5.1 Bulgaria (BG)

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

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

The Bulgarian NPF addresses only part of the requirements of Article 3 of the Directive. It contains an extensive discussion of the current state and future scenarios for alternative fuels in the transport sector. However the NPF does not contain any designation of urban/suburban agglomerations to be equipped with recharging points and with CNG refuelling points. In the Bulgarian NPF the number of refuelling points for CNG and for LNG to be put in place along the TEN-T Core Network is not defined.

In the Bulgarian NPF estimates for deployment of alternative fuel vehicles are only provided for electric and for hydrogen fuel cell cars. No estimate has been provided for LNG heavy duty vehicles or vessels.

The Bulgarian NPF recognises that electrification of the propulsion of vehicles could contribute to the development of environmentally friendly road transport in Bulgaria however in a long term perspective. Bulgaria expects a rather rapid deployment of electric vehicles, mainly PHEV. Moreover Bulgaria considers hydrogen technologies as a way of integrating renewable energy sources in transport and has included hydrogen in its national policy framework. Accordingly, Bulgaria intends to develop an alternative fuel infrastructure network that it is considerate of the Bulgarian economic conditions with lower initial investments and minimised risks in the first years.

For electric recharging infrastructure the current situation, with 22 publicly accessible recharging points, is sufficient. The Bulgarian targets for the recharging network in 2020, 2025 and 2030 might not be enough if the estimates for electric vehicles in Bulgaria are met. It may be important to closely monitor this development and correct infrastructure targets in line with the market developments.

Bulgaria has already today a relatively dense network of CNG refuelling stations in parts of the country and the NPF foresees that this will further grow to cover the complete Bulgarian territory and the Bulgarian part of the TEN-T corridors. It has a target of 4 LNG refuelling points for heavy duty motor vehicles.

The Bulgarian NPF contains some targets for LNG bunkering infrastructure for inland and sea going vessels. Building of the bunkering infrastructure is to a certain extent dependent on the availability of European funds.

The Bulgarian NPF is based on a well-defined legislative framework and on investment support that to some extent relies on European Union co-funding instruments and Cohesion Funds. The NPF contains large number of possible initiatives to enhance the deployment of electro mobility, hydrogen and natural gas vehicles and alternative infrastructure which, if implemented, could help overcome deployment barriers. Since most of these measures are still

only under consideration, there is a certain risk that the national targets and objectives of the NPF may not be reached.

The Republic of Bulgaria, in its NPF, declares interest to cooperate with the neighbouring countries to ensure EU wide circulation of vehicles and vessels, especially for natural gas. It may be advisable to extend this cooperation also for the other fuels and modes.

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

Table 5.1.2-1 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, waterborne / electricity, CNG, LNG, H2, biofuels		Yes
ANNEX I: 2. Policy measures supporting the implementation of the national policy framework	Information on those measures shall include the following elements: • 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, other transport modes (in general) / electricity, CNG, H2, biofuels		Yes
	• consideration of the need for renewable jet fuel refuelling points in airports within the TEN-T Core Network	Air	Biofuels	No
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, waterborne / electricity, H2		Yes
	• Annual public budget allocated to support manufacturing plants for alternative fuels technologies, broken down by alternative fuel and by transport mode.			No
	• Consideration of any particular needs during the initial phase of the deployment of alternative fuels infrastructures.			No
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, waterborne / electricity, H2		Yes
ANNEX I: 5. Targets and objectives	• Estimation of the number of alternative fuel vehicles expected by 2020, 2025 and 2030	Road / electricity, H2		Yes
	• 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, H2, LPG		Yes
	• Level of achievement of the national targets, year by year, for the deployment of alternative fuels infrastructure in the different transport modes	Road, waterborne, air / electricity, CNG, H2, LPG		Yes
	• Information on the methodology applied to take account of the charging efficiency of high power recharging points			No
ANNEX I:6 Alternative fuels infrastructure developments	Changes in supply (additional infrastructure capacity) and demand (capacity actually used)			No

The checklist shows the requirements of Annex I from the Directive that are covered in the BG NIR.

Regarding the combination of AF/AFV/AFI with transport mode, electricity is covered for all modes; CNG, hydrogen and LPG are partially covered for road transport; all the other combinations are either absent or not applicable.

The Bulgarian NIR reports more than 30 measures. Under the Policy and Deployment & Manufacturing sections it was possible to identify four AF/transport mode clusters of measures, of which three were assessable.

5.1.3 *Quantitative assessment: Vehicles and infrastructure*

Table 5.1.3-1 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	7,034	145	7,629	300	25,550	2,000	66,200	5,000
	Change NIR vs NPF [%]			-78.20%	-88.00%	-63.50%	-66.67%	-49.08%	-44.44%
	Attainment [%]			92.20%	48.33%	27.53%	7.25%	10.63%	2.90%
CNG / road	NIR	21,823	102*	NA	NA	NA	NA	NA	NA
	Change NIR vs NPF [%]								
	Attainment [%]								
LNG / road	NIR	NA	NA	NA	NA	NA	NA	NA	NA
	Change NIR vs NPF [%]								
	Attainment [%]								
LNG / water (maritime)	NIR	NA	NA	NA	NA	NA	NA	NA	NA
	Change NIR vs NPF [%]								
	Attainment [%]								
LNG / water (inland)	NIR	NA	NA	NA	NA	NA	NA	NA	NA
	Change NIR vs NPF [%]								
	Attainment [%]								
Shore-side electricity supply / water (maritime)	NIR		172		NA		NA		NA
	Change NIR vs NPF [%]								
	Attainment [%]								
Shore-side electricity supply / water (inland)	NIR		90		NA		NA		NA
	Change NIR vs NPF [%]								
	Attainment [%]								
Electricity supply / air (stationary airplanes)	NIR		6		6		7		7
	Change NIR vs NPF [%]								
	Attainment [%]				100.00%		85.71%		85.71%
H2 / road	NIR	0	0	0	0	110	2 (5**)	555	4 (14**)
	Change NIR vs NPF [%]					-72.50%	-80.00%	-38.33%	-92.00%
	Attainment [%]								
LPG / road	NIR	164,077	2,800*	NA	NA	NA	NA	NA	NA
	Change NIR vs NPF [%]								
	Attainment [%]								

* Value taken from EAFO 2018 (absent in NIR)
** For Hydrogen, total number of AFI (public + private)

5.1.3.1 Road transport

5.1.3.1.1 Electricity

Vehicles

Bulgaria recorded 7,034 electric vehicles in 2018 (of which 6,288 were passenger cars, 721 LCVs and 25 buses and coaches). In addition, the number of electric PTW recorded in 2018 was 788. Even if the growth rate of battery electric and plug-in hybrid electric vehicles is slow in Bulgaria, the numbers are rising. For the period 2012-2018, the NIR outlines a 4.4 times increase in the number of BEVs and nearly 10 times increase for the number of PHEV.

As Table 5.1.3-1 shows, the NIR provides revised estimates for EVs expected to be registered in 2020, 2025 and 2030. The EV estimates in the NIR are 7,629 for 2020, 25,550 for 2025 and 66,200 for 2030, which are respectively 78.20%, 63.50% and 49.08% lower than in the NPF.

The 2018 ***attainment*** of future EV estimates is 92.20% for 2020 and 10.63% for 2030. According to the assessment methodology described in Section 2.1, the 2018 state of play 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 Bulgaria is equal to 23%.

Infrastructure

As it can be seen in Table 5.1.3-1, there were 145 publicly accessible recharging points in Bulgaria in 2018. The Bulgarian NIR mentions the positive trend in building-up the infrastructure for electric vehicle charging, which is implemented mainly at municipality level by private investors. High power (>22kW) recharging points have been built, at key locations, along the international routes from Sofia to the borders with Greece and Turkey.

The Bulgarian NIR presents revised targets for publicly accessible recharging points for 2020, 2025 and 2030 with respective values 88.00%, 66.67% and 44.44% lower than those provided in the NPF. The target number of publicly accessible recharging points in Bulgaria is 300 for 2020, 2,000 for 2025 and 5,000 for 2030. The NIR does not provide estimates for private recharging points.

The Bulgarian NIR states that "*having regard to the differences in functionality and price levels, the electric vehicles charging infrastructure to be deployed will include fast charging (of minimum capacity of 50 kW DC) stations along the TEN-T Core Network and a massive number of standard charging points (of at least 22 kW AC per point) at publicly accessible locations as shopping malls, entertainment and recreation centres, office buildings, industrial plants, hotels and restaurants.*"

The 2018 ***attainment*** of future public recharging infrastructure targets is 48.33% for 2020 and 2.90% for 2030. According to the assessment methodology described in Section 2.1, the 2018 state of play corresponds to an ***adequate 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 Bulgaria is equal to 43%.

Ratio

Based on the BG NIR, 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 current values are quite high, but in 2025 and 2030 the foreseen sufficiency index decreases towards values slightly above 10. Considering that in 2030 the share of high power charging points is planned to be 40%, the sufficiency index can be regarded as becoming adequate, although currently it is not.

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	Electricity	116.50	50.09	48.51	25.43	12.78	13.24

Information on charging efficiency

Information is not available in the Bulgarian NIR.

5.1.3.1.2 CNG

Vehicles

Bulgaria reported 21,823 CNG vehicles in 2018, mostly dual engines, (of which 17,829 were passenger cars, 3,376 LCVs, 116 HCVs and 502 buses and coaches). The Government of Bulgaria did not provide CNG vehicles estimates in the NPF for the years 2020, 2025 and 2030 and, likewise, the NIR does not contain any estimate for these vehicles.

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

Infrastructure

The BG NIR does not provide the state of play in the period 2016-2018, but the NPF had indicated 108 publicly accessible CNG refuelling points in 2016 and for 2018 EAFO has reported a number of 102. The Bulgarian NIR does not contain targets for CNG refuelling points, similarly to the NPF, which presented only the statement that in the period 2020-2025 emphasis should be placed on building infrastructure in regions with lower coverage of the distribution network.

Since there are no CNG refuelling points targets, the 2018 ***attainment*** and ***progress*** could not be computed.

Ratio

Based on the BG NIR, the following table shows the ratio between vehicles and publicly accessible refuelling points (i.e. sufficiency index) for the pair CNG/road. It can be seen that the sufficiency index (where computable) is well below the indicative value of 600 (see Section 2.1.5).

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	CNG	160.02		213.95*			

* Values of CNG AFI taken from EAFO (absent in NIR)

5.1.3.1.3 LNG

Vehicles

Information is not available in the Bulgarian NIR.

Infrastructure

The Bulgarian NIR does not provides information on LNG refuelling points for road vehicles. Since the NPF declared that in the period 2025-2030 activities should be aimed at increasing the density of the distribution network for LNG refuelling points, it can only be assumed that the assessment of the NPF continues to apply here.

Since there are no LNG refuelling points targets, the 2018 ***attainment*** and ***progress*** could not be computed.

Ratio

The lack of information on vehicles and infrastructure precluded the calculation of the sufficiency index.

5.1.3.1.4 Hydrogen

Vehicles

While there are no hydrogen fuelled vehicles recorded in Bulgaria in 2018, the NIR estimates the registration of 110 vehicles in 2025 and 555 in 2030. These values are, respectively, 72.5% and 38.33% smaller than the estimates provided in the NPF.

Notably, according to the BG NIR, the majority of the hydrogen vehicles will be hybrid electric/fuel cell buses and coaches. Bulgaria expects to have 80 of them in 2025 and 400 in 2030.

Since at the end of 2018 there was no deployment of hydrogen vehicles, the 2018 ***attainment*** and ***progress*** have not been computed.

Infrastructure

Bulgaria included hydrogen in its NPF and presented two scenarios regarding hydrogen refuelling stations deployment. The NIR provides a revision of the NPF projections and envisages 2 and 4 public refuelling points by 2025 and 2030, respectively, which correspond to the less ambitious NPF scenario. Compared with the most optimistic NPF scenario, this represents an 80% decrease for 2025 and a 92% for 2030 targets. It should be also mentioned that the BG NIR foresees 3 and 10 private fuelling stations by 2025 and 2030, respectively.

Since at the end of 2018 there was no deployment of hydrogen refuelling points, the 2018 ***attainment*** and ***progress*** have not been computed.

Ratio

Based on the BG NIR, the following table shows the ratio between vehicles and publicly accessible refuelling points (i.e. sufficiency index) for the pair hydrogen/road. Due to the lack of data, only the 2025 and 2030 sufficiency indexes could be computed.

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	H2					55.00	138.75

5.1.3.1.5 Biofuels

Vehicles

Information is not available in the BG NIR.

Infrastructure

Information is not available in the BG NIR.

5.1.3.1.6 LPG

Vehicles

The BG NIR reported 164,077 LPG vehicles in 2018. The majority of those are passenger cars (157,440), but 6,603 LCVs and 34 buses and coaches were also recorded. This represents a 17% increase compared to the data provided in the NPF for 2016. The NIR does not contain any future estimates for LPG vehicles.

Since there are no LPG vehicle estimates, the 2018 ***attainment*** and ***progress*** could not be computed.

Infrastructure

The BG NIR does not provide any past or future information concerning LPG infrastructure, thus the past total numbers of LPG refuelling points have been taken from EAFO.

Since there are no LPG refuelling points targets, the 2018 ***attainment*** and ***progress*** could not be computed.

Ratio

Based on the BG NIR, the following table shows the ratio between vehicles and publicly accessible refuelling points (i.e. sufficiency index) for the pair LPG/road.

Sufficiency Index		2016*	2017	2018*	2020	2025	2030
Road	LPG	50.41		58.60			

* Values of LPG AFI taken from EAFO (absent in NIR)

5.1.3.2 Rail transport

Information is not available in the Bulgarian NIR.

5.1.3.3 Waterborne transport (maritime)

5.1.3.3.1 Electricity

Vessels

Information is not available in the Bulgarian NIR.

Infrastructure

According to the BG NIR, shore-side electricity supply and the relevant infrastructure are available for public transport in the maritime ports that are part of the TEN-T Core and Comprehensive Networks. A slight increase in the provision of service is observed in maritime ports in the period 2016-2018.

Table 5.1.3-1 shows that the number of recharging points providing shore-side electricity supply at the Bulgarian maritime ports is 172 in 2018 albeit it is not evident from the NIR which kind of ships can be supplied with these supply points. Neither the NIR nor the NPF provided targets for the period 2020-2030.

The Bulgarian NIR mentions that Bulgarian ports have an obsolete infrastructure for shore-side electricity supply that needs modernising. The state-owned Bulgarian Ports Infrastructure Company has taken steps to examine the condition of the electricity supply network for seagoing vessels at the ports of Varna and Burgas.

Since there are no targets for shore-side electricity supply for seagoing ships in maritime ports, the 2018 ***attainment*** and ***progress*** could not be computed.

5.1.3.3.2 LNG

Vessels

Information is not available in the BG NIR.

Infrastructure

Information is not available in the BG NIR.

5.1.3.3.3 Hydrogen

Vessels

Information is not available in the BG NIR.

Infrastructure

The NIR mentions that the state-owned company "*Bulgarian Ports Infrastructure*" continues to explore possibilities for securing funding, using various EU programmes, for the construction of a hydrogen refuelling station at the port of Burgas.

5.1.3.4 Waterborne transport (inland)

5.1.3.4.1 Electricity

Vessels

The Bulgarian NIR does not provide any details on this matter.

Infrastructure

According to the NIR, shore-side electricity supply and the relevant infrastructure are available in inland waterway ports that are part of the TEN-T Core and Comprehensive Networks.

As Table 5.1.3-1 shows, the number of recharging points providing shore-side electricity supply at the Bulgarian inland ports is 90 albeit it is not evident from the NIR which kind of ships can be supplied with these supply points. Neither the NIR nor in the NPF provided targets.

Since there are no targets for shore-side electricity supply for inland waterway vessels in inland ports, the 2018 ***attainment*** and ***progress*** could not be computed.

5.1.3.4.2 LNG

Vessels

Information is not available in the BG NIR.

Infrastructure

The Bulgarian NPF reported one LNG refuelling point in 2016.

5.1.3.5 Air transport

5.1.3.5.1 Electricity

Airplanes

The Bulgarian NIR does not provide any details on the deployment of hybrid-electric or fully-electric airplanes.

Infrastructure (for stationary airplanes)

In the period 2016-2018, Sofia airport in the TEN-T Core Network provided power supply and air-conditioned from stationary facilities installed at 6 passenger sleeves at Terminal 2. The NIR mentions that a new boarding sleeve will be delivered in 2021. For airplanes serviced at Terminal 1 and for those not using Fixed Ground Power supply at Terminal 2, ground service operators provide upon request diesel-powered Ground Power Units. Sofia Airport has three recharging stations for electric vehicles (<22 kW) near Terminal 2.

The Bulgarian NIR provides information about electric vehicles and recharging infrastructure in the airports in the TEN-T Comprehensive Network (Plovdiv, Varna and Burgas), although it does not contain information about electricity supply for stationary airplanes in these airports.

5.1.3.5.2 Biofuels

Airplanes

Information on flights / airplanes powered by biofuels is unavailable in the Bulgarian NIR.

Infrastructure

There is no reference to the need for renewable jet fuel refuelling points in airports within the TEN-T Core Network in the Bulgarian NIR.

5.1.4 ***Measures assessment***

The Bulgarian NIR presents the measures put in place, adopted and under consideration in the period 2016 – 2018. The majority of these measures focus on electro-mobility and hydrogen for road transport.

5.1.4.1 Legal measures

The Bulgarian NIR contains seven[1] legal measures, which have been implemented at national level during the reporting period. These measures are required for the transposition of European Directives to the Bulgarian legislation. The level of ambition of the legal measures remains constant between NPF and the implementation report.

5.1.4.1.1 Legislative & Regulatory

The NIR shows that Bulgaria has progressed with the transposition of Directive 2014/94/EU, regarding the legal framework for electric vehicles recharging points. The requirement that shore-side electricity supply for maritime transport, deployed or updated after 18 November 2017, should comply with the technical specifications laid out in the Directive 2014/94/EU is transposed in Bulgarian law by its inclusion in "*Ordinance No 9 on the requirements for operability of ports and specialised port facilities*". In addition, an "*Ordinance on the conditions and procedures for designing, construction and commissioning into operation of hydrogen refuelling stations*" was in the process of being adopted.

The Bulgarian NIR does not contain any information on legislative and regulatory measures for LNG.

5.1.4.1.2 Administrative

In 2019, the Bulgarian "*Ordinance on sustainability criteria for biofuels and bio liquids*" was amended and a calculation methodology for greenhouse gas emission reduction throughout the whole life cycle of biofuels was set out, transposing Directive 2015/1513/EU.

[1] One additional measure referring to the Ordinance for determining the rate of product charges for motor vehicles was included by Bulgaria as legal measure, but this is assessed here as a policy measure for consistency with our previous assessment and the Guidance Support document.

5.1.4.2 Policy measures

The policy measures listed in the Bulgarian national implementation report comprise both strategic plans in support of the implementation of the NPF and supporting measures for development of electro-mobility. Although the level of ambition of AF vehicle estimates and infrastructure targets has decreased between NPF and NIR, in terms of measures it has instead increased in the NIR compared to the NPF, in particular for electricity and hydrogen.

5.1.4.2.1 Measures to ensure national targets and objectives

The Bulgarian NIR mentions two strategic documents, supporting the use of alternative fuels in transport. The first one is the "*Integrated Transport Strategy until 2030*", approved in 2017, which includes a measure on the '*Promotion of the use of biofuels and other renewable fuels in transport*' in order to achieve the strategic priority '*Reduction of the fuel consumption and increasing the energy efficiency of transport*'. The second document is the "*draft Integrated National Energy and Climate Plan of the Republic of Bulgaria until 2030*", developed in 2019.

Although not specifically mentioned in the NIR, it is understood that these documents are generally applicable to all transport modes.

Road transport

For electric vehicles, the "*draft Integrated National Energy and Climate Plan of the Republic of Bulgaria*" envisages that: '*in view of promoting the development and deployment of electric mobility, obligations will be imposed on the local authorities to introduce within their programmes measured to make the use of electric transport mode more attractive. Good practices, as tax reliefs, simplified access, reserved parking spaces for electric vehicles, will be promoted in view of their widespread implementation*.'

In 2018, the "*Ordinance setting out the procedure and the rate of product charges for motor vehicles*" was amended, including a reduction of the product charge for new hybrid motor vehicles as well as for plug-in hybrid electric and fully electric cars and light commercial vehicles. The product charge for the latter shall be payable from 1 January 2022.

The "*Climate Investment Programme of the National Trust Eco Fund*" started in 2016 and provides funding support to public institutions in purchasing electric and plug-in hybrid vehicles. This measure was also present in the NPF. The programme runs on annual calls for project proposals and the BG NIR declares that, as of 2018, 16 projects have been completed, 10 are being implemented and another three have signed the contract.

Other transport modes

There are no measures concerning other transport modes (water, air and railway) in the Bulgarian implementation report.

5.1.4.2.2 Measures that can promote AFI in public transport services

Of all the policy measures described in the Bulgarian NIR, two can be categorised as measures aimed at promoting AFI in public transport services.

Within the Priority Axis "*Improvement of Ambient Air Quality of the Operational Programme Environment 2014 – 2020*", also described in the NPF, a new procedure on '*Measures for*

addressing transport as a source of ambient air pollution' was announced in 2019. The procedure comprises two components: electric road buses and trolleybuses and electric rail tramways. With a budget of 500 million BGN, 11 Bulgarian municipalities were selected as beneficiaries of grant-projects for the provision of vehicles and infrastructure.

The other measure deals with the procurement of hydrogen buses for public transport. An overall budget of 150 million € is planned for the purchase of 50 hydrogen buses by three municipalities between 2020 and 2030.

The Bulgarian NIR also reports about the investment programme of the '*Sofia Public Electrical Transport Company EAD*' that envisages the acquisition of 30 fast-charging standard low-floor buses, out of which 20 buses are already into operation. Moreover, in the period August 2017-August 2018 Sofia airport used a -leased from manufacturer- electric bus for passenger's transfer between terminals and one electric bus is expected to be purchased and delivered at the airport at the end of 2020.

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

The Bulgarian NIR does not contain information on this matter

5.1.4.3 Deployment and manufacturing support

The Bulgarian NIR contains six AFI deployment support measures, which represents an increase compared to the four measures identified in the NPF. Three of the six measures are exiting, two are adopted and one is under consideration. The measures cover recharging points, shore-side electricity supply and hydrogen infrastructure.

5.1.4.3.1 AFI deployment

In 2017, the "*Central European Ultra Charging project*" was funded under the CEF[2]. In Bulgaria, four ultra-fast recharging points are planned to ensure cross-border connection to the main urban nodes of the TEN-T Core road Network.

At the end of 2017, Sofia's public electrical transport company "*Stolichen Electrotransport EAD*" adopted a plan for setting up six new electric bus lines, using fast charging technologies. Its investment programme envisages the installation of 12 recharging points at depots as well as at the start and end stops of the bus lines.

According to the Bulgarian NIR, deployment and manufacturing support is planned to help the take up of hydrogen technologies in transport. The implementation, between 2020 and 2030, will start by the purchase of buses (see above) and the construction of the related infrastructure for hydrogen production and dispensing. The NIR contains the planned budget for the construction in Sofia of one hydrogen refuelling station amounting 9.5 million € and €800,000 for one mobile refuelling station.

The state-owned "*Bulgarian Ports Infrastructure Company*" is considering the need of modernising the shore-side electricity supply to waterborne vessels and has taken steps to examine the condition of the electricity supply network at Varna and Burgas ports.

[2] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2017-eu-tm-0065-w

The NIR indicates that the "*Bulgarian Ports Infrastructure*" company continues to explore possibilities for securing funding, under various EU programmes, for the construction of a hydrogen refuelling station at Burgas Port.

5.1.4.3.2 Support of manufacturing plants for AF technologies

One measure that can support the manufacturing plants for alternative fuel technologies could be identified in the NIR, namely for the production of green hydrogen from renewables. At present, the total cost of ownership is being evaluated in order to determine the most suitable locations and to prepare funding mechanisms, which are counting on EIB support. The overall planned budget for the production of green hydrogen, reported in the NIR, amounts to 35 million €.

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

Information is not available in the Bulgarian NIR.

5.1.4.4 Quantitative assessment of Policy and Deployment & Manufacturing measures

Table 5.1.4-1**Error! Reference source not found.** presents an analysis of all the Policy and Deployment & Manufacturing measures, carried out according to the assessment methodology described in Section 2.2. As it can be seen, only four clusters have been identified, of which one is not assessable. The assessable clusters have all a medium score, but only electricity/road and hydrogen/road result to be comprehensive. For all other combinations of AF and transport mode, there are no measures. In terms of expected impact of the measures to support the realisation of the AFV/AFI objectives as presented in the NPF and revised in the NIR, those for the pairs electricity/road and hydrogen/road result to have a medium impact, while those for biofuels/road have a low impact.

Concerning the level of ambition, this has increased for the pairs electricity/road and hydrogen/road.

Table 5.1.4-1 Quantitative assessment of Policy and Deployment & Manufacturing support measures

AF	Transport mode	Score	Comprehensiveness		Impact		Ambition (NIR vs NPF)
Electricity	Road	M	C		**M**		+
CNG	Road	X					
LNG	Road						
	Water - maritime						
	Water - inland						
H2	Road	M	C		**M**		+
Biofuel	Road	M	N		**L**		

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'.

5.1.4.5 Research, Technological Development & Demonstration

The Bulgarian NIR contains a list of 12 RTD&D programmes, which represents a significant increase compared to the six RTD&D actions identified in the NPF. The majority of these RTD&D programmes focus on electric vehicles and notably on hydrogen.

The continuation of the "*Operational Programme Innovation and Competitiveness 2014-2020*" for the period 2021-2027 will speed up the development of alternative fuels and the deployment of the relevant infrastructure. Funds are mainly channelled through the ESF+, the ERDF and the Cohesion Fund.

The "*National Research Programme Low Carbon and Energy for Transport and Households (EPLUS)*", approved in 2018, contains a component on '*Electric Vehicles and Hydrogen Mobility'*. The NIR report showcases the activities towards Bulgaria's specialisation in battery/fuel cell based hybrid electric mobility: namely a cyber-physical platform for development and demonstration of battery/fuel cell hybrid vehicles and the retrofitting of trolleybuses with a battery/fuel cell range extender. The total budgets for these projects are €450,000 and €650,000 respectively.

In addition, the "*Energy Storage and Hydrogen Energy project*", funded by the Bulgarian Ministry of Education and Science, foresees 1.5 million € to be used for the development of the relevant hydrogen infrastructure for transport application and the "*Clean Energy Production Storage and Application Technologies Competence Centre – HITMOBIL*" has allocated 2 million €, out of 8 million € total budget, to transport. Highlighted in the Bulgarian NIR report are the €750,000 for the demonstration of a mobile hydrogen refuelling station and €700,000 for an electrolysis system for hydrogen production from RES.

5.1.5 ***Additional information on alternative fuels infrastructure developments***

The Bulgarian NIR does not provide information on the changes in fuel use.

5.1.6 *Summary of the assessment*

Tabular overview

Table 5.1.6-1 Overview of the NIR assessment

		Indicators	Alternative fuel / transport mode					
			Electricity / road	CNG / road	LNG / road	LNG / water (maritime)	LNG / water (inland)	H2 / road
AF Vehicles / Vessels		Past situation (2016)	3,728	17,282	NA	0	0	0
		Situation (2018)	7,034	21,823	NA	NA	NA	0
		Estimate (2030)	66,200	NA	NA	NA	NA	555
		Future share (2030) [%]	1.80%					0.02%
		Estimate attainment (2018 vs 2030) [%]	10.63%					
		Progress (2018)	adequate					
Publicly accessible AF Infrastructure		Past situation (2016)	32	108*	NA	NA	1*	0
		Situation (2018)	145	102**	NA	NA	NA	0
		Target (2030)	5,000	NA	NA	NA	NA	4
		Target attainment (2018 vs 2030) [%]	2.90%					
		Progress (2018)	adequate					
Sufficiency Index		2016	116.50	160.02				
		2018	48.51	213.95				
		2020	25.43					
		2025	12.78					55.00
		2030	13.24					138.75
Measures	Legal measures	Ambition (NIR vs NPF)	=	=				=
	Policy measures + Deployment & manufacturing	Score	M	X				M
		Comprehensiveness	C					C
		Impact	M					M
		Ambition (NIR vs NPF)	+					+
	RTD&D	Ambition (NIR vs NPF)	+	=				+

Legend:

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

* Value taken from BG NPF

** Value taken from EAFO (absent in NIR)

In its NPF, the Republic of Bulgaria indicated that their long-term goal, after 2030, was to deploy electro-mobility, use natural gas widely as a standard fuel and advance hydrogen technology out of the research and development phase. The Bulgarian NIR is fully consistent with the NPF and focuses on road transport electrification and on the potential for the use of hydrogen in transport. The Bulgarian NIR covers mostly the 1st part of the AFID period (2016-2020).

The Bulgarian NIR almost fully addresses the requirements of Annex I of the Directive, but limitedly to electro-mobility and, to a lesser extent, hydrogen/road. To have fully complied with the requirements of Annex I of the Directive, the Bulgarian government should have considered the need for renewable jet fuel refuelling points in airports within the TEN-T Core Network and it should have provided information on the methodology applied to take account of the charging efficiency of high power recharging points.

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

Road transport

- **Electricity** – Concerning EVs, Bulgaria recorded a total of 7,034 electric vehicles in 2018 (of which 6,288 were passenger cars, 721 LCVs and 25 buses and coaches). The Bulgarian NIR reports a revised set of vehicle estimates for 2020, 2025 and 2030, which are respectively 78.2%, 63.5% and 49.08% lower than in the NPF. Passenger cars have the highest share, but in 2030, 10,000 LCVs, 200 HCVs and 1,000 buses and coaches are also foreseen. Similarly, the infrastructure targets in the BG NIR have been reduced compared to the NPF by 88%, 66.67% and 44.44% respectively for 2020, 2025 and 2030. The 2018 progress towards the significantly reduced objectives is considered to be adequate both for the vehicles and for infrastructure, but the sufficiency index becomes adequate only in 2025 and 2030 while until then infrastructure deployment cannot be considered sufficient with respect to the expected vehicle uptake.
- **CNG** – The Bulgarian NIR shows only the state of play of CNG vehicles in 2018 (21,823 vehicles, mostly dual engines, of which 17,829 were passenger cars, 3,376 LCVs, 116 HCVs and 502 buses and coaches), but does not report any vehicle estimate or infrastructure target for 2020, 2025 and 2030.
- **LNG** – Information is not available in the Bulgarian NIR.
- **Hydrogen** – The Republic of Bulgaria had included hydrogen in its NPF. Accordingly, the Bulgarian NIR shows that emphasis is put on hydrogen road transport, however it presents reduced ambition for vehicles and infrastructure. Although there are no hydrogen vehicles on the Bulgarian roads as of 2018, 110 vehicles are expected to be deployed by 2025 and 555 in 2030, mainly buses. Two publicly accessible hydrogen refuelling points will be deployed by 2025 and four refuelling points are foreseen for 2030. These will be accompanied by three and ten private refuelling points in 2025 and 2030 respectively.
- **Biofuels** – Information is not available in the Bulgarian NIR.
- **LPG** – Other than reporting a total number of 164,077 LPG vehicles in 2018 (of which 157,440 passenger cars, 6,603 LCVs and 34 buses and coaches), the BG NIR does not show any further information or objectives for vehicles and infrastructure.

Rail transport

Information is not available in the Bulgarian NIR.

Waterborne transport (maritime)

- **Electricity** – The number of shore-side electricity supply points at the Bulgarian maritime ports was 172 in 2018. There are no targets for the period 2020-2030 in either the NIR or the NPF.
- **LNG** – Information is not available in the Bulgarian NIR.
- **Hydrogen** – The BG NIR mentions that the state-owned company "*Bulgarian Ports Infrastructure*" continues to explore possibilities for the construction of a hydrogen refuelling station at the port of Burgas.

Waterborne transport (inland)

- **Electricity** – The number of shore-side electricity supply points at the Bulgarian inland ports was 90 in 2018. There are no targets for the period 2020-2030 in either the NIR or the NPF.
- **LNG** –Information is not available in the Bulgarian NIR. The Bulgarian NPF reported one LNG refuelling point in 2016.

Air transport

- **Electricity** (for stationary airplanes) - In the period 2016-2018, Sofia airport in the TEN-T Core Network provided power supply and air-conditioning from stationary facilities installed at six passenger sleeves at the Terminal 2. The NIR mentions that a new boarding sleeve will be delivered in 2021.

The **measures** presented in the Bulgarian Implementation Report mainly focus on electro-mobility and hydrogen. The legal, regulatory and administrative measures detailed in the NIR mainly concern the requirements for the transposition of European Directives to the Bulgarian legislation. In the period 2016-2018, most legal measures were in place or in the process of being adopted. Based on the available information, the level of ambition can be considered to remain constant between NPF and NIR.

As for the policy measures, the BG NIR contains measures oriented to enhance the deployment of electro-mobility, with particular reference to electrification of urban public transport and the acquisition of hydrogen buses. The number of deployment and manufacturing support initiatives portrayed in the Bulgarian NIR has increased in comparison to the NPF. Measures in the NIR target recharging points for electricity supply and hydrogen refuelling infrastructure. Bulgaria relies on the European Union co-funding instruments and Cohesion Funds to finance support initiatives for the production of alternative fuels, as for example the 35 million € foreseen for the production of green hydrogen.
In terms of expected impact of the measures to support the realisation of the AFV/AFI objectives as presented in the NPF and revised in the NIR, those for the pairs electricity/road and hydrogen/road result to have a medium impact, those for the pair biofuels/road have a low impact, while all the others are not assessable.

With regard to RTD&D measures, the Bulgarian implementation report shows an increased effort to channel financial resources, counting on the European Union co-funding instruments and Cohesion funds. Research, development and demonstration activities mainly concern electro-mobility and hydrogen related projects. From the information provided in the NIR for RTD&D, the level of support, compared to the NPF, can be considered to have increased for electro-mobility and hydrogen road transport.

5.1.7 *Final remarks*

The Bulgarian NIR reports on a range of efforts to implement the Directive but with a focus on electro-mobility and, to a lesser extent, on hydrogen for road transport. In particular, it does not provide future estimates for CNG and LNG vehicles and vessels for the years 2020, 2025 and 2030. It also lacks information, for the same years, on the targets for CNG refuelling points for vehicles and LNG refuelling points for vehicles and vessels. There are no estimates on the future

shore-side electricity supply in ports. Most of the measures referenced in the NIR focus on electro-mobility and hydrogen for road transport.

Regarding electricity, the NIR estimates for 2030 a fleet of 66,200 electric vehicles, representing about 1.8% of the future vehicle fleet. Taking into account the current situation and expected trends, this level of ambition appears quite low compared to the pace of deployment of electric vehicles considered necessary for a full transition to carbon neutrality by 2050. The targets for publicly accessible recharging infrastructure correspond to those low vehicle estimates. An increase in ambition would contribute to better meeting the needs for a dense, wide-spread and easy to use network of recharging and refuelling infrastructure in the EU. No information on charging efficiency is provided. The NIR states that shore-side electricity supply is available in a significant number of maritime and inland ports. However, it remains unclear which vessels can actually connect to the infrastructure and whether this infrastructure is suitable for all seagoing ships and inland waterway vessels as requested by the Directive. The NIR notes the intention to develop measures to modernise the existing infrastructure for shore-side electricity supply in ports and ensure that seagoing ships and inland waterway vessels can be connected. Electricity to stationary aircraft is supplied at the TEN-T Core airport of Sofia. Future reporting could usefully include more information as regards the current and planned electrification of railways.

Concerning hydrogen for road transport, the NIR expresses Bulgaria's interest in developing hydrogen as a fuel for road transport. It estimates 555 FCHVs by 2030. The NIR envisages four public refuelling points by 2030. Further detail on infrastructure needs and planning should be provided, particularly for buses and heavy-duty vehicles.

Regarding natural gas for transport, there was already a limited fleet of 21,823 CNG vehicles in Bulgaria in 2018. The NIR does not provide information on estimates and targets for CNG vehicles and refuelling points for 2020, 2025 and 2030. It further does not provide information on LNG for road and inland and maritime waterway transport.

As regards LPG in road transport, there was already a fleet of 164,077 LPG vehicles in 2018, but the Bulgarian NIR does not bring any further information or objectives for vehicles and infrastructure.

As far as biofuels are concerned, no quantitative information on the use of biofuels in road transport is provided. However, the measure “Promotion of the use of biofuels and other renewable fuels in transport” has been included in the NIR. Bulgaria should provide more information on efforts to promote the use of renewable fuels in transport, and particularly in aviation.

5.1.8 *ANNEX - Description of the Member State*

On a surface area of 111,000 km², Bulgaria has a population of 7.050 million people in 2018, which makes up for a population density of 64 inhabitants/km².

Number of main urban agglomerations

- 17 urban agglomerations > 50,000 inhabitants

In 2018, Bulgaria achieves a per capita gross domestic product at market prices of €7,980, which represents a per capita gross domestic product in purchasing power standards of 51 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 Bulgaria is 1,507 km. The total road network length is 7,690 km, of which 757 km are motorways.

The following lengths of the TEN-T Road Corridors are present in Bulgaria: 18% (960 km) of the Orient – East Mediterranean Corridor.

Through the TEN-T Road Corridors, Bulgaria is connected with the following Member States:
- Greece (through the Orient – East Mediterranean Corridor),
- Romania (through the Orient – East Mediterranean Corridor)

Number of registered road vehicles

At the end of 2018, Bulgaria accounts for 3,413,371 registered road vehicles[3] of which 2,773,325 are categorized as passenger cars, 438,328 as heavy goods vehicles and 20,818 as buses and coaches. The motorisation rate is 393 passenger cars per 1,000 inhabitants. The Bulgarian NIR describes the age distribution of the vehicle fleet: in 2017 around 86% of vehicles were over 10 years old (with 69% of passenger cars being over 15 years old), while only 5% of the vehicles have less than 5 years and 9% are in the range of 60 to 10 years. The matter of the renewal of the country's vehicle is regarded by Bulgaria as needing to be considered.

Number of ports in the TEN-T Core Network

- 1 maritime port in the TEN-T Core Network (Burgas)
- 1 maritime port in the TEN-T Comprehensive Network (Varna)
- 2 inland ports in the TEN-T Core Network (Ruse, Vidin)
- 4 inland ports in the TEN-T Comprehensive Network

Through the 478 km inland waterways TEN-T Core Network, Bulgaria is connected with Romania through the Rhine-Danube Corridor.

[3] No data available for light goods vehicles.

Number of airports in the TEN-T Core Network

- 1 airport in the TEN-T Core Network (Sofia)
- 4 airports in the TEN-T Comprehensive Network