

- **Slovakia (SK)**

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

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

The Slovak 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 (electricity and natural gas), it establishes targets as required by Article 3 of the Directive. No measures have been taken or proposed to promote alternative fuels infrastructure in public transport services or to facilitate the deployment of recharging points not accessible to the public.

The Slovak NPF puts a comparably low emphasis on electric vehicles and estimates only 0.5% electric vehicles on the road in 2020. The number of electric recharging points foreseen for 2020 and 2025 seems not sufficient to cover the needs of Slovakia in terms of number of the estimated number of vehicles and distance requirements. This could evolve to become a barrier for the further deployment of electric vehicles in Slovakia and could also lead to market fragmentation within the EU. The spatial distribution of the recharging points is not given. According to the Slovak NPF, the greatest distance between any two directly neighbouring high power recharging points is at the moment approximately 80 km which seems insufficient. Also according to the Slovak NPF, South Slovakia is at the moment poorly – perhaps even inadequately – covered in terms of all types of recharging. It will be important to closely monitor this development and correct the infrastructure targets in line with the market developments. Purchase incentives have been defined to increase the number of electric vehicles in Slovakia. The Slovak NPF discusses electricity for stationary airplanes at the Bratislava TEN-T Core Network airport. It does not specify any quantitative targets for this. The Slovakian NPF does not include concrete plans for shore-side electricity supply for inland ports. However, it mentions that this will be further investigated in the future.

Regarding CNG, the NPF shows that the available number of CNG refuelling points and the ones planned for 2020 and 2025 are sufficient to pass the threshold value of one CNG refuelling point per 600 vehicles today and in the future. The distance requirement of at least one refuelling point every 150 km is met already today. The NPF shows also the ambition of increasing the number of CNG refuelling points with a specific plan on selected urban/suburban agglomerations. Some lower impact financial measures have been defined to promote the use of CNG vehicles on the roads.

The Slovak NPF considers that at least two LNG refuelling points for heavy-duty vehicles will be required and mentions that the ideal situation appears to be 3-5 public LNG refuelling points for road transport by 2025. If at least two LNG refuelling points were realised (one on each TEN-T Corridor; Bratislava area, Žilina area and/or Košice/Prešov area) this could guarantee that the maximum distance requirement for LNG refuelling points along the TEN-T Core Network would be fulfilled on Slovak territory.

The construction of LNG bunkering facilities in the two TEN-T Core Network inland ports (Bratislava and Komárno) is planned and measures are proposed to support the construction of these LNG facilities on the Slovak section of the River Danube.

The Slovak NPF does not include hydrogen but will analyse opportunities to further the advancement of hydrogen infrastructure.

According to the Slovak NPF, LPG is actually covered by a relatively large nationwide network of refuelling points (fulfilling the needs of vehicle operators) and the infrastructure of LPG refuelling points is constantly expanding. However, one of the main barriers preventing the development of LPG vehicles seems to be the restriction on parking in underground parking facilities.

The Slovak NPF contains a comprehensive list of support measures for electricity for vehicles, most already in place and for some a prolongation is foreseen. They can be considered having a low to 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 Slovak NPF seem to have a rather low impact and are not comprehensive. No measures are discussed to promote AFI in public transport services or to promote the deployment of private electro-mobility infrastructure.

The Slovak NPF has taken into consideration the interests of regional and local authorities, as well as other stakeholders during its drafting.

Slovakia has not listed specific cooperation programmes; however, some collaboration examples are given. Slovakia has cooperated with the Czech Republic within the Connecting Europe Facility programme and, since 2013, has also assisted in the implementation of the TEN-T project LNG Masterplan for the Rhine - Main - Danube Corridor.

▪ **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, waterborne (inland) / Electricity, CNG, LNG, H2, LPG		Yes
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, waterborne (inland) / Electricity, CNG, LNG, H2, LPG		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).			No
	• Annual public budget allocated to support manufacturing plants for alternative fuels technologies, broken down by alternative fuel and by transport mode.	Road, waterborne (inland) / Electricity		Yes
	• 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 (inland) / Electricity, LNG		Yes
ANNEX I: 5. Targets and objectives	• Estimation of the number of alternative fuel vehicles expected by 2020, 2025 and 2030	Road / Electricity, CNG, LNG, H2, LPG		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, LNG, 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 (inland) / Electricity, CNG, LNG, H2, LPG		Yes
	• Information on the methodology applied to take account of the charging efficiency of high power recharging points	All	Electricity	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 SK NIR.

Regarding the combination of AF/AFV/AFI with transport mode, electricity, CNG, LNG, hydrogen and LPG are covered for road transport; LNG is just mentioned for inland water

transport; hydrogen is mentioned for rail and inland water transport; all the other combinations are either absent or not applicable.

The Slovak NIR reports 17 measures. Under the Policy and Deployment & Manufacturing sections it was possible to identify six AF/transport mode clusters of measures, of which four were 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	1,691	237	10,000	750	19,950	1,500	34,900	3,000
	Change NIR vs NPF [%]			0.00%	0.00%	-0.25%	0.00%	-0.29%	
	Attainment [%]			16.91%	31.60%	8.48%	15.80%	4.85%	7.90%
CNG / road	NIR	2,454	12	4,500	18	14,300	76	24,000	114
	Change NIR vs NPF [%]			-10.00%	-56.10%	-4.67%	-15.56%	-20.00%	
	Attainment [%]			54.53%	66.67%	17.16%	15.79%	10.23%	10.53%
LNG / road	NIR	15	0	100	3	397	8	1,888	10
	Change NIR vs NPF [%]						300.00%		
	Attainment [%]			15.00%		3.78%		0.79%	
LNG / water (inland)	NIR	NA	0	NA	0	NA	1	NA	2
	Change NIR vs NPF [%]								
	Attainment [%]								
H2 / road	NIR	0	0	0	0	160	6	3,600	18
	Change NIR vs NPF [%]								
	Attainment [%]								
H2 / water (inland)	NIR	0	0	0	0	0	0	1	NA
	Change NIR vs NPF [%]								
	Attainment [%]								
H2 / Rail	NIR	0	0	0	0	3	NA	10	NA
	Change NIR vs NPF [%]								
	Attainment [%]								
LPG / road	NIR	52,219	362	55,514	362	61,017	365	66,022	365
	Change NIR vs NPF [%]								
	Attainment [%]			94.06%	100.00%	85.58%	99.18%	79.09%	99.18%

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

- Road transport
 - Electricity

Vehicles

Slovakia recorded 1,691 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 1,570 were passenger cars, 74 LCVs and 47 buses and coaches. Regarding EV estimates for 2020, 2025 and 2030, the SK NIR substantially confirms the estimates made in the NPF (10,000; 19,950 and 34,900 EVs in the NIR, versus 10,000; 20,000 and 35,000 in the NPF). The NIR also provides estimates for electric two-wheelers, which were not reported in the NPF (500, 1,000 and 2,000 two-wheelers respectively for 2020, 2025 and 2030). Concerning heavy-duty vehicles, the SK NIR estimates 200 electrified buses and coaches on the road by 2030 but no HCV.

The 2018 **attainment** of future EV estimates is 16.91% for 2020 and 4.85% for 2030. According to the assessment methodology described in Section 2.1, the state of play in 2018 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 Slovakia is equal to 31%.

Infrastructure

Slovakia recorded 237 publicly accessible recharging points in 2018 (Table Error! No text of specified style in document. -2). Concerning the targets for 2020 and 2025, the SK NIR confirms the NPF targets (750 and 1,500, respectively). For 2030 the NIR presents a new target (3,000). The SK NIR also shows for 2020 and 2025 a progressive shift from normal power (≤ 22 kW) to high power (>22 kW) recharging points compared to the NPF. For 2030, the new target of 3,000 recharging points should consist of 50% normal power and 50% high power.

The 2018 **attainment** of future publicly accessible recharging infrastructure targets is 31.60% for 2020 and 7.90% for 2030. According to the assessment methodology described in Section 2.1, the state of play in 2018 corresponds to an **adequate progress** towards reaching these envisaged targets. The calculated **average annual growth rate** corresponding to the period 2016-2030 for publicly accessible recharging infrastructure evolution planned by Slovakia is equal to 24%.

Ratio

Based on the SK NIR, the following table shows the ratio between vehicles and publicly accessible recharging points (i.e. sufficiency index) for the pair electricity/road. For the next decade the foreseen sufficiency index is not far from a value of 10 that, considering the planned 50% share of high power recharging points in 2030, can be regarded as adequate.

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	Electricity	4.84	7.90	7.14	13.33	13.30	11.63

Information on charging efficiency

Information is not available in the Slovak NIR.

- CNG

Vehicles

Slovakia recorded 2,454 CNG vehicles in use in 2018, of which 1,856 were passenger cars, 334 LCVs, 24 HCVs and 240 buses and coaches. As shown in Table Error! No text of specified style in document.-2, the NIR presents lower estimates of CNG vehicles for 2025 and 2030 than the NPF. In the latter, a total number of 30,000 CNG vehicles were estimated by 2030, while in the NIR this number has been revised to 24,000 CNG vehicles. With regard to the heavy-duty sector, the SK NIR estimates 800 HCVs and 200 buses and coaches by 2030.

The 2018 **attainment** of future CNG vehicles estimates is 54.53% for 2020 and 10.23% for 2030. According to the assessment methodology described in Section 2.1, the 2018 situation corresponds to a **slow progress** towards reaching the envisaged CNG vehicles estimates. The calculated **average annual growth rate** corresponding to the period 2016-2030 for the CNG vehicle fleet evolution planned by Slovakia is equal to 20%.

Infrastructure

Slovakia recorded 12 publicly accessible CNG refuelling points in 2018 (see Table Error! No text of specified style in document.-2). For the next decade, the SK NIR shows a general reduction of the targets for publicly accessible CNG refuelling points over the period 2020-2025 compared to the NPF (-56.10% in 2020 and -15.56% in 2025). For 2030, the SK NIR presents a new CNG infrastructure target of 114 publicly accessible refuelling points that was absent in the NPF. According to the SK NIR “the number of (CNG) refuelling points (in 2018) appears to be inadequate. The target situation, as defined in the National Policy Framework, is to achieve a critical mass of CNG refuelling point infrastructure that will trigger the spontaneous development of CNG use”.

The 2018 **attainment** of future publicly accessible CNG refuelling infrastructure targets is 66.67% for 2020 and 10.53% 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 2016-2030 for publicly accessible CNG refuelling infrastructure evolution planned by Slovakia is equal to 20%.

Ratio

Based on the SK NIR, the following table shows the ratio between vehicles and publicly accessible refuelling points (i.e. sufficiency index) for the pair CNG/road. The sufficiency index is well below the indicative value of 600 (see Section 2.1.5) for the whole implementation period.

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	CNG	172.09	177.58	204.50	250.00	188.16	210.53

- LNG

Vehicles

Slovakia recorded 15 LNG vehicles in 2018 (all HCVs). For the next decade, the SK NIR shows a series of LNG vehicles estimates (100, 397 and 1,888 vehicles, respectively for 2020, 2025 and 2030), all in the heavy-duty sector, which was completely absent in the NPF. Estimates for 2030 point to 1850 HCVs and 38 buses and coaches are estimated.

The 2018 **attainment** of future LNG vehicles estimates is 15.00% for 2020 and 0.79% for 2030. According to the assessment methodology described in Section 2.1, the **progress** obtained by Slovakia from 2016 until 2018 for LNG vehicles deployment is 0.79% of the overall planned deployment during the period 2016-2030.

Infrastructure

The SK NIR does not report any LNG refuelling point in 2018, however it shows a new strategy on LNG infrastructure (similar to that for LNG vehicles). While in the NPF there was only a target of two refuelling points for 2025, the SK NIR shows a new set of targets for 2020, 2025 and 2030 (three, eight and ten refuelling points, respectively). The reason for this new approach is due to the need to provide the heavy-duty sector with a more CO₂ friendly solution (compared to diesel fuel) “*in connection with the adoption of the Regulation of the European Parliament and of the Council setting CO₂ emission performance standards for new heavy-duty vehicles*”.

Since at the end of 2018 there are no LNG refuelling points deployed, the 2018 **attainment** and **progress** have not been computed.

Ratio

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

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	LNG				33.33	39.70	134.86

- Hydrogen

Vehicles

The SK NIR reports zero hydrogen vehicles in 2018, but shows estimates for 2025 and 2030 (160, and 3,600 vehicles, respectively), which were absent in the NPF. The plan for 2030 is to have 3,000 passenger cars, 250 LCVs, 150 HCVs and 200 buses and coaches.

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

Infrastructure

The SK NIR does not report any hydrogen refuelling point in 2018, but presents new targets for hydrogen infrastructure, which were not present in the NPF. The targeted hydrogen publicly accessible refuelling points for 2025 and 2030 are six and eighteen, respectively.

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

Ratio

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

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	H2					26.67	200.00

- Biofuels

Vehicles

Information is not available in the Slovak NIR.

Infrastructure

The Slovak NIR reports that, while the content of biofuel in diesel fuel is at the upper limit of the technical standard (7% by volume), for petrol there is scope to increase the share of biofuels from the present 7.4% to 9% by volume. Also, the introduction of high-biofuel blends in the form of E20, E85 and, if appropriate, B30 is expected to be considered in the near future in parallel to the development of electro-mobility. There is, however, no description of concrete planning into this direction and no indication of infrastructure implication.

- LPG

Vehicles

The SK NIR recorded 52,219 LPG vehicles in 2018 (of which 49,083 were passenger cars, 3,125 were LCVs, 10 HCVs and 1 bus) and confirms the LPG vehicle estimates for 2020, 2025 and 2030 that were already in the NPF (see Table Error! No text of specified style in document.-2). Such estimate appears as an incremental increase from 55,514 vehicles in 2020 to the 66,022 vehicles in 2030, with an overall growth of 26% compared to 2018.

The 2018 **attainment** of future LPG vehicles estimates is 94.06% for 2020 and 79.09% for 2030. According to the assessment methodology described in Section 2.1, the **progress** obtained by Slovakia from 2016 until 2018 for LPG vehicles deployment is 21.71% of the overall planned deployment during the period 2016-2030.

Infrastructure

The SK NIR reports 362 LPG refuelling points in 2018. In the NPF there was no mention of a targets for 2020, 2025 and 2030, while in the NIR (see Table Error! No text of specified style in document.-2) such plan appears as a substantial confirmation of the current situation regarding LPG refuelling points in Slovakia also for the period up to 2030 (365 LPG refuelling points).

The 2018 **attainment** of future publicly accessible LPG refuelling infrastructure targets is 100% for 2020 and 99.18% for 2030, reflecting a mature and stable situation. According to the assessment methodology described in Section 2.1, the **progress** obtained by Slovakia from 2016 until 2018 for LPG refuelling infrastructure deployment is already 95.38% of the overall planned deployment during the period 2016-2030.

Ratio

Based on the SK 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	161.31	153.51	144.25	153.35	180.88	180.88

- Rail transport
 - Hydrogen

Vehicles

The SK NIR shows the plan to have three and ten hydrogen-fuelled locomotives by 2025 and 2030, respectively. This is new compared to the NPF.

Infrastructure

Information is not available in the Slovak NIR.

- Waterborne transport (maritime)

Not applicable since Slovakia has no maritime ports in the TEN-T Core Network.

- Waterborne transport (inland)
 - LNG

Vessels

Information is not available in the Slovak NIR.

Infrastructure

The SK NIR presents the target (absent in the NPF) to provide one LNG refuelling point for each port in the TEN-T Core Network (i.e. Bratislava and Komárno) by 2030.

Since at the end of 2018 there were no LNG refuelling points deployed, the 2018 *attainment* and *progress* have not been computed.

- Hydrogen

Vessels

The Slovak NIR reports the plan to have one hydrogen-fuelled vessel by 2030.

Infrastructure

Information is not available in the Slovak NIR.

- Air transport
 - Electricity

Airplanes

Information is not available in the SK NIR.

Infrastructure (for stationary airplanes)

Information is not available in the Slovak NIR.

- Biofuels

Airplanes

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

Infrastructure

The Slovak NIR provides no information on the need for renewable jet fuel refuelling points in airports within the TEN-T Core Network.

▪ ***Measures assessment***

The SK NIR presents a set of measures covering all the four categories (legal, policy, deployment & manufacturing and RTD&D) however they mostly focus on the development of electro-mobility. To a lower extent, also measures for CNG, LNG, and hydrogen refuelling infrastructure for road transport are present.

- Legal measures

The most prominent legislative and regulatory initiatives taken by Slovakia are the approval of the Action Plan (the ‘Action Plan’) for the Development of Electro-mobility in the Slovak Republic (Resolution No 110/2019) and the revision of two legislative acts. The implementation report submitted by SK does not list all the initiatives taken in the Action Plan. Below is a summary of the initiatives mentioned in the SK NIR and those mentioned in the Action Plan only.

Considering all the legal measures, they appear, if fully implemented, to be fit to support the realisation of the AFV/AFI objectives as presented in the NPF and revised in the NIR. On the basis of the available information, it can be considered that the level of ambition remains constant between NPF and implementation report.

- Legislative & Regulatory

SK NIR lists three legal measures: i) the Action Plan for the Development of Electro-mobility in the Slovak Republic (Resolution No 110/2019); ii) the Act No 162/2018, establishing terms and conditions for the operation of publicly accessible recharging points and refuelling points for AF; iii) the Amendment of Act No 71/2013 Coll., to allow subsidies and state aid to support the construction of AF infrastructure and subsidies for the purchase of AF vehicles.

- Administrative

Although there is no mention of them in the SK NIR (probably because they were still under discussion), the Action Plan lists two administrative measures that, if approved, can provide a positive contribution to the development of AFV and AFI in Slovakia: i) simplification of the administrative process for the construction of recharging infrastructure; ii) legislative obligation to build recharging infrastructure in the construction of new parking spaces.

- Policy measures

- Measures to ensure national targets and objectives

Road transport

The implementation report lists a series of eight policy measures (six of which are financial, two non-financial), all related to road transport. One of these eight measures has expired in 2019, while the other seven are either in force or have been adopted for entry into force from 2020 onward. The six financial policy measures entail: subsidies for the purchase of BEV and PHEV (€5,000 and €3,000 respectively); subsidies (expired in 2019) for the purchase of EV by municipalities; subsidies for building EV recharging infrastructure by municipalities (up to €5,000 per each recharging point); reduction of 50% in the annual tax rate for hybrid, CNG, LNG and hydrogen vehicles; reduction of 50% in the registration fee for these same vehicles; reduced excise duty for CNG. The two non-financial policy measures involve the introduction of terms and conditions for establishing low-emission zones and the introduction of emission plaques for marking vehicles.

In addition to these eight measures, the Action Plan lists seven other policy measures that are either in force, in process of adoption, or under discussion.

Other transport modes

The SK NIR presents no measure concerning other transport modes (waterborne, air, rail).

- Measures that can promote AFI in public transport services

The SK NIR presents no measure regarding the promotion of AFI in public transport.

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

The SK NIR presents no measure regarding the promotion of the deployment of private electro-mobility infrastructure.

- Deployment and manufacturing support

- AFI deployment

As part of the measures for the deployment of alternative fuels infrastructure, the SK NIR lists the state subsidies allocated to the municipalities for the build-up of publicly accessible recharging points, as set forth in Act No 71/2013 and the approved Scheme for the Build-up of Alternative Fuels Infrastructure (a de minimis aid scheme) – DM 6/2019. This measure is also listed as one of the financial policy measures.

In addition to the above initiative, SK NIR also mentions the update of the Operational Programme Integrated Infrastructure to incorporate alternative fuels into Priority Axis 6 – as a potential means of using financial instruments (as part of the National Development Fund II, which accounts for 3% of each operational programme).

- Support of manufacturing plants for AF technologies

Concerning the support to manufacturing plants related to AFV/AFI, SK NIR reports the granting of investment aid in the form of tax concessions for two companies that manufacture electric vehicle components.

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

Information is not available in the Slovak 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. As it can be seen, the pair electricity/road obtains an overall medium score and is considered comprehensive. None of the other pairs identified can be considered comprehensive. Support measures have a medium score for the pair CNG/road and low score for LNG/road and for hydrogen/road. For all the other pairs the measures are either absent or not assessable. In terms of expected impact of the assessable measures to support the realisation of the AFV/AFI objectives as presented in the NPF and revised in the NIR, the measures for the pair electricity/road have a medium impact, those for the pairs CNG/road, LNG/road and hydrogen/road have a low impact.

Compared to the NPF, the level of ambition of the Policy and Deployment & Manufacturing support measures has increased for the pairs CNG/road and hydrogen/road, although this does not appear to correlate with the vehicle estimates and infrastructure targets described in the previous Section 5.25.3.

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 (IR vs NPF)
Electricity	Road	M	C	M	=
CNG	Road	M	N	L	+
LNG	Road	L	N	L	=
	Water-inland				
H2	Road	L	N	L	+
Electricity	Water-inland	X			
Electricity	Air	X			

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

- Research, Technological Development & Demonstration

Compared to the NPF, which only reported one RTD&D measure, the implementation report shows an increased effort to channel financial resources into the support of research, development and demonstration in the form of grant calls by the Slovak Research and Development Agency and via the Operational Programme Research and Innovation and the Operational Programme Integrated Infrastructure. Three RTD&D programmes have been launched concerning AFV for a total budget of €550,000, one programme is related to recharging points for EVs with a budget of €200,000, two programmes deal with the design of the LNG terminal at the public port of Bratislava for a total budget of €953,000.

The Action Plan mentions that a seventh RTD&D programme regarding battery manufacturing is under discussion.

- *Additional information on alternative fuels infrastructure developments*


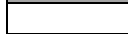
The Slovak NIR does not provide information on the changes in fuel use.

▪ *Summary of the assessment*

Tabular overview

Table *Error! No text of specified style in document.*-4 Overview of the NIR assessment

		Indicators	Alternative fuel / transport mode				H2 / road	LPG / road
			Electricity / road	CNG / road	LNG / road	LNG / water (inland)		
AF Vehicles / Vessels		Past situation (2016)	557	1,893	0	NA	0	48,392
		Situation (2018)	1,691	2,454	15	NA	0	52,219
		Estimate (2030)	34,900	24,000	1,888	NA	3,600	66,022
		Future share (2030) [%]	1.42%	0.98%	1.33%		0.15%	2.69%
		Estimate attainment (2018 vs 2030) [%]	4.85%	10.23%	0.79%			79.09%
		Progress (2018)	adequate	slow	0.79%			21.71%
Publicly accessible AF Infrastructure		Past situation (2016)	115	11	0	0	0	300
		Situation (2018)	237	12	0	0	0	362
		Target (2030)	3,000	114	10	2	18	365
		Target attainment (2018 vs 2030) [%]	7.90%	10.53%				99.18%
		Progress (2018)	adequate	slow				95.38%
Sufficiency Index		2016	4.84	172.09				161.31
		2018	7.14	204.50				144.25
		2020	13.33	250.00	33.33			153.35
		2025	13.30	188.16	49.63		26.67	180.88
		2030	11.63	210.53	188.80		200.00	180.88
Measures	Legal measures	Ambition (NIR vs NPF)	=	=	=			
	Policy measures + Deployment & manufacturing support	Score	M	M	L		L	
		Comprehensiveness	C	N	N		N	
		Impact	M	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

The SK NIR addresses several but not all the requirements of Annex I from the Directive.

Regarding the combination of AF/AFV/AFI with transport mode, electricity for road transport is the most comprehensively covered; CNG, LNG and hydrogen are also partially covered for road transport; LNG is just mentioned for inland water transport; all the other combinations are either absent or not applicable. As for LPG, Slovakia has already a quite developed combination of refuelling infrastructure and vehicles. The Slovak NIR does not provide information on the methodology applied to take account of the charging efficiency of high power recharging points nor any particular needs during the initial phase of AFI deployment.

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

Road transport

- **Electricity** - The SK NIR confirms the NPF vehicles estimates and infrastructure targets for the period 2020-2030, thus showing the same level of ambition of the NPF. According to our methodology, the progress achieved between 2016 and 2018 to meet the 2030 objectives is adequate. The sufficiency index indicating the ratio between number of EVs

and number of recharging points also remains adequate until 2030. With regards to heavy-duty vehicles, the SK NIR estimates 200 electrified buses and coaches on the road by 2030 but no HCV.

- **CNG** - The SK NIR reports an important revision of both the vehicle estimates and infrastructure targets for the period 2020-2030 compared to the NPF. The new objectives are both lowered (for example 24,000 CNG vehicles are now foreseen in the NIR for 2030, compared to 30,000 CNG vehicles in the NPF), representing a clear decrease of ambition. This is further confirmed by the progress for the period 2016-2018, assessed as slow for both vehicle and infrastructure deployment. However, the decrease in vehicle estimates and infrastructure targets for CNG/road is partially mitigated by a comparable increase of LNG/road and hydrogen/road objectives, combined. For the heavy-duty sector the SK NIR estimates 800 HCVs and 200 buses and coaches by 2030.
- **LNG** – Unlike the NPF, the SK NIR presents a strategy for LNG/road, which plans to have 1,888 heavy-duty vehicles and 10 LNG refuelling points by 2030.
- **Hydrogen** - Similarly to LNG, the SK NIR presents a strategy for the pair hydrogen/road that was not present in the NPF. In this case, 3,600 vehicles and 18 hydrogen refuelling points are foreseen by 2030. Most of the hydrogen-fuelled vehicles should be light-duty vehicles (3,250), but 150 HCVs and 200 buses and coaches are estimated too.
- **Biofuels** – The SK NIR reports that for petrol there is scope to increase the share of biofuels from 7.4% to 9% by volume. It also includes the possibility in the near future to introduce high-biofuel blends in the form of E20, E85 and, if appropriate, B30.
- **LPG** - The SK NIR presents a plan for the LPG/road, however this cannot be regarded as a consequence of the AFI Directive, because the LPG vehicles and infrastructure were already present on the Slovak territory before 2016 and the outlook presented in the NIR until 2030 shows a substantial confirmation of the present situation.

Rail transport

- **Hydrogen** - The SK NIR plans to have three and ten hydrogen-fuelled locomotives by 2025 and 2030, respectively. This is new compared to the NPF.

Waterborne transport (inland)

- **LNG** - The SK NIR presents the target (absent in the NPF) to provide by 2030 one LNG refuelling point for each port in the TEN-T Core Network (i.e. Bratislava and Komárno).

Air transport

- **Biofuels** – The Slovak NIR does not provide information related to the need of renewable jet fuel refuelling points in airports within the TEN-T Core Network.

With reference to the **measures**, the SK NIR shows a focus on the development of electro-mobility. To a lower extent, also measures addressing CNG, LNG, and hydrogen refuelling infrastructure are present.

The Legal measures are mainly dedicated to allowing the development of electro-mobility, in terms of both electric vehicles and recharging infrastructure. If fully implemented, these measures appear to be fit to support the realisation of the AFV/AFI objectives, as presented in the NPF and revised in the NIR. Based on the available information, the level of ambition remains constant between the NPF and the NIR.

The Policy and Deployment & Manufacturing measures, taken singularly, score low or medium, with the majority showing the same or higher level of ambition compared to the NPF. The most complete and comprehensive cluster of measures applies the pair electricity/road,

followed by the pair CNG/road, while the LNG/road pair obtains the same overall score as in the NPF. As for hydrogen, there were no measures in the NPF, thus those in the NIR, although overall low scoring and not-comprehensive, represent an increase of ambition compared to the NPF. In terms of expected impact of the assessable measures to support the realisation of the AFV/AFI objectives as presented in the NPF and revised in the NIR, the measures for the pair electricity/road have a medium impact, those for the pairs CNG/road, LNG/road and hydrogen/road have a low impact.

With regards to the RTD&D measures, the implementation report shows an increased effort to channel financial resources into the support of research, development and demonstration, with focus on electro-mobility projects. This qualitatively scores as showing a higher ambition compared to the NPF.

▪ *Final remarks*

The Slovak NIR provides a rather comprehensive report on the efforts to implement the Directive. The NIR meets many requirements of Annex I to the Directive, with some exceptions like the missing information on the use of shore-side electricity supply in inland ports and electricity supply for stationary aircraft in airports. There is also a lack of information on the measures to be implemented to promote other modes of transport than road.

The Slovak NIR plans for approximately 34,900 electric vehicles on the roads by 2030, representing about 1.4% of the fleet by that time. 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. Furthermore, the targets for publicly accessible recharging infrastructure correspond to the low estimated number of vehicles and will hence not lead to an appropriate recharging network. An increase in ambition will contribute to better meeting the needs of a dense, wide-spread and easy to use network of recharging and refuelling infrastructure throughout the EU. No information on charging efficiency is provided. Further information should be provided on the electrification of waterborne, air and rail transport.

For hydrogen infrastructure, the NIR includes a strategy for developing hydrogen infrastructure for road transport. Such strategy was not considered in the NPF. The NIR targets around 3,600 FCHVs by 2030. A number of 18 hydrogen refuelling points is estimated for 2030. This number seems sufficient subject to future fleet development. The NIR also includes the plans of Slovakia to use hydrogen as a fuel for rail.

With regard to CNG vehicles and infrastructure, the NIR shows a slightly reduced level of ambition in comparison with the figures reported in the NPF. In any case, the estimated uptake of CNG is expected to result in about 24,000 vehicles by 2030, which will represent about 1% of the fleet by that time. The estimated number of CNG refuelling points by 2030 seems to be sufficient taking into account the estimated size of the CNG fleet in that year. Concerning LNG for road transport, the NIR includes a strategy to develop the LNG infrastructure for road transport, which had not been included in the NPF. The NIR estimates eight LNG refuelling points by 2025 and ten LNG refuelling points by 2030. The number of refuelling points seems sufficient, considering the length of the TEN-T Road Core Network, provided that the refuelling points are widely distributed along the network. Concerning the LNG infrastructure for inland

ports, the NIR estimates one refuelling point for each port of the TEN-T Core Network, which is in line with the requirements of the Directive.

With regard to LPG infrastructure, the NIR reports a fleet of 52,219 LPG vehicles and a sufficient number of 362 refuelling points in Slovakia in 2018. According to the NIR, a slight increase of LPG vehicles and a constant number of LPG refuelling points is estimated by 2025 and 2030 compared to 2018. The estimated number of around 66,000 LPG vehicles will only make up approximately 2-3% of the fleet by 2030.

Regarding biofuels, Slovakia is also considering the use of higher blends of biofuels in road transport. The NIR expresses that there is scope to increase the share of biofuels in petrol from 7.4% to 9% by volume. Biodiesel is blended by 7%. The NIR does not provide information on the use of biofuels in aviation. Slovakia 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 49,000 km², Slovakia has a population of 5.443 million people in 2018, which makes up for a population density of 111 inhabitants/km².

Number of main urban agglomerations

- 8 urban agglomerations > 50,000 inhabitants

In 2018, Slovakia achieves a per capita gross domestic product at market prices of €16,470, which represents a per capita gross domestic product in purchasing power standards of 73 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 Slovakia is 832 km. The total road network length is 18,023 km, of which 413 km are motorways.

The following lengths of the TEN-T Road Corridors are present in Slovakia: 7% (256 km) of the Baltic - Adriatic Corridor, 1% (81 km) of the Orient / East - Mediterranean Corridor and 9% (395 km) of the Rhine - Danube Corridor.

Through the TEN-T Road Corridors, Slovakia is connected with the following Member States:

- Austria (through the Baltic - Adriatic and the Rhine - Danube Corridor)
- Poland (through the Baltic - Adriatic Corridor)
- Czechia (through the Orient / East Mediterranean and the Rhine - Danube Corridor)
- Hungary (through the Orient / East Mediterranean and the Rhine - Danube Corridor)

Number of registered road vehicles

At the end of 2018, Slovakia accounts for 3,141,103 registered road vehicles of which 2,321,608 are categorized as passenger cars, 318,000 as light goods vehicles, 358,832 as heavy goods vehicles and 9,363 as buses and coaches. The motorisation rate is 427 passenger cars per 1,000 inhabitants.

Number of ports in the TEN-T Core Network

- No maritime ports
- 2 inland ports in the TEN-T Core Network (Bratislava, Komárno)
- No inland ports in the TEN-T Comprehensive Network

Through the 413 km inland waterways TEN-T Core Network, Slovakia is connected with Austria and Hungary by the Rhine - Danube Corridor.

Number of airports in the TEN-T Core Network

- 1 airport in the TEN-T Core Network (Bratislava)
- 2 airports in the TEN-T Comprehensive Network