

- **Ireland (IE)**

- **Main messages from the Commission assessment of the NPF**

In its original assessment of the Irish NPF the Commission concluded:

The Irish NPF addresses partly the requirements of Article 3. It contains a discussion of the current state and future scenarios for alternative fuels in the transport sector. For all the mandatory fuels and modes except for LNG it establishes targets as required by Article 3 of the Directive.

The spatial distribution of the available recharging points fulfils the requirement of having chargers available every 60 km on Ireland's main intercity roads, including the TEN-T Core Network. The actual number of public recharging points is also sufficient to cover the requirement of one recharging point every 10 electric vehicles. However, the numbers of electric recharging points foreseen for 2020, 2025 and 2030 seem to be insufficient for the foreseen number of electric vehicles in Ireland if only the public recharging points are taken into account. Ireland supports the deployment of private electro-mobility infrastructure. To increase the number of electric vehicles in Ireland, vehicle purchase and registration tax incentives exist since 2011. Company tax incentives exist since 2008. The registration tax relief for battery electric vehicles will be extended until 2021 and for plug in hybrid vehicles until 2018.

The Dublin Airport in the TEN-T Core Network is currently using mobile ground power units for use by stationary airplanes. However, the Irish NPF does not include targets for electricity supply for stationary airplanes only a life-cycle cost analysis of rolling out Fixed Electrical Grown Power units at airports is considered for 2018.

The Irish NPF does not include concrete plans for shore-side electricity supply for maritime ports. The development of a feasibility study of shore-side electricity supply for seagoing ships in TEN-T ports (Dublin, Cork and Shannon Foynes) is considered for 2018. Based on the results of the study, targets for shore-side electricity supply should be established.

Regarding CNG, the current number of vehicles in Ireland is insignificant. The current number of refuelling points is also insufficient to cover the Irish territory, not fulfilling the requirement of refuelling points every 150 km. In order to improve this situation, the Ireland has established direct incentives for the installation of 5 public CNG points in 2017. For 2020, the targeted number of public refuelling points would be sufficient to have one for every 600 vehicles. For 2025 and 2030, the number of public points seems to be insufficient to cover all the foreseen CNG vehicles in Ireland. The inclusion of biomethane as transport fuel in the biofuel obligation scheme since 2010 assists the promotion of the vehicles running with natural gas.

The Irish NPF does not consider any LNG refuelling points in Ireland (neither for road nor for maritime ports). Ireland has committed to setting targets for the LNG facilities at the three TEN-T Core Network maritime ports in 2019.

The Irish NPF does not include hydrogen. It has already identified measures to be considered by 2020 and plans to analyse opportunities to further the advancement of hydrogen infrastructure.

In Ireland, since 2013 tax incentives like lower fuel excise duty for LPG vehicles exist. They are foreseen to be active at least until 2023. These measures together with the already existing infrastructure for LPG have led to substantial LPG vehicle shares in Ireland.

The Irish NPF contains a comprehensive list of financial support measures already in place for the support of electricity, CNG (biofuels included) and LPG vehicles and infrastructure. They can be considered having a medium impact on market actor's decisions. Longer periods for their validity could provide certainty for market actors and hence increase the likelihood that the national targets and objectives of the NPF can be reached. For other modes and fuels the measures in the Irish NPF seem to have a rather low impact because they are only in planning phase. The Irish NPF has included a group of measures to be implemented in the coming years 2017 and 2018 (e.g. establishment of the green bus fund and scrappage scheme for taxis) which have been considered to have a medium impact on the promotion of alternative fuels in public services. Finally, the tax incentives for the installation of free home recharging points have had an important impact on the deployment of private electro-mobility infrastructure in Ireland.

The NPF states that the development of alternative fuels use has benefitted from close cooperation between the Republic of Ireland and Northern Ireland.

▪ **Overview of requirements' fulfilment from Annex I of the Directive**

Table Error! No text of specified style in document.-1 Checklist Table

Part of the Directive 2014/94/EU	Requirement	Mode of Transport / Alternative Fuel (provided in the NIR)		Yes / No
ANNEX I: 1. Legal measures	Information on legal measures, which may consist of legislative, regulatory or administrative measures to support the build-up of alternative fuels infrastructure, such as building permits, parking lot permits, certification of the environmental performance of businesses and fuel stations concessions.	Road, air / Electricity, CNG, biofuels, AF (in general)		Y
ANNEX I: 2. Policy measures supporting the implementation of the national policy framework	Information on those measures shall include the following elements: <ul style="list-style-type: none"> • direct incentives for the purchase of means of transport using alternative fuels or for building the infrastructure, • availability of tax incentives to promote means of transport using alternative fuels and the relevant infrastructure, • use of public procurement in support of alternative fuels, including joint procurement, • demand-side non-financial incentives, for example preferential access to restricted areas, parking policy and dedicated lanes, • technical and administrative procedures and legislation with regard to the authorisation of alternative fuels supply, in order to facilitate the authorisation process. 	Road, rail / Electricity, CNG, H2, AF (in general)		Y
	• consideration of the need for renewable jet fuel refuelling points in airports within the TEN-T Core Network	Air	Biofuels	Y
ANNEX I: 3. Deployment and manufacturing support	• Annual public budget allocated for alternative fuels infrastructure deployment, broken down by alternative fuel and by transport mode (road, rail, water and air).	Road / Electricity, CNG		Y
	• Annual public budget allocated to support manufacturing plants for alternative fuels technologies, broken down by alternative fuel and by transport mode.			N
	• Consideration of any particular needs during the initial phase of the deployment of alternative fuels infrastructures.			N
ANNEX I: 4. Research, technological development and demonstration	• Annual public budget allocated to support alternative fuels RTD&D, broken down by fuel and by transport mode.	Road, water (maritime) / Electricity, CNG, H2, biofuels, AF (in general)		Y
ANNEX I: 5. Targets and objectives	• Estimation of the number of alternative fuel vehicles expected by 2020, 2025 and 2030	Road / Electricity, CNG (partial)		Y
	• Level of achievement of the national objectives for the deployment of alternative fuels in the different transport modes (road, rail, water and air)	Road / Electricity, CNG		Y
	• Level of achievement of the national targets, year by year, for the deployment of alternative fuels infrastructure in the different transport modes	Road / Electricity, CNG		Y
	• Information on the methodology applied to take account of the charging efficiency of high power recharging points	Road	Electricity	Y
ANNEX I:6 Alternative fuels infrastructure developments	Changes in supply (additional infrastructure capacity) and demand (capacity actually used)	Road / Electricity, CNG, biofuels		Y

The checklist shows that most of the requirements of Annex I from the Directive are covered.

Regarding the combination of AF/AFV/AFI with transport mode, electricity and CNG are covered for road transport; LNG, hydrogen and biofuels are partially covered for road transport;

electricity is partially covered for rail transport; shore-side electricity supply and LNG are partially covered for maritime water transport; electricity supply for stationary airplanes is partially covered for air transport; all the other combinations are either absent or not applicable.

The Irish NIR reports more than 50 measures. Under the Policy and Deployment & Manufacturing sections it was possible to identify 11 AF/transport mode clusters of measures, all assessable.

▪ **Quantitative assessment: Vehicles and infrastructure**

Table Error! No text of specified style in document.-2 National AFV estimates and AFI targets established in the NIR at the horizon 2020, 2025 and 2030 and their comparison with the NPF situation

Alternative fuel / Transport mode		2018		2020		2025		2030	
		AFV	AFI public	AFV	AFI public	AFV	AFI public	AFV	AFI public
Electricity / road	NIR	7.464	806 (4,624*)	59.219	950 (18,970*)	181.266	1,100 (201,200*)	936.363	1,200 (701,400*)
	Change NIR vs NPF [%]			136.83%	0.00%	-30.97%	0.00%	13.71%	-4.00%
	Attainment [%]			12.60%	84.84%	4.12%	73.27%	0.80%	67.17%
CNG / road	NIR	2 (HCV)	1 (4*)	20 (HCV)	1 (4*)	100 (HCV)	23 (66*)	150 (HCV)	42 (168*)
	Change NIR vs NPF [%]				-92.31%		-14.81%		-14.29%
	Attainment [%]				100.00%		4.35%		2.38%
LNG / road	NIR	0	0	NA	NA	NA	NA	NA	NA
	Change NIR vs NPF [%]								
	Attainment [%]								
LNG / water (maritime)	NIR	0	NA	NA	NA	NA	NA	NA	NA
	Change NIR vs NPF [%]								
	Attainment [%]								
LPG / road	NIR	3,700**	45**	NA	NA	NA	NA	NA	NA
	Change NIR vs NPF [%]								
	Attainment [%]								
Electricity supply / air (stationary airplanes)	NIR		46		NA		NA		NA
	Change NIR vs NPF [%]								
	Attainment [%]								

Legend:		not applicable
		the value could not be computed
	NA	no value/information provided/available in the NIR

* Total number of AFI (public + private). ** Data from EAFO (absent in the IE NIR)

- Road transport
 - Electricity

Vehicles

Ireland recorded 7,464 battery-electric and plug-in hybrid electric vehicles in use in 2018 (see Table Error! No text of specified style in document.-2), of which 7,287 were passenger cars and 177 were LCVs. The Irish NIR EV estimates are 59,219 for 2020, 181,266 for 2025 and 936,363 for 2030, reflecting a revised curve compared to the NPF related to the estimated growth of electric vehicles for the next decade. Compared to the NPF values, the IE NIR forecasts an earlier and higher EV market uptake for 2020 (+136.83%) and an increased estimated number for 2030 (+13.71%), while for 2025 the NIR estimates a decrease (-30.97%) compared to the NPF. The Irish NIR expects that of the total 936,363 EVs foreseen in use in 2030, 89.72% will be passenger cars, 10.14% LCVs and 0.13% buses and coaches. The interest in electrifying the light commercial vehicles deserves to be highlighted since a progressive increase of their number compared with NPF is foreseen (7% in 2020, 140% in 2025 and 313% in 2030).

The 2018 **attainment** of future EV estimates is 12.60% for 2020 and 0.80% for 2030. According to the assessment methodology described in Section 2.1, the 2018 situation corresponds to an **adequate progress** towards reaching the envisaged EV estimates. The calculated **average annual growth rate** corresponding to the period 2016-2030 for EV fleet evolution planned by Ireland is equal to 50%.

Infrastructure

Ireland recorded 806 publicly accessible recharging points in 2018 (see Table Error! No text of specified style in document.-2), of which 666 were normal power (≤ 22 kW) and 140 high power (> 22 kW) recharging points. Concerning the next decade, the IE NIR shows a confirmation of the NPF targets for 2020 and 2025 (950 and 1,100, respectively). For 2030, the revised target of 1,200 represents a slight decrease compared with the NPF (-4%) that originates from a reduction of the targeted number of high power recharging points. In the NIR, the percentage of planned high power recharging points in the total publicly accessible recharging infrastructure increases from 12% or 100 (2020) to 16% or 150 (2025) and 20% or 200 (2030) but it has to be highlighted that the 2020 target was already overpassed in 2018. The Irish NIR confirms the targets for private recharging points provided in the NPF: 18,020 in 2020, 200,100 in 2025 and 700,200 in 2030. This confirms a clear strategy of Ireland to support the uptake of electro-mobility primarily on private recharging infrastructure, while keeping publicly accessible infrastructure at a bare minimum. It can be noticed in fact that the percentage of publicly accessible infrastructure from the total infrastructure is 17.43% in 2018 and foreseen to decrease to 5% (2020), 0.55% (2025) and 0.17% (2030).

The 2018 **attainment** of future public recharging infrastructure targets is 84.84% for 2020 to 67.17% for 2030. According to the assessment methodology described in Section 2.1, the 2018 situation corresponds to a **slow progress** towards reaching these envisaged targets. The calculated **average annual growth rate** corresponding to the period 2016-2020 for publicly accessible recharging infrastructure evolution planned by Ireland is equal to 3%.

Ratio

Based on the IE NIR and NPF, the following table shows the ratio between vehicles and publicly accessible recharging points (i.e. sufficiency index) for the pair electricity/road. It can be seen that for the next decade the foreseen sufficiency index is expected to progressively increase to values that are considerably above 10 and thus inadequate. The fact that Ireland has a clear strategy regarding private recharging infrastructure does not seem to solve the problem fully.

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	Electricity	2.75*	4.49	9.26	62.34	164.79	780.30

* Value calculated from IE NPF

Information on charging efficiency

The Irish NIR provides an example of usage for the high power (>22kW) recharging infrastructure. It mentions that the average overall number of transactions per day in 2018 was 840 corresponding to all the existing 140 high power recharging points, while the average duration of a stay was of 47 minutes. It is worth noting that in 2018 there were no recharging and no overstay fees at this infrastructure.

○ CNG

Vehicles

Compared to the NPF, the Irish NIR does not include any more estimates for CNG light-duty vehicles, reflecting a modification in the policy direction where the support focuses principally on electrification in the light vehicle sector. Since the IE NIR mentions that “*in the heavy-duty sector there is a recognition that electrification is not currently a viable alternative*” and other solutions must be considered, the report contains only future estimates for CNG HCV but their values are significantly reduced in comparison with the NPF ones (20 vs 150 for 2020, 100 vs 1,050 for 2025 and 150 vs 1,550 for 2030).

Because there are no total CNG vehicle estimates, the 2018 **attainment** and **progress** could not be computed.

Infrastructure

In 2018, Ireland recorded one public CNG refuelling point and three private fleet operators' ones. Table Error! No text of specified style in document.-2 shows an overall reduction of the targets for public CNG refuelling points provided in the NIR compared to the NPF over the next decade (1 vs 13 for 2020, 23 vs 27 for 2025 and 42 vs 49 for 2030). The Irish NIR also provides revised targets for private CNG refuelling points in comparison to the NPF (3 vs 5 for 2020, the same number of 43 for 2025 and 126 vs 53 for 2030), reflecting the forecast that during the next decade the share of private CNG refuelling infrastructure will progressively increase and become dominant.

A map with the locations of the 14 public CNG refuelling stations to be rolled out as part of Causeway Project is provided (for more information on the project, see Section 5.7.4.3). The Irish NIR mentions the objective of the Gas Network Ireland that 20% of the gas in the network will be renewable by 2030.

The 2018 *attainment* of future public CNG refuelling infrastructure targets is 100% for 2020 and 2.38% for 2030. According to the assessment methodology described in Section 2.1, the 2018 situation corresponds to an *adequate progress* towards reaching these envisaged targets. The *average annual growth rate* corresponding to the period 2016-2030 for public CNG refuelling infrastructure evolution planned by Ireland could not be calculated since in 2016 there were no public CNG refuelling points deployed.

Ratio

Since there are no total CNG vehicle estimates provided in the Irish NIR, it is not possible to compute the sufficiency index.

○ LNG

Vehicles

At the end of 2018, there were no LNG vehicles in use. Similarly to the NPF, the Irish NIR provides no LNG vehicle estimates for the future and therefore the 2018 *attainment* and *progress* could not be computed.

Infrastructure

At the end of 2018, there were no LNG road refuelling points deployed. Similarly to the NPF, the Irish NIR does not commit to any targets for LNG road refuelling infrastructure and therefore the 2018 *attainment* and *progress* could not be computed.

Ratio

For the same reason, it is not possible to compute the sufficiency index.

○ Hydrogen

Vehicles

Estimates for hydrogen vehicles are absent in the Irish NIR as they were lacking also in the NPF. The NIR mentions there are currently no hydrogen vehicles in use in Ireland and no real suppressed demand for hydrogen vehicles at current market prices. However, it states that a potential deployment of around 100 vehicles in 2022/23 is under consideration by a range of engaged stakeholders possibly with government support.

Because no clear quantitative hydrogen vehicle estimates were provided, the 2018 *attainment* and *progress* could not be computed.

Infrastructure

In line with the strategy regarding the hydrogen vehicles, the Irish NIR as the NPF does not commit to targets for hydrogen refuelling infrastructure and justifies this by the lack of demand at this stage. However, it mentions that there is under consideration by a range of engaged stakeholders, potentially with government support, a deployment of a sustainable hydrogen production and three clustered refuelling points in 2022/23.

Because no clear quantitative hydrogen refuelling infrastructure targets were provided, the 2018 *attainment* and *progress* could not be computed.

Ratio

For the same reason, it is not possible to compute the sufficiency index.

- Biofuels

Vehicles

No quantitative information regarding vehicles fuelled by biofuels is provided in the Irish NIR. However, the IE NIR contains some details on the biofuels consumption in transport (see Section Additional information on alternative fuels infrastructure developments) and about the Biofuels Obligation Scheme (see Section Legislative & Regulatory).

Infrastructure

Information is not available in the Irish NIR.

Ratio

Information is not available in the Irish NIR.

- LPG

Vehicles

The Irish NIR does not provide information on the number of LPG vehicles. However, according to EAFO, Ireland recorded 3,700 LPG vehicles in use in 2018, all of which were passenger cars (Table Error! No text of specified style in document.-2).

Infrastructure

The Irish NIR does not provide information on the number of LPG refuelling points. According to EAFO, Ireland recorded 50 LPG refuelling points in 2016, 47 in 2017, and 45 in 2018.

Ratio

Based on EAFO data for Ireland, the following table shows the ratio between vehicles and publicly accessible refuelling points (i.e. sufficiency index) for the pair LPG/road. The sufficiency index could only be computed for the 2016 – 2018 period.

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	LPG	86.00*	85.11*	82.22*			

* data from EAFO

- Rail transport
 - Electricity

Vehicles

The IE NIR recorded 144 locomotives in 2018 and this number is expected to increase in the next decade (196 in 2025 and 600 in 2030). However, the IE NIR mentions that “*these figures include hybrid trains which are expected to come into service in the coming years*”.

Infrastructure

Information is not available in the Irish NIR.

- Waterborne transport (maritime)
 - Electricity

Vessels

Information is not available in the Irish NIR.

Infrastructure

The feasibility study on the development of AFI in Irish ports foreseen in the NPF has been carried out and was included as an annex of the IE NIR¹. Favourable economic (e.g. price of electricity below European average) and geographic conditions, a stringent regulatory environment and scale of operations were identified to have a common influence in the successful deployment of AFI in general, and shore-side electricity (SSE) in particular. Taking these drivers into account, the study considered the demand for, and feasibility of, AFI in Irish ports. The study found that many of the characteristics evident at current ports providing AFI are not present at Irish ports as “*Ireland does not gain from geographic conditions favourable to ... renewable energy production*” and the scale of operations in Irish ports and the number of ships calling to them does not generate sufficient demand to justify the capital investment that AFI requires. As a result, forecasted demand for SSE in Irish ports was considered low. The same view resulted from stakeholder consultations highlighting concerns that forecasted demand does not justify large scale capital investment in AFI. Based on these findings from the market demand analysis, the Irish NIR is not setting targets for SSE at maritime ports on the TEN-T network at this time but commits however to a continued monitoring of markets trends.

¹ Irish Maritime Development Office, 2019, “The Development of Alternative Fuel Infrastructure in Irish Ports – A Feasibility Study”

- LNG

Vessels

Information is not available in the Irish NIR.

Infrastructure

Similarly to the NPF, the Irish NIR does not commit to any targets for LNG refuelling infrastructure at maritime ports on the TEN-T network.

The feasibility study on the development of AFI in Irish maritime ports (see Section 5.7.3.3.1) covered also LNG refuelling infrastructure. As already mentioned in the section dedicated to SSE, the study found that many of the characteristics common to ports with successful AFI deployment are not present at Irish ports: Ireland does not gain from favourable economic (e.g. price of natural gas below European average) and geographic conditions (e.g. large natural gas resources), the scale of operations in Irish ports does not generate sufficient demand and Ireland falls outside the Emission Control Areas with stringent regulatory standards. Therefore, the demand for LNG refuelling infrastructure in Irish ports was considered low. The innate conservatism and risk aversion of the shipping industry was also mentioned as a reason to consider investment in LNG unlikely because of the potential obsolescence of LNG technologies through the development of alternative fuels such as hydrogen and ammonia. The Irish NIR mentions that, based on these arguments, it did not provide targets for LNG refuelling infrastructure at maritime ports on the TEN-T network at this time. However, it commits to facilitate discussions between the maritime industry and other industries currently using LNG and to monitor annually the use of alternative fuels use.

- Waterborne transport (inland)

Not applicable since Ireland has no inland ports in the TEN-T Core Network.

- Air transport

The NIR mentions that *“Ireland’s policy to reduce the climate impact of aviation emissions is aligned with the strategies being pursued at EU level and globally”* by the International Civil Aviation Organisation (ICAO). Regarding aircraft technology, the two major Irish airlines have invested recently in newer fuel efficient aircraft.

It is mentioned that the Irish state airports Dublin, Cork and Shannon are reducing their year-to-year carbon footprint being accredited by Airport Council International (ACI) at “Level 2 Reduction” status. Several examples of existing or foreseen sustainability activities are provided:

- *“Dublin is committed, and Cork Airports also intends, to become carbon neutral under the Airport Carbon Accreditation Scheme of the ACI by 2020”* through initiatives such as the use and generation of green electricity and various other renewable energy projects.

- Dublin and Cork Airports, as part of ACI EUROPE, “*have committed to achieving net zero emissions by 2050 at the latest*”, as part of a collective pledge of 194 airports in 24 countries.

- Electricity

Airplanes

Information is not available in the Irish NIR.

Infrastructure (for stationary airplanes)

The Irish NIR, similarly to the NPF, does not include quantitative future targets for electricity supply at Irish airports for use by stationary airplanes. However, it mentions that Dublin Airport from the TEN-T Core Network is replacing diesel-powered ground power units with fixed electrical ground power (FEGP) units. An amount of 46 FEGP units are currently available at most of the aircraft contact stands on three out of the four piers at this airport and the Dublin Airport Authority has committed to introduce FEGP on all future new contact stands.

- Biofuels

Airplanes

The Irish NIR mentions that there are no sustainable aviation fuel (SAF) stocks in any Irish airport, as no flights to/from Ireland have requested the use of such fuel. The report states that despite most commercial aircraft in use in Ireland are capable of using a blend of conventional and SAF, all aircraft still use conventional fuel.

Infrastructure

Information is not available in the Irish NIR.

▪ ***Measures assessment***

The Irish NIR, as the NPF, contains an extensive and detailed description of measures. They cover a wide variety of types and several AFs and modes, however the vast majority focuses on electricity/road and, to a lesser extent, CNG/road. The policy direction in Ireland is to encourage the move away from fossil fuelled vehicles to AFV and other sustainable transport modes in order to reduce national emissions. Electro-mobility and EVs are a prominent mitigation in the Irish Climate Action Plan, foreseen to rely mostly on private recharging infrastructure.

- Legal measures

The Irish NIR contains 18 legal measures (versus 10 in the NPF) to promote AF, with detailed descriptions (12 measures appear only in the NIR, 6 are common to the NIR and NPF while 4 were only present in the NPF). Most of the NIR measures are represented by national plans that address entirely or partly the topic of alternative fuels and by national legal acts transposing EU Directives.

In line with the overall focus on electrification of the NIR, the most numerous cluster concerns electricity/road containing 15 measures, of which 6 are specifically dedicated to this pair of

AF/transport mode, and was assessed to display an increased ambition level compared to the NPF (see Table Error! No text of specified style in document.-5 for the ambition levels of other clusters).

○ Legislative & Regulatory

There are 12 measures identified in this category out of which 8 appear only in the NIR.

A ban to sale new fossil fuel cars from 2030 and to stop the granting of national car tests from 2045 is under consideration.

Several national plans that concern alternative fuels are mentioned:

- the Climate Action Plan together with its planned Amendment Bill and its predecessor the National Mitigation Plan,
- the National Planning Framework for land use,
- the Development Plan Guidelines for planning authorities,
- the National Energy and Climate Plan and
- the National Aviation Policy.

Listed as well are the Biofuels Obligation Scheme with stricter future requirements² and the transposition of the EU Energy Performance of Buildings Directive in the national Building Regulations. As part of AFI Legislations, the Irish NIR presents the Electrical Wiring Standards to which the recharging points' installation must comply and the CNG Installation Legislation regarding the corresponding licences.

○ Administrative

The Irish NIR describes six administrative measures, of which two were also present in the NPF. The Low-Emission Vehicle Taskforce foreseen in the NPF was established in December 2016 focusing exclusively on EVs in a first phase and covering other low-emission fuels, including CNG, LNG and hydrogen, in a second phase. The two Statutory Instruments from 2018 that served to transpose the AFI Directive provisions not addressed through the NPF are presented. There are also mentioned the Clean Vehicles Directive transposition and the National Adaptation Framework including mitigation and climate adaptation measures and sectoral sub-plans for transport infrastructure and for gas and electricity networks. Concerning electricity, an Electric Vehicle Deployment Roadmap is under development and guidance will be issued to planning authorities to ensure a consistent and future proofed approach to the rollout of recharging infrastructure.

• Policy measures

The Irish NIR reports 21 policy measures intended to foster alternative fuels in Ireland, most of them represent financial incentives. The modes of transport covered are road, rail or a combination of modes where fuels have been subject of the measures.

○ Measures to ensure national targets and objectives

² A scheme that places an obligation on fuel suppliers in the road transport to ensure that a certain of all fuel is from renewable sources (the obligation rate increases over time - 4% by volume in 2010, 10% by volume in 2019 and 11% in 2020).

Road transport

A set of 15 policy measures meant to support the achievement of the Irish AF objectives have been identified in the Irish NIR (9 measures appear only in the NIR, 6 are common to the NIR and NPF). Nine measures present in the NPF are not part of the NIR anymore. They are all in place or planned for the future with one exception (the free public recharging of EVs which was discontinued in 2019/2020). The majority is represented by financial incentives (sometimes with different conditions depending on the AF) for road as transport mode.

Within the measures in place targeting specifically electricity, the Irish NIR lists:

- purchase subsidies (grants of up to €5,000 for the private purchase of a new BEV or PHEV and of €3,800 for companies purchasing electric LCVs),
- tax reductions/exemptions
 - Vehicle Registration Tax relief of up to €5,000 for BEVs – until the end of 2021, up to €2,500 for PHEVs - until the end of 2020;
 - BEVs qualify for a 0% Benefit-in-Kind rate up to €50,000 without mileage conditions - until the end of 2022;
 - toll incentive scheme (BEVs qualify for 50% and PHEVs for 25% toll reductions up to a maximum of €500 per year).

As general measures targeting several AFs, the IE NIR includes:

- different tax related incentives
 - annual motor tax based on CO₂ emission band;
 - punitive measures related to fossil fuels
 - tax based on a vehicle's nitrogen oxide emissions applied to new car purchases and used imports
 - increasing carbon tax (at least €80 per tonne by 2030 is foreseen)
 - Accelerated Capital Allowance support scheme regarding corporation tax for vehicles and infrastructure purchase – existing for electricity and CNG, under consideration for hydrogen;
 - minimum excise duty rate – existing for natural gas and biogas as a propellant set at the current EU minimum rate of €2.60 per GJ, under consideration for hydrogen.

Two measures targeting HCV fuelled on AFs (electricity, CNG, LNG, hydrogen) are in the process of adoption:

- purchase subsidies (grants of up to 30% of the cost differential between a traditional fossil fuelled HCV and an AF equivalent)
- toll incentive scheme.

Of the measures that were presented in the NPF but not in the NIR, three concerned LPG, two synthetic and paraffinic fuels and one biofuels.

Other transport modes

No measure specifically dedicated to the other transport modes (water, air and rail) is listed in the Irish NIR.

- Measures that can promote AFI in public transport services

In the Irish NIR, six policy measures related to the public transport are presented (one measure is only part of the NIR, five are common to the NIR and NPF, while three were only present in the NPF).

Three measures correspond to rail as mode of transport and concern the electrification of public transport in the Dublin area. The DART (Dublin Area Rapid Transit) Expansion Programme is expected to create a full metropolitan area DART network and to transition current diesel commuter lines to electricity from the city centre to Drogheda, Co. Louth, to Celbridge/Hazelhatch and Maynooth, Co. Kildare. In 2022 is expected the delivery of Ireland's first diesel-electric trains enlarging the rail fleet by approximately 300 new rail carriages. A new metro system, MetroLink, will be also funded and will stretch from Swords, north Co. Dublin, to Dublin's south city centre serving critical destinations including Dublin Airport and Dublin City University. Light rail projects will also receive investments including the Green Line Capacity Enhancement Project which will add capacity to the light rail network in Dublin through additional and longer trams.

Two measures regard the public urban bus fleet. The National Development Plan committed Ireland to no longer purchase diesel-only buses for the urban public bus fleet from July 2019 and a decision was made to purchase hybrid-electric buses in the short term (nine hybrid buses have entered into service in Dublin city centre). To inform the long term approach, a low-emission bus trial was launched in December 2018 to assess full electric, diesel-electric hybrids and CNG buses. A major project to be funded is BusConnects which commits to the uptake of low-emission technologies and which will be rolled out across all major cities in Ireland. It is anticipated that by 2023, half of the bus fleet (approximately 500 buses) will be converted to low-emission vehicles, with plans for full conversion by 2030.

The Electric Small Public Service Vehicle (eSPSV) Grant Scheme currently offers purchase subsidies for new BEVs (up to €7,000) or PHEVs (€3,500) for taxis, hackneys and limousines. Plans are mentioned to increase the level of the grants for BEVs to up to €10,000 from 1 January 2020. In order to encourage an increase in electric wheelchair accessible vehicles (WAV) in the taxi fleet, from 2020 further support will be given to through an extra €2,500 grant for the conversion of an eSPSV to a WAV.

- Measures that can promote the deployment of private electro-mobility infrastructure

A group of two measures from the Irish NIR have been identified as helping the deployment of private electro-mobility infrastructure. These measures are included and assessed in the measures on AFI deployment and only mentioned here. They are the EV Home Charger Grant and the Accelerated Capital Allowance tax incentive scheme (companies allowed to write off 100% of recharging points purchase value against profit of same year).

- Deployment and manufacturing support
 - AFI deployment

A set of 10 measures related to AFI deployment has been included in the Irish NIR (five measures appear only in the NIR, five are common to the NIR and NPF, while three were only present in the NPF). All NIR measures correspond to road as transport mode, with five targeting electricity, four CNG and one hydrogen.

Concerning electricity/road, the listed measures are promising and include:

- the EV Home Charger Grant (subsidy in place of up to €600 for the purchase and installation of a home recharging point but no indication of future allocated budget is given),
- the EV High Power Charging Infrastructure Development Project (government supported project to install >100 high power points (150kW) at key locations on the national road network, to replace 100 high power points (50kW) and also to refurbish up to 200 high power points (22kW) in 2020-2022),
- the planned support for installing EV Fast Chargers for taxis at Transport Hubs,
- the support for local authorities to rollout up to 2,000 on-street public recharging points over the next 5 years (which would mean the over achievement of the committed publicly accessible target for 2025 which is 1,100).

For CNG/road, the measures presented regard:

- two installation projects receiving funding from the CEF
 - Causeway project – 14 public refuelling points and 1 large scale renewable gas injection point by 2021 and
 - its follow up Green Connect project – 21 public refuelling points and 4 renewable gas injection points
- a national funded project at validation stage named GRAZE (Mitchelstown Central Grid Injection Point) to create the first large scale central injection point on the gas network.

The Accelerated Capital Allowance incentive scheme mentioned within policy measures section also applies to infrastructure purchase and is in place for electricity and CNG and under consideration for hydrogen.

The NPF measures not present anymore in the NIR concerned the Accelerated Capital Allowance scheme related to LPG, renewable jet fuel refuelling points in airports and the reduction of electricity tax for SSE.

- Support of manufacturing plants for AF technologies

No measure regarding the support of manufacturing plants for AF technologies is presented in the Irish NIR.

- Consideration of any particular needs during the initial phase of the deployment of alternative fuels infrastructures

No information is presented in the Irish NIR.

- Quantitative assessment of Policy and Deployment & Manufacturing measures

Table Error! No text of specified style in document.-3 presents an analysis of all the Policy and Deployment & Manufacturing measures, carried out according to the assessment methodology described in Section 2.2. Among the clusters of measures identified in the Irish NIR, four clusters contain dedicated measures (electricity/road, electricity/rail, CNG/road and hydrogen/road) while the other six contain general measures addressing combinations of

several alternative fuels³. For all other pairs of AF and transport mode, there are either no measures or the pair is not applicable to Ireland.

Table Error! No text of specified style in document.-3 Quantitative assessment of Policy and Deployment & Manufacturing support measures

AF	Transport mode	Score	Comprehensiveness	Impact	Ambition (NIR vs NPF)
Electricity	Road	H	C	H	+
CNG	Road	H	C	H	+
LNG	Road	L	N	L	+
	Water - maritime	L	N	L	=
H2	Road	L	C	L	=
Biofuels	Road	L	N	L	-
LPG	Road	L	N	L	-
Synthetic & paraffinic fuels	Road	L	N	L	-
Electricity	Water - maritime	L	N	L	-
	Air	L	N	L	-
	Rail	M	C	M	+

Legend: Score and Impact: H = high; M = medium; L = low; X = not assessable. Comprehensiveness: C = comprehensive; N = Not comprehensive. Ambition level: ‘+’ means ‘higher’; ‘=’ means ‘comparable’; ‘-’ means ‘lower’.

In line with the overall focus on road electrification reported in the NIR, the most numerous cluster concerns electricity/road containing a comprehensive set of 19 NIR measures out of which 12 are new measures, displaying a high overall score and showing an increased level of ambition compared with the NPF.

Even though the CNG related infrastructure targets and vehicle estimates have been reduced in the NIR, the corresponding CNG/road cluster containing 14 measures has been assessed to have a high score, to be comprehensive and to show an increased level of ambition.

The Irish NIR did not commit to hydrogen AFI targets or AFV estimates but includes a set of support measures assessed to be comprehensive and having a low score but a similar level of ambition compared to the NPF.

The electricity/road and CNG/road clusters have at least one measure that scores high, thus the overall score is H. In terms of expected impact of these measures to support the realisation of the AFV/AFI objectives as presented in the NPF and revised in the NIR, the measures for the pairs electricity/road and CNG/road result to have a high impact, the measures for the pair electricity/rail have a medium impact. For all the other assessable clusters of measures, the partial or total lack of future targets and estimates does not allow putting this assessment into perspective. However, as all these other pairs have an overall low score, they have therefore a low impact. Compared to the NPF, the level of ambition of the Policy and Deployment & Manufacturing support measures has increased for electricity/road, electricity/rail, CNG/road and LNG/road, has remained the same for hydrogen/road and LNG water-maritime and has

³ The cluster Synthetic & paraffinic fuels/road contained measures only in the IE NPF.

decreased⁴ for biofuels/road, LPG/road, synthetic¶ffinic fuels/road, electricity/water-maritime and electricity/air.

- Research, Technological Development & Demonstration

The Irish NIR contains 10 RTD&D activities, nine are only present the NIR, one is common to the NIR and NPF while other eight were only present in the NPF. For most activities, the financial details are given, with the overall budget surpassing 1.5 million €. The RTD&D activities from the NIR cover more uniformly the transport modes, the AFs and their related technologies. Compared with the NPF measures, they are more concrete, diversified and documented and the clusters electricity/road and CNG/road have an increased level of ambition.

Two research projects related to biofuels are mentioned (one on the production of oxygenated hydrocarbons from lignocellulosic waste by acid hydrolysis and the other on large scale algal biofuel production). Another project presented is a European project with Interreg funding aiming to accelerate the transition to renewable energy in agricultural transport in North-West Europe by making clean hydrogen technology for field operations ready for practice. Three projects listed in the NIR concern potential emission savings from the HCV segment.

- *Additional information on alternative fuels infrastructure developments*

The Irish NIR contains information on the changes in fuels use in the transport sector (see Table Error! No text of specified style in document.-4). As it can be noticed, biofuels use is foreseen to increase progressively, remaining the most significant alternative fuel⁵ in road transport until 2025 but in 2030 electricity is expected to take the lead. A decrease of diesel use is expected in the next years and the tax based on a vehicle's nitrogen oxide emissions applied to new car purchases and used imports could have an influence in this direction. No increase in LNG use in maritime transport is expected as marine diesel oil will continue to be the only fuel used in water transport.

Table Error! No text of specified style in document.-4 Changes in fuels use in transport sector (2016-2030)

MODE OF TRANSPORT	FUEL	Fuels use [%]			Estimated fuels use [%]		
		2016	2017	2018	2020	2025	2030
Road	Gasoline	24.00%	22.00%	19.00%	21.00%	21.00%	17.00%
	Diesel	73.00%	74.00%	77.00%	72.00%	69.00%	64.00%
	Electricity	0.00%	0.00%	0.00%	0.00%	1.00%	10.00%
	CNG	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
	Biofuels	3.00%	4.00%	4.00%	6.00%	8.00%	9.00%
	Other AF	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Total Road	100.00%	100.00%	100.00%	99.00%	99.01%	100.01%
Maritime	Marine diesel oil	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

⁴ The decrease in level of ambition at cluster level originates from the disappearing in the NIR of measures that were present in the NPF.

⁵ In 2018, circa 216 million litres of sustainable biofuels (approximately 162 million litres biodiesel and 54 million litres of bioethanol) were placed on the Irish market

▪ *Summary of the assessment*

Tabular overview

Table Error! No text of specified style in document.-5 Overview of the NIR assessment

		Indicators	Alternative fuel / transport mode					
			Electricity / road	CNG / road	LNG / road	LNG / water (maritime)	H2 / road	LPG / road
AF Vehicles / Vessels		Past situation (2016)	2,176*	10*	0	0	NA	4,300***
		Situation (2018)	7,464	2**	0	0	NA	3,700
		Estimate (2030)	936,363	150**	NA	NA	NA	NA
		Future share (2030) [%]	30.19%	0.26%**				
		Estimate attainment (2018 vs 2030) [%]	0.80%					
		Progress (2018)	adequate					
Publicly accessible AF Infrastructure		Past situation (2016)	790	0	0	NA	0	78*
		Situation (2018)	806	1	0	NA	0	45***
		Target (2030)	1,200	42	NA	NA	NA	NA
		Target attainment (2018 vs 2030) [%]	67.17%	2.38%				
		Progress (2018)	slow	adequate				
Sufficiency Index		2016	2.75					
		2018	9.26					
		2020	62.34					
		2025	164.79					
		2030	780.30					
Measures	Legal measures	Ambition (NIR vs NPF)	+	+	=	=		
	Policy measures + Deployment & manufacturing support	Score	H	H	L	L	L	L
		Comprehensiveness	C	C	N	N	C	N
		Impact	H	H	L	L	L	L
	RTD&D	Ambition (NIR vs NPF)	+	+	+	=	=	-
		Ambition (NIR vs NPF)	+	+	=	=		

Legend:		not applicable
		the value could not be computed
	NA	no value/information provided/available in the NIR

* Value taken or calculated from IE NPF; ** HCV; *** Value taken from EAFO (absent in both NPF and NIR).

The Irish NIR addresses most of the requirements of Annex I from the Directive, although not with the same level of detail for all the alternative fuels and transport modes.

Regarding the combination of AF/AFV/AFI with transport mode, electricity and CNG are covered for road transport; LNG, hydrogen and biofuels are partially covered for road transport; electricity is partially covered for rail transport; shore-side electricity supply and LNG are partially covered for maritime water transport; electricity supply for stationary airplanes is partially covered for air transport; all the other combinations are either absent or not applicable.

The main outcomes of the technical assessment of the Irish NIR on vehicles/vessels estimates and infrastructure targets can be summarised as follows:

Road transport

- **Electricity** – Ireland recorded a total of 7,464 electric vehicles and 806 publicly accessible recharging points in 2018. Compared to the NPF the IE NIR presents a new scenario

concerning EV estimates for the next decade, i.e. an earlier and higher EV market uptake for 2020 (+136.83%), a decrease in 2025 (-30.97%) and an increased number for 2030 (936,363 vs. 823,455 EVs, of which 89.72% passenger cars, 10.14% LCVs and 0.13% buses and coaches). Instead, NPF targets of public recharging infrastructure are kept in the NIR, with minor differences. The progress in 2018, calculated according to the assessment technology described in Section 2.1, is adequate for EVs and is slow for the infrastructure. Indeed Ireland seems to largely rely on private recharging infrastructure for which an accelerated increase is foreseen. For this same reason, the ratio AFV to AFI considering only the public recharging infrastructure situation is progressively degrading as its value is expected to increase considerably over time.

- **CNG** – Compared to the NPF, the Irish NIR does not include any more estimates for CNG light-duty vehicles, reflecting a modification in the policy direction where the support focuses principally on electrification in the light vehicle sector. The IE NIR only records two HCVs in 2018 and provides estimates in 2020, 2025 and 2030 again only for HCVs. This fact makes impossible to calculate of the 2018 progress and attainment or of the infrastructure sufficiency index. Against this situation, the strategy for refuelling infrastructure is reported as evolving toward an increasing share of private CNG refuelling points. In 2030, the total number of CNG refuelling points planned is 168, of which only 42 are publicly accessible refuelling points. With respect to the latter, the progress in 2018 is adequate.
- **LNG** – The Irish NIR, as the NPF, does not propose vehicle estimates nor targets for LNG refuelling infrastructure.
- **Hydrogen** – Similarly to the NPF, the Irish NIR does not commit to targets for hydrogen refuelling infrastructure or to estimates for hydrogen vehicles. However, the possibility for a deployment is under consideration.
- **Biofuels** – No specific information is provided in the Irish NIR.
- **LPG** – The Irish NIR does not provide information on the number of LPG vehicles nor on the existing or future infrastructure.

Rail transport

- **Electricity** – The IE NIR recorded 144 locomotives in 2018 and this number is expected to increase in the next decade (196 in 2025 and 600 in 2030). However, the IE NIR mentions that *“these figures include hybrid trains which are expected to come into service in the coming years”*.

Waterborne transport (maritime)

- **Electricity** - The feasibility study on the development of AFI in Irish ports foreseen in the NPF has been carried out and was included as an annex of the IE NIR. The study found that many of the characteristics evident at current ports providing AFI are not present at Irish ports as *“Ireland does not gain from geographic conditions favourable to ... renewable energy production”* and the scale of operations in Irish ports and the number of ships calling to them does not generate sufficient demand to justify the capital investment that AFI requires. Based on these findings, the Irish NIR did not set targets for shore-side electricity supply at maritime ports on the TEN-T network at this time but commits to a continued monitoring of markets trends.

- **LNG** – The feasibility study mentioned above reported for LNG infrastructure at ports the same conclusions as for shore-side electricity. For this reason, the IE NIR did not provide targets for LNG refuelling infrastructure at maritime ports on the TEN-T network at this time. However, it commits to facilitate discussions between the maritime industry and other industries currently using LNG and to monitor annually the use of alternative fuels use.

Air transport

- **Electricity** – The Irish NIR, similarly to the NPF, does not include quantitative future targets for electricity supply at Irish airports for use by stationary airplanes. However, it mentions that the Dublin Airport from the TEN-T Core Network is replacing diesel-powered ground power units with fixed electrical ground power (FEGP) units. FEGP units are currently available at most of the aircraft contact stands on three of the four piers at this airport, and the Dublin Airport Authority has committed to introduce FEGP on all future new contact stands.

The Irish NIR contains a rather comprehensive list of **measures** to support the envisaged AFI targets and AFV estimates. The legal measures to promote AFs are represented mainly by national plans that address entirely or partly the topic of alternative fuels and by national legal acts transposing EU Directives.

Concerning Policy and Deployment & Manufacturing support measures, the majority of support measures including the most prominent ones relate to electricity/road and CNG/road, noting that Ireland does not intend to foster publicly accessible recharging infrastructure. The two clusters have been quantitatively assessed with similar results: high overall score and comprehensiveness, and thus high impact. They however correspond to different envisaged AFI targets and AFV estimates, increased in the case of electro-mobility and decreased for the CNG in comparison with the NPF situation. For all the other assessable clusters of measures, the partial or total lack of future targets and estimates does not allow putting this assessment into perspective. However, with the only exception of the pair electricity/rail, which has a medium impact, all the other pairs have an overall low score, and therefore have a low impact.

The increased emphasis of the policy direction on electro-mobility has also influenced changes in the Irish NIR compared to the NPF with regards to the disappearing of some measures dedicated to LPG and synthetic & paraffinic fuels.

Compared to the NPF, the level of ambition of the Policy and Deployment & Manufacturing support measures has increased for electricity/road, electricity/rail, CNG/road and LNG/road, has remained the same for hydrogen/road and LNG water-maritime and has decreased⁶ for biofuels/road, LPG/road, synthetic & paraffinic fuels/road, electricity/water-maritime and electricity/air. The RTD&D activities included in the NIR have changed compared to those in the NPF. They currently cover more uniformly the transport modes, the AFs and their related technologies. Compared with the NPF, they are more concrete, diversified and documented.

⁶ The decrease in level of ambition at cluster level originates from the disappearing in the NIR of measures that were present in the NPF.

▪ *Final remarks*

The Irish NIR provides a rather comprehensive report on the efforts to implement the Directive. The NIR is largely in line with the provisions of Annex I to the Directive, with the exception of missing estimates for LNG vehicles, vessels and related infrastructure targets for the years 2020, 2025 and 2030. The Irish NIR includes a significant number of measures to promote the uptake of electric vehicles and some measures on the use of electricity in the rail sector as well as for the possible promotion of CNG (heavy-duty vehicles). Future reporting should include information on further measures to promote other alternative fuels and modes of transport.

The Irish NIR estimates that approximately 940,000 electric vehicles could be on the roads by 2030, representing about 30% of the fleet by that time. Taking into account the current situation, fleet and existing trends, this level of ambition appears to be consistent with the pace of deployment of electric vehicles considered necessary for a full transition to carbon neutrality by 2050. Nevertheless, the number of public recharging points for 2025 and 2030 seems far too low against the estimated fleet of electric vehicles. Ireland would be encouraged to explain in greater detail how it intends to ensure sufficient public infrastructure for a vehicle fleet that is expected to grow rapidly. Information on charging efficiency is provided. The NIR does not include information on plans for shore-side electricity supply in ports in the short term. Ireland should update planning and reporting on this matter. Furthermore, the Irish NIR does not include quantitative future targets for electricity supply to stationary aircraft at Irish airports. However, it mentions that Dublin Airport, which forms part of the TEN-T Core Network, is replacing diesel-powered ground power units with fixed electrical ground power units. It would be beneficial to provide further detail on the possible extension of these facilities to other airports. Further information should be provided on the share of the electrified rail network.

Hydrogen for road transport is not considered in the NIR.

The NIR reports that by 2030, Ireland expects no more than 150 CNG heavy-duty vehicles, a significant drop compared to the estimates number in the NPF (1,550), which demonstrates Ireland's reduction of ambition towards CNG. Information is not available on CNG fuelled passenger cars. The NIR does not provide estimates for LNG vehicles, vessels and the relevant infrastructure by 2020, 2025 and 2030.

The NIR does not include information on the number of LPG vehicles, nor does it provide information on the LPG infrastructure.

The share of biofuel blends with conventional fuels in road vehicles is estimated at 6% in 2020 and is expected to be 9% by 2030, thus contributing to the objectives of the recast Renewable Energy Directive. Ireland should provide more information in future reporting on efforts to promote the use of renewable fuels in transport, and particularly in aviation.

▪ *ANNEX - Description of the Member State*

On a surface area of 70,300 km², Ireland has a population of 4.830 million people in 2018, which makes up for a population density of 69 inhabitants/km².

Number of main urban agglomerations

- 4 urban agglomerations > 50,000 inhabitants

In 2018, Ireland achieves a per capita gross domestic product at market prices of €66,670, which represents a per capita gross domestic product in purchasing power standards of 191 if expressed in relation to the EU-28 average set to equal 100.

Length of the road networks

The length of the road TEN-T Core Network in Ireland is 478 km. The total road network length is 18,426 km, of which 916 km are motorways.

The following lengths of the TEN-T Road Corridors are present in Ireland: 8% (353 km) of the North Sea – Mediterranean Corridor.

Through the TEN-T Road Corridors, Ireland is connected with the following Member States:
- the United Kingdom (through the North Sea - Mediterranean Corridor)

Number of registered road vehicles

At the end of 2018, Ireland accounts for 2,590,989 registered road vehicles of which 2,182,920 are categorized as passenger cars, 317,798 as light goods vehicles, 37,871 as heavy goods vehicles and 12,500 as buses and coaches. The motorisation rate is 452 passenger cars per 1,000 inhabitants.

Number of ports in the TEN-T Core Network

- 3 maritime ports in the TEN-T Core Network (Cork, Dublin, Limerick)
- 2 maritime ports in the TEN-T Comprehensive Network
- No inland ports

Number of airports in the TEN-T Core Network

- 2 airports in the TEN-T Core Network (Cork, Dublin)
- 6 airports in the TEN-T Comprehensive Network

