

- **Croatia (HR)**

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

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

The Croatian NPF addresses most of the requirements of Article 3. It contains a comprehensive discussion of the current state, but a somewhat limited discussion of future scenarios for most alternative fuels in the transport sector. For all fuels and some modes, it establishes targets as required by Article 3 of the Directive. The NPF does not contain concrete measures to encourage and facilitate the deployment of recharging points not accessible to the public.

The NPF does not contain vehicle estimates for the future deployment of EVs. The given recharging points target and especially high power recharging infrastructure seems to cover the needs of electric vehicles in terms of number of publicly accessible recharging points as well as minimum coverage requirements in Croatia in 2020. The NPF does neither consider electricity supply for stationary airplanes nor shore-side electricity.

The NPF does not contain vehicle estimates for the future deployment of CNG vehicles. Croatia currently has a sufficient network of CNG refuelling points when compared to CNG vehicles, but it does not meet the minimum coverage requirements. Regarding the 2025 minimum coverage target in terms of distance requirements, the existing measure for the deployment of CNG refuelling points seems sufficient. Croatia already counts a high number of CNG buses and future promotion of CNG vehicles for public transport is foreseen.

The Croatian NPF plans two LNG refuelling points for heavy-duty vehicles in road transport until 2025 and seven until 2030. Moreover, the NPF plans one LNG refuelling point in maritime transport in 2025 and seven until 2030. Furthermore, two LNG refuelling points for inland waterways are planned until 2030. It is not specifically stated in the NPF whether the inland waterways and maritime LNG refuelling points will be accessible for LNG heavy-duty vehicles. In case they are accessible, Croatia would meet the minimum distance requirement of one LNG refuelling point every 400 km on the road TEN-T Core Network in 2025.

The NPF does not consider hydrogen for transport.

The Croatian NPF contains a list of measures with a low impact score on overcoming deployment barriers in electro-mobility, CNG and LNG vehicles and infrastructure deployment. Only measures concerning electro-mobility are considered comprehensive. Most of the existing or planned measures end in 2018 or earlier, with no prolongation explicitly stated. The majority of measures stated in the NPF could not be assessed due to the limited information provided.

Croatia considered local authorities and stakeholders' interest, and coordinated the NPF with the local authorities. Moreover, Croatia cooperated with many Member States in projects concerning electro-mobility and LNG infrastructure deployment.

▪ **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 (maritime), /electricity, biofuel(s)	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, waterborne (inland), /electricity, CNG, LNG, LPG, H2	Y
	<ul style="list-style-type: none"> • consideration of the need for renewable jet fuel refuelling points in airports within the TEN-T Core Network 		N
ANNEX I: 3. Deployment and manufacturing support	<ul style="list-style-type: none"> • 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, LNG, H2	Y
	<ul style="list-style-type: none"> • Annual public budget allocated to support manufacturing plants for alternative fuels technologies, broken down by alternative fuel and by transport mode. 		N
	<ul style="list-style-type: none"> • Consideration of any particular needs during the initial phase of the deployment of alternative fuels infrastructures. 	All / All	Y
ANNEX I: 4. Research, technological development and demonstration	<ul style="list-style-type: none"> • Annual public budget allocated to support alternative fuels RTD&D, broken down by fuel and by transport mode. 	Road, waterborne (maritime)/ biofuels	Y
ANNEX I: 5. Targets and objectives	<ul style="list-style-type: none"> • Estimation of the number of alternative fuel vehicles expected by 2020, 2025 and 2030 		N
	<ul style="list-style-type: none"> • 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, LPG	Y
	<ul style="list-style-type: none"> • 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, H2 LPG	Y
	<ul style="list-style-type: none"> • Information on the methodology applied to take account of the charging efficiency of high power recharging points 		N
ANNEX I:6 Alternative fuels infrastructure developments	Changes in supply (additional infrastructure capacity) and demand (capacity actually used)	Road / CNG, LNG, LPG	Y

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

The HR NIR does not provide AF vehicle estimates for 2020, 2025 and 2030, and presents AFI targets only for electricity/road, CNG/road, hydrogen/road and only for 2020. Electricity is partially covered also for waterborne transport, both maritime and inland. Other combinations AF/transport mode, are either just mentioned or not reported at all.

The Croatian NIR reports a long list of legal initiatives, but provide assessable information only on around 33 measures. Under the Policy and Deployment & Manufacturing sections it was possible to identify seven AF/transport mode clusters of measures, of which five 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	792	315	NA	515	NA	NA	NA	NA
	Change NIR vs NPF [%]				73.99%				
	Attainment [%]				61.17%				
CNG / road	NIR	338	2	NA	3	NA	NA	NA	NA
	Change NIR vs NPF [%]				-76.92%				
	Attainment [%]				66.67%				
LNG / road	NIR	NA	NA	NA	1	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 [%]								
H2 / road	NIR	NA	1	NA	2	NA	NA	NA	NA
	Change NIR vs NPF [%]								
	Attainment [%]				50.00%				
LPG / road	NIR	61,558	557	NA	NA	NA	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

- Road transport

The Croatian NIR provides no vehicle estimates for the next decade and, concerning infrastructure, it presents quantitative AFI targets for electricity CNG, LNG and hydrogen only for the year 2020.

The HR NIR states that Croatia had set aside a dedicated budget until 2030 in order to reach the minimum share of AF vehicles, which is 1% of all vehicles registered. This includes vehicles powered by electricity, CNG/CBG, LNG/LBG and hydrogen, and the funds to reach the goal will be distributed by co-financing mechanisms.

- Electricity

Vehicles

Croatia recorded 792 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 693 were passenger cars, 96 LCVs and 3 battery-electric buses and coaches. There are no electric HCVs recorded in Croatia in 2018. Similarly to the NPF, the Croatian NIR does not provide EV estimates for any vehicle category for 2020, 2025 or 2030. The EV numbers available for 2016, 2017 and 2018 show a moderate positive trend in the new EVs in the national fleet mix, however, still very low compared to the overall fleet, with only 0.04% in 2018.

As the NIR did not provide future vehicle estimates, the 2018 *attainment* and *progress* could not be computed.

Infrastructure

Croatia recorded 315 public recharging points in 2018 (Table 2), of which 45 normal power ($\leq 22\text{kW}$) and 270 high power ($>22\text{kW}$) recharging points ($>22\text{kW}$). This is more than the NPF target of 296 for 2020. The new NIR target of 515 publicly accessible recharging points for 2020 is almost 74% higher than the NPF target. While the NPF had set targets for both 2025 and 2030, which were 602 and 806 public recharging points respectively, the NIR does not state 2025 and 2030 targets.

The 2018 *attainment* of future public recharging infrastructure targets is 61.17% for 2020. According to the assessment methodology described in Section 2.1, the 2018 situation corresponds to a *fast 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 Croatia is equal to 54%.

Ratio

Based on the HR NIR, the following table shows the ratio between vehicles and publicly accessible recharging points (i.e. sufficiency index) for the pair electricity/road. Since there are no estimates provided for the future, the sufficiency index could only be computed for the 2016 - 2018 period. It is considered adequate since it is inferior to the threshold value of 10.

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	Electricity	4.23	2.95	2.51			

Information on charging efficiency

Information is not available in the HR NIR.

- CNG

Vehicles

Croatia reported 338 CNG vehicles in use in 2018, of which 133 were passenger cars, 96 LCVs, 9 HCVs and 100 buses and coaches. As in the NPF, there are no estimates in the HR NIR for 2020, 2025 and 2030 on CNG vehicles. For this reason, the 2018 **attainment** and **progress** could not be computed.

Infrastructure

The Croatian NIR indicates that two publicly accessible CNG refuelling points were in use in 2018. The NPF had CNG AFI targets for 2020 and 2025, while the HR NIR shows only the 2020 target (three publicly accessible CNG refuelling points for 2020, which is nearly 77% lower than in the NPF, plus two private) but no targets for 2025 or 2030, thus reflecting a decreased ambition.

The 2018 **attainment** of future public CNG refuelling infrastructure targets is 66.67% for 2020. According to the assessment methodology described in Section 2.1, the 2018 level of **progress** cannot be evaluated, because the future 2020 target is only one unit above the number of CNG refuelling points in 2016. The calculated **average annual growth rate** corresponding to the period 2016-2020 for publicly accessible CNG refuelling infrastructure evolution planned by Croatia is equal to 11%.

Ratio

Based on the Croatian NIR, the following table shows the ratio between vehicles and publicly accessible refuelling points (i.e. sufficiency index) for the pair CNG/road. Since there are no estimates provided for the future, only 2016-2018 sufficiency index can be calculated, and it is considered adequate since it is inferior to the indicative value of 600 (see Section 2.1.5).

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	CNG	133.00	162.00	169.00			

- LNG

Vehicles

Similarly to the Croatian NPF, there is no information provided about LNG vehicles in the Croatian NIR. Therefore, the 2018 **attainment** and **progress** could not be computed.

Infrastructure

The Croatian NIR provides no information about 2016 to 2018 public refuelling points but presents a target of one LNG refuelling station for 2020. This represents a different scenario compared to the NPF that had not provided a target for 2020, but had provided targets for 2025 and 2030, of two and seven LNG refuelling points respectively, with a possibility of increasing facilities if a higher demand was present.

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

Ratio

Since there are no LNG vehicles in the HR NIR, either recorded or estimated, it is not possible to compute the sufficiency index.

- Hydrogen

Vehicles

There were no hydrogen vehicles recorded in Croatia in 2018. The Croatian NIR mentions that for 2030 all AF vehicles will reach at least 1% of the total fleet, including vehicles running on hydrogen. In relation to this goal, the Croatian NIR clarifies that no concrete actions have yet been taken specifically on hydrogen vehicles. For this reason, the 2018 **attainment** and **progress** could not be computed.

Infrastructure

The Croatian NIR reports one publicly accessible hydrogen refuelling point in use in 2018. The target for 2020 is equal to two, while no 2025 or 2030 targets are provided. The NPF had not provided targets for 2020 or 2025, however it had provided a target for 2030, which could have been 1 or 2, depending on the demand.

The 2018 **attainment** of future publicly accessible hydrogen refuelling infrastructure targets is 50% for 2020. According to the assessment methodology described in Section 2.1, the **progress** obtained by Croatia for publicly accessible hydrogen refuelling infrastructure deployment from 2016 until 2018 versus the period 2016-2030 could not be computed because the 2030 target is not provided.

Ratio

Since there are no hydrogen vehicles in the HR NIR, either recorded or estimated, it was not possible to compute the sufficiency index.

- Biofuels

The creation of a plan to develop the market for biofuels until 2030 affecting both AFI and AFV has been announced, and a significant effort in the research of third generation biofuels is noted.

Vehicles

Information is not available in the Croatian NIR.

Infrastructure

Information is not available in the Croatian NIR.

- LPG

Vehicles

Croatia reported 61,558 LPG vehicles in use in 2018 (Table Error! No text of specified style in document.-2), of which 60,527 were passenger cars and 1,031 LCVs. There are no future estimates for the LPG vehicles. The HR NIR does not mention LPG as a desirable AF in the national fuel mix by the year 2030.

Due to the lack of future estimates, the 2018 *progress* and *attainment* could not be computed.

Infrastructure

Croatia reported 557 publicly accessible LPG refuelling points in use in 2018. According to EAFO, Croatia recorded 550 LPG refuelling points in 2016. No future targets are provided in terms of publicly accessible LPG refuelling points and, therefore, the 2018 *progress* and *attainment* could not be computed. The HR NIR does not mention LPG as a desirable AF in the national fuel mix by 2030.

Ratio

Based on the HR NIR and EAFO, 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 2016 and 2018.

Sufficiency Index		2016	2017	2018	2020	2025	2030
Road	LPG	108.46*		110.52			

* Value of LPG AFI taken from EAFO

- Rail transport
 - Electricity

Vehicles

Information is not available in the Croatian NIR.

Infrastructure

Information is not available in the Croatian NIR.

- Waterborne transport (maritime)

No specific AF vessels estimates are provided for the future years, however a dedicated measure implies the conversion of obsolete fossil fuel vessels to different AF propulsion systems both in maritime and inland waterways by 2030.

- Electricity

Vessels

The HR NIR reported one electric seagoing ship in 2018. Similarly to the NPF, the NIR does not provide any specific numerical estimates for the next decade.

Infrastructure

Information is not available in the Croatian NIR. The NPF had provided a target of three shore-sided electricity supplies for seagoing ships in maritime ports by 2025, but this is absent in the HR NIR.

- LNG

Vessels

Information is not available in the Croatian NIR.

Infrastructure

The Croatian NIR explains that the LNG terminal mentioned earlier under the road/LNG section and targeted for 2020, will be used by both maritime and road transport. The NPF had presented a target of one refuelling point for 2025 and seven for 2030, but the NIR does not provide confirmation of this plan.

- Waterborne transport (inland)
 - Electricity

As already mentioned in Section 5.11.3.3, the HR NIR mentions a dedicated measure concerning the conversion of obsolete fossil fuel vessels to different AF propulsion systems both in maritime and inland waterways by 2030.

Vessels

Croatia reported two electric vessels in 2018, used for touristic purposes in inland waterborne transport. No specific estimates are provided for the future years.

Infrastructure

The HR NIR does not state any current numbers or future targets regarding shore-side electricity supply. The NPF had reported two shore-side electricity supplies in inland ports in 2016, and a target of four for 2020, but these numbers have not been confirmed in the HR NIR.

- LNG

Vessels

Information is not available in the Croatian NIR.

Infrastructure

The NPF had presented a target of two refuelling points for 2030, but the NIR does not provide confirmation of this plan.

- Air transport
 - Electricity

No specific information on electric airplanes/infrastructure was found in the Croatian NIR.

- Biofuels

The Croatian NIR does not provide specific information related to the use of biofuels in aviation.

▪ *Measures assessment*

The Croatian NIR provides a portfolio of measures with a long list of legal initiatives, addressing different modes of transport and all the major alternative fuels to a certain degree. They cover a wide variety of combinations AF/transport mode, however they mostly focus on electricity and road transport. Noteworthy is the special attention of RTD&D measures towards advanced biofuels.

- Legal measures

The Croatian NIR provides information on the national legal framework for the deployment of alternative fuels infrastructure by listing the relevant existing legislation elements (16 legal acts, 71 implementing regulations) and by mentioning seven strategic documents (national plans and strategies). Additionally, the HR NIR goes in details regarding three areas in which future legislation is foreseen (described in the next section) and five administrative measures. The three legislative & regulatory measures were also covered by the NPF, however the NIR provides an updated version and continuation of them, increasing their level of ambition.

- Legislative & Regulatory

The three legal measures described in details in the Croatian NIR belong to the legislative & regulatory category and cover different transport modes. One measure addresses the overall integration of renewable energy sources in the 10-year national energy and climate plan, with the RES reaching the share of 13.2% in the overall Croatian transportation final energy consumption by 2030, following the legal restrictions laid down in the plan.

The second legal measure aims at legislative adjustments to increase the development of AFI and to promote the deployment of clean and energy efficient vehicles in all transport modes. In particular, for road transport, it aims to achieve a share of energy efficient purchased vehicles of 37% light commercial vehicles, 13% heavy commercial vehicles and 65% buses, achieved under the sustainable procurement act at a national level. The HR NIR mentions the intention to transpose in national legislation parts of several EU Directives (i.e. Directive 2018/2001/EU on the promotion of the use of energy from renewable sources, Directive 2019/1161/EU on the

promotion of clean and energy-efficient road transport vehicles, Directive 2018/844/EU amending the Energy Performance of Buildings Directive).

The third measure aims at providing an action plan that lays down a policy for the promotion and use of biofuels in Croatia: assessment of the current situation, long-term objectives, targeted biofuels market and further measures to promote production and use of biofuels until 2020.

- Administrative

The Croatian NIR contains five administrative measures, all applicable at national level. Out of these five measures, three measures are related to road transport and two concern a combination of different modes. Mostly, they are addressing the compliance with relevant EU and international standards and producing different plans and acts for classifications of the AFV performances. It is important to note that one measure is currently existing and four measures are either planned or in the process of adoption. These four measures address directly the AFs and AFVs, while the one measure currently existing is not directly related, as it deals with the training of truck drivers on eco-driving.

- Policy measures

The Croatian NIR reports 19 policy measures intended to foster alternative fuels in Croatia. This is an improvement compared to the NPF, which contained nine policy measures. Most policy measures in the Croatian NIR are financial incentives.

- Measures to ensure national targets and objectives

All the 19 policy measures in the Croatian NIR are measures that aim to ensure national targets and objectives.

Nine measures target AFVs, two target AFI, two target AFs and the rest target combinations of AF/transport modes. Road transport is the most covered, and to a lesser extent waterborne transport inland and other combinations. One of the most significant measures to directly incentivise the purchase of EVs and the construction of recharging infrastructure saw a considerable increase of budget, compared to the same measure in the NPF, which shows a positive ambition towards electrification of road vehicles.

Some measures from the NPF appear to be implemented in the NIR. They include purchasing of a smaller amount of AFVs and installing AFIs in national parks, nature parks, small islands etc. When assessed as single measures they do not significantly contribute to the overall target achievement, but are in themselves an indicator of good ambition and positive trend towards electro-mobility in touristic areas and areas of specific nature reserves.

Out of the 19 measures, two measures listed in the Croatian NIR can be seen as exceptions as they do not directly address AFI or AFV, but are rather indirect measures that aim to promote different modes of transport, increase fluidity of traffic by better optimising ICT solutions and an incentive programme for combined goods transport in order to decrease GHG, fuel consumption and increase safety.

- Measures that can promote AFI in public transport services

The Croatian NIR does not list any measure to promote AFI in public transport services.

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

The Croatian NIR does not list any measure to promote the deployment of private electro-mobility infrastructure.

- Deployment and manufacturing support

- AFI deployment

The Croatian NIR lists five measures to support the deployment and manufacturing of alternative fuels. All these five measures are listed under a specific cluster in the NIR, which started the implementation in 2017 with a dedicated budget of approximately €663,000 and aims at the deployment of AFI for electricity. They are related to the construction of fast recharging stations/points at the following localities: municipality of Pizarovina, municipality of Radoboj, town of Rab, island of Ugljan and the city of Zagreb. Since no end year was provided, it is fair to assume the construction of these stations has been finalised and the stations are in use. These measures are present only in NIR and this is considered to show a positive ambition towards electro-mobility in small, medium and large cities, along with the availability of publicly recharging stations on the remote islands of Ugljan and Rab.

The Croatian NIR does not consider any other alternative fuel besides electricity in this section.

- Support of manufacturing plants for AF technologies

No measures regarding the support of manufacturing plants for AF technologies are present in the Croatian NIR.

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

The Croatian NIR highlights the need for financial incentives in the initial phase of AFI deployment. It is clear from the NIR that a dedicated measure and budget mark the necessary first step for the development of the market, foreseeing the co-financing of the AFI construction in order to reach at least the minimum coverage criteria laid down by the main text of the Directive. The measure is set to last from 2019 until 2030 with a budget of approximately 49 million € in that period.

- Quantitative assessment of Policy and Deployment & Manufacturing measures

Table Error! No text of specified style in document.-3 presents an overview of the analysis of all the Policy and Deployment & Manufacturing measures, carried out according to the assessment methodology described in Section 2.2. In total, seven clusters of measures were identified, of which five resulted assessable. No clusters of measures have emerged for LNG for inland waterborne transport, nor for rail or air transport.

All the five assessable clusters of measures get a high overall score, but only the one for the pair electricity/road results to be comprehensive. The clusters for the pairs electricity /water (both maritime and inland) are not assessable. 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 partial or total lack of future targets and estimates does not allow putting this assessment into perspective. Based on the impact seen during the implementation period, for the future it can be said that the measures for the pair electricity/road might have a high impact, those for the pairs CNG/road, LNG/road, LNG/water-maritime and hydrogen/road might have a medium impact.

Compared to the NPF, the level of ambition of the Policy and Deployment & Manufacturing support measures has generally increased for all the identified clusters.

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	N	M	+
LNG	Road	H	N	M	+
	Water - maritime	H	N	M	=
	Water-inland				
H2	Road	H	N	M	+
Electricity	Water - maritime	X			+
	Water - inland	X			+

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'.

- Research, Technological Development & Demonstration

The Croatian NIR lists four RTD&D measures/projects. Since all of the measures are newly introduced in the NIR, it is not possible to compare the nature of the projects with the three RTD&D projects that were presented in the NPF. Out of these four new RTD&D projects, three are targeting biofuels production while the other is a promotional research project/campaign concerning solar powered vehicles. Two RTD&D measures are already in place with dedicated staff and budget. Both are addressing advanced biofuels (third generation biofuels) production in Croatia: one research project investigates the potential of Adriatic algae in third generation

biofuel production, while the second one is broader and targets to produce 3.5% of advanced biofuels in transport from domestic feedstock by the year 2030. Finally, the third measure is planned to start in 2021 and aims to develop the market for advanced biofuels and to put in place the corresponding legal acts. The end result of this final measure is to set up a model for promoting and developing the market for biofuels in transport and designing funding instruments for projects regarding biofuels.

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

The Croatian NIR provided (partial) information suggesting that, until 2018, the percentage of the AFs in the total national fuel mix was 3.10%. The NIR does not provide past or future data on electricity, biofuels or hydrogen. The NIR estimates that CNG in road transport will grow from 0.10% in 2018 to 1% in 2025 and then to 3% in 2030. LNG for road use will increase from 0% in 2018 to 0.1% in 2020, to 1.5% in 2025, and up to 5% in 2030. Unlike CNG and LNG, the NIR foresees for LPG a constant share 3% from 2018 until 2030 (Table Error! No text of specified style in document.-4).

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



MODE OF TRANSPORT	FUEL	Fuels use [%]			Estimated fuels use [%]		
		2016	2017	2018	2020	2025	2030
Road	Gasoline						
	Diesel						
	Electricity						
	CNG	0.10%	0.10%	0.10%	0.10%	1.00%	3.00%
	LPG	3.00%	3.00%	3.00%	3.00%	3.00%	3.00%
	Other AF (LNG)	0.00%	0.00%	0.00%	0.10%	1.50%	5.00%
	Total Road	3.10%	3.10%	3.10%	3.20%	5.50%	11.00%
Maritime	Marine diesel oil	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

- ***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					H2 / road	LPG / road
		Electricity / road	CNG / road	LNG / road	LNG / water (maritime)	LNG / water (inland)		
AF Vehicles / Vessels	Past situation (2016)	389	266	NA	NA	NA	NA	59,652
	Situation (2018)	792	338	NA	NA	NA	NA	61,558
	Estimate (2030)	NA	NA	NA	NA	NA	NA	NA
	Future share (2030) [%]							
	Estimate attainment (2018 vs 2030) [%]							
	Progress (2018)							
Publicly accessible AF Infrastructure	Past situation (2016)	92	2	NA	NA	NA	0	550*
	Situation (2018)	315	2	NA	NA	NA	1	557
	Target (2030)	NA	NA	NA	NA	NA	NA	NA
	Target attainment (2018 vs 2030) [%]							
	Progress (2018)	fast						
Sufficiency Index	2016	4.23	133.00					
	2018	2.51	169.00					110.52
	2020							
	2025							
	2030							
Measures	Legal measures	Ambition (NIR vs NPF)	+	+	+	=		
	Policy measures +	Score	H	H	H	H		H
		Comprehensiveness	C	N	N	N		N
	Deployment & manufacturing	Impact	H	M	M	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 EAFO (absent in NIR)

The Croatian NIR contains a sufficient description of the policy direction towards the introduction of alternative fuels in Croatia. The NIR however completely lacks the estimation of the number of AFVs for 2020, 2025 and 2030, similarly to the NPF. It does establish the 2020 targets for the AFI in detail for the majority of AFs, but it does not provide any targets for 2025 and 2030, unlike the NPF report that indeed had provided targets for the majority of AFs in 2020, 2025 and in 2030. Most of the measures address electricity in detail, with other AFs being covered in a 10-year plan, except LPG. The plan is rather generic, but it contains budget description and the authorities responsible for enforcing the deployment of AFs, signalling a positive ambition towards the achievement of the national plan.

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

Road transport

- Electricity** – Croatia recorded 792 battery-electric and plug-in hybrid electric vehicles in use in 2018, of which 693 were passenger cars, 96 LCVs and 3 battery-electric buses and coaches. There were no electric HCVs recorded in Croatia in 2018. The Croatian NIR does not estimate the EVs for any vehicle category for 2020, 2025 or 2030, thus the progress and attainment could not be computed. Croatia recorded 315 publicly accessible recharging points in 2018, out of which 45 were normal power ($\leq 22\text{kW}$) and 270 high power points ($> 22\text{kW}$). The NPF had set targets for 2020, 2025 and 2030, but the NIR does not mention any 2025 and 2030 targets. As for 2020, the NIR target of 515 for publicly accessible

recharging points is 74% higher than the NPF target of 296 recharging points. The 2018 progress for AFI was fast, the sufficiency index in 2018 was adequate.

- **CNG** – Croatia reported 338 CNG vehicles were in use in 2018, out of which 133 were passenger cars, 96 LCVs, 9 HCVs and 100 buses and coaches. There are no estimates in the NPF nor in the NIR for 2020, 2025 and 2030 of CNG vehicles. The Croatian NIR indicates that two publicly accessible CNG refuelling points were in use in 2018. It also reports a target of three CNG publicly accessible refuelling points for 2020, but no targets for 2025 or 2030. The NPF had CNG AFI targets for 2020 and 2025, while the HR NIR shows only the 2020 target, which is 77 % lower than in the NPF, thus reflecting a decreased ambition.
- **LNG** – Like in the NPF, there is no information about LNG vehicles in the HR NIR, which also provides no information about 2016 to 2018 AFI, but does provide the target for 2020, which is one LNG refuelling station. The NPF target for 2020 had not been provided, however the 2025 target was of two LNG refuelling points and the 2030 target was of seven refuelling points.
 - **Hydrogen** – The Croatian NIR does not report any information on existing or future hydrogen vehicles; it only mentions that, as a part of a global 2030 target, all AFVs will reach 1% of the total fleet, including vehicles running on hydrogen. The HR NIR informs that there was one hydrogen publicly accessible refuelling point in use in 2018. The target for 2020 is equal to two, while no 2025 or 2030 targets are provided. The NPF had no targets for 2020 nor 2025 publicly accessible hydrogen refuelling points, however it did provide a tentative target for 2030 which was stated to be one or two, depending on the demand.
 - **Biofuels** – The Croatian NIR only mentions that, as a part of a global 2030 target, all AFVs will reach 1% of the total fleet, including vehicles running on biofuels, but it is not specified which biofuels and in what amount. The preparation of a plan to develop the market for biofuels is envisaged until 2030, and will affect both the AFI and AFV.
- **LPG** – Croatia reported 61,558 LPG road vehicles in use in 2018, of which 60,527 were passenger cars, and 1,031 LCVs. No future estimates for the LPG vehicles are reported in the HR NIR. Croatia reported 557 publicly accessible LPG refuelling points in use in 2018. No future targets are provided in terms of publicly accessible LPG refuelling points.

Rail transport

- **Electricity** – The HR NIR does not address rail electrification.

Waterborne transport (maritime and inland waterway)

- **Electricity** – Croatia reported three electric vessels in service in 2018, used for touristic purposes. No specific targets are provided for the future years, however a dedicated measure implies the conversion of obsolete fossil fuel vessels to different AF propulsion systems both in maritime and inland waterways by 2030, including electricity. The Croatian NIR does not provide any information on shore-side electricity supply. The NPF had reported two shore-sided electricity supplies in 2016 in inland ports, and for 2020 a target of four supplies in inland ports and of three shore-sided electricity supplies in maritime ports.
- **LNG** – The Croatian NIR does not provide any LNG vessel estimate. It presents a target of one LNG terminal that will be used by maritime and road transport from 2020. While the NPF had presented a target of one maritime refuelling point for 2025, and of seven refuelling points in maritime ports and two in inland ports in 2030, the NIR does not provide any targets in that aspect.

Air transport

- **Electricity/Biofuels** - The Croatian NIR does not specifically provide targets.

The Croatian NIR provides a list of **measures** related to road transport and all the major alternative fuels (to a certain degree), however mostly focusing on electricity and road transport. Waterborne transport (both maritime and inland) is also covered. The portfolio consists of a total of 33 assessable measures addressing several, but not all, provisions of the Annex 1 of the Directive. A significant number of the measures in place target either AFV public procurement, national co-funding scheme for electricity, or recharging infrastructure deployment. Furthermore, the Croatian government emphasises two general measures with dedicated budget addressing the deployment of AFI and AFV until 2030. These measures provide significant budget and aim to reach 2030 target set by the Croatian energy and climate plan. Concerning the Policy and Deployment & Manufacturing measures, seven clusters were identified, of which five were assessable. 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 partial or total lack of future targets and estimates does not allow putting this assessment into perspective. Based on the impact seen during the implementation period, it can be said that future measures for the pair electricity/road might have a high impact, those for the pairs CNG/road, LNG/road, LNG/water-maritime and hydrogen/road might have a medium impact.

There are four RTD&D measures addressing the research for AFs, in particular advanced biofuels production in Croatia, showing a positive ambition towards a national target of 3.5% biofuels production from the domestic feedstock.

▪ *Final remarks*

The Croatian NIR provides a rather limited report on the efforts to implement the Directive. It partially meets the requirements of Annex I to the Directive and lacks information regarding vehicles and vessel estimates while providing infrastructure targets for road transport with regard to electricity, natural gas and hydrogen for 2020. In terms of measures, the Croatian NIR provides a rather comprehensive portfolio related to road transports, however mostly focusing on electricity. Waterborne maritime transport is also covered, but in a more discrete manner, while waterborne inland transport is not covered. With regard to air transport, Croatia announces the elaboration of a plan to decarbonise air transport. In future reports, Croatia should strengthen information on targets and measures promoting uptake of zero-emission vehicles infrastructures. The targets for the required coverage of publicly accessible infrastructure need to be established, where the number of alternative fuels vehicles and infrastructure are adequately quantified and reported for the different modes of transport.

Regarding electricity, Croatia recorded 792 battery-electric and plug-in hybrid electric vehicles in use in 2018. The NIR does not estimate the electric vehicles for any vehicle category for the target years of 2020, 2025 and 2030. As for infrastructure, Croatia recorded 315 publicly accessible recharging points in 2018. The NPF had set targets for 2020, 2025 and 2030, but the NIR does not mention any targets for 2025 and 2030. Croatia has considerably increased its ambitions for 2020 in the NIR compared to the NPF, but the lack of data prevents the assessment of ambition for 2030. Croatia should provide more information in future reporting in this regard. No information on charging efficiency is provided. Concerning waterborne transport, Croatia reported two electric vessels in service in 2018 used for touristic purposes and one electric

seagoing ship. No specific targets nor information on shore-side electricity supply are provided for the target years of 2025 and 2030. However, a measure conveys the intention to promote different alternative fuel propulsion systems both in maritime and inland waterways by 2030, including electricity supply. The NIR does neither provide information on the supply of electricity to stationary aircraft nor on the further electrification of railways.

For hydrogen, the NIR does not report any information on existing or future deployment of FCHVs. It reports one hydrogen refuelling point for 2018 and another one planned for 2020. Although hydrogen is not binding under the Directive, it would be relevant that Croatia provides more information on how to ensure EU-wide connectivity for HCEV.

Croatia reported 338 CNG vehicles in use in 2018, without estimates in the NIR nor in the NPF for 2020, 2025 and 2030. In terms of infrastructure, the NIR indicates that two publicly accessible CNG refuelling points were in use in 2018 and sets a target of three CNG publicly accessible refuelling points for 2020. The NIR does not set targets for 2025 or 2030 and shows a decreased ambition in comparison to the NPF. Regarding LNG, the NIR does not contain information on vehicle and vessels estimates nor on infrastructure. For 2020, the NIR only foresees one LNG refuelling point. In this respect, Croatia needs to provide further information on its future planning.

On LPG, Croatia reported 61,558 vehicles and 557 refuelling points in 2018. No future vehicle estimates or infrastructure targets were provided.

Further information should be provided on the consumption of biofuels in road and air transport. Croatia 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 56,600 km², Croatia has a population of 4.105 million people in 2018, which makes up for a population density of 73 inhabitants/km².

Number of main urban agglomerations

- 7 urban agglomerations > 50,000 inhabitants

In 2018, Croatia achieves a per capita gross domestic product at market prices of €12,620, which represents a per capita gross domestic product in purchasing power standards of 63 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 Croatia is 1,107 km. The total road network length is 17,800 km, of which 1,310 km are motorways.

The following lengths of the TEN-T Road Corridors are present in Croatia: 6% (315 km) of the Mediterranean Corridor.

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

- Hungary (through the Mediterranean Corridor),
- Slovenia (through the Mediterranean Corridor)

Number of registered road vehicles

At the end of 2018, Croatia accounts for 2,007,817 registered road vehicles of which 1,666,413 are categorized as passenger cars, 137,049 as light goods vehicles, 44,355 as heavy goods vehicles and 5,700 as buses and coaches. The motorisation rate is 406 passenger cars per 1,000 inhabitants.

Number of ports in the TEN-T Core Network

- 1 maritime port in the TEN-T Core Network (Rijeka)
- 6 maritime ports in the TEN-T Comprehensive Network
- 2 inland ports in the TEN-T Core Network (Slavonski Brod, Vukovar)
- 2 inland ports in the TEN-T Comprehensive Network

Through the 541 km inland waterways TEN-T Core Network, Croatia is connected with Hungary by the Rhine – Danube Corridor.

Number of airports in the TEN-T Core Network

- 1 airport in the TEN-T Core Network (Zagreb)
- 6 airports in the TEN-T Comprehensive Network

