

Zero Emission Vehicles Ireland (ZEVl), Part I

Meeting the EV charging infrastructure challenge

by Ciarán Hayes

Introduction

Zero Emission Vehicles Ireland (ZEVl) was established in July 2022 as a dedicated office within the Department of Transport to support consumers, public sector, and businesses to continue making the switch to zero-emission vehicles. A target to switch 845,000 EV¹, or 30% of the national fleet, by 2030 to electric vehicles was set in the National Climate Action Plan 2023 (CAP 23). ZEVl was tasked with the role of leading on the delivery of the ambitious target.

A strategy for achieving the objective was outlined in a Draft National En-Route EV Charging Network Plan 2023-2030 (Draft Plan) published in September '23. The objective is to have a national EV charging infrastructure network delivered by the private sector in collaboration with multiple national public sector bodies including the Department of Transport (DoT), ESB Networks, Eirgrid, Transport Infrastructure Ireland, and the Local Government sector. Other stakeholders include the Departments of Finance (DoF) and Public Expenditure and Reform (DPER) and the Sustainable Energy Authority of Ireland (SEAI).

Dealing with such a multiplicity of stakeholders has the capacity to add complexity that will put pressure on the already tight delivery timeline. What must also be factored in is the EU's Alternative Fuels Infrastructure Register (AFIR), the implementation of which sets targets out to 2030 for the provision of fast recharging stations for cars and vans, as well as for heavy-duty vehicles, along the EU's main transport corridors ('trans-European transport (TEN-T) network).

The primary focus of the Draft Plan is the TEN-T and national road enroute charging network and will be the focus of this Part I briefing. Additional issues arise for the delivery of an EV charging network in urban areas and in this regard, ZEVl issued a separate Guidance document to the Local Authority sector in July '23². Part II of the Briefing will focus primarily on the Local Government sector and on gaps in the local EV charging network.

¹ CAP 23, Chapter 15, Transportation, Table 15.6 – Key Metrics to Deliver Abatement in the Transport Sector

² Guidelines for Local Authorities on procurement of a consultant to develop their Local Authority EV Infrastructure Strategy

As outlined above, this Part of the Briefing examines the Draft Plan and its implications from the national road and TEN-T enroute charging perspective. In addition to Local Government senior management teams, the Briefing will be of interest to senior policy makers across government, the Department of Transport (DoT), ESB Networks, and Eirgrid, all of whom are engaged and have differing levels of responsibility for the conversion of the national fleet to electric vehicles.

Background and Context

Transport is the second largest CO₂ emitting sector and faces major challenges in meeting its stringent carbon budget ceilings. CAP 23 acknowledges the transformational change and accelerated action required across all key decarbonisation channels for the 2030 transport abatement targets to be achieved. It is also recognised by Government as an unprecedented challenge.

CAP 23, Chapter 15 and the accompanying Annex of Actions deals comprehensively with Transportation as a sector. It is clear from CAP 23 that DoT is taking an ambitious and proactive approach to the climate issues and has set out 77 comprehensive actions to be advanced by the sector. One of these, Action TR/23/7(TF), requires the advancement of a ZEVI Information and Engagement Programme, which is a progress targeted campaign to support uptake and achievement of electric vehicle targets.

Relevant CAP 23 actions³ in addition to TR/23/7(TF), reproduced in Table 1 below, provide an overview of the breadth of actions and stakeholders involved in the process.

Theme: IMPROVE						
Measure: EV Charging Infrastructure Strategy & ZEVI work programme		2025 KPI - 175,000 passenger EVs, 20,000 commercial LGVs, 700 low-emission HDVs, 300 PSO bus EVs, expansion of electrified rail services		2025 Abatement Potential for Measure: Included in Electrification and Vehicle Technology Basket: 1.96 Mt		
Actions						
Action Number	Actions	Steps necessary for delivery	Output	Timeline	Lead	Stakeholders
TR/23/55	Advance Destination Charge Point Scheme – including sports clubs, community centres and State operated visitor sites, as well as commercial destinations	As per headline action	Destination Charger Schemes established and drawdown of funding	Q4 2023	D/Transport	SEAI, ESBn, D/FIN, D/HLGH

³ CAP 23 Annex of Actions, TR₁ Transport

TR/23/56	Advance Local Authority Residential Charging Scheme and Shared Charging App Pilot	As per headline action	Launch of Shared Charging App pilot; Publication of specific guidelines for the development of EV charging in residential areas, and continued rollout of LA Residential Charging infrastructure	Q4 2023	D/Transport	Local Authorities
TR/23/57	Develop Regional Assembly and Local Authority EV Network plans to deliver accessible and low-cost charging	Regional Authorities supported in development of EV Network plans, and aligned with National EV Charging Infrastructure Strategy	Publication of specific guidelines for the development of EV charging in remote areas and of Regional and Local EV Network Plans	Q4 2023	D/Transport, Regional & Local Authorities	SEAI, ESBn, TII
TR/23/58	Publish a high-powered charging strategy	Strategy development to be informed by mandatory targets set under EU Alternative Fuels Infrastructure Regulation (AFIR)	Publication of high-powered charging strategy	Q4 2023	D/Transport	SEAI, ESBn, TII
TR/23/59*	Review financial incentives to further the transition of vehicle fleets, considering actions to support and deliver a just and equitable EV transition	To consider EV Policy pathway and mechanisms to support achievement of sectoral abatement targets in advance of Budget negotiations	n/a – to inform Budgetary process	Q3 2023	D/Transport	D/FIN, D/PER, NTA
TR/23/60*	Undertake planning and enabling works for AFIR high-power charging requirements on TEN-T network	As per headline action	n/a – requirements not yet established at EU level	Q4 2023	TII	D/Transport, ESBn

Table 1. Extract of CAP 23 Annex of Actions for Transport

Notwithstanding DoT's comprehensive and proactive approach, the Climate Change Advisory Council's (CCAC) Annual Review 2023⁴ is something of a reality check that puts the challenge in stark terms. According to the CCAC, emissions in the transport sector were 11.63 Mt CO₂eq in 2022, compared with 10.98 Mt CO₂eq in 2021, an increase of 6%, and 42% of the transport sector's 2021-2025 carbon emission budget was expended by the end of 2022. Further, the EPA projections indicate that under the 'With Additional Measures' scenario, the transport sector will exceed its 2021-2025 sectoral ceiling by 1.1 Mt CO₂eq and its 2026-2030 sectoral ceiling by 5.4 Mt CO₂eq.

⁴ Climate Change Advisory Council, Annual Review 2023, Chapter 6, Transport

Add to that the SEAI's latest '[Energy in Ireland 2023](#)'⁵ report stating that Ireland's energy demand is increasing and emissions are not reducing fast enough. With regard to Transport, it states that in 2022, transport energy demand rebounded to 95% of pre-COVID 2019 levels, and data from January to September 2023 indicates continuing rebounds in petrol, diesel, and jet kerosene demand. SEAI analysis indicates that transport emissions this year will likely be higher than last year, at odds with the obligations of our legally binding carbon budgets.

It is against this background and in this context that the ZEV Draft Plan is set.

ZEV Draft Plan

Despite the existence of over 2,100 EV charging points throughout the country as of 2023, the Draft Plan identifies considerable gaps in the national road and urban charging point networks. It aims to complete National EV Charging Network Plan for the country, go beyond the minimum requirements as set out in AFIR and TEN-T, set standards for charging stations, get ahead of customer demand for EV charging, and remove administrative and other system blockages, thereby facilitating delivery of a charging network by the private sector.

Sales figures of 25,857 for new EVs in 2022, representing an increase of 20% in EV sales and 65% of battery electric vehicle (BEV) sales since 2021⁶, indicate both the growth in the EV car sector and the need for existing gaps to be closed. The Draft Plan also notes the Irish Government's target of all new cars sold in Ireland being zero-emission by 2030, which is more ambitious than that prescribed by EU regulations, which has set a similar target for 2035. Given the growth in EV sales coupled with the ambitious targets, there is a recognition in the Draft Plan that without a change to the existing strategy, it will not be possible to get ahead of customer demand, provide additional charging points at the current gaps in the network, reduce queueing, and provide for reliability and maintenance of the existing charging points.

As a means of addressing these gaps and informed by EU best practice examples, the Draft Plan draws on seven key lessons from our EU counterparts to:

1. Set clear targets and ambitions
2. Coordinate the approach

⁵ SEAI Energy in Ireland, 2023 Report

⁶ [gov.ie - Irish Bulletin of Vehicle and Driver Statistics 2020 \(www.gov.ie\)](#), [gov.ie - Irish Bulletin of Vehicle and Driver Statistics 2021 \(www.gov.ie\)](#), [Vehicles licensed for the first time April 2023 - CSO - Central Statistics Office](#); [Number of Vehicles by Taxation Class and Fuel Type under Current Taxation on 31 December 2022](#)

3. Provide funding and support
4. Encourage private investment
5. Standardise user experience
6. Plan for a resilient and future-proofed network, and
7. Continuously monitor and evaluate.

Milestones for development of the network are set for 2025, 2027 and 2030 with a requirement to provide for the charging needs of cars, light duty vehicles (LDV), heavy duty vehicles (HDV), and passenger buses. The focus is on the motorway and national road network in the first instance.

TEN-T Road Network.

2,200 of Ireland's 5,300 km of national road network is categorised as TEN-T. In turn, the 2,200 km comprises 500 km of core network and 1,700 km of comprehensive network. Core network provides the most important connections linking major cities and nodes and must meet the highest infrastructure quality standards. It includes multiple categories of roads including motorways, dual carriageways, and other national primary roads. The comprehensive network connects all regions of the EU to the core network.

EU funding opportunities may exist for meeting the TEN-T policy standards and requirements, including the recent AFIR Regulation. Standards include provision for ad-hoc charging, acceptance of electronic payments and provision of clear information to the user about pricing options.

Targets for both the core and comprehensive network include:

- 400 kW charging pools on the TEN-T core road network at 60 km intervals in both directions by 2025.
- Charging pools of 600 kW for LDVs at 60 km intervals in both directions on TEN-T core and comprehensive road network by 2035.
- Dedicated charging pools for HDVs of 3,600 kW at 60 km intervals in both directions on the core network and 1,500 kW at 100 km in both directions on the comprehensive network by 2030.

Of the 3.5m daily vehicular trips including 82,000 daily heavy goods vehicle (HGV) trips, Ireland's core TEN-T network carries 19.2% of all traffic kilometres.

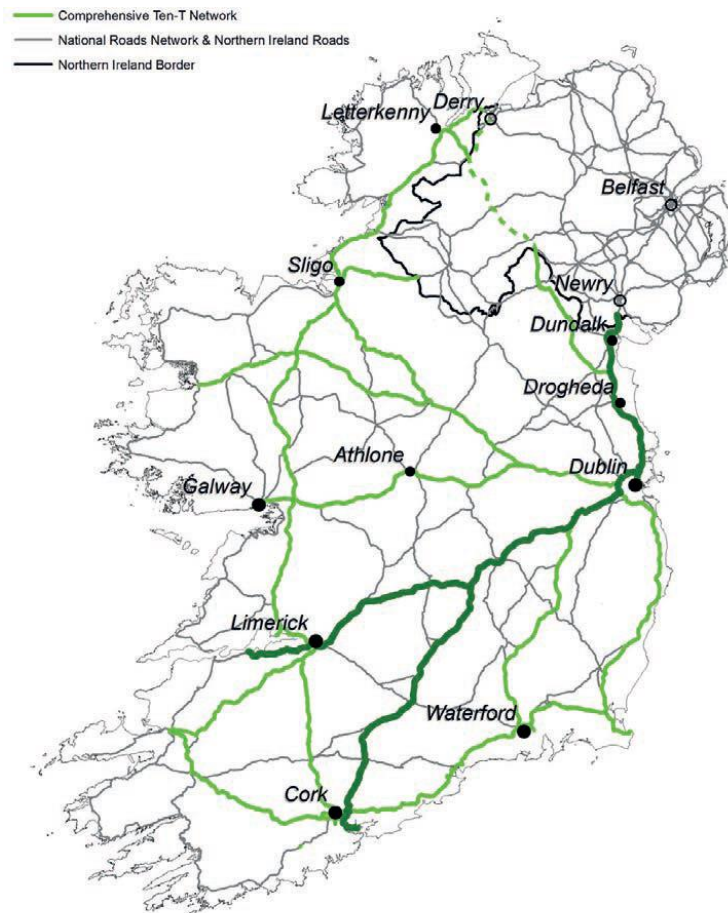


Figure 1. Ireland TEN-T Network.

Draft Plan Targets.

Future demand for EV charging points was determined through both a top-down and bottom-up approach. An agent-based modelling system was used that analysed where and when agents with EVs will want to charge in 2030 and 2035. It was considered following the analysis that frontloading of infrastructure beyond AFIR regulation requirements would be important to get ahead of demand and address any range anxiety issues in the process. Three Alternatives were presented in respect of the national primary and secondary road network serving only passenger and LGVs:

1. **Alternative Fuels Infrastructure Regulation.** This is the minimum requirement to comply with the AFIR and TEN-T regulations.
2. **Medium EV Charging Capacity Scenario.** This scenario sought AFIR 2030 TEN-T targets for LDVs to be delivered in 2025, and on the comprehensive motorway/dual carriageway roads for the 2035 target to be delivered by 2025 along with 100 kW of charging every 30 Kilometres on the remaining national primary and secondary roads. The modelling for 2030 conducted as part of this scenario indicated that the AFIR and TEN-T targets would not be sufficient to meet demand.

3. **High EV Charging Capacity Scenario.** The third scenario was also informed by the modelling and called for a higher level of high-power enroute charging due to 43% of all road traffic being carried on the national primary network.

Alternatives 2 and 3 require a significant accelerated deployment of the EV charging infrastructure. The Draft Plan comes down in favour of at least Alternative 2, with Alternative 3 level of charging being considered where required. The overall aim of the Draft Plan is to provide for Alternative 1 at a minimum and to consider and explore the most appropriate supports whereby the private sector will be stimulated to accelerate their plans for the delivery of the infrastructure.

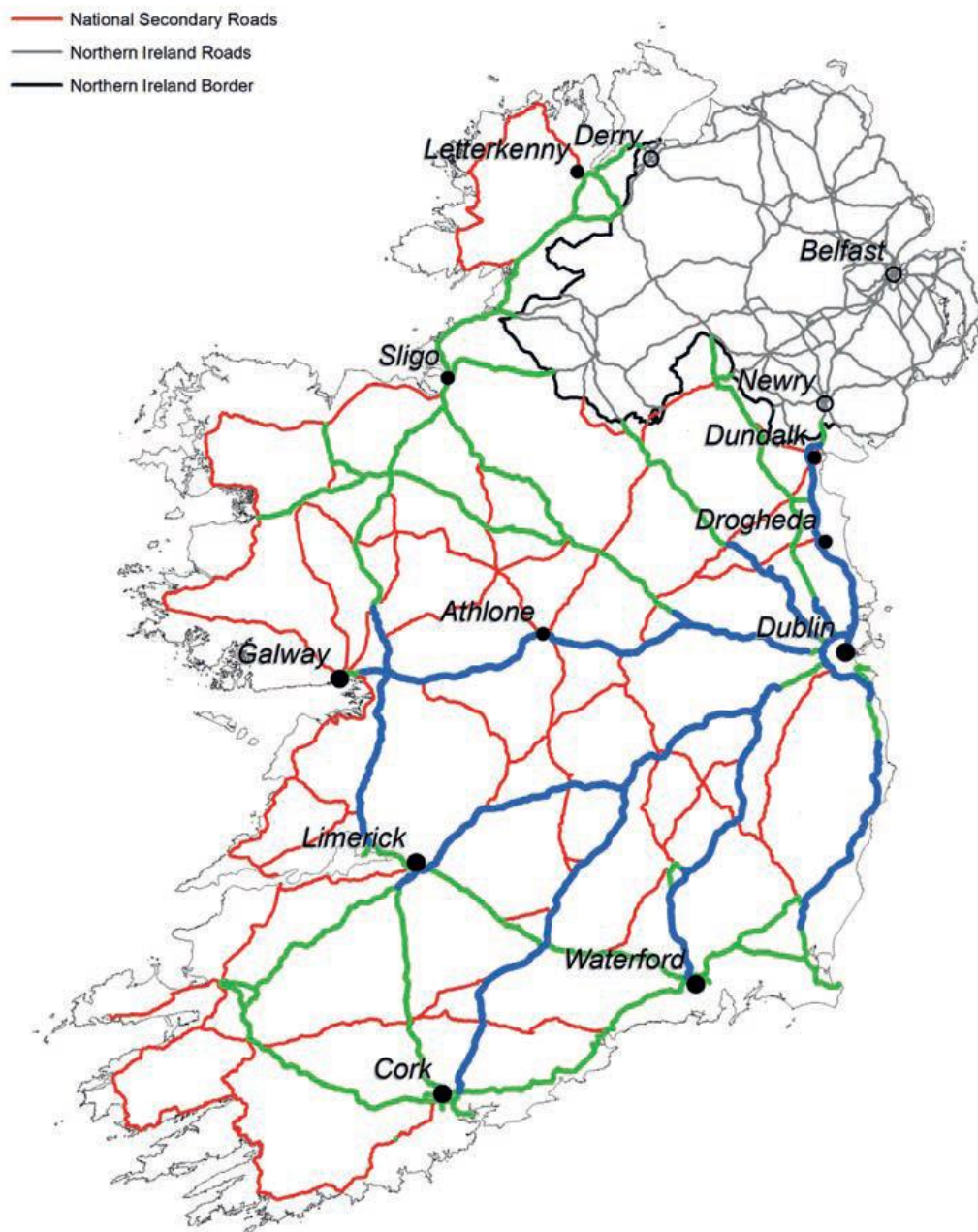


Figure 2. National Road Network Categories.

Category	Kilometres
National Secondary Roads	2,659 km
National Primary Roads	1,639 km
Motorway	995 km

Table 2. National Road Network & Mileage

Figure 2 and Table 2 above detail the national road network while Table 3 below details Alternatives 1,2 and 3 in respect of the 2025 Draft Plan targets.

2025: Where	Road Length (km)	Alternative 1: Alternative Fuel Infrastructure Regulation 2025	Alternative 2: Medium EV Charging Capacity Scenario 2025	Alternative 3: High EV Charging Capacity Scenario 2025
TEN-T core (each direction)	500	400 kW @ 60 km 3-4 charge points At least one with 150 kW capacity	600 kW @ 60 km 4-6 x charge points	900 kW @ 60 km 6-9 x charge points
TEN-T comprehensive (motorway / dual carriageway) (each direction)	700	Nothing specific – (covered by fleet target)	600 kW @ 60 km 4-6 x charge points	900 kW @ 60 km 6-9 x charge points
TEN-T comprehensive (single carriageway) (each direction)	1000	Nothing specific – covered by fleet target)	300 kW @ 60 km 3-4x charge points	400 kW @ 60 km 3-4x charge points
Primary and secondary road (non-TEN-T)	3100	Nothing specific – (covered by fleet target)	100 kW @ 30 km 1-2 x charge points	200 kW @ 30 km 2-4 x charge Points
Total charging power (kW)	5,300	7,665	45,200	73,000
Approx. no. of charge points		78-104	415-706	706-1118
No. of EVs anticipated		195,000	195,000	195,000
National fleet-based target output (kW) (Required by AFIR)		214,000	214,000	214,000
% of national fleetbased target output (kW) delivered through en-route charging infrastructure		4%	21%	34%

Table 3: 2025 - Targeted En-Route Charging Infrastructure for Passenger/LGVs

An indication of the scale of the challenge is highlighted by the modelling and analysis, which indicates a requirement for a further 104 charging points on the TEN-T network alone to meet the AFIR requirements and the expected demand for passenger cars and LDVs by 2025. Beyond TEN-T and AFIR however, the modelling and analysis reflecting driver needs indicates a requirement for up to 1,118 charge points. Add to that the capacity issues for Eirgrid and ESB Networks given the scale of logistical demands for electricity and the ability of these stakeholders to deliver within the set timelines.

Implementation Roadmap

The Draft Plan sets out a road map for implementation and proposes to support the private sector in the provision of the charging point infrastructure in accordance with a number of principles of intervention as follows:

- Measures to prioritise and enhance private sector participation by recognising the contribution of existing private sector companies providing fuelling, charging and ancillary services. It is designed to support the vitality of the private sector.
- Sustainability first, prioritising enhancement of existing facilities rather than new build.
- Alignment with wider policy and other network goals such as the National Planning Framework, overall carbon emission goals, ESBN and Eirgrid network strategies.
- Customer experience and equity to provide a best-in-class customer experience.
- Enhance and facilitate innovation in EV charging infrastructure and data management to inform decision making, and
- Resource efficiency to facilitate the efficient use of private and public sector resources.

Other measures include the unblocking of potential barriers by facilitating and progressing grid upgrade enabling works to streamline the process for the private sector; direct public intervention where necessary and where market gaps are not addressed by the private sector; and standardisation for a consistent and reliable charging experience for EV owners across the country. Further, revised legislation in the Road Traffic and Roads Act, 2023 extends TII powers in respect of recharging and refuelling infrastructure for zero to low emission vehicles and to provide and maintain or secure the provision and maintenance of such a network.

Both ZEV and TII have committed to engage with market participants to determine the best process for support and have established a 5-step process as a guide. While the process is reproduced in Table 4 below, time will tell as to whether it has been sufficiently streamlined to encourage private sector engagement or whether it could be refined further.

Step 1.	<ul style="list-style-type: none"> • ZEVI/TII will open the call for expression of interest in delivering the infrastructure outlined in chapter 3, requesting two options for application. • Expression of interest (Option 1): high level information for proposals that are very early in the development phase. • Application for support (Option 2): Detailed information for sites that can be delivered within 1-3 years including evidence of ability to deliver. • CPO/Other Support Applicants (SA) will prepare and submit applications.
Step 2.	<ul style="list-style-type: none"> • ZEVI/TII & partners will review the EOI and applications for support and screen/shortlist based on set criteria. • ZEVI/TII will inform the applicants of the outcome.
Step 3.	<p>If successfully short listed in the EOI, Charge Point Operators (CPOs)/Support Applicants prepare detailed information for formal application which will require detailed evidence of ability to deliver such as:</p> <ul style="list-style-type: none"> • Application made for ESBN connection, secured a site screening report. • Have formal agreement for the site including site design and evidence of planning progression. • Evidence of funding available. • Evidence of materials delivery timeline. • Evidence of previous experience. <p>If successfully approved for financial support for infrastructure that can be delivered within 1-3 years (Option 2):</p> <ul style="list-style-type: none"> • CPO/SA accept terms of funding
Step 4.	<ul style="list-style-type: none"> • Successful Option 2 CPO/SAs in receipt of funding will deliver Infrastructure, within timeline and to standard agreed. • ZEVI/TII and partners will review the detailed submissions by CPO/SA from Option 1 applicants and inform successful applicants.
Step 5.	<ul style="list-style-type: none"> • Option 1 applicant CPO/SA accept terms and conditions of funding. • Deliver infrastructure within timeline and to standards accepted in T&Cs.

Table 4: Proposed Market Assessment Approach

Strategic national infrastructure cannot be developed without funding. Development of the charge point infrastructure to date has primarily been through private investment with an element of support through the Climate Action Fund support for ESB ecars investments and Connecting Europe Facility (CEF) EU funding. Supports for the further development of the network by the private sector have been allocated by the National Development Plan with funding of €1 bn allocated to specific carbon reduction measures, of which €100m is provided for the period to 2025 to support investment in EV charging infrastructure.

Risk Assessment

A Risk Assessment process identified seven risks, risk dependencies and mitigation measures, and stakeholders for each risk. The identified risks are:

- Lack of available grid capacity when needed to meet demand within the timelines,
- Site availability for implementation of charge points,
- Lack of available staff & delivery resources,
- Adequate public & private funding in the years up to 2025,
- Legal challenges to schemes launched,
- Lack of confidence of vehicle purchasers that charging infrastructure will be delivered, thereby slowing the transition from ICE to electric, and
- Risk of under/over specifying level of infrastructure called for in 2025 and 2030.

Comment.

The risk assessment process does not appear to have identified delays in the Planning process as a risk and one that could seriously impact the rollout of the ZEV1 work programme. Consideration in this regard should take account of the proposed role of the private sector and whether their exposure to such Planning delays will deter private sector investment in the upgrade of the national charging infrastructure as envisaged in the Draft Plan. In the event that delays in the Planning process does manifest as a risk, Step 5 of the Market Assessment Approach as detailed in Table 4 above will be seriously impacted.

Assistance for the achievement of the private sector role is given through the commitment to remove obstacles to private sector participation. Should it be decided to include Planning as a risk at this point, an opportunity to mitigate such a risk exists with the reform of the Planning legislation currently underway.

A four-year timeline for delivering HDV infrastructure is anticipated while infrastructure planned for passenger cars/LDVs on the motorway/dual carriageway network can take approximately three years and three months. However, this includes an ambitious timeframe of 9-months for development of the funding scheme and initial screening of applications. ZEV1 proposes a market assessment of the ability to meet prioritised HDV and Passenger/LDV motorway/dual carriageway charging infrastructure in the first instance, with other categories of roads to follow.

Should any of the risks identified in the Risk Assessment or indeed any other risk manifest themselves, implementation of the Draft Plan proposals will be set back due to the already tight 2025 timescale.

Existing tight targets do not lend themselves to delays. Notwithstanding the level of forward planning undertaken to date, there is unlikely to be sufficient time for mitigation measures to take effect in time to meet the deadlines.

Summary

Establishment of the ZEVI office is a pro-active and ambitious response to what is acknowledged as a difficult challenge. A lot of credit can be given to the aspiration of getting ahead of consumer demand, recognising and providing for the growing percentage of EVs in the national fleet, proactively addressing range anxiety, and developing the enroute charging network. While the Draft Plan has all the necessary elements expected of a good policy document including application of international best practice, the issue will once again come down to implementation.

Given the SEAI's latest carbon emission report showing an increase in transportation emissions, implementation is getting more challenging. Timescales set at national level for delivery of the enroute charging network are also challenging and the multiplicity of national public sector stakeholders will require significant management, coordination, and collaboration to ensure successful implementation. Ultimately however, the Draft Plan envisages implementation by the private sector while facilitated by the public sector agencies, yet private sector implementation is not fully in the control of ZEVI.

The question remains as to whether this is the weak link in the Draft Plan. Further, the methodology and strategy adopted for the rollout is logical and rational, but it is not clear that all risks have been identified and where they have, whether there is sufficient redundancy in the process to mitigate the risks while still meeting the target deadlines.

It remains to be seen therefore whether the aspiration of implementing more ambitious targets than that set by the EU will, or can, be delivered.