2026-2030	63	57	-6	52,518	242,333	-0.011%	-0.002%
2031-2035	40	39	-2	46,380	212,458	-0.003%	-0.001%
2036-2040	39	37	-2	39,958	197,619	-0.004%	-0.001%
2041-2045	32	31	-2	32,034	178,702	-0.005%	-0.001%
2046-2050	29	27	-2	25,700	163,169	-0.006%	-0.001%

13.10.31 As shown in Table 13-24, airport operations emissions associated with the 2029 Permitted Operation are lower than those associated with the 2025 Current Operation. The reduction represents up to approximately 0.011% of Ireland's projected Transport Emissions Trajectory and 0.002% of the projected National Emissions Trajectory over the periods assessed. For the 2026–2030 period, the reduction represents approximately 0.1% of the Built Environment – Commercial sectoral emissions ceiling of 5 $MtCO_2e$.

Surface Access

13.10.32 The projected surface access emissions associated with the 2025 Current Operation and Permitted Operation are presented in Table 13-25. The projections incorporate the future surface transport decarbonisation assumptions described in Section 13.3. The conversion factors used in the calculation of surface access GHG emissions are provided in Appendix 13-1.

Table 13-25: Surface Access GHG Emissions – Supporting Assessment 3 ($ktCO_2e$)

Year	Current Operation (36.4 mppa)	Permitted Operation (32 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2026-2030	1,309	1,170	-139	52,518	242,333	-0.3%	-0.06%
2031-2035	1,245	1,114	-131	46,380	212,458	-0.3%	-0.06%
2036-2040	1,075	962	-113	39,958	197,619	-0.3%	-0.06%
2041-2045	829	742	-87	32,034	178,702	-0.3%	-0.05%
2046-2050	602	539	-63	25,700	163,169	-0.2%	-0.04%

13.10.33 As shown in Table 13-25, surface access emissions associated with the 2029 Permitted Operation are lower than those associated with the 2025 Current Operation. The reduction represents up to approximately 0.3% of Ireland's projected Transport Emissions Trajectory and 0.06% of the projected National Emissions Trajectory over the periods assessed. For the 2026–2030 period, the reduction represents approximately 0.4% of the Transport sectoral emissions ceiling of 37 $MtCO_2e$.

Overall GHG Emissions

13.10.34 The combined GHG emissions associated with aviation, airport operations and surface access for the 2025 Current Operation and Permitted Operation are presented in Table 13-26.

Table 13-26: Total GHG Emissions – Supporting Assessment 3 ($ktCO_2e$)

Year	Current Operation (36.4 mppa)	Future Permitted Operation (32 mppa)	Emissions Variation	Ireland's Transport Emissions Trajectory (With Additional Measures)	Ireland's National Emissions Trajectory (With Additional Measures)	Total emissions variation as a % of carbon Ireland's Transport Emissions	Total emissions variation as a % of carbon Ireland's National Emissions
2026-2030	18,894	16,560	-2,334	52,518	242,333	-4%	-1%
2031-2035	16,425	14,401	-2,024	46,380	212,458	-4%	-1%
2036-2040	13,776	12,080	-1,697	39,958	197,619	-4%	-1%
2041-2045	12,269	10,755	-1,514	32,034	178,702	-5%	-1%
2046-2050	10,188	8,929	-1,259	25,700	163,169	-5%	-1%

13.10.35 As shown in Table 13-26, the combined GHG emissions associated with the Permitted Operation are lower than those associated with the 2025 Current Operation throughout the periods assessed. The reduction ranges from approximately 1,259 $ktCO_2e$ to 2,334 $ktCO_2e$ across the five-year periods and

represents approximately 4–5% of Ireland's projected Transport Emissions Trajectory and 1% of the projected National Emissions Trajectory.

13.10.36 Supporting Assessment 3 therefore demonstrates the reduction in GHG emissions associated with a change from the 2025 Current Operation (36.4 mppa) to the 2029 Permitted Operation (32.0 mppa). This provides additional context for interpretation of the Principal Assessment and does not alter the significance conclusions of that assessment.

13.11 Conclusion

13.11.1 This chapter has assessed the potential effects of the Proposed Order on climate arising from GHG emissions associated with aviation, airport operations and surface access. The Principal Assessment compares the 2029 Permitted Operation (32.0 mppa) with the 2029 Proposed Operation (40.0 mppa), with emissions also projected to 2050 to consider their longer-term trajectory in the context of Ireland's pathway towards net zero.

13.11.2 The Proposed Order would result in an increase in GHG emissions compared with the 2029 Permitted Operation, with aviation accounting for the substantial majority of the additional emissions. The assessment nevertheless projects a declining overall emissions trajectory to 2050. For aviation, this reflects the quantified effects of mandated SAF uptake and assumed improvements in aircraft and engine efficiency. Airport operations and surface access emissions are also projected to decline as the Irish energy and transport systems progressively decarbonise and through the implementation of relevant airport-level carbon reduction measures.

13.11.3 The additional aviation emissions associated with the Proposed Order represent approximately 7–9% of Ireland's projected Transport Emissions Trajectory and approximately 1–2% of the projected National Emissions Trajectory over the periods assessed. The corresponding contributions from airport operations and surface access are substantially smaller. Overall, the combined additional GHG emissions associated with the Proposed Order represent no more than approximately 9% of the projected Transport Emissions Trajectory and 2% of the projected National Emissions Trajectory over the periods assessed.

13.11.4 Aviation emissions also operate within a wider regulatory framework including ReFuelEU Aviation, the EU Emissions Trading System (EU ETS) and CORSIA. The operation of the EU ETS and CORSIA has not been used to reduce the gross aviation emissions reported in this assessment. The assessment therefore does not rely on these market-based mechanisms to demonstrate the projected reductions in gross aviation emissions.

13.11.5 Taking account of the magnitude and trajectory of the additional GHG emissions associated with the Proposed Order, the quantified emissions-reduction measures incorporated into the assessment, wider decarbonisation of the energy and transport systems, and applicable policy, regulatory and airport-level measures, the effect of the Proposed Order on climate is assessed as Minor Adverse and Not Significant. No additional mitigation or monitoring measures are proposed beyond those identified in this chapter and the Dublin Airport Carbon Reduction Strategy.

13.11.6 The ACP Scoping Opinion (presented in Appendix 1-1 of this EIAR) included a number of requirements pertinent to the assessment of climate impacts. This included primarily two main aspects that were assessed in Appendix 13-8:

- Assessing the Proposed Order’s expected future impact of domestic aviation emissions against the 1990 – 2024 baseline in Table 3.2 of Annex 3.1 of Ireland’s National Inventory Document to the United National Framework Convention on Climate Change: Ireland’s National Inventory Submissions 2026; and
- The expected impact on international aviation emissions (IPCC category I.A.3.a.ii) should be reported against Table 3.1.2 of Annex 3.1 of Ireland’s National Inventory Document.

13.11.7 The findings of the supplementary assessment presented in Appendix 13-8 provide additional context in response to the ACP Scoping Opinion but do not alter the assessment of effects or conclusions on significance presented in this Chapter. Refer to Appendix 13-8 for further details.

13.11.8 For ease of reference, the conclusion of the climate change risk assessment (Appendix 13-2) is summarised below. Full details are provided in the Appendix and this chapter.

13.11.9 The climate risk assessment identified 16 potential climate-related risks, primarily associated with flooding, temperature changes and severe weather. Initially, 10 of these risks were considered significant under the climate projection scenarios assessed.

13.11.10 However, the assessment found that the proposed adaptation, monitoring and mitigation measures would substantially reduce these risks. With these measures in place, no residual risks were identified as significant, indicating that daa Dublin Airport is expected to be resilient to future climate-related impacts.