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Subject:	REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Renewable Energy Progress Report

Delegations will find attached document COM(2020) 952 final.

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REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Renewable Energy Progress Report

1. INTRODUCTION

Renewable energy is at the core of the European Green Deal priorities. The Directive 2009/28/EC on the promotion of the use of energy from renewable sources[1] (RED I) is a central element in the EU's energy policy and a key driver for meeting the renewable energy targets for 2020. The 2020 targets are also the first major milestone to provide the basis to deliver on the increased ambition of 55% greenhouse gas (GHG) emissions reductions by 2030 as envisaged in the Climate Target Plan[2] under the European Green Deal[3]. With that increased ambition, the EU has established a balanced path to climate neutrality by 2050 through the deep decarbonisation of all sectors of the economy. In this sense, a transition is needed from today's energy system to an integrated energy system largely based on renewables. As specified in the impact assessment for the Climate Target Plan for the 55% greenhouse gas reduction, the 2030 share of renewables will need to reach 38-40%.[4]

The Energy System Integration Strategy[5] emphasises that Europe's energy future must rely on an ever growing share of geographically distributed renewable energies that integrate different energy carriers flexibly, while remaining resource-efficient and avoiding pollution and biodiversity loss. Clean and renewable energy will also be a building block of the economic recovery in the aftermath of the Covid-19 crisis. The Commission's recovery plan[6], as presented on 27 May 2020, highlights the need for better integration of the energy system, as part of efforts to unlock investment in key clean technologies and value chains and increase economy-wide resilience. In the context of the Recovery and Resilience Facility, Member States shall prepare national recovery and resilience plans, which shall be consistent with the relevant country-specific challenges and priorities identified in the context of the European Semester, in particular those relevant for or resulting from the green and digital transition. The recovery and resilience plans shall also be consistent with the information included by the Member States in the national reform programmes under the European Semester, in their national energy and climate plans (NECP) and updates thereof under the Regulation (EU)2018/1999, in the territorial just transition plans under the Just Transition Fund, and in the partnership agreements and programmes under EU funds.

A main building block is the entry into force of the Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (RED II[7]) on 24 December 2018. The new directive established a robust framework for meeting the binding EU target of at least 32 % renewable energy in gross final energy consumption by 2030. This framework built on progress under the RED I include *inter alia* the obligation for Member States to use the 2020

[1] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources, OJL 140, 5.6.2009. p. 16
[2] COM(2020) COM(2020) 562 final
[3] COM(2019) 640 final.
[4] SWD(2020) 176 final
[5] COM(2020) 299 final
[6] COM (2020)456 final
[7] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2018, p. 82).

targets as the baseline for national trajectories in the NECPs. Following the submission of all the NECPs the EU's renewable energy share is now expected to reach 33.1-33.7%[8] in 2030. The aggregated Member States contributions indicate that renewable energy use will grow faster in the years up to 2030, so that if the Member States' deliver (and exceed) their renewable energy contributions, the EU overall share of renewable energy will therefore surpass the 32% target.

The EU's political priority of becoming the world leader in renewables is underpinned by the presence of renewables in all dimensions of the Energy Union. Technology leadership is prominent in the clean energy sector (in particular in wind, ocean, smart grid technologies and renewable hydrogen), but continuing efforts are needed to catch up and build a competitive edge in batteries and solar photovoltaic (PV)[9]. The EU ranks high among international competitors in high value patents demonstrating the leading position of Europe to innovate and export new and improved low carbon technologies[10].

The benefits of renewables extend well beyond the dimensions of the Energy Union. Renewable energies are a source of economic growth and jobs for Europeans, in particular local jobs with **more than 1.5 million people currently working in the sector in the EU and generating an estimated annual turnover of €158.9 billion**[11]. The recent report on energy prices and costs in Europe[12] documents that the greater amounts of renewable energy are a relevant factor behind the fall in wholesale energy prices in recent years. This could in turn reduce energy costs for industry and potentially improve industrial competitiveness. Last but not least, the falling costs of the technology, combined with digitalisation are making renewables a real driving force for empowering consumers to play a key role in the energy transition.

This report provides the latest insights into progress made up to 2018 towards the 2020 national binding targets on renewables and fulfils Commission reporting obligations under RED I and the Directive on Indirect Land Use Change (ILUC)[13]. It uses energy statistics based on Member States transmissions to Eurostat up to July 2020 as primary data source for evaluating progress towards the 2020 target. This report builds further on the Member States fifth biannual renewable energy progress report covering 2017-18[14], as well as complementary technical analysis conducted in the course of 2020. It also includes an overview of the potential in terms of co-operation mechanisms, and assess the administrative frameworks as well as biofuels sustainability.

[8] COM(2020) 564 final EU-wide assessment of National Energy and Climate Plans
[9] COM(2020)953 Report on progress of clean energy competitiveness
[10] JRC (2017), Monitoring R&I in Low-Carbon Energy Technologies, http://publications.jrc.ec.europa.eu/repository/handle/JRC105642
[11] Eurobserv'ER (2020) 2019 barometer. https://www.eurobserv-er.org/19th-annual-overview-barometer/
[12] Underlying study from Trinomics for the European Commission October 2020 Report on Energy prices and cost in Europe
[13] Directive (EU) 2015/1513
[14] https://ec.europa.eu/energy/en/topics/renewable-energy/progress-reports

The report consist of four main chapters. Chapter 2 sets out an overall EU level assessment while chapter 3 adds more detailed analysis of Member State progress including projections towards 2020. Chapter 4 assesses the sustainability of biofuels. Overall conclusions with recommendations are presented in Chapter 5. Unless specifically mentioned, figures provided in this report include the UK, an EU Member State in the 2018 reporting period

2. EU PROGRESS IN DEPLOYING RENEWABLE ENERGY

In 2018, the EU reached a share of 18.0% (18.9% EU 27) of renewable energy in gross final energy consumption, against a target of at least 20% (20.6[15] % for EU 27) for 2020, and above the indicative trajectory of 16% for 2017/2018. In addition, the EU as a whole is also above the slightly more ambitious trajectory defined by Member States themselves in their National Renewable Energy Action Plans (NREAPs)[16]. Recent years, have seen a steady growth in the overall share of renewable energy sources (RES) at EU level and in the sectoral shares of renewable energy in electricity (RES-E), heating & cooling (RES-H&C), and to a lesser extent, transport (RES-T).

With regard to individual sectors, at EU level the renewable energy **share in electricity and heating and cooling has been systematically above** the levels defined by Member States in their NREAPs, while the **transport sector is slightly below the planned share** in the NREAP (8.03% actual versus 8.50% planned)[17]. This shortfall is partly due to the debate on biofuels policy and the related adjustments to the legislative framework. While these adjustments were necessary to address sustainability concerns, the resulting uncertainty about the future policy framework slowed down investments in biofuel production capacity including advanced biofuels[18]. The increase in investment into advanced biofuel production capacity resulting from the adoption of RED II is not reflected in the 2018 data.

Bioenergy in general continues to be the main source of renewable energy in the EU, with a share of around 60% in 2018. Solid biofuels account with 68.4% for the largest share of bioenergy. Of these solid biofuels, forestry accounts for approximately 91%. The other forms of bioenergy are liquid biofuels (12.6%), biogas (11.6%), the renewable share of municipal waste (7.2%) and charcoal (2%).[19]

[15] Indicative aggregated EU 27 share of the 27 Member States national binding targets and based on Commission estimates of the Gross Final Energy Consumption of energy in each EU27 Member State in 2020

[16] https://ec.europa.eu/energy/en/topics/renewable-energy/national-action-plans

[17] Navigant (2020): Technical assistance in realisation of the 5th report on progress of renewable energy in the EU - Task 1-2. Service contract: ENER/C1/ 2019-478 [DOI 10.2833/325152]

[18] Advanced biofuels are defined in the RED as biofuels produced from a positive list of feedstock comprised mostly of wastes and residues.

[19] Navigant (2020): Technical assistance in realisation of the 5th report on progress of renewable energy in the EU - Task 3. Service contract ENER/C1/ 2019-478

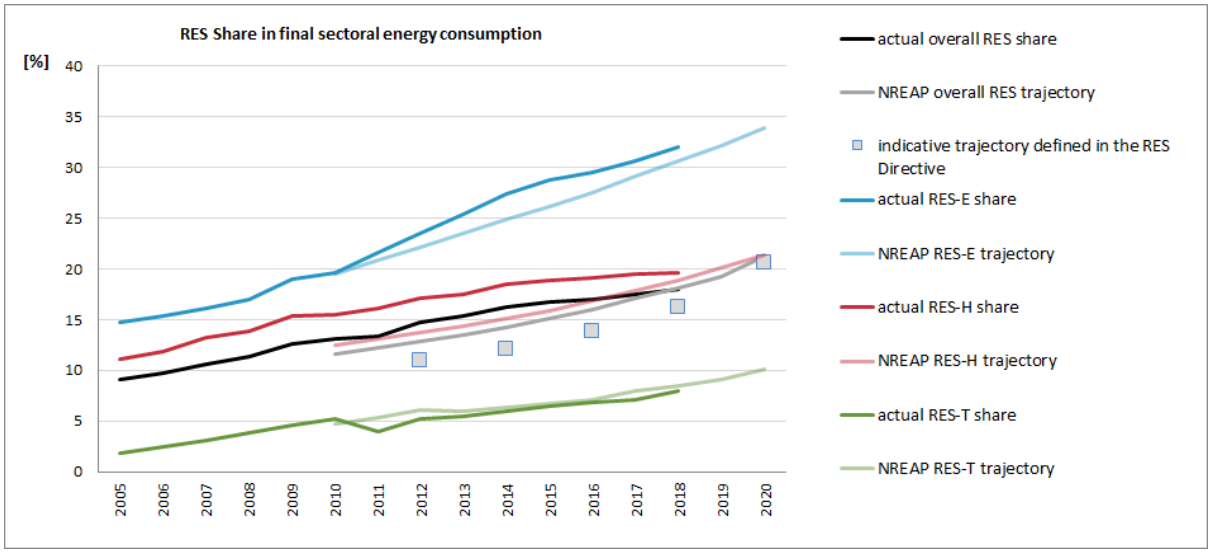

Figure 1: *Actual and planned renewable energy shares for the EU (2005-2020, %). Source: Eurostat and National Renewable Energy Action plans (NREAP)*

In terms of absolute consumption of renewable energy, heating & cooling makes the biggest contribution (total of 102.9 Mtoe in 2018), closely followed by renewable electricity, (90.3 Mtoe), and transport (25.1 Mtoe)[20].

The main renewable sources used in energy consumption sectors were biomass for heating & cooling, hydropower and wind for electricity, and biofuels for transport.

Member States are primarily supporting RES T through instruments targeting the use of biofuels, but they are increasingly promoting e-mobility options or are currently planning to implement subsidies for e-mobility. Among those Member States that already have support instruments in place are Denmark, Germany, Ireland, Croatia, Italy, Latvia, Malta, Austria, Romania, Sweden and the UK.

In the electricity sector, a clear paradigm shift is happening towards renewables. Between 2010 and 2018, the solar and wind cumulative capacity in EU has grown from 110 GW to 261 GW[21]. One of the key factors has been the decline in the cost of electricity from solar PV and wind power, which over the period from 2009 to 2018 fell by nearly 75% and about 50% (depending on the market) respectively, due to capital costs reductions, advances in efficiency and supply chain improvements and competitive tendering for support schemes. E.g. Germany and Netherlands have since mid-2016 allocated more than 3.1 GW of offshore capacities under zero-subsidy bids[22]. By July 2020, 18 MS determine the support levels for (larger) RES-E installations in a competitive bidding process[23]. A continuation of the trend to

[20] Eurostat SHARES 2018. Using the multipliers set in RED I
[21] Eurostat 2020: EU energy in Figures.
[22] JRC, Wind Energy Technology Market Report, EUR 29922 EN, European Commission, Luxembourg, 2019
[23] Navigant (2020): Technical assistance in realisation of the 5th report on progress of renewable energy in the EU - Task 1-2. Service contract: ENER/C1/ 2019-478 [DOI 10.2833/325152]

fully market-based RES-E projects would help contain electricity retail prices by reducing the support-related component[24].

Worldwide, **solar and wind sources accounted for most new power generation** in 2019, for the first time ever. Solar additions totalled 119 gigawatts (45% of all new capacity) and solar and wind together accounted for more than two thirds of the additions[25]. Similarly, IRENA notes that newly installed renewable power capacity increasingly costs less than the cheapest power generation options based on fossil fuels.[26]

The decline in costs is also one of the key drivers for an increase in the corporate sourcing of renewables, especially where corporate energy users sign a direct power purchase agreement with a renewable energy developer. In 2015-2019, the amount of renewable electricity to be supplied under corporate power purchase agreements in Europe[27] tripled from 847 MW to 2487 MW[28].

3. DETAILED ASSESSMENTS OF MEMBER STATES PROGRESS AND PROJECTIONS BY 2020

1. Progress in electricity, heating & cooling and transport

The renewable energy shares reflect the historic diversity in Member States' energy mix and their differences in renewable energy potential and the different progress, with **shares ranging from 7.4% in the Netherlands to 54.6% in Sweden in 2018** (see figure 2).

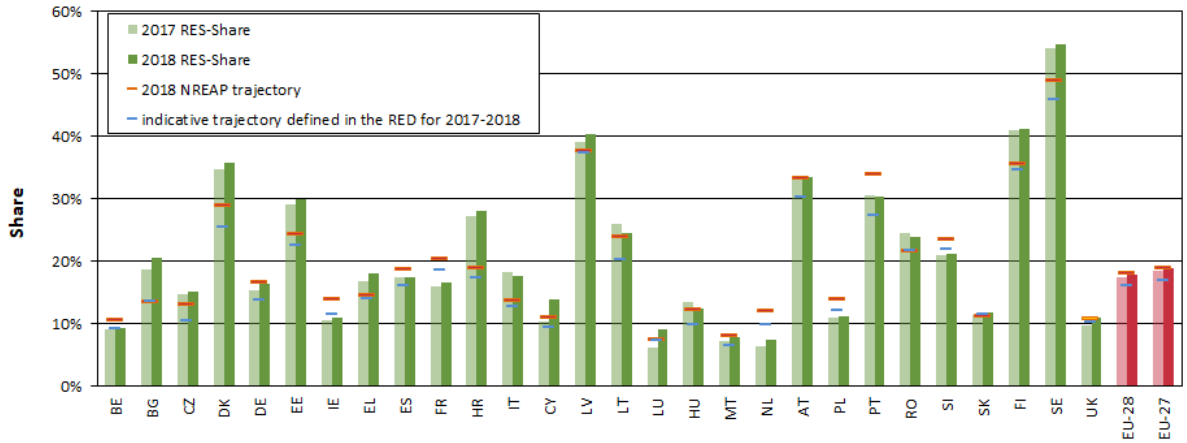

Figure 2: *EU and Member States renewable energy shares in gross final energy consumption 2017-2018 vs.RED I trajectories (source: Eurostat)*

[24] COM(2020)951 Report on Energy prices and cost in Europe

[25] https://www.bloomberg.com/news/articles/2020-09-01/the-world-added-more-solar-wind-than-anything-else-last-year#:%7E:text=For%20the%20first%20time%20ever,a%20report%20Tuesday%20by%20BloombergNEF

[26] https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019

[27] Including Norway and UK

[28] Bloomberg New Energy Finance Corporate PPA Database, accessed September 2020

There are now twelve Member States[29] (Bulgaria, the Czech Republic, Denmark, Estonia, (Greece estimated), Finland, Croatia, Italy, Cyprus, Latvia, Lithuania and Sweden) **that have already achieved a share equal to, or higher than, their 2020 target**. **At the same time, during 2018, six Member States** Spain, Italy, Lithuania, Hungary, Portugal and Romania **have reduced their renewable energy share compared to 2017**.

For the indicative RED trajectories, 23 Member States are above it while Ireland, France, the Netherlands, Poland and Slovenia are below. Ireland, France, Poland and Slovenia are below with shares between 0.7 and 2.3% while the Netherlands shows the biggest shortfall, with an actual share of 6.9% for 2017-1208 versus an indicative RED trajectory point of 9.9%. It lagged even further behind its 12.1% NREAP share for 2018. The largest positive deviations from their indicative RED trajectories can be observed for Croatia, Bulgaria, Czech Republic and Italy.

Looking at the absolute levels of consumption of renewable energy in EU, there is a significant increase from 189 Mtoe in 2015 to 209 Mtoe in 2018 i.e. 10.6%. However, in the same period the gross final consumption of energy grew from 1126 Mtoe to 1160 Mtoe, which resulted in a decreased impact on the renewable energy share, as it is calculated as the final renewable energy consumption divided by the gross final consumption of energy.

Sectorial renewable energy shares grew for a large majority of the Member States between 2017-2018. For the transport sector, where all Member States should reach the same target of 10%, only the two Member States Finland and Sweden are above this level. While there are 4 Member States within a 1% range of this target (France, Netherland, Austria and Portugal), the remaining Member States will need a steep increase to reach the 10% target. The recourse to statistical transfers for the transport sector, enabled by the ILUC Directive is also a possible avenue to explore.

2. Cross-border collaboration and the use of cooperation mechanisms

Co-operation mechanisms are based on Articles 6 to 11 of RED I. They include several mechanisms through which Member States can cooperate on renewable energy such as statistical transfers, joint projects and joint support schemes. Statistical transfers are particularly relevant to facilitate target achievement since they enable Member States that have reached a higher renewable energy share than their national target to transfer their surplus to another Member States. **There are currently four agreements to make use of statistical transfers**. The 2 agreements from 2017 between **Luxembourg-Lithuania** and **Luxembourg-Estonia** while 2020 until now saw 2 additional agreements between **Netherlands-Denmark** as well as **Malta-Estonia**.

According to the estimates that most Member States have included in their progress reports, **there will be an overall 12,177 ktoe 'excess production' of renewable energy, compared to the indicative trajectory, available for potential statistical transfers in 2020**. This corresponds to around half of France gross final consumption of energy from renewable

[29] Compared to 11 Member States in 2017.

sources. For a Member State that may not meet the 2020 target using their own renewable sources, this could be a viable option to meet their target cost-effectively (see table 1). To complement these expectations from Member States the Commission present an updated and coherent projection for 2020 in section 3.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Belgium			0	0	0	0	0	0	0	0	0	0
Bulgaria		362	348	520	630	593	602	638	579	767	411	341
Croatia												
Czech Republic		0	0	0	0	1146	1040	947	863	892	678	643
Denmark			694	834	1123	1106	833	928	552	619		63
Germany			9236	11831	9816	1066	7967	8069	3945	6141		3065
Estonia			191	206	177	197	230	243	243	300	344	397
Ireland				93	-14	111	79	26	-142	-12	-239	-366
Greece		196	260	380	306	266	211	-81	-189	-377	683	529
Spain			2026	2866	2704	3326	2040	3106	1323	1220		0
Italy	8324	8613	7405	10011	10936	9344	9456	7803	7555	5148	3805	2462
Cyprus							29	29	4	72	18	51
Latvia[30]									-37	16		
Luxembourg	0	0	0	0	0	0	0	0	0	95		86
Hungary		968	1150	1213	1295	883	970	803	470	271		
Malta									3	4		0
Netherlands									0	0	-	-
Austria	0	0	0	0	0	0	0	0	0	0	0	0
Poland[31]		543	729	929	530	93	174	-26031	-544	790		345
Portugal												
Romania	1207	1296	824	974	1114	1210	1091	1122	858	684	439	0
Slovenia												
Slovakia									45	84		00
Finland	0	0	0	0	0	0	0	0	1179	1420	1420	1420
Sweden[32]	2407	2141	2482	3318	3214	3335	3347	3475	3215	3610	3428	3241
Total sum	**11938**	**14119**	**25345**	**33175**	**31831**	**22676**	**28069**	**27108**	**19922**	**21744**	**10987**	**12177**

Table 1: *Actual and estimated excess and/or deficit production of renewable energy in Member States compared to the indicative RED trajectory (ktoe). Source: Navigant 2020*[33]*, Member States reports*[34].

[30] Please note that Latvia is ahead of their indicative RED and planned NREAP trajectory for 2015-2016, but this was due to a lower energy consumption. They have (as indicated in their progress report) not reached the levels of gross RES consumption as planned, shown by the negative numbers in this table.

[31] Poland reported actual gross RES consumption negative compared to the planned value for 2016. Percentage wise they are also below their NREAP planned trajectory. However, their achievement in percentages shows that they are above the indicative trajectory as specified in the RED for 2015/2016. A cause could be a lower overall energy consumption than planned.

[32] The values still refer to the 4th Progress Report. Sweden did not provide updated values in the 5th Progress Report, but only referred to the estimates of the Swedish Energy Agency.

[33] Navigant (2020): Technical assistance in realisation of the 5th report on progress of renewable energy in the EU - Task 1-2. Service contract: ENER/C1/ 2019-478 [DOI 10.2833/325152]

[34] The table include only figures Member States that provided them in their progress report i.e. no information from United Kingdom and 5 Member States, Croatia, Portugal, Slovenia, France and Lithuania

3. Outlook for 2020 - current projections

In order to assess the feasibility of 2020 target achievement, a modelling exercise[35] has been carried out for the Commission. The analysis is based on an extrapolation of statistical data taking into account the RES investment level, the available pipeline of RES projects, and relevant Current Policy Initiatives[36] (CPI) including potential statistical transfers. The Covid-19 pandemic has caused additional uncertainty on the various parts of the (renewable) energy market. Due to these uncertainties two distinct demand trends (low and high demand) are shown representing likely lower and upper boundaries of what is classified as feasible concerning demand trends[37]. This is further combined with two distinct scenarios for the use of RES cooperation by means of statistical transfers: a "strong cooperation" and a "weak cooperation" scenario. More precisely, at Member State level the following assumptions were taken:

- "strong cooperation": A statistical transfer of in total 1,700 GWh from Estonia (1,000 GWh) and Lithuania (700 GWh) to Luxembourg, a statistical transfer of 16,000 GWh from Denmark to the Netherlands, and a statistical transfer of 80 GWh from Estonia to Malta.

- "weak cooperation": A statistical transfer of 1,100 GWh to Luxembourg (400 GWh from Estonia and 700 GWh from Lithuania), a statistical transfer of 8,000 GWh from Denmark to the Netherlands, and a statistical transfer of 80 GWh from Estonia to Malta.

This modelling projects the EU to reach a renewables share of 22.8% - 23.1% (see figure 3 below) in 2020. It also finds that many individual Member States are expected to perform well in the remaining years, reaching deployment levels beyond their target levels. Nevertheless, **three Member States (Belgium, France, and Poland) are at severe risk of not meeting the target**. **Furthermore, 2 Member States the Netherlands and Luxembourg are at moderate risk of not meeting the target**. For reference, the figure also includes the 2020 baseline that the Member States have specified in their Final National Energy and Climate Plans.

[35] Navigant (2020): Technical assistance in realisation of the 5th report on progress of renewable energy in the EU - Task 1-2. Service contract: ENER/C1/ 2019-478 [DOI 10.2833/325152]

[36] Note that the range indicates the uncertainty related to key input parameter for the model-based assessment of future RES progress. Remarkably, this year's (2020) energy demand drop as a consequence of the Covid-19 pandemic, and corresponding (comparatively small) changes in RES supply play a decisive role in this respect.

[37] The demand trends are based on available data up to July 2020

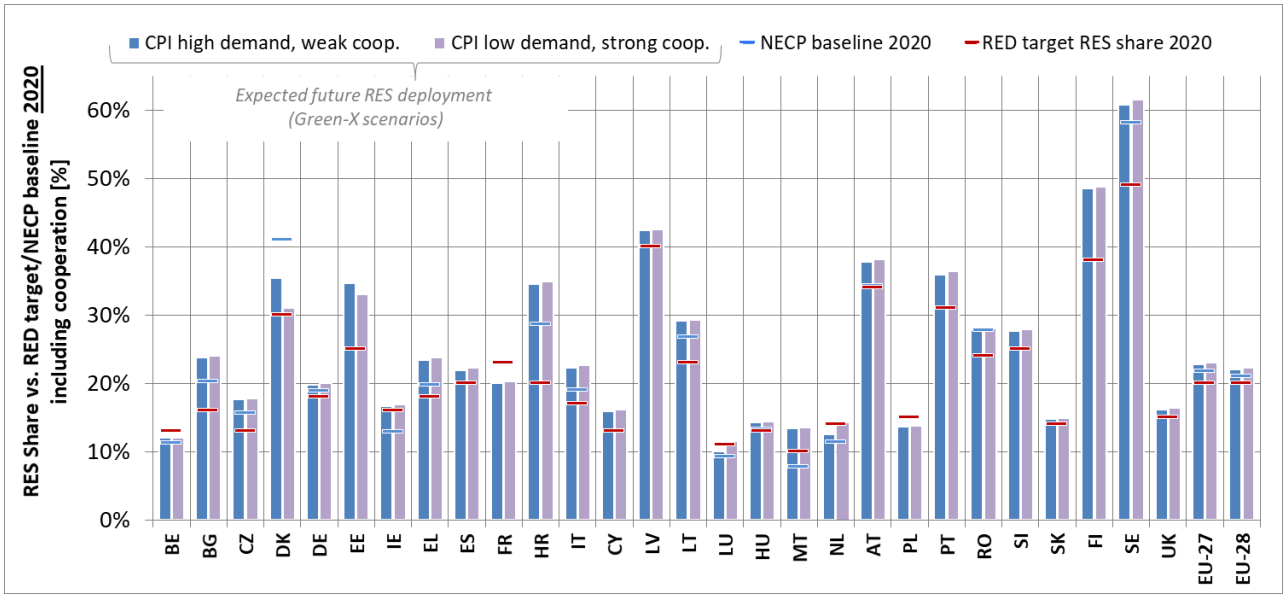

Figure 3: *Expected RES share in 2020 vs. 2020 RED target RES share and 2020 NECP baseline (%) including cooperation mechanisms (source: Navigant)*

The modelling also calculated absolute deficits and surplus in the Member States including the co-operation mechanisms (see table 2).

RES share in gross final energy demand by 2020 - with impact of RES cooperation	**Expected RES share 2020** (CPI scenario)		**RED target RES share 2020**	**Deviation of expected from RED target RES share** (CPI scenario)		**Absolute deviation of expected from RED target RES share** (CPI scenario)	
	Min.	Max.		Min.	Max.	Min.	Max.
Member State	[%]	[%]	[%]	[%]	[%]	[ktoe]	[ktoe]
Belgium	12.0%	12.0%	13.0%	-7.6%	-7.3%	-321	-303
Bulgaria	23.8%	24.0%	16.0%	48.9%	50.1%	785	790
Czechia	17.6%	17.8%	13.0%	35.7%	36.6%	1,132	1,136
Denmark	30.9%	35.7%	30.0%	3.1%	18.9%	140	844
Germany	19.8%	20.0%	18.0%	9.8%	11.1%	3,643	4,041
Estonia	33.0%	34.9%	25.0%	31.8%	39.5%	236	289
Ireland	16.6%	16.9%	16.0%	4.0%	5.5%	71	95
Greece	23.4%	23.8%	18.0%	30.3%	32.2%	831	862
Spain	22.0%	22.4%	20.0%	9.9%	11.8%	1,523	1,763
France	20.0%	20.3%	23.0%	-12.9%	-11.8%	-4,033	-3,585
Croatia	34.6%	34.9%	20.0%	72.8%	74.5%	916	919
Italy	22.3%	22.7%	17.0%	31.3%	33.4%	5,522	5,732
Cyprus	15.9%	16.1%	13.0%	22.3%	24.2%	44	47
Latvia	42.4%	42.6%	40.0%	6.0%	6.5%	96	101
Lithuania	29.2%	29.3%	23.0%	27.0%	27.3%	325	328
Luxembourg	10.1%	11.6%	11.0%	-8.4%	5.1%	-34	21
Hungary	14.3%	14.4%	13.0%	10.0%	10.5%	228	236
Malta	13.4%	13.6%	10.0%	34.0%	35.7%	18	18
Netherlands	12.5%	14.2%	14.0%	-10.8%	1.2%	-688	74
Austria	37.8%	38.2%	34.0%	11.2%	12.4%	1,009	1,099
Poland	13.7%	13.8%	15.0%	-8.7%	-8.3%	-918	-859
Portugal	35.9%	36.4%	31.0%	15.8%	17.5%	784	847
Romania	27.8%	28.0%	24.0%	16.0%	16.8%	892	921
Slovenia	27.7%	27.9%	25.0%	10.6%	11.6%	121	129
Slovakia	14.7%	14.9%	14.0%	5.3%	6.4%	71	84
Finland	48.6%	48.9%	38.0%	27.8%	28.6%	2,697	2,721
Sweden	60.9%	61.6%	49.0%	24.3%	25.7%	3,914	4,058
United Kingdom[38]	16.2%	16.4%	15.0%	7.9%	9.7%	1,391	1,649
EU-27	22.8%	23.1%	20.0%	14.2%	15.5%	*19,751**	*21,661**
EU-plus UK	22.1%	22.4%	20.0%	10.4%	11.8%	*21,142**	*23,309**

Table 2: *Expected and required RES shares in 2020 including cooperation mechanisms Source: Navigant 2020*[39]

[38] The rights and obligations of a Member State apply to the UK until the end of the transition period on 31 December 2020

The table 2 shows that **with the expected EU 27 RES deployments there is a considerable margin for the Member States to establish statistical transfer agreements. The surplus is at least 19.7 Mtoe (229 TWh).** On basis of the energy demand projections from the modelling, RES deployment is expected to increase by 19.2-21.7 Mtoe in 2018-2020.

Modelling has further been performed specifically for the transport sector in order to assess expected progress on the basis of current policies and demand trends taking account of the Covid-19 pandemic.

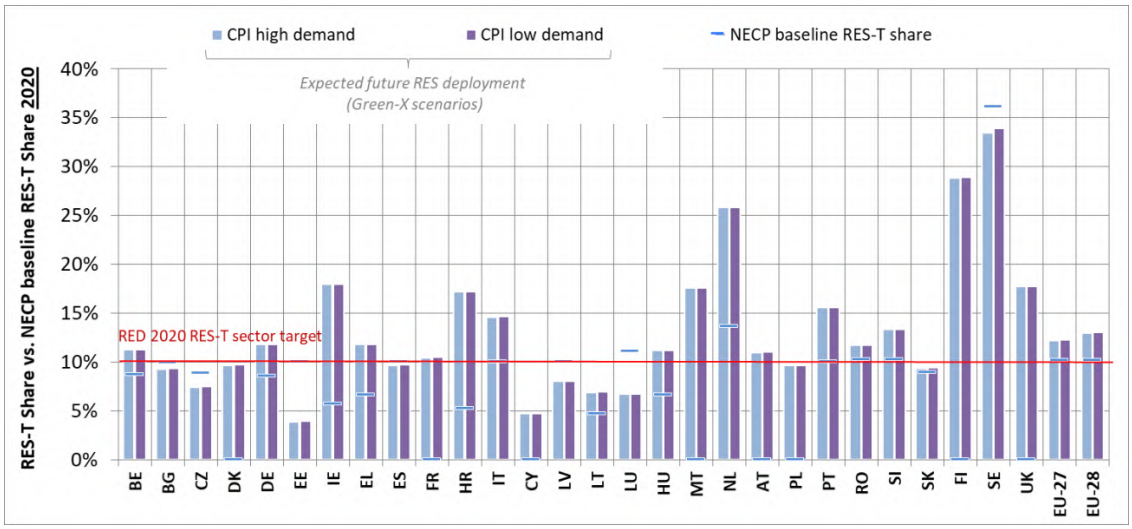

Figure 4: *Expected RES-T share in 2020 vs. binding national RED RES-T sector target and NECP baseline (%) (source: Navigant)*

The overall EU level is expected to be around 2% above the 10% level by 2020 and 16 of 27 Member States are expected to meet (and over-succeed) their binding RED RES-T sector target under all assessed circumstances. On the top of that list is Sweden, followed by Finland, the Netherlands, Ireland, Malta, Croatia, and Portugal, all showing a surplus larger than 50% compared to the target. Other Member States where RES-T target achievement appears likely are Belgium, Germany, Greece, France, Italy, Hungary, Austria, Romania and Slovenia. The remaining 11 Member States are not expected to meet their binding RED RES-T sector target with the current policies although 3 Member States (Denmark, Spain, and Poland) are less than 0.5% away from the target. The Member States that are found to be further away are Estonia, Cyprus, Luxembourg, and Lithuania – all with deficits larger than 25%.

Given that the EU level is well above 10% binding RES-T target, the Member States should consider the use of statistical transfers for the transport sector, as enabled under the ILUC Directive.

[39] Navigant (2020): Technical assistance in realisation of the 5th report on progress of renewable energy in the EU - Task 1-2. Service contract: ENER/C1/ 2019-478 [DOI 10.2833/325152]

4. Developments in streamlining administrative procedures

In their 5th national renewable energy progress reports, Member States report on measures to streamline administrative procedures for renewable energy projects (pursuant article 13 of RED I). According to external analysis[40], in global terms, a large share of the relevant measures in the REDI have been successfully implemented across the Member States. These measures include, amongst others: facilitated procedures for small-scale projects, requirements on system operators to provide cost estimates and other necessary information, requirements on the distribution of costs of grid development and grid connection of renewable energy, consideration of RES-E in the national network development plan, and the existence of support schemes promoting the use of renewable energy.

The following examples of positive developments in individual Member States are among those identified in the technical analysis[41]:

- ✓ Denmark
  - a one-stop shop for offshore wind turbines has simplified the administrative burden for the approval of offshore wind farms;
  - coordination between all relevant authorities in the licensing process is handled centrally by the Danish Energy Agency; and
  - licences are prepared in advance and can be issued once the environmental impact assessment of the winning tenderer for the project has been approved;
- ✓ since 2018, Bulgaria has run a single information and services web portal for the submission of electronic applications;
- ✓ Germany has eased administration and reporting by introducing a comprehensive database with all master data from the electricity and gas markets;
- ✓ Sweden
  - the application forms for solar PV investment aid have been simplified;
  - e-applications have been facilitated;
  - the requirement for follow-up has been abolished; and
  - dialogue between the government agencies that administer the aid has been improved; and
- ✓ the Netherlands aims to:
  - speed up spatial planning with an Environment Act entering into force in 2021; and

[40] Navigant (2020): Technical assistance in realisation of the 5th report on progress of renewable energy in the EU - Task 1-2. Service contract: ENER/C1/ 2019-478 [DOI 10.2833/325152]

[41] More details can be found in: Navigant (2020): Technical assistance in realisation of the 5th report on progress of renewable energy in the EU - Task 1-2. Service contract: ENER/C1/ 2019-478 [DOI 10.2833/325152]

- package plans and permits to reduce costs.

However, also some barriers remain. While progress has already been made in the past, administrative procedures across all sectors can be even further streamlined in many Member States. Also, authorisation procedures have room for further simplification, and the time required for processing permits could be reduced. The transposition of RED II by June 30th 2021, require overall further enhancement of these procedures.

In the electricity sector, spatial and environmental planning requirements hamper progress in some Member States. In the heating & cooling sector, the barriers are mainly due to shortcomings affecting the capacities of district heating networks, while the transport sector mainly sees barriers arising from the lack of adequate infrastructure for electric vehicles and market uncertainty created by policy changes in the field of biofuels. The integration of increasing RES capacities in the grid is also a persistent challenge for most Member States. The barriers arise mainly from the high cost of grid connection and the lack of certainty in grid development scenarios and transparency in the connection procedures

4. ASSESSMENT OF THE SUSTAINABILITY OF BIOFUELS[42]

1. Overview of biofuel consumption in the EU

In 2018, the EU consumption of sustainable biofuels amounted to 16,597 ktoe of which 3,905 ktoe (24%) were Annex IX biofuels[43] and 12,692 ktoe (76%) were other compliant biofuels.

Most biofuels consumed in the EU constitute of biodiesel (77%, FAME or HVO) or bioethanol (16%)[44]. Other liquid biofuels (6%) are not specified. **About 59% of the feedstock used for biodiesel consumed in the EU in 2018 was imported or produced from imported feedstock, while 41% came from EU feedstock, mainly rapeseed (26%), used cooking oil (8%) and animal fat (5%)**. The main non-EU countries of origin are Indonesia (17%) and Malaysia (8%), whose palm oil is used for biodiesel in the EU, and Argentina (9%) which exports biodiesel made from soybeans (see Table 3).

[42] The main source for the data and assessment in this section: "Technical assistance in realisation of the 5th report on progress of renewable energy in the EU" – Task 3 [DOI 10.2833/428247] and 4 [DOI 10.2833/10640]. Produced under service contract ENER/C1/ 2019-478 by "Navigant – A Guidehouse Company".

[43] "Annex IX biofuels" cover biofuels produced from feedstock listed in Annex IX of RED II.

[44] Source: Eurostat nrg_bal_c. The terms biodiesel and bioethanol refer to the physical composition of the fuel. Biodiesel is a type of fuel that can be blended with diesel. The main types of biodiesel are Fatty Acid Methyl Ester (FAME) and Hydrotreated Vegetable Oil (HVO). Ethanol is the chemical name of what is commonly known as alcohol. It can be blended with gasoline. These terms have no relation to the sustainability of biofuels, and are also unrelated to the categories "compliant biofuels" or "Annex IX biofuels".

	Rapeseed	Palm oil	Soybean	Use cooking oil (UCO)	Animal fat	Other, pine/tall oils, fatty acids, sunflower oil	Total (%)	Total (ktoe)
EU	26%		1%	8%	5%	1%	41%	5,871
Australia	2%						2%	308
Ukraine	2%						3%	362
Canada							1%	96
Indonesia		15%		2%			17%	2,382
Malaysia		7%		1%			8%	1,082
USA			3%	1%			4%	580
Brazil			2%				2%	266
China				4%			4%	527
Argentina			9%				9%	1,342
Other		1%[2)]		3%[3)]		1%	5%	707
Unknown	1%[1)]					4%	5%	671
Total (%)	32%	23%	15%	19%	5%	6%	100%	
Total (ktoe)	4,502	3,208	2,193	2,678	693	921		14,194

1) Small fraction of rapeseed imports is reported in the Eurostat [EU trade since 1988 by CN8 [DS-016890]] as import from countries and territories not specified for commercial or military reasons

2) Smaller fractions of palm oil-based biodiesel are estimated to originate from amongst others Honduras (0.3%), Guatemala (0.1%) and Colombia (0.1%)

3) Smaller fractions of UCO biodiesel are estimated to originate from amongst others Saudi Arabia (0.5%), Japan (0.3%), Russia (0.3%)

Table 3: *Origin of feedstock for biodiesel consumed in the EU (2018, % and ktoe). Source: Navigant analysis*

Ethanol consumed in the EU is produced mainly from EU feedstock (73%), including from wheat (34%), maize (24%) and sugar beet (14%) and only a small amount from cellulosic ethanol. Non-EU feedstock accounts for about 27% of the EU bioethanol market, mainly maize originating in Ukraine, Brazil, the United States and Canada (see Table 4).

	Wheat	Maize	Barley	Rye	Triticale	Sugar beet	Sugar cane	Cellulosic	Unknown/other	Total (%)	Total (ktoe)
EU	34%	24%				14%		0%		73%	2,199
Ukraine	0%	4%							0%	4.5%	134
Brazil		2%					1%			2.6%	79
Canada	0%	1%								0.8%	24
USA	0%	2%								2.2%	68
Russia	1%	0%								1.6%	50
Pakistan							2%			1.6%	49
Other	0%	1%					1%		2%	4.0%	119
Unknown			2%	3%	5%					9%	285
Total (%)	37%	34%	2%	3%	5%	14%	4%	0%	2%	100%	
Total (ktoe)	1,101	1,016	70	79	136	425	116	8	54		3,006

Table 4: *Origin of feedstock for bioethanol consumed in the EU (2018, % and ktoe). Source: Navigant analysis*

Besides biodiesel and bioethanol, a small amount of biogas is consumed in road transport in Sweden (118 ktoe) and Germany (33 ktoe).

	Solid biofuels	Biogas	Bio gasoline	Biodiesel	Other liquid biofuels	Bio jet kerosene	Total liquid biofuels	Total
Road	-	153.8	2,997.2	13,629.9	0.7	-	16,627.8	16,781.7
Rail	0.0	0.0	0.0	26.3	0.0	-	26.3	26.3
Domestic aviation	-	-	0.0	0.0	0.0	0.0	0.0	0.0
Domestic navigation[2)]	-	0.0	2.0	5.0	0.0	-	6.9	6.9
Non-specified transport	-	0.0	0.0	5.6	0.0	0.0	5.6	5.6
Total	0.0	153.8	2,999.2	13,666.7	0.7	0.0	16,666.6	16,820.5

1) Eurostat categories "charcoal" and "municipal solid waste" are excluded from the table, as they are not consumed in transport according to Eurostat nrg_bal_c. Eurostat category "consumption in pipeline transport" consumes no biofuels and has been excluded from the table. Total of liquid biofuels is the total of bio gasoline, biodiesels, other liquid biofuels and bio jet kerosene. Unlikely combinations (e.g. solid biofuels in aviation) are indicated with "-". 2) Domestic navigation includes all the quantities delivered to vessels of all flags within Europe as well as inland navigation and yachting.

Table 5 : *Total final bioenergy consumption in EU transport sub-sectors (2018, ktoe). Source: [Eurostat nrg_bal_c][1)]*

2. Impacts of biofuels consumed in the EU

It is estimated that 7.4 Mha of land was required for the production of crops for EU biofuel consumption in 2018[45]. Of that amount, 3.4 Mha (46%) are located within the EU and 3.8 Mha (51%) are located in third countries. The remaining 0.2 Mha (3%) was for barley, rye and triticale sourced from unknown countries. The total amount of cropland dedicated to biofuel production in the EU was 3% (on the basis of an estimate of total EU cropland of 117 Mha), with rapeseed accounting for 72% of the total land used for biofuels production. In 2018, land use for biofuels consumed in the EU made up 0.5 % of global land use for the production of crops used for biofuels. The land use for biofuels consumed in the EU accounts for 8.5% of the global land use for the production of rapeseed and 5.2% in case of palm oil. For most of the non-EU countries, it is estimated that less than 1% of their total cropland was used for the extraction of feedstock to be used in the production of biofuels produced or consumed in the EU.

In recent years, no correlation has been observed between food prices and biofuel demand. Any impact on food prices is small compared to other dynamics in the global food market. Most Member States did not observe any impacts on prices due to increased bioenergy demand within their countries. The last time food prices increased significantly was between 2006 and 2008 and in 2011. Since 2011, global food prices have fallen back to 2010 levels. In literature[46], causes other than biofuel production were identified for increased food prices in

[45] In the calculation of land use for crops used to produce biofuels, the amount of biofuel produced from a specific crop type was converted to the amount of feedstock needed to produce that amount of biofuel, also considering by-products.

[46] Ecofys, 2013, Biofuels and food security; Filip, Ondrej, et al., 2019, Food versus fuel: An updated and expanded evidence

the period of the food price spikes in 2006–2008 and 2011. It must be noted, however, that between 2008 and 2016, growing global demand for food and feed crops was requiring the agricultural sector to constantly increase production, which was achieved by both increasing yields and by an expanding agricultural area. It is estimated that the biofuels industry employed 208,000 people in 2018, being the third largest renewable energy job creator after wind energy and solid biomass (314,000 and 387,000). Countries with the greatest employment are Romania (40,000 jobs) and Poland (41,200 jobs) due to their large agricultural land area. France is the third largest (29,100 jobs) as it has both biofuel production facilities and feedstock production.

The cultivation of feedstock used for the production of biofuels consumed in the EU can potentially result in negative environmental impacts. Apart from indirect impacts these effects are usually site-specific and depend on the agricultural practices and are comparable with the impact of crops produced for other uses[47]. These negative environmental impacts include eutrophication of water bodies, water scarcity, soil erosion, soil compaction, air pollution, habitat loss and biodiversity loss. Impacts such as the conversion of land with high carbon stock and land of high biodiversity value are prohibited by the sustainability criteria. In their Progress Reports, most Member States point to limited cultivation of feedstock used in biofuel production compared to total agricultural activities, and consider therefore that associated environmental impacts are low. Several Member States point out that all agricultural production is regulated with respect to environmental impacts and therefore consider that no more impacts should be expected from biofuel crop production than from other crop production.

According to information reported by Member States, total emission savings from the use of renewables in transport in the EU amounted to 45.6 Mt CO2eq in 2018. The Member State reports indicate total GHG emission savings from transport and do not explain the roles of renewable electricity and (different types of) biofuels. However, given the overwhelming share of biofuels in the RES-T (89%), it is reasonable to assume that the emission savings result largely from the use of biofuels. Taking into account the provisional estimated ILUC emission factors set out in the RED, results in total emission savings from the use of biofuels in transport of 24 Mt CO2eq (with a range from 18.8 to 33.8 Mt)[48]. While the level of ILUC emissions depends on a variety of factors[49] and cannot be measured precisely, the results show that the contribution of biofuels from food and feed crops for decarbonisation is limited and their use for energy production – whether produced in the EU or imported – should be minimised. Against this background, RED II limits the amount of biofuels produced from food and feed crops that can be counted towards the overall share of renewables and the share of renewables in transport and foresees a gradual phasing out of

[47] It should however be noted that neither site-specific data nor data related specifically to the local environmental impacts of cultivation of feedstocks for biofuel production are available.
[48]The impact of ILUC is calculated on the basis of the provisional estimated indirect land-use change emissions from biofuel, bioliquid and biomass fuel feedstock (g CO2eq/MJ) in Annex VIII of Directive (EU) 2018/2001.
[49] The provisional estimated ILUC factors were for instance based on a scenario assuming a substantial increase in the level of consumption, which did not materialise.

biofuels with high ILUC risk. The Directive, however, makes it possible to exempt from the phase out those fuels that are certified as low ILUC-risk.

To implement this approach, on 13 March 2019 the Commission adopted a Delegated Act setting out rules for determining biofuels which have a high ILUC-risk and certification of low-ILUC-risk biofuels,[50] which identifies palm oil as a high ILUC-risk feedstock. Biofuels produced from palm oil would therefore be subject to the gradual phase out unless they meet the strict criteria for low ILUC-risk fuels. In 2021, the Commission will review the data on biofuels with high ILUC-risk and establish a trajectory for their gradual phase out by 2030.

More generally, the EU has decided to minimise the use of food and feed crop based biofuels and to focus in future on the promotion of advanced biofuels and other low carbon fuels, such as renewable electricity, recycled carbon fuels and renewable liquid and gaseous transport fuels of non-biological origin. In 2018, advanced biofuels accounted for 828 ktoe (21%) of the 3,905 ktoe of Annex IX biofuels, which corresponds to a biofuels market share of 5% (of 16,597 ktoe). This share has grown significantly in the recent past and is expected to grow further in the future. The Commission will continue to promote the development of advanced biofuels including by exploring sources for potential new feedstocks and by supporting the commercialisation of technologies to convert feedstocks available at scale, in particular wastes and residues.

3. Operation of the voluntary schemes recognised by the Commission

RED I[51], and from July 2021 RED II, empower the Commission to recognise certification schemes, referred to as voluntary schemes, which operators can use to demonstrate compliance with the sustainability and GHG saving criteria of the Directive. **To date, 13 voluntary schemes have been recognised for this purpose[52]**. Under the schemes, Member States are required to accept the evidence regarding the sustainability criteria obtained by operators participating in these schemes. This greatly facilitates the implementation of the sustainability criteria as it allows operators to provide the required evidence following a single procedure in all Member States. Each voluntary scheme on which a decision has been adopted and which has been in operation for the past twelve months is required to submit annual reports to the Commission.

Over the last few years, voluntary schemes have become the main tool to demonstrate compliance with the EU biofuel sustainability criteria. In 2019, 21,876 kilotons (kt) of liquid biofuels (including pure vegetable oil), 147,357 thousand m3 of biomethane (equivalent to around 106 kt), and 219,266 kt of feedstock were certified to comply with the EU sustainability criteria as set out in Articles 17(2)-(5) of the Renewable Energy Directive.[53]

[50] C(2019) 2055 final.
[51] Directive 2009/28/EC 30 (RED I) will be repealed on 30 June 2021.
[52] https://ec.europa.eu/energy/topics/renewable-energy/biofuels/voluntary-schemes_en
[53] Data for liquid biofuels has been excluded from one voluntary scheme due to identified inconsistencies.

Looking in more detail at certified liquid biofuels, 12,099 kt (55% of the total) was biodiesel and 6,340 kt (29%) was bioethanol. The rest was made up of Hydrotreated Vegetable Oil (HVO) biofuels (2,671 kt, 12%), pure vegetable oil (380 kt, 1.7%) and other fuels (385 kt, 1.8%). The main certified feedstocks used for biofuels were rapeseed (24%), palm oil (16%), used cooking oil (13%), sugarcane (12%) and maize (10%).

The Commission only recognises schemes that meet adequate standards of reliability, transparency and independent auditing. For this purpose, it conducts a thorough assessment of the voluntary schemes requesting recognition[54]. This ensures that, among other things: feedstock producers comply with the sustainability criteria of the Directive, information on sustainability characteristics is traceable to the origin of the feedstock, companies are audited before they start to participate in the scheme, retrospective audits take place regularly and auditors are external and independent.

In recent years, the governance of the voluntary schemes has been under increasing scrutiny, for example by the European Court of Auditors[55]. In order to address these concerns and guarantee robust implementation, Article 30 of RED II lays down strengthened rules for the verification of the bioenergy sustainability criteria, including stronger national and EU oversight of voluntary schemes and third party auditing. In addition, in 2021, the Commission will adopt detailed implementing rules on adequate standards of reliability, transparency and independent auditing and require all recognised voluntary schemes to apply them. It is currently working on these standards, which will among other things harmonise implementation of the mass balance system and further strengthen the requirements for scheme governance, transparency and audits. Finally, the Commission will establish a European database to improve the tracing of sustainable biofuels.

[54] Details on the recognition process of voluntary schemes can be found on the following Commission website: https://ec.europa.eu/energy/topics/renewable-energy/biofuels/voluntary-schemes_en

[55] European Court of Auditors (ECA), 2016, Special report No 18/2016: The EU system for the certification of sustainable biofuels.

Voluntary scheme	Scope		
Name	**Feedstock type**	**Feedstock origin**	**Supply chain covered**
International Sustainability and Carbon Certification (ISCC)	Wide range of feedstocks	Global	Full supply chain
Bonsucro EU	Sugar cane	Global	Full supply chain
Roundtable on Sustainable Biomaterial EU RED (RSB EU RED)	Wide range of feedstocks	Global	Full supply chain
RTRS EU RED	Soy	Global	Full supply chain
U.S. Soybean Sustainability Assurance Protocol (SSAP)	Soy	US	From cultivation to place of export
Biomass Biofuels voluntary scheme (2BSvs)	Wide range of feedstocks	Global	Full supply chain
Red Tractor Farm Assurance Combinable Crops & Sugar Beet (Red Tractor)	Cereals, oilseeds, sugar beet	UK	Until the first feedstock delivery point
REDcert	Wide range of feedstocks	Europe	Full supply chain
Better Biomass	Wide range of feedstocks	Global	Full supply chain
KZR INiG System	Wide range of feedstocks	Europe	Full supply chain
Trade Assurance Scheme for Combinable Crops (TASC)	Combinable crops, such as cereals, oilseeds and sugar beet	UK	Chain of custody from farm gate to first processor
Universal Feed Assurance Scheme(UFAS)	Feed ingredients and compound feeds as well as combinable crops	UK	Chain of custody from farm gate to first processor
Roundtable on Sustainable Palm Oil RED (RSPO RED)	Oil palm	Global	Full supply chain

Table 6: *Voluntary schemes currently recognised by the Commission*

5. CONCLUSIONS

The 2020 renewable energy targets will have to be met in the context of the Covid-19 pandemic where society at large as well as the energy sector has been impacted by the most serious health and economic crisis in decades. This report confirms that **the EU is on track for reaching its renewable energy targets for 2020**. **In 2018, the share of renewable energy in the EU energy mix has reached 18% (18.9 % for EU-27).** Investments in renewable energy are increasingly driven by the market and the share of public subsidies is falling in particular for the new projects[56]. This has been triggered by the significant cost reductions in renewable energy technologies, the decrease of subsidies through more competitive support schemes and exemplified by the numerous zero or low cost auction results in several European countries.

In 2018, twelve Member States already have a renewable energy share above their respective 2020 targets. Eleven other Member States met or exceeded their RED I average indicative trajectory for 2017-2018. However, five Member States (France, Ireland, the Netherlands, Poland and Slovenia) failed to do so.

[56] Energy subsidies in the EU (annex to the State of the Energy Union Report, COM(2020)950)

As regards the prospects for the 2020 renewable energy target achievement, recent modelling projects the EU-27 to reach a renewable energy share between 22.8 % and 23.1%[57]. This corresponds to an expected absolute RES deployment increase of 19.2-21.7 Mtoe between 2018 and 2020. The impact of the Covid-19 pandemic on the energy demand is significant and this exceptional situation has the consequence that the projected renewable energy shares for 2020 increase overall. However, some of these increases might not be sustained over time once economic activity is fully recovered.

The vast majority of Member States will meet their targets, but three Member States **(Belgium, France, and Poland) are at severe risk of failing to do so**. Furthermore, 2 Member States (The Netherlands and Luxembourg) are at moderate risk of not meeting the target.

In view of the analysis in this report:

- **Member States are strongly encouraged** to explore all possible options **to use cooperation mechanisms**, notably statistical transfers, as the solution to address the situation with the few weeks left till the end of 2020
- **The European Commission is ready to support** the process e.g. through supporting the political dialogue of Member States, offering technical guidance and the Union Renewable development platform for statistical transfers that is being prepared.
- The **continued deployment of renewables is of utmost importance**. In particular in light of the need to stay above the 2020 baseline in the National Energy and Climate Plans as established by the Clean Energy Package and the need to advance towards the 2030 as well as 2050 objectives.
- **The Recovery and Resilience Plans** that Member States should prepare setting out their reform and investment agendas for the subsequent four years provide a **unique opportunity for boosting renewable energy deployment** and contribute to both economic recovery and the European Green Deal objectives.
- The **European Commission will continue monitoring developments** and as required by the Energy Governance Regulation assess final target compliance based on reports from Member States by 30th April 2022 with the actual 2020 data.

For the transport sector, where all Member States shall achieve at least a 10% share of renewable energy, only two Member States Finland and Sweden have managed to exceed this level in 2018. The modelling for 2020 show a somewhat improved picture with an EU RES-Transport share of 12.2[58]% and 16 Member States achieving or exceeding the target. Meeting the target is a legal obligation, so **the Commission urges the 11 remaining Member States to take appropriate action via national deployment or cooperation mechanisms**.

[57] The EU-plus UK is 22.1 %-22,4%
[58] EU plus UK is 12.9%