



An Roinn Iompair
Department of Transport

zevi
Zero Emission
Vehicles Ireland

National Road Network EV Charging Plan *Executive Summary* **2024-2030**



Department of Transport



Minister's Foreword

Climate action is the most pressing global challenge of our time and a priority for the Government of Ireland. The Climate Action Plan 2024 outlines the pathway to cut transport emissions by 50% by 2030. The transition of our vehicle fleet to electricity is critical to delivering on that challenge, and by 2030 will provide the single biggest mitigation action in the transport sector. To support this transition the Government is fully committed to supporting a significant expansion of the electric vehicle charging network over the coming years. ZEVl, an office based in the Department of Transport is charged with leading and co-ordinating this infrastructure roll out.

Launched by ZEVl in January 2023, the National EV Charging Infrastructure Strategy presents an ambitious pathway and practical steps for the delivery of a national EV charging network. The Strategy signposts the need for a pool of high-powered chargers every 60 km on our motorway network as well as home/apartment charging, residential neighbourhood charging (including new mobility hubs), destination charging and en-route charging. This **National Road Network EV Charging Plan** is the first step to delivering on the promise and identifies the level of charging that will be needed on our national primary and secondary road network. This plan forms part of a wider set of actions and initiatives aimed at accelerating the adoption of electric vehicles in Ireland as set out in the National EV Charging Infrastructure Strategy.

In addition to the Government's objective of rolling out an EV charging network to keep ahead of public demand, the European Union has agreed the Alternative Fuels Infrastructure Regulation (AFIR)ⁱ, which will apply from 13th April, 2024. For charging light-duty electric vehicles including passenger EVs, the regulation requires a total power capacity to be provided based on the size of the registered fleet. This will require almost 250% increase in charging capacity by 2025 and the national road network infrastructure is a significant part of that overall effort. AFIR also calls for Trans-European Network Transport (TEN-T) coverage requirements in 2025 and 2035 for light-duty vehicles (LDVs), including passenger cars, and for heavy-duty vehicles (HDVs).

With over 110,000 EVs sold by the end of 2023, the number of electric vehicles on our roads continue to expand. To serve this market, Ireland already has a growing network of publicly accessible EV charging points with over 2,400 installed to date. However, we now need to significantly increase and accelerate the delivery of this network. This Plan sets out how Government will, working with private industry, deliver on our ambitious EV charging targets.

In addition to light-duty vehicles, the transition of heavy-duty vehicles (HDVs) to electric is now taking off across Europe. The Climate Action Plan has a target of 30% of sales for new medium and heavy-duty vehicles (MHDVs) (including buses) to be zero-emission by 2030. This **National Road Network EV Charging Plan** outlines the infrastructure that will be rolled out to serve this developing EV market.

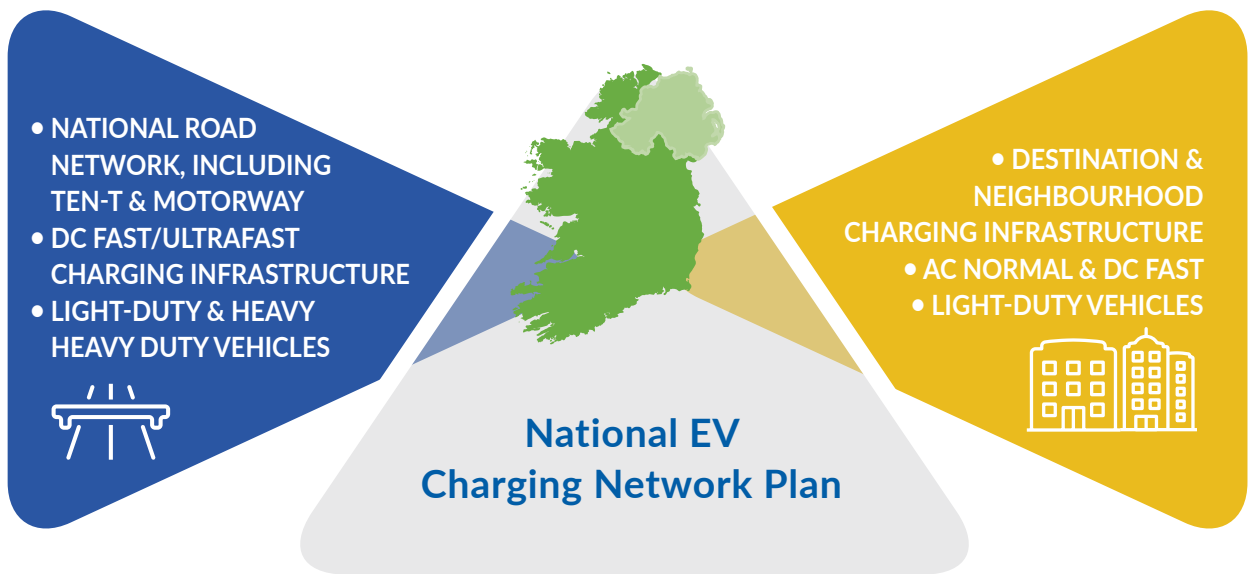
As the fleet transitions to zero emission, the deployment of en-route charging infrastructure on the national road network presents a unique challenge. Factors such as site location, electricity grid connections and power capacity along with consideration of business models for operators all play a key part in the decision-making process. In developing this plan, ZEVl has worked with Transport Infrastructure Ireland (TII) with valuable input from ESB Networks and the wider industry. The implementation of this plan has already begun with the launch of the €21M motorway scheme. Government's ambition is to deliver a high quality, state of the art, EV charging infrastructure that works for all people living and visiting Ireland. Delivering this network will require a focused and collaborative effort from all stakeholders. Government welcomes the significant support from civil society and the private sector in taking on this task – and we look forward to delivering on this challenge.

Eamon Ryan TD,
Minister for Transport

ⁱ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023R1804>

EXECUTIVE SUMMARY

The National Road Network EV Charging Plan constitutes the first part of a National EV Charging Network Plan, focussing on the Motorway, Primary and Secondary National Roads. In addition to this Plan, Zero Emission Vehicles Ireland (ZEVI) have been working with Local Authorities to deliver the Regional and Local EV Charging Network Plan. Once the first iterations of these plans have been published for consultation, and feedback has been incorporated, both plans combined will form the National EV Charging Network Plan.



National Road Network EV Charging Plan

Regional and Local EV Charging Network Plan

Figure 1: The National EV Charging Network Plan will be an amalgamation of this National Road Network EV Charging Plan and the Regional and Local EV Charging Network Plan which will be published for consultation in March/April 2024.

The aim of this plan is to provide a roadmap for the deployment of en-route EV charging infrastructure, working towards achieving both national and European ambitions for cleaner transportation. This document sets out a path to deliver on these ambitions, coupled with a package of proposals on investment, regulation, and policy instruments over the coming years.

The plan and accompanying SEA Report will be reviewed in 2027. Any necessary updates to the plan and 2030 targets will be made to reflect the revision of the Electric Vehicle Charging Infrastructure Strategy, the transition to EVs, the usage of charging infrastructure, and any updates to national frameworks or plans which set the ambitions of this Plan.

While at a national level these ambitions are defined mainly by the Climate Action Plan and the Electric Vehicle Charging Infrastructure Strategy, at a European level, the Alternative Fuels Infrastructure Regulation (AFIR) sets specific requirements and standards for the provision of accessible and efficient charging infrastructure. These targets include an overall “fleet-based” target, requiring a total national

power output based on the number of battery electric vehicles (BEVs) or plug-in hybrid electric vehicles (PHEVs) in the country, and specific levels of EV charging infrastructure on the Trans-European Transport Network (TEN-T) by 2025, 2027, 2030 and 2035.

The TEN-T road network is a strategic transportation infrastructure initiative of the European Union (EU), and comprises two categories of road:

- The core network, including the most important connections linking major cities and nodes. It needs to meet the highest infrastructure quality standards.
- The comprehensive network, connecting all regions of the EU to the core network.

This National Road Network EV Charging Plan goes further than AFIR requirements and encompasses the entire national road network (and close proximity). In Ireland, of the 5,300 km of national road network, the TEN-T road network makes up almost 2,200 km: 500 km of core network and 1,700 km of comprehensive network.

National Roads EV Charging Network Development

Developing an effective and efficient national electric vehicle (EV) charging infrastructure plan requires careful consideration of various factors. One crucial aspect is the modelling approach employed to ensure a comprehensive and well-informed plan. In this context, a combination of bottom-up and top-down approaches has been utilised, along with taking into account the AFIR minimum requirements.

The bottom-up approach involves an extensive agent-based modelling tool to analyse where and when EV drivers will want to charge in 2030 and 2035. The results suggest that EV charging required on the TEN-T network by 2030 would be significantly higher than that required under AFIR, however this varies by location.

Complementing this, the top-down approach considered the requirements for high-power charging (HPC) based on the total annual kWh requirement for public HPCs and total kWh charging possible per charger at county level. Average annual daily traffic (AADT) data on the national road network was also analysed at county level to determine the volume of traffic and allocation of HPCs within the county.

In addition to the modelling, detailed evaluation of seven characters and their journeys through charging were developed to understand how people may interact with the future EV public charging network. These personas, extracted from the National EV Charging Strategy (plus an additional user group, commercial/van drivers) have been used as different lenses to assess the main challenges experienced by EV users when charging on national roads and, from here, to identify the required supports.

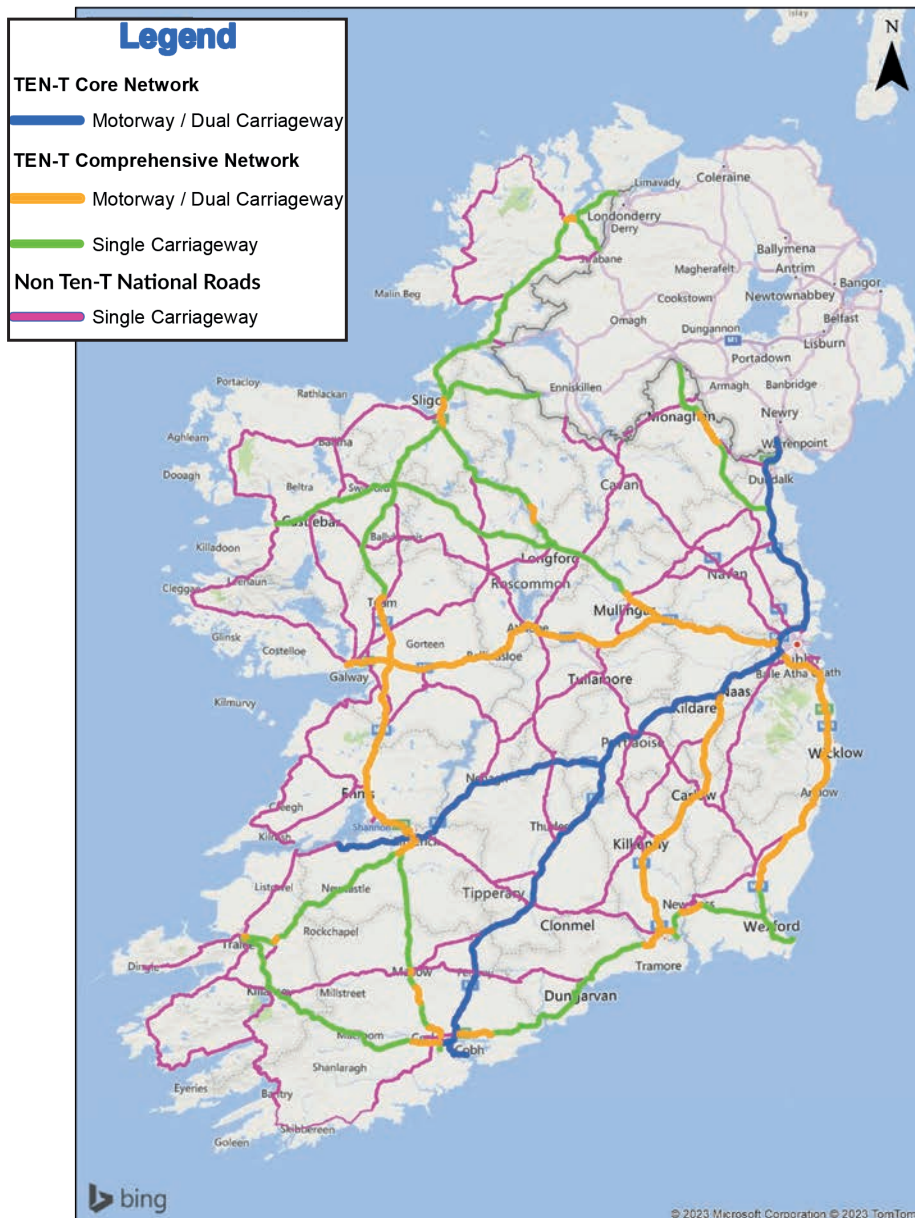
The EV Charging Network Proposals for LDVs, including Passenger Cars

The plan outlines the proposed alternatives for delivery of en-route infrastructure for light-duty vehicles, including passenger cars for 2025 and 2030, as outlined in Table 1 along with the map in Figure 2.

The proposed level of charging is weighted according to the road category. The national motorway network which is covered by the first two rows of Table 1, and depicted by blue and yellow on the Figure 2 map, will require large pools of charge points to be installed at regular intervals. Although these roads comprise just 1,200km of the national road network, they carry over 19% of the km driven across the country. The proposed charging infrastructure for the single carriageway TEN-T road network is outlined in

the third row of Table 1. These roads are coloured green on Figure 2. The final road category are the other primary and secondary roads which are not part of the TEN-T road network coloured pink on Figure 2. The proposed charging infrastructure for this group is outlined in the fourth row of Table 1. The charging infrastructure for this road category will result in shorter distances between charging stations to cater for the type of journeys on these roads.

For each of the road categories, three alternatives are proposed for passenger/LDV charging. At minimum, Alternative 1 must be delivered to meet the Alternative Fuel Infrastructure Regulation (AFIR)'s specific TEN-T road network requirements. However, results of analysis show that more than this is needed to deliver AFIR's fleet-based targets and be ahead of the needs of EV drivers. It is expected that a minimum Alternative 2 will be required, with some areas needing Alternative 3 levels, particularly those areas of higher demand. Feedback through this consultation will inform the final targets.







Location (Color coded to match the map above)	Map Legend	Road Length km	2025			2030		
			Alternative 1: AFIR	Alternative 2: Medium EV Charging Capacity Scenario	Alternative 3: High EV Charging Capacity Scenario	Alternative 1: AFIR	Alternative 2: Medium EV Charging Capacity Scenario	Alternative 3: High EV Charging Capacity Scenario
TEN-T Core (Motorway) (Each Direction)		500	400 kW @60 km 3-4 charge points At least one with 150 kW Capacity	600 kW @60 km 4-6 Charge Points	900 kW @60 km 6-9 Charge Points	600 kW @60 km	1,800 kW @60 km	3,000 kW @60 km
TEN-T Comprehensive (Motorway/Dual Carriageway) (Each Direction)		700	Nothing Specific (covered by fleet target)	600 kW @60 km 4-6 Charge Points	900 kW @60 km 6-9 Charge Points	300 kW @60 km	1,800 kW @60 km	3,000 kW @60 km
TEN-T Comprehensive (Single Carriageway) (Each Direction)		1,000	Nothing Specific (covered by fleet target)	300 kW @60 km 3-4 Charge Points	400 kW @60 km 3-4 Charge Points	300 kW @60 km	600 kW @60 km	1,200 kW @60 km
Primary and Secondary roads Non-TEN-T		3,100	Nothing Specific (covered by fleet target)	100 kW @30 km 1-2 Charge points	200 kW @30 km 2-4 Charge Points	Nothing Specific	300 kW @15 km	400 kW @15 km

Table 1: EV Charging Network Proposals, LDVs, including Passenger Cars

The EV Charging Network Requirements for Heavy-Duty Vehicles (HDVs)

As the pathway to electrify the freight and bus sector has become clearer in recent years, the installation of infrastructure to enable this transition is required. For HDVs, the implementation of the AFIR will impose a substantial infrastructure rollout obligation on each Member State across Europe. It is expected that this infrastructure, as outlined in Table 2, will be sufficient and, in fact, surpass the demand to meet the requirements on Irish roads. For this reason, our main objective will be to deliver the required AFIR targets and ZEVs may apply for derogations based on the levels of HDV traffic where possible. Even with derogations, a high level of infrastructure will be installed with 7,200kW installed on the heavy trafficked roads and 1500kW of HDV charging every 100KM on the TEN-T single carriageways including from Donegal to Kerry and over to Waterford- Roslare. This should be adequate to meet the needs of HDV drivers operating on the national roads.

The HDV infrastructure will be confined to the Ten-T Core and Comprehensive road networks which are shown by the blue, yellow and green roads on the map in Figure 2. ZEVs have established a Freight Subgroup to get input from the industry on the roll out of this infrastructure along the national roads. In addition, the AFIR requires infrastructure to be installed at the Urban Nodes across Europe. The Irish ports which are classified as “Urban Nodes” are Dublin, Cork, Shannon/Foynes, and Galway and, as per Table 2, the AFIR requires specific levels of charging infrastructure at those locations.

Year	Road Network	Rechargers for heavy-duty vehicles
By 2025	TEN-T Core & Comprehensive	For 15% of the total length of TEN-T road network <ul style="list-style-type: none"> ● 1400 kW every 120 km in each direction – with at least one charge point with 350 kW
	Urban Node (Dublin, Cork, Foynes and Galway)	900 kW – provided by stations with an individual power output of 150 kW
By 2027	TEN-T Core & Comprehensive	For 50% of the total length of TEN-T Road network with capacity and distance as follows: <ul style="list-style-type: none"> ● TEN-T Core: 2800 kW every 120 km in each direction – with at least two charge point with 350 kW ● TEN-T Comprehensive: 1400 kW every 120 km in each direction - with at least one charge point with 350kW
	At each HDV parking and rest area dedicated to vehicles overnight parking	2 recharging stations dedicated to heavy-duty vehicles (minimum 100 kW each) (Note Ireland does not have any such sites at present)
By 2030	TEN-T Core & Comprehensive	<ul style="list-style-type: none"> ● On TEN-T Core - 3600 kW every 60 km, in each direction – with at least two stations with 350 kW each ● On TEN-T Comprehensive - 1500 kW every 100 km, in each direction – with at least one station with 350 kW
	Parking and rest areas	At each safe and secure parking area 4 recharging stations dedicated to heavy-duty vehicles (min. 100 kW each) (Note Ireland does not have any such sites at present)
	Urban Nodes	1800 kW - provided by stations with an individual power output of 150 kW

Table 2: En-Route Charging Infrastructure required for Heavy-Duty Vehicles

Accelerating Delivery of En-route High Power Charging Infrastructure

To achieve the level of EV charging infrastructure required to be ahead of demand, its development and implementation must be accelerated. To accomplish this, the State proposes supporting the private sector by reducing barriers to deployment plans and incentivising and accelerating the development of high-power chargers across Ireland. To achieve Ireland's Climate Action Plan targets, a collaborative effort among stakeholders, particularly with the electricity system (e.g. Eirgrid and ESBN), is essential to overcome the challenge of timely delivery.

ZEVI/TII, have engaged with stakeholders and reviewed the responses to the Draft Plan to inform the supports that will be put in place to deliver this National Road Network EV Charging Plan.

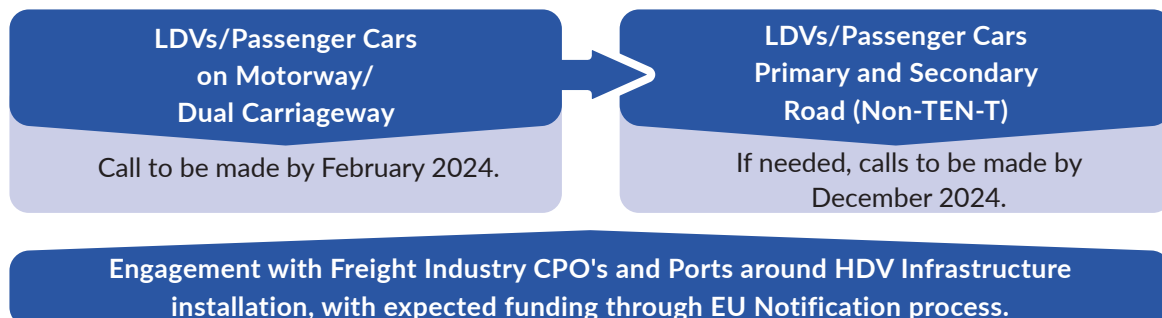
TII in conjunction with ZEVI have developed and launched the first support scheme for this plan. This initial scheme aims to deliver 1200kW of charging capacity every 60KM along the motorway network by the end of 2025. Subsequent schemes for light-duty vehicles including passenger cars, if required, will be launched later in the year to deliver the remaining objectives of this plan for 2025. This approach will be continually modified with learnings from the first scheme. ZEVI and TII, in collaboration with the Freight Subgroup are reviewing funding options for heavy goods vehicle infrastructure.

In parallel with this process, a set of potential support options and indirect measures will be needed to accelerate en-route high powered charging infrastructure. These supports range from enabling grid upgrades to policy, regulations, embracing new technology and the development of standards to create a consistent and reliable charging experience for EV owners across the country.

Roadmap to Implementation

In terms of the programme, the approximate timeline that will be required to deliver the EV charging pools for each category of road is considered. The timeline for delivering HDV 2027 EV charging infrastructure requirements will be up over four years while infrastructure planned for LDVs, including Passenger Cars, on the motorway/dual carriageway network could take approximately three years and three months. This includes an ambitious timeframe of nine months for development funding schemes and taking this through to results of initial screening of applications. Therefore, the priority in terms of phasing is to run a support scheme to deliver Passenger/LDV motorway/dual carriageway charging infrastructure first, with the other categories of roads to follow.

The Motorway/Dual Carriageway scheme for LDVs, including Passenger Cars, launched on February 14th 2024, will be the first of several opportunities to secure funding. It is expected that a scheme to deliver 2025 targets for the remainder of the National Roads will be run by the end of 2024. The launch of this comprehensive programme scheme, to accelerate the infrastructure roll out, is expected to be phased along the following timeline:



The rollout of charging infrastructure for electric vehicles (EVs) is crucial to achieving CAP targets. However, environmental considerations must be factored through the implementation. The Strategic Environmental Assessment (SEA) and Natura Impact Statement (NIS) propose mitigation measures to prevent, reduce and offset adverse impacts to the extent possible of this Plan implementation. The primary focus is sustainable development without compromising the natural and built environment. Additional impact identification and mitigation will occur at project and EIA levels. All development proposals must align with SEA and NIS guidelines. Refer to Table 2.6 (SEA) and Table 5.6 (NIS) for specific mitigation measures. Table 2.7 of the SEA Statement provides a complete list of potential monitoring measures required for the Plan.

Delivering this plan will be extremely challenging. As we forge ahead, it is important to acknowledge the potential risks associated with its delivery and implementation and identify potential mitigation measures. Challenges such as lack of available grid capacity, lack of compliance resulting in poor standards and reduced competition, site availability, lack of resources, financial uncertainties, legal challenges, unpredictable demand or lack of confidence of vehicle purchasers pose potential obstacles to the seamless development and operation of charging networks along major transportation corridors. However, by proactively addressing these risks through strategic planning, stakeholder collaboration, and adaptive approaches, we can overcome these challenges and ensure the successful implementation of robust and accessible charging infrastructure. By effectively managing these risks, we pave the way for widespread EV adoption, contribute to sustainable transportation, and foster a greener future for all.

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