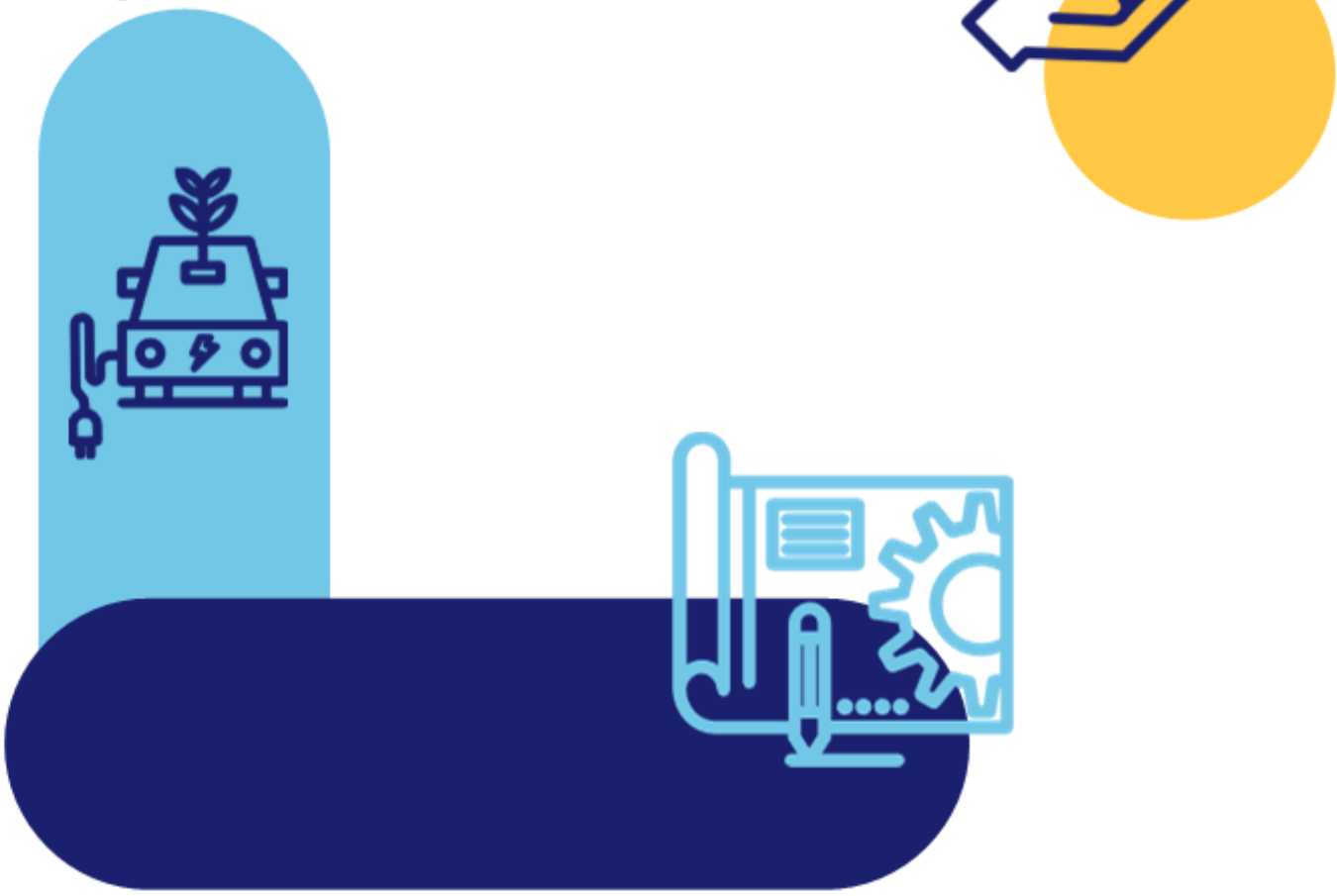
Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Transport Infrastructure Ireland

2025 Climate Action Roadmap

September 2025



DOCUMENT HISTORY OF APPROVAL

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Executive Summary

This Roadmap (2025) sets out Transport Infrastructure Ireland's (TII) plans to reduce greenhouse gas emissions and meet decarbonisation, energy efficiency, and energy reduction targets. This Roadmap documents progress and builds on last year's Roadmap (2024). It has been prepared in line with guidance from the Sustainable Energy Authority of Ireland (SEAI), the Environmental Protection Agency (EPA) and the Climate Action Plan 2025 (CAP25), which stipulates that the public sector will lead by example in delivering on Ireland's decarbonisation commitments.

This Roadmap demonstrates how TII will achieve emissions reductions to 2030. As a public sector organisation TII has two targets under CAP25 focused on energy:

- **Target 1 Decarbonisation:** To reduce greenhouse gas (GHG) emissions associated with energy from TII's operations by 73%[1] to 7,606 tonnes of Carbon Dioxide equivalent (tCO2e) by 2030, compared to a 2016-2018 (average) baseline of 28,533 tCO2e; and
- **Target 2 Energy Efficiency:** To improve energy efficiency by 50% by 2030 compared to a 2009 baseline.

These targets focus on the emissions and energy performance within TII's control; from electricity purchased by the organisation, and emissions produced from combustion on site such as gas and oil in offices and depots (for heating and hot water), as well as fuels like diesel, used in TII's fleet and sub-contractors' fleets for the Light Rail Network (LRN) and National Roads Network (NRN).

Using SEAI's gap-to-target (GTT) model, TII is projected to achieve a 63–74% reduction in emissions and a 48–53% improvement in energy efficiency by 2030. These outcomes are primarily driven by grid decarbonisation and planned energy initiatives. This Roadmap sets out 25 projects to be delivered between now and 2030. The successful achievement of the targets is dependent on all of the projects being implemented as planned, with funding and resources in place in addition to availability of the expected technology and solutions, and the accuracy of the model predictions. Existing funding constraints in 2025 are impacting the successful delivery of these projects, with six projects delayed beyond their original timelines. In addition to the risk of lack of funding, there is also an undeniable risk that the grid may not decarbonise at the planned rate.

The Energy Efficiency Directive (EU) 2023/1791 has set new targets for the public sector to reduce energy consumption. As a public body, TII is subject to an EU-mandated target, that is to be transposed into Irish law in October 2025, to reduce absolute energy consumption by 1.9% each year compared to a 2021 baseline. This new target is challenging for TII. Currently, TII's projected energy consumption by 2030 is forecast to be approximately 3% above the 2021 baseline. The inclusion of additional energy requirements consequent on the delivery of Luas Finglas, Metrolink and Luas Cork will be in excess of the threshold that is set by this Directive.

Under the Directive, EU Member states have the option of exempting public transport from the new energy target. TII will propose to the Department of Transport that Ireland apply this exemption for light rail and metro.

GHG emissions within TII's direct control account for around 1% of the GHG emissions associated with delivery, operation and use of the transport infrastructure and services provided by TII. The remaining 99% of emissions are not controlled, but can be influenced, by TII.

TII applies the GHG Protocol, an internationally recognised standard, to measure and manage emissions. Within this framework, emissions are categorised into three scope definitions: scope 1 (direct emissions from sources that are owned or controlled by an organisation), scope 2 (indirect emissions from electricity), and scope 3 (other indirect emissions).

[1] This target will fluctuate in line with changes to the emissions forecasts published by the SEAI.

Figure 1 shows TII's emissions from 2021 to 2023 by scope. At the time of writing, analysis of 2024 emissions for TII have not yet been completed for inclusion in this Roadmap.

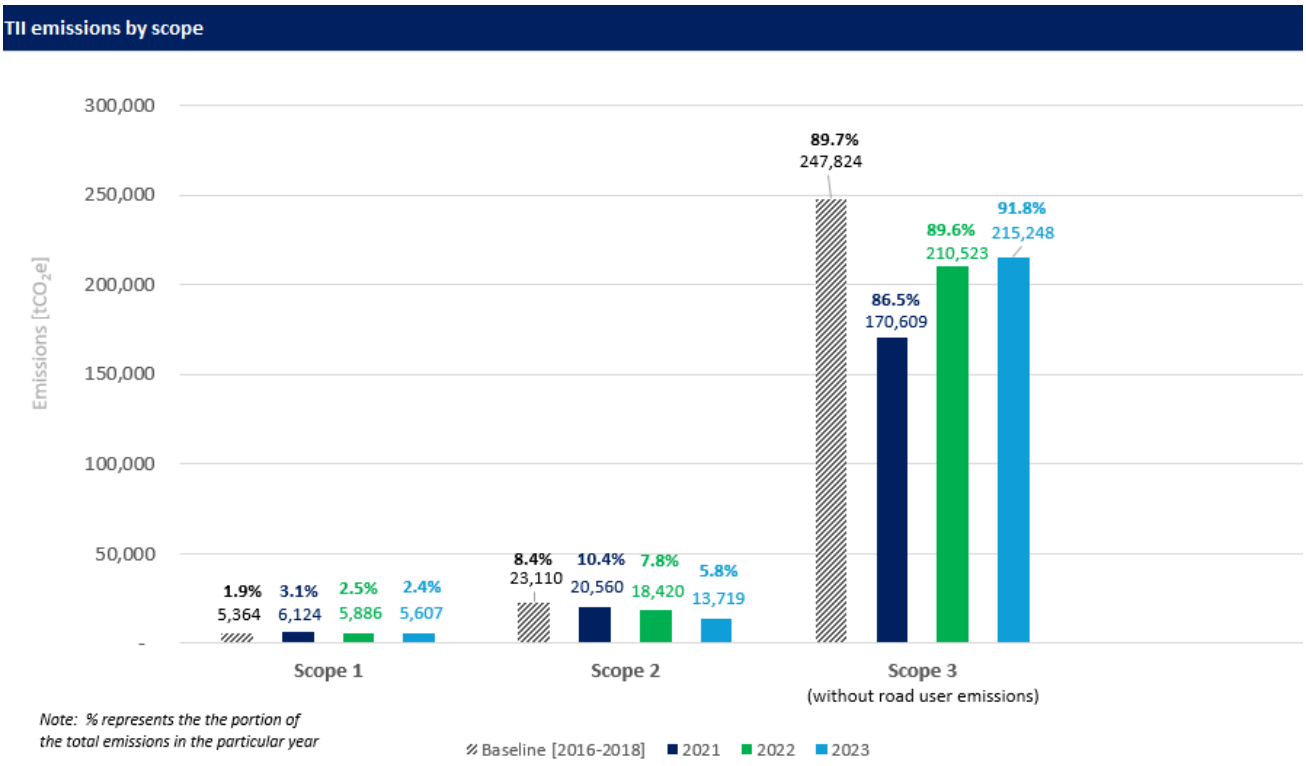


Figure 1 TII's emissions by scope[2]

TII's scope 3 emissions (without road user emissions) increased slightly in 2023. This is mainly due to increased construction activity linked to major road and greenway projects such as the Listowel and Moycullen bypasses. TII is committed to reducing GHG emissions across all its activities. This includes influencing emissions within both the Transport and Industry sectors in alignment with CAP25. The Transport and Industry sectors are both major sources of Ireland's GHG emissions. In 2023, transport emissions, representing 21.5% of economy-wide emissions, increased by 0.3% compared to 2022 notwithstanding economic growth of 5% and a 3% increase to the national vehicle fleet, reflecting the increased penetration of more sustainable modes of transport and low-emissions vehicles. Chapter 3 of this Roadmap sets out some of the activities undertaken to support emissions reductions in these sectors.

Under the sectoral emissions ceilings, the Transport sector requires a reduction of 50% from 12 million tCO_2e ($MtCO_2e$) in 2018 to 6 million tCO_2e in 2030. Travel on National Roads accounted for approximately 37% of road transport emissions from 2018 to 2024. Details are shown in **Figure 2** (TII, 2025) below.

[2] Scope 3 2022 emissions include additional categories not available in previous years. Better quality data for the years 2020-2021 resulted in an update to emissions previously reported.

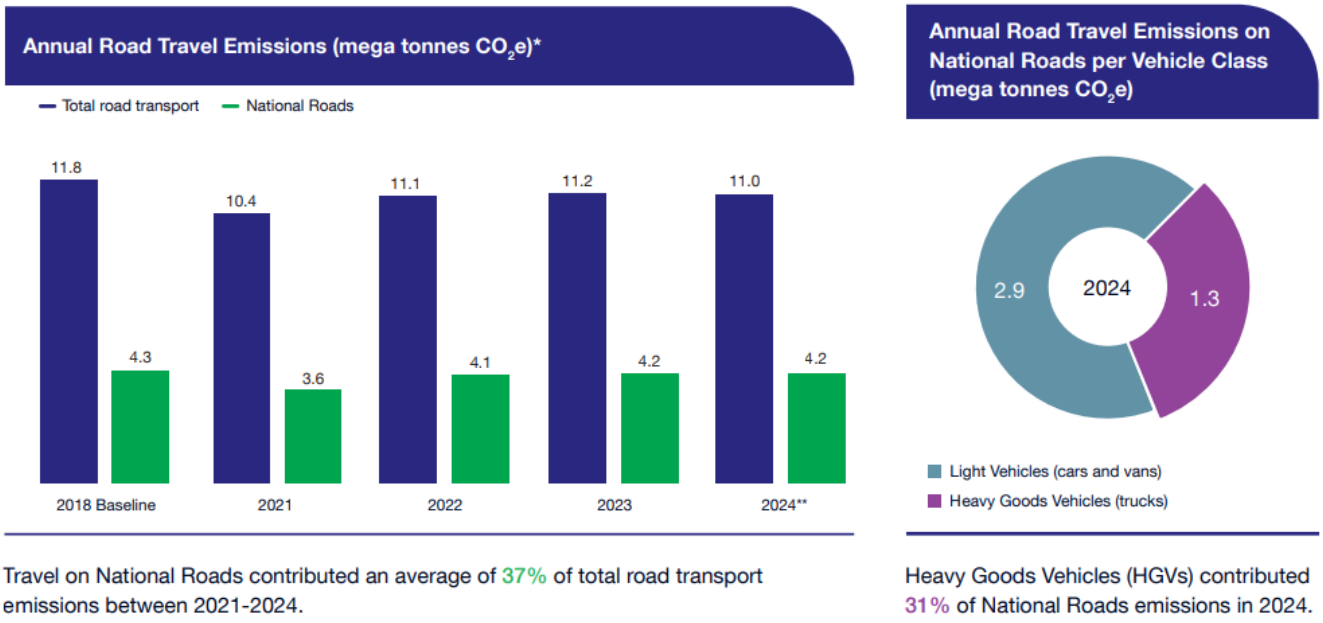


*Figure 2 Annual Road User Emissions (*provisional) (TII, 2025)*[3]

The Industry sector requires a 35% reduction from approximately 7 million tCO_2e in 2018 to 4.5 million tCO_2e by 2030. TII is working with partners, stakeholders, and suppliers to reduce the overall emissions associated with construction, operation, and protection and renewal of transport infrastructure, and use of TII's transport networks. TII also recognises its role in contributing to wider sustainability such as enhancing biodiversity and supporting climate adaptation.

TII acknowledges that the 2030 targets are interim targets on the path to the goal of net-zero emissions by 2050. This Roadmap (2025) is a live document and will be updated annually to reflect TII's progress and to respond to requirements under the Climate Action Mandate.

[3] Link to the source: https://www.tii.ie/media/sxrd4efi/tii-national-road-greenway-network-indicators-2024.pdf

Glossary

Name	Definition
Biodiversity	Biodiversity includes all life on Earth. As defined by the United Nations Convention on Biological Diversity (CBD), "biological diversity" means the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes genetic diversity within species, between species and of ecosystems.
Biodiversity Crisis	The biodiversity crisis is the rapid loss of species and the rapid degradation of ecosystems.
Biofuels	Biofuels are liquid or gaseous transport fuels, such as biodiesel and bioethanol, made from biomass which are renewable alternatives to fossil fuels in the transport sector.
Business As Usual (BAU)	The energy consumption before additional energy-saving projects (project pipeline) as considered within the SEAI gap-to-target (GTT) model.
Carbon Budget	A carbon budget represents the total amount of emissions, measured in tonnes of CO_2 equivalent, which may be emitted by a country or a region during a specific period.
Carbon Emissions	Carbon dioxide (CO_2) emissions are emissions resulting from the burning of fossil fuels. CO_2 is a compound of carbon and oxygen formed when carbon is burned and is one of the main greenhouse gases.
Climate Action Plan 2025 (CAP25)	CAP25 provides a detailed plan to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting Ireland on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and set out in the Climate Action Low Carbon Development (Amendment) Act 2021. This Plan is updated annually.
Climate Change	The United Nations Framework on Climate Change (UNFCCC, 1992) defines climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods.
Climate Crisis	Problems that are being caused, or likely to be caused by changes in the world's weather, in particular the world getting warmer as a result of human activity increasing the level of carbon dioxide in the atmosphere.
Climate Mitigation	The Intergovernmental Panel on Climate Change (IPCC, 2018) defines mitigation of climate change as: 'a human intervention to reduce emissions or enhance the sinks of greenhouse gases'. Mitigation measures include technologies, processes or practices that contribute to mitigation.
Conversion Factor	The number or formula needed to convert a measurement in one set of units to the same measurement in another set of units.
Decarbonisation	Decarbonisation is the removal or reduction of carbon dioxide inputs from human activity into the atmosphere which is important for limiting global warming. The main levers for decarbonisation are the development of renewable energies, switching fuels and the improvement of energy efficiency.
Direct Emissions	Greenhouse gas emissions from use of fossil fuels, including in buildings, vehicles, and equipment.

Name	Definition
Energy Efficiency	Energy efficiency is a reduction in the energy used to achieve the same result. Retrofitting options can be used to reduce energy usage. These may include switching to LED lighting and energy efficient appliances or upgrading insulation. Energy-efficiency has a variety of benefits including reducing GHG emissions, reducing demand for energy imports, and lowering energy costs.
Green Public Procurement (or Sustainable Procurement)	Green Public Procurement (GPP) (or Sustainable Procurement) is a process where public authorities seek to source goods, services or works with a reduced environmental impact.
Greenhouse Gas Emissions (GHG)	Gases that trap heat in the atmosphere are called greenhouse gases. Greenhouse gas emissions come from many different sources. The two most important from the point of view of human contribution to climate change are carbon dioxide (CO_2) and methane (CH_4). Carbon dioxide mainly comes from the burning of fossil fuels for energy. Other sources of greenhouse gas emissions include industrial processes such as cement manufacturing, fertiliser spreading in agriculture and refrigeration gases.
Greenway	A cycleway that caters for people walking, wheeling, and cycling in a mainly recreational environment.
Hydrogenated Vegetable Oil (HVO)	HVO is a low carbon fuel that is obtained by processing lipids such as vegetable oil, tallow, or used cooking oil, all made from paraffinic hydrocarbon.
Indirect Emissions	Indirect emissions arise because of an organisation's activity but occur at sources that are typically not owned or controlled by the organisation. Emissions from electricity use in buildings, vehicles, equipment, lighting etc. are indirect emissions.
ISO 14001	ISO 14001 is the international standard for Environmental Management Systems (EMS).
ISO 50001	ISO 50001 is the international standard for Energy Management Systems (EnMS).
Net-Zero	Net-zero emissions refer to achieving a balance between greenhouse gas emissions generated and greenhouse gas removals.
Operations	TII operations are all non-material-based activities required to uphold or provide services on the national roads and Luas networks.
Public Sector Climate Action Mandate	The Public Sector Climate Action Mandate supports public sector bodies leading by example on climate action. The Mandate requires public sector bodies to demonstrate leadership in climate action by taking, and reporting on, the actions set out in the Mandate. The Mandate is published annually as part of the CAP.
Road User	The term "road user" refers to a motorist, passenger, public transport provider or user, freight vehicle driver, motorcyclist, cyclist, or pedestrian.
Sectoral Emissions Ceilings	Sectoral Emissions Ceilings refer to the total amount of permitted greenhouse gas emissions that each sector of the economy can produce during a specific period.
Supply-Side Decarbonisation	Supply-side emissions reductions are attributed to the decarbonisation of Ireland's electricity grid and additional biofuel blending in road transport fuels.

Name	Definition
Sustainable Energy Authority of Ireland (SEAI)	The SEAI is Ireland's national sustainable energy authority and works with householders, businesses, communities, and government to create a cleaner energy future.
Total Final Consumption (TFC) and Total Primary Energy Requirement (TPER)	Energy consumption can be expressed as total final consumption (TFC) or total primary energy requirement (TPER). Primary energy also accounts for the energy that is consumed and/or lost in transformation, transmission, and distribution processes. It is calculated by applying conversion factors, which vary by fuel type, to final consumption values. Conversion factors for thermal and transport fuels typically remain unchanged from year to year. The current factors are available on the SEAI website. The GTT model considers carbon emissions in terms of TFC, while the energy efficiency model considers carbon emissions in terms of TPER.
Zero Emissions Vehicles (ZEVs)	Zero emissions vehicles (ZEVs) are vehicles that do not use petroleum fuels and therefore do not emit greenhouse gas emissions from the tailpipe. Battery electric vehicles and hydrogen fuel cell electric vehicles are examples of these technologies.

1 Introduction

Securing Ireland's Future the 2025 Programme for Government commits to lowering Ireland's greenhouse gas (GHG) emissions by increasing energy efficiency and reducing fossil fuel dependence across the public sector. This Climate Action Roadmap 2025 (Roadmap) sets out Transport Infrastructure Ireland's (TII's) plan to reduce GHG emissions and contribute to the delivery of climate targets. This Roadmap documents progress and builds on last year's Roadmap published in June 2024. It has been prepared in line with the Sustainable Energy Authority of Ireland (SEAI) and Environmental Protection Agency (EPA) guidance and Chapter 9 of the Government's Climate Action Plan 2025 (CAP25) which stipulates that the public sector will lead by example in delivering on Ireland's decarbonisation commitments. Meeting the targets depends on TII receiving the funding and resources required to deliver the interventions needed, and overcoming risks and challenges that may be outside of TII's control. TII's response to the SEAI and EPA Guidance on the requirements for a Climate Action Roadmap has been set out in **Appendix A - Mandate Response**. This Roadmap also includes references to TII's suite of climate-related projects and programmes that will contribute to the reduction of emissions within TII's control and/or influence across the transport and industry sectors. Additionally, it references TII's broad range of wider sustainability initiatives. This is TII's Roadmap to 2030, but TII recognises that these are interim targets towards achieving the 2050 net-zero targets.

1.1 The purpose of the Climate Action Roadmap

According to the CAP25 Climate Action Mandate for public bodies, TII must update its Climate Action Roadmap (Roadmap) within 6 months of the publication of the Climate Action Plan to report on progress towards achieving the decarbonisation and energy efficiency targets. Overall, the public sector must achieve a 51% reduction in GHG emissions, a 50% improvement in energy efficiency by 2030 and reduce its total final energy consumption by at least 1.9% each year compared with the 2021 baseline. Each public sector organisation has been set an individual target by the SEAI for overall GHG emissions reduction from energy. TII's target is to reduce GHG emissions from energy by 73% by 2030 compared to a 2016-2018 baseline (average).

The Roadmap is a live document and will be updated annually.

1.2 Guide to this Roadmap

This Roadmap contains five main chapters:

Chapter 1 – Introduction: Presents the information needed to navigate this Roadmap; including an overview of the policy context, introduction to energy efficiency and measuring GHG emissions from energy, and the importance of addressing overall emissions and wider sustainability.

Chapter 2 – Decarbonisation and energy efficiency: Sets out the 2030 decarbonisation, energy reduction and energy efficiency targets that apply to TII, summarises TII's forecast GHG emissions from energy, and the organisation's expected energy efficiency, by 2030. This chapter also includes details of the planned projects that will contribute to TII's decarbonisation, energy efficiency and energy reduction targets.

Chapter 3 – TII's influence on emissions: Provides an overview of TII's scope 3 emissions through the lens of the Transport and Industry sectors and highlights relevant case studies.

Chapter 4 – TII's influence on sustainability: Presents a concise overview of TII's influence on wider sustainability, supported by relevant case studies.

Chapter 5 – Conclusion: Summarises TII's approach to climate action.

1.3 Policy Context

This introduction to the Roadmap's policy context is accompanied by a detailed policy review in **Appendix B – Policy Context**.

1.3.1 European Policy

The European Green Deal outlines the EU's strategic response to the climate crisis, committing to climate neutrality by 2050. As part of this commitment, the EU has set a target to reduce greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels—an ambition aligned with the Paris Agreement's goal of limiting global warming to 1.5°C. To achieve these targets, the EU is implementing the 'Fit for 55' package, a wide-ranging legislative initiative that revises climate, energy, and transport laws. This package includes reforms to emissions trading, energy efficiency, renewable energy, and vehicle standards, ensuring that EU policy is aligned with its 2030 and 2050 climate goals.

1.3.2 Irish Policy

Securing Ireland's Future, the Programme for Government 2025, aims to achieve a 51% reduction in emissions from 2018 to 2030 and net-zero emissions no later than 2050. Ireland's Climate Action and Low Carbon Development (Amendment) Act 2021 enacts the national climate objectives into law. The Act commits Ireland to move to a climate resilient and climate neutral economy by 2050 in alignment with the European Green Deal. Ireland's CAP25 provides the implementation plan to deliver on these commitments. CAP25 recognises that there is significant potential to lower Ireland's GHG emissions by increasing energy efficiency and reducing fossil fuel dependence across the public sector. In order to provide consistency in climate action across the public service, the Public Sector Climate Action Strategy (2023-2025) was developed.

1.3.3 TII Policy

TII's Statement of Strategy 2021-2025 commits the organisation to providing sustainable transport infrastructure and services, delivering a better quality of life, supporting economic growth, and respecting the environment. The Statement of Strategy includes eight goals, and several supporting strategic objectives that address the need to reduce carbon, including:

- Existing Infrastructure:
  - Introduce measures to support the reduction of carbon and other emissions in TII operations.
- New Infrastructure:
  - Deliver infrastructure that supports low-carbon transport systems and emission reductions.
  - Promote further use of low-carbon products in construction projects.
- Services:
  - Support and develop carbon-reduction measures in the transport sector.
  - Achieve a 73% reduction of our scope 1 and scope 2 emissions and the elements of scope 3 we can influence by 2030 in the context of the transport and industry sector's need to reduce emissions by 50% and 35% respectively by 2030, and as part of the large-scale transition of the transport and energy sectors to achieve global climate goals.
- TII's Sustainability Implementation Plan (SIP) sets the direction for TII's sustainability agenda and guides action across all areas of sustainability under six key sustainability principles. This includes Principle 5 'Transition to Net Zero'. The SIP details an outcomes framework to enable prioritisation of sustainability actions across the organisation.

National Roads 2040 (NR2040) published in April 2023 is TII's long-term strategy for planning, operating, and maintaining the national roads network (NRN), ensuring delivery of policy objectives with decarbonisation as a key priority. It supports the delivery of Project Ireland 2040 (National Planning Framework) objectives and aligns with the Department of Transport's (DoT) National Investment Framework for Transport in Ireland (NIFTI). NR2040 will be delivered by TII in collaboration with other government agencies and transport stakeholders. NR2040 outlines commitments to address challenges such as population growth, decarbonisation, biodiversity, climate adaptation, safety, and congestion. NR2040 also aligns with CAP25 and the National Sustainable Mobility Policy.

1.3.4 Public Sector Climate Action Mandate

The CAP25 Public Sector Climate Action Mandate (the Mandate) focuses predominantly on reducing scope 1 and 2 emissions and must be adopted by public sector bodies, including TII. The Mandate sets out requirements for action and reporting across the following areas:

- GHG emissions targets
- People
- Ways of working
- Buildings and vehicles

The SEAI issued updated guidance to the public sector in June 2025, setting out the minimum evidence requirements to demonstrate adherence to the Mandate. The guidance states that each organisation's Roadmap must be approved by the most senior management level within the organisation.

TII is actively implementing the actions set out in the Mandate (as a minimum). The status of these measures is detailed in **Appendix A - Mandate Response**.

1.3.5 Consistency with the Climate Action and Low Carbon (Amendment) Act 2021

The 2025 Public Sector Climate Action Roadmap Guidance sets out that each public sector body should ensure consistency with Section 15(1) of the Climate Action and Low Carbon (Amendment) Act 2021 and adhere to Action CP/23/12 as set out in Climate Action Plan 2023. "Relevant bodies shall, where practicable, ensure private sector investment is consistent with the Government's Sectoral Emission Ceilings". The sections within this chapter set out how TII is supporting the Industry and Transport sectors to reduce emissions.

TII is working on ensuring alignment with this legislation. Its activities should be aligned to deliver upon a low carbon future while providing sustainable transport infrastructure and services, delivering a better quality of life, supporting economic growth and respecting the environment. TII's Sustainability Implementation Plan (SIP) sets out its strategic direction in relation to sustainability and ensures that TII delivers upon its mission in a sustainable manner. Through delivering the SIP TII is embedding sustainability throughout all activities and continues to monitor climate guidance and legislation to ensure support of the national climate objective. One element of this is the assessment of the business cases for new projects under NIFTI and TAF. This meets the requirement that all public bodies must perform their functions in a manner consistent with Ireland's climate ambition. Additionally, the Roadmap sets out a small selection of projects which TII is delivering to support the national climate objective. These range from providing infrastructure to decarbonise elements of the transport sector, such as EV charging infrastructure alongside implementing projects to reduce emissions in the protection and renewal of the National Roads Network (NRN).

1.4 Measuring and Reporting GHG Emissions and Energy Efficiency

1.4.1 Public sector targets

The public sector has a clear mandate to lead on climate action, and the Government has set ambitious targets for public sector organisations:

1. A 51% reduction in the total tonnage of direct energy-related GHG emissions (i.e., thermal and transport), plus projected supply-side reductions in indirect energy-related emissions (i.e., electricity), compared to a 2016-2018 (average) baseline.
2. A 50% improvement in energy efficiency by 2030, compared to a 2009 baseline.
3. An energy consumption reduction of at least 1.9% each year compared to a 2021 baseline.
4. Net-zero emissions no later than 2050.

Each public sector organisation will contribute to achieving the overall sectoral targets outlined above. **Figure 3** below shows key dates and targets from 2009 to 2050.

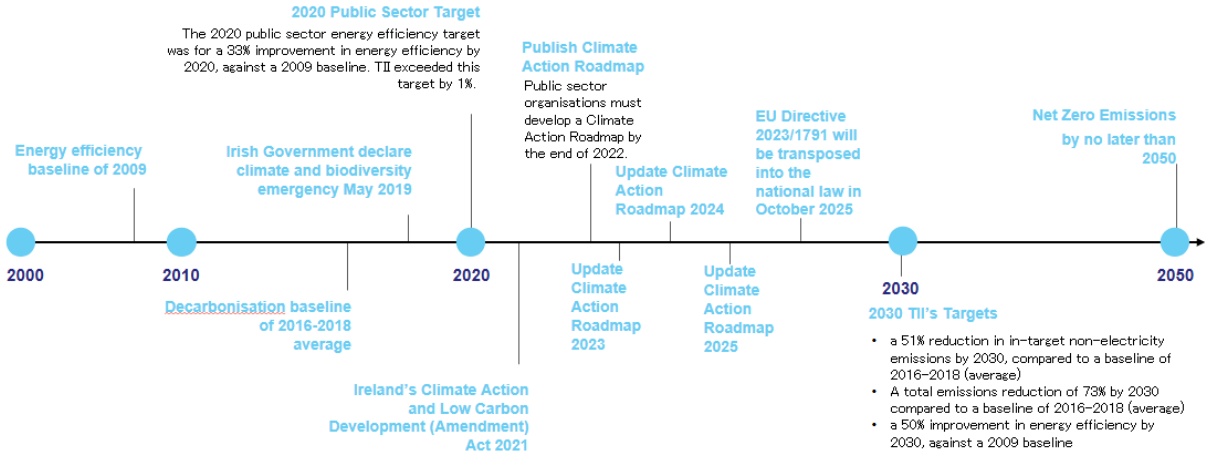


Figure 3 Timeline of public sector targets

1.4.2 Energy performance reporting

Public sector organisations in Ireland are required to report energy performance annually using the SEAI Public Sector 'Monitoring and Reporting' (M&R) system. The M&R system enables monitoring of progress, identification of improvement opportunities, and validation of emissions savings.

TII data reported through the M&R system annually includes energy consumption, activities undertaken and energy saving projects. The M&R data is used in this Roadmap to model progress to meeting TII's targets.

1.4.3 GHG emissions categorisation

The GHG Protocol is an internationally recognised standard to measure and manage emissions. Within this framework emissions are categorised into three scope definitions as defined in **Table 1**.

Table 1 GHG Protocol Scope Definitions

Scope 1 emissions	Direct GHG emissions. These occur from sources that are owned or controlled by the organisation, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc. emissions from chemical production in owned or controlled process equipment.
Scope 2 emissions	Indirect GHG emissions. These are emissions generated from the purchase of electricity, steam, heating, and cooling consumed by the organisation. These emissions are "indirect," meaning the release of GHGs is physically occurring off-site on behalf of the organisation in question.
Scope 3 emissions	Indirect GHG emissions. These emissions are a consequence of the activities of the organisation but occur from sources not owned or controlled by the organisation. Some examples of scope 3 activities are the extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services.

Figure 4 below illustrates the types of activities which generate GHG emissions for TII under each scope. Scope 1 emissions (direct emissions) occur when fossil fuels (e.g., diesel, coal, oil, or gas) are directly used by TII (including TII's outsourced service providers), such as diesel for TII's fleet and gas used on site to heat TII's buildings. Scope 2 emissions (indirect emissions) are generated off site, such as the electricity supplied by the grid to TII and used to power the Luas and light the NRN, created from a mixture of fuel (e.g. wind, coal, and gas). Scope 1 and scope 2 emissions are part of the mandatory reporting within the M&R system. **Figure 4** shows TII's emissions by scope and illustrates that scope 1 and 2 account for approximately 1% of emissions, while scope 3 accounts for the remaining 99%. **Figure 5** and **Figure 6** provide further overview of the historical data by scope.

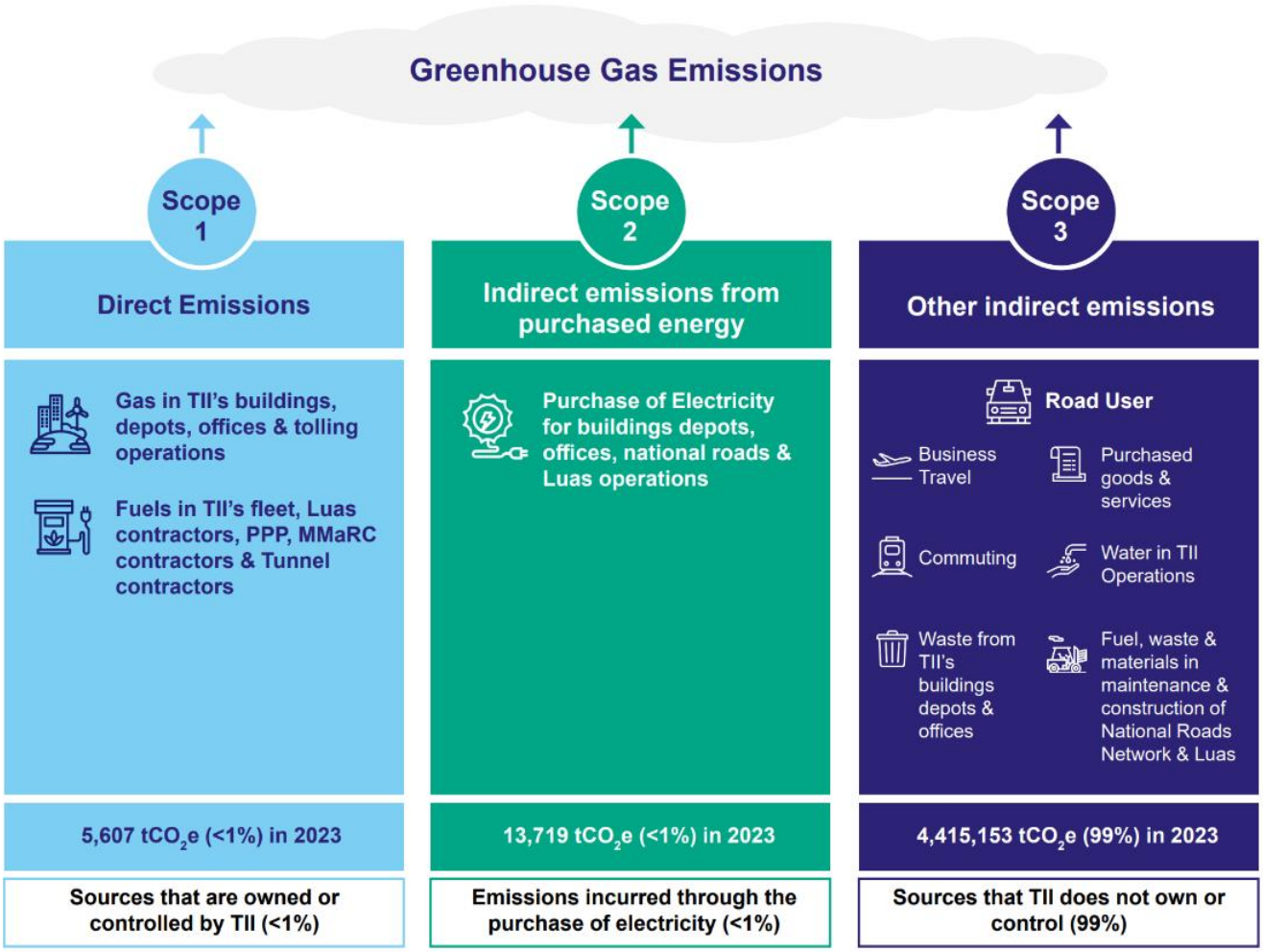


Figure 4 Activities within each GHG Protocol Scope[4]

[4] At the time of developing the 2025 Roadmap, final figures for TII's scope 3 emissions for 2024 were not available.

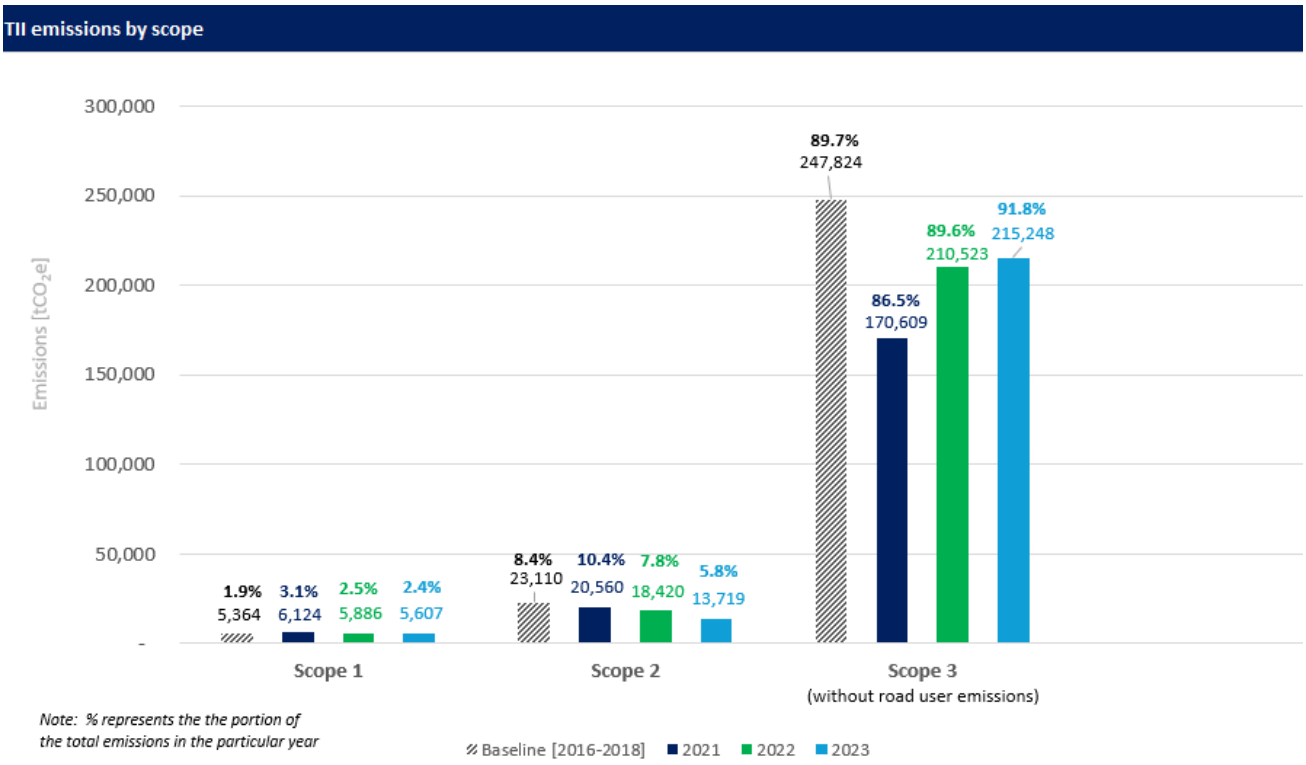


Figure 5 TII's emissions by scope[5]

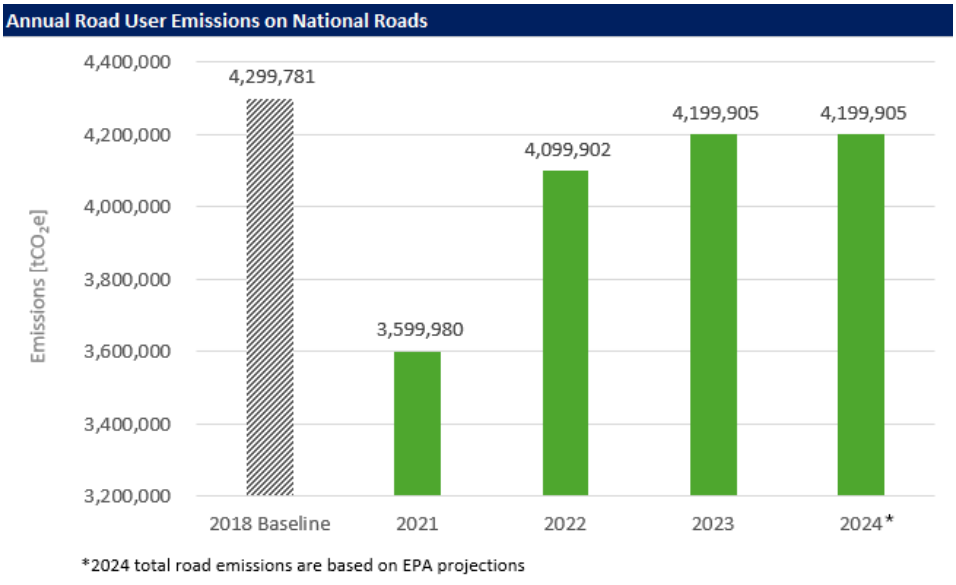


Figure 6 Annual Road Travel Emissions on National Roads[6]

[5] Scope 3 2023 emissions include additional categories not available in previous years. Better quality data for the years 2021-2022 resulted in an update to emissions previously reported.
[6] Link to the source: https://www.tii.ie/media/sxrd4efi/tii-national-road-greenway-network-indicators-2024.pdf

1.5 TII's influence

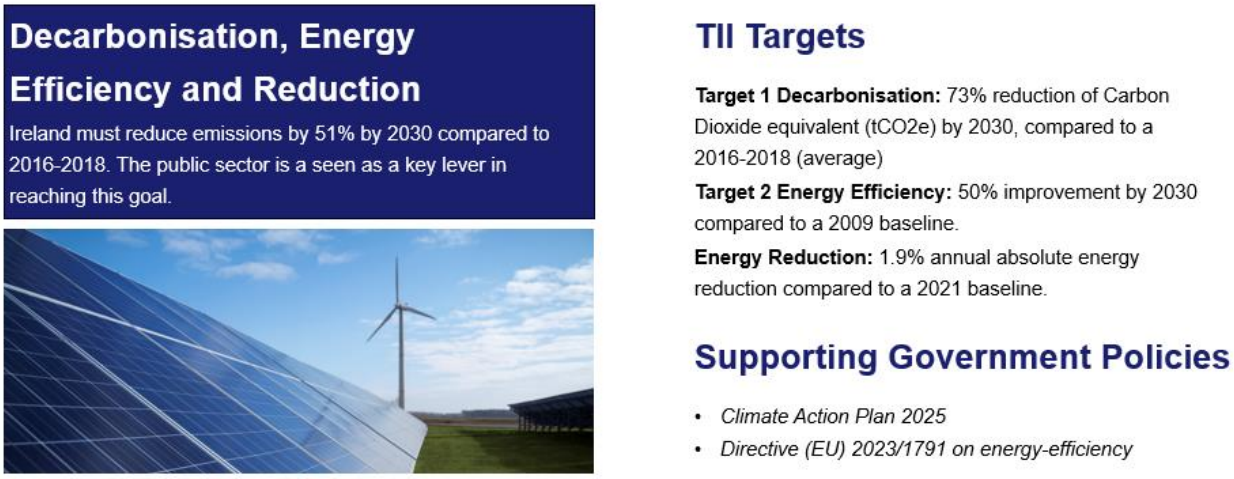
The Transport and Industry sectors are both major sources of Ireland's GHG emissions. In 2023, transport emissions, representing 21.5% of economy-wide emissions, increased by 0.3% compared to 2022 notwithstanding economic growth of 5% and a 3% increase to the national vehicle fleet, reflecting the increased penetration of more sustainable modes of transport and low-emissions vehicles.

In the same year, the Industry sector saw a decrease in emissions of 6.1% from 2022. TII supports both sectors in reducing emissions to meet 2030 targets. TII is working with partners, stakeholders, and suppliers to reduce the overall emissions associated with the operation, protection and renewal, construction of transport infrastructure, and use of TII's transport networks.

TII's approach is outlined in Chapter 3 and includes:

- TII's development of policies, strategies, industry standards and guidelines,
- Working with the supply chain to use more sustainable products and processes for TII projects, and
- Encouraging sustainable travel choices through the development of demand management measures and the provision of public transport and active travel infrastructure and services.

2 Decarbonisation and Energy Efficiency



This chapter sets out the decarbonisation and energy efficiency 2030 targets that apply to TII and summarises TII's forecast GHG emissions from energy consumption, and the organisation's expected energy efficiency by 2030. It includes a summary of the planned projects that will contribute to TII's decarbonisation, energy reduction and energy efficiency. A technical note with supporting information is provided in **Appendix C – Technical Note**.

2.1 Gap-to-target model and key terms

The SEAI's gap-to-target model was used to forecast TII's GHG emissions and energy efficiency. The methodologies and calculations embedded in the gap-to-target model are based on the SEAI Public Sector Monitoring & Reporting (M&R) System. The gap-to-target model consists of a combined decarbonisation component and an energy efficiency component. The detail and methodology behind each component are outlined in the technical note (see **Appendix C – Technical Note**), with the modelling approach following the SEAI methodology and aligning with CAP25. The energy modelled includes electricity, gas, liquid fuels (i.e. petrol, diesel and biofuels) used in the operation of national roads and Light Rail networks. Conversion factors are as per the SEAI gap-to-target model.

The results presented in this chapter represent modelling outputs, dated July 2025, based on the most recent gap-to-target SEAI tool (version 4.05) released in May 2025. As further decarbonisation and energy efficiency projects are developed and progressed, the modelling will be updated to reflect their impact, and results will be reported in future Roadmaps. Modelling is used to project future scenarios based on currently available information and is therefore subject to change. Throughout this Roadmap, 2024 in-target emissions (M&R data) are projected based on the gap-to-target model version 4.05, which includes M&R emissions up to 2024. At the time of writing the total emission inventory (scope 1, 2, and 3) for 2024 has not been completed due to the absence of detailed 2024 data from M&R. The limitations of the modelling exercise are detailed in the technical note (see **Appendix C – Technical Note**).

Key terms referred to throughout this chapter are set out in **Table 2** and are defined in the glossary. The supporting policy context for this chapter can be found in **Appendix B – Policy Context**.

Table 2 Decarbonisation and Energy Efficiency Key Terms

Key terms found in the glossary
Conversion factors
Decarbonisation
Direct emissions
Energy efficiency
Supply-side decarbonisation
Total Final Consumption (TFC) and Total Primary Energy Requirement (TPER)

2.2 Approach to decarbonisation and energy efficiency modelling

The modelling aims to develop a pathway for TII to achieve the targets set out in Chapter 9 of CAP25, and in this Roadmap. Two scenarios were modelled: a 'Business as Usual' case in which TII does not implement GHG emissions reduction and energy efficiency projects, and all the projected reductions are expected from supply-side decarbonisation only; and a 'With Project Pipeline' case in which TII implements a portfolio of projects between 2025 and 2030.

The modelling of the 'With Project Pipeline' case represents a technical feasibility study in which budget considerations are not the focus. It is proposed that the project pipeline is implemented over the period 2025-2030. However, all solutions proposed are based on what is currently technically feasible, or options that can reasonably be expected to become available to TII between now and 2030. A pathway to achieving the decarbonisation and energy efficiency targets has been identified, however there are costs, challenges, and risks associated with implementing the project pipeline. For example, the availability of Hydrogenated Vegetable Oil (HVO) at the level required for TII is uncertain at this time.

Challenges such as funding, resources, planning and technical challenges can lead to timelines extending beyond those initially planned which could lead to adjusted implementation dates (but remaining within the pathway to 2030). There may also be a need for additional trial projects or extended trial periods before widespread roll out of a certain project is achievable.

To account for this uncertainty, TII has considered both the 'Business as Usual' and 'With Project Pipeline' scenarios, and modelling results are presented as ranges of emissions reduction and energy efficiency outcomes.

2.3 Decarbonisation and energy efficiency targets

The public sector targets for decarbonisation and energy efficiency alongside associated baselines are set out in **Table 3** below. TII's individual target for decarbonisation is also noted. The upcoming energy reduction target is also noted in grey below.

Table 3 Public Sector Targets

	Target	Sectors	Description	Baseline year	Target Year
Target 1	Decarbonisation target	Thermal Transport Electricity	51% reduction (direct emissions: thermal and transport) *TII 73% reduction (total emissions)*	2016-2018 (average)	2030
Target 2	Energy efficiency target	Thermal Transport Electricity	50% improvement	2009	2030
	Energy reduction	Thermal Transport Electricity	1.9% annual reduction	2021	2030

2.4 TII's achievements in 2024

The projects below are a sample of energy related projects which TII delivered in 2024:

- **Alternative Lighting Trial for Tram Vehicles** – TII Luas Operations in collaboration with TII's Luas Network Operator initiated an alternative lighting trial for tram vehicles, fitting a trial tram with LED lamps as a replacement for fluorescent lamps. Following progress in trials of lighting products to date, the next step is proof-of-concept trials on selected products suitable for tram vehicles in line with the manufacturers design specifications whilst also complying with all standards. TII is developing a detailed project plan and roadmap for implementation between 2025 - 2026.
- **Tram saloon HVAC Trials** – TII Luas Operations in collaboration with TII's Luas Network operator initiated a heating and ventilation unit trial to improve the energy efficiency of the tram passenger saloon heating and ventilation modules, a system that regulates the quantity of air delivered depending on the number of passengers onboard, thus conserving energy. The heating and ventilation proportion of electrical energy consumed on a tram can equate to 35% and higher of total consumption. A proof-of-concept trial involving five tram vehicles commenced in March 2024 and ran for three seasons (Autumn, Winter, and Spring) finishing in Q2 2025. Results of the trial are now being analysed.
- **Decarbonisation activities** - TII is continuing to deliver decarbonisation projects such as upgrading lighting to LEDs and installing solar panels to reduce emissions.
- **Fossil Fuel Phase Out** - TII updated procurement and design procedures to comply with the requirement to eliminate fossil fuel heating after 2023. In addition, TII is investigating alternative energy supply options. This requirement will be applied to all new builds or renovations under TII's remit moving forward.

Further information is available in TII's '2024 Annual Report'.

2.5 Target 1: Decarbonisation

2.5.1 TII's baseline and current GHG emissions from energy

TII's baseline (2016-2018 [annual average]) GHG emissions from energy is 28,533 tonnes of carbon dioxide (tCO_2).

Based on projections from v4.05 of the gap-to-target model (for more details see 2.1 of **Appendix C – Technical Note**), in 2024, TII's GHG emissions from energy were 20,184 tCO_2, a reduction of 29% from the baseline. The change in tCO_2 from the baseline to 2024 was due to:

- **Electricity emissions:** The reduction from the baseline to 2024 can be mainly attributed to supply-side improvements from electricity grid decarbonisation and the already implemented lighting projects on the NRN in 2023. In 2024, emissions from TII's electricity consumption were 37% lower than the baseline.
- **Thermal emissions:** Between the baseline and 2024 there was an increase in thermal emissions of 8%, due to an increase in LPG, oil and gas consumption in TII's depots and buildings.
- **Transport related emissions:** Between the baseline and 2024 there was a 4% increase in transport-related emissions, due to increased diesel and petrol consumption.

2.5.2 TII's decarbonisation target for 2030

TII's decarbonisation target is set by SEAI. SEAI calculates the 2030 decarbonisation target using the data reported to the M&R system and SEAI emissions projections for electricity.

TII must reduce total GHG emissions from energy by 73% overall (total emissions) and by 51% for non-electricity emissions (transport and thermal) by 2030 compared to the 2016-2018 (average) baseline.

The total emissions target is calculated using the 51% required reduction in non-electricity emissions and SEAI's projection for supply-side emissions reduction for the electricity grid (79%), compared to the baseline. These steps have been set out below in **Table 4**. This results in a total emissions reduction target of 73% by 2030 for TII, compared to the 2016-2018 (average) baseline. As SEAI updates projections for the electricity grid, the total emissions target is subject to change in line with expected electricity grid decarbonisation.

Table 4 Decarbonisation Target Calculation

Decarbonisation target calculation
+ non-electricity target for 2030*
+ electricity emissions at the baseline
- minus the projected supply-side emissions reductions from electricity grid decarbonisation by 2030
= 2030 total emissions target
**Non-electricity target = 51% reduction in energy-related thermal and transport emissions by 2030*

TII's target reduction of 73% in total emissions requires an overall reduction in GHG emissions from energy of 20,927 tCO_2 compared to the baseline, as shown below in **Table 5**.

Table 5 2030 Target GHG Energy Emissions Versus Baseline

[tCO_2] Total Final Consumption (TFC)	2016-2018 (average) Baseline	Reduction target %	2030 Target	Baseline minus 2030 target
Electricity				
Electricity	23,117	79%*** (based on anticipated grid decarbonisation)	4,952	18,165
Non-electricity				
Thermal	1,808	51%	886	922
Transport	3,608	51%	1,768	1,840
Non-electricity Total*	**5,416**	**51%**	**2,654**	**2,762**
Total GHG Emissions				
Total GHG emissions**	28,533	73%****	7,606	20,927

*Non-electricity total = thermal + transport

**Total GHG emissions = electricity + non-electricity

***CAP25 only specifies targets for non-electricity emissions and for total emissions. Thus, 2030 target for electricity, is calculated based on projected emissions in 2030, and feeds into the total emissions target of 73%.

****This target will fluctuate in line with changes to the emissions forecasts published by the SEAI

2.5.3 TII's planned projects expected to reduce GHG emissions from energy

TII has planned several projects that will contribute to a reduction in the GHG emissions associated with energy use. **Table 6** below sets out the projects where energy savings are quantified, along with their energy offset shown in kilowatt-hours per annum (kWh Total Final Consumption (TFC)/annum), and the expected year of implementation. The projects are delivered on a phased basis across a range of locations, contracts, and fleets.

As energy efficiency is a key lever for decarbonisation, the model also includes emissions reductions from energy efficiency projects.

Table 6 Planned TII Projects

Planned projects	Energy savings** (kWh TFC/annum)	Expected implementation years
Road network lighting projects in various phases***	2.9m kWh	2026 - 2028
Installation of solar PV on all applicable road network management premises, in various phases***	1.2m kWh	2026 – 2029

Planned projects	Energy savings** (kWh TFC/annum)	Expected implementation years
Luas stop lighting projects and rolling stock lighting trials	0.12m kWh	2024 – 2026
Installation of rooftop solar PV arrays onsite at all Luas Depots	0.9m kWh	2025 – 2028
Transition of road network light and medium contractor diesel fleets to electric vehicles, in various phases.	3.7m kWh	2025 – 2028
Transition of road network heavy vehicle contractor fleets to alternative fuel (for example HVO), in various phases*	N/A (The transition will reduce carbon emissions instead of fuel consumption)	2025 – 2029
Management premises transition from fossil fuel boilers to electric heat pumps	0.15m kWh	2029

** The gap-to-target model assumes that TII's Total Final Consumption will be constant between the baseline and 2030 e.g. no expansion or growth of TII services or operations is expected within the period to 2030.*

These projects only contribute to the decarbonisation target as they will have no impact on energy efficiency.

*** The total energy savings estimated take into consideration the increases in energy consumption as a result of implementing said projects.*

**** These initiatives include projects implemented in 2023, which are already completed, where savings have been captured in the Roadmap.*

By 2030, TII's planned projects are modelled to result in an overall emissions reduction of 2,332 tCO2. Each of these 25 projects are at different stages of the project life cycle. The projects also include later phases of road network lighting, solar PV, and fleet fuel transition. Details on each of these projects are provided in **Appendix D – List of Projects**.

2.5.4 Projected 2030 GHG emissions from energy – Business as Usual (BAU)

In the BAU scenario, a gap-to-target would remain in 2030. As outlined below in **Table 7** and **Figure 7**, TII's non-electricity emissions (thermal and transport) are expected to be 0.4% higher in the BAU 2030 scenario than the baseline. However, TII can expect a reduction in total emissions (electricity and non-electricity) of 63% by 2030 in the BAU scenario, resulting in a gap-to-target of 2,908 tCO_2.

2.5.5 Projected 2030 GHG emissions from energy – With Project Pipeline

The 'With Project Pipeline' scenario models the emissions savings that could be achieved if TII's planned project pipeline was implemented as outlined above in **Table 6** and below in **Figure 7**. In this scenario, TII's total GHG emissions from energy are modelled to be 7,499 tCO_2 in 2030, considering both the supply-side decarbonisation and the planned projects, which will contribute to a reduction in GHG emissions. This is a decrease of 74% from the baseline, as shown below in **Table 7**. In the 'With Project Pipeline' scenario TII meets its target. TII is projected to meet its overall emissions reduction target of 73% and its fossil fuel reduction target of 51%, with a total expected reduction of 2,332 tCO_2 resulting from implemented projects.

The scenario analysis highlights that timely project implementation is essential to achieving the 2030 targets. However, there are costs, challenges, and risks associated with implementing the project pipeline. Without the timely allocation of funding and resources, this pathway to meeting the decarbonisation target as described in the 'With Project Pipeline' scenario may not be achievable for TII.

Table 7 GHG Emissions from Energy – 2030 Projections

[tCO_2] TFC	2016-2018 (average) Baseline	2030 Target emissions	'Business as Usual' Scenario			'With Project Pipeline' Scenario		
			2030 emissions	% Change from baseline to 2030	Gap-to-target in 2030	2030 emissions	% Change from baseline to 2030	Gap-to-target in 2030
Electricity								
Electricity	23,117	4,952	5,078	-78%	-	4,845	-79%	-
Non-electricity								
Thermal	1,808	886	2,057	+14%	-	2,002	+11%	-
Transport	3,608	1,768	3,379	-6%	-	652	-82%	-
Non-electricity Total*	**5,416**	**2,654**	**5,436**	**+0.4%**	**2,782**	**2,654**	**-51%**	**NIL**
Total GHG Emissions								
Total GHG emissions**	**28,533**	**7,606**	**10,514**	**-63%**	**2,908**	**7,499**	**-74%**	**NIL**

**Non-electricity total = thermal + transport*

***Total GHG emissions = electricity + non-electricity*

Figure 7 shows TII's projected emission pathways to 2030, with modelled emissions in the 'With Project Pipeline' scenario reaching the 2030 target.

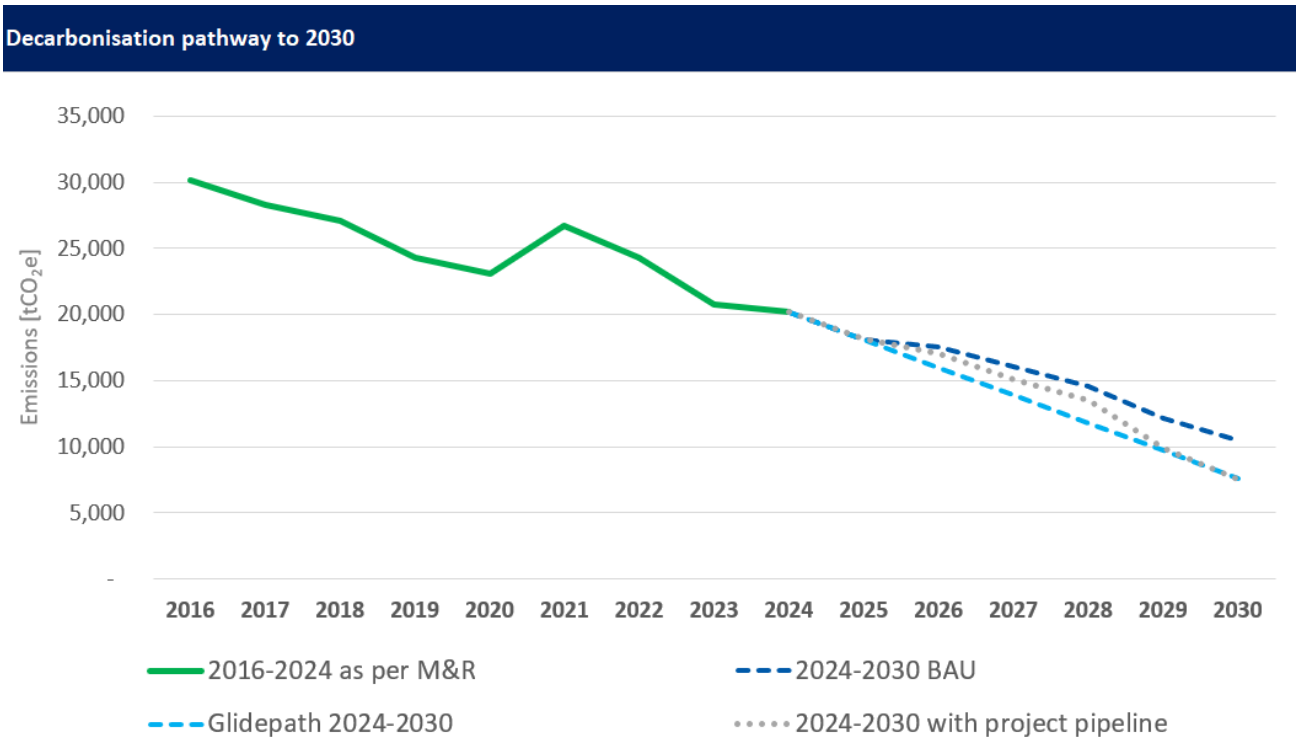


Figure 7 Decarbonisation pathway to 2030 (Emissions 2016-2030)

2.5.6 Impact of decarbonisation initiatives

Table 8 sets out the relative impact of each decarbonisation initiative towards the total emission reduction expected from 2025 to 2030. This excludes supply-side decarbonisation, as if it were to be added, supply-side decarbonisation would account for the biggest total contribution. As shown in **Table 8** below, the biggest contribution towards total emission reduction is expected from the implementation of low-carbon fuel initiatives for TII's fleet (such as biofuels and electric vehicles), which account for approximately 85% of the total. A sizeable contribution is also expected from lighting retrofits, which contributes 8% of the total.

Table 8 Impact of decarbonisation initiatives towards total emission reductions in 2030 (excluding supply-side decarbonisation)

Decarbonisation Initiative	Total in-target emissions
Retrofits & efficiency	8%
Heat pumps	1%
Electric vehicles	38%
High-blend biofuels	47%
100% RES-E	6%
Total modelled changes	**100%**

The electrification of vehicles will result in a decrease in scope 1 emissions, but an increase in scope 2 emissions from increased electricity use. It is expected that as the grid decarbonises overall emissions will decrease.

2.5.7 Implementation timeline

Figure 8 below outlines the expected implementation timeline for the projects considered in the gap-to-target model. The year represented in the timeline refers to the expected date of completion of the project.

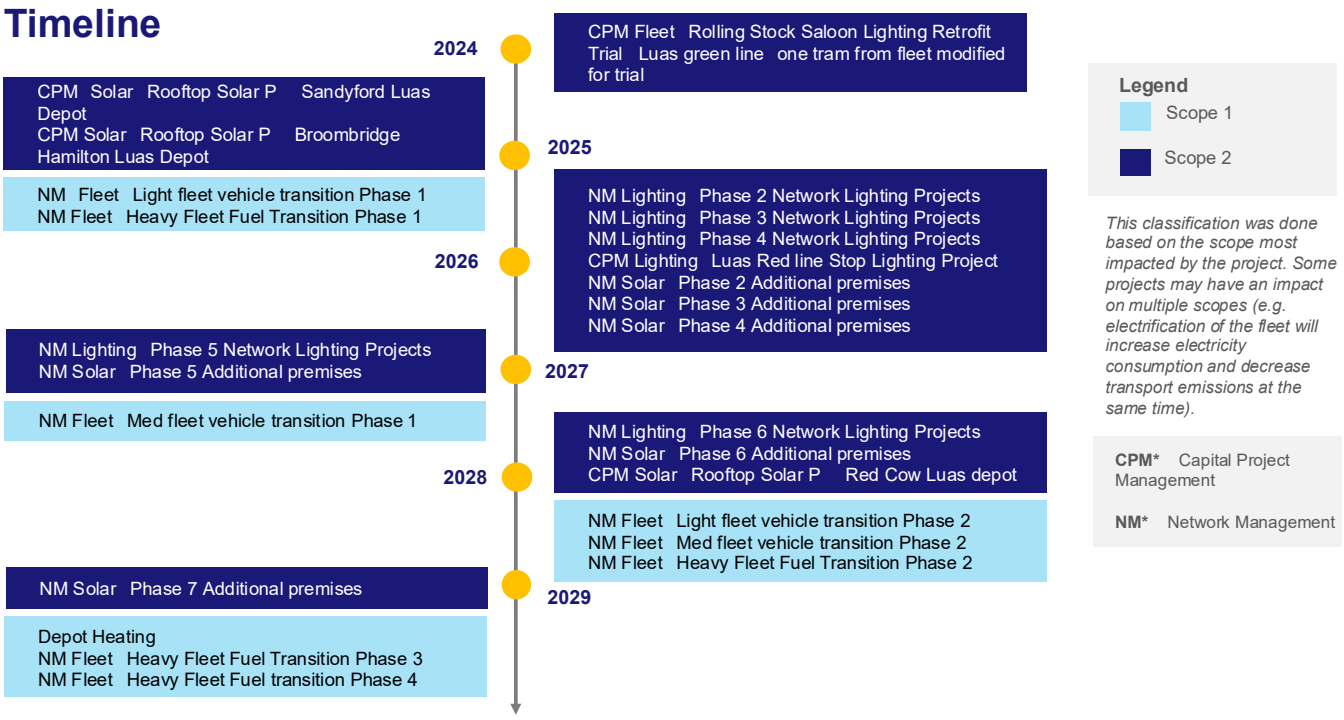


Figure 8 Project implementation timeline

2.6 Target 2: Energy efficiency

2.6.1 TII's energy efficiency

Delivering energy efficiency projects has a variety of benefits including reducing GHG emissions, reducing demand for energy imports, and lowering energy costs.

TII measures its energy efficiency annually using an Energy Performance Index (EnPI). The EnPI is calculated using annual energy consumption and a measure of TII's annual activity, known as an activity metric.

The EnPI for each year is normalised by SEAI to allow comparison of the energy performance in the baseline year (2009) against subsequent years, this is called the normalised Energy Performance Index (nEnPI).

To achieve the public sector 2030 target of an energy efficiency improvement of 50%, TII's nEnPI must be less than 50%.

2.6.2 Energy efficiency improvement and gap-to-target

Based on the SEAI methodology, the BAU forecast of TII's nEnPI is estimated to be 52% in 2030, indicating an energy efficiency improvement of 48% compared to the 2009 baseline (**Table 9**). A gap-to-target of 2% remains in the BAU scenario. Energy reductions related to the decarbonisation projects (described in Section 2.5.3) will improve TII's energy efficiency by a further 5%, meaning TII could reach a 53% improvement in energy efficiency. TII is expected to achieve an overall energy efficiency improvement of 48-53% depending on the delivery of the planned projects.

Table 9 Energy Efficiency Model Results

	Target	2030 BAU Projection	2030 Projection with projects
nEnPI	50%	52%	47%
Energy efficiency improvement versus 2009 baseline	50%	48%	53%
Gap-to-target in 2030	NIL	2%	NIL (Target exceeded by 3%)

The modelling shows a continuing trend of improvement, with substantial improvement in energy efficiency since the baseline year of 2009, as shown in **Figure 9** below. In 2024, the nEnPI was 63%, equating to an energy efficiency improvement of 37% since 2009.

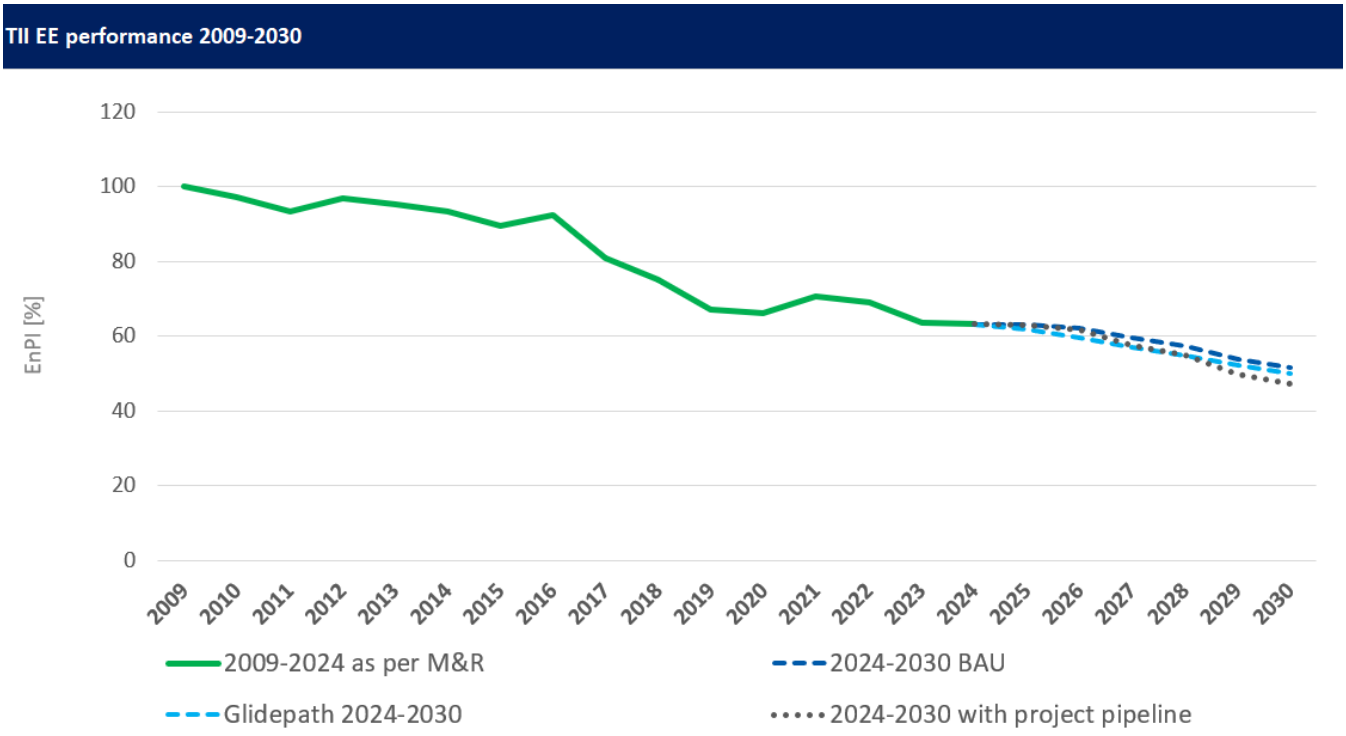


Figure 9 Energy Efficiency Path to 2030 (TII EE performance 2009-2030)

2.7 Energy reduction

The EU Energy Efficiency Directive 2023/1791 requires all public sector bodies to reduce their combined final energy consumption by at least 1.9% each year (compared to 2021 baseline). As part of the European Green Deal and in accordance with the Paris Agreement objectives, the European Commission has proposed a climate target plan to raise the EU's greenhouse gas emissions target to at least 55% below 1990 levels by 2030. This directive raises energy efficiency targets as part of this wider goal.

It has not yet been determined whether public transport will be included within this target in Ireland. However, TII will seek an exemption for its public transport operations. The current gap-to-target model, **Figure 10** below illustrates TII's current trajectory toward achieving the annual 1.9% energy reduction target. In the gap-to-target model, the projected annual energy consumption is calculated by taking 1.9% of the TII's energy consumption in the baseline year and subtracting this absolute reduction from the final energy consumption in each year.

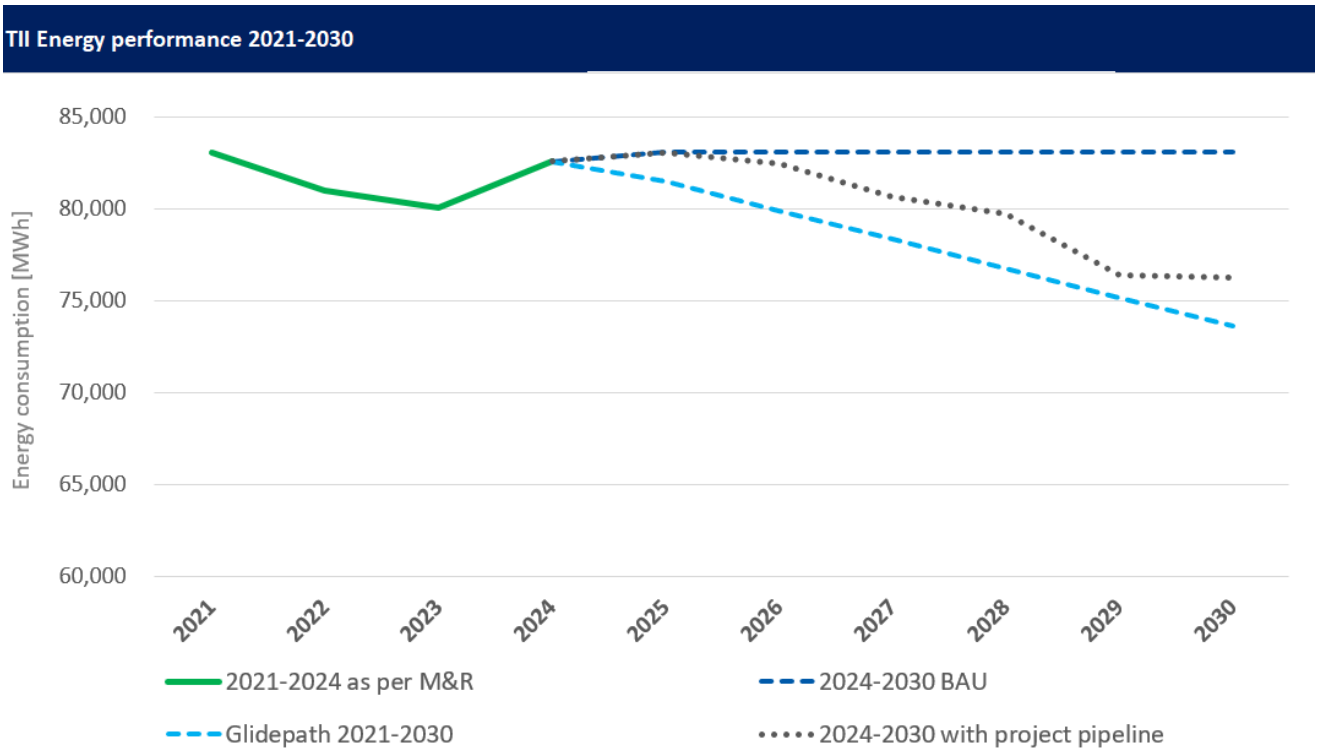


Figure 10 Energy Reduction Path to 2030 (TII Energy performance 2021-2030)[7]

According to the modelled scenario TII would not currently be on track to meet the required reductions. By 2030, the projected gap to target is estimated to be over 3% compared to the 2021 baseline (equivalent to 2,634 kWh). The projects presented in Section 2.5.3 contribute to reducing final energy consumption each year between 2025-2030. However, current forecasts highlight the need for additional efforts to achieve the target.

The gap-to-target model assumes that TII's Total Final Consumption will be constant between the baseline and 2030 e.g. no expansion or growth of TII services or operations is expected within the period to 2030.

[7] Note: BAU TFC is constant by assumption of the model.

2.8 Energy efficiency, reduction and decarbonisation activities

Table 10 below outlines some of the areas of focus for emissions reduction and improving energy efficiency across TII's activities.

Table 10 Energy Efficiency and Decarbonisation Activities

Operation and Protection and Renewal	
Decarbonisation of assets	TII is investigating decarbonisation opportunities across its assets and operations. TII has identified the three Luas depots as being suitable locations for the generation of renewable electricity. TII has commenced phase one of a renewable energy project which involves the installation of rooftop solar photovoltaic (PV) arrays. For Broombridge-Hamilton and Sandyford depots, the works are expected to commence soon. This will contribute to national climate adaptation and mitigation efforts through on-site generation of electricity reducing TII's reliance on the national grid. TII is reviewing wider opportunities for rooftop or ground mounted PV at its motorway protection and renewal depots distributed across the NRN and where feasible will develop on-site generation projects.
Energy efficiency	
Public Sector Energy Efficiency Targets	TII is working to meet the public sector energy efficiency targets for 2030. For example, TII's headquarter now operates with greater efficiency, due to the replacement of core heating and cooling equipment on all Parkgate Street buildings. Similar core equipment upgrades have also been completed at the Luas Sandyford depot buildings following the extension of the depot. Additionally, all lighting is equipped with LED energy efficient technology.
Building Management System	Spatial and water heating is controlled from a central BMS (Building Management System), and an intelligent lighting system operates based on people's presence and activity within the offices. This enables improved energy efficiency and is particularly important given TII's blended working arrangements.

2.8.1 Risks

This section outlines the risks to TII meeting its decarbonisation, energy efficiency and energy reduction targets. **Figure 11** illustrates some of the key risks in achieving the targets. Limitations to the gap-to-target model are set out in **Appendix C – Technical Note**.

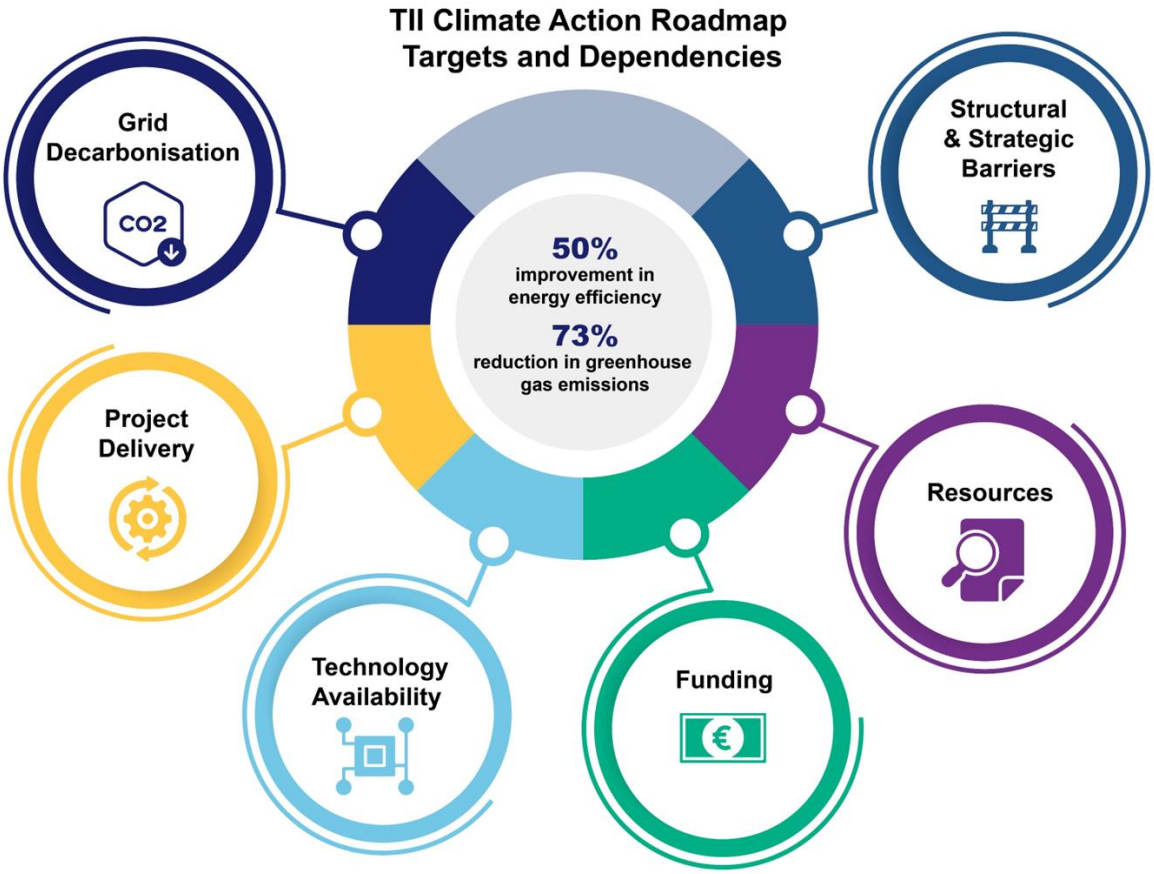


Figure 11 Climate Action Roadmap, Targets and Dependencies

2.8.1.1 Performance of the national grid[8]

GHG emissions savings are highly sensitive to changes in the national electricity grid carbon emissions factors. These carbon emissions factors change from year to year as the efficiency of the electricity grid changes. Ireland's electricity grid has significantly decarbonised, and it is expected that this trend will continue as fossil fuels are phased out of power generation. However, emissions increased in 2021 and 2022 due to a greater reliance on carbon intensive fuel to generate electricity. In contrast, 2023 saw a 21.4% reduction in emissions from electricity generation due to the reduced use of coal, fuel oil and natural gas. Notably, this reduction in emissions occurred despite a 3% increase in the national electricity demand in the same year. This illustrates the sensitivity of the grid to these compounded factors and impacts on energy efficiency modelling.

It is important to specify that changes in grid performance will be reflected in the SEAI gap-to-target model. Specifically, changes to the projected decarbonisation of the grid by 2030 will result in a corresponding change within the gap-to-target model. The risk associated with the performance of the national grid is outside of TII's control.

[8] Source 1: https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/Ireland's-NID-2025.pdf
Source 2: https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/Ireland's-NID-2025.pdf

2.8.1.2 Funding and Resourcing

The projects that have been included in the model vary in terms of project readiness from concept to tender/contracting stage. The projects which are at concept stage have not yet been developed to any significant extent beyond simple scoping and early-stage engagement. Other projects are at a more advanced stage with well-defined designs and technical specifications. For TII to deliver these emissions savings projects a programme of targeted investment will be required to deliver the planned projects and support the associated monitoring and maintenance into the future. Current funding constraints in 2025 have resulted in timelines for some projects being delayed which is cause for concern.

2.8.1.3 Availability of Hydrogenated Vegetable Oil (HVO) and Electric Vehicles

As set out in Section 2.5.6 above, a significant portion of the target (47%) will be achieved via the transition to high-blend biofuels, such as HVO. HVOs result from the process of hydrotreatment of virgin or waste vegetable oils and are one of the potential solutions for reducing carbon emissions in heavy-duty vehicle transportation in the near to medium future. Nonetheless, their production and market uptake face significant obstacles throughout their supply chain. HVO production (particularly from refined vegetable oils like rapeseed and palm oil) consumes a significant amount of energy.

Within the model, the transition to EVs accounts for over a third of the overall target. While this transition should be relatively straightforward for light vehicle classes such as passenger cars, the transition will be more complex for heavy duty vehicles (HDV) such as winter maintenance trucks.

2.8.1.4 Structural & Strategic Barriers

Despite notable progress in decarbonisation and improving energy efficiency, achieving reduction targets across Ireland's public sector presents several structural and strategic challenges. One key consideration is that ongoing public sector expansion driven by population growth and increasing service demands may offset energy savings achieved and reduce the impact of decarbonisation initiatives. When the proposed new and expanded infrastructure and services, as set out in Government policy, are considered (e.g. Luas Cork, Luas Finglas, Metrolink) the gap to target could be significantly higher. In addition, TII will introduce new Luas trams, and increase service frequency which will in turn increase public transport provision in Ireland but also TII's energy consumption. Given the current legislative and policy landscape, achieving the energy reduction target would be unattainable for TII.

2.9 Decarbonisation and energy efficiency summary

TII's Roadmap modelling, developed using SEAI's methodology and inputs, outlines a pathway toward meeting the targets set out in Chapter 9 of CAP25. While the model demonstrates strong progress through a combination of supply-side emissions reductions and a diverse portfolio of projects, it also highlights the need for additional energy reduction measures. The modelling is based on what is assumed to be technically feasible in the period to 2030.

Delivery of the project portfolio has started but will take years to complete. Project costs will be assessed as each project progresses from concept to delivery in line with standard project appraisal guidelines. Some projects will induce an increased operation cost rather than a capital cost. In some cases, ongoing savings arising from a project may defray capital cost.

TII is committed to achieving its targets, however, it must be recognised that success is dependent on some factors that are outside of TII's control, including:

- Grid decarbonisation progressing as forecast.
- Additional funding and resources for the delivery of planned decarbonisation and energy efficiency projects.

- Developments in the medium classes of electric vehicles (EVs) to provide sufficient range for the long-distance Motorway Maintenance and Renewal Contract (MMaRC) operations; and
- The widespread availability of HVO (or the maturation of some other technology or fuel) for the Heavy-Duty Vehicle (HDV) classes.

TII acknowledges that additional or alternative solutions may emerge in coming years and that the medium- and longer-term elements of some of the projects are subject to review and reconsideration in the light of any developments that might enable TII to meet its targets.

3 TII's Influence on Emissions

3.1 Context

The Climate Action and Low Carbon (Amendment) Act 2021 sets out Ireland's goal to transition to a climate resilient, biodiversity rich, environmentally sustainable, and climate neutral economy no later than 2050. In April 2022, Ireland's first carbon budget was published by the Government to provide a framework for reducing GHG emissions and set milestones on the path to achieving the 2050 goals. The Sectoral Emissions Ceilings released in July 2022, determine how each sector of the economy will contribute to achieving the carbon budget.

In alignment with national and international climate targets, TII is committed to reducing GHG emissions across all its operations, and is working with partners, stakeholders, and suppliers to influence a reduction in overall emissions from both the Transport and Industry sectors, i.e. emissions associated with construction, operation, and protection and renewal of transport infrastructure, and use of TII's transport networks (e.g. from road users).

Figure 12 shows TII's scope 3 emissions across TII's operations, construction and protection and renewal of the National Roads and Luas networks. Road user emissions are shown in **Figure 13**.

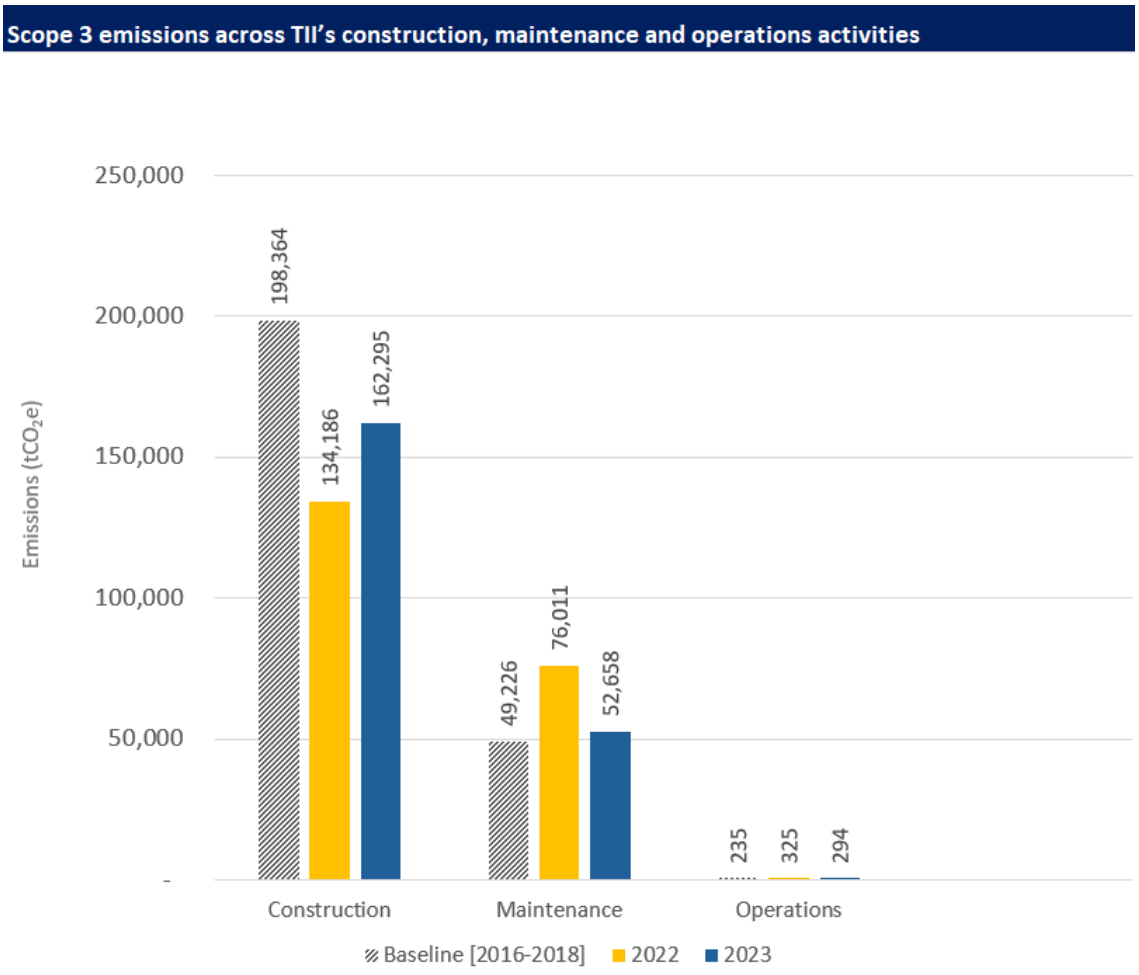


Figure 12 Scope 3 emissions across TII's construction, maintenance and operations activities

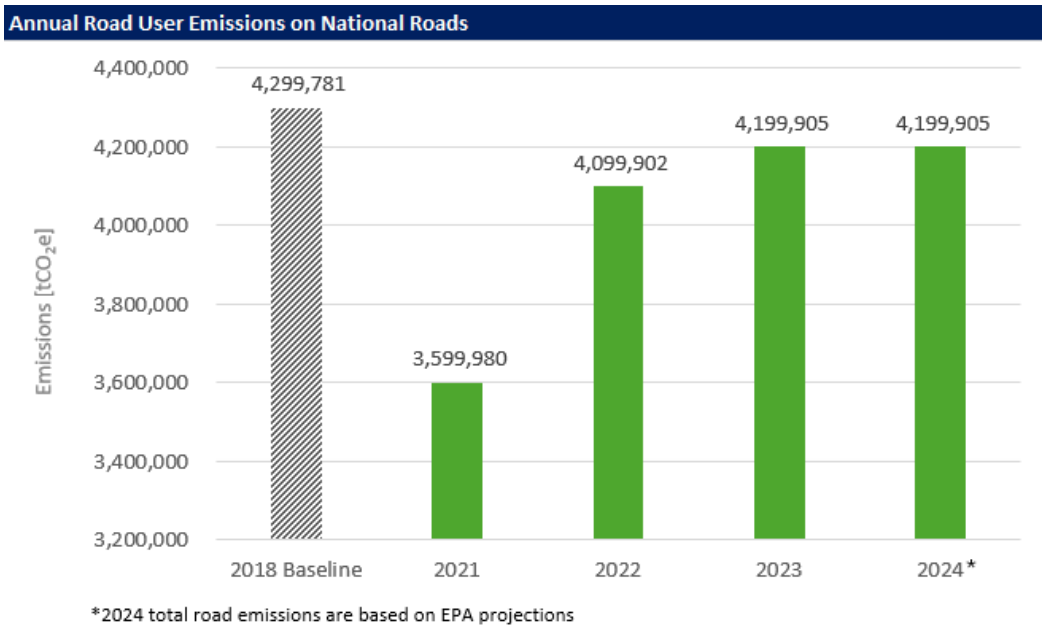


Figure 13 Annual Road User Emissions on National Roads[9]

3.1.1 Levers of Influence

TII has adopted an integrated approach to implementing climate action and sustainability across the organisation.

While not all emissions are under the control of TII, it is indirectly responsible for scope 3 emissions and can influence emissions across the supply chain and transport ecosystems. Six levers of influence have been identified, shown in **Figure 14** below.

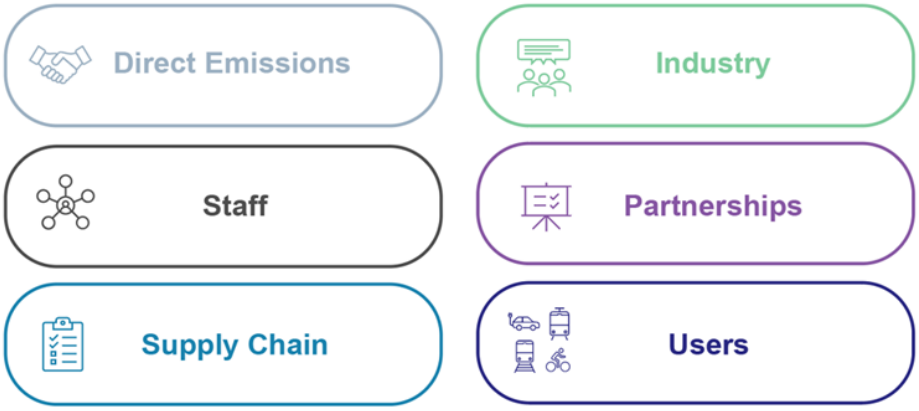


Figure 14 Levers of Influence

TII has developed a categorisation based on decarbonisation action areas (tags) as shown in **Figure 15** to inform decarbonisation modelling and assumptions in future when TII is in a position to calculate emissions savings associated with scope 3.

The action areas are aligned with TII and national policy to cover a broad range of areas where TII can contribute to emissions reductions. The categorisation is not exhaustive and is subject to change as new information and strategies emerge.

[9] Link to the source: https://www.tii.ie/media/sxrd4efi/tii-national-road-greenway-network-indicators-2024.pdf

	Decarbonisation Themes							
Project/Initiative	Energy	Circular Economy	Biodiversity and Land Use	Sustainable Transport	Engagement	Policy, Tools and Standards	Water Management	Protection and Renewal
TII's Influence on Transport Sector Emissions								
Electrification of the National Fleet	■			■		■		
Road Freight Decarbonisation	■			■		■		
Cork Light Rail	■	■	■	■	■	■		
Letterkenny Urban Active Travel	■	■	■	■	■			
Integrated Mobility and Multi-modal Interchange	■	■	■	■	■			
TII's Influence on Industry Sector Emissions								
Asset Management		■				■		■
Low Energy Bound Materials	■	■			■	■		■
Warm Mix Asphalt with High Recycled Asphalt Pavement	■	■			■	■		■
Stacking of All Available Pavement Technologies	■	■			■	■		■
Carbon KPIs in pavement asset renewal programme	■	■			■	■		■
Procurement Award Criteria: Pilot CO2 Ladder	■	■			■	■		■
TII's Influence on Sustainability								
Climate Adaptation		■	■				■	■
Earthworks		■	■				■	
Peatlands Technical Guidance			■				■	
Biodiversity in Schools			■		■			
Native Woodland Planting			■		■		■	
TII Partnerships	■	■	■	■	■	■	■	■
Standards, guidelines, and technical documents	■	■	■	■	■	■	■	■

Figure 15 Decarbonisation action areas

3.2 TII's Influence on Transport Sector Emissions

3.2.1 Context

The Transport sector is required to reduce its GHG emissions as set out in Chapter 14 of the Climate Action Plan 2025 (CAP25). The 50% reduction is an ambitious target and reflects the sector's high share of national emissions and its challenging decarbonisation pathway. Transport is Ireland's largest source of energy demand [1].

Overall, transport emissions decreased by 1.3% in 2024 due to more efficient vehicles and the increasing availability and uptake of public transport [2]. However, remaining within the first sectoral emissions budget (2021-2025) will now require unprecedented emission reductions in 2025. Key actions to meet the 2030 target include:

- A 20% reduction in vehicle kilometres travelled (relative to business-as-usual levels),
- A 50% reduction in fossil fuel use across the transport system,
- Modal shift towards public and active transport,
- Increased electrification of the vehicle fleet,
- Expanded use of biofuels and hydrogen in heavy-duty transport.

Table 11 below shows the expected change in annual emissions for the Transport sector by the horizon year of 2030. The range of measures modelled includes known public transport schemes as outlined in the National Development Plan (NDP). The decarbonisation pathway for transport was modelled by the National Transport Authority (NTA) using projected implementation of infrastructure, mobility behaviour change, and vehicle fleet transformation.

Table 11 Expected change in annual emissions by 2030 horizon

Modelled Growth / Reduction in Emissions	Car	HGV	LGV	PT	Other	Total (Mt CO2e)
Demographic Growth	0.62	0.73	0.01	- 0.01	0.48	1.84
Sustainable Transport and Behavioural Change	- 1.06	- 0.27	- 0.08	-	- 0.68	- 2.09
Electrification and Vehicle Technology	- 2.99	- 0.29	- 0.22	- 0.38	- 0.86	- 4.74

Modelled Growth / Reduction in Emissions	Car	HGV	LGV	PT	Other	Total (Mt CO2e)
Biofuels	- 0.36	- 0.36	- 0.11	- 0.02	- 0.24	- 1.08
Total	- 3.79	- 0.19	- 0.40	- 0.41	- 1.30	- 6.08

Of all the measures and targets to reduce emissions set out in the annual Climate Action Plan (CAP), fleet electrification and biofuels are expected to provide the greatest share of emissions abatement in the short to medium term, while investment and delivery of major public transport projects will have a significant impact in the medium to longer term.

TII is currently advancing a suite of projects aimed at reducing transport emissions in multiple areas including the decarbonisation of existing infrastructure and the delivery of new, low-carbon mobility options to support modal shift. These include Electrification of the fleet, Road Freight Decarbonisation, Cork Light Rail, Letterkenny Urban Active Travel, and Integrated Mobility and Multi-modal Interchange. A sample of these projects are set out in the following sections.

3.2.2 Electrification of the National Fleet

National Road Haulage Strategy 2022 – 2031, Action 20

Zero Emission Vehicles Ireland (ZEVI) has been established as a dedicated Office within the Department of Transport (DoT) to support consumers, the public sector and businesses to transition to zero emission vehicles. TII has established the Alternative Fuels Project Unit (AFPU) as a delivery unit to support ZEVI and the DoT in actioning these targets. The Electric Vehicle Charging Infrastructure (EVCI) Light Duty Vehicle (LDV) En-Route Grant Scheme is the first phase of funding for energy distribution and charging infrastructure to implement Recharging Pools by the end of 2025; providing initial coverage for the most heavily used parts of the NRN. In recognition of the fundamental role of open data in the efficient and effective provision of alternative fuel infrastructure, TII is collaborating with ZEVI to develop a central data platform to effectively collect, use, and share data with the EV value chain and end users. This delivers on a key objective of the national Electric Vehicle Charging Infrastructure Strategy 2022-2025.

3.2.3 Road Freight Decarbonisation

National Road Haulage Strategy 2022 -2031, Action 6

TII has explored the potential of urban freight consolidation centres to reduce kilometres of travel by heavy goods vehicles (HGVs) in urban areas and will further explore the impact on national roads. As shown in **Figure 16** travel on the NRN in 2024 generated 4.2 $MtCO_2e$ in emissions.[3] Although HGV traffic is a small proportion of on-road vehicles, it is responsible for a significant 31% of NRN emissions in 2024. This highlights the potential benefits of targeted interventions for HGVs. TII presented a study report to the DoT to fulfil its obligations under Action 6 of the DoT haulage strategy. TII also administers the Zero Emissions Heavy Duty Vehicles (ZEHDV) purchase grant scheme on behalf of the DoT to promote the decarbonisation of freight. The value of the scheme in 2024 was €3.5 million.

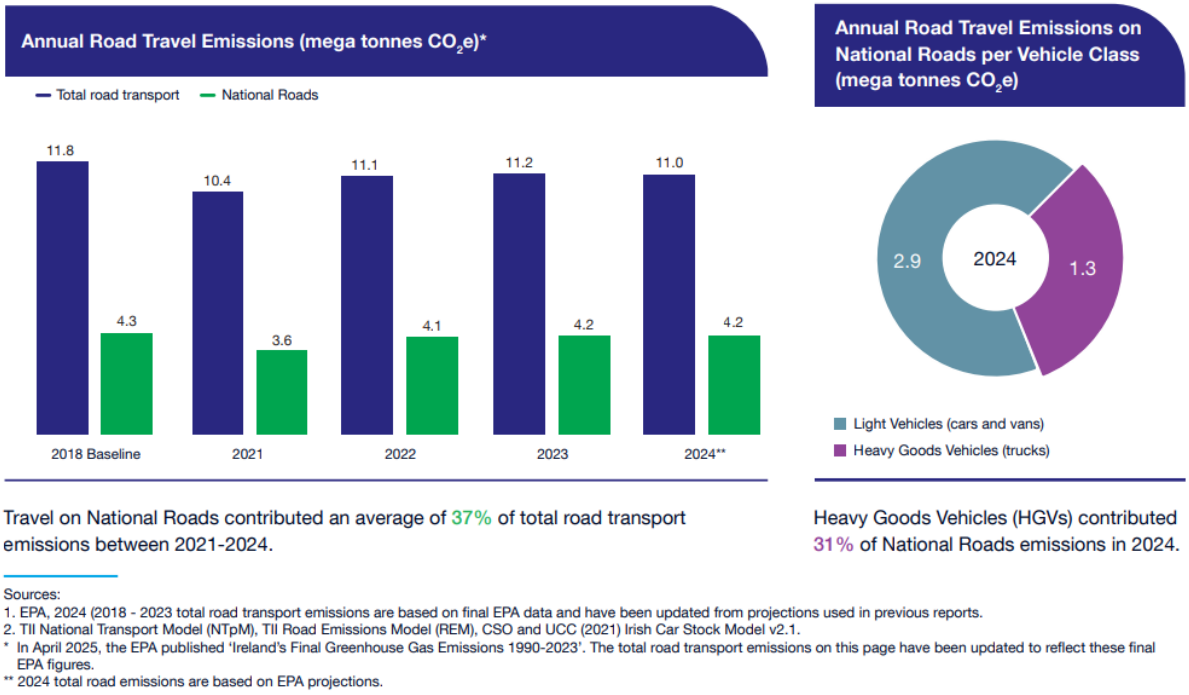


Figure 16 Annual Road User Emissions on National roads per Vehicle Class

3.2.4 Cork Light Rail

National Development Plan 2021-2030; Project Ireland 2040

The Cork Light Rail project is a transformative investment in low-carbon mobility for the Cork Metropolitan Area. Originally envisioned in the Cork Area Strategic Plan, the east–west light rail corridor was selected over Bus Rapid Transit following detailed analysis showing the need for a higher-capacity solution to meet the growth projections of the National Planning Framework to 2040 and beyond. The Light Rail Transit system will support compact, high-density development along the 18km route from Ballincollig to Mahon Point, enabling a shift away from private car use and reducing transport emissions. Public consultation on the *Emerging Preferred Route* was undertaken in April-June 2025. The scheme will enable land use and transport integration while unlocking strategic development sites, supporting access to education, healthcare, and employment, and advancing TII's climate and decarbonisation objectives. Consideration must be given to the impact of this increased service in achieving the energy reduction targets set out.

3.2.5 Letterkenny Urban Active Travel

National Sustainable Mobility Policy

TII is providing Donegal County Council with funding to deliver high quality continuous footway and cycleway routes along the N56 in Letterkenny Town to promote active travel as part of the N56 Letterkenny Urban Active Travel project. This will be achieved by signalised junction upgrades and provision of active travel facilities adjacent to the N56. The overall project is phased, with advance works on site in 2025. It is anticipated that the N56 Ballyraine junction and N56 Creamery junction will be signalised in the near future.

3.2.6 Integrated Mobility and Multi-modal Interchange

National Road Haulage Strategy 2022 -2031, Action 6

High-quality and integrated mobility plays a key role in enabling modal shift from private vehicles to more sustainable transport modes, reducing carbon emissions, and ensuring road safety. Enhancing the convenience and attractiveness of public transport is critical to enabling modal shift in urban areas and improving regional and rural connectivity. TII contributes to integrated mobility by investing in multi-modal interchanges such as Park and Ride/Share facilities adjacent to the NRN. The Park and Share Strategy was first developed in 2023 and will be updated in 2025. The Park and Share scheme operated in partnership with Louth County Council, operates at full capacity with all 226 spaces occupied during weekdays, has shown high user satisfaction in surveys.

National Sustainable Mobility Policy Action Plan 2022 -2025, Action 25

The delivery of this action is led by DoT and TII is supporting the development of Integrated Mobility Hubs. The action is currently progressing to public consultation.

3.2.7 Luas in numbers

In 2024 TII celebrated 20 years since the Luas was commenced operation. The graphic below shows the Luas in numbers.

3.2.8 Additional projects

In addition to the case studies included within this chapter, **Table 12** below outlines further projects that contribute to TII's efforts to decarbonise transport infrastructure and operations and enable modal shift. These projects demonstrate some of the wide-ranging activities underway in TII. These initiatives have been included in previous editions of the TII Climate Action Roadmap and continue to support progress across the sector.

Table 12 Additional Transport Projects

Project Title	Source
Bus Corridor Prioritisation	Roadmap 2024
TII Road Emissions Model	Roadmap 2024
Luas Finglas	Roadmap 2024
MetroLink	Roadmap 2024

Project Title	Source
Better Road User Charging Evaluation	Roadmap 2024
Local Transport Plans	Roadmap 2024
Demand Management	Roadmap 2024
Speed Limit Review	Roadmap 2024
National and Regional Greenways Programme	Roadmap 2024
Active Travel Projects Interacting with the NRN	Roadmap 2024
Severance Packages	Roadmap 2024
Transport Research Arena (TRA)	Roadmap 2024
TII Public Transport Linkages Review	Roadmap 2023
Low Emissions Vehicle Tolling Incentive (LEVTI)	Roadmap 2023
Multi-Modal Interchange	Roadmap 2022

3.3 TII's Influence on Industry Sector Emissions

3.3.1 Context

CAP25 sets ambitious targets for the reduction of industrial emissions, and TII is committed to contributing to these targets. Despite a period of economic growth between 2018 and 2023, emissions decreased by 9.6% in this sector, demonstrating a partial decoupling of industrial activity from emissions. Emissions continued to fall in 2023 and 2024 by 5.1% and 4.6% respectively [4]. In 2024 emissions reductions were largely driven by declining use of coal and oil. Alongside this, emissions from the use of cement declined as clinker production has decreased [4]. TII is contributing to these reductions through a combination of strategic initiatives, innovative projects, and the adoption of sustainability practices in construction and operations; particularly through the shift toward low-carbon materials, circular approaches, and low carbon construction methodologies. The following sections set out some of TII's projects within these areas.

3.3.2 Asset Management

The TII Asset Management Strategy contributes to enabling circular economy principles whilst managing TII's complex transport network. TII oversees the delivery of ca. 200km (approx. €110 million) of pavement asset repairs and renewals each year. Investment in the TII pavement renewal programme ensures that the National Roads Network (NRN) surface and structure is maintained to a high level. By having a robust maintenance programme, the need to reconstruct the NRN is reduced which in turn avoids additional carbon emissions. During the life of the pavement asset, varying levels of carbon emissions are generated depending on the road condition. **Figure 17** illustrates the full life cycle of asphalt; from raw material extraction to end-of-life disposal, highlighting emissions at each Life Cycle Assessment (LCA) stage (A1–A5 and C1–C4). This demonstrates carbon hotspots across the lifecycle of asphalt. Within these hotspots are opportunities for TII to influence emissions at all phases of the asphalt lifecycle.

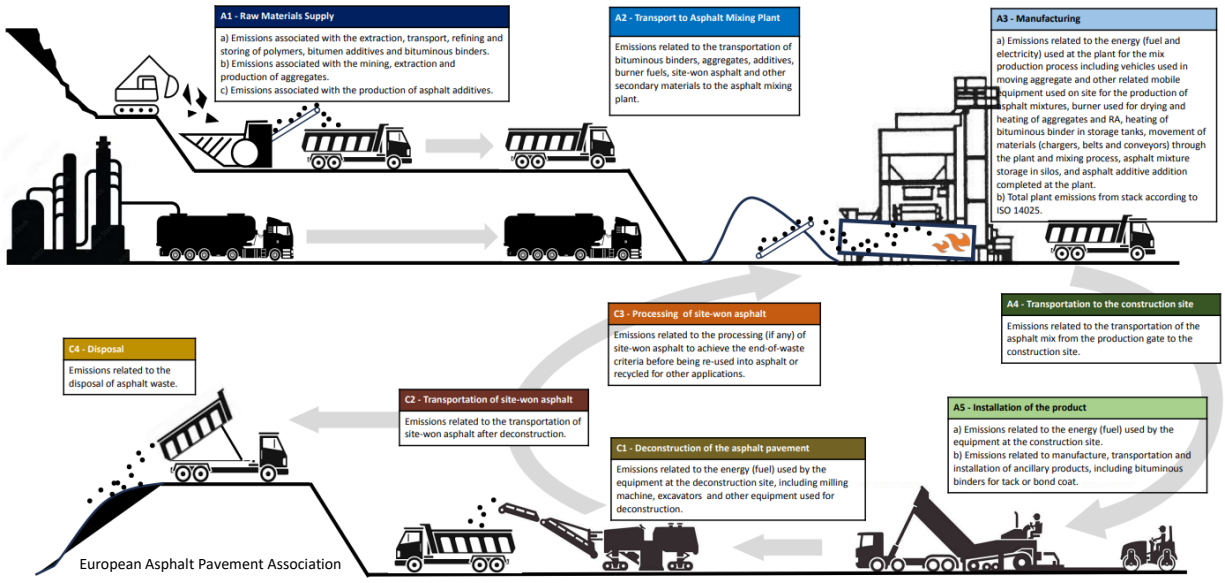


Figure 17 Lifecycle of Asphalt [5]

TII's implementation of circular economy principles involves moving from a "waste" to a "value" approach to assets, components, and materials where they are consistently maintained at their highest value throughout their use within the transport infrastructure system. This systematic approach to capturing and retaining value at every lifecycle stage has included engaging with its supply chain to minimise emissions from materials used within assets, as well as undertaking research into materials optimisation and sustainable materials management. This Roadmap sets out some of the initiatives TII has progressed to reduce emissions across construction and protection and renewal, contributing to the CAP25 requirements to reduce industry emissions.

3.3.3 Low Energy Bound Materials

Climate Action Plan 2025

TII incorporated Low Energy Bound Materials (LEBM) materials in its Specification for Roadworks some years ago utilising cold or ambient-temperature aggregates, bound with low-energy binders offering significant reductions in both production energy requirements and GHG emissions.

More recently and in collaboration with TII, the DoT, Colas, and TH Moore, Monaghan County Council has led the development and trial of LEBM incorporating high quantities of Reclaimed Asphalt (RA) in ex-situ cold mixtures on Local and Regional roads. Initial trials began on local roads, focusing on how high quantities of RA could be reused in ex-situ cold mix applications. In 2022, this progressed to a high-profile demonstration on the Regional Road R180 at Lough Eglis, where a cold mix containing 79% RA (the RAP was sourced from the NRN), 20% virgin aggregate, and 1% cement was used. Monitoring of the Lough Egis trial is on-going and the results indicate improvements in pavement performance. A detailed environmental analysis of the LEBM mix at production stage (LCA Stage A1 to A3) indicates significant energy savings /reduction in GHG emissions when compared to the production stage of a hot mix asphalt. While the reduction in emissions at the production stage is positive, a full lifecycle assessment is required to determine if these saving are a significant step towards decarbonising road maintenance and construction. Following the successful installation of the material on the R180, the project expanded regionally in 2024, with Louth, Cavan and Cork County Councils, joining Monaghan in trialling LEBM across a wider variety of road types, including on cycle tracks. This project demonstrates the important role that collaboration and research plays in the development of new / improved materials for use in decarbonising the protection and renewal of the road network.

3.3.4 Warm Mix Asphalt with High Recycled Asphalt Pavement

Climate Action Plan 2025

In 2022, TII, Meath County Council, and Kilsaran, with support from the DoT, collaborated on an asphalt trial on the R147 that explored the use of high RAP content in combination with Warm Mix Asphalt (WMA) technologies. The objective was to evaluate the performance and feasibility of using up to 40% reclaimed asphalt (RA) in base and binder course materials while reducing the environmental impact of production through lower temperatures. The 40% RA mixture replaced an equivalent portion of virgin aggregates and bitumen with reclaimed asphalt materials. A WMA additive was used during production to enable mixing, laying, and compaction at a reduced temperature of 135°C (compared to 170 to 180°C for conventional hot mix temperatures). Laboratory testing and on-site evaluations confirmed that the 40% RA warm mix asphalt demonstrated mechanical properties and performance comparable to conventional hot mix asphalt. These positive results informed a revision of asphalt specifications to allow for higher RA inclusion, supporting Ireland's circular economy and decarbonisation goals in road construction.

3.3.5 Stacking of All Available Pavement Technologies

Climate Action Plan 2025

Subsequent to the activities detailed in sections 3.3.3 and 3.3.4, Roadstone in conjunction with TII and Meath County Council carried out a trial on the N52 in November 2024, combining the use of multiple carbon reduction technologies. This "stacking" of available technologies included the use of WMA together with 70% RA and bio-binders together with use of Hydrogenated Vegetable Oil (HVO) fuel in construction plant and delivery vehicles and the use of green energy in the asphalt production facilities, thereby achieving further emissions reductions which are currently being verified through TII's monitoring programme. Future work will assess the performance, consistency, and durability of high RA content asphalt mixtures under varying site conditions. These projects demonstrate the

potential for substantial carbon savings, reduced raw material demand, and lower energy use, all while maintaining infrastructure quality and performance—highlighting the role of innovative materials in advancing TII's sustainability impact.

3.3.6 Carbon KPIs in pavement asset renewal programme

Climate Action Plan 2025

In 2025, TII has progressed the integration of environmental and carbon Key Performance Indicators (KPIs) within the national pavement asset protection and renewal programme. Building on earlier work, the programme now enables the evaluation of alternative pavement protection and renewal treatment strategies with carbon reduction as a core decision-making criterion. The lifecycle carbon performance of various asset management strategies can now be quantified through Global Warming Potential (GWP) metrics, allowing TII to strategically align road pavement interventions with national decarbonisation targets.

This enhanced approach accounts for key factors such as fuel efficiency, traffic patterns, GWP emissions associated with construction activities, and emissions linked to construction-related traffic congestion. As a result, carbon and environmental KPIs are now embedded within annual performance reporting, supporting transparent, evidence-based scaling of decarbonisation initiatives and reinforcing the sustainability and long-term value of the pavement asset management programme.

3.3.7 Procurement Award Criteria: Pilot CO2 Ladder

Climate Action Plan 2025

TII has continued to roll out the CO_2 Performance Ladder, a certification scheme designed to incentivise contractors to reduce their carbon emissions and improve sustainability performance. The scheme uses a five-step ladder to rank organisations based on their emissions reduction efforts and implementation of sustainable practices.

The CO_2 Performance Ladder was successfully piloted on the M7 Kildare Bypass Pavement Renewal Scheme, delivered in 2024. The contractor received its level 4 certification based on achieving a reduction of **21% in CO_2** savings. The savings were made possible through energy-efficient construction methods, the use of sustainably manufactured asphalt, and reductions of 165 tonnes in raw material usage and 126 tonnes in equipment-related emissions, among other contributing factors.[10]

To guide the consistent rollout of the ladder, TII developed an internal guidance to assist project teams and contract managers. In 2025, the CO_2 Performance Ladder will be applied to several high-value tenders:

- Three Call-Off Contracts from the High-Speed Pavement Framework Agreement (€20–30 million),
- TII404 Signs Maintenance Call-Off Contracts (€40–60 million over four years),
- Delineation Programme Framework Agreement (€40–60 million), and
- South-East Framework for Pavement and Minor Works (procured via Kilkenny County Council, valued at €100 million).

The implementation of the CO_2 Performance Ladder in its first tender outside the Netherlands and Belgium demonstrated that the system is both transferable and practical in new national contexts. The experience showed that the framework is relatively easy to adopt, particularly for organisations already accustomed to working with ISO-based management systems.

The most significant challenge lay in the initial lead time—the period between early engagement and full integration into the tendering process. This phase required aligning stakeholders, clearly communicating the methodology and its benefits, and ensuring the Ladder was appropriately embedded in procurement documentation. [11]

TII also plays a leadership role by supporting other public bodies in adopting the CO_2 Performance Ladder within their own organisations.

3.3.8 Additional projects

In addition to the case studies detailed in this section, **Table 13** below highlights a selection of additional projects that contribute to TII's industry decarbonisation efforts. These projects reflect the

[10] Source: https://www.co2performanceladder.com/news/first-ladder-tender-in-ireland-21-percent-co2-reduction/
[11] Source: https://www.co2performanceladder.com/news/first-ladder-tender-in-ireland-21-percent-co2-reduction/

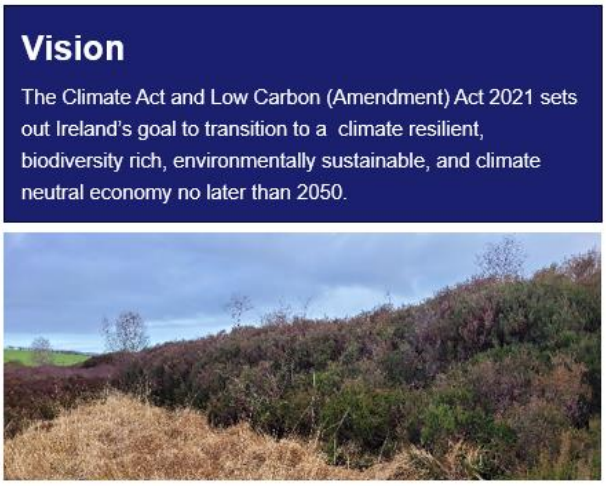
range of activities underway in TII. These initiatives have been included in previous editions of the Climate Action Roadmap and continue to support progress across the sector.

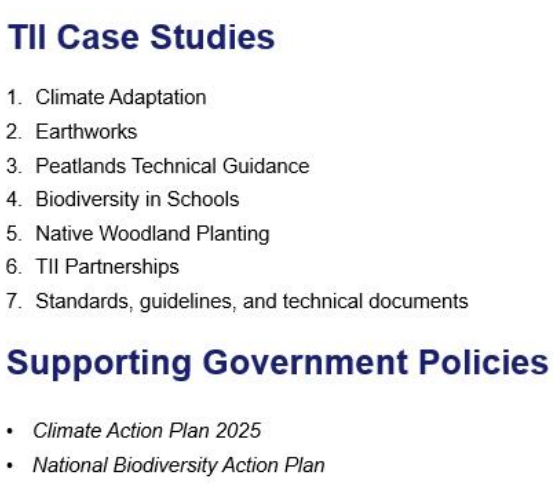
Table 13 Industry Decarbonisation Projects

Project Title	Link
Luas Finglas Circular Economy Pilot	Roadmap 2024
Dunkettle Interchange Upgrade Scheme Construction and Materials Management	Roadmap 2024
Surface Course Layer Preservation	Roadmap 2024
Environmental Product Declarations	Roadmap 2024
Irish Analytical Pavement Design Method	Roadmap 2024
N22 Benchmarking: Example of the Carbon Tool in Use	Roadmap 2024
Road Lighting Upgrades	Roadmap 2024
Carbon Emissions Assessment of TII Pavement Renewals	Roadmap 2024
Salt Reduction in Winter Maintenance	Roadmap 2024
Roadsoil	Roadmap 2024
TII Carbon Tool	Roadmap 2024
Asphalt Concrete (CC-SPW-00900 Specification for Roadworks – Series 900 Road Pavements - Bituminous Materials)	Roadmap 2024
Digitalisation of Paper Based Processes	Roadmap 2022
Whole Life Carbon	Roadmap 2022

4 TII's Influence on Sustainability

4.1 Context





TII is committed to advancing sustainability in all its activities as set out in its Sustainability Implementation Plan (SIP).

4.2 Sustainability Initiatives

This chapter sets out TII's sustainability efforts, which are aligned with Ireland's broader climate goals and wider sustainability targets.

4.2.1 Climate Adaptation

Climate Action Plan 2025

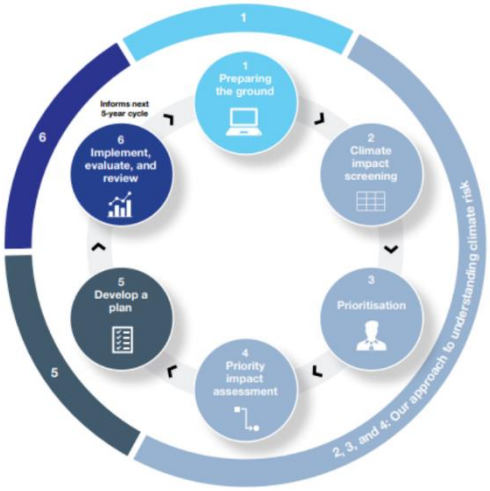
Challenge

Ireland's climate is changing. Consequently, Ireland will experience more severe weather and flooding events, more intense rainfall and slope failures, and higher sea levels. Much of Ireland's infrastructure, was not designed or built to perform in this new emerging climate.

Such weather events are anticipated to become more extreme or occur more frequently (e.g. pluvial flooding), while others are expected to emerge (e.g. sea level rise). These changes increasingly pose challenges to TII's assets as ageing infrastructure, asset deterioration and rising demand make assets more vulnerable to climate hazards. With the total annual costs from extreme weather events to infrastructure in Europe estimated to increase, along with adverse safety, reputational and environmental impacts, it is essential that TII understand and address these climate-related impacts.

Solution

In 2022, TII published its updated Climate Adaptation Strategy, enabling TII to proactively prepare for the impacts of climate change through improving its understanding of climate risks. The strategy is informing the organisation's approach to climate adaptation action across its activities, while also embedding climate adaptation principles within decision-making. The strategy outlines a six-stage approach to climate adaptation, which forms part of a 5-year rolling cycle.



Progress:

- TII has completed **Stages 1-3** of the approach and is currently at **Stage 4 and 5**. The Climate Adaptation Strategy publication marked the completion of **Stage 1**.
- A climate impact screening assessment tool has been developed, informed by TII's Climate Guidance for National Roads, Light Rail, and Rural Cycleways.
- Climate impact screening assessments and prioritisation have been undertaken for each of TII's six main asset groups (**Stages 2 and 3**).
- Following these assessments, a methodology was developed for the detailed Climate Change Risk Assessments (CCRAs), providing a clear route to completing Stage 4. The methodology enables TII to adopt a spatial approach to understanding the climate risks across its networks and activities, using spatial asset and climate projection data to understand how assets are likely to be exposed to climate hazards through to the end of the century.
- Detailed CCRAs are being undertaken (**Stage 4**) and will subsequently inform the development of Climate Adaptation Implementation Plans (**Stage 5**). A draft Implementation Plan is currently being prepared for the NRN.
- In addition, a methodology for understanding the financial impact of climate change has been developed.
- TII also engaged with the EPA and Climate Ireland to develop climate adaptation indicators for the NRN and light rail network. Input has been provided since 2022, and the report was published in 2024.

4.2.2 Earthworks

Climate Action Plan 2025

The Earthworks associated with a National Road project can have significant impact in terms of environmental aspects, energy consumption and the achievement of sustainability targets. Earthworks activities result in the transformation of the natural environment, often requiring the excavation of materials, processing and haulage of material from source to destination, and in some

situations, the removal of excavated material as a waste material for off-site disposal and the import of natural material from scarce off-site sources.

The principles outlined in TII's SIP include developing sustainable assets through innovating and improving the planning, design and construction of the network while also reducing the environmental impact through responsible use of resources, reuse, and repurposing of materials. A critical aspect of achieving TII's vision in terms of sustainability is to ensure that sufficient consideration is given to earthworks to achieve objectives such as waste minimisation, optimal material reuse, reuse of materials at their highest value and identify opportunities for greater sustainability over the lifecycle of a project and the network assets.

In September 2024, TII updated the Earthworks Specification for National Roads. The material classification system was overhauled to promote reuse at their highest value, thereby improving sustainability while maintaining engineering quality and functionality. The system now supports project teams to reuse materials to a greater extent, rather than classifying as unacceptable for use.

In September 2024 and February 2025, TII published Ground Investigation Guidance (Part 1 and Part 2 respectively) which provides practical guidance for sufficient, strategic and cost-effective ground investigations across all Project phases. Sustainability and circular economy principles are incorporated within the guidance provided, emphasising the need for early consideration of earthwork in the Project phases and the necessary ground investigation to adequately inform sustainable design. Combined with an update (now Version 2.01) to the Mass Haul and Earthworks Analysis (MEA) Tool, TII now provides comprehensive resources in promoting sustainable earthworks design and construction.

Figure 18 shows the sustainability principles related to Earthworks as presented at the Mass Haul and Earthworks Analysis (MEA) Tool Training in May 2024.

Figure 18 Sustainability principles related to Earthworks

4.2.3 Peatlands Technical Guidance

National Biodiversity Action Plan

TII is developing a technical guidance document which focuses on the rehabilitation and management of peatlands. Where linear projects such as roads, greenways or light rail interact with degraded peatlands the document will provides project managers with guidance for assessing peatland conditions, implementing restoration and rehabilitation strategies, and managing excavated peat to enhance biodiversity and carbon sequestration. The document outlines how peatlands, which cover over 20% of Ireland's land area, are vital ecosystems for climate regulation, water management, and biodiversity, but are increasingly threatened by human activities.

The guidance highlights techniques such as rewetting, drain blocking, and vegetation restoration, and introduces tools like the Peatland Site Assessment Report (PSAR) to support decision-making in projects. Key legislation mentioned include the Habitats Directive, Water Framework Directive, and the EU soil strategy 2030. Options for peat reuse include deposition in engineered cells (Material Deposition Areas), restoration of cutover bogs, and habitat creation. Long-term monitoring protocols are provided for hydrology, ecology, and carbon, such as water table depth tracking, vegetation surveys, GHG flux measurements, and adaptive management strategies. The guidance encourages collaboration with key stakeholders to identify restoration opportunities.

4.2.4 Biodiversity in Schools

National Biodiversity Action Plan

Coill na nÓg, a schools biodiversity competition spearheaded by Biodiversity in Schools and sponsored by TII/eFlow focused on the crucial task of planting native trees and hedgerows. The competition was open to preschools, primary schools, secondary schools and homeschools across both the Republic of Ireland and Northern Ireland. Through eFlow, TII funded a total of 200 plantation kits for schools across the country including 23 schools within 10km of the M50, with eFlow being positioned as a lead sponsor of the program nationwide. A total of 490 registrations were received, and the schools who received kits were selected through a raffle. In addition to the above, eFlow

sponsored three outdoor classrooms worth €4,000 each for the top three schools chosen through the social media competition where schools shared their work around planting trees.

The three winning schools were announced in January 2025. Representatives from Turas, TII and Biodiversity in Schools visited the winning schools in May to formally present the awards.

Circular Economy | Biodiversity & Land Use

4.2.5 Native Woodland Planting

National Biodiversity Action Plan

TII is working to develop solutions such as Native Woodland Planting and other biodiversity initiatives that contribute to sustainability objectives while ensuring sustainable use of surplus lands. A 36-acre surplus site that was acquired as part of the Macroom and Ballyvourney bypass project is planned to be donated to Nature Trust to be turned into a native woodland. This is the first plan of its kind with the site envisaged to be managed by the trust with opportunities provided to the public for leisure activities.

Circular Economy | Biodiversity & Land Use | Water Management

4.2.6 TII Partnerships

TII collaborates with a wide range of partners across industry, academia, and the public sector to drive innovation, reduce emissions, and embed circular economy practices. These partnerships play a vital role in shaping the construction and transport materials sector, supporting knowledge exchange, research and development, and the implementation of low-carbon solutions across the asset lifecycle. They enable TII to stay at the forefront of sustainable infrastructure delivery and to influence sector-wide decarbonisation efforts through shared expertise, aligned goals, and coordinated action. A list of TII's partnerships can be found in **Appendix E.**

4.2.7 Standards, guidelines, and technical documents

TII maintains a range of standards, guidelines, and technical documents in relation to the planning, design, construction, protection and renewal, and operation of national roads. These standards and technical documents (available at https://www.tiipublications.ie/) are used across the construction and transport sectors, as well as by Local Authorities on regional and local roads. Recent updates and new standards include:

- Updates to the Guidelines for Cultural Heritage Impact Assessments of TII national roads & Greenways projects to provide clarity regarding Department of Housing, Local Government and Heritage notification processes and to remove references to the associated standard, which is not required at this time.
- Updates to the Project Appraisal Guidelines to support the appraisal of projects in a more sustainable way.
- Updated Earthworks Guidance and specifications contributing to more sustainable use of natural resources.
- A new standard on Population and Human Health - Assessment of Proposed National Roads.
- An overarching Technical Document for the Design and Delivery of Soft Landscape Treatments in Urban Transport Environments to support urban resilience.

4.2.8 Additional projects

In addition to the case studies detailed above, **Table 14** below highlights a selection of additional projects that contribute to TII's wider sustainability efforts in a variety of ways. For example, the Sustainable Procurement Steering Group aims at integrating environmental and social considerations into procurement decisions. These projects reflect a small selection of the breadth of activity underway in TII. These initiatives have been included in previous editions of the Climate Action Roadmap and continue to support progress in sustainability.

Table 14 Sustainability Projects

Project Title	Source
Ireland's Supply Chain Sustainability School	Roadmap 2024
Environmental Monitoring	Roadmap 2024
Sustainable Procurement Steering Group	Roadmap 2024
TII Roadshows	Roadmap 2024

Project Title	Source
Sustainability Education, Engagement & Awareness Programme	Roadmap 2024
Native Woodland Planting	Roadmap 2024
Collaborating for Better Biodiversity Outcomes	Roadmap 2024
Biodiversity Plan	Roadmap 2024
Climate Leadership Training Programme	Roadmap 2024
Population and Human Health Standard	Roadmap 2024
N5 Furniture Restoration Project (Social Value)	Roadmap 2024
Community Engagement for Climate Action	Roadmap 2023
Collaboration on National Climate Adaptation Strategy	Roadmap 2023

5 Conclusion

This Roadmap sets out TII's plans to reduce GHG emissions and meet decarbonisation and energy efficiency targets.

TII is well-positioned to meet its overall decarbonisation target of 73%, with an expected reduction of 63–74% in greenhouse gas emissions and achieve 48–53% improvement in energy efficiency by 2030.

The EU's new energy reduction target for the public sector of 1.9% annually will be very challenging for TII. Forecasts show that TII's energy consumption could exceed the target by approximately 3% by 2030, highlighting the need for continued efforts to bring energy use in line with EU expectations outlined in the Energy Efficiency Directive (EU) 2023/1791. This trajectory could change if public transport is excluded from the target in Ireland. TII will seek an exemption for its public transport operations.

The delivery of the GHG emissions reductions outlined in this Roadmap will rely on:

- Robust governance: the Executive Office has overall responsibility for TII's Roadmap and reporting to TII's Board.
- Engaged staff: TII will continue to empower staff to identify innovative approaches to emissions reductions, provide support and training, and communicate progress to all staff.
- Monitoring and evaluation: High quality data, monitoring, and reporting will support improved measuring and monitoring of progress with responsibility to achieve the targets being distributed across the organisation.
- Funding and resources: Meeting emissions reduction targets is contingent on TII receiving sufficient capital and operational funding and resources to deliver the necessary projects whilst overcoming challenges and uncertainties within and outside of TII's control. Funding constraints in 2025 have resulted in six projects being delayed which is cause for concern. This Roadmap (2025) is a live document and will be updated annually to reflect TII's progress and to respond to requirements under the Climate Action Mandate.

TII recognises that delivering on Ireland's ambitious climate action targets requires transformative change across the transport system. With public sector targets only accounting for a small proportion (less than 1%) of TII's overall emissions, TII's biggest impact is expected from its influence on scope 3 emissions in both the Industry and Transport sectors. This will be realised through:

- Working with the supply chain to encourage lower carbon materials and construction processes; and
- Working with partners and stakeholders to achieve a greater modal shift towards public transport, walking and cycling, transition to the use of zero emissions vehicles, and management of overall travel demand.

TII recognises the scale of the challenge to meet the national emission reduction targets, whilst also addressing the biodiversity crisis, and supporting national climate adaptation efforts. TII will contribute by collaborating with partners, industry, and wider transport stakeholders to deliver material change across the organisation, industry, and society.

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Appendix A - Mandate Response

Transport Infrastructure Ireland

Appendix A

TII's response to the Public Sector Climate Action Mandate

September 2025

1 RESPONSE TO THE CLIMATE ACTION MANDATE

This Appendix sets out TII's response to the Public Sector Climate Action Mandate published as part of Climate Action Plan 2025 in April 2025. The guidelines outline minimum level of requirements and documentation across all public sector organisations.

Climate Mandate Area	Theme	Mandate	Required Content (as per SEAI/EPA Guidance published June 2025)	TII Response	Documentation to support adherence to the Climate Action Mandate	Status
Our Targets	***Achieving the carbon emissions reduction target***	1.1	Reduce GHG emissions by 51% in 2030.	In progress	See Chapter 2 of this Climate Action Roadmap.	In progress
	Achieving the energy efficiency target	1.2	Improve energy efficiency in the public sector by 50% by 2030.	In progress	See Chapter 2 of this Climate Action Roadmap.	In progress
	Updating the Climate Action Roadmap	1.3	Update Climate Action Roadmaps annually within 6 months of the Climate Action Plan, in line with updated Public Sector Climate Action Mandate.	In progress	TII published a 2024 Climate Action Roadmap within 6 months of the Climate Action Plan (CAP24). See link below: TII 2024 Roadmap: https://www.tii.ie/media/se2nmhve/170724-climate-action-roadmap-2024.pdf . The 2025 Climate Action Roadmap will be published in October 2025, which is 6 months after the release of CAP25.	In progress
Our People	***Leadership and governance for climate action***	2.1	Establish and resource Green Teams, reporting to senior management, to become integrated drivers of sustainability in every public sector body.	In place	TII established a 'Green Team' internally referred to as the Sustainability Leaders Forum as per the Sustainability Portfolio Management Framework (2024).	Complete
		2.2	Nominate a member of the Management Board as the Climate and Sustainability Champion with responsibility for implementing and reporting on the Mandate.	In place	The Director of the Executive Office is the nominated Climate and Sustainability Champion with responsibility for implementing and reporting on the Mandate.	Complete
	Engaging and training staff	2.3	Incorporate appropriate climate action and sustainability training (technical and behavioural, including green procurement training) into learning and development strategies for staff.	In place	TII completed TII's Sustainability Training Needs Assessment (Dec 2020). TII creates regular sustainability webinars and events which are supplemented by online modules, on a dedicated learning portal, Articulate. The portal allows staff to learn at their own pace, which was a recommendation of the Sustainability Needs Assessment, based on how TII staff prefer to learn. In 2024, TII's Sustainability Education, Engagement & Awareness programme covered topics including Climate Policy	Complete

Climate Mandate Area	Theme	Mandate	Required Content (as per SEAI/EPA Guidance published June 2025)	TII Response	Documentation to support adherence to the Climate Action Mandate	Status
					Landscape, Biodiversity, Climate Communications, Sustainable Mobility, Innovation & Transformation, and Sustainability Partnerships and Sustainable Leadership. Green public procurement and TII's piloting of the CO2 performance ladder were among the topics covered in the Sustainability Education, Engagement and Awareness programme as well as the Climate Leadership training programme.	
		2.4	Organise staff workshops (at least annually) to engage on climate issues, including a focus on decreasing the organisation's carbon footprint.	In place/ In progress	TII's Sustainability Education, Engagement & Awareness programme includes workshops and training materials that are available to all staff year round on the learning portal, after the training. Initiatives such as regular TII webinars relating to sustainability and climate action empower TII staff to discuss new methods and approaches for delivering projects more sustainably.	In progress
		2.5	Ensure all senior management (P.O. level or equivalent and above) and members of State Boards, complete a climate action leadership training course.	In place/ In progress	TII developed a Climate Action Leadership online training programme for all senior management and the TII Board which was rolled out in four separate 3.5-hour sessions across TII, from late January until mid-March 2024. The sessions were recorded and made available to all TII staff. The programme aligned with guidance received from the Department of the Environment, Climate and Communications. The training was specifically designed and customised to take account of the level of expertise within TII, in addition to TII's recently published sustainability/climate related polices, strategies, plans, guidelines, standards, etc. The training was divided into four modules: Climate Fundamentals, Climate Governance, Adaptation and Just Transition, Climate Leadership and Additional Content specific to TII.	In progress
Our Way of Working	***Reporting progress against the Climate Action*** ***Mandate requirements***	3.1	Report on the following in the Annual Report: • GHG emissions • Implementation of the mandate • Sustainability activities report • Compliance with Circular 1/2020: Procedures for offsetting the emissions associated with official air travel.	In place/ In progress	The TII 2024 Annual Report includes details on GHG emissions, notes progress in implementing the mandate and sets out sustainability activities across TII. TII is compliant with Circular 1/2020 and is working in conjunction with Finance to produce the necessary return for the period 2024.	In progress

Climate Mandate Area	Theme	Mandate	Required Content (as per SEAI/EPA Guidance published June 2025)	TII Response	Documentation to support adherence to the Climate Action Mandate	Status
		3.2	Using SEAI's Public Sector Monitoring and Reporting System, public bodies are to report annually on implementation of the individual mandate requirements using a 'comply or explain' approach.		TII reports as required against individual mandate requirements including using the M&R system.	
	Energy & environmental management systems	3.3	Achieve formal environmental certification for large public sector bodies, such as ISO 50001 (Energy Management Standard) or ISO 14001 (Environmental Management System), with a view to going beyond ISO 14001 to adopting EMAS (Eco Management and Audit Scheme). Specifically: 3.3.1 All public sector bodies with an energy spend greater than €2m per annum to achieve ISO 50001 certification by end-2024; 3.3.2 All remaining public bodies to implement energy management programmes as per SEAI's energy management guidance (S.I. 426 of 2014) and report to SEAI annually on M&R.	In place and in progress	TII achieved accreditation to ISO 50001: 2018 Energy Management System in 2019 and has passed subsequent surveillance audits in 2020, 2021 with re-certification in 2022 and subsequent successful surveillance audits in 2023 and 2024. The certification is an ongoing process. TII is currently in the final stage of acquiring ISO 14001:2015 EMS certification (TII successfully passed external audits in summer 2025). As part of the EMS, TII tracks environmental criteria including water usage and waste production. TII completes an energy audit every four years. TII's S.I. 426 audit was carried out in 2021. TII reports annually to the SEAI on M&R. Following the achievement of ISO 14001 certification, TII will look to adopt EMAS. This is in line with section 2.3 of the Public Sector Climate Action Strategy 2023 - 2025	In place and in progress
	Green public procurement	3.4	3.4.1 Implement Green Public Procurement in accordance with the Green Public Procurement Implementation Mandate set out in Buying Greener: Green Public Procurement Strategy and Action Plan 2024-2027, using the EPA Green Public Procurement Guidance and criteria/Office of Government Procurement's online Green Public Procurement Criteria Search tool as resources.	In place and in progress	3.4.1 TII produced a Sustainable Procurement Guide (2021) for all spend across the organisation. This is an internal document based on the EPA Sustainable Procurement Guide for the public sector and is designed to assist project and contract managers, this document has been updated to adhere to the mandated requirements under the Buying Greener: Green Public Procurement Strategy and Action Plan 2024-2027 and is in line with Circular 17/2025: Updated Green Public Procurement Instructions for Public Sector Bodies, ensuring that sustainability requirements are embedded in all TII procurements subject to applicability of the subject matter. TII has also developed a library of sustainability related selection and award criteria questions across all sectors, which contract managers can use during the development of tenders. TII has updated its Procurement Master tracker to track all sustainable GPP criteria used on each of its tender competitions. Details on the CO2 performance ladder are included in Chapter 3 of this Roadmap.	In progress

Climate Mandate Area	Theme	Mandate	Required Content (as per SEAI/EPA Guidance published June 2025)	TII Response	Documentation to support adherence to the Climate Action Mandate	Status
			3.4.2 Adhere to the new circular, which will replace Circular 20/2019, to be published by the Department of Public Expenditure, NDP Delivery and Reform regarding new Green Public Procurement obligations included in the GPP Strategy and Action Plan 2024-2027.	In progress	TII will adhere to the new circular published July 2025 by the Department of Public Expenditure, and will update procurement guidance to reflect the updates.	In progress
	Construction	3.5	3.5.1 Specify low carbon construction methods and low carbon cement material as far as practicable as per guidance issued by Department of Enterprise, Trade and Employment for directly procured or supported construction projects from 2024 3.5.2 Adhere to the best practice guidelines for the preparation of Resource and Waste Management Plans for construction and demolition projects for directly procured or supported construction projects from 2024.	In progress	See Chapter 3 of Climate Action Roadmap. TII adheres to best practice guidelines for the preparation of Resource and Waste Management Plans for construction and demolition projects. In 2017, TII published a standard titled: The Management of Waste from National Road Construction Projects (GE-ENV-01101) which details best practice for the same. Low Carbon cement is a requirement under TII standards and TII encourages low carbon construction methods as much as possible for suitable projects. For the M7 Kildare By-pass pavement scheme, the CO2 performance ladder was successfully trailed in 2024. In 2024 TII awarded a contract for a specialist sub-contractor to provide design, manufacture and installation of the specialist canopies, waiting rooms, bus shelters and totems at the proposed new Red Cow Bus Interchange. Tenderers were required to provide details of any specific sustainability commitments / actions they will undertake as a direct consequence of being awarded this commission under the headings of (i) Carbon reduction mitigation and (ii) Reduced waste and the circular economy. Tenderers were also required to submit a CO2e estimate for the materials with supporting evidence in the form of EPDs. Tenderers could get a competitive advantage by proposing lower CO2e estimates with 7.5% of the available marks going for this estimate and the Contractor would be required under the contract to deliver the materials listed in response to this criterion.	In progress
			3.5.3 A minimum proportion of construction materials procured by public bodies under new contract arrangements to comprise recycled materials, that is informed by a Circularity Roadmap for the Construction Sector and the 2nd Whole of Government Circular Economy Strategy to be published in 2025.	In progress	TII Procurement Guidelines to be updated in 2025 to reflect the mandate requirements	In progress
	Organic Food	3.6	A minimum of 10% by value (€) of food sought under new contract arrangements (including via contractors such as canteen service providers), is to be certified organic in each of the following	In progress	TII Procurement Guidelines to be updated in 2025 to reflect the mandate requirements	In progress

Climate Mandate Area	Theme	Mandate	Required Content (as per SEAI/EPA Guidance published June 2025)	TII Response	Documentation to support adherence to the Climate Action Mandate	Status
			categories of Cereals, fresh Beef, Lamb, Pork, Poultry, Fish, Vegetables and Dairy products, where possible.			
	Food Waste	3.7	3.7.1 Measure and monitor the food waste generated on premises from 2024, using a standardised approach to food waste measurement set out in the EPA public sector guidance. 3.7.2 All new contract arrangements related to canteen or food services, including events and conferences, to include measures that are targeted at addressing food waste (with a specific focus on food waste prevention and food waste segregation, taking into account Ireland's commitment to reduce food waste by 50% by 2030.	In progress	Compost bins are provided at several locations across TII offices. The amount of food waste is monitored through the contractor. Food waste prevention and segregation is practiced on TII premises. TII is in the process of addressing food waste in arrangements for events and conferences.	In progress
	ICT Equipment	3.8	A minimum of 80% of ICT end user products (desktop computers, portable computers and mobile phones) procured by public sector bodies under new contract arrangements are certified to EPEAT Gold Standard (or equivalent), TCO Certified (or equivalent) or will have been remanufactured.	In progress	TII uses government's framework for ICT equipment procurement, using a competitive process through OGP for purchases like docking stations, other ICT equipment, etc. Some goods must be bought in new condition, such as laptops, purchased via the Government Framework Drawdown Agreement. TII's IT team aim to maintain electrical equipment for as long as possible and have an ICT Equipment Provision Policy.	In progress
	Paper	3.9	3.9.1 Review any paper-based processes and evaluate the possibilities for digitisation so it becomes the default approach. Eliminate paper-based processes as far as is practicable. Where office paper for printing and photocopying must be procured, 100% of the paper must be recycled paper.	In progress	TII completed a review of paper-based processes across the organisation in 2024. Since 2019 paper use across TII has dropped by 82%. The paper-based review was undertaken on the remaining processes which have not been digitised. TII identified the exact processes of the departments, where processes might be digitised further. TII is working on assessing the feasibility of the proposed processes for digitisation.	In progress
			3.9.2 Measure and monitor paper consumption.	In place/ in progress	Paper consumption is being monitored as part of TII's actions aimed at achieving ISO 14001 Environmental Management System certification in 2025.	In progress
	Water	3.10	3.10.1 Provide suitable drinking water refill points for all staff and in any premises accessed by the public.	In place/ in progress	TII provides water refill points across it premises. These are specific taps that provide filtered tap water.	In progress
			3.10.2 Measure and monitor total water usage for the organisation as a whole.	In place/ in progress	TII measures water usage on its premises.	In progress

Climate Mandate Area	Theme	Mandate	Required Content (as per SEAI/EPA Guidance published June 2025)	TII Response	Documentation to support adherence to the Climate Action Mandate	Status
	Single Use	3.11	3.11.1 Cease using disposable cups, plates and cutlery in any public sector canteen or closed facility, excluding clinical (i.e., non-canteen healthcare) environments, and in publicly funded advertising or broadcasting. 3.12.1 Eliminate all single use items within the organisation and from events organised, funded, or sponsored.	In progress	TII has ceased using disposable cups, plates, cutlery and similar single use items, and is working towards EMS accreditation to ISO 14001:2015. Single use items are not provided on TII premises. TII is in the process of eliminating single use items for events organised, funded or sponsored by TII. TII does not engage in publicly funded advertising or broadcasting.	In progress
	Other Materials	3.12	3.12.1 Support Ireland's Producer Responsibility Initiatives in the collection and recycling of products including the Deposit Return Scheme.	In progress	TII procurements require suppliers to be compliant with the relevant producer responsibility initiative.	In progress
			3.12.2 Contract waste collection services that are segregated into a minimum of 3 streams – residual/general waste, recycling waste and organic/biowaste and monitor weights collected.	In progress	TII segregates and the waste collection service processes its waste into 3 waste categories: general, recycling and compost (brown bin).	In progress
Our Buildings and vehicles	***Our buildings and vehicles***	4.1	Promote the use of bicycles (including push bikes, electric bikes, and cargo bikes) and shared mobility options as an alternative to car use among employees and visitors by creating and maintaining facilities (both inside and outside of buildings) that support such options, including secure and accessible bicycle parking, shared mobility parking, and charging stations, as appropriate, with a view to achieving the Smarter Travel Mark.	In progress	TII has introduced a variety of initiatives to promote active travel and behaviour change: • Facilities for bike parking, shower, clothes drying etc are provided • Regular travel to work surveys and communication of same to staff to raise awareness on sustainable mobility. Furthermore, TII engages in a variety of campaigns aimed at promoting walking and cycling including: • Bike-to-work scheme supporting staff purchase a bike for commuting. • TII updated its Blended Working Policy, incorporating insights from TII's Smarter Travel Survey (2022) and best practice. • As part of it's Blended Working Task Force, TII conducted an office fitout across both it's Liffey and Phoenix Buildings in 2025. Neighbourhoods are now in place across both office buildings, facilitating employees to sit with their teams.	In progress

Climate Mandate Area	Theme	Mandate	Required Content (as per SEAI/EPA Guidance published June 2025)	TII Response	Documentation to support adherence to the Climate Action Mandate	Status
					• 4-week Marchathon step challenge (11 teams and 56 staff). • 'Ready Set Cycle' programme over 10 weeks encouraging cycling among staff, which comprises a call for 10 cycling champions, promotion of cycle to work scheme, a free bicycle repair clinic and a cycling distance competition. In 2025 TII had four teams entering and was the winner of the 'Best Organisation' prize. • 4-week Walktober step challenge (6 teams and 30 staff). • 'Smarter Travel Mark' programme recently launched by the National Transport Authority (NTA) to support employers to develop voluntary Travel Plans focused on encouraging staff to sustainably and actively commute, considering flexible working arrangements. The Smarter Travel Mark in Silver was awarded to TII in October 2023. • Active partner in the NTA 'Smarter Travel Workplaces' programme, promoting behaviour change among staff.	
		4.2	Phase out the use of parking in buildings that have access to a range of public transport services and active/shared mobility options for the majority of staff/visitors while providing that sufficient accessible parking is maintained for those with physical mobility issues.	In progress	TII has commenced phasing out parking and removed 5 car spaces to increase bicycle parking facilities.	In progress
		4.3	Display an up-to-date Display Energy Certificate in every public building that is open to the public to clearly show energy use.	In place	As of Q1 2023, TII provides up-to-date Display Energy Certificate on every public building.	In place
		4.4	The public sector will not install heating systems that use fossil fuels after 2023, in (1) new buildings, and (2) "major renovation" retrofit projects (as defined in the Energy Performance of Buildings Directive (EPBD)) unless at least one of the following exceptions applies: • The fossil-fuel use is only using electricity from the grid; • There is no technically viable non-fossil alternative (generally only related to applications for a purpose other than space heating);	In progress	TII will not install heating systems that use fossil fuels after 2023. TII has not installed any fossil-fuel heating systems in any 'major renovation' retrofit projects since 2023. See Chapter 2 of Climate Action Roadmap for decarbonisation plans.	In progress

Climate Mandate Area	Theme	Mandate	Required Content (as per SEAI/EPA Guidance published June 2025)	TII Response	Documentation to support adherence to the Climate Action Mandate	Status
			• The installation of a renewable space heating system would increase final CO2 emissions; • The fossil-fuel use is provided for backup, peaking, or operational purposes (and makes up less than 10% of annual heating energy); • Where the direct replacement of existing fossil fuel heating is required for an emergency maintenance purpose.			
		4.5	All tenders for the public procurement of energy-related products, heating equipment, or indoor and outdoor lighting to include a requirement for tenderers to specify recommendations and options for the product, when the product or components of the product comes to the end of life, that consider environmental sustainability, including options for reuse, repair, and recycling. Comply with SI 626 of 2016 to procure Triple E registered products or equivalent.	In progress	TII Procurement Guidelines to be updated in 2025 to reflect the mandate requirements	In progress
		4.6	All tenders for the public procurement of indoor cleaning services to include a requirement for tenderers to specify the training that will be put in place to ensure that all staff involved in delivery of the contract have the knowledge and skills to apply cleaning methods, which will reduce the environmental impact of the services.	In progress	TII Procurement Guidelines to be updated in 2025 to reflect the mandate requirements	In progress
		4.7	Buildings: 4.7.1 Building stock plans – all public bodies that have not yet completed a stage 1 Building Stock Plan should do so and submit to SEAI. Public bodies that have completed a BSP should update it regularly, minimum every two years. Public bodies are encouraged to include their BSPs in their Climate Action Roadmaps. 4.7.2 National Estate Portfolio Leads are accountable for energy targets within their sectors and for developing pathways to achieve these targets. e.g., in relation to the Civil Service, the OPW will plan the deep retrofit of Government Departments' building stock. They shall develop plans and roadmaps of how they & their respective sectors will address national and upcoming EU EPBD and EED directive targets, considering both the short-term actions (towards 2030 targets) and long-term vision (to 2050 net zero). 4.7.3 SEAIs Monitoring and Reporting system will be enhanced to track national and relevant EU directive targets at NEPL level	In progress	TII upgraded its leased Parkgate Street office several years ago. Blocks A and B have a C1 BER rating. There are currently no retrofit works planned. In 2024 TII commenced internal fit-out works to accommodate more people in the existing office space and to facilitate working practices associated with blended working. TII completed the building register section of the M&R system on 15/11/24 under M&R window 2 in line with guidance issued by SEAI. TII is planning for the decarbonisation of its building stock in the coming years and will remain abreast of guidance issued by SEAI.	In progress

Climate Mandate Area	Theme	Mandate	Required Content (as per SEAI/EPA Guidance published June 2025)	TII Response	Documentation to support adherence to the Climate Action Mandate	Status
			4.7.4 Small public sector bodies should include a basic building stock analysis or statement as part of their Climate Action Roadmap, in line with the guidance published by SEAI.			
		4.8	Vehicles: Procure (purchase or lease) only zero-emission vehicles from the end of 2022, enabling Ireland to go beyond the requirements of the EU Directive, amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles (EU Directive 2019/1161, the Clean Vehicle Directive) and act as an international leader in this area. An exception applies where the vehicle is exempt under European Communities (Clean and Energy-Efficient Road Transport Vehicles) (Amendment) Regulations (S.I. 381 of 2021).1 Public sector procurement contracts for delivery and haulage should specify zero emissions vehicles where possible.	In progress	It is TII policy to use zero emission vehicles where operationally feasible. This is supported by the installation of charging points at its head office. In 2024, TII leased 2 EVs. TII is aiming to embed sustainable considerations into all stages of the procurement lifecycle in alignment with the Green Public Procurement guidance.	In progress
			4.8.1 As an enabler for the switch to zero-emissions vehicles and meeting Climate Action Plan targets, in 2024 public sector bodies with a vehicle fleet should develop a plan for installation of charging infrastructure in relevant locations. The plan should align installation of infrastructure with timelines for decarbonisation of the body's fleet. The plan should be included in the body's Climate Action Roadmap.	In progress	TII has 3 EV chargers installed at the head office for private vehicle use, and 4 EV chargers in the basement of its head office for TII fleet vehicles only.	In progress

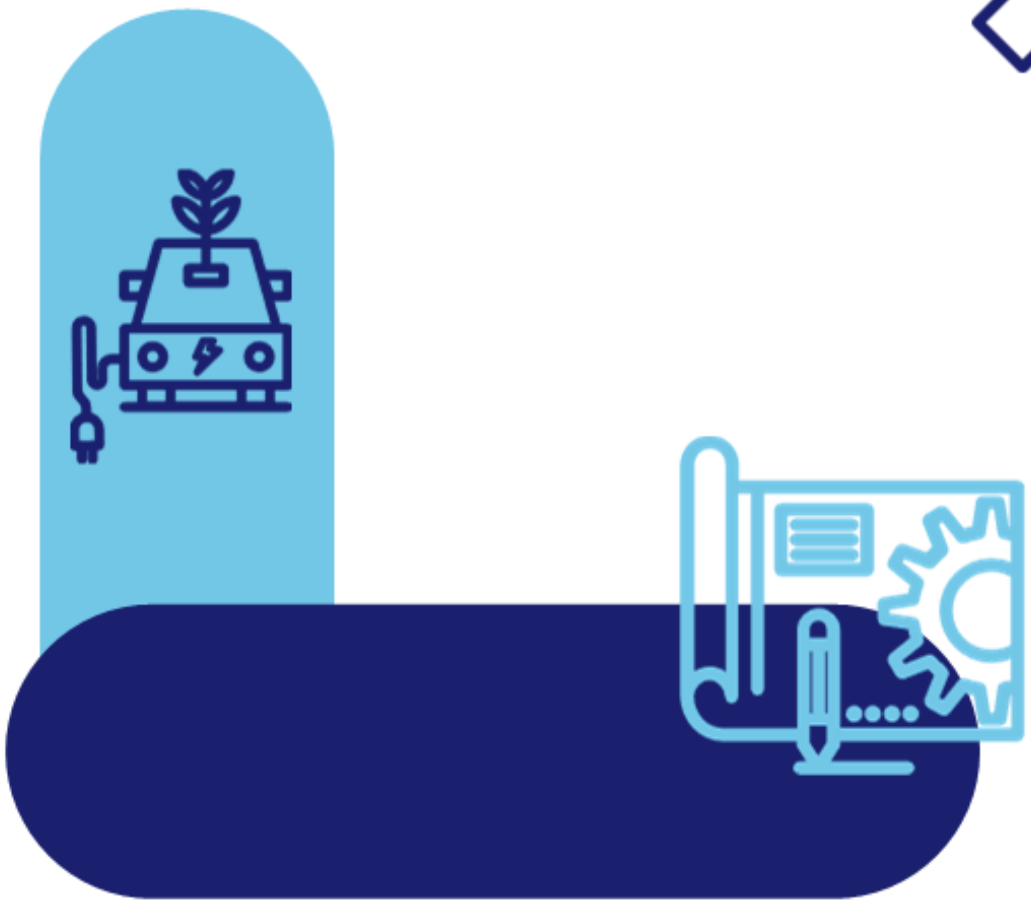
Appendix B – Policy Context

Transport Infrastructure Ireland

Appendix B

Policy Context

September 2025



CONTENTS

1 European Policy

The European Green Deal outlines Europe's response to the climate crisis. The Green Deal commits to delivering net-zero GHG emissions in the EU by 2050 and sets the EU GHG emissions reduction target to at least 55% by 2030 to limit global warming to 1.5 degrees Celsius relative to 1990 levels in line with the Paris Agreement. The 'Fit for 55' legislative package will turn the EU's ambition into reality. The EU is working to revise its climate, energy, and transport related legislation under the 'Fit for 55' package, this will align the current laws with the 2030 and 2050 ambitions. Ireland is a supporter of the EU's enhanced climate ambition.

To promote a higher energy performance of its buildings, the EU has established a legislative framework including the Energy Performance of Buildings Directive 2010/31/EU and the Energy Efficiency Directive EU/2023/1791. In combination these Directives aim to establish a highly energy efficient and decarbonised building stock by 2050, create a good environment for investment decisions, and enable consumers to make informed decisions to save energy and money. Both directives were revised in 2023. Public bodies in the EU must ensure that new public buildings, and buildings undergoing major renovation, comply with net zero-energy provisions as per this legislation or by allowing for roofs to be used for renewable energy installations.

The Energy Efficiency Directive targets energy savings in the public sector including obligating annual renovation of public buildings, and accounting for energy efficiency in procurement processes. These measures ensure that the public sector will lead by example in upgrading the energy performance of their buildings. The Directive requires large public organisations to complete energy audits every four years.

The European Commission (the Commission) has revised the Energy Efficiency Directive to align with meeting the EU 2030 target of reducing GHG emissions by at least 55%. In 2021 the Commission proposed a new directive on energy efficiency which will further prioritise energy efficiency needs within the European Union (EU) and make the ambition binding, and this new Directive was adopted in July 2023. This proposal promotes 'energy efficiency first' amongst the EU's energy policy goals which sets out its importance in both policy and investment decisions. It requires EU Member States to collectively ensure an additional reduction of energy consumption of 11.7% by 2030 compared to 2020.

The Commission's Renewable Energy Directive EU/2023/2413 is the legal framework for the development of renewable energy across all economic sectors. The Directive was revised in 2023 to align with the ambition of the European Green Deal and the recent REPower EU Plan. Under the latest directive, the EU is bound to a target of at least 42.5% renewable energies for 2030, but aiming for 45%. The Renewable Energy Directive promotes incentivisation for the use and expansion of public transport and energy efficient technologies and use of renewables within the electricity, heating, and transport sectors to reduce energy consumption.

2 National policy

Securing Ireland's Future, the Irish Programme for Government, commits to a 51% reduction in Ireland's overall GHG emissions from 2018 to 2030, and to achieving net-zero emissions by 2050.

The Public Sector Climate Action Strategy (2023-2025) aims to support public sector bodies in leading by example on climate action. It means to provide consistency in climate action across the public service. Governance has been identified as a key pillar in supporting the leadership role of the public sector in the broader nationwide transition to net zero, and takes a strong focus in the strategy. Moreover, the strategy addresses green public procurement (GPP), sustainable travel, a strategic approach for buildings, and financing.

Ireland's CAP25 outlines the plan to deliver Ireland's climate ambition (51% reduction in emissions relative to a 2018 baseline) in alignment with legally binding economy-wide carbon budgets and sectoral ceilings. CAP25 sets out a pathway for increased decarbonisation ambition across all sectors. There is significant potential for lowering Ireland's GHG emissions by increasing energy efficiency and reducing fossil fuel dependence across the public sector.

The national target for public sector energy efficiency is set for 50% increase in energy efficiency by 2030 (compared to 2009), all public buildings to achieve a B BER rating, and a new emissions reduction target of 51%. To assist in delivering this goal, the Public Sector Climate Action Strategy was published in 2023. Public bodies report on energy performance to the Sustainable Energy Authority of Ireland (SEAI) annually.

Under the EU Energy Efficiency Directive, Ireland is required to submit a National Energy Efficiency Action Plan (NEEAP) every three years. Ireland's 4th and latest NEEAP was published in early 2017.

The National Energy and Climate Plan (NECP; 2021-2030) builds on previous national strategies and sets out Ireland's decarbonisation objectives including measures relating to renewable energy, energy efficiency, energy security, internal energy market, research, innovation, and competitiveness, together with planned policies and measures. The NECP brings together the various climate and energy policies, measures and actions which are outlined in government plans, including the Climate Action Plan, the National Development Plan, and Project Ireland 2040. Among other measures, the NECP specifically mentions the development of alternative fuels infrastructure over the coming years, mandated by the EU's Alternative Fuels Infrastructure Regulation to ensure adequate EV and hydrogen vehicle charging points.

The Climate Action and Low Carbon Development (Amendment) Act 2021 enacts these objectives in law and acts as a legally binding framework with goals and commitments, to ensure that targets and obligations are met at an EU and national level.

The Act commits Ireland to move to a climate resilient and climate neutral economy by 2050 in alignment with the European Green Deal, and includes the following elements:

- Establishes the 2050 emissions target
- Introduces a system of successive 5-year, economy-wide carbon budgets
- Strengthens the role of the Climate Change Advisory Council in proposing carbon budgets
- Introduces a requirement to annually revise the national Climate Action Plan and prepare a National Long Term Climate Action Strategy at least every decade
- Introduces a requirement for all Local Authorities to prepare individual Climate Action Plans which will include both mitigation and adaptation measures.

In 2022 Ireland's first carbon budget programme was approved. The programme consists of three 5-year budgets (2021-2025; 2026-2030; 2031-2035). Each budget sets out a total allowed quantity of emissions and the average annual reduction for each period. For the 2021-2025, the overall emissions allowed are 295 Mt CO_2e, representing an average reduction in emissions of 4.8% per annum. For 2026-2030, the budget is 200 Mt CO_2e, an average reduction of 8.3% per annum.

In 2031-2035, the budget is 151 Mt CO_2e, representing an average reduction in emissions of 3.5% per annum for the third provisional budget. In addition, the Irish government reached an agreement regarding Sectoral Emissions Ceilings, which set limits on the maximum Greenhouse Gas (GHG) emissions per sector.

Sectoral Emissions Ceilings have been set for the electricity, transport, buildings, industry, and agriculture sectors. In particular, the percentage in reduction set for 2030 compared to 2018 is as follows:

- Electricity: 75%
- Transport: 50%
- Buildings (Commercial and Public): 45%
- Buildings (Residential): 40%
- Industry: 35%
- Agriculture: 25%
- Other: 50%.

The carbon budgets are intended for Ireland to progress towards the 2030 target of a 51% reduction from a 2018 baseline.

Appendix C – Technical Note

Transport Infrastructure Ireland

Appendix C

Gap-to-Target Technical Note

September 2025

CONTENTS

1 Introduction

The Sustainable Energy Authority of Ireland (SEAI) and the EPA (Environmental Protection Agency) have developed a modelling tool for public bodies to use to project progress towards the 2030 Climate Action Plan 2025 (CAP25) targets. This is known as the “Gap-to-target Tool”. The tool consists of a decarbonisation component (“decarbonisation model”) and an energy efficiency component (“energy efficiency model”) which form the two distinct parts of this tool. The details of both components are outlined in this technical note.

2 Model Background

This Appendix (Appendix C) has been prepared in line with the SEAI/EPA guidance on Climate Action Roadmaps published in April 2025. It documents how TII has utilised the gap-to-target model in line with the SEAI's *Gap-to-target model User guide* and the *Public Sector M&R-2030 Framework M&R-2030 Methodology Guidance*. The results presented in this chapter represent modelling outputs, dated July 2025, based on the most recent (at the time of writing) gap-to-target SEAI model (version 4.05) released May 2025. The Climate Action Roadmap ('Roadmap') contains a glossary of key terms to assist with reading this Appendix.

Public sector organisations in Ireland must report energy performance annually using the SEAI Public Sector 'Monitoring and Reporting' (M&R) system. The M&R system enables monitoring of progress, identification of improvement opportunities, and validation of emissions savings.

Data reported through the M&R system annually includes:

- Energy consumption
- Activities undertaken; and
- Energy-saving projects.

The Gap-to-target (GTT) tool was used to forecast TII's GHG emissions and energy efficiency progress to 2030. The GTT tool consists of a decarbonisation component ('decarbonisation model') and an energy efficiency component ('energy efficiency model'). These are described below. The GTT tool uses data collected through the M&R system as a basis for modelling.

At the time of writing, guidance for version 4.05 of the GTT model had not yet been released. As a result, the most recent available guidance—published in December 2023 and corresponding to version 3.14—was used in the preparation of this Appendix. While version 4.05 introduces annual content iterations (e.g. revised forecasts) and improvements to its visual structure, the underlying calculation methodology appears to remain consistent with previous versions. One of the most notable visual additions in version 4.05 is a new section addressing the EU-mandated 1.9% annual energy reduction target, which is discussed in detail in Chapter 2 of this report.

2.1 Decarbonisation model

The decarbonisation model aggregates emissions as in-target non-electricity, in-target electricity and total. They are defined in **Table 1** below, in line with the SEAI M&R System Guidance:

Table 1 Definition of types of emissions under M&R guidance

In-target non-electricity emissions	In-target non-electricity emissions arise from the combustion of fuels ('energy types'): • At Public Sector Organisation (PSO) facilities, to generate heat, steam, electricity, or power in stationary equipment such as boilers, furnaces etc. • In vehicles & mobile plant, including cars, trucks, trains, planes, ships, non-road • mobile machinery. • For the generation of purchased heat, cooling & or steam, including district heating.
In-target electricity emissions	In-target electricity emissions arise from: • Consumption of electricity purchased from the electricity network ('grid electricity'). • Consumption of electricity purchased via corporate purchase power agreement (CPPA). • Consumption of electricity that is produced by a non-fuel-based generator inside the meter boundary of a PSO electricity end-user, e.g., solar PV, hydro, wind turbines.

Total emissions	These are the sum of in-target electricity and in-target non-electricity (thermal and transport) emissions

A visual representation of the decarbonisation model can be found in Figure 1. The model uses historic M&R system data relating to energy consumption, carbon emissions factors set by the SEAI and TII's portfolio of planned projects from 2025-2030 to model TII's GHG emissions from its baseline (2016-2018 (average)) to 2030.

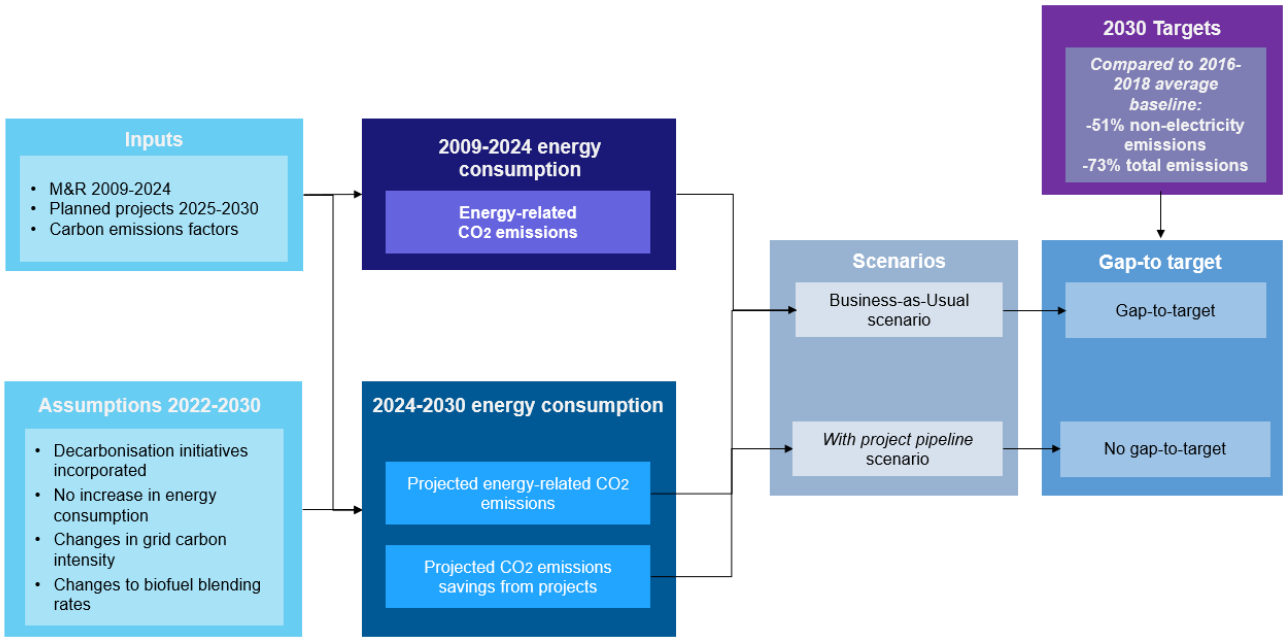


Figure 1 Representation of the decarbonisation model

Future emissions pathways are calculated up to 2030, relying on SEAI carbon emissions factors and M&R system data. The options to *'model future GHG emissions incorporating decarbonisation initiatives between 2025 & 2030 (aka 'with project pipeline scenario')'* and *'include anticipated changes to biofuel blending rates (road diesel and petrol) in calculation of future emissions'* are selected by default.

Supply-side decarbonisation, for both electricity and liquid road transport fuels are accounted for within the model. Specifically, electricity decarbonisation relates to the anticipated phasing out of fossil fuels and increased renewable energy in power generation (grid decarbonisation). Supply-side decarbonisation for fuels relates to the increased rates of blending of biofuels in road diesel and petrol. The model includes SEAI forecasts of carbon emissions factors and applies future grid conversion factors.

The impact of additional decarbonisation initiatives is accounted for either as standalone or within a portfolio of projects. The model includes calculations for a variety of initiatives, including:

i) Energy efficiency gains from building retrofits & other decreases in energy consumption

ii) Fossil-fuel boilers replacement with heat pumps

iii) Fossil-fuel boilers replacement with biomass boilers

iv) Other thermal (heat) fuel switching, e.g. changing from oil heating to gas heating

v) Fossil-fuel transport replacement with electric vehicles

vi) Fossil-fuel transport replacement with high-blend biofuels

vii) Fossil-fuel transport replacement with compressed natural gas (CNG)

viii) 100% renewable electricity (onsite generation) reducing the required grid electricity imports

For fuel switching initiatives, the model accounts for both the reduction in the fossil fuel consumption (e.g. natural gas for boilers) and the increase in electricity consumption (e.g. required for heat pumps) and applies the relevant carbon emissions factors.

The model also has the flexibility to add further increases in energy consumption, e.g., arising from expansions, new facilities, or growth in activities.

2.2 Energy efficiency

The GTT model considers TII's energy efficiency, using a baseline of 2009 and a target date of 2030. The energy efficiency scenario depends on a variety of inputs, as set out in Figure 2.

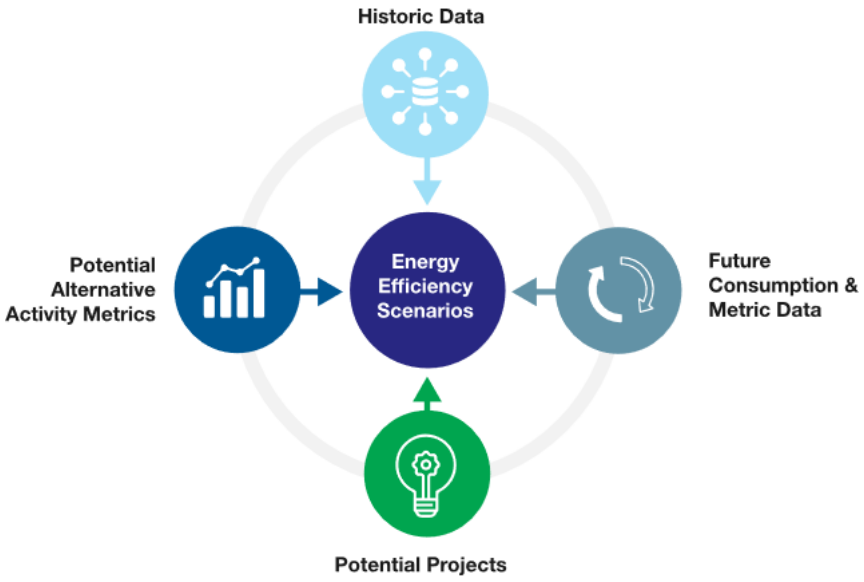


Figure 2 Building blocks for energy efficiency scenarios

Source: SEAI, Public sector energy efficiency & greenhouse gas targets - Gap-to-target model User guide (2023)

Within each scenario there are several variables that can be changed. These are: activity metrics; split of final energy consumption (percentage of electricity, heat, transport within final consumption); primary energy conversion factors.

Figure 3 below indicates how activity metrics, Total Final Consumption (TFC), Total Primary Energy Requirement (TPER), and Energy Performance Indicator (EnPI) relate to each other and are calculated.

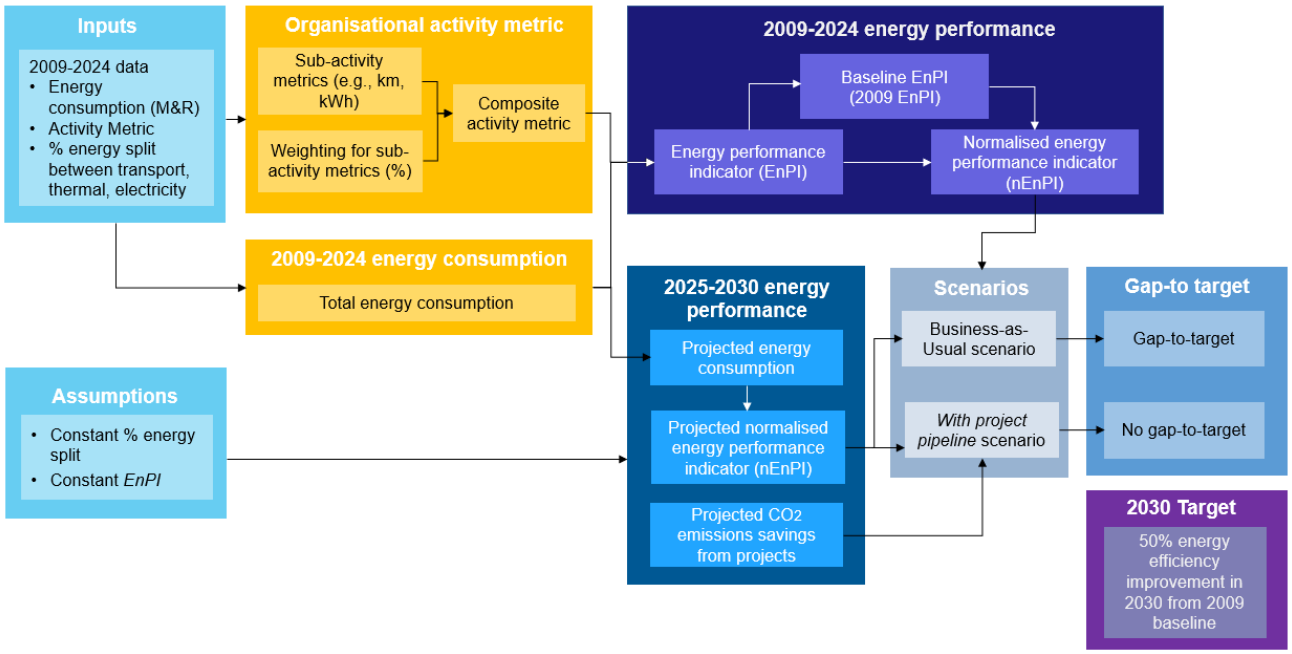


Figure 3 Representation of the energy efficiency calculation in the model

This model is based on choosing an activity metric, which is a measure of the activity that TII undertakes. As TII is a complex organisation, a composite activity metric is used to track performance as this allows distinct aspects of TII's organisation, which consume several types and quantities of energy, to be appropriately incorporated. The composite organisation-level activity metric is based on more than one sub-activity metric. The scale of each sub-activity metric's contribution to the overall activity metric is specified by TII and is based on each sub-activity metric's share of the overall energy consumption.

The sub-activities included in composite activity metric are:

- No. of lighting points in tunnels and Motorway Service Areas
- No. of lighting columns on PPP and MMaRC schemes (no. of columns)
- Product of distance travelled by Luas vehicles and the un-laden weight of Luas trams (tonne/kilometres)
- Area of the administration buildings and Luas depots (m2)
- Transport distance travelled (km).

TII measures its energy efficiency annually using an Energy Performance Index (EnPI). EnPI is calculated using annual energy consumption and a measure of TII's composite activity metric. It is calculated by dividing the Total Primary Energy Requirement (TPER) for each year by the corresponding activity metric for each year.

The EnPI for each year is normalised to allow comparison against the energy performance in the baseline year (2009), this is called the normalised Energy Performance Index (nEnPI). EnPI is normalised by dividing it by the baseline EnPI (EnPI in 2009). Lower nEnPI values show higher energy efficiency improvements, with an nEnPI below 50% meaning that the energy efficiency target of a 50% improvement has been achieved.

2.3 Updates to Luas sub-activity metric

As per the 2022 iteration of TII's Climate Action Roadmap, the model uses an updated sub-activity metric for the Luas within the composite organisational-level activity metric.

Previously, Luas activity was measured using the total kilometres travelled by its vehicles each year. This approach was suitable when tram types were more uniform across lines. However, as the fleet diversified, particularly with the extension of Green Line trams between 2019 and 2021, this metric became less representative.

To address this, the sub-activity metric has been updated. It now reflects the product of the distance travelled and the unladen weight of each Luas vehicle. This change accounts for variations in tram models and their respective weights, offering a more accurate representation of energy performance.

Consequently, the composite organisation-level activity metric used in the energy efficiency model has been updated in the M&R system to incorporate this improved Luas sub-activity metric.

3 Model Findings

The results of the gap-to-target model have been outlined in Chapter 2 of the Roadmap report. Below further details and graphical representations of the findings of the decarbonisation and energy efficiency models have been set out.

3.1 Decarbonisation

TII's decarbonisation target is set by SEAI. SEAI calculates the 2030 decarbonisation target using the data reported to the M&R system and SEAI emissions projections for electricity. TII must reduce total GHG emissions from energy by 73% overall (total emissions) and by 51% for non-electricity emissions (transport and thermal) by 2030 compared to the 2016-2018 (average) baseline.

The total emissions target is calculated using the 51% required reduction in non-electricity emissions and SEAI's projection for supply-side emissions reduction for the electricity grid (79%), compared to the baseline. This results in a total emissions reduction target of 73% by 2030 for TII, compared to the 2016-2018 (average) baseline. As SEAI updates its projections for the electricity grid, the total emissions target is subject to change in line with expected electricity grid decarbonisation.

In the model, two scenarios were set out for TII: Business-as-Usual (BAU) and 'With Project Pipeline'. The BAU scenario looks at emissions projections to 2030 whereby emissions reductions depend solely on supply-side decarbonisation. Supply-side emissions reductions from 2025 to 2030 are expected from an increased proportion of biofuels in liquid transport fuels and the decarbonisation of the electricity grid over time.

The 'With Project Pipeline' scenario explores a situation in which both supply-side decarbonisation and the emissions reductions from the project pipeline are achieved. **Table 2** outlines the GHG emissions projected under the BAU and 'With Project Pipeline' scenarios.

Table 2 GHG emissions from energy - 2030 projections

[tCO2] TFC	2016-2018 (average) Baseline	2030 Target emissions	'Business as Usual' Scenario			'With Project Pipeline' Scenario		
			2030 emissions	% Change from baseline to 2030	Gap-to-target in 2030	2030 emissions	% Change from baseline to 2030	Gap-to-target in 2030
Electricity								
Electricity	23,117	4,952	5,078	-78%	-	4,845	-79%	-
Non-electricity								
Thermal	1,808	886	2,057	+14%	-	2,002	+11%	-
Transport	3,608	1,768	3,379	-6%	-	652	-82%	-
Non-electricity Total*	5,416	2,654	5,436	+0.4%	2,782	2,654	-51%	NIL
Total GHG Emissions								
Total GHG emissions**	28,533	7,606	10,514	-63%	2,908	7,499	-74%	NIL

**Non-electricity total = thermal + transport*

***Total GHG emissions = electricity + non-electricity*

In the BAU scenario, a gap-to-target would remain in 2030. TII's non-electricity emissions (thermal and transport) are expected to be 0.4% higher in the BAU 2030 scenario than the baseline. However, TII could expect a reduction in total emissions (electricity and non-electricity) of 63% by 2030 in the BAU scenario, resulting in a gap-to-target of 2,908 tCO_2 to the target (73%).

In the 'With Project Pipeline' scenario, projected supply-side reductions from electricity grid decarbonisation, alongside the delivery of decarbonisation initiatives, are expected to lead to a 79% reduction in electricity emissions and 51% of reduction in non-electricity emissions from thermal and transport between the baseline and 2030. A higher rate of biofuel blending in liquid transport fuels will further increase supply-side reductions. TII plans to deploy a portfolio of projects between 2025 and 2030 to further accelerate decarbonisation. The planned projects are detailed in Appendix D.

The progress to date reflects the actual impact of TII's efforts and highlights the urgency of the actions still required to meet the 2030 target. Furthermore, it extends the responsibility beyond individual project teams, emphasising the need for coordinated support to secure appropriate funding, expertise, and resourcing to successfully deliver the project pipeline.

Figure 4 sets out the impact of the variety of projects on reaching the decarbonisation target. This includes projects grouped under the following categories: retrofits and efficiency initiatives, electric vehicles, and 100% renewable energy sources in electricity (RES-E), which, in addition to previous reductions from the baseline to 2024, will result in a further 11% reduction (in addition to the 'Business as Usual' scenario) by 2030 compared to the baseline. Therefore, TII is expected to exceed the 73% target, projecting a 74% reduction from the baseline.

Figure 4 Impact of projects and supply-side reductions on total emissions

3.2 Energy efficiency

The public sector is obliged to improve its energy efficiency by 50% by 2030, as set out in the Public Sector Climate Action Mandate 2025 and the CAP25. This follows from Ireland's first National Energy Efficiency Action Plan (NEEAP) of 2009, which obliged the public sector to improve its energy efficiency by 33% by 2020. TII's energy efficiency target is a 50% improvement from its 2009 baseline by 2030. Progress towards this target is tracked using the data reported to the M&R system.

The results from energy efficiency calculations are shown in **Table 3** below. **Figure 5** shows nEnPI reaching 62% in 2024, indicating a 38% improvement in energy efficiency from the 2009 baseline. In

the BAU scenario nEnPI is projected at 48%, resulting in the gap-to-target of 2% against the 50% target.

Projects that will contribute to decarbonisation will also contribute to an improvement in energy efficiency and have therefore been included within the project pipeline. When the project pipeline is considered, the projections show that gap-to-target will be closed, and the 50% target will exceed by 3%. This shows that if the planned projects are implemented as in the 'With Project Pipeline' scenario, TII is expected to achieve the energy efficiency target.

Table 3 3 Results from the energy efficiency model

	Target	2030 BAU Projection	2030 Projection with projects
nEnPI	50%	52%	47%
Energy efficiency improvement versus 2009 baseline	50%	48%	53%
Gap-to-target in 2030	NIL	2%	NIL (Target exceeded by 3%)

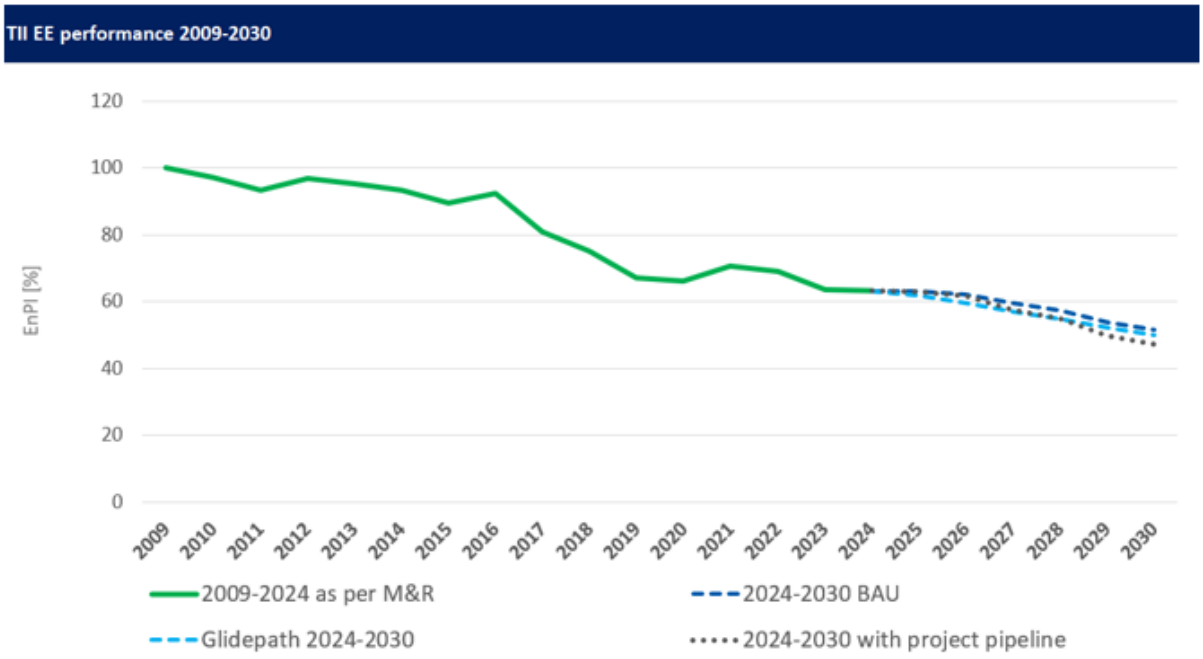


Figure 5 TII energy efficiency 2009-2030

3.3 Energy reduction

Directive (EU) 2023/1791 mandates that all public sector bodies reduce their combined final energy consumption by at least 1.9% annually, using 2021 as the baseline. The 1.9% annual reduction target is embedded within the EU's overall goal of reducing final energy consumption by 11.7% by 2030, relative to 2020 projections. This requirement forms part of the European Green Deal and aligns with the Paris Agreement objectives.

It has not yet been determined whether public transport will be included within this target in Ireland. However, TII will seek an exemption for its public transport operations. In the current gap-to-target

model, **Figure 6** illustrates TII's current trajectory toward meeting the 1.9% annual energy reduction target. Within the Gap-To-Target model, annual energy consumption is projected by applying a 1.9% reduction to the baseline year and subtracting this absolute value from the previous year's final energy consumption.

The forecasts indicate that TII is currently not on track to meet the required reductions, indicating a gap to target of 3.1% compared to the 2021 baseline, equivalent to 2,634 kWh. It highlights the urgent need to continue efforts to close this gap.

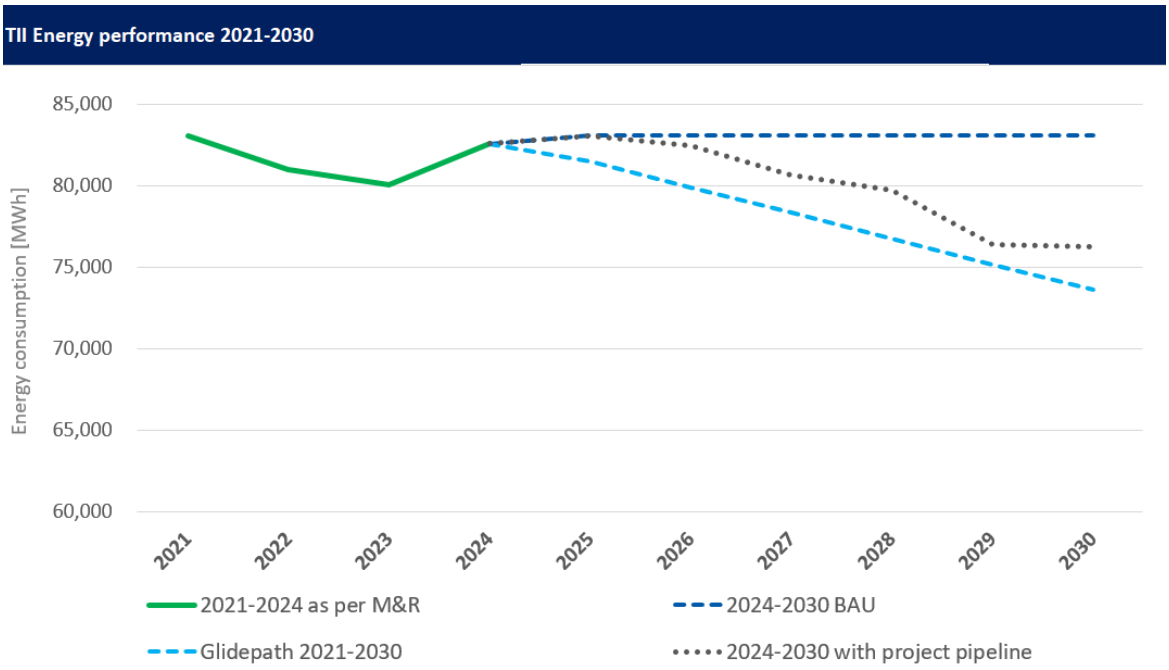


Figure 6 TII energy reduction 2021-2030

4 Analysis Of Major Emitters

TII's energy-related carbon emissions include all the electricity, thermal and transport fuel emissions associated with TII's buildings, depots and offices, the national road network (fuel and electricity consumption for operations such as PPP, MMaRC, and tunnels, excluding road users) and light rail network. Most emissions are associated with the operation of the national road network and the operation of the Light Rail Network.

The national road network is made up of 995 km of motorway, 374 km of dual carriageway and 3,936 km of single carriageway, as stated in TII's National Road Networks Indicators (2024). The emissions from the national road network arise from: route lighting, tunnels, motorway service areas, motorway operations and maintenance, bridge maintenance, travel information services for road users and tolling. Route lighting on roads and tunnels consumes the largest amount of energy. Therefore, TII has focused on finding measures to reduce energy consumption from traffic route lighting. This includes removing surplus lighting, dimming/voltage regulation where appropriate, and replacing of existing fittings with LED lighting. The removal of surplus lighting at motorway junctions have provided typical energy savings at each junction of ~70%. TII's Energy Policy for Route Lighting of Remove, Reduce and Replace has contributed to 12.85 GWh in energy savings per year, which amounts to an annual emissions reduction 3,855 tCO_2. This is illustrated in **Figure** 7.

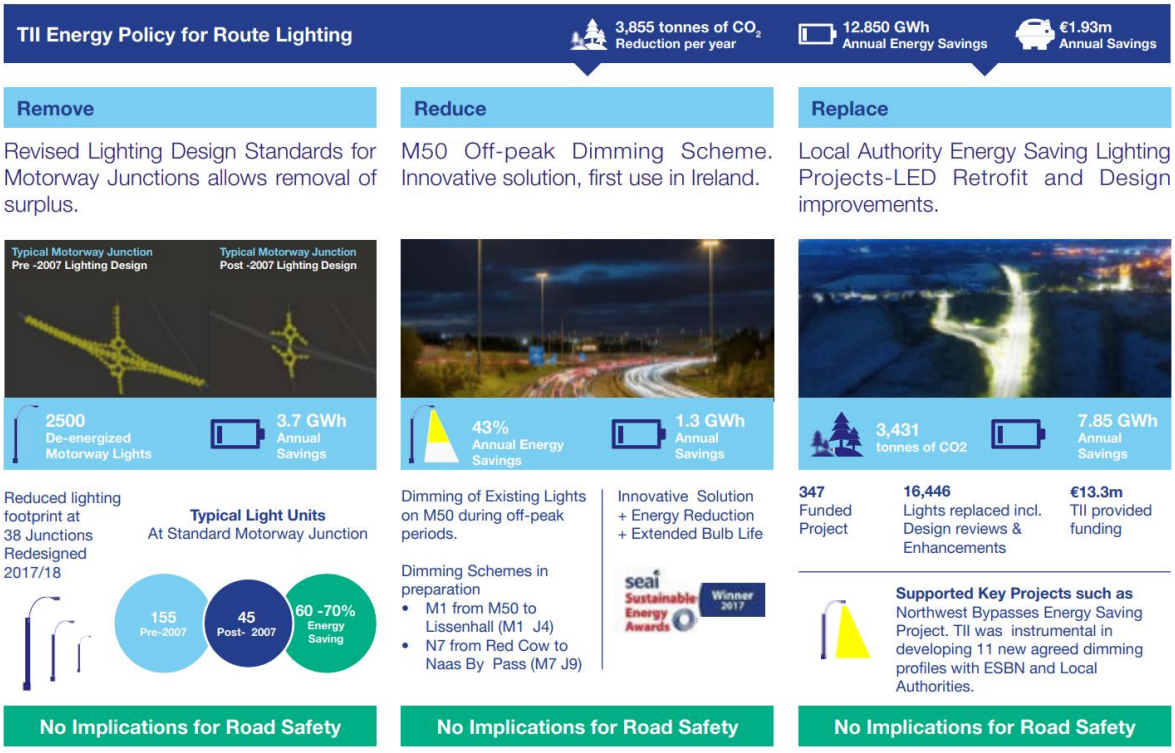


Figure 7 TII energy policy for route lighting (Source: TII Annual Report and Financial Statements (2021))

The Luas network is Dublin's Light Rail Transit system. The Luas network consists of two tram lines, the Luas Red Line (21km) and the Luas Green Line (22km) which interchange in Dublin city centre. The Luas network has 67 tram stops, seven park and ride facilities at stop locations, 24 traction substations and three tram depots. During peak hours, 58 operational trams accommodate up to 18,000 passengers.

The Luas forms transport hubs with Irish Rail stations at Heuston, Connolly, Spencer Dock and Broombridge and shortly with Bus Connects at the Red Cow interchange thus providing a seamless transport experience for passengers.

The Red Line extends from Tallaght, in the southwest of Dublin, through the city centre, to The Point in Dublin's Docklands. The Line has two spurs one to service Connolly Station, and one to service Saggart.

The Green Line extends from Bride's Glen in the southeast of Dublin to Broombridge in the north-west city suburbs. The line consists of a combination of single and twin tracks and is 43km in length overall.

54 million passenger journeys recorded on the Red and Green lines and a new timetable was brought into operation for both lines in May 2025 improving passenger experiences. In 2024, weekly passenger numbers averaged 1 million, with 75% of passengers using the service at least twice a week. Furthermore, TII commenced capacity enhancement studies for both the Red and Green Luas lines, which are expected to be complete in late 2025. Modern tramways are one of the most environmentally friendly and energy-efficient forms of public transport, with zero emissions at the point of use. The existing Luas network and its continued expansion has the potential to reduce commuters' carbon footprint, encourage modal shift to public transit, and prevent chronic road congestion – thus helping to meet the carbon emissions goals set out in CAP25.

As the operation of the Luas network relies on electricity, the implementation of energy efficiency projects on the network is key to decreasing energy use and associated emissions. TII will deliver a number of projects aimed at increasing the efficiency of the Luas infrastructure such as stop LED lighting retrofitting projects which will replace all metal halide lamps with LED lamps for the light rail network. Further projects phases will target the Luas depots and park & ride car park lighting.

Alongside this, TII updated procurement and design procedures to comply with the requirement to eliminate fossil fuel heating after 2023. TII is investigating alternative energy supply options. This requirement will be applied to all new builds or renovations under the TII remit moving forward.

TII will focus on decarbonising the electricity feeding all Luas depots. Luas depots are measured as among the top four highest energy consuming sites within the TII organisation. This shall be carried out via on-site renewable energy generation via the introduction of commercial scale rooftop solar PV arrays on the roof areas of the tram depots. The arrays will vary in size between 350KWp and 500KWp thus contributing significantly to decarbonising the electricity consumed on site and thus significantly reducing the CO_2 emissions. These projects are included within the Gap-to-target model.

5 Opportunities Arising from a Detailed Design

TII is accredited to ISO 50001: 2018 Energy Management Systems and in the context of ISO surveillance, TII delivers continuous improvement in order to retain the certification. ISO 50001 applies to TII's Parkgate Street offices, its staff transport fleet and equipment on the Motorway (e.g., Variable Message Signs [VMS]) as these systems are under the control of TII. TII has to date identified the following opportunities which have been completed or are in progress:

- Replacement of core building services equipment at all Parkgate Street buildings to energy efficient latest technology which included gas boilers, Air Handling Units (AHUs), Fan Coil Units (FCUs), chillers, pumps, and calorifiers.
- Upgraded lighting to LED technology including presence detection to allow for an automated lighting system.
- In 2024, TII completed implementation of the Cloud First Strategy through migration to new cloud systems for Network Monitoring, File Sharing, Wi-Fi Management, and system authentication.
- Sub-metering within TII's buildings and major consumers which leads to better control of electrical consumption and thus leads to emission reduction opportunities.

The following opportunities were found following the 2022 recertification audit for ISO 50001:

- Reducing boiler return temperature to ensure condensing effect.
- Fitting a weather compensator to the Building Management System to adjust on times according to the external temperature.
- Monitoring system for Intelligent Transportation Systems (ITS) energy consumption.
- Investigating heat pumps as replacements to the current heating and cooling sources at Parkgate Street HQ.
- Removing desktop PCs from workstations. All staff will use laptops and following the introduction of hot desking (hybrid working system) will dock at booked workstations. This will ensure no laptop will remain powered on after close of business thus reducing consumption of electricity.
- Introduction of hybrid working thus ensuring the most efficient use of the three buildings whilst also facilitating an increase of up to 100 new personal in between 2023 - 2025 for large capital projects.

These opportunities will contribute to TII achieving a higher building energy rating.

The Energy Efficiency Directive (EED) mandates large organisations such as TII to complete energy audits every four years. This is reflected in Irish legislation in S.I. 426 of 2014 and is known as the Energy Auditing Scheme. TII's 2021 S.I .426 audit found the following opportunities:

- Solar PV panels to power motorway based ITS (Intelligent Transport System) equipment such as VMS (Variable Message Sign) on N17/18 motorway.
- Wind turbines connected to batteries to power motorway based ITS equipment to support the solar powered VMS.
- Motorway based weather stations powered from solar/ wind combination.

The findings of the recertification audit for ISO 50001 and S.I. 426 energy efficiency audit inform project planning decisions. The planned project pipeline has been outlined in Appendix D.

6 Investment and Resources

Overall TII has a mature project delivery ability. TII has a proven record of delivering large (>€1m), complex, capital investments of a similar scale and complexity to those projects planned in Appendix D. For TII to deliver the emissions savings projects, significant additional funding and resources will be needed. A program of targeted investment will be required to deliver the planned projects and support the associated monitoring and maintenance into the future. Achieving the targets will be dependent on TII receiving additional resources and funding.

7 Limitations

The projects that have been included in the model vary in terms of project readiness from concept to tender/contracting stage. The projects which are at concept stage have not yet been developed to any significant extent beyond simple scoping and early-stage engagement. Other projects are at a more advanced stage with well-defined designs and technical specifications. Projects that are currently at concept stage cannot be considered equivalent to those that are at a tendering stage.

The use of modelling has inherent limitations as models provide a simplified picture of the real-world situation. The Gap-to-target model focuses on key features relating to decarbonisation and energy efficiency of TII up to 2030. However, a model cannot include all the details of a real-world situation and therefore not all attributes of decarbonisation and energy efficiency can be represented. The results of the model are therefore considered approximations and not real or exact observation.

Appendix D – List of Projects

Introduction

Each project within this appendix has been categorised in terms of scale and readiness, where known a cost estimate has also been provided. The categories have been provided by the SEAI.

Table 1 Project scale categories

Category	Description
1 Zero- or minimal-investment	'Low-hanging fruit', consisting of energy management, staff awareness and minor investments in controls (e.g. automatically powering off PCs).
2 Standalone energy project (<€100k)	Investments in single systems (e.g. lighting, heating, etc.) that have a defined payback based on energy cost savings.
3 Standalone energy project (>€100k)	Investments in single or multiple systems (e.g. lighting, heating, etc.), potentially including building fabric measures. These projects are not necessarily limited to the built environment, i.e. a project could involve fleet replacement.
4 Asset renewal project	Generally where a full building retrofit is required, or a building is recommended for replacement.
5 New build project	New buildings being constructed. These will be to the latest building standards, which are tending towards NZEB by the end of this decade. Energy Efficient Design principles are promoted by SEAI. These ensure that the energy footprint of a building can be minimised for the energy service required.
6 National infrastructure project	Large elements of national infrastructure are being be upgraded or replaced, e.g. rolling stock (rail), buses, water and waste systems, and hospitals.

Table 2 Project readiness categories

Category	Description
1 Concept	Project has been identified by an audit, end-of-life of existing system, or is desirable to the client. Project has not been developed to any significant extent beyond simple scoping and early market engagement.
2 Priority project	Project has been identified through structured energy management processes and audits and has been prioritised among other register of opportunity projects. Project has not been developed to any significant extent.
3 Project scope developed	Project scope has been advanced and developed and basic project parameters are understood. This could be through feasibility study, opportunity assessment or through deeper engagement with the market (e.g. receiving quotations, etc.).
4 Business case developed	Project has been developed to include surveys, schedules, baseline energy data (from metering or engineering calculations). Consideration has been given to contracting approach and a robust analysis of cost and energy savings has been undertaken to inform a business case for the project. Financing options are being considered and/or budget is being sought.
5 Design stage	Detailed design work has been undertaken, either by a consultant engineer or as part of a procurement exercise. Project is very well defined - design drawings, technical specification, schedules and the contracting approach have all been defined. Finance is in place.
6 Tender / contracting stage	Project is ready for tendering, or tendering is underway. Project is very advanced and contractor could be mobilised within 3 months.

Appendix D Roadmap 2025 Projects

**The implementation year is the year when the project is completed*

Projects included in the Gap to Target model.

	Project details			Project categorisation					Energy savings in year after implementation					Financial summary			Notes/Project description
	Project name	Implementation year*	Location	Type	Sub-type	Project scale	Project readiness	EE or RE or CHP?	Grid electricity	Thermal	Transport	Total	Duration of savings	Estimated cost	Project will seek to avail of external funding or support	Project will seek to incorporate pay for performance	
	[-]	[-]	[-]	[-]	[-]	[-]	[-]	[-]	[kWh TFC]	[kWh TFC]	[kWh TFC]	[kWh TFC]	[years]	[€]	[-]	[-]	[-]
	Energy efficiency gains from retrofits & other decreases in consumption																
1	NM Lighting - Phase 2 Network Lighting Projects	2026	Managed Network Lighting	Lighting	Lighting & lighting controls (external)	3 Standalone energy project (>€100k)	5 Design stage	EE	383,000.00	0	0	383,000.00	100.00	250,000.00	None	No	Cost note refers to new capital investment required by TII - assumption is no new capital will be required by TII (operator may offset capital costs against savings).
2	NM Lighting - Phase 3 Network Lighting Projects	2026	Managed Network Lighting	Lighting	Lighting & lighting controls (external)	3 Standalone energy project (>€100k)	2 Priority project	EE	736,981.21	0	0	736,981.21	100.00	3,000,000.00	None	No	Cost note refers to new capital investment required by TII - assumption is no new capital will be required by TII (operator may offset capital costs against savings).
3	NM Lighting - Phase 4 Network Lighting Projects	2026	Managed Network Lighting	Lighting	Lighting & lighting controls (public lighting)	3 Standalone energy project (>€100k)	2 Priority project	EE	612,175.40	0	0	612,175.40	100.00	1,000,000.00	None	No	Cost note refers to new capital investment required by TII - assumption is no new capital will be required by TII (operator may offset capital costs against savings).
4	NM Lighting - Phase 5 Network Lighting Projects	2027	Managed Network Lighting	Lighting	Lighting & lighting controls (public lighting)	3 Standalone energy project (>€100k)	1 Concept	EE	600,000.00	0	0	600,000.00	100.00	-	None	No	Cost note refers to new capital investment required by TII - assumption is no new capital will be required by TII (operator may offset capital costs against savings).
5	NM Lighting - Phase 6 Network Lighting Projects	2028	Managed Network Lighting	Lighting	Lighting & lighting controls (public lighting)	3 Standalone energy project (>€100k)	1 Concept	EE	550,843.39	0	0	550,843.39	100.00	-	None	No	Cost note refers to new capital investment required by TII - assumption is no new capital will be required by TII (operator may offset capital costs against savings).
6	CPM Lighting - Luas Red line Stop Lighting Project	2026	Luas Red line	Lighting	Lighting & lighting controls (external)	3 Standalone energy project (>€100k)	6 Tender / contracting stage	EE	106,000.00	0	0	106,000.00	100.00	-	Yes	No	The red line stop lighting project involves the replacement of the existing stop lighting metal halide (MH) lamps and fittings with LED type fittings and lamps on each of the red line stops from Tallaght stop to Connolly stop. The scope of the works will include verification and testing of the electrical installation on completion which includes the lighting circuitry, protective devices, earthing & bonding and lighting controls.
7	CPM Fleet - Rolling Stock Saloon Lighting Retrofit Trial - Luas green line - one tram from fleet modified for trial	2024	Luas Green Line	Lighting	Lighting & lighting controls (Internal)	3 Standalone energy project (>€100k)	6 Tender / contracting stage	EE	18,510.00	0	0	18,510.00	100.00	-	None	No	Saloon LED Lighting Trial is being implemented by Transdev (Luas operator). The trial will involve the replacement of the existing saloon fluorescent tubes with LED lamps on a single tram from the Luas fleet. This trial will determine if the replacement LED lamps conform to certain quality, brightness (lux levels) and durability standards. In addition to energy savings, the introduction of LED technology offers other benefits such as: - Waste Reduction: The overall quantity of fluorescent tubes consumed will be significantly reduced - Maintenance: There will be a reduction in the cost of parts and labour. - Reliability: The service life of LED tubes is in excess of 10 years.
	Heat | fossil fuel boiler -> heat pump																
8	Depot Heating	2029	Managed Network premises	HVAC	Boiler upgrade	4 Asset renewal project	1 Concept	EE	- 64,648.00	215,492.00	0	150,844.00	100.00	-	None	No	-
	Transport | fossil fuel -> electric vehicle																
9	NM Fleet - Light fleet vehicle transition Phase 1	2025	Managed Network Fleet	Transport	Electric vehicle	3 Standalone energy project (>€100k)	2 Priority project	EE	- 374,373.01	0	935,932.52	561,559.51	100.00	-	None	No	Swap from LIGHT vehicle diesel to Elec means less diesel consumed but an increase in electricity. For TII, an additional operational costs will arise relating to extra over on EV replacements vs standard light diesels, while differential energy costs will also be considered.
10	NM Fleet - Med fleet vehicle transition Phase 1	2027	Managed Network Fleet	Transport	Electric vehicle	3 Standalone energy project (>€100k)	2 Priority project	EE	- 239,598.72	0	598,996.81	359,398.09	100.00	-	None	No	Swap from MEDIUM diesel to Elec means less diesel consumed but an increase in electricity. For TII, an additional operational costs is likely to arise relating to extra over on EV replacements vs standard medium diesels, while differential energy costs will also be considered. Medium vehicle projections are subject to the availability of vehicles of appropriate range when loaded / towing etc.
11	NM Fleet - Light fleet vehicle transition Phase 2	2028	Managed Network Fleet	Transport	Electric vehicle	3 Standalone energy project (>€100k)	1 Concept	EE	- 1,123,119.02	0	2,807,797.55	1,684,678.53	100.00		None	No	Swap from LIGHT vehicle diesel to Elec means less diesel consumed but an increase in electricity. For TII, an additional operational costs will arise relating to extra over on EV replacements vs standard light diesels, while differential energy costs will also be considered.
12	NM Fleet - Med fleet vehicle transition Phase 2	2028	Managed Network Fleet	Transport	Electric vehicle	3 Standalone energy project (>€100k)	1 Concept	EE	- 718,796.17	0	1,796,990.43	1,078,194.26	100.00	-	None	No	Swap from MEDIUM diesel to Elec means less diesel consumed but an increase in electricity. For TII, an additional operational costs is likely to arise relating to extra over on EV replacements vs standard medium diesels, while differential energy costs will also be considered. Medium vehicle projections are subject to the availability of vehicles of appropriate range when loaded / towing etc.
	Transport | fossil fuel -> HVO & other high-blend biofuels																
13	NM Fleet - Heavy Fleet Fuel Transition Phase 1	2025	Managed Network Fleet	Transport	Combination/other	1 Zero- or minimal-investment	6 Tender / contracting stage	RE	-	0	1,065,562.54	-	100.00	-	None	No	Recorded here for completeness, no impact on EE. While modest capital investment may be required to provision or upgrade fuelling equipment, there will be an increase in operational costs, based on likley prevailing market rates. Full roll out is dependent on a sucessful trial. If available TII will work to increase the transition form diesel year on year - availability and costs may ultimately limit ambition.
14	NM Fleet - Heavy Fleet Fuel Transition Phase 2	2028	Managed Network Fleet	Transport	Combination/other	1 Zero- or minimal-investment	1 Concept	RE	-	0	2,163,414.85	-	100.00	-	None	No	Recorded here for completeness, no impact on EE. While modest capital investment may be required to provision or upgrade fuelling equipment, there will be an increase in operational costs, based on likley prevailing market rates. Full roll out is dependent on a sucessful trial. If available TII will work to increase the transition form diesel year on year - availability and costs may ultimately limit ambition.
15	NM Fleet - Heavy Fleet Fuel Transition Phase 3	2029	Managed Network Fleet	Transport	Combination/other	1 Zero- or minimal-investment	1 Concept	RE	-	0	2,863,433.00	-	100.00	-	None	No	Recorded here for completeness, no impact on EE. While modest capital investment may be required to provision or upgrade fuelling equipment, there will be an increase in operational costs, based on likley prevailing market rates. Full roll out is dependent on a sucessful trial. If available TII will work to increase the transition form diesel year on year - availability and costs may ultimately limit ambition.
16	NM Fleet - Heavy Fleet Fuel transition Phase 4	2029	Various fleet elements	Transport	Combination/other	1 Zero- or minimal-investment	1 Concept	RE	-	0	416,788.00	-	100.00	-	None	No	Recorded here for completeness, no impact on EE. While modest capital investment may be required to provision or upgrade fuelling equipment, there will be an increase in operational costs, based on likley prevailing market rates. Full roll out is dependent on a sucessful trial. If available TII will work to increase the transition form diesel year on year - availability and costs may ultimately limit ambition.
	Electricity | grid electricity -> 100% renewable																
17	NM Solar - Phase 2 Additional premises	2026	Managed Network Premises	Energy supply	Onsite renewable electricity generation - solar PV	3 Standalone energy project (>€100k)	6 Tender / contracting stage	RE	160,000.00	0	0	-	100.00	464,000.00	None	No	Cost note refers to est. new capital investment required by TII.
18	NM Solar - Phase 3 Additional premises	2026	Managed Network Premises	Energy supply	Onsite renewable electricity generation - solar PV	3 Standalone energy project (>€100k)	2 Priority project	RE	200,000.00	0	0	-	100.00	580,000.00	None	No	Cost note refers to est. new capital investment required by TII.
19	NM Solar - Phase 4 Additional premises	2026	Managed Network Premises	Energy supply	Onsite renewable electricity generation - solar PV	3 Standalone energy project (>€100k)	2 Priority project	RE	200,000.00	0	0	-	100.00	580,000.00	None	No	Cost note refers to est. new capital investment required by TII.
20	NM Solar - Phase 5 Additional premises	2027	Managed Network Premises	Energy supply	Onsite renewable electricity generation - solar PV	3 Standalone energy project (>€100k)	1 Concept	RE	200,000.00	0	0	-	100.00	580,000.00	None	No	Cost note refers to est. new capital investment required by TII.
21	NM Solar - Phase 6 Additional premises	2028	Managed Network Premises	Energy supply	Onsite renewable electricity generation - solar PV	3 Standalone energy project (>€100k)	1 Concept	RE	200,000.00	0	0	-	100.00	580,000.00	None	No	Cost note refers to est. new capital investment required by TII.
22	NM Solar - Phase 7 Additional premises	2029	Managed Network Premises	Energy supply	Onsite renewable electricity generation - solar PV	3 Standalone energy project (>€100k)	1 Concept	RE	200,000.00	0	0	-	100.00	580,000.00	None	No	Cost note refers to est. new capital investment required by TII.
23	CPM Solar - Rooftop Solar PV - Red Cow Luas depot	2028	Red Cow Luas Depot	Energy supply	Onsite renewable electricity generation - solar PV	3 Standalone energy project (>€100k)	6 Tender / contracting stage	RE	414,780.00	0	0	414,780.00	100.00	700,000.00	Yes	No	Due to issues with the integrity of the roof at Red Cow depot coupled with a proposal to upgrade the Red Cow depot which includes extending the tram shed and accommodation block, the rooftop solar PV array for Red Cow will be delayed and absorbed into the main depot upgrade project.
24	CPM Solar - Rooftop Solar PV - Sandyford Luas Depot	2026	Sandyford Luas Depot	Energy supply	Onsite renewable electricity generation - solar PV	3 Standalone energy project (>€100k)	6 Tender / contracting stage	RE	265,000.00	0	0	265,000.00	100.00	500,000.00	Yes	No	TII IPG group approved the project and its funding source. Project Services achieved NTA approval. TII architecture dept will manage the planning process.
25	CPM Solar - Rooftop Solar PV - Broombridge-Hamilton Luas Depot	2025	Broombridge-Hamilton Luas Depot	Energy supply	Onsite renewable electricity generation - solar PV	3 Standalone energy project (>€100k)	6 Tender / contracting stage	RE	180,000.00	0	0	180,000.00	100.00	400,000.00	Yes	No	TII IPG group approved the project and its funding source. Project Services achieved NTA approval. TII architecture dept will manage the planning process.

Appendix E - TII's Partnerships

Corporate Membership	Description	Partnership Benefits
Construction Industry Federation	The representative body for construction companies in Ireland, promoting safety, training, and industry standards.	Promotes circular economy, low-carbon materials, and green procurement in construction.
Irish Academy of Engineering	All-island body of engineers that provides independent advice on engineering and technology-related policy issues.	Supports engineering solutions for mitigation and climate-resilient transport systems.
UK Tram Ltd	The UK's centre of excellence for light rail and tramway systems, supporting innovation, safety, and best practices in the sector.	Supports electrification and modal shift strategies.
Geotechnical Asset Owners Forums (MS)	A collaborative platform for infrastructure owners to share knowledge and best practices in managing geotechnical assets.	Supports climate adaptation and resilience of critical assets.
Bridge Owners Forum	UK-based group of public and private sector bridge owners sharing knowledge on asset management, safety, and innovation.	
PIARC (World Road Association)	International forum for the exchange of knowledge and best practices on roads and road transport, with members from over 120 countries.	Improves asset management, mitigation, and climate adaptation strategies.
CEDR (Conference of European Directors of Roads)	Platform for cooperation between national road authorities across Europe, focusing on innovation, sustainability, and policy alignment.	
FEHRL (Forum of European National Highway Research Laboratories)	Network of national research and technical centres focused on road engineering and infrastructure innovation across Europe.	
The International Bridge, Tunnel and Turnpike Association (IBTTA)	Global association representing toll facility operators and related businesses, focused on advancing mobility through tolling.	
CITA- The Construction IT alliance	Irish organisation that promotes the use of information and communication technologies (ICT) in the construction industry.	Enables better data tracking, lifecycle analysis, and carbon monitoring.
Irish Concrete Society	Technical and educational society dedicated to advancing concrete technology and construction in Ireland.	Encourages use of low-carbon concrete and recycled materials in TII projects.

Corporate Membership	Description	Partnership Benefits
Irish Concrete Society	Technical and educational society dedicated to advancing concrete technology and construction in Ireland.	Support sustainable urban mobility.
UITP: L'Union internationale des transports publics - International Association of Public Transport	Global network of public transport stakeholders, supporting sustainable urban mobility through knowledge sharing and advocacy.	Enhances traffic flow and reduces emissions through smart infrastructure.
ITS Ireland	The Irish chapter of the Intelligent Transport Systems community, promoting smart mobility solutions and innovation in transport technology.	Enhances traffic flow and reduces emissions through smart infrastructure.
Connected, cooperative and Automated Mobility Partnership (CCAM)	A European initiative fostering collaboration on connected and automated mobility technologies to improve road safety and efficiency.	Improves traffic efficiency and reduces emissions by enabling real-time communication between vehicles and infrastructure.
C-Roads Platform	A European initiative coordinating the deployment of Cooperative Intelligent Transport Systems (C-ITS) across EU member states.	
Infrastructure & Ecology Network Europe (IENE)	A European network that promotes environmentally sustainable transport infrastructure through research and policy development.	Promotes biodiversity and nature-based solutions alongside infrastructure.
Association Of Chief Executives of State Agencies (ACESA)	ACESA provides a forum for chief executives to discuss issues of mutual concern and enables them to develop and express a collective voice on issues that affect the sector.	Enabling discussions relating to sustainability across different stakeholders within the sector.
Supply Chain Sustainability School	The school is a partnership with businesses and organisations across Ireland designed to enable the supply chain to embed sustainability.	Embedding sustainability in the supply chain