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# **PANTERA**

## ***Pan European Technology Energy Research Approach***

### **Work Package 6**

### **Collaboration working groups**

#### **Deliverable D6.1**

## **Review of EU strategic priorities and relevant policy developments**

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Grant Agreement No:	<b>824389</b>
Funding Instrument:	<b>Coordination and Support Action (CSA)</b>
Funded under:	<b>H2020 LC-SC3-ES-7-2018: Pan-European Forum for R&amp;I on Smart Grids, flexibility and Local Energy Networks</b>
Starting date of project:	<b>01.01.2019</b>
Project Duration:	<b>48 months</b>

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Contractual delivery date:	<b>30.09.2019</b>
Actual delivery date:	<b>01.10.2019</b>
Lead beneficiary:	<b>Institute of Physical Energetics (IPE)</b>
Deliverable Type:	<b>Report (R)</b>
Dissemination level:	<b>Public (PU)</b>
Revision / Status:	<b>Final</b>

*This project has received funding from the European Union's Horizon 2020 Coordination and Support Action Programme under Grant Agreement No. 824389*

**Document Information**

Document Version: 2  
Revision / Status: final

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**Keywords:** Target countries, strategies, policy developments

**Document History**

Revision	Content / Changes	Resp. Partner	Date
[1]	First draft	IPE	26.09.19
[2]	[Final draft]	[IPE]	30.09.19
[3]	[Final]	[FOSS]	01.10.19

**Document Approval**

Final Approval	Name	Resp. Partner	Date
[Review Task Level]	Shafi Khadem	IERC	28.09.19
[Review WP Level]	Mattia Cabiati	RSE	28.09.19
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## Abbreviations

ACER	<i>Agency for the Cooperation of Energy Regulators</i>
CO <sub>2</sub>	<i>Carbon Dioxide</i>
DER	<i>Distributed Energy Resource</i>
DSO	<i>Distribution System Operator</i>
EC	<i>European Commission</i>
EP	<i>European Parliament</i>
EPBD	<i>Energy Performance of Buildings Directive</i>
ESIF	<i>European Structural and Investment Funds</i>
ETS	<i>Emission Trading System</i>
EU	<i>European Union</i>
FP	<i>Framework Programmes</i>
GDP	<i>Gross Domestic Product</i>
GHG	<i>Greenhouse Gas</i>
MS	<i>Member States</i>
NECP	<i>National Energy and Climate Plan</i>
R&D	<i>Research and Development</i>
R&D&I	<i>Research, Development and Innovation</i>
R&I	<i>Research and Innovation</i>
RD&D	<i>Research, Development and Deployment</i>
RED	<i>Renewables Energy Directive</i>
RES	<i>Renewable Energy Sources</i>
TEN-E	<i>Trans-European Networks for Energy</i>
TSO	<i>Transmission System Operator</i>
WP	<i>Work Package</i>
WT	<i>Working Teams</i>

## **Executive Summary**

This document provides a review of EU strategic priorities and policy developments structured into two dimensions: the dimension of the legislative process and the dimension of the policies themselves. The dimension of the legislative process addresses the process of legislation co-creation and social acceptance from stakeholder perspective. The dimension of the policies review investigates policy implementation on two levels: the EU and national. As a result, the PANTERA country profiles are created for the countries that show low activity in the R&D in the field of smart grids, storage and local energy systems. These profiles intend to be a useful source of information primarily for PANTERA desks operations and workshops.

## **1 Introduction**

### **1.1 Purpose of the Document**

This deliverable aims at reviewing the EU policies on climate and energy. These include the EU 2030 and 2050 strategies (“A policy framework for climate and energy in the period from 2020 to 2030”<sup>[1]</sup> and “A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy”<sup>[2]</sup> and relevant legislative acts, mostly focusing on “Clean energy for all Europeans” package<sup>[3]</sup>. Next, the state of the EU and PANTERA target countries is reviewed in the frame of these developments in order to identify existing gaps between the current and the desired situation. Furthermore, the policy formulation process is discussed in order to assess to what extent also social acceptance is considered.

The report intends to be a useful source of comprehensive information on the EU climate and energy policy developments for both PANTERA stakeholders and consortium members. The stakeholders can obtain structured information on the EU developments and the specific country situation according to EU climate and energy targets. Whereas PANTERA partners together with the involved stakeholders may elaborate further during the project timeline on the shortcomings identified.

### **1.2 Scope of the Document**

The current document is part of the PANTERA project Work Package 6 (WP6) “Collaboration working groups”. It summarises the activities and results of the Task 6.1 “Review of EU strategic priorities and relevant policy developments”. R&I activities on smart grids within the PANTERA project are initially categorised into three groups: technology and communication; regulations, codes and standards; energy policy and social acceptance. The D6.1 refers to the energy policy area.

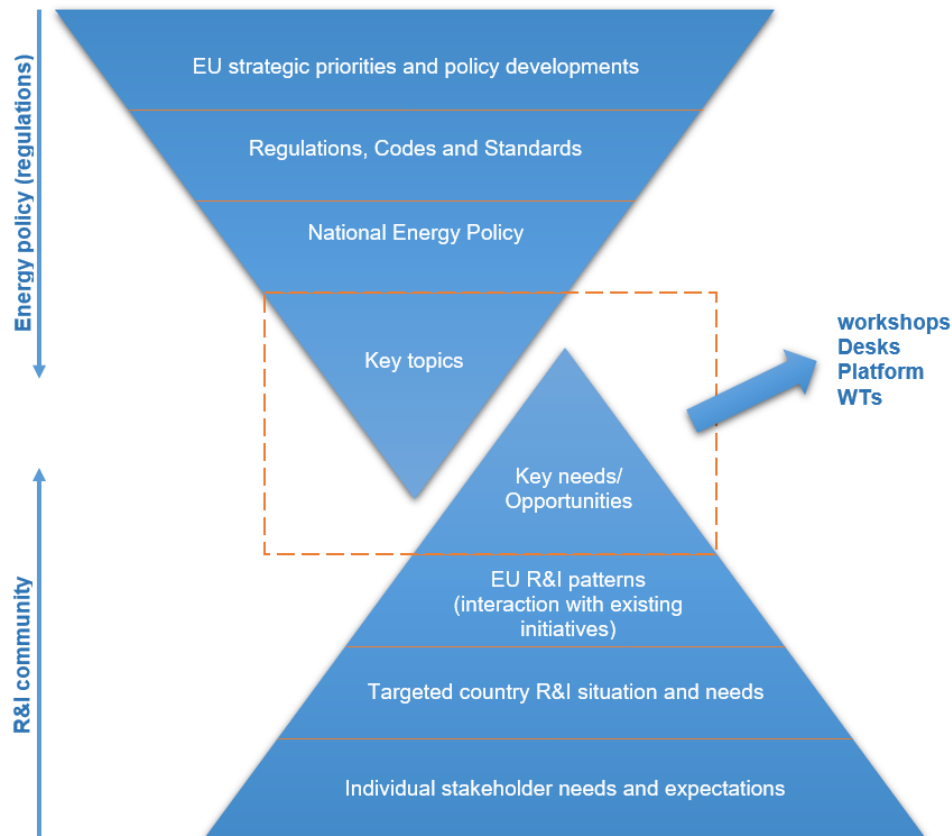
### **1.3 Structure of the Document**

The D6.1 is structured to cover all aspects of the review of EU strategic priorities and relevant policy developments. Section 2 covers the selected approach and methodology of the review. Section 3 covers the review of stakeholder engagement in the co-design of relevant strategies and legislative acts. Section 4 includes a review of EU policy developments, EU targets and corresponding state of the EU, national targets and corresponding state of the target countries. Section 5 concludes the document and sets the directions for further work.

## 2 Approach

### 2.1 General considerations

In the frame of PANTERA project, several stakeholder engagement approaches are identified. These are Working Teams (WT), PANTERA desks, workshops and the PANTERA platform itself. In order to initiate effective dialogue, these activities shall be designed according to both EU targets and individual stakeholder needs, e.g., top-down and bottom-up (*Figure 1*). The D6.1 launches the top-down process: from EU policy level to country level.



*Figure 1: Top-down and bottom up-approach*

The EU R&I strategy, which defines main areas of R&I efforts, is based on the EU strategic priorities. Similarly, national R&I strategies, which define national goals and guide national funding and support schemes, shall reflect European and country specific political targets, as well as discover specific country potential utilizing country's strengths and available resources in the most efficient way. By reviewing EU policies and set targets and countries' targets and corresponding situation using similar framework, this deliverable makes national trends of the target countries visible and creates a clear logical base for enriching WP6 tasks (Tasks 6.2 "Analysis of the national project findings" and Task 6.3 "National cross-case comparisons and conclusions").

Furthermore, this deliverable addresses the issues of social acceptance of EU climate and energy policies. From PANTERA perspective, social acceptance can be defined as the acceptance of EU policies by different stakeholder categories and by different Member States (MS), especially PANTERA target countries.

## 2.2 PANTERA desks

The PANTERA project has a special focus on countries that appear to have a lower rate of smart grids investments and related R&I activity. In order to better organise the work of the consortium and build close relations with national stakeholders the “PANTERA 6+1” approach was established. Six desks address target countries and one address more successful countries for gathering best-practices (Figure 2).



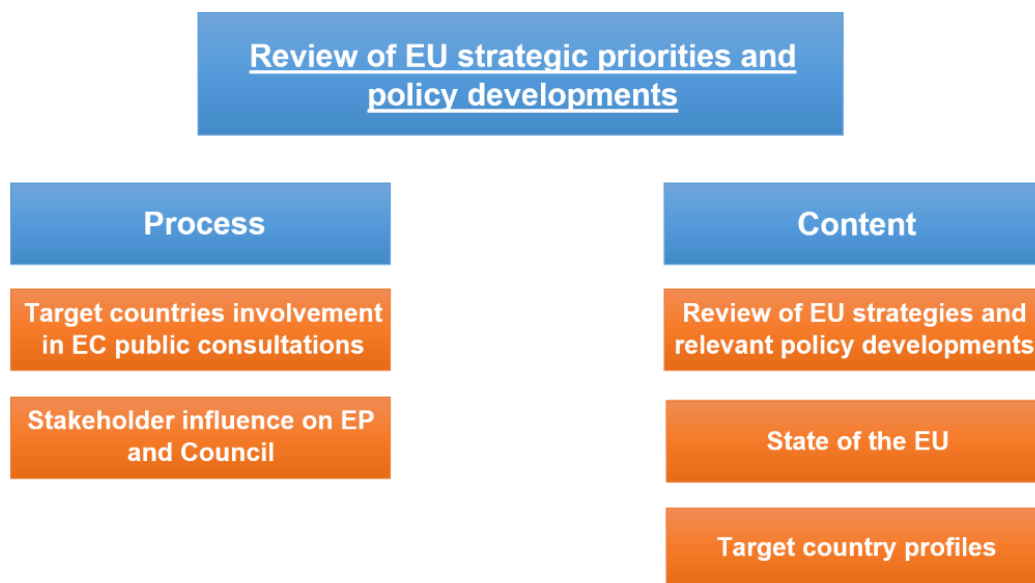
Figure 2: PANTERA 6+1 approach

PANTERA desk is a group of stakeholders active in the relevant countries coordinated by responsible project partner, which aims to ensure wide participation and involvement of main stakeholders throughout the project and create a local network. The desks employ an inclusive approach that takes into account different needs and expectations of the stakeholders as well as the regional or local processes and cultures. This deliverable includes information on countries corresponding to the six desks and does not cover the best-practice desk.



## 2.3 The review's concept

The review is divided into two major parts: the process and the contents review (*Figure 3*). The process review, addressed in Section 3, covers the social acceptance issues by reviewing possibilities of stakeholders to influence EU decision-makers. It includes an analysis of public consultations organised by European Commission (EC) and stakeholder position papers submitted to the European Parliament (EP) and the Council. In the content part, addressed in Section 4, the EU legislative developments and EU and national achievements are reviewed; finally, PANTERA country profiles are created.



*Figure 3: The review concept*

The objectives of each part and outcomes reached are described in more detail in the relevant sections.

### **3 Stakeholders Engagement in the EU Legislative Process**

#### **3.1 Stakeholders possibilities to be involved in the EU legislative process**

The review of stakeholder engagement in the EU legislative process in energy sector aims at exploring opportunities of the representatives of PANTERA target countries to influence EU decision-makers and at identifying their activity in the relevant processes.

In the frame of better regulation of agendas<sup>[4]</sup> - the EC is improving and increasing opportunities to contribute throughout the policy and law-making cycle. Interested citizens and stakeholders can share their views on:

- roadmaps and inception impact assessments;
- aspects of impact assessments;
- legislative proposals;
- draft acts that add or amend aspects of existing laws (delegated acts), or set out rules to make sure EU countries implement laws in the same way (implementing acts);
- elements of evaluations and 'fitness checks' of existing policies and laws;
- ways to improve existing EU laws.

Besides, stakeholders can participate in citizens' initiative, lobby members of EP, submit petition to EP, submit opinions to the concerned parties and members of committees, participate in EP's public hearings / consultations and advise members of EP via letters, meetings etc, after the EC proposal has been forwarded to EP for the first reading, after EP position is forwarded to the Counsel's first reading.<sup>[5]</sup> Stakeholders can send comments and concerns to the relevant national authorities, for example to ministers or to representatives of national governments.

Possibilities to influence the legislative process exist even after the first reading if there is no consensus between the EP and the Council and the proposal is being redirected to the second reading. As this does not happen often, and the most relevant to PANTERA legislative acts from "Clean energy for all Europeans" package were accepted in the first reading of ordinary legislative procedure, further stages of legislative process are not addressed in the current deliverable.

The analysis of stakeholder engagement in the legislative process in the frame of D6.1 covers stakeholder interaction on EC level as analysis of participation in the public consultation in the 2030 energy framework and new energy market design, and on the EP level as analysis of selected stakeholders' amendment papers on the proposal for the Electricity market directive. The consultation on the 2030 energy framework was selected for analysis since it forms general development direction of the Energy Union and, as a result, influences every MS, stakeholder and citizen. The consultation on the new electricity market and position papers on Electricity directive were selected as the most relevant to the smart grid area.

## 3.2 Analysis of public consultations

### 3.2.1 Public consultation on the Green Paper “A 2030 framework for climate and energy policies”

On 27 March 2013, the European Commission published a Green Paper to gather stakeholders' views on developing a framework of EU 2030 Energy Strategy. Stakeholders and citizens were offered an opportunity to express their opinion on 2030 climate goals from 28 March 2013 to 02 July 2013 via written consultation, answering questions posted in the Green Paper. 550 responses were received, including responses from 24 EU Member States and EU level organisations and associations<sup>[6]</sup>.

The results of quantitative analysis of the consultation discover the uneven distribution of national stakeholders, without considering EU level organisations and associations. More than half of the replies originate from only five Western European countries (Germany, United Kingdom, Austria, Spain and France). Furthermore, stakeholders from some countries like Latvia, Slovakia, Croatia and Malta did not submit any single opinion (see *Figure 4*).

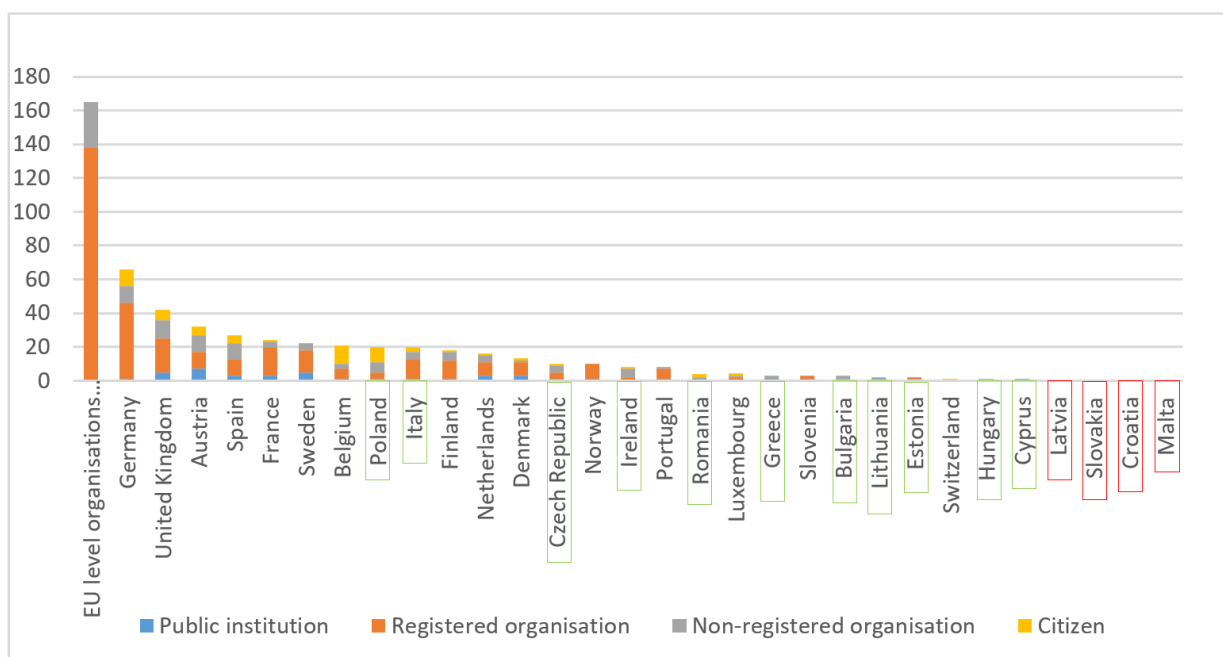


Figure 4: Number of responses to public consultation “Green Paper „A 2030 framework for climate and energy policies””

The results illustrate the trend that stakeholders from PANTERA target countries appear to be less active in contributing to the formulation process of EU-wide targets and strategies.

In order to influence this issue, PANTERA partners shall identify the possibility of publishing information on actual consultations on PANTERA web page, sharing this through the public media or educating the stakeholders during the workshops and constantly through dedicated content on the PANTERA platform.

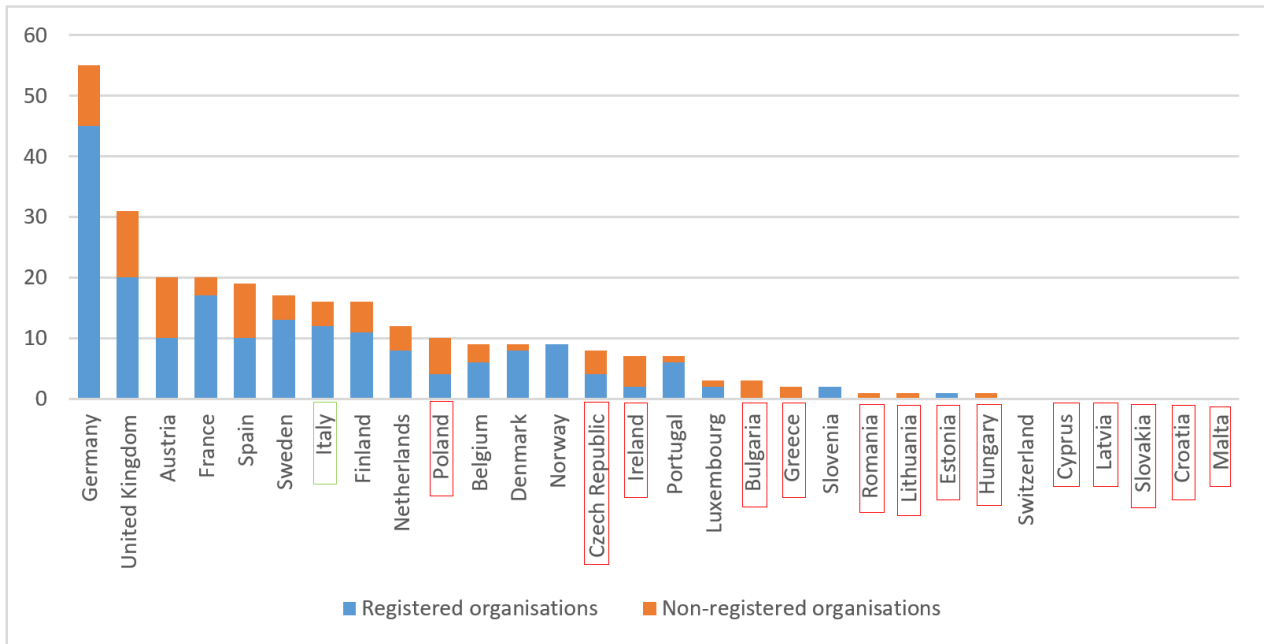


Figure 5: Number of responses of registered and non-registered in EU Transparency Register organisations in public consultation “Green Paper „A 2030 framework for climate and energy policies””

Figure 5 illustrates the share of representatives from different MS that are registered in the Transparency Register.

The Transparency Register was set up as a joint scheme by the EP and the EC in 2011 by means of an Inter-institutional Agreement. It represents one of the key tools for implementing the commitment of these two institutions to transparency, among a number of other initiatives. The Transparency Register applies to all organisations and self-employed individuals engaged in activities carried out with the objective of influencing the decision-making and policy implementation processes of the EU institutions.<sup>[7]</sup>

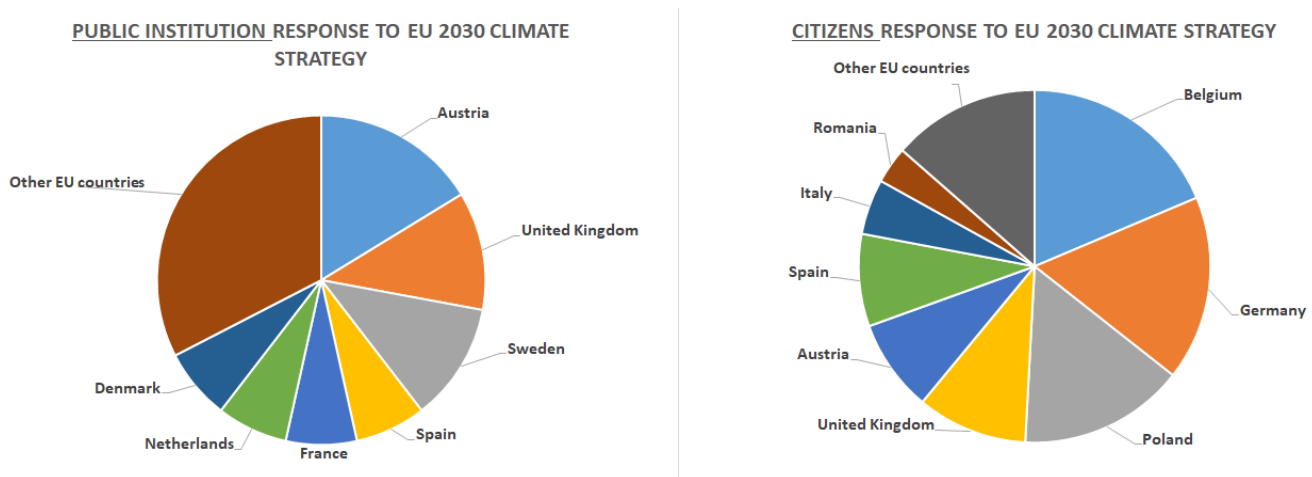
The Transparency Register has grown since its inception and today includes almost 12 000 entities; they all signed up to a common Code of Conduct. It is the largest tool of its kind worldwide<sup>[7]</sup>. Registration in the Transparency Register may raise stakeholder awareness on possibility of influencing the actual legislative provisions, as registered organisations are automatically notified about consultations and roadmaps in the areas they have specified. Furthermore, registered users can subscribe to email notifications on the activities of Parliament’s Committees via the Register.<sup>[8]</sup>

As illustrated in Figure 5, the participation rate of registered organizations in the public consultation was higher than that of non-registered organisations. Whereas, the share of non-registered respondents from PANTERA target countries (except Italy and Estonia) was higher than the share of registered ones.

The additional evidence of the lack of awareness of national stakeholders on the Transparency Register may be received from the example of Latvia. Just 10 stakeholders who marked the energy sector as the area of their interest are present in the register. None of them is directly acting in the energy sector in Latvia.<sup>[9]</sup>

This means that registration in the Transparency Register may raise response rate in all MS. Furthermore, it may play even more important role in involving stakeholders from PANTERA target countries. PANTERA consortium shall consider the possibility of advising national stakeholders to register in the Transparency Register. Furthermore, the consortium shall discuss the necessity of registering the PANTERA in the Transparency register in order to create the best-practice case.

Evaluating citizens contribution, 50% of responds consisted of only three countries' – Belgium, Germany and Poland (see *Figure 6*).



*Figure 6: Participation of public institutions and citizens in public consultation “Green Paper „A 2030 framework for climate and energy policies””*

The derived results indicate that citizens in the PANTERA target countries (except Poland and Italy) tend to be less active than citizens in more successful countries. This demonstrates that social acceptance issues, especially community acceptance, appears to be more important in the target countries. In PANTERA case, the additional investigation shall be performed on the possibilities to elaborate on that, as community acceptance is quite special, of wider influence and multidisciplinary topic.

### 3.2.2 Public consultation on a new energy market design

Public consultation on new energy market design was organised by EC via questionnaire. From 15 July 2015 to 9 October 2015 stakeholders were advised to share their opinion on<sup>[10]</sup>:

- Market functioning and investment signals improvement;
- Integration of renewables;
- Linking retail and wholesale markets
- Reinforcing regional coordination of policy making
- Governing internal electricity market,
- European dimension to security of supply.

The EC received 320 replies from 245 stakeholders and 75 citizens, including responses from 21 Member States, Norway, Switzerland, EU and global level organisations and associations. Similarly, to the 2030 Energy Strategy public consultation results, the fragmentation of national participation rate is observed. Without considering EU and global level organisations and associations, more than half of EU MS replies originated from only six countries (Germany, Austria, United Kingdom,

Netherlands, Belgium and France). Besides, stakeholders from some MS (Croatia, Cyprus, Greece, Latvia, Luxembourg, Malta and Slovenia) did not submit any opinion. The results are summarized in Figure 7.

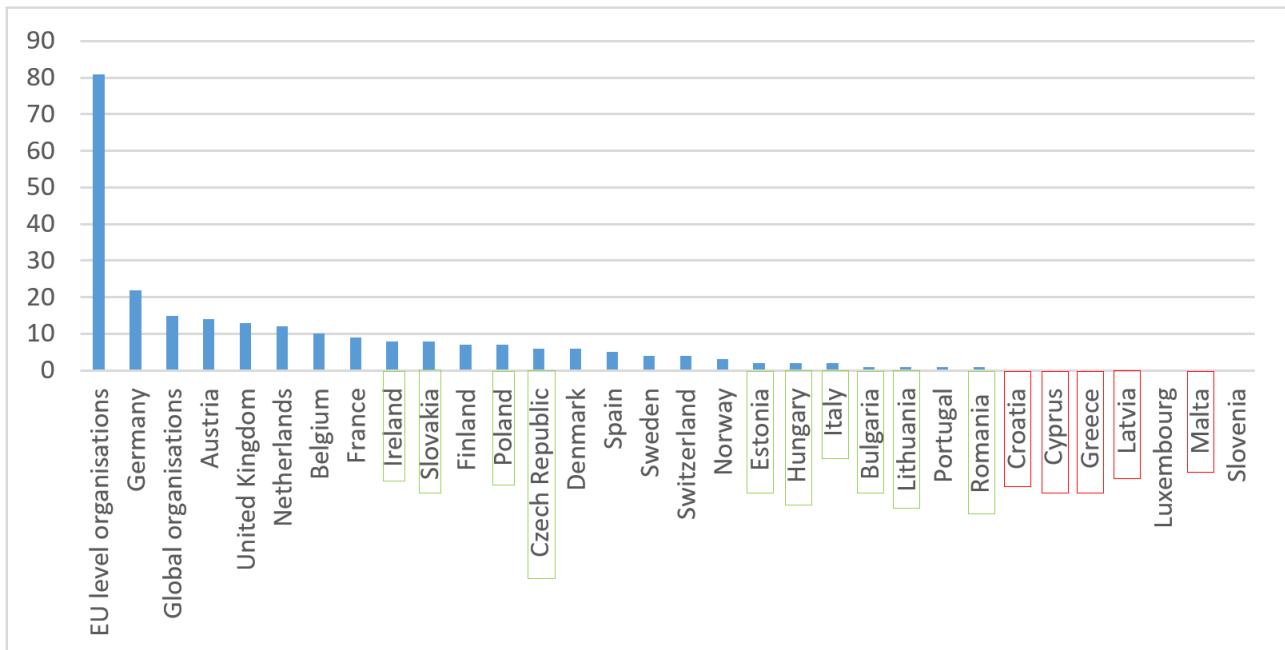


Figure 7: Number of responses to public consultation on Electricity Market Design

Considering that about half of total responses were received from EU level organisations and associations, additional analysis was performed in order to find out to what extent national stakeholders are present in these organisations. The results demonstrated that nine countries were involved in over 50% EU level organisations / associations, which participated in the addressed public consultation (see Figure 7).

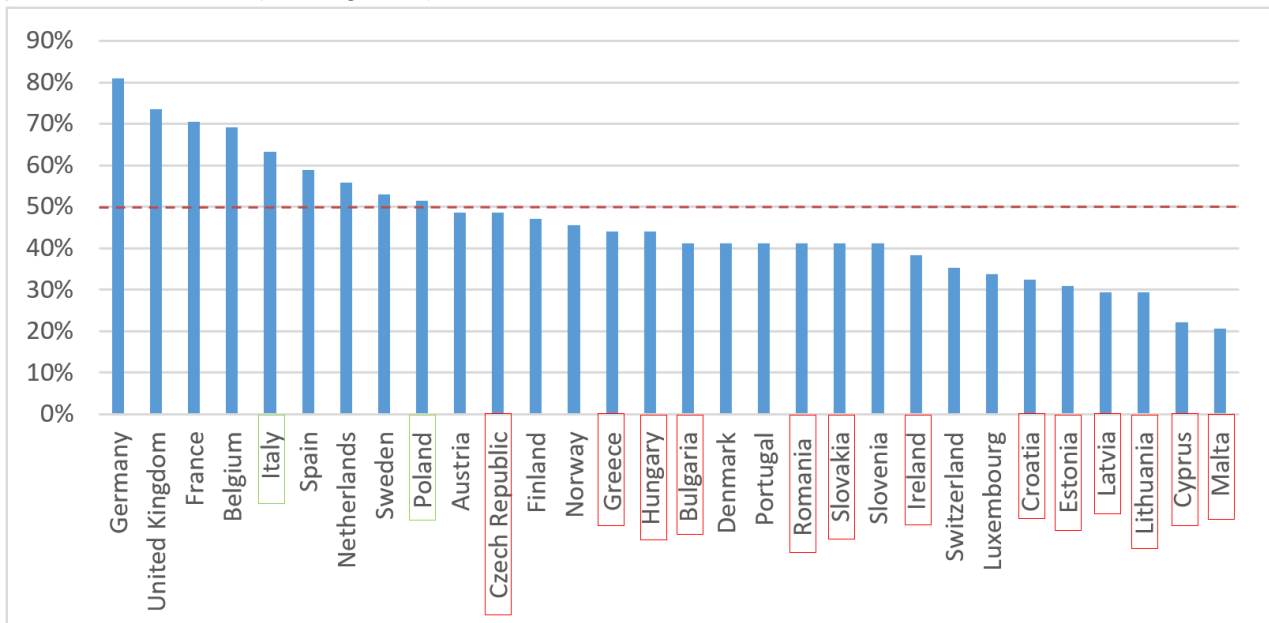


Figure 8: National stakeholder involvement in EU level organisations and associations, who contributed in a public consultation on Electricity Market design

It is difficult to determine whether representatives from every country have actually contributed to the formulation of position of the organization, as the answers are not expressed on behalf of the

organization representatives, but on behalf of the organization itself. It might be possible that some of the stakeholders may be less active or may have less ability to influence the position of the relevant organisation.

The analysis of the consultation on market design confirms the trend that stakeholders from PANTERA target countries appear to be less active in contributing to the EU policy formulation process both directly by submitting their contribution to EC and indirectly via participating in the EU level organisations.

It is worth mentioning that more than half of the respondents are EU level organizations and associations. Thus, national stakeholders appear to be less active than EU-level stakeholders, and, as a result, national interests may be less visible than EU-wide sectoral interests. In this case, possibility of cooperating more closely with EU level initiatives and organizations provided by PANTERA platform, workshops and WTs may be helpful for national level stakeholders in strengthening their position at EU level.

### 3.3 Analysis of stakeholders' amendment papers

This section addresses the possibility of stakeholders to influence the legislative process at a time when a legislative proposal has been submitted to the EP. As it is not possible to address all legislative proposals in energy field within the frame of one deliverable, the most relevant one to smart grid field was selected.

On 30 November 2016, the EC published a legislative proposal for the new Electricity market directive as part of "Clean energy for all Europeans package".<sup>[11]</sup>

Several stakeholders submitted the amendment papers to EP suggesting some corrections. Three amendment papers were selected from publicly available resources, which represent organizations and associations whose field of interest is the most relevant to the smart grid area and thus PANTERA:

- **EURELECTRIC**<sup>[12]</sup> – represents the common interests of the electricity industry in 32 European countries;
- **EDSO for Smart Grids**<sup>[13]</sup> - European distribution system operator association for electricity focused on smart grids, guiding EU RD&D, policy and member state regulation to support this development;
- **ESMIG**<sup>[14]</sup> - represents European companies which provide products, information technology and services for multi-commodity metering, display and management of energy consumption and production at consumer premises.

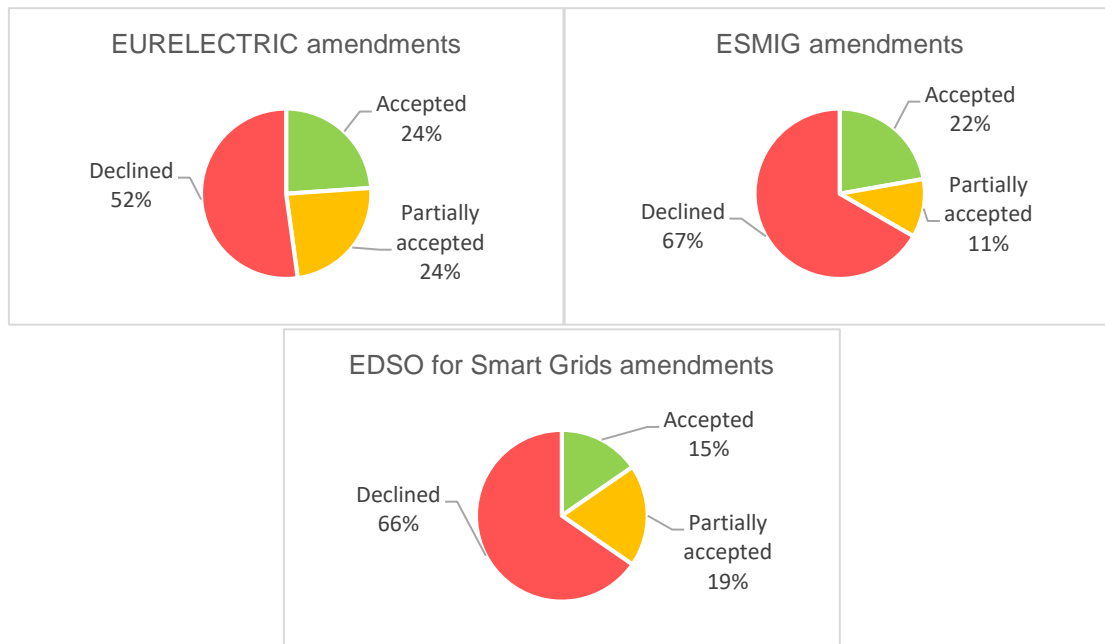
An analysis comparing the amendments made by these three stakeholders to the proposal with the adopted final version of directive was performed in order to assess to what extent the different stakeholder opinion is considered (see Annex 1). The results are summarised in *Table 1*.

Table 1: EURELECTRIC, EDSO for Smart Grids and ESMIG amendment acceptance on Electricity Directive

Stakeholders proposed Electricity Directive amendment articles	Acceptance rate in the final text of the Electricity Directive								
	EURELECTRIC			EDSO			ESMIG		
	Accepted	Partially accepted	Declined	Accepted	Partially accepted	Declined	Accepted	Partially accepted	Declined
Art. 2, Definitions	0	1	6	1	0	1	0	0	2
Art. 5, Market-based supply prices	0	0	1	-	-	-	-	-	-
Art. 10, Basic contractual rights	1	1	1	-	-	-	-	-	-
Art. 11, Entitlement to a dynamic electricity price contract	0	1	0	-	-	-	-	-	-
Art. 12, Right to switch and rules on switching-related fees	1	0	0	-	-	-	0	1	0
Art. 13, Aggregation contract	1	0	0	-	-	-	1	0	0
Art. 15, Active customers	0	1	0	0	0	1	-	-	-
Art. 16, Citizen energy communities	0	2	1	0	0	3	-	-	-
Art. 17, Demand response through aggregation	1	0	1	-	-	-	-	-	-
Art. 18, Bills and billing information	3	1	0	-	-	-	-	-	-
Art. 19, Smart metering systems	-	-	-	-	-	-	1	0	1
Art. 20, Functionalities of smart metering systems	0	1	2	1	0	1	0	0	1
Art. 21, Entitlement to a smart meter	0	0	1	-	-	-	0	0	1
Art. 23, Data management	1	1	1	0	2	1	0	0	1
Art. 24, Interoperability requirements and procedures for access to data	-	-	-	0	1	1	-	-	-
Art.31, Tasks of distribution system operators	1	0	1	0	0	2	-	-	-
Art. 32, Incentives for the use of flexibility in distribution networks	0	0	3	0	1	1	-	-	-
Art. 33, Integration of electromobility into the electricity network	1	0	0	1	1	2	-	-	-
Art.34, Tasks of distribution system operators in data management	-	-	-	1	0	0	-	-	-
Art. 36, Ownership of energy storage facilities by distribution system operators	1	0	3	0	0	4	-	-	-
Art. 40, Tasks of transmission system operators	0	0	1	-	-	-	-	-	-
Art. 47, Independence of the transmission system operator	0	1	0	-	-	-	-	-	-
Annex, Minimum requirements for billing and billing information	0	1	1	-	-	-	-	-	-

As illustrated in *Figure 9*, views of stakeholders from selected categories appear to be considered approximately to similar extent.





*Figure 9: EURELECTRIC, EDSO for Smart Grids and ESMIG amendment acceptance on Electricity Directive in pie chart form*

It seems that the rate of accepted corrections submitted by stakeholders to the legislative act after the EC proposal is ready does not exceed 30%. This underlines the importance of having the possibility and willingness of stakeholders to express their opinion as early as possible, like EC public consultations. Certainly, more active involvement in EU wide initiatives and organisations, which participate in the feasibility studies, impact assessments and preliminary strategic discussions will result in higher impact.

## 4 Review of EU Strategies and Relevant Policy Developments

### 4.1 The review of 2030/2050 climate and energy framework, relevant policies and state of the Energy Union

In order to analyse the current status and progress of R&I activities in the smart grid domain, PANTERA implements a hybrid hierarchical process – top-down and bottom-up from European to national and individual stakeholder level. The review of EU strategies and relevant policy developments is part of the top-down approach: from analysis of EU wide energy policy developments to analysis of prevailing developments at country level.

The review of the 2030/2050 climate and energy framework is structured according to the five dimensions of the Energy Union<sup>[50]</sup> :

- Energy security, solidarity and trust;
- A fully integrated European energy market;
- Energy efficiency contributing to moderation of demand;
- Decarbonising the economy, and
- Research, innovation and competitiveness.

This approach is chosen in order to link the state of the EU and later on the state of target countries with the EU adopted strategical priorities and illustrate how these priorities are reflected in the relevant legislative acts.

At first, the EU strategies are reviewed: “A policy framework for climate and energy in the period from 2020 to 2030”<sup>[1]</sup> , “A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy”<sup>[2]</sup> and additionally “Energy Efficiency and its contribution to energy security and the 2030 Framework for climate and energy policy”<sup>[48]</sup>. Then, the main messages, covering the five dimensions of the Energy Union are extracted and the key words highlighted. Finally, the corresponding situation is described referring to the “Fourth report on the State of the Energy Union”<sup>[47]</sup>, Renewable Energy Progress Report<sup>[46]</sup>, Eurostat data, relevant legislative acts and other sources. Relevant legislative acts, proposals for legislative acts and EC communication documents are separately highlighted.

The resulting *Table 2* is intended to be used in the frame of other PANTERA WPs and WTs in order to follow-up the situation in the relevant policy area. Furthermore, the information may be corrected and complemented during the project timeline as the EU is continuously working on improving legislation.

Table 2: The review of EU strategical priorities and relevant policy developments

Messages from 2030 strategy framework and 2050 long-term vision	Key words	State of Energy Union	Related documents
<b>1. Climate action, decarbonizing the economy</b>			
<b>1.1 Decarbonization</b>			
The Commission proposes to set a greenhouse gas emission reduction target for domestic EU emissions of 40% in 2030 relative to emissions in 1990 <sup>[1]</sup>	<b>Progress towards GHG target 2020</b>	The EU is well on track to achieve its 2020 target for reductions in greenhouse gas emissions (i.e. a reduction in emissions of 20% by 2020 compared to 1990 levels). Between 1990 and 2017, the EU economy grew by 58%, while emissions decreased by 22%, according to preliminary data submitted by the Member States. The most marked fall has been in emissions from energy supply. <sup>[47]</sup>	
The ETS sector would have to deliver a reduction of 43% in GHG in 2030 and the non-ETS sector a reduction of 30% both compared to 2005. <sup>[1]</sup>	<b>Non-ETS GHG target 2030</b>	Each Member State (MS) shall, in 2030, limit its greenhouse gas emissions at least by the percentage set for that MS in Annex I of the Effort sharing regulation <sup>[51]</sup> .	Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030
In order to bring about the required emissions reduction in the ETS sector, the annual factor by which the cap on the maximum permitted emissions within the ETS decreases will have to be increased from 1.74% currently to 2.2% after 2020. <sup>[1]</sup>	<b>ETS sector</b>	As the ETS was not driving investments in low-carbon technologies sufficiently well, the amendments to ETS directive were adopted as well as some additional measures, like establishing the market stability reserve.	Directive (EU) 2018/410 to enhance cost-effective emission reductions and low-carbon investment
		The ETS Directive <sup>[52]</sup> sets up the linear allowances reduction factor of 2.2% starting from 2021. According to the ETS directive <sup>[52]</sup> the foreseen share of allowances to be auctioned shall be 57%	
A higher carbon price creates stronger incentives for investment in low-carbon technologies, but may increase the risk of carbon leakage. Such carbon leakage is in particular a concern for those industry sectors subject to global competition and global price patterns. <sup>[2]</sup>	<b>Carbon leakage</b>	Some allowances continue to be allocated for free until 2020 and beyond. The new carbon leakage list valid for 2021-2030 was adopted on 15 February 2019. <sup>[53]</sup>	
<b>1.2 Uptake of renewable energy resources (RES)</b>			
Energy system transformation is not possible without significantly higher shares of renewable energy. <sup>[1]</sup>	<b>RES 2030 target 32%</b>	The new revised Renewables energy directive (RED II) <sup>[54]</sup> established a new binding renewable energy target for the EU for 2030 of at least 32%, with a clause for a possible upwards revision by 2023.	Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources
		According to the RES progress report <sup>[47]</sup> , the pace of increase of the renewable energy share has slowed down since 2014. While the EU is still on track to meet its renewable energy 2020 targets, efforts should be stepped up in the remaining period until 2020 to ensure this is the case, also in connection with expected higher energy consumption in the future. The penetration of renewable energy varies across sectors, with renewable energy reaching 30.8% in the electricity sector, but only 19.5% in the heating and cooling sector, and 7.6% in the transport sector. <sup>[47]</sup>	
Moreover, most renewables development in the EU is driven by national support schemes, which on the one hand can address national and regional specificities but at the same time can hinder market integration and reduce cost-efficiency. <sup>[1]</sup>	<b>Market-driven deployment of renewables</b>	Investments in renewable energy are increasingly driven by the market and the share of public subsidies is falling. 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. <sup>[46]</sup>	Guidelines on State aid for environmental protection and energy 2014-2020 (2014/C 200/01)
In the future, the benefits of renewable energy must be exploited in a way which is to the greatest extent possible market driven. <sup>[1]</sup>	<b>Costs of renewable electricity</b>	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 with nearly 75% and about 50% (depending on the market) respectively. <sup>[46]</sup>	

They also have the potential to drive growth in innovative technologies. <sup>[1]</sup>	<b>Innovative technologies</b>	Renewables are a key contributor to the innovation dimension. In the area of renewables, 53% of inventions from EU based companies acquire patent protection outside Europe. This demonstrates high-value of the innovation, since the protection is done with the view that it has scope to reach, and be successful in foreign markets. <sup>[46]</sup>	
Attainment of the European target for renewables would be ensured by a new governance framework based on national plans for competitive, secure and sustainable energy prepared by the Member States. <sup>[1]</sup>	<b>NECPs</b>	According to the new rules laid out in the Governance regulation <sup>[55]</sup> , EU countries are also required to develop national long-term strategies by 1 January 2020.	Regulation (EU) 2018/199 on the Governance of the Energy Union and Climate Action
It is not appropriate to establish new targets for renewable energy or the greenhouse gas intensity of fuels used in the transport sector or any other sub-sector after 2020. <sup>[1]</sup>	<b>RES in transport</b>	Share of renewable energy sources in transport in 2017 in EU was 7,6%. <sup>[17]</sup>	
The assessment of how to minimise indirect land-use change emissions made clear that first generation biofuels have a limited role in decarbonising the transport sector. <sup>[1]</sup>	<b>Biofuels</b>	Biofuels consumed in the EU continue to be largely produced from domestic feedstock. The cultivation of feedstocks used for the production of biofuels consumed in the EU can potentially result in negative environmental impacts. <sup>[46]</sup>	C(2019) 2055 Degeated regulation on ILUC
Food-based biofuels should not receive public support after 2020. <sup>[1]</sup>		The RED II <sup>[54]</sup> sets national limits, which will gradually decrease to zero by 2030, for high-ILUC biofuels, bioliquids and biomass fuels produced from food or feed crops.	
The focus of policy development should be on improving the efficiency of the transport system, further development and deployment of electric vehicles, second and third generation biofuels and other alternative. <sup>[1]</sup>	<b>Efficiency of transport system</b>	The EU is stimulating the market for zero- and low-emission vehicles by encouraging their use in public procurement through the newly adopted Directive on the promotion of clean and energy-efficient road transport vehicles. <sup>[56]</sup>	Directive (EU) 2019/1161 on the promotion of clean and energy-efficient road transport vehicles
	<b>Alternative fuels</b>	The EC through its Alternative Fuels Directive 2014/94/EU <sup>[57]</sup> is seeking to promote the deployment of alternative fuels infrastructure to enable an increase in the uptake of alternative fuels vehicles and reduce Europe's dependence on oil and oil related products.	Directive 2014/94/EU on the deployment of alternative fuels infrastructure
<b>2. Energy Efficiency</b>			
While energy powers our societies and economies, future growth must be driven with less energy and lower costs. <sup>[48]</sup>	<b>Energy efficiency target 2030</b>	The new Energy efficiency directive (EED) <sup>[58]</sup> establishes a headline EU energy efficiency target for 2030 of at least 32.5% (compared to projections) with a clause for a possible upwards revision by 2023.	Directive (EU) 2018/2002 on energy efficiency
	<b>Primary energy consumption indicative target 2020/2030</b>	In 2017, primary energy consumption in the EU was 5 % above the 2020 (1483Mtoe) energy target and 23% above the 2030 target (1273Mtoe). <sup>[21]</sup>	
	<b>Final energy consumption indicative target 2020/2030</b>	In 2017, final energy consumption in the EU was 3 % above the 2020 energy target (1086Mtoe) and 17% above the 2030 target (956Mtoe). <sup>[21]</sup>	
The majority of the energy-saving potential is in the building sector with 40% of the EU's energy consumption coming from buildings. To reap the benefits of energy efficiency in buildings, the biggest challenge is to accelerate and finance upfront investments and speed up the renovation rate of the existing stock from 1.4% - today's average - to above 2% annually. <sup>[48]</sup>	<b>Building stock renovation rate</b>	Under the revised the Energy performance of buildings directive (EPBD) <sup>[59]</sup> EU countries will have to establish stronger long-term renovation strategies, aiming at decarbonising the national building stocks by 2050, with indicative milestones for 2030, 2040 and 2050, measurable progress indicators and with a solid financial component. These will be integrated into NECP.	Directive (EU) 2018/844 on the energy performance of buildings
Nearly zero energy buildings should become the norm. <sup>[2]</sup>	<b>Zero energy buildings</b>	The first EPBD <sup>[60]</sup> requires all new buildings to be nearly zero-energy by the end of 2020.	
Efforts are needed to strengthen the market surveillance of the energy efficiency of products that needs to be resourced in all Member States and that will ensure a level	<b>Eco-design and energy labelling</b>	The Eco-design and energy labelling framework has been one of the most effective policy instruments at EU level to promote energy efficiency. <sup>[61]</sup>	Regulation (EU) 2017/1369 setting a framework for energy labelling

playing field for industry and provide consumers with the information they need to make informed choices. <sup>[48]</sup>			
Efforts are needed to fully implicate utilities in working with their customers to obtain energy savings. <sup>[48]</sup>	<b>Energy savings</b>	<p>The previous Energy efficiency directive 2012/27/EU required an annual reduction of 1.5% in national energy sales.<sup>[62]</sup></p> <p>The revised EED<sup>[58]</sup> extends the annual energy saving obligation after 2020 and beyond (requirement to achieve new savings of 0.8% each year of final energy consumption).</p> <p>Member States have reported achieved savings for 2014-2016; at EU level these amounted to 54 547ktoe in cumulative terms. This is approximately 24% of the sum of all cumulative energy savings required by the end of 2020.<sup>[21]</sup></p>	
<b>3. Integrated energy market</b>			
The rapid deployment of renewable energy already poses challenges for the electricity system in particular, which needs to adapt to increasingly decentralised and variable production (solar and wind). Since 1990, emissions have decreased in all economic sectors except transport. <sup>[1]</sup>	<b>Electricity system challenges</b>	Despite the progress, investments on a much larger scale are needed in electricity grids (both transmission and distribution). The level of investment needed for electricity transmission is estimated at more than EUR 150 billion for the period 2021-2030. These new investments should be bundled with further digitisation and 'smartening' of the grids, as well as the deployment of new storage facilities. <sup>[47]</sup>	
High levels of competition in the internal energy market will be pivotal to deliver progress towards all objectives of the Union's energy policy in the 2030 timeframe. <sup>[1]</sup>	<b>Wholesale electricity market</b>	This has resulted in greater competitiveness, reduced costs and better security. So far, 26 countries — accounting for over 90% of European electricity consumption and more than 400 million people — have coupled their day-ahead electricity markets. Over the past 7 years, day-ahead market coupling alone has rendered a benefit of approximately EUR 1 billion per year to European consumers. <sup>[47]</sup>	
Rights to more informative, transparent and frequent bills, and to take part in demand response markets, give consumers the power to manage their energy consumption actively. Creating a market for innovative energy services where investments in efficient appliances and intelligent consumption and production pays off, should be the focus of MS when preparing for or facilitating the implementation of intelligent metering systems. <sup>[48]</sup>	<b>Intelligent metering systems</b>	According to the previous version of Electricity market directive <sup>[63]</sup> , where roll-out of smart meters is assessed positively, at least 80% of consumers shall be equipped with intelligent metering systems by 2020.	Directive 2009/72/EC concerning common rules for the internal market in electricity
	<b>Dynamic contracts</b>	According to EC estimations <sup>[64]</sup> , it is projected that 72 % of consumers will be equipped with smart meters for electricity by 2020.	
	<b>Informative bills</b>	According to the Electricity market directive <sup>[65]</sup> , consumers will have the right to request a smart meter and a dynamic price contract.	Directive (EU) 2019/944 on common rules for the internal market for electricity
Consumers must be in control of consumption data and be free to select energy service providers or to produce their own sustainable energy. <sup>[1]</sup>	<b>Possibility to choose the electricity supplier</b>	The Electricity market directive sets the minimum requirements for the electricity bills. <sup>[65]</sup>	
	<b>Prosumer role</b>	The Electricity market directive requires the technical process of switching suppliers to take less than 24 hours in all EU countries by 2026. <sup>[65]</sup>	
		The Electricity directive sets the framework for consumers to be able to participate actively, individually or through communities, in all markets, either by generating electricity and then consuming, sharing or selling it, or by providing storage services. <sup>[65]</sup>	
<b>4. Security, solidarity and trust</b>			
<b>4.1 Energy security and interconnection</b>			
The clean energy transition would result in an energy system where primary energy supply would largely come from renewable energy sources, thereby significantly improving security of supply. <sup>[2]</sup> Europe's energy import dependence, notably as regards imports of oil and gas, standing today at around 55% will fall in 2050 to 20%. <sup>[2]</sup>	<b>Dependence on oil and gas imports</b>	Total energy import dependence of EU in 2005 was 52.28% and in 2017 was 55.12 % <sup>[22]</sup>	
		The average monthly value of imports in energy products rose from €17.4 billion per month in 2016 to €27.6 billion per month in 2018. <sup>[66]</sup>	
Renewables can reduce EU trade deficit in energy commodities and exposure to supply disruption and to volatile prices of fossil fuels. <sup>[1]</sup>	<b>RES role in reducing energy dependency</b>	It is estimated that the increase in the use of renewable energy compared with the level of renewable energy consumption in 2005 allowed the EU to cut its demand for fossil fuels by 143 Mtoe in 2016 (approximately 12 % of total primary fossil fuel consumption). <sup>[48]</sup>	

MS must act collectively to diversify their supply countries and routes for imported fossil fuels. Competition on energy markets must also be enhanced through greater liberalization, completion of the internal energy market including the development of energy transport infrastructure including cross-border interconnectors that may be more efficient in ensuring security of supply than support for domestic generation capacity. <sup>[1]</sup>	Diversification of gas supply	All MS but one have access to two independent sources of gas, and if all ongoing projects are implemented on schedule, all MS except for Malta and Cyprus will have access to three sources of gas by 2022, and 23 MS will have access to the global liquefied natural gas market. If the necessary commitment is maintained, and there are no delays in implementing key projects, Europe should achieve a well-interconnected and fully shock-resilient gas grid by 2020 or shortly thereafter. <sup>[47]</sup>	Regulation (EU) 2017/1938 concerning measures to safeguard the security of gas supply
	Gas market	Progress has also been made in the gas market, notably with the agreement on the revision of the Gas Directive <sup>[67]</sup> . <sup>[47]</sup>	Directive (EU) 2019/692 concerning common rules for the internal market in natural gas
Too often energy security issues are addressed only at a national level without taking fully into account the interdependence of MS. The key to improved energy security lies first in a more collective approach through a functioning internal market and greater cooperation at regional and European levels, in particular for coordinating network developments and opening up markets, and second, in a more coherent external action. <sup>[70]</sup>	Cooperation in energy security issues	According to the Risk preparedness regulation <sup>[68]</sup> each EU country is required to define Risk Preparedness plans to be ready to respond to for unexpected situations, working closely with neighbouring member states.	Regulation (EU) 2019/941 on risk-preparedness in the electricity sector
		As described in the ACER regulation <sup>[69]</sup> , in addition to coordinating the action of national energy regulators, ACER has been granted additional competences in those areas where fragmented national decisions of cross-border relevance are likely to lead to problems for the internal Energy Market.	Regulation (EU) 2019/942 establishing a European Union Agency for the Cooperation of Energy Regulators
The agreed projects of common interest under the Energy Infrastructure Regulation should result in most Member States meeting the 10% level of interconnectors (by 2020) as a share of installed production capacity. <sup>[1]</sup>	Interconnection	The electricity interconnections target was set to improve security of supply by stepping up to 15 % in each Member State by 2030. <sup>[47]</sup>	Communication COM(2015) 82 Making Europe's electricity grid fit for 2020
		The TEN-E policy promoted a focused approach to identify and implement the Projects of Common Interest (PCIs) critical to building well-connected networks across Europe. Over 30 PCIs have been implemented, and some 75 PCIs should be in place by 2022. <sup>[47]</sup>	Communication COM(2017) 718 on strengthening Europe's energy networks
The transition will also need to be safeguarded from any increased cyber security risks. <sup>[2]</sup>	Cyber security	The recast of the Electricity regulation <sup>[71]</sup> gives a mandate to the Commission to develop a network code on cyber security for the electricity sector in order to increase its resilience and protect the grid. <sup>[72]</sup>	Recommendation C(2019) 2400 on cybersecurity in the energy sector
		The new Regulation on electricity risk preparedness <sup>[68]</sup> mandates Member States to develop national risk preparedness plans and coordinate their preparation at regional level, including measures to cope with cyber-attacks. <sup>[72]</sup>	
4.2 Solidarity and trust			
As energy poverty is one of the sources of poverty in Europe, the social aspects of energy pricing should be reflected in the energy policy of Member States. <sup>[74]</sup>	Energy poverty	Energy poverty still affects nearly 50 million people across the EU. <sup>[47]</sup>	European Energy Poverty Observatory
Citizens need to be informed and engaged in the decision-making process, while technological choices need to take account of the local environment. <sup>[74]</sup>	Social acceptance	Around three-quarters of Europeans see climate change as a very serious problem. 90% of Europeans say that they have personally taken action to fight climate change. <sup>[73]</sup>	
5 Research, innovation and competitiveness			
According to EU 2020 Strategy <sup>[75]</sup> , 3 % of the EU's GDP should be invested in R&D.	Total investments in R&D	R&D expenditure in the EU increased slightly to 2.06% of GDP in 2017. <sup>[24]</sup>	
The transition also requires further scaling-up of technological innovations in energy, buildings, transport, industry and agriculture sectors. It can be accelerated by breakthroughs in digitalisation, information and communications, artificial intelligence and biotechnology. The expansion of new systems and processes, with cooperation across sectors, is also required. <sup>[2]</sup>	Innovation performance	The 2019 European Innovation Scoreboard shows that EU innovation performance continues to increase. For the first time, the EU has surpassed the United States, but it continues to lose some ground to Japan and South Korea, and China is catching up fast. Within the EU, 25 Member States have increased their innovation performance since 2011. In addition, in 2018 lower performing countries were catching up with higher performing ones faster than before. <sup>[23]</sup>	



EU is ramping up investment in energy and climate related research. <sup>[1]</sup>	<b>Climate related research</b>	In its communication "EU budget for the future" <sup>[76]</sup> the Commission proposes to build on the positive experience with climate mainstreaming and to set a more ambitious goal for climate mainstreaming across all EU programmes, with a target of 25% of EU expenditure contributing to climate objectives (The EU has agreed to make at least 20% of EU expenditure climate-related in 2014-2020).	
This should focus on scaling up investments in large scale demonstrators, stimulating the demand for innovative technologies, and ensuring appropriate regulatory frameworks across the single market. <sup>[1]</sup>	<b>Large scale demonstrations</b>	Under the revised EU Emission Trading System, the Commission set up the Innovation Fund, which will pool together resources amounting to around €10 billion to support the demonstration of low-carbon technologies and processes. <sup>[72]</sup>  Loans from the Innovfin Energy Demonstration Project financial instrument of Horizon 2020 have provided €107 million loaned to 4 first-of-a-kind energy demonstration projects since 2016. <sup>[77]</sup>	
It will also require cooperation at different levels among regions and among MS to maximise synergies by pooling resources and knowledge together. <sup>[2]</sup>	<b>Participation rate in Horizon 2020</b>	The 2016 Interim evaluation of Horizon 2020 highlights the concentration of funding in terms of participants and the geographical representation as challenges. Participants from five EU-15 countries – UK, Germany, France, Spain and Italy – received 60% of the overall funding, with Germany receiving 17%, while participants from Bulgaria, Latvia, Lithuania and Malta received 0.1% each. <sup>[35]</sup>  The EU-13 countries obtained 4.4% of the Horizon 2020 funding although their total nominal GDP amounted to about 7% of all countries taking part. The Horizon 2020 financial contributions are in line with the R&D spending as the share of GDP, which is about two times lower in the EU-13 countries than in the EU-15. <sup>[35]</sup>	Proposal for regulation COM(2018) 435 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination
	<b>Networking</b>	Despite the evidence collected by the Commission which shows that the networks are opening to Widening countries, the access to existing networks and the clustering of large research performing countries were identified as the Number One barrier to entry for lower performing countries in Horizon 2020. <sup>[35]</sup>  The relevant networks include the Public-Private Partnerships and European Technology Platforms operating at EU level, which develop R&I roadmaps for action at EU and national level in some sectors, influence the development of priorities for research and innovation funding and subsequently generate an important number of EU project proposals. Although the networks can be accessed through a paid membership, the key players continue to lead them. <sup>[35]</sup>	
	<b>Synergies</b>	Synergies between the FP and ESIF remain variable across the EU countries. Some countries have successfully allocated ESIF money to R&I, which has substantially improved their R&I capabilities, whereas others continue to face challenges in utilising these funds in a sustainable way. <sup>[35]</sup>	
	<b>Research Infrastructures</b>	The European Strategy Forum on Research Infrastructures (ESFRI) plays a key role in policy-making on Research Infrastructures in Europe. The European Commission and ESFRI encourage EU countries and associated countries to develop national roadmaps for Research Infrastructures. <sup>[78]</sup>	

## 4.2 The bird's eye view on adopted climate and energy related legislative acts

The objective of the bird's eye view on EU policy developments is to structure climate and energy related legislative acts in the easy-to-use and comprehensive list. The addressed legislative acts are not limited to those being part of the well-known "Winter package"<sup>[3]</sup> and represent an attempt to cover to some extent most of EU regulations and directives which are relevant to the EU strategic priorities in energy sector and climate policies.

The list is organized in *Table 3* referring to the five dimensions of the Energy Union. Furthermore, the relevant directives and regulations are mapped according to the sectors of economy they cover. In order to avoid repetition of the same document, it is worth mentioning that each document is linked to the political area it covers most.

The resulting table creates a comprehensive and clear picture on the legislative efforts of the EU, covering the major part of the most important relevant documents.



Table 3: Overview of Climate related legislative acts

Sector	Industry		Transport	Residential, commercial and services	Agriculture	Circular economy (waste)
Energy Union objectives	Utilities, refineries, supply	Manufacturing				
<b>1. Climate action, decarbonising the economy</b>						
Air pollutant emission reduction	Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants					
	Directive 2009/30/EC introducing a mechanism to monitor and reduce greenhouse gas emissions					
	Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control)					
GHG emission reduction	Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030					
	Directive (EU) 2018/410 to enhance cost-effective emission reductions and low-carbon investment. (*covers aviation)					
	Directive 2009/31/EC on the geological storage of carbon dioxide					
			Regulation (EU) 2019/63 setting CO <sub>2</sub> emission performance standards for new passenger cars and for new light commercial vehicle			
			Regulation (EU) 2019/1242 setting CO <sub>2</sub> emission performance standards for new heavy-duty vehicles			
					Regulation (EU) 2018/841 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework	
			Directive (EU) 2019/904 on the reduction of the impact of certain plastic products on the environment			
			Directive (EU) 2018/852 on packaging and packaging waste			

Uptake of renewable energy sources	Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (RED II)					
	Directive 2009/28/E on the promotion of the use of energy from renewable sources (RED I)					
	Guidelines on State aid for environmental protection and energy 2014-2020 (2014/C 200/01)					
			C(2019) 2055 Delegated regulation on ILUC			
2. Energy efficiency						
Energy efficiency	Directive (EU) 2018/2002 on energy efficiency					
	Directive 2012/27/EU on energy efficiency					
	Delegated Regulation (EU) 2015/2402 reviewing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2012/27/EU					
				Directive (EU) 2018/844 on the energy performance of buildings		
				Directive 2010/31/EU on the energy performance of buildings		
				Regulation (EU) 2017/1369 setting a framework for energy labelling		
		Directive 2009/125/EC establishing a framework for the setting of eco-design requirements for energy-related products				
			Directive (EU) 2019/1161 on the promotion of clean and energy-efficient road transport vehicles			
			Directive 2014/94/EU on the deployment of alternative fuels infrastructure			

3. Security, solidarity and trust						
Solidarity and trust	Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action					
Security and diversification of gas supply	Regulation (EU) 2017/1938 concerning measures to safeguard the security of gas supply					
	Directive (EU) 2019/692 concerning common rules for the internal market in natural gas					
Security of electricity supply	Regulation (EU) 2019/941 on risk-preparedness in the electricity sector					
Cybersecurity in energy sector	Recommendation C(2019) 2400 on cybersecurity in the energy sector					
4. A fully-integrated internal energy market						
New energy market design	Regulation (EU) 2019/943 on the internal market for electricity					
	Regulation (EU) 2019/942 establishing a European Union Agency for the Cooperation of Energy Regulators					
Energy consumer rights	Directive (EU) 2019/944 on common rules for the internal market for electricity					
Infrastructure - connecting markets and regions	Regulation (EU) No 347/2013 on guidelines for trans-European energy infrastructure					
5. Research, innovation and competitiveness						
Framework program	Proposal for regulation COM(2018) 435 establishing Horizon Europe – the Framework Programme for Research and Innovation, laying down its rules for participation and dissemination					

### 4.3 PANTERA country profiles

The framework for PANTERA country profile is aligned with the review of the 2030/2050 climate and energy framework, relevant policies and state of the Energy Union. It aims at monitoring the progress of the target countries towards the EU objectives, reflected on national 2020/2030 targets, and structure countries' specific information from such sources as EC country reports, Eurostat, NECPs and NECPs assessments and other.

Furthermore, creating PANTERA country profiles for target countries aims at:

- Identifying countries' specific gaps for further detailed analysis of causes of insufficient performance to determine PANTERA desks' activities;
- Providing input for preparing PANTERA workshops;
- Providing input to Task 6.2 "Analysis of the national project findings in the target regions" and Task 6.3 "National cross-case comparisons and conclusions" of WP6,
- Helping in shaping PANTERA WT's content from target countries' perspective.

Within the frame of Deliverable D4.1 "Content and topics for dissemination and networking activities", the generic structure of steps in the decision-making process of funding and coordinating R&I activities is created. Adapting it to the specific target country, using information from the country profile of the D6.1 and additional investigation in the frame of Task 6.2 "Analysis of the national project findings in the target regions" aims at identifying shortcomings in national system and prepare information for discussions with national stakeholders via national workshops and PANTERA desks. Thus, for example, the initial comparison of the generic structure and data from Latvia's country profile (addressed in Section 4.4.1) discovers the need for the clear country energy strategy as an input to the R&I strategy. Similar issues will be investigated further in the frame of WP6 Task 6.2 "Analysis of the national project findings in the target regions" and operation of PANTERA desks.

Sections 4.4.1, 4.4.2 and 4.4.3 provide information on Latvia, Lithuania and Estonia with some comments on trends and shortcomings. In further sections country profiles for all other target countries are included.

### 4.3.1 Latvia

Table 4 summarizes information from various data and literature sources on the progress of Latvia towards the Energy Union objectives. Then some highlights are discussed in more detail.

Table 4: Progress towards the Energy Union objectives in Latvia

Category	Description
<b>1. Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	Latvia's "Long-Term Energy Strategy of Latvia 2030" gives a vision how the 2030 could look like, but the proposed targets are not officially adopted by the government. <sup>[29]</sup> The Long-Term Energy Strategy is linked to a broader "Sustainable Development Strategy of Latvia until 2030" <sup>[27]</sup> , which covers areas like culture, education, environment and innovation.
<b>GHG target 2020</b>	Greenhouse gas emissions: maximum increase by 17% between 2005 and 2020. <sup>[26]</sup> According to the latest national projections and taking into account existing measures, the target is expected to be achieved: 8% in 2020 compared to 2005. <sup>[26]</sup>
<b>GHG target 2030</b>	According to Effort sharing regulation 2030 target which requires Latvia to reduce its emissions by 6% by 2030 (relative to 2005 levels). <sup>[26]</sup> They are projected to rise by 13%, instead. <sup>[26]</sup>
<b>1.2 Uptake of renewable energy resources (RES)</b>	
<b>RES 2020 target</b>	Latvia is on track to achieve its 2020 target for the share of energy produced from renewable sources (40%), although the support scheme has proved expensive. <sup>[26]</sup> In 2017, the indicator constituted 39%. <sup>[15]</sup>
<b>RES 2030 target</b>	In the draft NECP, Latvia has set a contribution to the EU renewable energy target of at least 45% in gross final consumption of energy for 2030, significantly below the 50% share that results from the formula of Annex II of the Governance Regulation. <sup>[31]</sup>
<b>National support schemes</b>	In Latvia, renewable electricity generation was stimulated through a complex support system based on a feed-in tariff, which also includes elements of a quota system and tenders. <sup>[16]</sup> In the spring of 2018 the Ministry of Economy initiated a reform of the existing support scheme for the electricity produced from renewables with a view to reduce the costs to final consumers (a threshold of 0.3% of GDP). The Ministry of Economy proposed a set of solutions for abolishing the mandatory procurement component as of January 2022. <sup>[26]</sup>
<b>Connection of RES to the grid</b>	Access of renewable energy plants to the grid is subject to the general legislation on energy. Electricity from renewable sources is not given priority. Also, installations for heat production from renewable energy sources are not given priority connection, and there is no special legislation promoting the connection of RES heating devices to the heat transmission network at the national level. <sup>[16]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Latvia according to Eurostat data in 2017 was 2.5%. <sup>[17]</sup> The target according to the first Renewable Directive RED I <sup>[19]</sup> is 10%.
<b>Support of RES in transport</b>	Renewable energy use in the transport sector is promoted through obligation to sell petrol and diesel blended with biofuels and a tax regulation mechanism. <sup>[16]</sup>
<b>Charging points</b>	According to Eurostat data, there are 7.25 EV charging points per 100000 inhabitants in Latvia in 2017 (EU rank 23 of 28). <sup>[18]</sup>

<b>Plug-in vehicles</b>	The share of newly registered plug-in electric vehicles (including Battery Electric Vehicles) and Plug-in hybrid electric vehicles) in the 2017 was 0.61% (EU rank 15 of 28). <sup>[20]</sup>
<b>2. Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	Latvian indicative energy efficiency target for 2020 is 5.4 Mtoe expressed in primary energy consumption and 4.5 Mtoe expressed in final energy consumption. <sup>[26]</sup> In 2017, Latvia's primary energy consumption increased to 4.5 Mtoe from 4.3 Mtoe in 2016. The final energy consumption also increased from 3.8 Mtoe to 4.0 Mtoe. Given the current trend, Latvia is on track to achieve its energy efficiency target. <sup>[26]</sup>
<b>Energy savings</b>	In 2016, it had made only 7% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>
<b>2030 target</b>	In the draft NECP, Latvia has set its national energy efficiency contribution for 2030 at 4.3 Mtoe of primary energy consumption, which has been converted into final energy consumption of 3.6 Mtoe. The proposed target could be considered of <u>low ambition</u> for primary energy consumption and of modest ambition for final energy consumption, considering the level of efforts required at the EU level to collectively reach the Union's 2030 efficiency target. <sup>[31]</sup>
<b>3. Energy security and interconnection</b>	
<b>Interconnection</b>	Latvia is well above the EU interconnection target (15%). According to the draft NECP <sup>[34]</sup> data Latvian electricity grid interconnection level with neighbouring countries in 2017 was 80%.
<b>Energy security Target 2030</b>	The draft NECP puts forward an <u>ambitious</u> objective to reduce imports of energy and energy resources from third countries by 50% compared to 2011 by 2030 <sup>[31]</sup> , reaching the energy dependence level of 30% <sup>[34]</sup> .
<b>Trade deficit</b>	The Latvian energy dependence fell from 64% in 2005 to 44% in 2017. <sup>[22]</sup>
<b>Electricity generation capacities</b>	In 2018, 61% of total produced electricity in Latvia was delivered from conventional power plants (utilizing mostly natural gas), 37,2% - from hydropower plants and 1,8% from wind. <sup>[25]</sup>
<b>4. Integrated electricity market</b>	
<b>Wholesale electricity market</b>	Latvia is part of the Nord Pool market since 2013. <sup>[29]</sup>
<b>Retail electricity market</b>	Latvia's electricity market was liberalised in 2015. In 2017, 100% of total electricity was traded in the electricity market at contract prices in accordance with bilateral agreements and 62% of that electricity was traded by the dominant trader in the market - JSC "Latvenergo", and the remaining 38% - by other traders. During the year, 4% of all households and 20% of all non-household users changed electricity trader. <sup>[32]</sup>
<b>Intelligent metering systems</b>	Since 2014, more than 544 000 smart meters have been installed; these account for 49% (end of the 2018) of the total fleet of electricity meters and measure 83% of the total amount of electricity consumed by customers. <sup>[33]</sup> Smart electricity meters are planned for all Sadales tīkls AS (Latvian DSO) customers until 2020. <sup>[33]</sup>
<b>Tariffs</b>	Dynamic tariff is available.
<b>5. Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	The main strategic frameworks in which the country operates are the Guidelines for National Industrial Policy 2014-20, the Guidelines for Science, Technology Development and Innovation (2014-20) and in particular the Smart Specialisation Strategy (RIS3, 2014-20) <sup>[49]</sup>
<b>Innovation performance</b>	Latvia is a moderate innovator. <sup>[23]</sup>
<b>National target</b>	Latvia will likely not meet its national R&D intensity target of 1.5% of GDP. <sup>[25]</sup>

<b>Total R&amp;D expenditure</b>	In 2007, R&D intensity reached 0.55% of GDP. <sup>[24]</sup> In 2017, R&D intensity reached 0.51% of GDP. <sup>[26]</sup>
<b>Public R&amp;D expenditure</b>	The public funding level in 2017 reached 0.37% of GDP. <sup>[26]</sup>
<b>Business expenditure in R&amp;D</b>	The level of business expenditure in R&D comprises 0.14% of GDP and is among the lowest in the EU. <sup>[26]</sup>
<b>R&amp;D policy coordination</b>	This weakness is aggravated by inadequate administrative capacity and the scattering of policymaking and implementation among a multitude of ministries and agencies. <sup>[26]</sup>
<b>Funding from Horizon 2020</b>	Latvia is among least successful countries received only 0.18% of the overall Horizon funding according to the Horizon dashboard. <sup>[28]</sup>
<b>Research infrastructures roadmap</b>	National roadmap with identified ESPRI projects is not available. <sup>[30]</sup>

Figure 10 illustrates the GHG emissions trend in Latvia based on Eurostat data<sup>[79]</sup>. In 2017, the amount of the GHG emissions was well below Latvia's national 2020 target. At the same time, there is a high uncertainty on achieving the 2030 target. According to the country report<sup>[26]</sup>, this will require significant additional measures and accompanying investments, in particular, in the transport, agricultural and manufacturing sectors, where emissions are projected to increase the most.

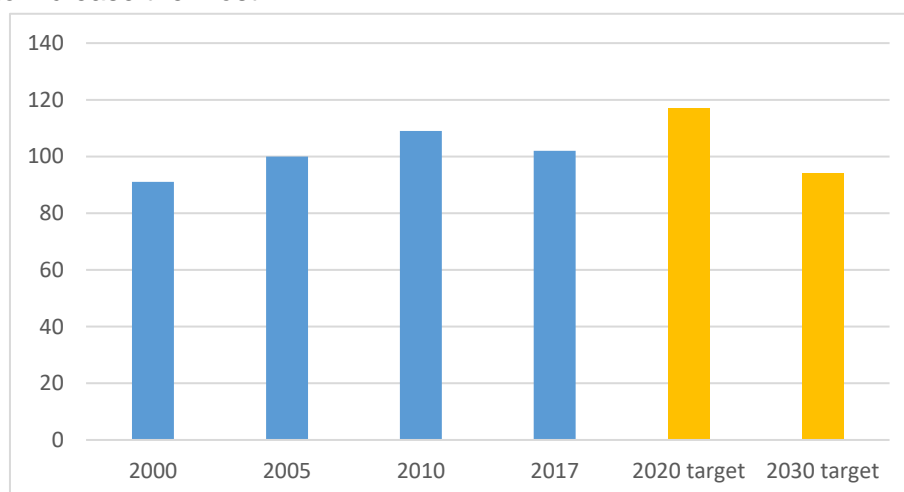


Figure 10: GHG trend in Latvia (Index 2005=100)

Since the main electricity generation capacities in Latvia are hydropower plants, it has historically high penetration of renewable energy resources. In 2005, the share of energy from renewable sources in the gross consumption comprised 32%<sup>[15]</sup>. In 2005, Latvia ranked number two after Sweden in the RES share between the EU member states. In 2017, the indicator rose to 39% (ranked third) with a gap of 1% to the national 2020 target – 40%. The growth of RES penetration by 2017 constituted 20% of the RES share in 2005. The dynamic of RES uptake and future plans are illustrated in Figure 11 (the 2030 target results from the formula of Annex II of the Governance Regulation<sup>[55]</sup>).

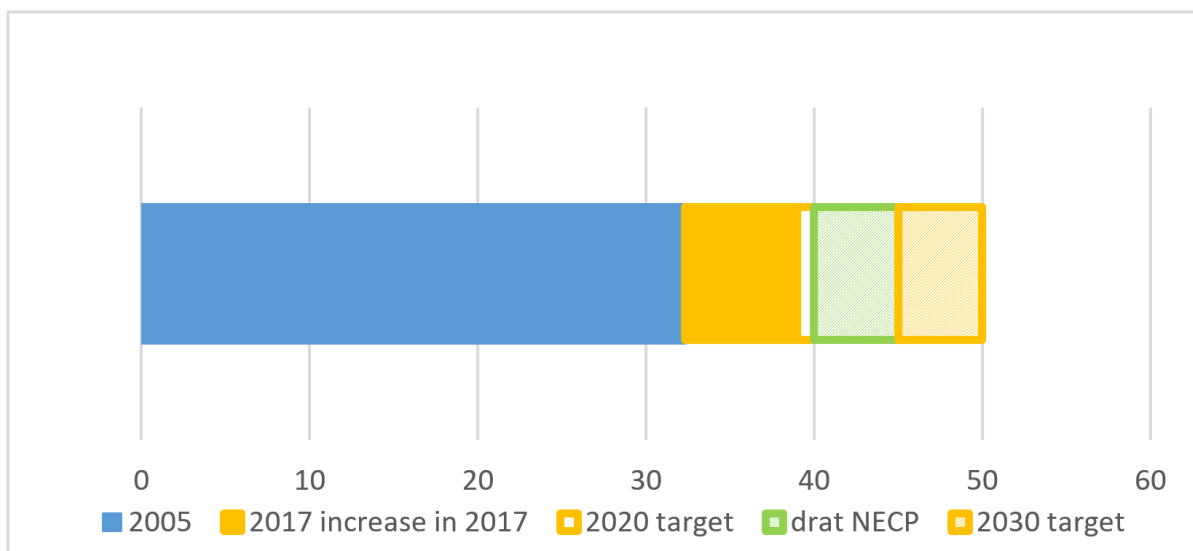


Figure 11: Share of energy from RES in Latvia (percentage of total gross final consumption of energy)

Latvia's weakest point has been research and innovation. R&D investment in Latvia is low and dependent on European Structural and Investment Funds (ESIFs). According to Eurostat data<sup>[24]</sup>, Latvia's R&D intensity in 2017 was even lower than it was in 2007. Therefore, it is highly likely that Latvia will not meet its national R&D target. The EC underlines<sup>[26]</sup> that the main reason may be low political importance given to R&D funding. According to the country report<sup>[26]</sup>, there is a need of an adjustment in Latvia's smart specialisation strategy to focus on the areas of its economy with the most potential. Furthermore, Latvia's innovation performance could benefit from the more active involvement of its largest state-owned companies, which have the resources to afford substantive investment capacity<sup>[26]</sup>. Figure 12 shows the gap between current R&D intensity and Latvia's national target, as well as the distance to the EU average R&D expenditure.

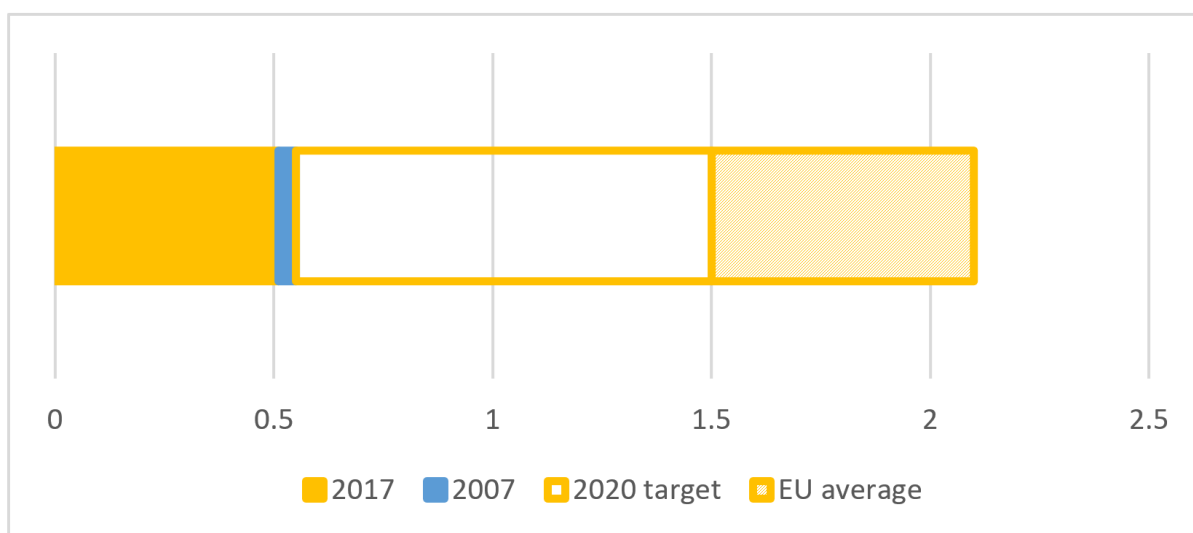


Figure 12: R&D intensity in Latvia (total R&D expenditure as percentage of GDP)

Latvian Long-Term Energy Strategy is linked to a broader "Sustainable Development Strategy of Latvia until 2030" that covers areas like culture, education, the environment and innovation. It was adopted in 2010. Latvia's "Long-Term Energy Strategy of Latvia 2030" was published in 2013 and gives a vision how the 2030 could look like, but the government does not officially



adopt the proposed targets. This uncovers the need for the updated and detailed energy strategy in Latvia.

### 4.3.2 Lithuania

Table 5 summarizes information from various data and literature sources on the progress of Lithuania towards the Energy Union objectives. Then some highlights are discussed in more detail.

Table 5: Progress towards the Energy Union objectives in Lithuania

Category	Description
<b>1. Climate action, decarbonizing the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	Revised ambitious National Energy Independence Strategy was approved by the Seimas of the Republic of Lithuania in 2018. <sup>[39]</sup>
<b>GHG target 2020</b>	Greenhouse gas emissions: maximum increase by 15% between 2005 and 2020. <sup>[36]</sup> Lithuania's emissions are expected to increase by 2% in 2020 compared to 2005. It will consequently meet its target. <sup>[36]</sup>
<b>GHG target 2030</b>	According to Effort sharing regulation 2030 target which requires Lithuania to reduce its emissions by 9% by 2030 (relative to 2005 levels). <sup>[36]</sup> Lithuania expects emissions to rise by 6% by 2030 relative to 2005 levels. <sup>[36]</sup>
<b>1.2 Uptake of renewable energy resources (RES)</b>	
<b>RES 2020 target</b>	With a 25.6% share of renewables in 2016, Lithuania has already more than achieved its 2020 target (23%). <sup>[36]</sup>
<b>RES 2030 target</b>	According to the draft NECP, the proposed share of 45% of energy from renewable sources in gross final energy consumption in 2030 is a contribution to the EU renewable energy target for 2030 that is significantly <u>above</u> the share of 34% in 2030 resulting from the formula in Annex II of the Governance Regulation. <sup>[38]</sup> This includes doubling domestic power generation capacities (with 70% of electricity produced domestically in 2030). This will be achieved through investment in wind and solar power generation and wide uptake of small-scale renewable installations owned by private energy consumers and communities (with 30% of consumers producing energy for their own needs in 2030). <sup>[36]</sup>
<b>National support schemes</b>	In Lithuania, electricity from renewable sources is mainly promoted through a sliding feed-in premium. Under the sliding feed-in premium scheme only the already existing RES plants are supported. Support is not available for new RES installations and no tenders are currently being organised. However, a new support scheme for renewable energy technologies is planned to be introduced from 2019 - technology neutral tenders in combination with a fixed feed-in premium. <sup>[16]</sup> Furthermore, the producers of renewable electricity may apply for subsidies and loans from the Environmental Project Management Agency under the Climate Change Special Programme and are exempt from excise duty. For solar, wind and biomass power installations, net-metering is in place. <sup>[16]</sup>
<b>Connection of RES to the grid</b>	The operators of RES-E plants are entitled to priority connection to the electricity grid. The transmission and distribution of electricity from renewable energy sources shall also be given the priority. Heating devices using renewable energy sources are connected according to non-discriminatory principles. <sup>[16]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Latvia according to Eurostat data in 2017 was 3.6%. <sup>[17]</sup>

<b>Support of RES in transport</b>	<p>Transport sector is promoted through reimbursement of raw materials for biofuel production, obligation to sell petrol and diesel blended with biofuels (quota obligation), an excise tax relief and an exemption from the environmental pollution tax.<sup>[16]</sup></p> <p>CO<sub>2</sub>-based motor vehicle taxes are not in place in Lithuania. Incentives to favour cars with lower CO<sub>2</sub> emissions are very limited and new vehicles purchased in Lithuania are among the least environmentally friendly in the EU.<sup>[36]</sup></p>
<b>Charging points</b>	According to Eurostat data, there are 12.67 EV charging points per 100000 inhabitants in Lithuania in 2017 (EU rank 21 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	The share of newly registered plug-in electric vehicles (including Battery Electric Vehicles) and Plug-in hybrid electric vehicles) in the 2017 was 0.28% (EU rank 22 of 28). <sup>[20]</sup>
<b>2. Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	<p>Lithuanian indicative energy efficiency target for 2020 is 6.5 Mtoe expressed in primary energy consumption and 4.3 Mtoe expressed in final energy consumption.<sup>[36]</sup></p> <p>Lithuania's final energy consumption was relatively stable between 2010 and 2015, but in 2016 it increased by 5 % to 5.11 Mtoe. Therefore, in order to reach its 2020 final energy consumption target, Lithuania must further increase its efforts to promote energy efficiency.<sup>[36]</sup></p>
<b>Energy savings</b>	In 2016, it had made only 19% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>
<b>2030 target</b>	In the draft NECP, Lithuania's national contribution for energy efficiency is presented in terms of primary and final energy intensity, which is to be 1.5 times lower than in 2018. The Commission recommends to express national energy efficiency contribution in terms of absolute level of primary and final energy consumption in 2030 and to increase the level of its ambition. <sup>[38]</sup>
<b>3. Energy security and interconnection</b>	
<b>Interconnection</b>	Lithuania aims to reach an interconnectivity level of 23% in 2030. <sup>[38]</sup>
<b>Energy security target 2030</b>	The draft NECP puts forward a specific objective of decreasing electricity import dependency to 30% by 2030. <sup>[38]</sup>
<b>Trade deficit</b>	With the final shutdown of Ignalina nuclear power plant in 2009, the Lithuanian energy dependence increased from 56.6% in 2005 to 75.6% in 2017. <sup>[22]</sup>
<b>Electricity generation capacities</b>	Lithuanian electricity imports have increased since Ignalina nuclear power plant shut down at the end of 2009. In 2018, 35.7% of total domestically produced electricity in Lithuania came from wind power plants, 29.6% from hydro (including pumped hydro) and 25.2% from conventional thermal power plants, additionally 2.5% contributed solar and 7% geothermal and other sources. <sup>[25]</sup>
<b>4. Integrated electricity market</b>	
<b>Wholesale electricity market</b>	Lithuania is part of the Nord Pool market since 2012. <sup>[29]</sup>
<b>Retail electricity market</b>	Lithuanian domestic electricity market is not liberalized.
<b>Intelligent metering systems</b>	The mass roll-out of smart metering in Lithuania by 2023 is included in the National Energy Independence Strategy. <sup>[39]</sup>
<b>5. Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	Several strategies and programmes in the field of R&I, although the National Progress Strategy 'Lithuania 2030' is an overarching reference as it sets the strategic direction for the development of the country. It includes some general terms around R&I. Six other documents influence the direction of R&I: the National Progress Strategy 'Lithuania 2030,' the National Progress Programme for Lithuania for the period 2014-2020 (NPP); the Programme for Development

	of Studies and R&D for 2013-2020; the updated Concept of the Establishment and Development of Integrated Science, Studies and Business Centres (Valleys); the Lithuanian Innovation Development Programme for 2014-2020 and the Programme on the Implementation of the R&D&I Priority Areas and Their Priorities. <sup>[49]</sup>
<b>Innovation performance</b>	Lithuania is a Moderate Innovator. <sup>[23]</sup>
<b>National target</b>	Lithuania is far away from reaching its R&D intensity 2020 target of 1.9%. <sup>[36]</sup>
<b>Total R&amp;D expenditure</b>	In 2017, total R&D investments amounted to only 0.9% of GDP. <sup>[24]</sup>
<b>Public R&amp;D expenditure</b>	Public investment, which is funded mainly from EU funds, made up the bulk of R&D investment at 0.6 % of GDP. <sup>[36]</sup>
<b>Business expenditure in R&amp;D</b>	Business expenditure on R&D in 2017 was 0.3% of GDP. <sup>[24]</sup>
<b>R&amp;D policy coordination</b>	R&I policy coordination was slightly improved by reassigning responsibility for it to the Ministry of Economy and the Ministry of Education and Science, and transferring the experimental development in companies file to the Ministry of Economics. However, a coherent new R&I policy still needs to be developed. <sup>[36]</sup>
<b>Funding from Horizon 2020</b>	Lithuania is among least successful countries received only 0.15 % of the overall Horizon funding according to the Horizon dashboard. <sup>[28]</sup>
<b>Research infrastructures roadmap</b>	National roadmap with identified ESPRI projects is available, with latest update in 2015. <sup>[30]</sup>

Figure 13 illustrates the GHG emissions trend in Lithuania based on Eurostat data<sup>[79]</sup>. In 2017, the amount of the GHG emissions was well below Lithuanian's national 2020 target. At the same time, according to the EC country report<sup>[36]</sup>, Lithuania expects emissions to rise by 6% by 2030 relative to 2005 levels whereas its binding EU target is a reduction of 9%. So, additional efforts will be needed, in particular, in the transport sector, which according to the country report<sup>[36]</sup> is the sector with the highest energy consumption and is responsible for half of Lithuania's total greenhouse gas emissions. Residential sector is another critical sector with energy intensity above the EU average and according to the country report<sup>[36]</sup> renovating. The large stock of inefficient housing and public buildings remains a challenge.

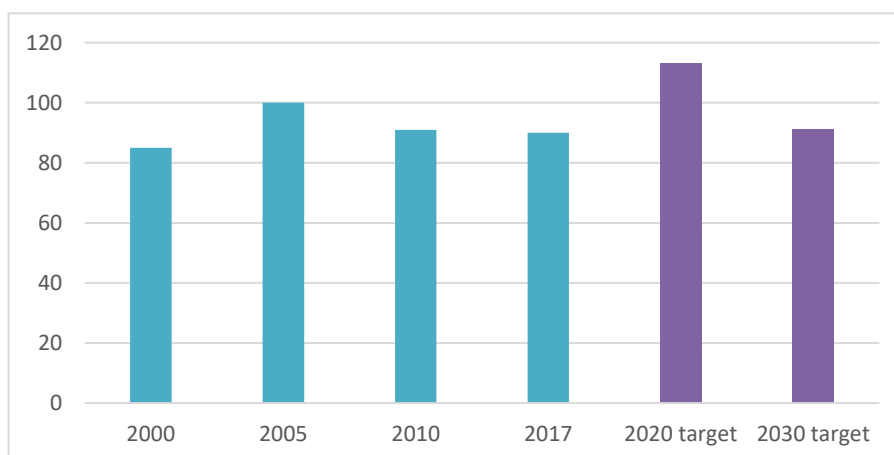


Figure 13: GHG trend in Lithuania (Index 2005=100)

Figure 14 illustrates the progress of Lithuania in the RES uptake: with a 25.6% share for renewables in 2016, Lithuania is already above its 2020 target (23%). Furthermore, it aims to double the share of RES by 2030. Successful integration of the increased amounts of renewable energy and the large number of producing consumers will also require investment in smart energy systems, including transmission, distribution and storage infrastructure as well as investment in increasing the amount of required balancing capacities.<sup>[36]</sup> Recently, the EC has approved €385 million support for production of electricity from renewable sources in Lithuania.<sup>[37]</sup> Shortly after that, at the end of April 2019 the Lithuanian government announced a first renewables auction and €4.5 million in solar rebates.

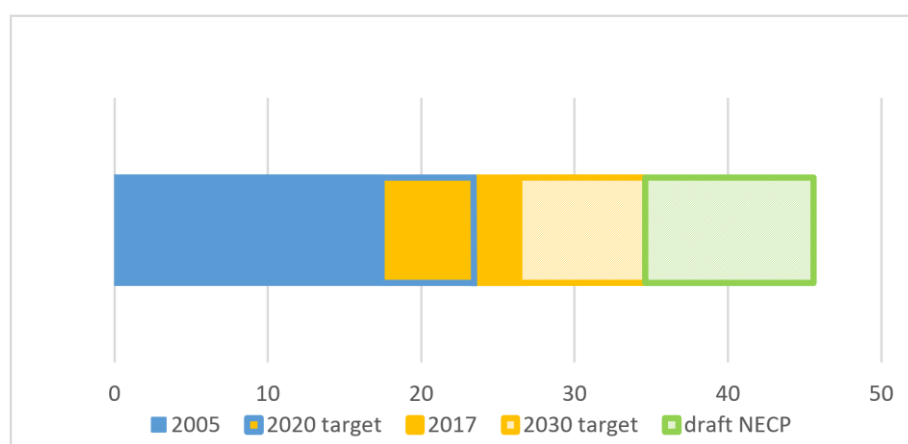


Figure 14: Share of energy from RES in Lithuania (percentage of total gross final consumption of energy)

Lithuania's weakest point has been research and innovation. R&D investment in Lithuania is low and dependent on ESIFs. According to Eurostat data<sup>[24]</sup>, Lithuania has made limited progress in R&D intensity (0.88 % of GDP spent on R&D in 2017 and 0.8% -earlier in 2007), what will highly likely not lead to reaching its national target. According to the country report<sup>[36]</sup>, the competitiveness of the country's research and innovation (R&I) system is hampered by the shortage of skills and a lack of a coherent programme for publicly funded science to collaborate with businesses. Furthermore, smart specialisation strategy is rather broad and covers most economic sectors, thus contributing to a thin spread of limited funding.<sup>[36]</sup> Figure 15 illustrates the distance of the current R&D intensity and Lithuania's national target, as well as the distance to the EU average R&D expenditure.

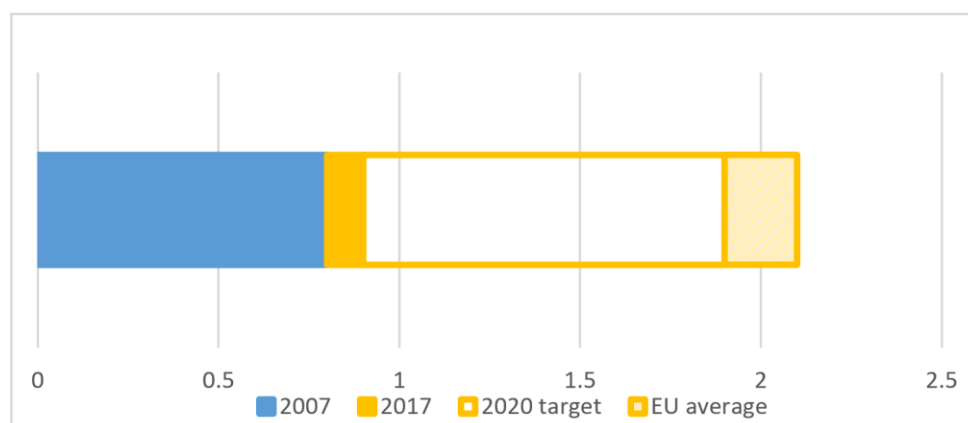


Figure 15: R&D intensity in Lithuania (total R&D expenditure as percentage of GDP)

As regards the energy strategy, in 2018 Lithuania adopted and introduced its revised ambitious plan – “National Energy Independence Strategy”, prepared by the Ministry of Energy.<sup>[39]</sup>

### 4.3.3 Estonia

Table 6 summarizes information from various data and literature sources on the progress of Estonia towards the Energy Union objectives. Then some highlights are discussed in more detail.

*Table 6: Progress towards the Energy Union objectives in Estonia*

Category	Description
<b>1 Climate action, decarbonizing the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	In 2017, the “National Development Plan of the Energy Sector until 2030” was adopted and published. <sup>[40]</sup> The “General Principles of Estonian Climate Policy until 2050” were approved in the Estonian Parliament in April 2017. <sup>[41]</sup>
<b>GHG target 2020</b>	Greenhouse gas emissions: maximum 11% increase in 2020 compared with 2005. <sup>[42]</sup> Emissions are projected to be 11% higher in 2020 than in 2005, according to national projections and taking into account existing measures. This means that the target is expected to be met. <sup>[42]</sup>
<b>GHG target 2030</b>	According to Effort sharing regulation 2030 target which requires Estonia to reduce its emissions by 13% by 2030 (relative to 2005 levels). Under the existing policies, Estonia is projected to fall short of its 2030 target. <sup>[42]</sup>
<b>1.2 Uptake of renewable energy resources (RES)</b>	
<b>2020 target</b>	With a renewable energy share of 29.2% in 2017, Estonia is already above its 25% target for 2020. <sup>[42]</sup>
<b>2030 target</b>	Estonia estimates a share of 42% of energy from renewable sources in gross final consumption of energy for 2030. This level of ambition, is significantly <u>above</u> the share of 37% in 2030 that results from the formula in Annex II of the Governance Regulation. <sup>[43]</sup>
<b>National support schemes</b>	In Estonia, electricity from renewable sources has so far been promoted mainly through a premium tariff. However, major revisions in the legislation regarding RES support schemes have taken place in recent years. An auction-based system to promote RES development has been introduced in June 2018 which replaced the previous premium tariffs. <sup>[16]</sup>
<b>Connection of RES to the grid</b>	Access of electricity from renewable energy sources to the electricity grid is granted based on the principle of non-discrimination. The grid operator is obliged to develop the grid to guarantee grid services for all electricity producers and to be able to connect further electricity plants to the grid. The connection of a heat generation plant to the grid is auction based and follows the principle of non-discrimination. <sup>[16]</sup>
<b>RES in transport</b>	With a 0.4% share of RES in transport in 2017, Estonia is lagging behind the binding 10% target in transport to be achieved by 2020. <sup>[17]</sup>
<b>Support of RES</b>	In transport, the use of renewable energies is currently mainly encouraged through a measure to support biomethane use and build biomethane fuelling stations. <sup>[16]</sup>
<b>Charging points</b>	According to Eurostat data, there are 65.78 EV charging points per 100000 inhabitants in Estonia in 2017 (EU rank 9 of 28). <sup>[18]</sup>

<b>Plug-in vehicles</b>	<p>The share of newly registered plug-in electric vehicles (including Battery Electric Vehicles) and Plug-in hybrid electric vehicles) in the 2017 was 0.2% (EU 27 of 28).<sup>[20]</sup></p> <p>Sales of alternative fuel vehicles have decreased from 2.7% to 0.2% between 2012 and 2017 notwithstanding the measures taken in recent years.<sup>[42]</sup></p>
<b>2. Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	<p>Estonia's 2020 indicative energy efficiency target is 6.5 Mtoe expressed in primary energy consumption (2.8Mtoe expressed in final energy consumption).<sup>[42]</sup></p> <p>In 2017, Estonia's primary energy consumption decreased to 5.6Mtoe, compared to 2016. On the other hand, final energy consumption increased to 2.9Mtoe.<sup>[42]</sup></p>
<b>Energy savings</b>	<p>In 2016, Estonia had made 47% of the total savings it had committed to achieve over the 2014 to 2020 period.<sup>[21]</sup></p>
<b>2030 target</b>	<p>In the draft NECP, Estonia sets a contribution to the EU energy efficiency target in terms of primary energy consumption of maximum 5.49Mtoe. An official corresponding figure for final energy consumption is not yet provided. The draft contribution represents <u>low ambition</u>, and more details on policies and measures would be necessary to assess their sufficiency.<sup>[43]</sup></p>
<b>3. Energy security and interconnection</b>	
<b>Interconnection</b>	<p>Estonia already has an electricity interconnectivity level of 63%.<sup>[43]</sup></p>
<b>Energy security</b>	<p>According to the draft NECP, Estonia's main objective in the energy security dimension appears under the headline of ensuring continuous energy supply. The draft NECP states that this can be ensured by more extensive use of domestic energy resources – oil shale and renewable energy, while at the same time ensuring that the share of any one energy source does not exceed 30% by 2020.<sup>[45]</sup></p>
<b>Trade deficit</b>	<p>The Estonian energy dependence fell from 28% in 2005 to 4% in 2017.<sup>[22]</sup></p>
<b>Electricity generation capacities</b>	<p>In 2018, 94% of total produced electricity in Estonia was delivered from conventional power plants (utilizing oil shale and shale gas) and 6% - from wind power plants.<sup>[25]</sup></p>
<b>4. Integrated electricity market</b>	
<b>Wholesale electricity market</b>	<p>Estonia is part of the Nord Pool market since 2011.<sup>[29]</sup></p>
<b>Retail electricity market</b>	<p>Estonian market was liberalised in 2013. In 2017 there were 16 independent electricity suppliers in Estonia, 10 of them are active players in the market.<sup>[44]</sup></p>
<b>Intelligent metering systems</b>	<p>Estonia completed a roll-out of smart meters and developed a data hub to ensure the efficient handling of data in retail energy markets, relatively low proportion of households is switching suppliers, which in turn allows incumbents to maintain a high market share.<sup>[42]</sup></p>
<b>Tariffs</b>	<p>Estonia is among the EU leaders in terms of availability of dynamic price contracts. These contracts cover about 1/3 of the population and directly reflect the price in the wholesale spot market.<sup>[42]</sup></p>
<b>5. Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	<p>Single overarching strategy: Knowledge Based Estonia 2014-2020 (2014).<sup>[49]</sup></p>
<b>Innovation performance</b>	<p>Estonia is a strong innovator or in 2019 Innovation Scoreboard (previously Moderate Innovator).<sup>[23]</sup></p>
<b>National target</b>	<p>R&amp;D target set in the 2013 National Reform Programme: 3% of GDP, of which 2% for the private sector.<sup>[42]</sup></p>
<b>Total R&amp;D expenditure</b>	<p>In 2017, total R&amp;D investment in Estonia slightly increased to 1.29% of GDP, up from 1.25% in 2016, but remains below the EU average of 2.07% of GDP.<sup>[42]</sup></p>



<b>Public R&amp;D expenditure</b>	Public expenditure in R&D reached 0.66% of GDP in 2017, slightly below the EU average of 0.69% of GDP. <sup>[42]</sup> While currently around 48% of funding for R&D is provided by the EU, Estonia plans to increase the state budget allocation for R&D to 1% of GDP. <sup>[42]</sup>
<b>Business expenditure in R&amp;D</b>	Business enterprise expenditure in R&D decreased slightly from 0.64 in 2016 to 0.61% in 2017. <sup>[42]</sup>
<b>R&amp;D policy coordination</b>	Estonia has pursued a widespread liberalisation and deregulation process at the fastest pace among the Widening countries. By implementing structural reforms and an enabling legal framework, Estonia has aligned its R&I strategies with the European policies and directed Structural Funds to the development of R&D infrastructure, human capital and entrepreneurship. <sup>[35]</sup>
<b>Funding from Horizon 2020</b>	Estonia is among the best performing countries in terms of the Horizon 2020 funding contribution normalised per inhabitant, researcher and R&D&I investment. <sup>[35]</sup> It received 0.42% of total net funding according to Horizon dashboard. <sup>[28]</sup>
<b>Research infrastructures roadmap</b>	National roadmap with identified ESPRI projects is available and updated in 2019. <sup>[30]</sup>

Figure 16 illustrates the GHG emissions trend in Estonia based on Eurostat data<sup>[79]</sup>. In 2017, the amount of the GHG emissions was on the same level as national 2020 target. As regards 2030 target, the current trend shows that Estonia may have significant difficulties in reaching it. According to the country report<sup>[42]</sup>, the challenges lie, in particular, in transport and agriculture sectors. Moreover, the Estonian economy is among the most carbon intensive in the EU, due to the important role of oil shale in energy production, which is qualified under the EU ETS.

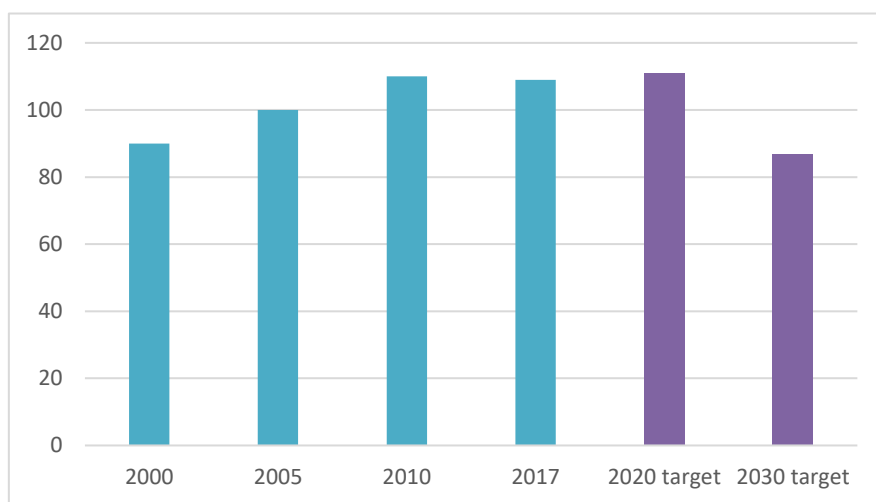


Figure 16: GHG trend in Estonia (Index 2005=100)

Figure 17 illustrates the progress of Estonia in the RES uptake: with a renewable energy share of 29.2% in 2017, Estonia is already above its 25% target for 2020. Moreover, the draft NECP puts further ambitious national RES target for 2030, which is higher than result from formula of Annex II of the Governance Regulation<sup>[55]</sup>.

Member States can cooperate on renewable energy utilising several mechanisms, such as statistical transfers, joint projects and joint support schemes. Co-operation mechanisms are based on Articles 6 to 11 of the first Renewable Energy Directive RED I<sup>[19]</sup>. There are currently

two agreements to make use of these statistical transfers between Luxembourg and Lithuania and between Luxembourg and Estonia.<sup>[46]</sup>

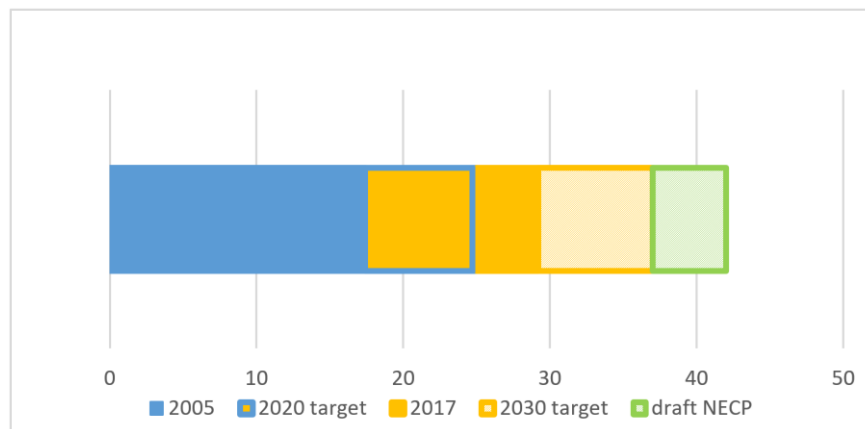


Figure 17: Share of energy from RES in Estonia (percentage of total gross final consumption of energy)

Over the past years, Estonia has taken measures to strengthen its research and innovation system.<sup>[42]</sup> Estonia has improved its position in the EU innovation scoreboard moving from moderate innovator to strong innovator position. Estonian national R&D intensity target is similar to that of the EU total. Figure 18 illustrates Estonian R&D intensity.

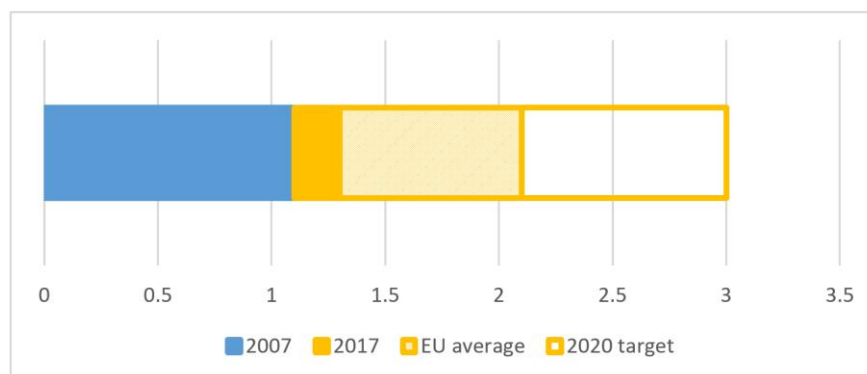


Figure 18: R&D intensity in Estonia (total R&D expenditure as percentage of GDP)

As for the energy strategy, in 2017 Estonian Energy Development Plan<sup>[40]</sup> and General Principles of Estonian Climate Policy until 2050<sup>[41]</sup> were approved.

#### 4.3.4 Bulgaria

Table 7: Progress towards the Energy Union objectives in Bulgaria

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	The present Energy Strategy of Bulgaria covers the period till 2020. <sup>[80]</sup>
<b>GHG target 2020</b>	Greenhouse gas (GHG) emissions target: maximum increase of 20% in 2020 compared to 2005 (in non-ETS sectors) <sup>[81]</sup>



	In 2020 Bulgaria's non-ETS emissions are expected to be 1.7% less than in 2005, which is an overachievement of the 2020 target by a margin of 21.7 percentage points. <sup>[81]</sup>
<b>GHG target 2030</b>	Effort sharing regulation requires Bulgaria to keep its greenhouse gas emissions at no higher than the 2005 level.  Based on its own projections, Bulgaria may miss by 1 pp. its 2030 target of keeping its greenhouse gas emissions at no higher than the 2005 level. <sup>[80]</sup>
<b>1.2 Uptake of renewable RES</b>	
<b>RES 2020 target</b>	Bulgaria is on track. The 2017 share of renewable energy in gross final energy consumption was 18.7%, on par with the level registered in 2016 and well above the 2020 target of 16% of gross final energy consumption. <sup>[80]</sup>  In 2017, the indicator constituted 18,7%. <sup>[15]</sup>
<b>RES 2030 target</b>	The Bulgarian draft NECP sets a share of 25% renewable energy in gross final consumption of energy for 2030 as contribution to the EU renewable energy target for 2030, which is slightly below the share of 27% in 2030 that results from the formula in Annex II of the Governance Regulation. <sup>[82]</sup>
<b>National support schemes</b>	In Bulgaria, electricity from renewable sources is promoted through a feed-in tariff (FiT) and a premium tariff. As of 1 July 2018, the FiTs are terminated and the RES producers, which enjoyed PPAs and FiT are offered to execute Premium contracts with the ESSF (Electricity System Security Fund) by 1 July 2018. The Energy and Water Regulatory Commission regulates the electricity selling price at the wholesale market and the FiT at which the RES producers sell electricity to suppliers. RES-E producers with a total installed capacity of at least 4 MW are obliged to sell their electricity on the exchange. <sup>[83]</sup>
<b>Connection of RES to the grid</b>	In Bulgaria, the connection of renewable energy systems to the grid is subject to the provisions of the general legislation on energy. Renewable energy is not given priority access. Plant operators are contractually entitled to have their electricity dispatched by the grid operator. Grid operators are obliged to upgrade and expand their grids if the upgrade or expansion is required to connect a plant. <sup>[80]</sup>  The use of renewable energy for heating and cooling is promoted through a subsidy from the European Regional Development Fund, several loan schemes and through an exemption for building owners from property tax. <sup>[80]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Bulgaria according to Eurostat data in 2017 was 7.2%. <sup>[17]</sup> The respective 2020 target is 10 %.
<b>Support of RES in transport</b>	In Bulgaria, the main support scheme for renewable energy sources used in transport is a quota system. This scheme obliges companies importing or producing petrol or diesel to ensure that biofuels make up a defined percentage of their annual fuel sales. Furthermore, biofuels are supported through a fiscal regulation mechanism. <sup>[83]</sup>
<b>Charging points</b>	According to Eurostat data, there are 7.1 EV charging points per 100000 inhabitants in Bulgaria in 2017 (EU rank 24 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	Share of newly registered plug-in electric vehicles (PEV) in the 2017 was 0.37% (EU rank 20 of 28) <sup>[20]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	The 2020 energy efficiency target of Bulgaria is 16.9Mtoe expressed in primary energy consumption and 8.6Mtoe expressed in final energy consumption. <sup>[81]</sup>  Indicative national target not yet achieved. In 2017 primary energy consumption stood at 18.3Mtoe, up from 17.7Mtoe in 2016. In 2017 final energy consumption stood at 9.89Mtoe, up from 9.65Mtoe in 2016. <sup>[81]</sup>
<b>Energy savings</b>	In 2016, it had made only 9% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>

<b>2030 target</b>	The Bulgarian draft NECP includes a national energy efficiency contribution for 2030 of 27%, which translates into a national contribution of 17.7Mtoe of primary and 8.7Mtoe of final energy consumption. The proposed contributions are above the 2020 target levels (+0.4 and +4.9 for final and primary energy consumption respectively), but below the 2017 energy consumption levels (-12.3 % and -3.5% for final and primary energy consumption respectively). Overall, the contributions of Bulgaria are of low ambition considering the need to increase efforts at the EU level to collectively reach the Union's 2030 energy efficient targets. <sup>[82]</sup>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	The Bulgarian draft NECP states that the transmission capacity shall be at least 10% of the installed generation starting from 2020 and at least 15% of the installed generation starting from 2030. <sup>[84]</sup> According to <sup>[82]</sup> Bulgaria has set an interconnectivity target of 22 % for 2030, the interconnectivity level in 2017 was 7 %, and the interconnectivity target for 2020 is 18 %.
<b>Energy security target 2030</b>	<p>The Bulgarian draft NECP identifies the efficient use of indigenous resources, increased interconnectivity and enhancing system flexibility as the cornerstones of energy security. The continuous use of coal reserves – that could provide feedstock for electricity generation for the next 60 years – and of nuclear energy are the main elements in this approach. <sup>[82]</sup></p> <p>The energy dependency of Bulgaria is much lower than the average for the EU Member States. With respect to diversification, national energy security objectives regarded in the Bulgarian draft NECP are: the diversification of energy sources by using indigenous resources (development of local natural gas extraction, utilisation of the potential of renewable energy sources as an indigenous resource that helps reduce import dependency); increasing the diversification of the sources of natural gas supply through interconnectors with neighbouring countries and supplies. <sup>[84]</sup></p>
<b>Trade deficit</b>	The Bulgaria energy dependence fell from 47,33% in 2005 to 39,5 in 2017. <sup>[22]</sup>
<b>Electricity generation capacities</b>	In 2018 46,4 % of total produced electricity in Bulgaria was delivered from conventional power plants mainly in coal power plants, 36,7 % produced from nuclear energy. The share of hydro power plants is about 11,2% and the rest is produced from wind and solar energy. <sup>[25]</sup>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	The wholesale electricity market is liberalized. Nord Pool is presented as NEMO (Nominated Electricity Market Operator)
<b>Retail electricity market</b>	Bulgarian electricity market is liberalized but still has regulated market for householder consumers. In December 2017 50% of the electricity is sold on the regulated market. <sup>[85]</sup>
<b>Intelligent metering systems</b>	The Energy and Water Regulatory Commission (KEVR) has powers to assess the cost-effectiveness of the implementation of intelligent metering systems proposed by the operators of the networks. Where cost-effective, the KEVR draws up schedules for the implementation of intelligent metering systems and guarantees the interoperability of the said systems. None data of the number of the smart meters installed is present in the draft NECP. <sup>[84]</sup>
<b>Tariffs</b>	Dynamic tariffs are not presented.
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	Single overarching strategy: National strategy for development of scientific research in the Republic of Bulgaria 2017-2030
<b>Innovation performance</b>	Bulgaria along with Romania are modest Innovators with performance below the EU average. <sup>[23]</sup>
<b>National target</b>	Bulgaria national R&D intensity target of 1,5% of GDP <sup>[25]</sup>

<b>Total R&amp;D expenditure</b>	In 2007, R&D intensity reached 0,43 % of GDP. <sup>[24]</sup> In 2017, R&D intensity reached 0,75 % of GDP. <sup>[24]</sup>
<b>Public R&amp;D expenditure</b>	The public funding level in 2017 reached 0,21 % of GDP. <sup>[81]</sup>
<b>Business expenditure in R&amp;D</b>	The level of business expenditure in R&D comprises 0.53 % of GDP and is among the lowest in the EU. <sup>[81]</sup>
<b>R&amp;D policy coordination</b>	The lack of an adequate funding portfolio in R&D remains a barrier for fostering public-private cooperation and internationalisation as well as reintegration of researchers and innovators.
<b>Funding from Horizon 2020</b>	According to the H2020 country profile of Bulgaria as of Sept. 2019, the net EU contribution (funding received by the project's participants after deduction of their linked third parties' funding) is only 0.25 % of the EU total. <sup>[28]</sup>
<b>Research infrastructures roadmap</b>	Roadmap published in 2010, updated in 2017 <sup>[30]</sup>

#### 4.3.5 Greece

Table 8: Progress towards the Energy Union objectives in Greece

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	The Greek 2050 Energy Roadmap <sup>[86]</sup>
<b>GHG target 2020</b>	Greenhouse gas (GHG) emissions target: 4% reduction by 2020 compared to 2005 (in non-ETS sectors) <sup>[87]</sup> Greece is expected to over-achieve its 2020 effort sharing decision greenhouse gas emissions target by a significant margin, with a reduction of 22% by 2020 relative to the 2005 level. <sup>[87]</sup>
<b>GHG target 2030</b>	Effort sharing regulation requires Greece to reduce its emissions by 16% by 2030 (relative to 2005 levels). They are projected to decrease by 25%, with existing measures and 29% with additional measures <sup>[87]</sup>
<b>1.2 Uptake of renewable energy resources (RES)</b>	
<b>RES 2020 target</b>	The renewable energy share in Greece was 15.2% in 2016. While being above the 2015/2016 indicative trajectory (11.9%), further efforts are necessary to reach the 2020 target (18%). <sup>[87]</sup> In 2017, the indicator constituted 16.3%. <sup>[15]</sup>
<b>RES 2030 target</b>	The Greek draft NECP sets out a contribution of at least 31 % (in gross final consumption of energy) for renewable energy share in 2030, which is in line with the result of the formula in Annex II of the Governance Regulation. <sup>[88]</sup>
<b>National support schemes</b>	From 2017, electricity from renewable sources in Greece are promoted through a feed-in premium granted by participation in "technology specific" tenders. In December 2016, a pilot tender for PV only took place. In 2018, two tenders for PV and wind energy took place. Apart from that, RES is eligible for a net metering scheme, mainly for PV and small wind power plants. In addition, a tax regulation mechanism and a subsidy scheme are available under the new Development Law. <sup>[89]</sup>

<b>Connection of RES to the grid</b>	The grid operator is obliged to connect renewable energy plants to the grid. Furthermore, the grid operator is obliged to purchase electricity from renewable sources. The connection contract, signed between the grid operator, the plant operator and Public Power Corporation (PPC), as the owner of the grid, must state that the grid operator is obliged to carry out the necessary grid development works. <sup>[89]</sup> In Greece, renewable energy sources in heating and cooling sector are supported by two tax relief mechanisms and subsidies. <sup>[89]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Greece according to Eurostat data in 2017 was 1.8%. <sup>[17]</sup> The respective 2020 target is 10%.
<b>Support of RES in transport</b>	Greece supports biofuels with a quota system, while there is also a tax regulation and a subsidy scheme available. <sup>[89]</sup>
<b>Charging points</b>	According to Eurostat data, there are 0.78 EV charging points per 100000 inhabitants in Greece in 2017 (EU rank 28 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	Share of newly registered plug-in electric vehicles (PEV) in the 2017 was 0.22% (EU rank 25 of 28). <sup>[20]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	The 2020 energy efficiency target of Greece is 24.7Mtoe expressed in primary energy consumption and 18.4Mtoe expressed in final energy consumption. <sup>[103]</sup> At 23.55Mtoe in 2016, Greece is on track to meet its primary energy consumption targets for 2020, but it should make more efforts to keep the primary energy consumption at this level or to minimise its increase when the GDP grows again during the next five-year period. <sup>[87]</sup>
<b>Energy savings</b>	In 2016, it had made only 12% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>
<b>2030 target</b>	In the draft NECP of Greece, the national contribution to the EU 2030 target for energy efficiency is set at a level of final energy consumption of 18.1Mtoe at most and translates to primary energy consumption of 24.7Mtoe at most in the same year. This contradicts the collective EU effort needed to achieve the EU 2030 target. However, it has to be taken into account that the trend in energy consumption over 2008-2016 was strongly affected by the severe economic recession faced by Greece, and it can be expected that future trends in consumption would have to reflect the economic recovery that is ongoing. <sup>[88]</sup>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	The interconnectivity level in 2017 was 9.3%, and Greece expects to reach the 10 % interconnectivity target for 2020. <sup>[88]</sup>
<b>Energy security target 2030</b>	As regards energy security, Greece targets the increased use of domestic sources, both renewable energy and fossil-fuels, and the reduction of import dependency, which is at very high levels. It has also set a target to connect 29 autonomous islands with the synchronised system of mainland Greece by 2030. <sup>[90]</sup>
<b>Trade deficit</b>	The Greece energy dependence raised from 68.2% in 2005 to 71.2% in 2017. <sup>[22]</sup>
<b>Electricity generation capacities</b>	In 2018 68.6% of total produced electricity in Greece was delivered from conventional power plants 31.4% produced from RES (11.4% - hydro, 12.4% - wind and 7,9% - solar). <sup>[25]</sup>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	Wholesale electricity market is fully liberalized. HEnEx (Hellenic Energy Exchange) has been designated by the Greek Regulatory Authority for Energy as the Nominated Electricity Market Operator (NEMO) and is operating the Greek day-ahead market, while working on the creation of an intraday electricity market and an energy derivatives market. <sup>[92]</sup>

	In the non-interconnected islands, autonomous power systems currently operate without any wholesale electricity market. <sup>[93]</sup>
<b>Retail electricity market</b>	The retail electricity market is also fully liberalized
<b>Intelligent metering systems</b>	By 2018 in Greece there are installed remote metering systems in the HV, MV and large LV customers, which consume almost half of the energy. The big challenge, however, is to replace all conventional meters across the country, with smart electronic meters. A first step was a pilot project for 200000 meters, which project by the date had not proceeded yet, due to legal disputes by the bidders. <sup>[91]</sup>  No date has been set for the large-scale deployment of smart meters, and current plans involve only pilot installations. <sup>[87]</sup>
<b>Tariffs</b>	Dynamic tariffs are not presented
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	Single overarching strategy: National Strategy for Research, Technological Development and Innovation (ESETAK) 2015-2021. Action plan to implement this strategy remains pending. <sup>[49]</sup>
<b>Innovation performance</b>	Greece is moderate innovator with performance below the EU average. <sup>[23]</sup>
<b>National target</b>	Greece national R&D intensity target of 1.21% of GDP
<b>Total R&amp;D expenditure</b>	In 2007, R&D intensity reached 0.58% of GDP. <sup>[24]</sup> In 2017, R&D intensity reached 1.13% of GDP. <sup>[24]</sup>
<b>Public R&amp;D expenditure</b>	The public funding level in 2017 reached 0.57% of GDP. <sup>[87]</sup>
<b>Business expenditure in R&amp;D</b>	The level of business expenditure in R&D comprises 0.55% of GDP and is among the lowest in the EU. <sup>[87]</sup>
<b>R&amp;D policy coordination</b>	The low level of public R&D intensity coupled with the absence of a performance-based funding system, has a further negative impact on already relatively low levels of scientific excellence. <sup>[87]</sup>
<b>Funding from Horizon 2020</b>	According to the H2020 country profile of Greece as of Sept. 2019, the net EU contribution (funding received by the project's participants after deduction of their linked third parties' funding) is 2.52 % of the EU total. <sup>[28]</sup>
<b>Research infrastructures roadmap</b>	Roadmap updated in 2014 <sup>[30]</sup>

#### 4.3.6 Romania

Table 9: Progress towards the Energy Union objectives in Romania

Category	Description
<b>1. Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	Romania's Energy Strategy 2019-2030 was developed with perspectives for 2050, and in March 2019, the Environmental Report and the Appropriate Assessment Study for this Strategy were published. <sup>[102]</sup>
<b>GHG target 2020</b>	National GHG emissions target: maximum increase of 19% [2R] in 2020 compared with 2005 (non-ETS) <sup>[94]</sup>  According to the latest national projections based on existing measures, non-ETS emissions will increase by 1.4% between 2005 and 2020. The target is consequently expected to be met with a margin of 17.6 percentage points. <sup>[94]</sup>
<b>GHG target 2030</b>	Effort sharing regulation requires Romania to reduce its emissions by 2% by 2030 (relative to 2005 levels).



	The 2030 target would be missed by a margin of 12.5% based on existing measures, as emissions are projected to increase above the base year in the long run. <sup>[94]</sup>
<b>1.2 Uptake of RES</b>	
<b>RES 2020 target</b>	Romania is on track and slightly above in attaining its renewable energy target (24%) for 2020. In light of the stable or slightly decreasing share, continued efforts are needed to install more capacity in a context of economic growth. <sup>[94]</sup>  In 2017, the indicator constituted 24.5%. <sup>[15]</sup>
<b>RES 2030 target</b>	The Romania's draft NECP sets a 27.9% renewable energy contribution in gross final consumption of energy for 2030, which is significantly below the renewable share of at least 34% in 2030 that results from the formula in Annex II of the Governance Regulation. <sup>[96]</sup>
<b>National support schemes</b>	In Romania, electricity from renewable sources has been organised according to a quota system. The quota support scheme has been available for new installations until 31 December 2016. Since 2017 there is no longer a comprehensive RES in electricity support scheme in place. The quota system is still valid for the installations commissioned before 2017 and will be in place until 2031. <sup>[97]</sup>  While the quota system is not available anymore for new installations, these can still obtain a subsidy through the National Rural Development Programme [5R] and financial scheme supported by the Ministry of Regional Development, Public Administration and European Funds, for energy production from less exploited energy sources (biomass, biogas and geothermal energy). Starting from 1 January 2019, the Administration of the Environmental Fund will finance small PV systems up to 90% of the total costs. <sup>[97]</sup>
<b>Connection of RES to the grid</b>	Grid operators are obliged to connect renewable energy plants to their grids without discriminating against certain plant operators. They are also obliged to transmit electricity from renewable sources as a priority. In general, the grid operators are obliged to develop their grids on the request of a plant operator, if the connection of a plant to the grid requires the grid to be developed. <sup>[97]</sup>  For RES heating and cooling Support is provided by subsidy programmes of the Romanian Environmental Fund, National Rural Development Programme and Ministry of Regional Development, Public Administration and European Funds. <sup>[97]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Romania according to Eurostat data in 2017 was 6.6%. <sup>[17]</sup> The respective 2020 target is 10%.
<b>Support of RES in transport</b>	In Romania, renewable energy sources in the transport sector are promoted by a quota system. Fuel retailers are obliged to ensure that biofuels make up a prescribed percentage of their annual sales. <sup>[97]</sup>
<b>Charging points</b>	According to Eurostat data, there are 4.41 EV charging points per 100000 inhabitants in Romania in 2017 (EU rank 26 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	Share of newly registered plug-in electric vehicles (PEV) in the 2017 was 0.36% (EU rank 21 of 28) <sup>[20]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	Romania's 2020 energy efficiency target is 43Mtoe expressed in primary energy consumption and 30.3Mtoe expressed in final energy consumption. <sup>[94]</sup>  Romania appears to be on track for reaching its 2020 target. However, both primary and final energy consumption increased in 2017, and therefore continued efforts are needed to limit energy consumption in a context of economic growth. <sup>[94]</sup>
<b>Energy savings</b>	In 2016, it had made only 24% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>

<b>2030 target</b>	The Romanian draft NECP includes a national energy efficiency contribution of 36.7Mtoe by 2030, expressed in primary energy consumption only, which corresponds to 27.5Mtoe of final energy consumption. The contributions of Romania reflect a very low ambition considering the need to increase efforts at EU level to collectively reach the Union's 2030 energy efficient targets. <sup>[96]</sup>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	The current interconnection capacity of Romania is 7%, and for year 2020 an increase is expected beyond 9%, thus facilitating the achievement of the 10% objective for year 2020. <sup>[101]</sup> The Romanian draft NECP does not provide numerical target for the 2030 national target and contribution. <sup>[96]</sup>
<b>Energy security target 2030</b>	In the Romanian draft NECP it is stated that most of the objectives for this dimension are of qualitative nature, therefore no numerical targets have been set. Among other objectives with regard to this dimension, Romania considers the electricity supply from internal sources as a primary objective for ensuring the national energy security. <sup>[101]</sup>
<b>Trade deficit</b>	The Romania energy dependence fall from 27.2% in 2005 to 23.1% in 2017. <sup>[22]</sup>
<b>Electricity generation capacities</b>	In 2018 38.5% of total produced electricity in Romania was delivered from conventional power plants mainly in coal power plants, 17.8% produced from nuclear energy. The share of hydro power plants is about 30.1% and the rest is produced from wind and solar energy. <sup>[25]</sup>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	Wholesale electricity market is fully liberalized. OPCOM is the Romanian Electricity and Gas Market Operator. OPCOM is also a Nominated Electricity Market Operator designated according to the Regulation (EU) 2015/1222 for performing the day-ahead and intraday markets coupling for Romania. <sup>[98]</sup> Romanian day-ahead market is functioning in coupling mode with day-ahead markets from Czech Republic, Slovakia and Hungary. <sup>[99]</sup>
<b>Retail electricity market</b>	Rumanian electricity market is fully liberalized. During 2017, 105 holders of licenses for electricity supply were active on this market. <sup>[100]</sup> In 2017, the supplier changeover rate for non-household consumers (according to the energy supplied) was 4.08%. For households, the supplier changeover per measure points was 0.84%, and the renegotiation rate for the same supplier was 1.31%. <sup>[100]</sup>
<b>Intelligent metering systems</b>	The Romanian draft NECP announces introducing smart metering "at the latest in 2028". <sup>[96]</sup> So far none other official information on the topic has been found.
<b>Tariffs</b>	Dynamic tariffs are not presented
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	Single overarching strategy: National Strategy for Research, Development and Innovation 2014-2020
<b>Innovation performance</b>	Romania is modest innovator with performance below the EU average. <sup>[23]</sup>
<b>National target</b>	The Romanian national 2020 R&D intensity target is 2% of GDP. <sup>[94]</sup>
<b>Total R&amp;D expenditure</b>	In 2007, R&D intensity reached 0,51% of GDP. <sup>[24]</sup> In 2017, R&D intensity reached 0,5 % of GDP. <sup>[24]</sup>
<b>Public R&amp;D expenditure</b>	The public funding level in 2017 reached 0,21 % of GDP. <sup>[94]</sup>
<b>Business expenditure in R&amp;D</b>	The level of business expenditure in R&D comprises 0.29 % of GDP and is among the lowest in the EU. <sup>[94]</sup>

<b>R&amp;D policy coordination</b>	The national objectives addressing the Research and Innovation pillar are outlined in the 2014-2020 National Strategy for Research, Development and Innovation. <sup>[101]</sup> In respect to the progress in achieving the national targets of Europe 2020 strategy, the objectives regarding investment in the field of research and development are at a distance from the assumed target. <sup>[102]</sup>
<b>Funding from Horizon 2020</b>	According to the H2020 country profile of Romania as of Sept. 2019, the net EU contribution (funding received by the project's participants after deduction of their linked third parties' funding) is only 0.45 % of the EU total. <sup>[28]</sup>
<b>Research infrastructures roadmap</b>	Roadmap published in 2008. Updated version under preparation. <sup>[30]</sup>

#### 4.3.7 Cyprus

Table 10: Progress towards the Energy Union objectives in Cyprus

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	Climate change mitigation is one of the main targets identified in the Cypriot strategy for sustainable development launched by MARDE (Ministry of Agriculture, Rural Development and Environment) in 2007. <sup>[104]</sup>  The priorities are: Development of New or Optimized Technologies for Renewable Energy Sources, Innovative Applications of Renewable Energy Sources, Exploitation of Hydrocarbons, Efficient Use-Energy Saving.
<b>GHG target 2020</b>	National greenhouse gas emissions target: 5% decrease in 2020 compared with 2005 (non-ETS). <sup>[105]</sup> GHG emissions in Cyprus continue to increase, and according to preliminary 2017 data and the latest national projections, Cyprus is expected to miss its target with a significant margin of around 12 percentage points. <sup>[105]</sup>
<b>GHG target 2030</b>	Cyprus' binding national target for GHG according to Effort sharing regulation is to limit GHG at least by 24% in relation to its greenhouse gas emissions in 2005 in non-ETS sectors, compared to 2005 levels. Cyprus is expected to fall short of its 2030 target. <sup>[105]</sup>  On the positive side, Cyprus has estimated that with additional measures, in areas, such as: (i) transport (e.g. promoting low-emission vehicles and reduction of vehicle use), (ii) waste management (e.g. promoting biogas and exploiting organic waste), (iii) buildings (e.g. replacing old systems and promoting co-generation) and (iv) industry by promoting energy efficiency can help reduce the gap to 17 percentage points and it is of crucial importance to ensure sufficient investments for these measures. <sup>[105]</sup>
<b>1.2 Uptake of RES</b>	
<b>RES 2020 target</b>	Target of share of renewables in gross final consumption of energy is 13% by 2020. <sup>[105]</sup> Cyprus renewable energy share increase from 9.3% in 2016 to around 9.9% in 2017; achieving the target for 2020 appears problematic. Considering Cyprus' high potential in this area the objective is still possible, but it would require a significant shift of the national energy policies. <sup>[105]</sup>
<b>RES 2030 target</b>	Based on a scenario with existing measures, Cyprus sets out a 19% share of energy from renewable sources in gross final consumption of energy in 2030. This level of ambition, which is not set out clearly as the proposed national contribution to the EU renewable energy target for 2030, is significantly below the share of 23% in 2030 which results from the formula contained in Annex II of the Governance Regulation. <sup>[106]</sup>



<b>National support schemes</b>	Cyprus promotes renewable electricity generation through a subsidy and a net metering scheme/ net billing scheme for PV and Biomass/biogas. There is a provision to asymmetric net billing in the future. <sup>[16]</sup>
	Conditional financing for challenged individuals to invest in RES self-consumption and Accelerated depreciation for energy saving investments or RES self-consumption in enterprises are also discussed. <sup>[107]</sup>
<b>Connection of RES to the grid</b>	In general, the entitlement of plant operators to grid connection and development is subject to the general legislation on energy. According to the general legislation, plant operators are contractually entitled to the connection of a renewable energy plant to the grid without any plant operator being discriminated against. Furthermore, they are entitled to the expansion of the grid, if such an expansion is necessary to connect a plant to the grid. Plant operators are also entitled to priority access and dispatch of electricity from renewable sources. <sup>[16]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Cyprus according to Eurostat data in 2017 was 2.6%. <sup>[17]</sup> The target according to the first Renewable Directive (RED I) <sup>[19]</sup> is 10%
<b>Support of RES in transport</b>	At the moment, there is no support scheme for RES-T in Cyprus. <sup>[16]</sup> Actions such as improvement of infrastructure for further encouragement of use of public transport, cycling and walking and financial incentives to encourage new vehicles with low or zero emissions and discourage the use of vehicles with high emissions, can reduce the emissions of one of the most important sectors in Cyprus. <sup>[107]</sup>
<b>Charging points</b>	According to Eurostat data, there are 4.21 EV charging points per 100000 inhabitants in Cyprus in 2017 (EU rank 27 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	Share of newly registered plug-in electric vehicles (PEV) in the 2017 was 0.78% (EU rank 12 of 28) <sup>[20]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	Cyprus' 2020 energy efficiency target is 2.2Mtoe expressed in primary energy consumption and 1.8Mtoe expressed in final energy consumption. <sup>[103]</sup> Primary energy consumption was reduced during the economic recession from 2.5Mtoe in 2012 to 2.2Mtoe in 2015, but in line with the sustained economic growth rose again to 2.5Mtoe in 2017. This poses a serious challenge in reaching the target without strong additional measures. <sup>[105]</sup>
<b>Energy savings</b>	In 2016, it had made only 6% of the total savings it had committed to achieve over the 2014 to 2020 period. Total cumulative savings required by 2020 target are 242ktoe. <sup>[21]</sup> The first estimation shows that the cumulative target of the period 2021-2030 will be between 235-238ktoe. Given that no official data are available at the moment for the national final energy consumption of the years 2017 and 2018, the national cumulative target of the period 2021-2030 will be recalculated in 2019 and will be included in the final national NECP of 2019. <sup>[21]</sup>
<b>2030 target</b>	The proposed contribution to the EU energy efficiency target would actually allow Cyprus to increase its primary and final energy consumption in 2030 by 3.1% and 18.8% compared to 2017 levels, respectively. This would go in the opposite direction of the collective EU effort on energy efficiency. <sup>[106]</sup>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	The planned EuroAsia interconnector would end Cyprus' energy isolation. When constructed, the EuroAsia interconnector will connect Cyprus with Israel, Crete and Attica. A feasibility study is currently under way. <sup>[105]</sup>

<b>Energy security target 2030</b>	Cyprus is a small isolated energy system, with high dependency on oil products for its energy needs. More than 90% of Cyprus energy inland consumption is from oil products and the rest is from renewables. The introduction of natural gas via LNG imports and the development of the necessary infrastructure by the end of 2020, will end the current energy isolation and diversify Cyprus' energy sources. <sup>[107]</sup>
<b>Trade deficit</b>	The Cypriot energy dependence fell from 100% in 2005 to 96% in 2017. <sup>[22]</sup>
<b>Electricity generation capacities</b>	In 2018 92% of total produced electricity in Cyprus was delivered from conventional power plants, 4% - from wind and 4% from PV. <sup>[25]</sup>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	Cyprus is not integrated and not interconnected with any neighbouring power systems. No wholesale market is currently operating in Cyprus;
<b>Retail electricity market</b>	The sole supplier the Electricity Authority of Cyprus is a State-owned enterprise that operates as a de facto monopoly. There are only few renewable generators, which signed power purchase agreements with the Electricity Authority of Cyprus for the whole production. Therefore, although the consumers are legally entitled to choose their supplier, in practice the lack of alternative suppliers means that they are unable to do so. Steps are being taken to open up the electricity market in Cyprus, but progress has been slow. <sup>[105]</sup>
<b>Intelligent metering systems</b>	Cyprus intends to install Advanced Metering Infrastructure (AMI) and Smart Meters to enable optimization and control of the distribution system, increase the penetration of distributed renewable sources, enable aggregation of RES, demand response and storage, increase direct final customer participation in all market stages (active customers). The AMI includes the roll-out of 400 000 smart meters. <sup>[107]</sup>
<b>Tariffs</b>	For domestic consumers the flat tariff is used that offers no incentives for DSM, efficiency and / or flexibilities to the grid. For PV owners the tariff is still flat but on the principles of Net Metering. For commercial and industrial consumers, the Net Billing tariff has been introduced with time of use cost elements that vary between seasons, working days and weekends / public holidays. <sup>[108]</sup>
<b>R&amp;D performance</b>	
<b>R&amp;I strategies</b>	In 2014 the National Council for Research, Technology Development and Innovation (RTDI) delivered a report proposing the reform of the RTDI system, including a new strategy for Research, Innovation and Entrepreneurship. The main findings and recommendations of the study have also been identified in the Smart Specialisation Strategy and its corresponding Action Plan 2015-2022. In 2015 the Research Promotion Foundation published a draft new RTDI programme that will implement the S3CY. The Action Plan for Growth of the Presidency's Unit for Administrative Reform supports the RTDI system, particularly in areas linked to entrepreneurship. <sup>[49]</sup>
<b>Innovation performance</b>	Cyprus is a moderate innovator. <sup>[23]</sup>
<b>National target</b>	The R&D intensity (64) in Cyprus stood at 0.56% of GDP in 2017, higher than its EU 2020 target (0.5%) — a target that was not deemed to be ambitious enough. <sup>[105]</sup>
<b>Total R&amp;D expenditure</b>	In 2007, R&D intensity reached 0.4% of GDP. <sup>[24]</sup> In 2017, R&D intensity reached 0.56% of GDP. <sup>[24]</sup>
<b>Public R&amp;D expenditure</b>	In 2017, public R&D expenditure was around 0.3% of the GDP, one of the lowest in the EU. <sup>[105]</sup>
<b>Business expenditure in R&amp;D</b>	The level of business expenditure in R&D comprises 37% of total expenditure and constituted 0.21% of GDP. <sup>[24]</sup>

<b>R&amp;D policy coordination</b>	Incentives have been put in place to improve knowledge transfer, Progress in implementing the smart specialisation strategy is key in diversifying the economy. In addition, a policy support facility measure to stimulate the utilisation of research laboratories of government-funded organisations by the business community is planned to start in 2019 <sup>[105]</sup>
<b>Funding from Horizon 2020</b>	With a population of 865 878 Cyprus is one of the least-populous member states of the European Union (0.2% of the total) but among the most successful Widening countries in Horizon 2020 <sup>[35]</sup> According to the H2020 country profile of Romania as of Sept. 2019, the net EU contribution (funding received by the project's participants after deduction of their linked third parties' funding) is 0.51% of the EU total. <sup>[28]</sup>
<b>Research infrastructures roadmap</b>	Roadmap under preparation <sup>[30]</sup>

#### 4.3.8 Malta

Table 11: Progress towards the Energy Union objectives in Malta

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	Malta lacks an integrated approach to climate policy with a cross-sectoral focus. <sup>[110]</sup> As its Low-Carbon Development Strategy has not been completed (to be finalised in the beginning of 2020), Malta does not yet have an action plan to reach its 2020 targets. <sup>[110]</sup> Malta's National Strategy for Sustainable Development was endorsed by Cabinet in December 2007. <sup>[109]</sup> The newly adopted National Agricultural Policy for the Maltese Islands 2018 – 2028 addresses the areas of sustainable agriculture products, circular economy, mitigation through adaptation and soil management, whereas there is no measure directly seeking greenhouse gas emission reductions. <sup>[110]</sup>
<b>GHG target 2020</b>	GHG emissions target: maximum 5% in 2020 compared to 2005 (non-ETS sector) <sup>[110]</sup> According to the latest national projections submitted to the Commission, the 2020 target under the Effort Sharing Decision is expected to be missed by a margin of 11 pps <sup>[110]</sup>
<b>GHG target 2030</b>	Maltas' binding national target for GHG according to Effort sharing regulation is to limit GHG at least by 19% in relation to its greenhouse gas emissions in 2005 in non-ETS sectors, compared to 2005 levels. <sup>[110]</sup> In 2030, this gap with the effort sharing target is expected to rise to 46 percentage points. <sup>[110]</sup>
<b>1.2 Uptake of RES</b>	
<b>RES 2020 target</b>	Target of share of renewables in gross final consumption of energy is 10% by 2020. <sup>[110]</sup> It only got 7.2% from these sources in 2017. <sup>[110]</sup> The share of renewables in Malta was 7.2 % in 2017. <sup>[110]</sup> In view of rising energy consumption and the steeper trajectory towards 2020, further investments in the renewable energy sector are required to meet the 2020 target. <sup>[110]</sup>

<b>RES 2030 target</b>	On renewable energy, the draft NECP does not include a formal proposal for a contribution to the 2030 EU target, but it explores two different scenarios. The ambition of both scenarios (10.6% and 13.3%) is significantly below the share of 21% that results from the formula in Annex II of the Governance Regulation. <sup>[113]</sup>
<b>National support schemes</b>	Electricity generated by PV installations in Malta is originally supported through a feed-in tariff. In addition, installations with a capacity exceeding 1,000kWp are promoted through tenders. <sup>[16]</sup>
<b>Connection of RES to the grid</b>	Plant operators are contractually entitled against the grid operator, Enemalta plc, to the conclusion of a connection agreement. Plant operators are entitled to connection to the grid after they have obtained a licence from the Regulator for Energy & Water Services (REWS) (Art. 4 SL 545.13) <sup>[16]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Malta according to Eurostat data in 2017 was 6.9%. <sup>[17]</sup> The target according to the first Renewable Directive (RED I) <sup>[19]</sup> is 10 %.
<b>Support of RES in transport</b>	Support for renewable energy sources (RES) used in the transport sector is provided through a substitution obligation on importers and wholesalers of fossil fuels. <sup>[16]</sup>
<b>Charging points</b>	According to Eurostat data, there are 21.07 EV charging points per 100000 inhabitants in Malta in 2017 (EU rank 18 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	Share of newly registered plug-in electric vehicles (PEV) in the 2017 was 0.41% (EU rank 18 of 28) <sup>[20]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	The 2020 indicative energy efficiency target (absolute level of energy consumption in 2020) is <sup>[110]</sup> : <ul style="list-style-type: none"> <li>- 0.823Mtoe expressed in primary energy consumption, and</li> <li>- 0.623Mtoe expressed in final energy consumption</li> </ul> Original target of energy efficiency for 2020 expressed in final energy is 0.5 Mtoe. <sup>[103]</sup> Final energy consumption slightly increased since 2016 (Malta's National Energy Efficiency Action Plan, 2017), putting the energy efficiency targets at risk <sup>[110]</sup>
<b>Energy savings</b>	In 2016, it had made 24% of the total savings it had committed to achieve over the 2014 to 2020 period. Total cumulative savings required by 2020 target are 67ktoe. <sup>[21]</sup>
<b>2030 target</b>	The proposed contributions in energy efficiency for 2030 mean that primary energy consumption is projected to increase by 40.5% and final energy consumption by 37.7% compared to 2017. These contributions would be of very low ambition compared to what is expected at the EU level to collectively reach the Union's 2030 energy efficient targets. <sup>[113]</sup>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	The new interconnector between the electricity grid of Malta and Italy represents major improvement, increasing Malta's electricity interconnection level from 0% to over 24%. <sup>[110]</sup> The electricity networks in Malta and Sicily (Italy) are linked by a 200MW HVAC interconnector, connecting Malta to the European electricity grid, which came into full operation in 2015. Electricity imported over the interconnector is projected to meet between 24-35% of Malta's electricity demand during the period 2021-2030. <sup>[111]</sup>
<b>Energy security target 2030</b>	As indicated in the section above, Malta's electricity interconnection level is well above the 15% EU interconnection target for 2030 required by the Governance regulation. Currently, there are no plans for a second interconnector. <sup>[111]</sup>

<b>Trade deficit</b>	The high dependency on oil and petroleum products decreased from 79% in 2016 to 56% in 2017, whereby the share of natural gas now amounts to 30% of the energy mix. The share of renewable energy is also increasing on an annual basis. The share of electricity imported over the interconnector in the energy mix in 2017 was 9%. In 2017, net import dependency in Malta reached 95.8%. <sup>[111]</sup>
<b>Electricity generation capacities</b>	In 2018, 91 % of total produced electricity in Malta was delivered from conventional power plants and 9% from geothermal and others. <sup>[25]</sup>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	Due to its size and insularity, Malta has no wholesale and retail markets for electricity and gas. The state-owned energy company Enemalta remains the only enterprise with a licence to supply electricity to final customers, and therefore it is not possible to implement customer switching. <sup>[110]</sup>
<b>Retail electricity market</b>	
<b>Intelligent metering systems</b>	In line with its programme to ensure an efficient distribution system, Enemalta (the leading energy services provider in the Maltese Islands) has equipped 99% of its consumers with smart meters. <sup>[111]</sup>
<b>Tariffs</b>	Malta has adopted a tariff system that favours the prudent use of energy. <sup>[111]</sup>
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I strategies</b>	Single overarching strategy: Multi-annual National R&I Strategy 2020 (2014) <sup>[49]</sup>
<b>Innovation performance</b>	Malta is a moderate innovator. <sup>[23]</sup>
<b>National target</b>	R&D intensity remained flat in recent years (0.55% of GDP in 2017 against 2.07% for the EU) and the country is likely to miss its target of 2% R&D intensity by 2020. <sup>[110]</sup>
<b>Total R&amp;D expenditure</b>	In 2007, R&D intensity reached 0.55% of GDP. <sup>[24]</sup>
	In 2017, R&D intensity stood at 0.55 % of GDP. <sup>[24]</sup>
<b>Public R&amp;D expenditure</b>	In 2017, Malta's public investment in R&D was 38% of total investment and constituted 0.21% of GDP. <sup>[110]</sup>  The recent slight increase in public R&D intensity is partly explained by the significant inflow of structural funds. The low level of public R&D investment in the public science base limits the full usage of the country's scientific and technological potential <sup>[110]</sup>
<b>Business expenditure in R&amp;D</b>	Business enterprise R&D expenditure intensity has declined since 2012 (0.34% of GDP in 2017 against 1.36% for the EU). <sup>[110]</sup>
<b>R&amp;D policy coordination</b>	The Research and Innovation Strategy 2014-2020 has little visibility and its implementation is scattered between various governmental bodies with limited coordination. <sup>[110]</sup>
<b>Funding from Horizon 2020</b>	Malta gets a significant part of their national R&D expenditure from the Horizon 2020 funding i.e. 10% <sup>[35]</sup>
<b>Research infrastructures roadmap</b>	No roadmap available <sup>[30]</sup>



### 4.3.9 Italy

Table 12: Progress towards the Energy Union objectives in Italy

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	The National Energy Strategy (SEN) <sup>[118]</sup> <sup>[119]</sup> published by Ministry of economic development defines the national energy targets to drive the energy transition. The SEN is closely coordinated with the European Strategic Energy Technology Plan (SET Plan) and is complemented by the Integrated National Energy and Climate Plan <sup>[114]</sup> . The plan sets the energy scenario towards 2030, fostering a wide-ranging transformation in which the combination of decarbonisation, circular economy, efficiency and rational and fair use of natural resources represent objectives and instruments for the future of the economy.
<b>GHG target 2020</b>	National greenhouse gas (GHG) emissions target: -13 % in 2020 compared with 2005 (non-ETS) According to the projections submitted in 2017, Italy is on track to meet its 2020 GHG emission target, with a 8 percentage points margin (i.e. a reduction of 21%). In 2017, according to preliminary data, emissions were reduced by 20 % from 2005. <sup>[114]</sup>
<b>GHG target 2030</b>	The GHG emission target under the Effort Sharing Regulation for sectors non-ETS sectors for 2030 is -33 % compared to 2005. <sup>[115]</sup> Based on the information provided, the planned policies and measures would be sufficient for Italy to meet this target, with a particularly important contribution coming from the transport and building sectors. <sup>[117]</sup>
<b>1.2 Uptake of RES</b>	
<b>RES 2020 target</b>	RES target for 2010 in gross final consumption 17% with a renewable energy share of 18.3% in 2017, Italy is well above the trajectory to reach its 2020 renewable energy target. <sup>[115]</sup>
<b>RES 2030 target</b>	The proposed contribution expressed as 30% share of energy from renewable sources in gross final consumption of energy in 2030, is slightly above the share that results from the formula in Annex II of the Governance Regulation. <sup>[117]</sup>
<b>National support schemes</b>	In Italy, support schemes for RES in electricity are managed by Manager of Electricity Services (GSE). Electricity generated from renewable energy sources is promoted through VAT- and real estate tax deductions. The electricity from renewable energy sources fed into the grid can be sold on the free market or to the GSE on a guaranteed minimum price ("ritiro dedicato"). Alternatively, renewable energy producers can opt for net-metering ("scambio sul posto") which provides economical compensation to PV-producers for the electricity fed into the grid. In March 2018 the Ministry for Economic Development approved a draft of the Renewable Energy Ministerial Decree ("Decreto FER 2018-2020") governing support schemes for renewable energies. However, the draft is still subject to amendments and is therefore not included in here. <sup>[16]</sup>
<b>Connection of RES to the grid</b>	Grid operators are obliged to give priority access to renewable energy plants. They are also obliged to give priority dispatch to electricity from renewable sources. Plant operators can request the grid operator to expand the grid if the connection of a plant requires this expansion. <sup>[16]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Italy according to Eurostat data in 2017 was 6.5 %. <sup>[17]</sup> The target according to the first Renewable Directive (RED I) <sup>[19]</sup> is 10 %.
<b>Support of RES in transport</b>	A quota system for biofuels is currently in place in Italy. Its compliance is controlled through a biofuel certificates system. Advanced biofuels receive special incentivisation. <sup>[16]</sup>

<b>Charging points</b>	According to Eurostat data, there are 9,4 EV charging points per 100000 inhabitants in Italy in 2017 (EU rank 22 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	The share of newly registered plug-in electric vehicles (including Battery Electric Vehicles) and Plug-in hybrid electric vehicles) in the 2017 was 0.25% <sup>[20]</sup>  Italy is also setting a target of 6 million electric cars by 2030. <sup>[117]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	Italy's 2020 energy efficiency target is 158Mtoe expressed in primary energy consumption (124Mtoe expressed in final energy consumption) <sup>[114]</sup> The target was set at a level that would allow energy consumption to grow in the coming years. After the growth of both primary and final energy consumption in the period 2013-2014, energy consumption in the country decreased between 2015 and 2016. However primary energy consumption registered again a small increase, moving from 148.0 Mtoe in 2016 to 148,94 Mtoe in 2017. Final energy consumption decreased slightly from 115.9 Mtoe in 2016 to 115.2 Mtoe in 2017. In light of the possible economic recovery in Italy and of the recent upward trend in primary energy consumption, further efforts are however needed both to remain within the levels set for the 2020 energy efficiency target and in view of the new 2030 objectives. <sup>[114]</sup>
<b>Energy savings</b>	In the period 2014-2016, it had made 18% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>
<b>2030 target</b>	Italy intends to pursue an indicative reduction target for 2030 of 43% for primary energy consumption and of 39.7% for final energy consumption. With respect to the reference PRIMES (Price-Induced Market Equilibrium System) 2007 scenario. With regard to the absolute level of energy consumption for 2030, Italy is pursuing a target of 132.0Mtoe of primary energy and 103.8Mtoe of final energy. <sup>[115]</sup> The proposed contribution towards the 2030 collective EU energy efficiency target, appears to be of sufficient ambition. The planned policies rely on instruments already partly existing, which have the potential to be stepped up and completed. <sup>[117]</sup>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	Interconnection capacity is currently primarily located at the country's northern border (4 lines with France, 12 with Switzerland, 2 with Austria, 2 with Slovenia). In total, there are 7 circuits at 380kV, 9 circuits at 220 kV and 3 circuits at 150/132kV on the northern border. There is also a direct current connection with Greece and one that connects Sardinia and the peninsula with Corsica. Sardinia is also connected to Corsica by an alternating current cable. A 220kV double circuit cable connects Sicily with Malta. <sup>[114]</sup>
<b>Energy security target 2030</b>	In terms of security of supply, the aim is, on the one hand, to become less dependent on imports by increasing renewable sources and energy efficiency and, on the other hand, to diversify sources of supply (for example through the use of natural gas, including LNG, with infrastructure consistent with the scenario of full decarbonisation by 2050). <sup>[115]</sup>
<b>Trade deficit</b>	The Italy energy dependence constituted 83,3% in 2005 and 76,9% in 2017. <sup>[22]</sup>
<b>Electricity generation capacities</b>	In 2018 66% of total produced electricity in Italy was delivered from conventional thermal power plants, 17.6% from hydro, 8.2% from solar, 6.2% from wind and 2% from geothermal and other sources. <sup>[25]</sup>
<b>4 Integrated electricity market</b>	

<b>Wholesale electricity market</b>	GME (Italian Energy Markets Operator) operates power, gas and environmental markets. On the power market platform managed by GME (also known as Italian Power Exchange, IPEX), producers and purchasers sell and buy wholesale electricity. With reference to power, GME operates a forward physical market (MTE), a market for the trading of daily products (MPEG) with continuous trading mode, a day ahead auction market (MGP), an intraday auction market (MI) based on 5 sessions. It also operates on behalf of the Italian TSO Terna a platform for ancillary services. <sup>[120]</sup> In February 2015 Multi-Regional Coupling (MRC) was started on the North Italian border with France, Austria and Slovenia. <sup>[121]</sup>
<b>Domestic electricity market</b>	The 2017 national strategy – currently under revision – proposes to narrow the price gap between Italy and European peers through, among other measures, the full liberalisation of final markets and the progressive reduction of system charges. <sup>[114]</sup>
<b>Intelligent metering systems</b>	The smart metering system is in place. The authority established the functional requirements for low-voltage smart meters and performance requirements for associated second-generation smart electricity metering systems ('2G meters'). <sup>[115]</sup>
<b>Tariffs</b>	The phasing out of the regulated tariffs in the energy sector has been postponed from 2019 to mid-2020. <sup>[114]</sup>
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	Single overarching strategy: National Research Programme 2014-2020 (approved in 2016). <sup>[49]</sup>
<b>Innovation performance</b>	Italy is a moderate innovator. <sup>[23]</sup>
<b>National target</b>	R&D target: 1,53% of GDP <sup>[114]</sup> Italy is not on track to meet its EU2020 target, as, R&D intensity would need to grow at more than double the growth rate of the current trend. In 2017, R&D intensity in Italy was 1.35% of GDP <sup>[114]</sup>
<b>Total R&amp;D expenditure</b>	In 2007, R&D intensity in Italy was 1.13% of GDP <sup>[114]</sup> In 2017, R&D intensity in Italy was 1.35% of GDP <sup>[114]</sup>
<b>Public R&amp;D expenditure</b>	37 % of the total are public investment (0.50% of GDP) <sup>[114]</sup>
<b>Business expenditure in R&amp;D</b>	61% of the total are private investment (0.83% of GDP) <sup>[114]</sup>
<b>R&amp;D policy coordination</b>	The public R&D is coordinated by the ministry of economic development (MiSe) together with the ministry of education, universities and research (MIUR) Public schemes supporting innovative investment remain temporary and still lack an in-depth assessment of their efficiency. R&D tax incentives generally have a positive but modest effect on investment in intangibles <sup>[114]</sup> The divergence in investment between the North and the South is particularly marked for intangibles and innovation. <sup>[114]</sup>
<b>Funding from Horizon 2020</b>	9.07% of the overall Horizon funding <sup>[28]</sup>
<b>Research infrastructures roadmap</b>	Roadmap published in 2007 <sup>[30]</sup>



#### 4.3.10 Croatia

Table 13: Progress towards the Energy Union objectives in Croatia

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	Energy strategy of Croatia was adopted in 2009. <sup>[126]</sup> In May 2019, the Croatian Government proposed a new national Energy Strategy to run until 2030, including an overview to run to 2050. The proposal is currently under public review. <sup>[127]</sup>
<b>GHG target 2020</b>	Greenhouse gas emissions, national target: maximum 11% increase between 2005 and 2020 (non-ETS) <sup>[122]</sup> Total GHG emissions in Croatia were reduced by 23.3% from 1990 to 2017. Based on the latest national projections submitted to the Commission, and taking into account existing measures, Croatia is expected to meet its GHG emission target by a wide margin (-12.5 % between 2005 and 2020). <sup>[122]</sup>
<b>GHG target 2030</b>	According to Effort sharing regulation 2030 target which requires Croatia to reduce its emissions by 7 % by 2030 (relative to 2005 levels). <sup>[122]</sup> According to the draft NECP, Croatia projects to overachieve this target with a continuation of current policies. <sup>[123]</sup>
<b>1.2 Uptake of RES</b>	
<b>RES 2020 target</b>	With a renewable energy share of 28.3 % in 2016, Croatia is well above its target for 2020 20%. <sup>[123]</sup>
<b>RES 2030 target</b>	The national contribution for renewable energy proposed in the draft plan is set at an ambitious share of 36.4% of energy from renewable sources in gross final consumption of energy in 2030. This level of ambition is above the share of 32% in 2030 that results from the formula in Annex II of the Governance Regulation. <sup>[123]</sup>
<b>National support schemes</b>	In Croatia, electricity from renewable sources is promoted through a premium tariff and a guaranteed feed-in tariff (for installations of less than 500 kW) allocated through tenders. So far, no tenders have been organised. <sup>[16]</sup>
<b>Connection of RES to the grid</b>	The access of electricity from RES to the grid is regulated by the general legislation on energy and RES installations are given priority. Electricity from RES is subject to special provisions only in case of wind power plants. <sup>[16]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Croatia according to Eurostat data in 2017 was 1.2 %. <sup>[17]</sup> The target according to the first Renewable Directive (RED I) <sup>[19]</sup> is 10 %.
<b>Support of RES in transport</b>	In Croatia, the main promotion scheme in the field of RES in transport is a biofuel quota obligation. Additionally, the state provides a tax regulation mechanism to encourage the usage of biofuels. <sup>[16]</sup>
<b>Charging points</b>	According to Eurostat data, there are 54.25 EV charging points per 100000 inhabitants in Croatia in 2017 (EU rank 13 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	The share of newly registered plug-in electric vehicles (including Battery Electric Vehicles) and Plug-in hybrid electric vehicles) in the 2017 was 0.05% (rank 28 of 28) <sup>[20]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	Energy efficiency, 2020 energy consumption targets: 11.2 Mtoe (primary energy consumption); 7 Mtoe (final energy consumption). <sup>[122]</sup> Croatia's primary and final energy consumption remains below the country's 2020 energy efficiency targets: 8.07 Mtoe (primary energy consumption, 2016) and 6.64 Mtoe (final energy consumption, 2016) <sup>[122]</sup> Increasing energy efficiency is crucial to reduce energy intensity. Croatia uses a third less energy per capita than the EU average, but its energy intensity (energy use as a share of GDP) is 61 % higher. <sup>[122]</sup>

<b>Energy savings</b>	In the period 2014-2016, it had made only 5% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>
<b>2030 target</b>	The energy efficiency contribution in the draft NECP is given in both primary energy consumption and in final energy consumption. The level of ambition seems low considering the efforts needed to achieve the EU level 2030 target of 32.5%. <sup>[123]</sup>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	The interconnection level of Croatia exceeds the 15% EU level aimed for 2030 and further interconnectors with neighbouring states are considered as part of Croatia's role as an important link between electricity systems of Central and South East Europe in the development of the internal energy market. <sup>[123]</sup>
<b>Energy security target 2030</b>	The Projects of Common Interest currently being developed, in particular the Krk LNG terminal and the SINCRO large-scale smart grid project, are essential to Croatia's security of supply of electricity and gas. <sup>[122]</sup>
<b>Trade deficit</b>	The Croatia energy dependence constituted 52.6% in 2005 and 53% in 2017. <sup>[22]</sup>
<b>Electricity generation capacities</b>	In 2018 57.9 % of total produced electricity in Croatia was delivered hydropower plants, 31.3% from conventional thermal power plants and 0.5% from solar power plant. <sup>[25]</sup>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	In June 2018 CROPEX (Croatian Power Exchange) and Croatian transmission system operator (HOPS) together with Slovenian power exchange and transmission system operator achieved the EU MRC (Multi-Regional Coupling) day ahead market coupling project on the Croatian-Slovenian border. <sup>[124]</sup>
<b>Retail electricity market</b>	Starting from 2016, energy price regulation for households for electricity has been phased out. <sup>[122]</sup>
<b>Intelligent metering systems</b>	Hungary has not yet decided to go for a full roll-out of smart metering. However, Croatia has already invested €3 million since 2013 in the introduction of smart meters. <sup>[125]</sup>
<b>Tariffs</b>	The analysis of the potential to provide ancillary services and flexibility services by consumption response of network users will be conducted. The method of providing services from final customers will be defined and the regulatory framework will be appropriately modified, primarily through the introduction of an aggregator as a market participant. <sup>[123]</sup>
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	Several national strategies shape the development of the national innovation system. The Strategy for Education, Science and Technology <sup>6</sup> (SECT) sits at the centre of this heterogeneous policy framework. Additional references include the Strategy for fostering innovation 2014-2020 and the Industrial Strategy (2014). <sup>[49]</sup>
<b>Innovation performance</b>	Croatia is a moderate innovator. <sup>[23]</sup>
<b>National target</b>	With 0.86% of GDP (2017) Croatia is not on track to meet the target of 1.4%. <sup>[122]</sup>
<b>Total R&amp;D expenditure</b>	In 2007, R&D intensity reached 0.79 % of GDP. <sup>[24]</sup> In 2017, R&D intensity in Croatia was 0.86% of GDP. <sup>[122]</sup>
<b>Public R&amp;D expenditure</b>	The public funding level in 2017 reached 0.43 % of GDP. <sup>[122]</sup>
<b>Business expenditure in R&amp;D</b>	The business expenditure in R&D in 2017 reached 0.43 % of GDP. <sup>[122]</sup>

<b>R&amp;D policy coordination</b>	Lack coordination and effective management in research and innovation policies leads to poor targeting and inadequate prioritisation of support instruments. In addition, some of the undertaken reforms of public research institutes and universities remain unfinished. <sup>[122]</sup> Measures to reduce fragmentation and improve the efficiency of research and innovation policies are lagging (RIS3). <sup>[122]</sup>
<b>Funding from Horizon 2020</b>	0.19% of the overall Horizon funding <sup>[35]</sup>
<b>Research infrastructures roadmap</b>	National roadmap with identified ESPRI projects was published in 2014 <sup>[30]</sup>

#### 4.3.11 Hungary

Table 14: Progress towards the Energy Union objectives in Hungary

Category	Description
<b>1. Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	Hungarian "National Energy strategy" was developed by the Ministry of National Development in 2012. <sup>[133]</sup> National Climate Change Strategy was adopted by the Government of Hungary in May 2017 and was adopted by the parliament in October 2018. <sup>[134]</sup>
<b>GHG target 2020</b>	National greenhouse gas (GHG) emissions target: maximum 10% increase in 2020 compared with 2005 (non-ETS) <sup>[128]</sup> By 2017, emissions fell by 9 % compared with 2005. According to the latest projection, the 2020 target is expected to be met by a wide margin. <sup>[128]</sup>
<b>GHG target 2030</b>	The GHG emission target under the Effort Sharing Regulation for sectors non-ETS sectors for 2030 is 7% decrease compared to 2005. <sup>[129]</sup> Hungary also has a national economy-wide target of 40% decrease GHG emissions by 2030 compared to 1990 (excluding LULUCF), and a long-term objective to reduce greenhouse gas emissions by 52 to 85 % by 2050 compared to 1990. <sup>[130]</sup> The projected gap with existing measures to the national greenhouse gas target in 2030 is quantified at 8.2 Mt CO <sub>2</sub> eq, while the corresponding gap to the 2030 target set in Effort Sharing Regulation can be estimated at around 5 % points or around 3 Mt CO <sub>2</sub> eq (excluding LULUCF). The planned policies and measures are sufficient to close the gap between a scenario with existing policies and the ESR target in 2030. <sup>[130]</sup>
<b>1.2 Uptake of RES</b>	
<b>RES 2020 target</b>	2020 renewable energy target: 13% <sup>[128]</sup> Although in 2017 the preliminary renewable share (13.3%) was higher than the 2020 target, it decreased from the last year (14.3%), owing to lower share of renewables in heating and cooling, and transport. <sup>[128]</sup>
<b>RES 2030 target</b>	Hungary set the target of reaching a 20% share of renewable energy sources within primary energy consumption by 2030. <sup>[129]</sup>
<b>National support schemes</b>	In Hungary, electricity from renewable energy sources is supported by a feed-in-tariff (FiT) for installations with an installed capacity of 50 kW-500 kW. For installations with a capacity of 0.5-1 MW, the market ('green') premium applies. House-hold-sized power plants up to 50 kW can benefit from net metering. <sup>[16]</sup>

<b>Connection of RES to the grid</b>	Renewable energy plants shall be given priority grid connection and grid access. The costs to connect renewable energy plants to the grid and the grid's expansion are borne either by the plant operator or by the grid operator, depending on certain criteria. <sup>[16]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector in Croatia according to Eurostat data in 2017 was 6.8%. <sup>[17]</sup> The target according to the first Renewable Directive (RED I) <sup>[19]</sup> is 10%.
<b>Support of RES in transport</b>	In Hungary, the main support scheme for the promotion of renewable energy sources in the transport sector is a quota system. This support scheme obliges fuel retailers to ensure that biofuels and hydrogen make up a certain percentage of their yearly sales. <sup>[16]</sup>
<b>Charging points</b>	According to Eurostat data, there are 15.12 EV charging points per 100000 inhabitants in Croatia in 2017 (EU rank 13 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	The share of newly registered plug-in electric vehicles (including Battery Electric Vehicles) and Plug-in hybrid electric vehicles) in the 2017 was 0.98% (rank 11 of 28). <sup>[20]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	Hungary's 2020 energy efficiency target is 24.1Mtoe expressed in primary energy consumption (14.4 million tons of oil equivalent expressed in final energy consumption) <sup>[128]</sup> Both primary and final energy consumption rose amid strong economic growth for the third consecutive year in 2017, respectively reaching 24.5 and 18.5 million tons of oil equivalent. These values are above the respective 2020 targets, implying that more efforts need to be done in the remaining three years. Final energy consumption target will be difficult to meet without additional measures. <sup>[128]</sup> Energy efficiency in the residential sector remains weak. Hungary is at risk of failing to reach its 2020 energy saving target, largely because household energy consumption per capita remains 12% higher than the EU average even though income levels are considerably lower. <sup>[128]</sup>
<b>Energy savings</b>	In the period 2014-2016, it had made 17% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>
<b>2030 target</b>	The Hungarian energy efficiency contribution for 2030 is set in a similar way as the 2020 target, and would represent a 8-10 % reduction compared to the projections of the baseline scenario for 2030. Based on the additional information provided, this translates into 27Mtoe of primary and 18.8Mtoe of final energy consumption in 2030. These contributions are of very low ambition compared to what is expected at the EU level to collectively reach the Union's 2030 energy efficiency targets. <sup>[130]</sup>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	Hungary is already significantly exceeding the 15% EU target relating to the interconnection of electricity systems; the share of cross-border capacities, nominal installed power plant capacities exceeds 47%. It follows that the Government of Hungary does not consider it necessary to define a new quantified target. The increase of cross-border capacities, however, is justified, as an interconnected energy network operated with neighbouring countries improves the national security of supply. <sup>[129]</sup>
<b>Energy security target 2030</b>	Hungary is a net importer of fossil fuels and electricity. Energy security objectives for electricity in the NECP are framed around the role of national assets (nuclear, renewable energy) and market integration. For gas, diversification of sources and import routes is a key element. <sup>[135]</sup> Hungary country plans to further develop nuclear capacities by building two new units of 1 200MW each by 2030. <sup>[130]</sup>
<b>Trade deficit</b>	The Hungary energy dependence constituted 62.2% in 2005 and 62.6% in 2017. <sup>[22]</sup>

<b>Electricity generation capacities</b>	In 2018 45.3% of total produced electricity in Hungary was delivered from conventional thermal power plants, 49,9% from nuclear and remaining 4,8% from renewables. <sup>[25]</sup>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	HUPX (Hungarian Power Exchange) day-ahead power market was launched in July 2010 as part of the liberalisation of the Hungarian energy sector. Currently, 61 companies from 19 countries trust HUPX to define a transparent and reliable power price, which is used as a benchmark for the whole region and the Balkan. <sup>[131]</sup>
<b>Retail electricity market</b>	Retail energy price regulation discourages investment in the sector. Retail electricity and gas prices in the household sector are low in EU comparison. <sup>[128]</sup>
<b>Intelligent metering systems</b>	Hungary has not yet made a definitive decision on whether to roll out of smart meters. <sup>[132]</sup>
<b>Tariffs</b>	Hungary is defining the regulatory framework for encouraging demand response in the new National Energy Strategy <sup>[129]</sup>
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	National Research and Development and Innovation Strategy (2013-2020). In order to enhance R&D&I performance, the National Smart Specialisation Strategy (S3) and the Research Infrastructures Hungary were adopted. There is also the Széll Kálmán Plan 2.0 of 2012, which defines the mid-term and long-term aims of the government and is aligned to the EU-2020 documents. <sup>[49]</sup>
<b>Innovation performance</b>	Hungary is a moderate innovator. <sup>[23]</sup>
<b>National target</b>	R&D target: 1.8% of GDP <sup>[128]</sup> Expenditure on R&D increased by 0.15 percentage points to 1.35 % of GDP in 2017. Hungary needs to make further, significant efforts to meet the national target. <sup>[128]</sup>
<b>Total R&amp;D expenditure</b>	In 2007, R&D intensity in Hungary was 0.96 % of GDP <sup>[24]</sup> In 2017, R&D intensity in Hungary was 1.35 % of GDP <sup>[128]</sup>
<b>Public R&amp;D expenditure</b>	26% of the total are public investment (0.35 % of GDP) <sup>[128]</sup>
<b>Business expenditure in R&amp;D</b>	73% of the total are private investment (0.99 % of GDP) <sup>[128]</sup>
<b>R&amp;D policy coordination</b>	The smart specialisation strategy would benefit from being updated, reinforced and more focused. <sup>[128]</sup> Recent policy measures create uncertainty in academic and research fora. <sup>[128]</sup> Science business cooperation remains below the EU average due to the traditional divide between research, education and innovation entities in Hungary. <sup>[128]</sup> In 2017, eight university-business cooperation centres were set up with EU cofinancing to foster collaboration. The centres should develop sustainable institutional operations and to run innovation projects. <sup>[128]</sup>
<b>Funding from Horizon 2020</b>	0.64% of the overall Horizon funding <sup>[35]</sup>
<b>Research infrastructures roadmap</b>	Roadmap published in 2018 <sup>[30]</sup>



#### 4.3.12 Poland

Table 15: Progress towards the Energy Union objectives in Poland

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	<p>The last adopted in 2009 energy strategy is the Poland Energy Strategy 2030, at the moment the work is going on the long-term strategy "Energy Policy of Poland until 2040".<sup>[136]</sup></p> <p>The Ministry of Energy submitted for public consultation a draft version of „Energy Policy of Poland until 2040”. The deadline for submitting opinions was January 2019.<sup>[137]</sup></p>
<b>GHG target 2020</b>	<p>National greenhouse gas (GHG) emission target: maximum 14% in 2020 compared to 2005 (non-ETS sectors).</p> <p>According to the latest national projections, Poland is expected to achieve its 2020 emission target for sectors outside the EU Emissions Trading Scheme.<sup>[138]</sup></p>
<b>GHG target 2030</b>	<p>The 2030 target (a reduction of emissions by 7% compared to 2005) could be missed by a wide margin if no additional measures are taken.<sup>[138]</sup></p>
<b>1.2 Uptake of renewable energy resources (RES)</b>	
<b>RES 2020 target</b>	<p>Poland faces a risk of missing its 2020 target of 15% of energy from renewables.<sup>[138]</sup></p> <p>In 2017, the share of renewables in gross final energy consumption declined to 10.9%. Investment in new renewable energy capacity has slowed down, presenting a challenge for achieving the 2020 renewables target 15%.<sup>[138]</sup></p>
<b>RES 2030 target</b>	<p>The draft Polish Energy Policy strategy foresees a large role for fossil fuels at least until 2040. Coal is to remain the main fuel until 2030 and its role is to decline fast thereafter. The construction of a first nuclear power plant (1-1.5GW) is planned by 2033 and its extension until 2043. Onshore wind generation is to decline, despite its effectiveness recently confirmed in November 2018 auction for 1GW renewable energy generation.<sup>[138]</sup></p> <p>The renewable energy contribution to the EU's 2030 target set out in the draft NECP (21%) is significantly below the share of 25% in 2030 that results from the formula of Annex II of the Governance Regulation.<sup>[140]</sup></p>
<b>National support schemes</b>	<p>In Poland, electricity from renewable sources is promoted through tenders for the definition of support level of a feed-in tariff or premium, tax relief and subsidy and loan schemes as well as a quota system for some older power plants.<sup>[16]</sup></p> <p>In Poland, electricity from renewable sources is promoted mainly through a tender system for the definition of support level of a feed-in tariff or premium. The installations launched before 1 July 2016 are allowed to choose between the tenders and remaining in the quota system.<sup>[16]</sup></p>
<b>Connection of RES to the grid</b>	<p>Access to the electricity grid for renewable energy generators is granted with priority. Furthermore, grid operators must give electricity from renewable sources priority dispatch. Plant operators are not entitled to the development of the grid.</p>
<b>RES in transport</b>	<p>According to Eurostat share of RES in transport in 2017 was 4.2%<sup>[17]</sup>, whereas 2020 target is 10%.</p>
<b>Support of RES in transport</b>	<p>In Poland, renewable energy in transport is promoted through a biofuels quota obligation.<sup>[16]</sup></p>
<b>Charging points</b>	<p>The <b>Energy for the future</b> project aims at 6000 charging points &amp; additionally 400 rapid charging points by 2020.<sup>[139]</sup> In 2017 there were 5.71 EV charging points per 100000 inhabitants (rank 24 of 28).<sup>[18]</sup></p>

<b>Plug-in vehicles</b>	<p>From 2019, Poland applies a new emission charge on fuels. The revenue collected is to finance electro-mobility projects and fighting smog<sup>[138]</sup>. The <b>Energy for the future</b> project aims to 50 000 electric vehicles in 2020 and in 2025 a million electric-drive vehicles.<sup>[139]</sup></p> <p>Share of newly registered plug-in electric vehicles (PEV) in the 2017 was 0.21% (EU rank 26 of 28)<sup>[20]</sup></p>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	<p>Poland has set an indicative national energy efficiency target of 13.6Mtoe primary energy savings in 2020 reaching a 2020 level of 96.4Mtoe primary energy consumption and 71.6Mtoe final energy consumption.<sup>[138]</sup></p> <p>Contrary to the EU trend, since 2005, Poland has increased both its primary energy and final energy consumption due to strong economic growth and historically high energy intensity of the Polish economy. In 2017, Poland's primary energy consumption reached 99.8Mtoe, exceeded its 2020 indicative target. Final energy consumption, at 71.0Mtoe was just below the 2020 indicative target.<sup>[138]</sup></p>
<b>Energy savings</b>	Progress towards total cumulative savings requirement by 2020 is 22%. <sup>[21]</sup>
<b>2030 target</b>	<p>Poland intends to reduce its energy consumption by 2030, but the level of the energy efficiency contribution set out in the draft plan appears modest considering the level of effort needed to reach the EU's energy efficiency target for 2030. At the same time, the complementary energy efficiency objectives are quantified (for example on smart meters), which constitutes an approach that could be replicated by other Member States. Details on policies and measures could be better elaborated upon in the final plan to support the credibility of the national ambition level.<sup>[140]</sup></p>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	<p>Poland is interconnected to the Baltic region through LitePol link.<sup>[29]</sup></p> <p>The limited capacity for interconnectors enabling electricity imports played its role in a particularly strong increase in wholesale electricity prices in 2018. In the second quarter of 2018, prices in Poland were significantly higher than in its EU neighbouring countries, despite improvements in commercial imports from Germany, the Czech Republic and Slovakia. There are still inefficiencies inherent to the unscheduled electricity flows in Central Europe, notably between Germany and Poland, limiting the amount of electricity Poland can import through Western interconnectors.<sup>[138]</sup></p> <p>Poland has committed towards achieving the synchronisation of its electricity grid with the Baltic states by 2025.<sup>[138]</sup></p> <p>Poland has committed towards achieving the synchronisation of its electricity grid with the Baltic States by 2025.<sup>[138]</sup></p>
<b>Energy security target 2030</b>	<p>Compared to EU average, the Polish energy mix has a significantly higher share of solid fuels (notably coal and lignite), which are mainly used in power generation and heating. At the same time, Poland's energy dependency, i.e. the proportion of energy that the economy is importing, is currently lower than EU average. The draft plan foresees that coal, considered as stable and reliable energy supply, will keep a significant share in electricity generation.<sup>[143]</sup></p> <p>The draft plan sets out the ambition for Poland to become a gas transmission and trade centre for the region. However, there is no description as regards the steps to be taken in this regard from a financing perspective.<sup>[143]</sup></p> <p>The draft plan describes the objective to limit, with national legislation, dependency on a single source of gas to 33 % in 2023.<sup>[143]</sup></p> <p>Developing nuclear energy is one of the objectives recalled in the draft plan. Activation of a first block of the first nuclear power plant is foreseen to take place in 2033.<sup>[143]</sup></p>
<b>Trade deficit</b>	The Poland's energy dependence raised from 17.7% in 2005 to 38.3% in 2017. <sup>[22]</sup>

<b>Electricity generation capacities</b>	<p>The installed capacity in RES-based generation has increased to a level of ca. 8.5 GW (with the total installed capacity in the National Power System reaching ca. 43 GW in 2017). The share of RES in the gross final consumption was ca. 11.3% in 2016<sup>[139]</sup></p> <p>Poland is among the EU countries with the fastest growth in domestic electricity production and consumption in recent years. In 2017, increased by around 2%. With a share close to 80%, coal and lignite dominate in the electricity generation mix. New generation capacity installed since 2017 and planned for 2019 is predominantly based on coal, with a smaller role of gas.<sup>[138]</sup></p>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	<p>Three largest producers (which were part of the groups: PGE Polska Grupa Energetyczna S.A., TAURON Polska Energia S.A., ENEA S.A.) had in total almost 2/3 of the installed capacity and were responsible for almost 70% of domestic electricity production.<sup>[141]</sup></p> <p>TGE (Polish Power Exchange) it is the Nominated Electricity Market Operator (NEMO) for the Polish pricing area and the only licensed commodity exchange in Poland.<sup>[142]</sup></p> <p>Electricity is also traded at PXE.</p>
<b>Retail electricity market</b>	<p>In 2017 there were five default suppliers and over 119 alternative trading companies actively selling electricity to final consumers, including households. On the electricity market there were also 178 suppliers operating under companies vertically integrated with the DSOs. The greatest share in electricity sales to final customers is still held by incumbent suppliers which are default suppliers to households that have not selected a new supplier.<sup>[141]</sup></p>
<b>Intelligent metering systems</b>	<p>The Polish government has decided to roll out smart electricity meters to 80% of electricity consumers, but has not yet implemented the decision into national law. Several hundred thousand consumers already have smart meters in Poland.<sup>[144]</sup></p>
<b>Tariffs</b>	Dynamic tariffs not present.
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I strategies</b>	<p>The strategic framework includes the Strategy for Innovativeness and Efficiency of the Economy as the overarching document (2013). This is supplemented by the Enterprise Development Programme (PRP) as implementing programme of SIEG (2014); National Smart Specialisations (KIS) (2014); National Research Programme (KPB) (2014); Polish Roadmap of Research Infrastructures (PMDIB) (2014); Operational Programme Smart Growth 2014-2020(POIR) (2014); Regional Operational Programmes (RPOs). Strategy for Innovation and Efficiency of the Economy – Dynamic Poland 2020 (2013-20)<sup>[49]</sup></p>
<b>Innovation performance</b>	<p>Poland lags on innovation, with recent legal changes only partially addressing challenges. Despite past efforts to improve the R&amp;D framework and significant support from EU funds, Poland's innovation performance remains modest.<sup>[138]</sup></p>
<b>National target</b>	National R&D intensity target is 1.7% for 2020 <sup>[138]</sup>
<b>Total R&amp;D expenditure</b>	<p>In 2007, R&amp;D intensity in Poland was 0.56% of GDP.<sup>[138]</sup></p> <p>In 2017, R&amp;D intensity in Poland was 1.03% of GDP.<sup>[138]</sup></p>
<b>Public R&amp;D expenditure</b>	Public investment constituted 35% of the total investments in 2017 (0.36% of GDP). <sup>[138]</sup>
<b>Business expenditure in R&amp;D</b>	Business investment constituted 64% of the total investments in 2017 (0.67% of GDP) <sup>[138]</sup>



<b>R&amp;D policy coordination</b>	Poland does not fully use environmental taxes as effective policy tools. The implicit tax rate on energy remained comparatively low in Poland and there are a number of tax exemptions. However, from 2019 Poland applies a new emission charge on fuels. The revenue collected is to finance electro-mobility projects and fighting smog. <sup>[138]</sup> Despite measures taken, including number of amendments to the act on higher education, only limited progress was observed in better links between research, innovation and industry. Some progress was achieved in improving the effectiveness of R&D tax incentives and better targeting financial instruments at the innovation cycle. In 2016-2018, Poland has reformed its R&D tax incentives with new regulations and changes encouraging wider use of R&D tax breaks. <sup>[138]</sup>
<b>Funding from Horizon 2020</b>	Poland, one of the most populous countries in Europe (38.5 million or 7.6% of EU-28, 6th in rank) has a relatively weak track record in the EU Framework Programme for research and innovation. The Horizon 2020 interim evaluation (2016) shows that Poland is one of the lowest performing EU-13 countries in terms of Horizon 2020 funding contributions normalised per inhabitant, full time researchers and RDI investments. <sup>[35]</sup>  According to the H2020 country profile of Poland as of Sept. 2019, the net EU contribution (funding received by the project's participants after deduction of their linked third parties' funding) is 0.81% of the EU total <sup>[35]</sup>
<b>Research infrastructures roadmap</b>	Roadmap published in 2014 <sup>[30]</sup>

#### 4.3.13 Slovakia

Table 16: Progress towards the Energy Union objectives in Slovakia

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	In June 2018, the Government adopted the Economic Policy Strategy 2030, focusing on raising productivity by supporting human resource development, R&D, a less energy intensive economy, the business environment, and agriculture. <sup>[149]</sup> The main problem however is that Slovakia lacks a long-term vision and strategy. There is some progress in terms of specific policies and projects, but the Slovak government should be more ambitious in its goals. To fulfil those, Slovakia needs a combination of well-target policies that are reasonably using EU funds together with private investments. Last but not least, the government needs to raise public support for energy transition policies. <sup>[147]</sup>
<b>GHG target 2020</b>	National greenhouse gas (GHG) emissions target: maximum 13% increase in 2020 compared with 2005 (in sectors not included in the EU emissions trading scheme). <sup>[149]</sup> Slovakia is set to overachieve its 2020 greenhouse gas target in sectors outside the emission trading system. <sup>[149]</sup>
<b>GHG target 2030</b>	According to Effort sharing regulation 2030 target requires Slovakia to reduce its emissions by 12% by 2030 (relative to 2005 levels). <sup>[149]</sup> The target may be achieved with existing policies, provided that accounted CO2 removals in the land use, land use change and forestry (LULUCF) sector will compensate for accounted emissions in this sector. <sup>[150]</sup>
<b>1.2 Uptake of RES</b>	
<b>RES 2020 target</b>	2020 renewable energy target: 14%. Slovakia had a 12% share of renewable energy in gross final consumption in 2016. <sup>[149]</sup>

	This was above the indicative goal for 2017/2018 of 11.4 % needed to stay on track towards its 2020 target, however 2016 shares for Slovakia are lower than those of 2015, pointing to the risk of a decreasing trend. <sup>[149]</sup>
<b>RES 2030 target</b>	The proposed contribution to the EU level target of renewable energy is a share of 18% of energy from renewable sources in gross final consumption of energy in 2030. This contribution is significantly below the share of 24% in 2030 that results from the formula contained in Annex II of the Governance Regulation. <sup>[150]</sup>
<b>National support schemes</b>	In the Slovak Republic, electricity from renewable sources is promoted through a fixed feed-in tariff. Energy companies are obliged to purchase and pay for electricity exported to the grid. Operators of renewable energy installations (especially PV and wind) may also receive subsidies under the Operational Programme Quality of Environment. The use of renewable energy sources is further incentivised through an exemption from excise tax. <sup>[16]</sup>
<b>Connection of RES to the grid</b>	Renewable energy plants must be given priority connection, and electricity from renewable sources must be given priority dispatch. The grid operator is obliged to extend the grid without discriminating against certain users. <sup>[16]</sup>
<b>RES in transport</b>	The low-carbon transformation of the transport sector is making tentative progress. While overall car fleet emissions are increasing and fuel taxes do not reflect CO2 intensities, subsidy schemes helped to put vehicles using alternative fuel sources into circulation, with the total increasing to 4,300 by mid-2018 (Ministry of Economy, 2018). <sup>[149]</sup>
<b>Support of RES in transport</b>	In Slovakia, the main support scheme for renewable energy sources used in transport is a quota system. This scheme obliges companies importing or producing petrol or diesel to ensure that biofuels make up a defined percentage of their annual fuel introduced to the market. Furthermore, biofuels are supported through a tax regulation mechanism.
<b>Charging points</b>	In November 2018 the Ministry of Economy proposed an Electromobility Action Plan for 2019-2020 including, among other things, the provision of financial support for purchasing an electric car or plug-in hybrids and constructing an additional 1,500 charging stations by 2025. <sup>[149]</sup> In 2017 there were 69.01 EV charging points per 100000 inhabitants (rank 8 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	Share of newly registered plug-in electric vehicles (PEV) in the 2017 was 0.41% (EU rank 18 of 28) <sup>[20]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	Slovakia's 2020 energy efficiency target is to have a maximum consumption of 16.4Mtoe (primary energy) and of 9.0Mtoe (final energy). <sup>[149]</sup> The primary energy consumption was of 16.1Mtoe in 2017, still below the EU 2020 target, but considerably higher than in 2016. Final energy consumption stood at 11.1Mtoe, exhibiting a trend that makes reaching the 2020 target very unlikely. <sup>[149]</sup>
<b>Energy savings</b>	In 2016, Slovakia had made 22% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>
<b>2030 target</b>	The draft plan includes energy efficiency contributions in both primary (16.16Mtoe) and final energy consumption (10.78Mtoe). The proposed level of contributions represents a minor reduction for primary energy consumption and an increase for final energy consumption compared to the 2020 targets. <sup>[151]</sup> Such contributions are of low ambition compared to the collective EU effort needed to achieve the EU 2030 targets <sup>[150]</sup>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	Slovakia has significant electricity interconnection capacity compared to its electricity generation capacity. The planned increase of new nuclear capacity is accompanied by new connections, e.g. with Hungary, aimed at reducing congestion. The interconnection level is projected to be at 52% in 2030. <sup>[150]</sup>

<b>Energy security target 2030</b>	With high dependency on energy imports, energy security is one of the priority topics of the Slovak national energy strategies. <sup>[150]</sup>  In the draft plan nuclear energy is mentioned as the main carbon-free source of electricity. <sup>[151]</sup>
<b>Trade deficit</b>	Energy import dependency was 64.8% in year 2017 (66% in 2005). <sup>[149]</sup>
<b>Electricity generation capacities</b>	In year 2018 more than 70% of electricity was produced by conventional and nuclear power plants. <sup>[25]</sup> In November 2018, the Slovak Government decided to advance the phasing-out of domestic coal for electricity generation from 2030 to 2023. <sup>[149]</sup>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	Following some success in electricity market coupling, Slovakia still has an active role to play in creating a pan-European electricity market by actively participating in the market coupling project 4MMC (Czech Republic, Slovakia, Hungary, Romania). This can help to strengthen security of supply and competition in the wholesale electricity market. <sup>[149]</sup>  The Slovak electricity market is part of the CENTREL area which also includes Poland, Hungary and the Czech Republic. Slovenské elektrárne represents around 8% of CENTREL's installed capacity and 7% of its annual generation. <sup>[148]</sup>
<b>Retail electricity market</b>	Retail energy markets are heavily regulated, with all households and small and medium-sized enterprises being supplied with electricity and gas at regulated prices. The current regulatory system, expected to apply until 2021, hampers market development and innovation. Although energy prices are in general lower than the EU average, electricity prices for companies are the highest in the region, putting Slovak companies at a competitive disadvantage. <sup>[149]</sup>  The number of licenced power retailers in the whole retail market has been constantly growing and it reached 407 at the end of 2012. 19 retailers provide electricity to household consumers at the end of 2012 <sup>463</sup> . Despite the growing number of competitors in the power supply market, prices for household consumers and small and medium companies remain regulated. The numbers of consumers switching power providers are increasing every year, which is a good sign for energy market liberalisation. <sup>[149]</sup>
<b>Intelligent metering systems</b>	Slovakia has set a detailed smart metering plan to fulfil the EU requirements in the area of energy efficiency by 2020. The country's goal is to install around one million smart meters that will enable utilities to perform demand response and allow consumers to better manage their energy consumption. <sup>[146]</sup>  The Slovak authorities have mandated that customers with a consumption of more than 4000kWh per year should have smart meters, estimated at 600000 end points. <sup>[47]</sup>
<b>Tariffs</b>	Despite the growing number of competitors in the power supply market, prices for household consumers and small and medium companies remain regulated. <sup>[149]</sup>
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I strategy</b>	The national Smart Specialisation Strategy (RIS3 document) is the national R&I strategy for 2014-2020 <sup>[49]</sup>
<b>Innovation performance</b>	Slovakia is a Moderate Innovator. <sup>[23]</sup>
<b>National target</b>	National R&D target: 1.2% of GDP. <sup>[149]</sup>
<b>Total R&amp;D expenditure</b>	Although overall R&D investment has risen from 0.45% of GDP since 2007 to peak at 1.2% in 2015, it dropped again to 0.88% in 2017. <sup>[149]</sup>
<b>Public R&amp;D expenditure</b>	While public R&D investment rose from 0.27% in 2007 to 0.4% in 2017, business R&D intensity remains among the lowest in the EU at 0.48% of GDP.

<b>Business expenditure in R&amp;D</b>	Business expenditure in R&D appears too low to substantially boost innovation performance. In addition, at 0.14% of GDP in 2016, business expenditure in R&D by small and medium-sized enterprises remains significantly below the EU average. <sup>[149]</sup>
<b>R&amp;D policy coordination</b>	A lack of R&D strategy and target measures, the limited engagement of research institutions and limited research capacity contribute to low private R&D expenditure. <sup>[149]</sup>
<b>Funding from Horizon 2020</b>	According to the H2020 country profile of Slovakia as of Sept. 2019, the net EU contribution (funding received by the project's participants after deduction of their linked third parties' funding) is 0.81% of the EU total. <sup>[35]</sup>
<b>Research infrastructures roadmap</b>	No roadmap available <sup>[30]</sup>

#### 4.3.14 Czech Republic

Table 17: Progress towards the Energy Union objectives in Czech Republic

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	On 18th of May 2015 the government of the Czech Republic approved the updated version of the State Energy Policy. <sup>[157]</sup> The strategic objectives are based on the EU energy strategy and are aimed at meeting the targets of the State Energy Policy and fulfilling the long-term vision for the energy sector in the Czech Republic. The top strategic objectives are security, competitiveness and sustainability. <sup>[155]</sup>
<b>GHG target 2020</b>	National greenhouse gas (GHG) emissions target: maximum 9% increase in 2020 compared with 2005. <sup>[154]</sup> Emissions are expected to be at 2005 level in 2020, according to national projections taking into account existing measures. This means that the Czech Republic is expected to overachieve its target by 9 pps. <sup>[154]</sup>
<b>GHG target 2030</b>	By 2030, reduce emissions of the Czech Republic by at least 44 Mt CO <sub>2</sub> eq. by comparison with 2005 (corresponding to a reduction of 30% by comparison with 2005). While the country is still likely to meet its 2020 target, recent emission increases (+11% between 2014 and 2017) will make it more challenging to meet the much more ambitious and binding 2030 target. <sup>[154]</sup>
<b>1.2 Uptake of RES</b>	
<b>RES 2020 target</b>	2020 renewable energy target: 13 %. <sup>[154]</sup> With a renewable energy share of 14.8 % in 2017, the Czech Republic is on track to meet its target for 2020. <sup>[154]</sup>
<b>RES 2030 target</b>	The Czech Republic set a 20.8% share of energy from renewable sources in gross final consumption of energy in 2030 as renewable energy contribution to the EU renewable energy target for 2030. This level of ambition is below the share of 23% in 2030 that results from the formula contained in Annex II of the Governance Regulation. <sup>[155]</sup>

<b>National support schemes</b>	<p>From January 2014 the support for new RES plants generating electricity has been stopped. The only exemption is small hydro power plants with an installed capacity up to 10 MW and ongoing projects using biomass, wind and geothermal energy. Semi-finished and yet unfinished projects have to meet certain conditions to be eligible for support (installed capacity, granting the state authorisation for the construction – a building permit or planning proceedings, and the date of commissioning).<sup>[16]</sup></p> <p>The abolishment of support schemes in 2014 and a retroactive tax on solar energy have resulted in a static market.<sup>[154]</sup></p> <p>In the area of renewables, retroactive changes have created significant uncertainty and have resulted in higher capital costs for current and future investments as well as a negative public perception.<sup>[154]</sup></p>
<b>Connection of RES to the grid</b>	Operators of renewable energy plants are entitled to priority connection to the grid. The use and the expansion of the grid are subject to general legislation on energy. <sup>[16]</sup>
<b>RES in transport</b>	The penetration of renewable energy in transport sector according to Eurostat data in 2017 was 6.6 %. <sup>[17]</sup>
<b>Support of RES in transport</b>	In the Czech Republic, the main support scheme for renewable energy sources used in transport is a quota system. This scheme obliges companies importing or producing petrol or diesel to ensure that biofuels make up a defined percentage of their annual fuel sales. Furthermore, biofuels are exempt from consumption tax. <sup>[16]</sup>
<b>Charging points</b>	The current number of publicly available recharging points covers the needs of the existing vehicle fleet but the planned growth of the recharging infrastructure may not be sufficient to cater for the needs of the expected take-up in the vehicle market. [K30]. Ranked 17/28 in Electric vehicle charging points. (23.63 EV charging points per 100000 inhabitants). <sup>[18]</sup>
<b>Plug-in vehicles</b>	Share of newly registered plug-in electric vehicles (PEV) in the 2017 was 0.23% (EU rank 25 of 28) <sup>[20]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	<p>The Czech Republic's 2020 energy efficiency target is 44.3Mtoe expressed in primary energy consumption (25.3Mtoe expressed in final energy consumption)<sup>[154]</sup></p> <p>The Czech Republic increased its primary energy consumption to 40.1Mtoe in 2017. Final energy consumption increased to 25.5Mtoe, above the set target.<sup>[154]</sup></p>
<b>Energy savings</b>	Progress towards total cumulative savings requirement by 2020 is 11%. <sup>[21]</sup>
<b>2030 target</b>	<p>The national contribution is set at a level that would allow the country to increase its energy consumption by 2.9 % in relation to 2017 levels for primary energy consumption while final energy consumption would have to decrease by 7.2 %. On the other hand, the target for 2030 is set at a lower level as compared to their 2020 energy efficiency target both for primary and final energy consumption. Such a trend appears to contradict the collective EU effort needed to achieve the EU 2030 target.<sup>[156]</sup></p>
<b>3 Energy security and interconnection</b>	
<b>Interconnection</b>	<p>The country is well interconnected in the internal electricity market. It currently has an interconnection capacity of 19.3%. However, congestion management in Central Europe needs a solution at regional level that facilitates cross-border electricity flows, while ensuring system security. Measures that can increase the flexibility of energy demand are still pending (e.g.: smart meters rollout).<sup>[154]</sup></p>



<b>Energy security target 2030</b>	As regards energy security, the objective is to limit import dependency below 65% by 2030 and 70% by 2040. There are diversification target corridors set up for individual fuels in the total primary energy resources and electricity generation which merit further elaboration in the final plan. <sup>[155]</sup>
<b>Trade deficit</b>	The Czech Republic's energy dependence raised from 28% in 2005 to 37% in 2017. <sup>[22]</sup>
<b>Electricity generation capacities</b>	More than 90% of electricity is generated from conventional and nuclear power plants and the contribution of RES was less than 10%. <sup>[153]</sup>
<b>4 Integrated electricity market</b>	
<b>Wholesale electricity market</b>	In the Czech Republic, electricity is traded at Prague-based Power Exchange Central Europe (PXE), and in spot markets (day-ahead and intraday) organised by OTE (Czech electricity and gas market operator). The market coupling of the Czech, Slovak and Hungarian day-ahead markets started in September 2012 and has been successful so far. <sup>[154]</sup>
<b>Retail electricity market</b>	Czech power market is fully liberalised. Market concentration remains very high, but the dominant position of three main power suppliers, ČEZ, E.ON and PRE is gradually decreasing. <sup>[154]</sup>
<b>Intelligent metering systems</b>	CEZ CEO Daniel Benes said that the current system was still based on the assumption that power generation is coming from a only a few large power plants, which is no longer the case, as a number of solar power panels and other micro facilities have been installed in recent years. What Benes proposes is the introduction of smart power meters, which would allow for fine-tuning of when consumption is being made and account for far more precise bills. <sup>[152]</sup>
<b>Tariffs</b>	The calculation of electricity tariffs needs to change, CEZ CEO Daniel Benes told Lidove Noviny, a newspaper. He argued that with the emergence of new technology in power generation, it was no longer feasible to maintain the current system, which calculates tariffs based on assumed consumption, rather than on actual one. He said that the government should either admit that it has been determining electricity tariffs in a way to lead a certain social policy, or face the new reality and adopt better ways to measure power consumption. <sup>[152]</sup>
<b>5 Research, innovation and competitiveness</b>	
<b>R&amp;I Strategies</b>	Single overarching strategy: The Innovation Strategy: Denmark A Nation of Solutions (2012-2020) (Updated in 2015) <sup>[49]</sup>
<b>Innovation performance</b>	Investment needs to support technology uptake and increase the innovation performance of firms, notably the domestic small and medium-sized enterprises. <sup>[154]</sup> The Czech Republic is a moderate innovator. <sup>[23]</sup>
<b>National target</b>	R&D target set in the NRP: 1% of GDP for public R&D expenditures. In 2017, R&D intensity in the Czech Republic was 1.79% of GDP composed of 63% private investment (1.13% of GDP) and 37% public investment (0.66% of GDP). <sup>[154]</sup>
<b>Total R&amp;D expenditure</b>	The overall R&D intensity in 2017 stood at 1.79% of GDP. <sup>[154]</sup> In 2007, R&D intensity comprised 1.31% of GDP. <sup>[24]</sup>
<b>Public R&amp;D expenditure</b>	Public R&D investment lacks a coherent strategy to increase the modest research performance. Its level of intensity stood at 0.66% of GDP in 2017 and if the current trend is maintained, the 2020 target of 1% of GDP might not be reached. While public R&D expenditure as a share of GDP strongly increased from 2008 to 2015 (from 0.52% to 0.87%), it decreased to 0.66% in 2017. It is not likely that the 1% target will be reached by 2020. <sup>[154]</sup>
<b>Business expenditure in R&amp;D</b>	Business expenditure on R&D increased from 0.77% of GDP in 2010 to 1.13% of GDP in 2017. However, close to two thirds of these expenditures are incurred by foreign firms. While some of these firms have set up medium and high-tech research and innovation facilities,

	their activities are mainly directed towards experimental development rather than industrial research. <sup>[154]</sup>
<b>R&amp;D policy coordination</b>	The country has not yet created a fully functioning innovation ecosystem based on domestic research and development [K30]. Public R&D investment lacks a coherent strategy to increase the modest research performance [K30]. The financing of innovation is still under development. <sup>[154]</sup> Despite some encouraging initiatives, the low cooperation between the private sector and the academia hampers technology diffusion. <sup>[154]</sup>
<b>Funding from Horizon 2020</b>	The Czech Republic belong to widening countries group in Horizon2020. According to Horizon2020 dashboard The Czech Republic received 0.8% of the total funding. <sup>[35]</sup>
<b>Research infrastructures roadmap</b>	Roadmap published in 2010, updated in 2016 <sup>[30]</sup>

#### 4.3.15 Ireland

Table 18: Progress towards the Energy Union objectives in Ireland

Category	Description
<b>1 Climate action, decarbonising the economy</b>	
<b>1.1 Decarbonization and energy strategies</b>	
<b>National strategies</b>	Ireland is currently embarking on an “energy transition”. The Government’s energy White Paper (2015) <sup>[158]</sup> sets out a framework for energy policy to 2030 and outlines a transition to a low carbon energy system for Ireland by 2050. Significantly, it is the first time an Irish government has outlined a path to the eventual elimination of fossil fuels from our energy system. The Government has also recently detailed its commitments to transition Ireland to a low-carbon and climate-resilient society in the National Development Plan 2018-2027 <sup>[159]</sup>
<b>GHG target 2020</b>	National greenhouse gas (GHG) emissions target: - 20% in 2020 compared with 2005 (non-ETS). <sup>[161]</sup> National projections indicate that cumulated emissions (on the basis of existing measures) over the 2013-2020 compliance period will exceed allocations by 16 million tons of CO2 equivalent and that emissions in 2020 will be around their 2005 level, i.e. 20 percentage points short of the reduction target. <sup>[161]</sup>
<b>GHG target 2030</b>	According to Effort sharing regulation 2030 target which requires Ireland to reduce its emissions by 30% by 2030 (relative to 2005 levels). Not reaching 2020 target meant that Ireland will need to buy allocations from other Member States in surplus in order to comply with the Effort Sharing Decision and it will put Ireland in a difficult starting position for the 2021-2030 compliance period under the Effort Sharing Regulation. <sup>[161]</sup>
<b>1.2 Uptake of RES</b>	
<b>RES 2020 target</b>	The draft NECP suggests that Ireland will miss its 16% target and reach a minimum of 12.3% and maximum of 14.3% by 2020. <sup>[161]</sup>
<b>RES 2030 target</b>	In the draft NECP sets the ambition levels for RES share range from 15.8% to 27.7%, and are below the share of 31% in 2030 that results from the formula contained in Annex II of the Governance Regulation. <sup>[167]</sup>
<b>National support schemes</b>	In Ireland, electricity from renewable sources was mainly promoted through a feed-in-tariff scheme (REFIT) until 31 December 2015. Currently there is one support scheme i.e. subsidy for the purchase and installation of PV and battery storage, while another new support scheme i.e. tender is expected to take place in 2019. <sup>[16]</sup>

<b>Connection of RES to the grid</b>	Under the Group Processing Approach (GPA) connection capacity has been reserved for renewable generation, including enough to specifically meet the 40% RES in electricity target in the context of the overall target addressed to Ireland under Directive 2009/28/EC. To date, there have been three 'Gates' provide total capacity of 5573MW renewable generation. In addition, certain providers of system services under the DS3 Programme (Delivering a Secure, Sustainable Electricity System) will be eligible and prioritised for a connection offer under the non-GPA process, until the enduring connection policy in line with the provisions of the new RES support scheme is in place. The DS3 programme is a multi-annual programme by EirGrid which envisages to ensure that the power system can be operated with increasing amounts of variable non-synchronous renewable generation over the coming years. There is also a policy that aims to facilitate renewables by providing for grid connections outside the gate process for certain small, renewable, low carbon generators. <sup>[16]</sup>
<b>RES in transport</b>	More than 99% of RES in transport in 2017 was from bioenergy, almost 90% was from biodiesel and 10% was from bio gasoline. • 84% of liquid biofuels used in transport in 2017 were imported. • Less than 1% of renewable transport energy is from electricity. Most electricity used for transport is used by DART (Dublin Area Rapid Transit) and Luas, but EVs are growing quickly from a low base. In 2017 RES in transport stood at 7.4%, compared to the 2020 target of 10%. <sup>[163]</sup>
<b>Support of RES in transport</b>	In Ireland, the support scheme for renewable energy sources used in the transport sector is a quota system. This scheme obliges suppliers of fuels to ensure that biofuels make up to a defined percentage of the company's total annual sale of fuel. <sup>[16]</sup>
<b>Charging points</b>	ESB (leading Irish utility company) has developed an island of Ireland-wide charging infrastructure of 1200 public charge points. (about 900 of these are in the Republic). ESB state that fast charge points are located every 50km on all major inter-urban routes. But the problem can be that some of them are out of order. Charging is currently free of charge— electric car owners have to register and get a card to use the chargers. <sup>[164]</sup>  According to Eurostat data, there are 74.83 EV charging points per 100000 inhabitants in Ireland in 2017 (EU rank 6 of 28). <sup>[18]</sup>
<b>Plug-in vehicles</b>	The share of newly registered plug-in electric vehicles (including Battery Electric Vehicles) and Plug-in hybrid electric vehicles) in the 2017 was 0.72% (EU rank 14 of 28). <sup>[24]</sup> There were 4825 electric cars in Ireland on the road at the start of 2019. (Out of a total of 2.7 million vehicles). The government currently has a target that electric vehicles will make up 10% of all vehicles on the road by 2020 – that would mean about 230000 electric vehicles on the road. <sup>[164]</sup>
<b>2 Energy Efficiency</b>	
<b>Energy efficiency indicative target</b>	Ireland indicative energy efficiency target for 2020 is 13.9Mtoe expressed in primary energy consumption (2.7Mtoe of savings corresponds to 20% efficiency target) and 11.7Mtoe expressed in final energy consumption. <sup>[103]</sup> According to Eurostat data primary energy consumption in Ireland in 2017 was 14.41Mtoe <sup>[165]</sup> and final energy consumption - 11.76Mtoe. <sup>[166]</sup>
<b>Energy savings</b>	In 2016, it had made 28% of the total savings it had committed to achieve over the 2014 to 2020 period. <sup>[21]</sup>
<b>2030 target</b>	Since Ireland has not provided a single value for its national contribution for energy efficiency, the assessment of Ireland's ambition is done on the basis of the two scenarios which follow the international fuel and EU ETS carbon price assumptions recommended by the EC. Overall, taking into account both options provided in the draft plan, Ireland has set an unambitious contribution, which goes in the opposite direction to what is required at EU level to collectively reach the Union's 2030 energy efficiency targets for both primary and final energy consumption. <sup>[167]</sup>



3 Energy security and interconnection	
<b>Interconnection</b>	Ireland's geographical location brings challenges in terms of interconnection with neighbouring countries. Ireland is exclusively connected to the United Kingdom through two electricity interconnectors: The 300 MW North-South interconnector, linking the electricity systems of Ireland and Northern Ireland, and the 500 MW East-West Interconnector connecting Ireland and Wales (United Kingdom). EirGrid owns and operates both interconnectors. Ireland is currently not meeting the indicative EU electricity interconnection target of at least 10% of installed capacity by 2020; its current level of interconnection is 7.4%. When the UK leaves the EU, Ireland will have no direct electrical interconnection with the rest of the EU. 700MW connection with France is expected to be ready by 2025. <sup>[170]</sup>
<b>Energy security target 2030</b>	In 2017, Ireland's total domestic energy production reached a new peak at 4.9Mtoe, nearly tripling over the past decade. However, Ireland still imports most of its energy needs, as energy production only covers 35% of Total Primary Energy Supply. The largest indigenous energy source is natural gas, representing more than half (58.7%) of total domestic production in 2017. <sup>[170]</sup> The United Kingdom's expected withdrawal from the EU comes across as a key risk for Ireland but due to ongoing uncertainty, the exact impact on market functioning is not yet known. <sup>[162]</sup>
<b>Trade deficit</b>	Ireland was the 10th most energy dependent EU Member State in 2016, importing 69.1% of the energy it consumed, a sharp decline from 2015 when it imported 88.6% (4th most dependent). This consumption level further declined to 66% in 2017. <sup>[170]</sup>
<b>Electricity generation capacities</b>	The generation portfolio in Ireland is still heavily reliant on fossil fuels. In 2018 68.3% of total produced electricity in Ireland was delivered from conventional power plants (utilizing mostly natural gas), 28.6% from wind and 3.2% from hydro power plants. <sup>[25]</sup>
4 Integrated electricity market	
<b>Wholesale electricity market</b>	In Ireland, the all-island wholesale Single Electricity Market (SEM) has been in place since 2007. It is regulated by the SEM Committee. I-SEM (Integrated Single Electricity Market) replaced the SEM on 01 October 2018. The Single Electricity Committee (SEM Committee) is the decision-making body for the I-SEM. It comprises representatives from regulators in Northern Ireland (the Utility Regulator) and the Republic of Ireland (the Commission for the Regulation of Utilities) and two independent members. <sup>[168]</sup>
<b>Retail electricity market</b>	Similar to other EU countries, the electricity market in Ireland was liberalized and opened to competition in 2000 as a result of EU directive 96/92/EC. Today, the Irish electricity market is governed by the Internal Market in Electricity Directive 2009/72/EC, which has introduced the common rules for the generation, transmission, distribution and supply of electricity in order to create competitive, secure and environmentally sustainable markets. <sup>[171]</sup>
<b>Intelligent metering systems</b>	ESB Networks announces initial roll out locations for Ireland's electricity meter upgrade programme (3 July 2019). The meter upgrade programme will commence in September of this year across two geographic areas in the midlands and in Co Cork. 20,000 meters will be installed by the end of this year. ESB Networks then plans to replace 250,000 meters between autumn 2019 and the end of 2020, with a further 500,000 meters each year from 2021 to 2024. <sup>[169]</sup>
<b>Tariffs</b>	Ireland has day-night tariff system.
5 Research, innovation and competitiveness	
<b>R&amp;I strategy</b>	Single overarching strategy: Strategy for research and development, science and technology, 2016-2020 <sup>[49]</sup>
<b>Innovation performance</b>	Ireland continue to improve in international innovation rankings, most recently climbing from 10th place in 2013 to 8th place in 2015 in the EU Innovation Union Scoreboard. Ireland is a strong innovator <sup>[23]</sup>

<b>National target</b>	Committed to increasing public and private investment in research to reach Ireland's intensity target of 2.5% of GNP by 2020. It will be difficult for Ireland to achieve its 2020 target. In 2017, IE had an overall public and private R&D intensity of 1.05% of GDP. <sup>[161]</sup>
	In 2017, IE had an overall public and private R&D intensity of 1.05% of GDP. <sup>[161]</sup>
<b>Total R&amp;D expenditure</b>	<p>In 2007, R&amp;D intensity reached 1.23% of GDP. <sup>[24]</sup></p> <p>In 2017, R&amp;D intensity reached 1.05% of GDP. <sup>[24]</sup></p> <p>Business R&amp;D expenditure is increasing, while its intensity remains below the EU average. The balance between the public and private R&amp;D intensity also varies across EU countries, with only eight Member States where the share of R&amp;D financed by government is below 30% and Ireland is one of them<sup>[35]</sup></p>
<b>Public R&amp;D expenditure</b>	Public expenditure in R&D grew from EUR 836 million in 2010 to EUR 907 million in 2017. However, there has been a decline in 2017 in relation to public expenditure in 2016 <sup>[161]</sup>
	Public R&D intensity stood at 0.3% of GDP in 2017. <sup>[161]</sup>
<b>Business expenditure in R&amp;D</b>	Business R&D expenditure increased from EUR 1.5 billion in 2006 to EUR 2.2 billion in 2017. However, 64% of total business expenditure is by foreign firms operating in a few sectors. In contrast, the R&D efforts of most domestic firms remain moderate, albeit increasing. <sup>[161]</sup>
	Business R&D intensity stood at 0.7 % of GDP (1.2 % of GNI*) in 2017, below the EU average of 1.3 %. <sup>[161]</sup>
<b>R&amp;D policy coordination</b>	Foreign firms operating in Ireland tend to benefit more from public sector R&D support. <sup>[161]</sup>
	Stronger linkages between multinationals and domestic firms could help improve the diffusion of innovation throughout the economy. <sup>[161]</sup>
	In addition, cooperation between firms and public research centres is improving although much work lays ahead in this area. <sup>[161]</sup>
	New initiatives are being launched to foster business research and innovation. <sup>[161]</sup>
<b>Funding from Horizon 2020</b>	By the end of 2017, Ireland had secured funding of €424 million in Horizon 2020 funding. Ireland also received around €600 million under the previous EU Research Framework Programme FP7. Up to now, Ireland received 1.88% of EU funding <sup>[35]</sup>
<b>Research infrastructures roadmap</b>	National roadmap with identified ESPRI projects was published in 2007. <sup>[30]</sup>

## 5 Conclusions and next steps

The current deliverable provides an extensive overview of the EU strategies and policy developments with special focus on target countries. It prepares a strong base for the pending work not only within the WP6, but for the whole PANTERA process.

The adopted bi-directional approach of the D6.1 allowed to develop the topic from different perspectives. The analysis of the stakeholder engagement process revealed the anticipated conclusions, that target countries are less involved in EU energy policy formulation processes. Still the D6.1 created deeper understanding of the necessary future steps. PANTERA shall initiate targeted information activities addressed to stakeholders covering EC open consultations in energy and R&I sector and other relevant EU level activities via the planned platform, workshops, desks; concentrate on assisting the stakeholders from target countries to build stronger relations with other EU level organisations and initiatives; start educating the stakeholders and advertising the Transparency Register as an instrument for enhancing stakeholder involvement during the workshops.

In the frame of this deliverable, country profiles for six PANTERA desks covering fifteen target countries are created. These aim at monitoring the progress of the target countries towards the EU objectives and national 2020/2030 targets, and structure countries' specific information from various information sources. Furthermore, country profiles provide information on each country's specific gaps for further detailed analysis of causes of insufficient performance within the framework of Task 6.2 "Analysis of the national project findings in the target regions" and Task 6.3 "National cross-case comparisons and conclusions". Moreover, the country profiles provide essential information for preparing presentations with specific national context and underline possible open questions for discussion within the PANTERA workshops. As can be seen in the report under Section 3.2, Region 1 has been further analysed giving more evidence on the status of the country progress and strategic objectives. This work will be replicated by all regions in the months ahead and the report will be updated in the second release.

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### 7.3 Annex 1, Analysis of stakeholders' amendment papers

<p style="text-align: center;"><b>ANNEX 1</b> European Commission's legislative proposal on common rules for the internal market in electricity EURELECTRIC proposals for amendments</p>				
Article	Commissions proposal	EURELECTRIC amendment proposal	Article in final text	Final text
<i>Definitions</i>				
Art.2, par. 6	6. 'active customer' means a customer or a group of jointly acting customers who consume, store or sell electricity generated <u>on their premises</u> , including through aggregators, or participate in demand response or energy efficiency schemes provided that these activities do not constitute their primary commercial or professional activity;	6. 'active customer' means a customer or a group of jointly acting customers who consume, store or sell electricity generated <u>behind the point of their connection to the grid</u> , including through aggregators, or participate in demand response or energy efficiency schemes provided that these activities do not constitute their primary commercial or professional activity;	Art.2, par. 8	<b><u>Suggestion was declined</u></b>  'active customer' means a final customer, or a group of jointly acting final customers, who consumes or stores electricity generated within <u>its premises</u> located within confined boundaries or, where permitted by a Member State, within other premises, or who sells self-generated electricity or participates in flexibility or energy efficiency schemes, provided that those activities do not constitute its primary commercial or professional activity;
Art.2, par. 7	7. 'local energy community' means: <u>an association, a cooperative, a partnership, a non-profit organisation or other legal entity which is effectively controlled by local shareholders or members, generally value rather than profit-driven, involved in distributed generation and in performing activities of a distribution system operator, supplier or aggregator at local level, including across borders;</u>	7. 'local energy community' means: <u>an SME or a not-for-profit organisation, the shareholders or members of which cooperate in the generation, distribution, storage or supply of energy at local level, including across borders, fulfilling at least four out of the following criteria:</u> <u>(a) shareholders or members are natural persons, local authorities, including municipalities, or SMEs;</u> <u>(b) at least 51% of the shareholders or members with voting rights of the entity are natural persons;</u> <u>(c) at least 51% of the shares or participation rights of the entity are owned by local members, i.e. representatives of local public and local private socio-economic interests or citizen having a direct interest in the community activity and its impacts;</u> <u>(d) at least 51% of the seats in the board of directors or managing bodies of the entity are reserved to local members, i.e. representatives of local public and local private socio economic interests or citizens having a direct interest in the community activity and its impacts;</u> <u>(e) the community has not installed more than 5 MW of capacity for electricity, heating and cooling and transport as a yearly average in the previous 5 year.</u>	Art.2, par. 11	<b><u>Suggestion was declined</u></b>  'citizen energy community' means a legal entity that: (a) is based on voluntary and open participation and is effectively controlled by members or shareholders that are natural persons, local authorities, including municipalities, or small enterprises; (b) has for its primary purpose to provide environmental, economic or social community benefits to its members or shareholders or to the local areas where it operates rather than to generate financial profits; and (c) may engage in generation, including from renewable sources, distribution, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders;
Art.2, par. 11	'dynamic electricity price contract' means an electricity supply contract between a supplier and a final customer that reflects <u>the price at the spot market or at the day ahead market at intervals at least equal to the market settlement frequency</u>	'dynamic electricity price contract' means an electricity supply contract between a supplier and a final customer that reflects <u>wholesale price volatility</u>	Art.2, par. 15	<b><u>Suggestion was declined</u></b>  'dynamic electricity price contract' means an electricity supply contract between a supplier and a final customer that reflects the price variation <u>in the spot markets, including in the day-ahead and intraday markets, at intervals at least equal to the market settlement frequency;</u>
Art.2, par. 12 /new/	/None/	<b><u>"Billing" means a written statement of the money owed for goods or services and containing the minimum information defined in Annex II.1</u></b>	/None/	<b><u>Suggestion was declined</u></b>  /None/

Art.2, par. 13 /new/	/None/	<b><u>“Billing information” means separate additional information about consumers’ consumption and rights, as defined in AnnexII.2 and II.5, and shall not constitute a request for payment.</u></b>	Art.2, par. 21	<b><u>Suggestion was partially accepted</u></b> ‘billing information’ means the information provided on a final customer’s bill, apart from a request for payment;
Art.2, par. 16 /new/	/None/	<b><u>“Energy service provider” means a natural or legal person who delivers energy services in a final customer’s facility or premises.</u></b>	/None/	<b><u>Suggestion was declined</u></b> /None/
Art.2, par. 20	<b><u>‘near-real time’ means, in the context of smart metering, the time, usually down to seconds, that elapses between data recording and their automated processing and transmission for use or information purposes;</u></b>	/Delete/	Art.2, par. 26	<b><u>Suggestion was declined</u></b> <b><u>‘near real-time’ means, in the context of smart metering, a short time period, usually down to seconds or up to the imbalance settlement period in the national market;</u></b>
<b><u>End-user energy prices</u></b>				
Art.5, par. 3	(3) By way of derogation from paragraphs 1 and 2, Member States who apply public interventions in price setting for the supply of electricity for energy poor or vulnerable household customers at the date of entry into force of this Directive may continue to apply such public interventions during five years from the entry into force of this Directive. Such public interventions shall pursue a general economic interest, be clearly defined, transparent, non-discriminatory, verifiable and guarantee equal access for Union electricity companies to customers. The interventions shall not go beyond what is necessary to achieve the general economic interest which they pursue, be limited in time and proportionate as regards their beneficiaries.	(3) By way of derogation from paragraphs 1 and 2, Member States who apply public interventions in price setting for the supply of electricity for energy poor or vulnerable household customers at the date of entry into force of this Directive may continue to apply such public interventions during five years from the entry into force of this Directive, <b><u>provided they are financed through the public budget.</u></b> Such public interventions shall pursue a general economic interest, be clearly defined, transparent, non-discriminatory, verifiable and guarantee equal access for Union electricity companies to customers. The interventions shall not go beyond what is necessary to achieve the general economic interest which they pursue, be limited in time and proportionate as regards their beneficiaries.	Art.5, par. 3 and 4	<b><u>Suggestion was declined</u></b> 3. By way of derogation from paragraphs 1 and 2, Member States may apply public interventions in the price setting for the supply of electricity to energy poor or vulnerable household customers. Such public interventions shall be subject to the conditions set out in paragraphs 4 and 5. 4. Public interventions in the price setting for the supply of electricity shall: (a) pursue a general economic interest and not go beyond what is necessary to achieve that general economic interest; 14.6.2019 L 158/143 Official Journal of the European Union EN (b) be clearly defined, transparent, non-discriminatory and verifiable; (c) guarantee equal access for Union electricity undertakings to customers; (d) be limited in time and proportionate as regards their beneficiaries; (e) not result in additional costs for market participants in a discriminatory way
<b><u>Basic contractual rights</u></b>				
Art.10, par. 1	1. 4. Member States shall ensure that all customers are entitled to have their electricity provided by a supplier, subject to the supplier’s agreement, regardless of the Member State in which the supplier is registered, as long as the supplier follows the applicable trading rules. In this regard, Member States shall take all measures necessary to ensure that administrative procedures do not discriminate against supply undertakings already registered in another Member State.	1.4. Member States shall ensure that all customers are entitled to have their electricity provided by a supplier, subject to the supplier’s agreement, regardless of the Member State in which the supplier is registered, as long as the supplier follows the applicable trading <b><u>and balancing rules.</u></b> In this regard, Member States shall take all measures necessary to ensure that administrative procedures do not discriminate against supply undertakings already registered in another Member State.	Art.10, par. 1	<b><u>Suggestion was accepted</u></b> Member States shall ensure that all final customers are entitled to have their electricity provided by a supplier, subject to the supplier’s agreement, regardless of the Member State in which the supplier is registered, provided that the supplier follows the applicable trading <b><u>and balancing rules.</u></b> In that regard, Member States shall take all measures necessary to ensure that administrative procedures do not discriminate against suppliers already registered in another Member State.



Art.10, par. 1b	Without prejudice to Union rules on consumer protection, in particular Directive 2011/83/EU of the European Parliament and of the Council and Council Directive 93/13/EEC, Member States shall ensure that customers:  (b) are given adequate notice of any intention to modify contractual conditions and are informed about their right to dissolve the contract when the notice is given. <b>Suppliers</b> shall notify their customers directly of any adjustment in the supply price as well as of the reasons and preconditions for the adjustment and its scope, at an appropriate time <b>no later than one normal billing period</b> before the adjustment comes into effect in a transparent and comprehensible manner. Member States shall ensure that customers are free to withdraw from contracts if they do not accept the new contractual conditions or adjustments in the supply price notified to them by their electricity supplier;	Without prejudice to Union rules on consumer protection, in particular Directive 2011/83/EU of the European Parliament and of the Council and Council Directive 93/13/EEC, Member States shall ensure that customers:  (b) are given adequate notice of any intention to modify contractual conditions and are informed about their right to dissolve the contract when the notice is given. <b>Service providers</b> shall notify their customers directly of any adjustment in the supply price as well as of the reasons and preconditions for the adjustment and its scope, <b>except if such adjustment was agreed upon by the customer when signing the contract</b> , at an appropriate time before the adjustment comes into effect in a transparent and comprehensible manner. Member States shall ensure that customers are free to withdraw from contracts if they do not accept the new contractual conditions or adjustments in the supply price notified to them by their electricity supplier;	Art.10, par. 2 and 4	<b><u>Suggestion was declined</u></b>  2. Without prejudice to Union rules on consumer protection, in particular Directive 2011/83/EU of the European Parliament and of the Council (20) and Council Directive 93/13/EEC (21), Member States shall ensure that final customers have the rights provided for in paragraphs 3 to 12 of this Article.  4. Final customers shall be given adequate notice of any intention to modify contractual conditions and shall be informed about their right to terminate the contract when the notice is given. <b>Suppliers</b> shall notify their final customers, in a transparent and comprehensible manner, directly of any adjustment in the supply price and of the reasons and preconditions for the adjustment and its scope, <b>at an appropriate time no later than two weeks, or no later than one month in the case of household customers</b> , before the adjustment comes into effect. Member States shall ensure that final customers are free to terminate contracts if they do not accept the new contractual conditions or adjustments in the supply price notified to them by their supplier.
Art.10, par. 1i	Without prejudice to Union rules on consumer protection, in particular Directive 2011/83/EU of the European Parliament and of the Council and Council Directive 93/13/EEC, Member States shall ensure that customers:  (i) are given adequate information on alternatives to disconnection sufficiently in advance before the planned disconnection. These alternatives may refer to sources of support to avoid disconnection, alternative payment plans, debt management advice or disconnection moratorium <b>and should not constitute an extra cost to customers</b>	Without prejudice to Union rules on consumer protection, in particular Directive 2011/83/EU of the European Parliament and of the Council and Council Directive 93/13/EEC, Member States shall ensure that customers:  (i) are <b>(i.e. when they are household customers)</b> given adequate information on alternatives to disconnection sufficiently in advance before the planned disconnection. These alternatives may refer to sources of support to avoid disconnection, alternative payment plans, debt management advice or disconnection moratorium.	Art.10, par. 11	<b><u>Suggestion was partially accepted</u></b>  Suppliers shall provide household customers with adequate information on alternative measures to disconnection sufficiently in advance of any planned disconnection. Such alternative measures may refer to sources of support to avoid disconnection, prepayment systems, energy audits, energy consultancy services, alternative payment plans, debt management advice or disconnection moratoria and not constitute an extra cost to the customers facing disconnection.
<b>Dynamic pricing</b>				
Art.11, par. 1	Member States shall ensure that <b>every final customer is entitled, on request, to a dynamic electricity price contract by his supplier.</b>	Member States shall ensure that <b>there are no barriers for suppliers to offer a dynamic electricity price contract to final customers.</b>	Art.11, par. 1	<b><u>Suggestion was partially accepted</u></b>  Member States shall ensure that the national regulatory framework enables suppliers to offer dynamic electricity price contracts. Member States shall ensure that final customers who have a smart meter installed can request to conclude a dynamic electricity price contract with at least one supplier and with every supplier that has more than 200000 final customers.
<b>Switching</b>				
Art.12, par. 3	(3) By way of derogation from paragraph 2, Member States may choose to permit suppliers to charge contract termination fees to customers willingly terminating fixed term supply contracts before their maturity. Such fees may only be charged if <b>customers receive a demonstrable advantage from these contracts</b> . In addition, such fees shall not exceed the direct economic loss to the supplier of the customer terminating the contract, including the cost of any bundled investments or services already provided to the customer as part of the contract	(3) By way of derogation from paragraph 2, Member States may choose to permit suppliers to charge contract termination fees to customers willingly terminating fixed term supply contracts before their maturity. Such fees may only be charged if <b>they are clearly communicated to customers up front and as part of their contract</b> . In addition, such fees shall not exceed the direct economic loss to the supplier of the customer terminating the contract, including the cost of any bundled investments or services already provided to the customer as part of the contract.	Art.12, par. 3	<b><u>Suggestion was accepted</u></b>  By way of derogation from paragraph 2, Member States may permit suppliers or market participants engaged in aggregation to charge customers contract termination fees where those customers voluntarily terminate fixed-term, fixed-price electricity supply contracts before their maturity, <b>provided that such fees are part of a contract that the customer has voluntarily entered into and that such fees are clearly communicated to the customer before the contract is entered into</b> . Such fees shall be proportionate and shall not exceed the direct economic loss to the supplier or the market participant engaged in aggregation resulting from the customer's termination of the contract, including the costs of any bundled investments or services that have already been provided to the customer as part



				of the contract. The burden of proving the direct economic loss shall be on the supplier or market participant engaged in aggregation, and the permissibility of contract termination fees shall be monitored by the regulatory authority, or by an other competent national authority.
Demand Response aggregation				
Art.13, par. 4	Member States shall ensure that final customers are entitled to receive all relevant demand response data or data on supplied and sold electricity <u>at least once per year.</u>	Member States shall ensure that final customers are entitled to receive all relevant demand response data or data on supplied and sold electricity <u>on a regular basis</u>	Art.13, par. 3	<b><u>Suggestion was accepted</u></b> Member States shall ensure that final customers are entitled to receive all relevant demand response data or data on supplied and sold electricity free of charge <u>at least once every billing period if requested by the customer</u>
Retail Pricing				
/New/	/None/	<b><u>Member States shall ensure that electricity prices do not hamper cost-efficient decarbonisation and may enable that network charges and policy support costs evolve along the following principles in order to enhance demand side flexibility, while improving the system's efficiency:</u></b> <b><u>a) A set of network tariff structures with different shares of standing charges (€/client) capacity-based (kW) and energy-based (kWh) components may be defined by the NRA based on consumers contracted and absorbed capacity and consumption level and patterns.</u></b> <b><u>b)These regulated charges may be conveyed by retailers to their customers with flat or more time-differentiated options</u></b> <b><u>c)Policy costs and levies may be recovered through other means than the electricity price</u></b>	/None/	<b><u>Suggestion was declined</u></b> /None/
Active Customers				
Art.15, par. 1	Member States shall ensure that final customers:(b) are subject to cost reflective, transparent and non-discriminatory network charges, <b><u>accounting separately for</u></b> the electricity fed into the grid and the electricity consumed from the grid, in line with Article 59.	Member States shall ensure that final customers:(b) are subject to cost reflective, transparent and non-discriminatory network charges, accounting separately for the electricity fed into the grid and the electricity consumed from the grid, in line with Article 59. <b><u>However, Member States should not allow the use of net-metering schemes under which the excess electricity injected into the grid can be used at a later time to offset consumption during times when onsite generation is insufficient.</u></b>	Art.15, par. 4	<b><u>Suggestion was partially accepted</u></b> Member States that have existing schemes that do not account separately for the electricity fed into the grid and the electricity consumed from the grid, <b><u>shall not grant new rights under such schemes after 31 December 2023.</u></b> In any event, customers subject to existing schemes shall have the possibility at any time to opt for a new scheme that accounts separately for the electricity fed into the grid and the electricity consumed from the grid as the basis for calculating network charges.
Local Energy Communities				
Art.16, par. 1c	Member States shall ensure that local energy communities:  (c) benefit from a non-discriminatory treatment with regard to their activities, rights and obligations as final customers, generators, distribution system operators, or aggregators;	Member States shall ensure that local energy communities:  (c) benefit from a non-discriminatory treatment with regard to their activities, rights and obligations as final customers, generators, distribution system operators, <b><u>suppliers</u></b> , or aggregators;	Art.16, par. 3b	<b><u>Suggestion was partially accepted</u></b> Member States shall ensure that citizen energy communities: [...] (b) are treated in a non-discriminatory and proportionate manner with regard to their activities, rights and obligations as final customers, <b><u>producers, suppliers</u></b> , distribution system operators or market participants engaged in aggregation; [...]

Art.16, par. 2b	Member States shall provide an enabling regulatory framework that ensures that:  (b) shareholders, or members of a local energy community shall not lose their rights and obligations as household customers or active customers;	Member States shall provide an enabling regulatory framework that ensures that:  (b) <b>system users</b> , shareholders, or members of a local energy community shall not lose their rights and obligations as household customers or active customers;	Art.16, par. 1c	<b><i>Suggestion was declined</i></b> Member States shall provide an enabling regulatory framework for citizen energy communities ensuring that: [...] (c) Members or shareholders of a citizen energy community do not lose their rights and obligations as household customers or active customers; [...]
Art.16, par. 2e	Member States shall provide an enabling regulatory framework that ensures that:  (e) provisions of Chapter IV apply to local energy communities that perform activities of a distribution system operator;	Member States shall provide an enabling regulatory framework that ensures that:  (e) <b>Article 6 and the</b> provisions of Chapter IV apply to local energy communities that perform activities of a distribution system operator;	Art.16, par. 4	<b><i>Suggestion was partially accepted</i></b> 4. Member States may decide to grant citizen energy communities the right to manage distribution networks in their area of operation and establish the relevant procedures, without prejudice to <b>Chapter IV or to other rules and regulations</b> applying to distribution system operators [...]
<b>Demand Response</b>				
Art.17, par. 3	(d) aggregators shall <b>not be required to</b> pay <b>compensation</b> <b>to</b> suppliers or generators;	(d) Aggregators shall pay suppliers <b>and</b> generators <b>the market value of the energy transacted as a result of a demand response action</b> .	Art.17, par. 4	<b><i>Suggestion was accepted</i></b> Member States may require electricity undertakings or participating final customers to pay financial compensation to other market participants or to the market participants' balance responsible parties, if those market participants or balance responsible parties are directly affected by demand response activation. Such financial compensation shall not create a barrier to market entry for market participants engaged in aggregation or a barrier to flexibility. In such cases, the financial compensation shall be strictly limited to covering the resulting costs incurred by the suppliers of participating customers or the suppliers' balance responsible parties during the activation of demand response. [...]
Art.17, par. 4	4. In order to ensure that balancing costs and benefits induced by aggregators are fairly assigned to market participants, Member States <b>may exceptionally</b> allow <b>compensation</b> payments between aggregators and balancing responsible parties. Such compensation payments must be limited to situations where one market participant induces imbalances to another market participant resulting in a financial cost. Such <b>exceptional compensation</b> payments shall be subject to approval by the national regulatory authorities and monitored by the Agency.	In order to ensure that balancing costs and benefits induced by aggregators are fairly assigned to market participants, Member States <b>should</b> allow payments between aggregators and balancing responsible parties. Such payments must be limited to situations where one market participant induces imbalances to another market participant resulting in a financial cost. Such payments shall be subject to approval by the national regulatory authorities and monitored by the Agency.	Art.17, par. 4	<b><i>Suggestion was declined</i></b> Member States <b>may</b> require electricity undertakings or participating final customers to pay financial compensation to other market participants or to the market participants' balance responsible parties, if those market participants or balance responsible parties are directly affected by demand response activation. Such financial compensation shall not create a barrier to market entry for market participants engaged in aggregation or a barrier to flexibility. In such cases, the financial compensation shall be strictly limited to covering the resulting costs incurred by the suppliers of participating customers or the suppliers' balance responsible parties during the activation of demand response. The method for calculating compensation may take account of the benefits brought about by the independent aggregators to other market participants and, where it does so, the aggregators or participating customers may be required to contribute to such compensation but only where and to the extent that the benefits to all suppliers, customers and their balance responsible parties do not exceed the direct costs incurred. The calculation method shall be subject to approval by the regulatory authority or by another competent national authority.

Billing and billing information				
Art.18, par. 1	(1) Member States shall ensure that <b>bills</b> fulfil the minimum requirements <b>for billing and billing information as</b> set out in Annex II. The information contained in bills shall be correct, clear, concise <b>and presented in a manner that facilitates comparison by consumers.</b>	(1) Member States shall ensure that <b>billing and billing information</b> fulfil the minimum requirements set out in Annex II. The information contained in bills shall be correct, clear, <b>and</b> concise.	Art.18, par. 1 Art.18, par. 6	<b><u>Suggestion was partially accepted</u></b> 1. Member States shall ensure that <b>bills and billing information are accurate, easy to understand, clear, concise, user-friendly and presented in a manner that facilitates comparison by final customers.</b> On request, final customers shall receive a clear and understandable explanation of how their bill was derived, especially where bills are not based on actual consumption. 6. Member States shall ensure that bills and billing information fulfil the minimum requirements set out in Annex I
Art.18, par. 3	(4) Billing shall take place on the basis of actual consumption at least once a year. <b>Billing</b> information shall be made available at least once every three months, upon request or where the final customers have opted to receive electronic billing or else twice a year	(4) Billing shall take place on the basis of actual consumption at least once a year. Information <b>on actual consumption</b> shall be made available at least once every three months, upon request or where the final customers have opted to receive electronic billing or else twice a year	Annex I, par. 2a and 2b	<b><u>Suggestion was accepted</u></b> Frequency of billing and the provision of billing information: (a) billing on the basis of <b>actual consumption</b> shall take place at least once a year; (b) where the final customer does not have a meter that allows remote reading by the operator, or where the final customer has actively chosen to disable remote reading in accordance with national law, accurate billing information based on actual consumption shall be made available to the final customer at least every six months, or once every three months, if requested or where the final customer has opted to receive electronic billing; [...]
Art.18, par. 4	(4) Where final customers have meters that allow remote reading by the operator, accurate <b>billing</b> information <b>based on</b> actual consumption shall be provided at least once a month.	(4) Where final customers have meters that allow remote reading by the operator, accurate information on actual consumption shall be provided at least once a month.	Annex I, par. 2d	<b><u>Suggestion was accepted</u></b> Frequency of billing and the provision of billing information: [...] (d) <b>where the final customer has a meter that allows remote reading by the operator, accurate billing information based on actual consumption shall be provided at least every month;</b> such information may also be made available via the internet, and shall be updated as frequently as allowed by the measurement devices and systems used.
Art.18, par. 7	<b><u>(7) Member States may lay down that, at the request of the final customers, the information contained in these bills shall not be considered to constitute a request for payment. In such cases, Member States shall ensure that suppliers offer flexible arrangements for payments.</u></b>	/Delete/	/None/	<b><u>Suggestion was accepted</u></b> /None/

Smart metering				
Article 20 (2)	<p>Where smart metering is positively assessed as a result of cost-benefit assessment referred to in Article 19(2), or systematically rolled out, Member States shall implement smart metering systems in accordance with European standards, the provisions in Annex III, and in line with the following principles:</p> <p>(a) the metering systems accurately measure actual electricity consumption and provide to final customers information on actual time of use. That information shall be made easily available <b>and visualised</b> to final customers <b>at no additional cost and at near-real time</b> in order to support automated energy efficiency programmes, demand response and other services;</p> <p>(b) the security of the smart metering systems and data communication is ensured in compliance with relevant European Union security legislation having due regard of the best available techniques for ensuring the highest level of cybersecurity protection;</p> <p>...</p> <p>(g) smart metering systems <b>shall</b> enable final customers to be metered and settled at the same time resolution as the imbalance period in the national market.</p>	<p>Where smart metering is positively assessed as a result of cost-benefit assessment referred to in Article 19(2), or systematically rolled out, Member States shall implement smart metering systems in accordance with European standards, the provisions in Annex III, and in line with the following principles:</p> <p>(a) the metering systems accurately measure actual electricity consumption and provide to final customers information on actual time of use. That information shall be made easily available to final customers in order to support automated energy efficiency programmes, demand response and other services;</p> <p>(b) the security of the smart metering systems and data communication is ensured in compliance with relevant European Union security legislation having due regard of the best available techniques for ensuring the highest level of cybersecurity protection <b>taking into consideration the customers interest for a constant level of protection and the costs of the upgrades involved;</b></p> <p>...</p> <p>(g) smart metering systems <b>may</b> enable final customers to be metered and settled at the same time resolution as the imbalance period in the national market.</p>	<p>Art. 20, par. a)</p> <p>Art. 20, par. b)</p> <p>Art. 20, par. g)</p>	<p><b><u>Suggestion was declined</u></b></p> <p>(a) the smart metering systems shall accurately measure actual electricity consumption and shall be capable of providing to final customers information on actual time of use. Validated historical consumption data shall be made easily and securely available and visualised to final customers on request and at no additional cost. Non-validated near real-time consumption data shall also be made easily and securely available to final customers at no additional cost, through a standardised interface or through remote access, in order to support automated energy efficiency programmes, demand response and other services;</p> <p><b><u>Suggestion was partially accepted</u></b></p> <p>(b) the security of the smart metering systems and data communication shall comply with relevant Union security rules, having due regard of the best available techniques for ensuring the highest level of cybersecurity protection while bearing in mind the costs and the principle of proportionality;</p> <p>[...]</p> <p><b><u>Suggestion was declined</u></b></p> <p>(g) smart metering systems shall enable final customers to be metered and settled at the same time resolution as the imbalance settlement period in the national market.</p>
Art. 21	<p>2. In the context of a customer request for a smart meter pursuant to paragraph 1, Member States or, where a Member State has so provided, the designated competent authorities shall:</p> <p>(a) ensure that the offer to the final customer requesting the installation of a smart meter explicitly states and clearly describes:</p> <ul style="list-style-type: none"> <li>– the functions and interoperability that can be supported by the smart meter and the services that are feasible as well as the benefits that can be realistically attained by having that smart meter at that moment in time;</li> <li>– any associated costs to be borne by the final customer;</li> </ul> <p>(b) ensure that it is installed within a reasonable time and no later than three months after the customer's request;</p> <p>....</p>	<p>2. In the context of a customer request for a smart meter pursuant to paragraph 1, Member States or, where a Member State has so provided, the designated competent authorities shall:</p> <p>(a) ensure that the offer to the final customer requesting the installation of a smart meter explicitly states and clearly describes:</p> <ul style="list-style-type: none"> <li>– the functions and interoperability that can be supported by the smart meter and the services that are feasible as well as the benefits that can be realistically attained by having that smart meter at that moment in time;</li> <li>– any associated costs to be borne by the final customer;</li> </ul> <p>(b) ensure that it is installed within a reasonable time <b><u>inside the roll-out planning</u></b> after the customer's request</p> <p>....</p>	<p>Art. 21, par. 2a and 2b</p>	<p><b><u>Suggestion was declined</u></b></p> <p>In the context of a customer request for a smart meter pursuant to paragraph 1, Member States or, where a Member State has so provided, the designated competent authorities shall:</p> <p>(a) ensure that the offer to the final customer requesting the installation of a smart meter explicitly states and clearly describes:</p> <ul style="list-style-type: none"> <li>- the functions and interoperability that can be supported by the smart meter and the services that are feasible as well as the benefits that can be realistically attained by having that smart meter at that moment in time;</li> <li>- any associated costs to be borne by the final customer;</li> </ul> <p>(b) ensure that it is installed within a reasonable time, no later than four months after the customer's request;</p> <p>[...]</p>

Data management and data format				
Art. 23, par. 2	(2) Member States shall organise the management of data in order to ensure efficient data access and exchange. Independently of the data management model applied in each Member State, the party or parties responsible for data management shall provide to any eligible party with the explicit consent of the final customer, access to the data of the final customer. Eligible parties should have at their disposal in a non-discriminatory manner and simultaneously the requested data. Access to data shall be easy, while relevant procedures shall be made publicly available.	(2) Member States shall organise the management of data in order to ensure <u>secure, transparent, neutral, non-discriminatory and cost-efficient</u> data access and exchange. Independently of the data management model applied in each Member State, the party or parties responsible for data management shall, <u>in accordance with Regulation (EU) 2016/679</u> , provide to any eligible party with the explicit consent of the final customer, access to the data of the final customer. Eligible parties should have at their disposal in a non-discriminatory manner and simultaneously the requested data. Access to data shall be easy, while relevant procedures shall be made publicly available	Art. 23, par. 2 Art. 23, par. 4	<b><u>Suggestion was partially accepted</u></b> <sup>2</sup> . Member States shall organise the management of data in order to <b><u>ensure efficient and secure data access and exchange, as well as data protection and data security</u></b> . Independently of the data management model applied in each Member State, the parties responsible for data management shall provide access to the data of the final customer to any eligible party, in accordance with paragraph 1. Eligible parties shall have the requested data at their disposal in a non-discriminatory manner and simultaneously. Access to data shall be easy and the relevant procedures for obtaining access to data shall be made publicly available. <sup>4</sup> Member States or, where a Member State has so provided, the designated competent authorities, shall authorise and certify or, where applicable, supervise the parties responsible for the data management, in order to ensure that they comply with the requirements of this Directive. Without prejudice to the tasks of the data protection officers <b><u>under Regulation (EU) 2016/679</u></b> . Member States may decide to require that parties responsible for the data management appoint compliance officers who are to be responsible for monitoring the implementation of measures taken by those parties to ensure non-discriminatory access to data and compliance with the requirements of this Directive. Member States may appoint compliance officers or bodies referred to in point (d) of Article 35(2) of this Directive to fulfil the obligations under this paragraph.
Art. 24, par. 1	(1) Member States shall define a common data format and a transparent procedure for eligible parties to have access to the data listed under paragraph 1 of Article 23, in order to promote competition in the retail market and avoid excessive administrative costs for the eligible parties.	(1) Member States shall define a common <b><u>national</u></b> data format and a transparent procedure for eligible parties to have access to the data listed under paragraph 1 of Article 23, in order to promote competition in the retail market and avoid excessive administrative costs for the eligible parties.	/None/	<b><u>Suggestion was declined</u></b> /No text/.
Art. 24, par. 2	(2) The Commission, <b><u>by means of implementing acts adopted in accordance with the advisory procedure referred to in Article 68, shall</u></b> determine a common European data <b><u>format and</u></b> non-discriminatory and transparent <b><u>procedures for</u></b> accessing the data, listed under paragraph 1 of Article 23, <b><u>that will replace</u></b> national data format and procedure <b><u>adopted by Member States</u></b> in accordance with paragraph 1. <b><u>Member States shall ensure that market participants apply a common European data format.</u></b>	(2) The Commission may determine <b><u>a set of principles for</u></b> a common European data <b><u>framework to support</u></b> non-discriminatory and transparent access <b><u>to</u></b> the data, listed under paragraph 1 of Article 23. <b><u>Such principles should be taken into account by Member States when developing their</u></b> national data format and procedure in accordance with paragraph 1.	Art. 24, par. 2 and 3	<b><u>Suggestion was accepted</u></b>  2. The Commission shall adopt, by means of implementing acts, interoperability requirements and non-discriminatory and transparent procedures for access to data referred to in Article 23(1). Those implementing acts shall be adopted in accordance with the advisory procedure referred to in Article 68(2). 3. Member States shall ensure that electricity undertakings apply the interoperability requirements and procedures for access to data referred to in paragraph 2. Those requirements and procedures shall be based on existing national practices.



Tasks of DSOs				
Art. 31, par. 1	<p>The distribution system operators shall be responsible for <b><u>ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity, for operating, maintaining and developing under economic conditions a secure, reliable and efficient electricity distribution system in its area with due regard for the environment and energy efficiency</u></b></p> <p>---</p>	<p>The distribution system operators shall be responsible for:</p> <p>a) ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity, for operating, maintaining and developing under economic conditions a secure, reliable and efficient electricity distribution system in its area with due regard for the environment and energy efficiency.</p> <p><b><u>b) managing electricity flows on the system, taking into account exchanges with other interconnected systems. To that end, the distribution system operator shall be responsible for ensuring a secure, reliable and efficient electricity system and, in that context, for ensuring the availability of all necessary ancillary services, including those provided by demand response and energy storage, in so far as such availability is independent from any other distribution system with which its system is interconnected;</u></b></p>	Art. 31, par. 1	<p><b><u>Suggestion was declined</u></b></p> <p><b><u>The distribution system operator shall be responsible for ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity, for operating, maintaining and developing under economic conditions a secure, reliable and efficient electricity distribution system in its area with due regard for the environment and energy efficiency.</u></b></p>
Art. 31, par. 6 /New/	/None/	<p><b><u>6. Where a distribution system operator is responsible for balancing the distribution system, rules adopted by it for that purpose shall be objective, transparent and non-discriminatory, including rules for the charging of system users of their networks for energy imbalance. Terms and conditions, including rules and tariffs, for the provision of such services by distribution system operators shall be established in accordance with Article 59 (6) in a non-discriminatory and cost-reflective way and shall be published.</u></b></p>	Art. 31, par. 6	<p><b><u>Suggestion was accepted</u></b></p> <p>Where a distribution system operator is responsible for the procurement of products and services necessary for the efficient, reliable and secure operation of the distribution system, rules adopted by the distribution system operator for that purpose shall be objective, transparent and non-discriminatory, and shall be developed in coordination with transmission system operators and other relevant market participants. The terms and conditions, including rules and tariffs, where applicable, for the provision of such products and services to distribution system operators shall be established in accordance with Article 59(7) in a non-discriminatory and cost-reflective way and shall be published.</p>
Tasks of DSOs in flexibility				
Art. 32	<p>1. Member States shall provide the necessary regulatory framework to allow and incentivise distribution system operators to procure services in order to improve efficiencies in the operation and development of the distribution system, including local congestion management. In particular, regulatory frameworks shall enable distribution system operators to procure services from resources such as distributed generation, demand response or storage and consider energy efficiency measures, which may supplant the need to upgrade or replace electricity capacity and which support the efficient and secure operation of the distribution system. Distribution system operators shall procure these services according to transparent, non-discriminatory and market based procedures.</p> <p>[...]</p>	<p>1. Member States shall provide the necessary regulatory framework to allow and incentivise distribution system operators to procure <b><u>and use</u></b> services in order to improve efficiencies in the operation and development of the distribution system, including local congestion management. In particular, regulatory frameworks shall enable distribution system operators to procure <b><u>and use</u></b> services from resources such as distributed generation, demand response or storage and consider energy efficiency measures, which may supplant the need to upgrade or replace electricity capacity and which support the efficient and secure operation of the distribution system. Distribution system operators shall procure these services according to transparent, non-discriminatory and market based procedures.</p> <p>[...]</p>	Art. 32, par. 1	<p><b><u>Suggestion was declined</u></b></p> <p>Member States shall provide the necessary regulatory framework to allow and provide incentives to distribution system operators to procure flexibility services, including congestion management in their areas, in order to improve efficiencies in the operation and development of the distribution system. In particular, the regulatory framework shall ensure that distribution system operators are able to procure such services from providers of distributed generation, demand response or energy storage and shall promote the uptake of energy efficiency measures, where such services cost-effectively alleviate the need to upgrade or replace electricity capacity and support the efficient and secure operation of the distribution system. Distribution system operators shall procure such services in accordance with transparent, non-discriminatory and market-based procedures unless the regulatory authorities have established that the procurement of such services is not economically efficient or that such procurement would lead to severe market distortions or to higher congestion.</p>



Art. 32	2. The development of a distribution system shall be based on a transparent network development plan that distribution system operators shall submit <b>every two years</b> to the regulatory authority. The network development plan shall contain the planned investments for the next five to ten years, with particular emphasis on the main distribution infrastructure which is required in order to connect new generation capacity and new loads including re-charging points for electric vehicles. The network development plan shall also demonstrate the use of demand response, energy efficiency, energy storage facilities or other resources that distribution system operator is using as an alternative to system expansion.	2.The development of a distribution system shall be based on a transparent network development plan that distribution system operators shall submit to the regulatory authority. The network development plan shall contain the planned investments for the next five to ten years, with particular emphasis on the main distribution infrastructure which is required in order to connect new generation capacity and new loads including re-charging points for electric vehicles. The network development plan shall also demonstrate the use of demand response, energy efficiency, energy storage facilities or other resources that distribution system operator is using as an alternative to system expansion.	Art. 32, par. 3	<b><u>Suggestion was declined</u></b> The development of a distribution system shall be based on a transparent network development plan that the distribution system operator shall publish at least every two years and shall submit to the regulatory authority. The network development plan shall provide transparency on the medium and long-term flexibility services needed, and shall set out the planned investments for the next five-to-ten years, with particular emphasis on the main distribution infrastructure which is required in order to connect new generation capacity and new loads, including recharging points for electric vehicles. The network development plan shall also include the use of demand response, energy efficiency, energy storage facilities or other resources that the distribution system operator is to use as an alternative to system expansion.
Art. 32	<b><u>The regulatory authority shall consult all current or potential system users on the network development plan. The regulatory authority shall publish the result of the consultation process on the proposed investments. [...]</u></b>	/Delete/	Art. 32, par. 4	<b><u>Suggestion was declined</u></b> The distribution system operator shall consult all relevant system users and the relevant transmission system operators on the network development plan. The distribution system operator shall publish the results of the consultation process along with the network development plan, and submit the results of the consultation and the network development plan to the regulatory authority. The regulatory authority may request amendments to the plan.
<b>Electro-mobility</b>				
Art. 33, par. 4	Member States shall perform at regular intervals or at least every five years a public consultation in order to re-assess the potential interest of market parties to own, develop, operate or manage recharging points for electric vehicles. In case the public consultation indicates that third parties are able to own, develop, operate or manage such points, Member States shall ensure that distribution system operators' activities in this regard are phased-out.	Member States shall perform at regular intervals or at least every five years a public consultation in order to re-assess the potential interest of market parties to own, develop, operate or manage recharging points for electric vehicles. In case the public consultation indicates that third parties are able to own, develop, operate or manage such points, Member States shall ensure that distribution system operators' activities in this regard are phased-out, <b><u>assets are transferred at market value, and distribution system operators recover eligible costs incurred. Distribution System Operators are entitled to own, develop, operate or manage their own recharging points in their facilities for their exclusively operational use.</u></b>	Art. 33, par. 4 Art. 33, par. 2	<b><u>Suggestion was accepted</u></b>  <b><u>4. [...] As part of the conditions of that procedure, regulatory authorities may allow the distribution system operator to recover the residual value of its investment in recharging infrastructure.</u></b>  2. Distribution system operators shall not own, develop, manage or operate recharging points for electric vehicles, <b><u>except where distribution system operators own private recharging points solely for their own use.</u></b>

Storage				
Art. 36	<p><b><u>1. Distribution system operators shall not be allowed to own, develop, manage or operate energy storage facilities.</u></b></p> <p><b><u>2. By way of derogation from paragraph 1. Member States may allow distribution system operators to own, develop, manage or operate storage facilities</u></b> only if the following conditions are fulfilled: (a) other parties, following an open and transparent tendering procedure, have not expressed their interest to own, develop, manage or operate storage facilities; <b><u>(b) such facilities are necessary for the distribution system operators to fulfil its obligations under this regulation for the efficient, reliable and secure operation of the distribution system;</u></b></p> <p><b><u>And</u></b></p> <p><b><u>(c) the regulatory authority</u></b> has assessed <b><u>the necessity of such derogation taking into account the conditions under points (a) and (b)</u></b> of this paragraph and has granted its approval.</p> <p>3. Articles 35 and Article 56 shall apply to distribution system operators engaged in ownership, development, operation or management of energy storage facilities.</p> <p>4. Regulatory authorities shall perform at regular intervals or at least every five years a public consultation in order to re-assess the potential interest of market parties to invest, develop, operate or manage energy storage facilities. In case the public consultation indicates that third parties are able to own, develop, operate or manage such facilities, Member States shall ensure that distribution system operators' activities in this regard are phased-out .</p>	<p><b><u>1. Energy storage facilities shall be owned, developed, managed or operated by markets participants.</u></b></p> <p><b><u>2. Distribution system operators may be allowed to own, develop, manage or operate storage facilities if such facilities are necessary for the distribution system operator to fulfil its obligations under this regulation for the efficient, reliable and secure operation of the distribution system</u></b> only if the following conditions are fulfilled: (a) other parties, following an open and transparent tendering procedure <b><u>(under NRA supervision)</u></b>, have not expressed their interest to own, develop, manage or operate <b><u>cost-effective</u></b> storage facilities <b><u>or for alternatives flexibility services;</u></b></p> <p><b><u>Or;</u></b></p> <p><b><u>(b) the NRA</u></b> has assessed <b><u>that there is nonnecessity to apply the condition under point(a)</u></b> of this paragraph and has granted its approval.</p> <p>3. Articles 35 and Article 56 shall apply to distribution system operators engaged in the ownership, development, operation or management of energy storage facilities.</p> <p>4. Regulatory authorities shall perform at regular intervals or at least every five years a public consultation in order to re-assess the potential interest of market parties to invest, develop, operate or manage energy storage facilities. In case the public consultation indicates that third parties are able to own, develop, operate or manage such facilities, Member States shall ensure that distribution system operators' activities in this regard are phased-out <b><u>with compensation on fair and reasonable terms.</u></b></p>	<p>Art. 36, par. 1</p> <p>Art. 36, par. 2</p> <p>Art. 36, par. 3</p>	<p><b><u>Suggestion was declined</u></b></p> <p>1. Distribution system operators shall not own, develop, manage or operate energy storage facilities.</p> <p><b><u>Suggestion was declined</u></b></p> <p>2. By way of derogation from paragraph 1, Member States may allow distribution system operators to own, develop, manage or operate energy storage facilities, where they are fully integrated network components and the regulatory authority has granted its approval, or where all of the following conditions are fulfilled:</p> <p>(a) other parties, following an open, transparent and non-discriminatory tendering procedure that is subject to review and approval by the regulatory authority, have not been awarded a right to own, develop, manage or operate such facilities, or could not deliver those services at a reasonable cost and in a timely manner;</p> <p>(b) such facilities are necessary for the distribution system operators to fulfil their obligations under this Directive for the efficient, reliable and secure operation of the distribution system and the facilities are not used to buy or sell electricity in the electricity markets; and</p> <p>[...]</p> <p><b><u>Suggestion was declined</u></b></p> <p>(3. Articles 35 and 56 shall... - no text)</p> <p><b><u>Suggestion was accepted</u></b></p> <p>3. [...] As part of the conditions of that procedure, regulatory authorities may allow the distribution system operators to receive reasonable compensation, in particular to recover the residual value of their investment in the energy storage facilities.</p>
Tasks of the TSOs				
Art. 40, par. 4/New/	/None/	<b><u>(c) reflective of the need for all products and services for the system.</u></b>	/None/	<b><u>Suggestion was declined/None/</u></b>
Independence of TSOs				
Art. 47, par. 3	<p>The vertically integrated undertaking and its subsidiaries undertaking performing functions of generation or supply shall not have any direct or indirect shareholding in the transmission system operator. The transmission system operator shall neither have any direct or indirect shareholding in any subsidiary of the vertically integrated undertaking performing functions of generation or supply, nor receive dividends or any other financial benefit from that subsidiary.</p>	<p>The vertically integrated undertaking and its subsidiaries <b><u>of the vertically integrated</u></b> undertaking performing functions of generation or supply shall not have any direct or indirect shareholding in the transmission system operator. The transmission system operator shall neither have any direct or indirect shareholding in any subsidiary of the vertically integrated undertaking performing functions of generation or supply, nor receive dividends or any other financial benefit from that subsidiary.</p>	Art. 47, par. 3	<p><b><u>Suggestion was partially accepted</u></b></p> <p><b><u>Subsidiaries of the vertically integrated undertaking performing functions</u></b> of generation or supply shall not have any direct or indirect shareholding in the transmission system operator. The transmission system operator shall neither have any direct or indirect shareholding in any subsidiary of the vertically integrated undertaking performing functions of generation or supply, nor receive dividends or other financial benefits from that subsidiary.</p>

Billing and billing information				
Annex II, par. 2 /New/	<p>Where appropriate, the following information shall be <b><u>prominently displayed</u></b> to final customers <b><u>in or with their bills and periodical settlement bills:</u></b></p> <p>(a) current actual prices and actual consumption of energy;</p> <p>(b) comparisons of the customers' current energy consumption with consumption for the same period in the previous year in graphic form;</p> <p>(c) contact information for consumer organisations, energy agencies or similar bodies, including website addresses, from which information may be obtained on available energy efficiency improvement measures, comparative end-user profiles and objective technical specifications for energy-using equipment.</p> <p>In addition, comparisons with an average normalised or benchmarked customer in the same user category shall be made available to final customers <b><u>in, with or signposted to within, their bills and periodical settlement bills.</u></b></p>	<p>2) Billing information</p> <p>Where appropriate, the following <b><u>billing</u></b> information shall be <b><u>made available</u></b> to final customers:</p> <p>(a) current actual prices and actual consumption of energy;</p> <p>(b) comparisons of the customers' current energy consumption with consumption for the same period in the previous year in graphic form;</p> <p>(c) contact information for consumer organisations, energy agencies or similar bodies, including website addresses, from which information may be obtained on available energy efficiency improvement measures, comparative end-user profiles and objective technical specifications for energy-using equipment.</p> <p>In addition, <b><u>wherever possible and useful</u></b>, comparisons with an average normalised or benchmarked customer in the same user category shall be made available to final customers.</p>	Annex I, par. 1.3	<p><b><u>Suggestion was partially accepted</u></b></p> <p>Where bills are based on actual consumption or remote reading by the operator, the following information shall be made available to final customers in, with or signposted to within their bills and periodic settlement bills:</p> <p>(a) comparisons of the final customer's current electricity consumption with the final customer's consumption for the same period in the previous year in graphic form;</p> <p>(b) contact information for consumer organisations, energy agencies or similar bodies, including website addresses, from which information may be obtained on available energy efficiency improvement measures for energy-using equipment;</p> <p>(c) comparisons with an average normalised or benchmarked final customer in the same user category.</p>
Annex II, par. 5	<p><b><u>4. Disclosure of energy sources</u></b></p> <p>Suppliers shall specify in <b><u>bills:</u></b></p> <p>(a) the contribution of each energy source to the overall fuel mix of the supplier <b><u>(at national level i.e. in the Member State where the supply contract has been concluded, as well as at the level of the supply undertaking if the supplier is active in several Member States)</u></b> over the preceding year in a comprehensible and clearly comparable manner;</p> <p>(b) the contribution of each energy source to the electricity purchased by the customer in accordance with the supply contract (product level disclosure);</p> <p>(c) as a minimum the reference to existing reference sources, such as web pages, where information on the environmental impact, in terms of at least CO<sub>2</sub> emissions and the radioactive waste resulting from the electricity produced by the overall fuel mix of the supplier over the preceding year is publicly available;</p>	<p><b><u>5. Disclosure of energy sources</u></b></p> <p>Suppliers shall specify in <b><u>billing information:</u></b></p> <p>(a) the contribution of each energy source to the overall fuel mix of the supplier over the preceding year in a comprehensible and clearly comparable manner; <b><u>and/or</u></b></p> <p>(b) the contribution of each energy source to the electricity purchased by the customer in accordance with the supply contract (product level disclosure);</p> <p>(c) as a minimum the reference to existing reference sources, such as web pages, where information on the environmental impact, in terms of at least CO<sub>2</sub> emissions and the radioactive waste resulting from the electricity produced by the overall fuel mix of the supplier over the preceding year is publicly available;</p>	Annex I, par. 5	<p><b><u>Suggestion was declined</u></b></p> <p><b><u>5. Disclosure of energy sources</u></b></p> <p>Suppliers shall specify in <b><u>bills</u></b> the contribution of each energy source to the electricity purchased by the final customer in accordance with the electricity supply contract (product level disclosure). The following information shall be made available to final customers in, with, or signposted to within their bills and billing information:</p> <p>(a) the contribution of each energy source to the overall energy mix of the supplier <b><u>(at national level, namely in the Member State in which the electricity supply contract has been concluded, as well as at the level of the supplier if the supplier is active in several Member States)</u></b> over the preceding year in a comprehensible and clearly comparable manner;</p> <p>(b) information on the environmental impact, in at least terms of CO<sub>2</sub> emissions and the radioactive waste resulting from the electricity produced by the overall energy mix of the supplier over the preceding year.</p> <p>[...]</p>

## ANNEX 1

### European Commission's legislative proposal on common rules for the internal market in electricity EDSO for Smart Grids proposals for amendments

Article	Commissions proposal	EDSO for smart grids amendment proposal	Article in final text	Final text
<i>Definitions</i>				
Art. 2, par. 39	(39) 'non-frequency ancillary service' means a service used by a transmission or distribution system operator for steady state voltage control, fast reactive current injections, inertia <b>and</b> black start capability;	(39) 'non-frequency ancillary service' means a service used by a transmission or distribution system operator for steady state voltage control, fast reactive current injections, inertia, black start capability and <b>island operation</b> ;	Art. 2, par. 49	<b><i>Suggestion was accepted</i></b> (49) 'non-frequency ancillary service' means a service used by a transmission system operator or distribution system operator for steady state voltage control, fast reactive current injections, inertia for local grid stability, short-circuit current, black start capability and <b>island operation capability</b> ;
<i>DSO roles</i>				
Art. 31, par. 1 and 5	1. The distribution system operator shall be responsible for ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity, for operating, maintaining and developing under economic conditions a secure, reliable and efficient electricity distribution system in its area with due regard for the environment and energy efficiency. <b><u>5. Each distribution system operator shall procure the energy it uses to cover energy losses and the non-frequency ancillary services in its system according to transparent, non-discriminatory and market based procedures, whenever it has such a function. Unless justified by a cost-benefit analysis, the procurement of non-frequency ancillary services by a distribution system operator shall be transparent, non-discriminatory and market based ensuring effective participation of all market participants including renewable energy sources, demand response, energy storage facilities and aggregators, in particular by requiring regulatory authorities or distribution system operators in close cooperation with all market participants, to define technical modalities for participation in these markets on the basis of the technical requirements of these markets and the capabilities of all market participants.</u></b>	1. The distribution system operator shall be responsible for: <b><u>(a)</u></b> ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity, for operating, maintaining and developing under economic conditions a secure, reliable and efficient electricity distribution system in its area with due regard for the environment and energy efficiency. <b><u>(b) managing electricity flows on the distribution system, taking into account exchanges with other interconnected systems. The distribution system operator shall be responsible for ensuring a secure, reliable and economically efficient distribution system.</u></b> <b><u>5. If a distribution system operator procures energy or non-frequency ancillary services for its system management, this procurement should follow transparent, non-discriminatory and market based procedures.</u></b>	Art. 31, par. 1 and 5	<b><i>Suggestion was declined</i></b> 1. The distribution system operator shall be responsible for ensuring the long-term ability of the system to meet reasonable demands for the distribution of electricity, for operating, maintaining and developing under economic conditions a secure, reliable and efficient electricity distribution system in its area with due regard for the environment and energy efficiency.  <b><i>Suggestion was declined</i></b> 5. Each distribution system operator shall act as a neutral market facilitator in procuring the energy it uses to cover energy losses in its system in accordance with transparent, non-discriminatory and market-based procedures, where it has such a function.



<p>Art. 32, par. 1</p>	<p>1. Member States shall provide the necessary regulatory framework to allow and incentivise distribution system operators to <b>procure services</b> in order to improve efficiencies in the operation and development of the distribution system, including local congestion management. In particular, regulatory frameworks shall enable distribution system operators to procure services from resources such as distributed generation, demand response or storage and consider energy efficiency measures, which may supplant the need to upgrade or replace electricity capacity and which support the efficient and secure operation of the distribution system.</p> <p><b><u>Distribution system operators shall procure these services according to transparent, nondiscriminatory and market based procedures.</u></b></p> <p>Distribution system operators shall define standardised market products for the services procured ensuring effective participation of all market participants including renewable energy sources, demand response, and aggregators. Distribution system operators shall exchange all necessary information and coordinate <b><u>with transmission system operators</u></b> in order to ensure the optimal utilisation of resources, ensure the secure and efficient operation of the system and facilitate market development. Distribution system operators shall be adequately remunerated for the procurement of such services in order to recover at least the corresponding expenses, including the necessary information and communication technologies expenses, including expenses which correspond to the necessary information and communication infrastructure.</p>	<p>1. Member States shall provide the necessary regulatory framework to allow and incentivise distribution system operators <b><u>to access and use all flexibility options</u></b> in order to improve efficiencies in the operation and development of the distribution system, including local congestion management <b><u>and local energy balance, as well as overseeing third-party uses of flexible resources connected to their networks.</u></b></p> <p><b><u>The national regulatory frameworks shall foster the development of different forms of network regulation, including flexible contracts, network tariffs, connection agreements as well as market-based procedures.</u></b> In particular, regulatory frameworks shall enable distribution system operators to procure services from resources such as distributed generation, demand response or storage and consider energy efficiency measures, <b><u>or use other flexibility options</u></b> which may supplant the need to upgrade or replace electricity capacity and which support the efficient and secure operation of the distribution system. <b><u>If distribution system operators procure market-based services, this shall be done in a transparent and non-discriminatory way.</u></b></p> <p>Distribution system operators <b><u>and market players</u></b> shall define standardised market products <b><u>at a Member State level</u></b> for the services procured ensuring effective participation of all market participants including renewable energy sources, demand response, and aggregators. Distribution system operators <b><u>and transmission system operators</u></b> shall exchange all necessary information and coordinate <b><u>between themselves</u></b>, in order to ensure the optimal utilisation of resources, ensure the secure and efficient operation of the system and facilitate market development. Distribution system operators shall be adequately remunerated for the procurement of such services in order to recover at least the corresponding expenses, including the necessary information and communication technologies expenses, including expenses which correspond to the necessary information and communication infrastructure.</p>	<p>Art. 32, par. 1 and 2</p>	<p><b><u>Suggestion was partially accepted</u></b></p> <p>1. Member States shall provide the necessary regulatory framework to allow and provide incentives to distribution system operators to procure flexibility services, including congestion management in their areas, in order to improve efficiencies in the operation and development of the distribution system. In particular, the regulatory framework shall ensure that distribution system operators are able to procure such services from providers of distributed generation, demand response or energy storage and shall promote the uptake of energy efficiency measures, where such services cost-effectively alleviate the need to upgrade or replace electricity capacity and support the efficient and secure operation of the distribution system. Distribution system operators shall procure such services in accordance with transparent, non-discriminatory and market-based procedures unless the regulatory authorities have established that the procurement of such services is not economically efficient or that such procurement would lead to severe market distortions or to higher congestion.</p> <p>2. Distribution system operators, subject to approval by the regulatory authority, or the regulatory authority itself, shall, in a transparent and participatory process that includes all relevant system users and transmission system operators, establish the specifications for the flexibility services procured and, where appropriate, standardised market products for such services at least at national level. The specifications shall ensure the effective and non-discriminatory participation of all market participants, including market participants offering energy from renewable sources, market participants engaged in demand response, operators of energy storage facilities and market participants engaged in aggregation. Distribution system operators shall exchange all necessary information and shall coordinate with transmission system operators in order to ensure the optimal utilisation of resources, to ensure the secure and efficient operation of the system and to facilitate market development. Distribution system operators shall be adequately remunerated for the procurement of such services to allow them to recover at least their reasonable corresponding costs, including the necessary information and communication technology expenses and infrastructure costs.</p>
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<p>Art. 32, par. 2</p>	<p>2. The development of a distribution system shall be based on a transparent network development plan that distribution system operators shall submit <b><u>every two years</u></b> to the regulatory authority. The network development plan shall contain the planned investments for the next five to ten years, with particular emphasis on the main distribution infrastructure which is required in order to connect new generation capacity and new loads including re-charging points for electric vehicles. The network development plan shall also demonstrate the use of demand response, energy efficiency, energy storage facilities or other resources that distribution system operator is using as an alternative to system expansion. The regulatory authority shall consult all current or potential system users on the network development plan. The regulatory authority shall publish the result of the consultation process on the proposed investments. Member States may decide not to apply this obligation to integrated undertakings serving less than 100 000 connected consumers, or serving isolated systems.</p>	<p>2. The development of a distribution system shall be based on a transparent network development plan that distribution system operators, <b><u>owning and operating high-voltage networks</u></b>, shall submit <b><u>at the end of each regulatory period</u></b> to the regulatory authority. The network development plan <b><u>should be limited to high-voltage networks only, and</u></b> shall contain the planned investments for the next five to ten years, with particular emphasis on the main distribution infrastructure which is required in order to connect new generation capacity and new loads including re-charging points for electric vehicles. The network development plan <b><u>for high voltage</u></b> shall also demonstrate the use of demand response, energy efficiency, energy storage facilities or other resources that distribution system operator is using as an alternative to system expansion. The regulatory authority shall consult all current or potential system users on the network development plan. The regulatory authority shall publish the result of the consultation process on the proposed investments. Member States may decide not to apply this obligation to integrated undertakings serving less than 100 000 connected consumers, or serving isolated system.</p>	<p>Art. 32, par. 3</p>	<p><b><u>Suggestion was declined</u></b></p> <p>3.The development of a distribution system shall be based on a transparent network development plan that the distribution system operator shall publish at least every two years and shall submit to the regulatory authority. The network development plan shall provide transparency on the medium and long-term flexibility services needed, and shall set out the planned investments for the next five-to-ten years, with particular emphasis on the main distribution infrastructure which is required in order to connect new generation capacity and new loads, including recharging points for electric vehicles. The network development plan shall also include the use of demand response, energy efficiency, energy storage facilities or other resources that the distribution system operator is to use as an alternative to system expansion.</p>
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## Storage

<p>Art. 36, par. 1, 2, 3 and 4</p>	<p>1. Distribution system operators shall not be allowed to own, develop, manage or operate energy storage facilities.</p> <p>2. <b><u>By way of derogation from paragraph 1, Member States may allow</u></b> distribution system operators to own, develop, manage or operate storage facilities only if the following conditions are fulfilled:</p> <p>(a) other parties, following an open and transparent tendering procedure, have not expressed their interest to own, develop, manage or operate storage facilities;</p> <p><b><u>(b) such facilities are necessary for the distribution system operators to fulfil their obligations under this Directive for the efficient, reliable and secure operation of the distribution system;</u></b> and</p> <p><b><u>(c) the regulatory authority has assessed the necessity of such derogation taking into account the conditions under points (a) and (b) and</u></b> has granted its approval.</p> <p>3. Articles 35 and 56 shall apply to distribution system operators engaged in ownership, development, operation or management of energy storage facilities.</p> <p><b><u>4. Regulatory authorities shall perform at regular intervals or at least every five years a public consultation in order to re-assess the potential interest of market parties to invest, develop, operate or manage energy storage facilities. In case the public consultation indicates that third parties are able to own, develop, operate or manage such facilities, Member States shall ensure that distribution system operators' activities in this regard are phased-out.</u></b></p>	<p><b><u>1. Distribution system operators shall not be allowed to own, develop, manage or operate energy storage facilities for engaging in commercial storage services.</u></b></p> <p>2. Distribution system operators <b><u>shall be allowed</u></b> to own, develop, manage or operate storage facilities if the following conditions are fulfilled:</p> <p>(a) other parties, following an open and transparent tendering procedure have not expressed their interest to own, develop, manage or operate storage facilities <b><u>in a cost-efficient manner, necessary for the distribution system operator to fulfil its obligations under this Directive for the efficient, reliable and secure operation of the distribution system; or</u></b></p> <p><b><u>(b) if they relate to a specific range of technical situations the DSO needs to address relating to the secure and reliable operation of the distribution system; or</u></b></p> <p>(c) the regulatory authority has granted its approval, <b><u>ensuring that the costs incurred by the distribution system operator for the storage facilities are fully covered.</u></b></p> <p>3. Articles 35 and 56 shall apply to distribution system operators engaged in ownership, development, operation or management of energy storage facilities.</p> <p><b><u>4. Deleted</u></b></p>	<p>Art. 36, par. 1, 2 and 3</p>	<p><b><u>Suggestion was declined</u></b></p> <p>1. Distribution system operators shall not own, develop, manage or operate energy storage facilities.</p> <p><b><u>Suggestion was declined</u></b></p> <p>2. By way of derogation from paragraph 1, Member States may allow distribution system operators to own, develop, manage or operate energy storage facilities, where they are fully integrated network components and the regulatory authority has granted its approval, or where all of the following conditions are fulfilled:</p> <p>(a) other parties, following an open, transparent and non-discriminatory tendering procedure that is subject to review and approval by the regulatory authority, have not been awarded a right to own, develop, manage or operate such facilities, or could not deliver those services at a reasonable cost and in a timely manner;</p> <p>(b) such facilities are necessary for the distribution system operators to fulfil their obligations under this Directive for the efficient, reliable and secure operation of the distribution system and the facilities are not used to buy or sell electricity in the electricity markets; and</p> <p>(c) the regulatory authority has assessed the necessity of such a derogation and has carried out an assessment of the tendering procedure, including the conditions of the tendering procedure, and has granted its approval. The regulatory authority may draw up guidelines or procurement clauses to help distribution system operators ensure a fair tendering procedure.</p> <p><b><u>Suggestion was declined</u></b></p> <p><i>(3. Articles 35 and 56 shall... - no text)</i></p> <p><b><u>Suggestion was declined</u></b></p> <p>3. The regulatory authorities shall perform, at regular intervals or at least every five years, a public consultation on the existing energy storage facilities in order to assess the potential availability and interest in investing in such facilities. Where the public consultation, as assessed by the regulatory authority, indicates that third parties are able to own, develop, operate or manage such facilities in a cost-effective manner, the regulatory authority shall ensure that the distribution system operators' activities in this regard are phased out within 18 months. As part of the conditions of that procedure, regulatory authorities may allow the distribution system operators to receive reasonable compensation, in particular to recover the residual value of their investment in the energy storage facilities.</p>
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## Data management

<p>Art. 23, par. 1, 2 and 4</p>	<p>1. When setting up the rules regarding the management and exchange of data, Member States or, where a Member State has so provided, the designated competent authorities shall specify the eligible parties which may have access to data of the final customer with their explicit consent in accordance with Regulation (EU) 2016/679 of the European Parliament and of the Council. <b><u>For the purpose of this Directive, data shall include metering and consumption data as well as data required for consumer switching.</u></b> Eligible parties shall include at least customers, suppliers, transmission and distribution system operators, aggregators, energy service companies, and other parties which provide energy or other services to customers.</p> <p>2. Member States shall organise the management of data in order to ensure efficient data access and exchange. Independently of the data management model applied in each Member State, the party or parties responsible for data management shall provide to any eligible party with the explicit consent of the final customer, access to the data of the final customer. Eligible parties should have at their disposal in a non-discriminatory manner and simultaneously the requested data. Access to data shall be easy, while relevant procedures shall be made publicly available.</p> <p>4. No additional costs shall be charged to final customers for access to their data. Member States shall be responsible for setting the relevant costs for access to data by eligible parties. Regulated entities which provide data services shall not profit from that activity.</p>	<p>1. When setting up the rules regarding the management and exchange of data, Member States or, where a Member State has so provided, the designated competent authorities shall specify the eligible parties which may have access to data of the final customer with their explicit consent in accordance with Regulation (EU) 2016/679 of the European Parliament and of the Council <b><u>and without prejudice to its provisions regarding the lawfulness of data processing without consent.</u></b> Eligible parties shall include at least customers, suppliers, transmission and distribution system operators, aggregators, energy service companies, and other parties which provide energy or other services to customers.</p> <p>2. Member States shall organise the management of data in order to ensure efficient data access and exchange. Independently of the data management model applied in each Member State, the party or parties responsible for data management shall provide to any eligible party with the explicit consent of the final customer, access to the data of the final customer <b><u>in accordance with Regulation (EU) 2016/679 and without prejudice to its provisions regarding the lawfulness of data processing without consent.</u></b> Eligible parties should have at their disposal in a non-discriminatory manner and simultaneously the requested data. Access to data shall be easy, while relevant procedures shall be made publicly available.</p> <p>4. No additional costs shall be charged to final customers for access to their data. Member States shall be responsible for setting the relevant costs for access to data by eligible parties. Regulated entities which provide data services shall not profit from that activity.</p>	<p>Art. 23, par. 1, 2, 4 and 5</p>	<p><b><u>Suggestion was declined</u></b></p> <p>1. When laying down the rules regarding the management and exchange of data, Member States or, where a Member State has so provided, the designated competent authorities shall specify the rules on the access to data of the final customer by eligible parties in accordance with this Article and the applicable Union legal framework. For the purpose of this Directive, data shall be understood to include metering and consumption data as well as data required for customer switching, demand response and other services.</p> <p><b><u>Suggestion was partially accepted</u></b></p> <p>2. Member States shall organise the management of data in order to ensure efficient and secure data access and exchange, as well as data protection and data security. Independently of the data management model applied in each Member State, the parties responsible for data management shall provide access to the data of the final customer to any eligible party, in accordance with paragraph 1. Eligible parties shall have the requested data at their disposal in a non-discriminatory manner and simultaneously. Access to data shall be easy and the relevant procedures for obtaining access to data shall be made publicly available.</p> <p><b><u>Suggestion was partially accepted</u></b></p> <p>5. No additional costs shall be charged to final customers for access to their data or for a request to make their data available. Member States shall be responsible for setting the relevant charges for access to data by eligible parties. Member States or, where a Member State has so provided, the designated competent authorities shall ensure that any charges imposed by regulated entities that provide data services are reasonable and duly justified.</p>
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<p>Art. 24, par. 1 and 2</p>	<p>1. Member States shall define a common data format and a transparent procedure for eligible parties to have access to the data listed under Article 23 (1), in order to promote competition in the retail market and avoid excessive administrative costs for the eligible parties.</p> <p>2. The Commission, by means of implementing acts adopted in accordance with the advisory procedure referred to in Article 68, shall determine a common European data format and non-discriminatory and transparent procedures for accessing the data, listed under Article 23 (1), <b><u>that will replace national data format and procedure adopted by Member States in accordance with paragraph 1. Member States shall ensure that market participants apply a common European data format.</u></b></p>	<p>1. Member States shall define a common data format, <b><u>if a thorough cost-benefit analysis demonstrates the added value of such a format</u></b>, and a transparent procedure for eligible parties to have access to the data listed under Article 23 (1), in order to promote competition in the retail market and avoid excessive administrative costs for the eligible parties. <b><u>The above-mentioned cost benefit analysis shall include an evaluation to determine whether this format should be limited to a 'minimum content'.</u></b></p> <p>2. The Commission, by means of implementing acts adopted in accordance with the advisory procedure referred to in Article 68, shall determine a common European data format <b><u>or 'minimum content', if the cost-benefit analysis referred to in paragraph 1 demonstrates the added value of such a format</u></b>, and non-discriminatory and transparent procedures for accessing the data, listed under Article 23 (1).</p>	<p>Art. 24, par. 2 and 3</p>	<p><b><u>1.Suggestion was declined</u></b> (no text)</p> <p><b><u>2.Suggestion was partially accepted</u></b></p> <p>2.The Commission shall adopt, by means of implementing acts, interoperability requirements and non-discriminatory and transparent procedures for access to data referred to in Article 23(1). Those implementing acts shall be adopted in accordance with the advisory procedure referred to in Article 68(2).</p> <p>3.Member States shall ensure that electricity undertakings apply the interoperability requirements and procedures for access to data referred to in paragraph 2. Those requirements and procedures shall be based on existing national practices.</p>
<p>Art. 34</p>	<p>Member States shall ensure that all eligible parties have non-discriminatory access to data under clear and equal terms. In Member States where smart metering systems have been implemented according to Article 19 and distribution system operators are involved in data management, compliance programmes as set in Article 35(2)(d) shall include specific measures in order to exclude discriminatory access to data from eligible parties as provided for in Article 23. Where distribution system operators are not subject to Article 35(1), (2) and (3), Member States shall take all necessary measures to ensure that the vertically integrated undertaking do not have privileged access to data for the conduct of its supply activity.</p>	<p>Member States shall ensure that all eligible parties have non-discriminatory access to data under clear and equal terms, <b><u>in consideration of provisions regarding data protection and security standards at the national level, and cybersecurity principles.</u></b> In Member States where smart metering systems have been implemented according to Article 19 and distribution system operators are involved in data management, compliance programmes as set in Article 35(2)(d) shall include specific measures in order to exclude discriminatory access to data from eligible parties as provided for in Article 23. Where distribution system operators are not subject to Article 35(1), (2) and (3), Member States shall take all necessary measures to ensure that the vertically integrated undertaking do not have privileged access to data for the conduct of its supply activity.</p>	<p>Art. 34</p>	<p><b><u>Suggestion was accepted</u></b></p> <p>Member States shall ensure that all eligible parties have non-discriminatory access to data under clear and equal terms, in accordance with the relevant data protection rules. In Member States where smart metering systems have been deployed in accordance with Article 19 and where distribution system operators are involved in data management, the compliance programmes referred to in point (d) of Article 35(2) shall include specific measures in order to exclude discriminatory access to data from eligible parties as provided for in Article 23. Where distribution system operators are not subject to Article 35(1), (2) or (3), Member States shall take all necessary measures to ensure that vertically integrated undertakings do not have privileged access to data for the conduct of their supply activities.</p>
<p>Electro-mobility</p>				

<p>Art. 33, par. 1, 2, 3 and 4</p>	<p>1. Member States shall provide the necessary regulatory framework to facilitate the connection of publicly accessible and private recharging points to the distribution networks. Member States shall ensure that distribution system operators cooperate on a non-discriminatory basis with any undertaking that owns, develops, operates or manages recharging points for electric vehicles, including with regard to connection to the grid.</p> <p>2. Member States may allow distribution system operators to own, develop, manage or operate recharging points for electric vehicles <b>only</b> if the following conditions are fulfilled:</p> <p>(a) other parties, following an open and transparent tendering procedure, have not expressed their interest to own, develop, manage or operate recharging points for electric vehicles;</p> <p>(b) the regulatory authority has granted its approval.</p> <p>3. Articles 35 and 56 shall apply to distribution system operators engaged in ownership, development, operation or management of recharging points.</p> <p>4. Member States shall perform at regular intervals or at least every five years a public consultation in order to re-assess the potential interest of market parties to own, develop, operate or manage recharging points for electric vehicles. In case the public consultation indicates that third parties are able to own, develop, operate or manage such points, Member States shall ensure that distribution system operators' activities in this regard are phased-out.</p>	<p>1. Member States shall provide the necessary regulatory framework to facilitate the connection of <b><u>and the efficient integration of</u></b> publicly accessible and private recharging points to the distribution networks. Member States shall ensure that distribution system operators <b><u>have the means in place to supervise and monitor the integrated distribution system infrastructure, and</u></b> cooperate on a non-discriminatory basis with any undertaking that owns, develops, operates or manages recharging points for electric vehicles, including with regard to connection to the grid.</p> <p>2. Member States shall allow distribution system operators to own, develop, manage or operate recharging points for electric vehicles if the following conditions are fulfilled:</p> <p>(a) other parties, following an open and transparent tendering procedure, have not expressed their interest to own, develop, manage or operate recharging points for electric vehicles <b><u>at a cost-competitive price nor can ensure an adequate infrastructure coverage, or;</u></b></p> <p>(b) the regulatory authority has granted its approval.</p> <p>3. Articles 35 and 56 shall apply to distribution system operators engaged in ownership, development, operation or management of recharging points.</p> <p>4. Member States shall perform at regular intervals or at least every five years a public consultation in order to re-assess the potential interest of market parties to own, develop, operate or manage recharging points for electric vehicles. In case the public consultation indicates that third parties are able to own, develop, operate or manage such points, Member States shall ensure that distribution system operators' activities in this regard are phased-out. <b><u>In this case, the national regulatory authority needs to ensure adequate compensation for the DSOs to be able to recover its stranded costs.</u></b></p>	<p>Art. 33, par. 1, 3 and 4</p>	<p><b><u>Suggestion was declined</u></b></p> <p>1. Without prejudice to Directive 2014/94/EU of the European Parliament and of the Council (25), Member States shall provide the necessary regulatory framework to facilitate the connection of publicly accessible and private recharging points to the distribution networks. Member States shall ensure that distribution system operators cooperate on a non-discriminatory basis with any undertaking that owns, develops, operates or manages recharging points for electric vehicles, including with regard to connection to the grid.</p> <p><b><u>Suggestion was partially accepted</u></b></p> <p>3. By way of derogation from paragraph 2, Member States may allow distribution system operators to own, develop, manage or operate recharging points for electric vehicles, provided that all of the following conditions are fulfilled: (a) other parties, following an open, transparent and non-discriminatory tendering procedure that is subject to review and approval by the regulatory authority, have not been awarded a right to own, develop, manage or operate recharging points for electric vehicles, or could not deliver those services at a reasonable cost and in a timely manner; (b) the regulatory authority has carried out an ex ante review of the conditions of the tendering procedure under point (a) and has granted its approval; (c) the distribution system operator operates the recharging points on the basis of third-party access in accordance with Article 6 and does not discriminate between system users or classes of system users, and in particular in favour of its related undertakings.</p> <p>The regulatory authority may draw up guidelines or procurement clauses to help distribution system operators ensure a fair tendering procedure.</p> <p><b><u>Suggestion was declined</u></b> (3. Articles 35 and 56 shall... - no text)</p> <p><b><u>Suggestion was accepted</u></b></p> <p>4. Where Member States have implemented the conditions set out in paragraph 3, Member States or their designated competent authorities shall perform, at regular intervals or at least every five years, a public consultation in order to re-assess the potential interest of other parties in owning, developing, operating or managing recharging points for electric vehicles. Where the public consultation indicates that other parties are able to own, develop, operate or manage such points, Member States shall ensure that distribution system operators' activities in this regard are phased-out, subject to the successful completion of the tendering procedure referred to in point (a) of paragraph 3. As part of the conditions of that procedure, regulatory authorities may allow the distribution system operator to recover the residual value of its investment in recharging infrastructure.</p>
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Microgrids (local energy communities)				
Art. 2, par. 7	7. 'local energy community' means: an association, a cooperative, a partnership, a non-profit organisation or other legal entity which is effectively controlled by local shareholders or members, generally value rather than profit-driven, involved in distributed generation and in performing activities of a distribution system operator,	7. 'local energy community' means: an association, a cooperative, a partnership, a non-profit organisation or other legal entity which is effectively controlled by local shareholders or members, generally value rather than profit driven, <b><u>which shall act as a distribution system operator if</u></b> involved in distributed generation and in performing activities of a distribution system operator, <b><u>or as a supplier or an aggregator at local level, including across borders if involved in activities related to the supply and aggregation business.</u></b>	Art. 2, par. 11	<p><b><i>Suggestion was declined</i></b></p> <p>(11) 'citizen energy community' means a legal entity that: (a) is based on voluntary and open participation and is effectively controlled by members or shareholders that are natural persons, local authorities, including municipalities, or small enterprises; (b) has for its primary purpose to provide environmental, economic or social community benefits to its members or shareholders or to the local areas where it operates rather than to generate financial profits; and (c) may engage in generation, including from renewable sources, distribution, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders;</p>



<p>Art. 16, par. 1 and 2</p>	<p><b>1.</b> Member States shall ensure that local energy communities:</p> <p>(a) are entitled to own, establish, <u>or lease</u> community networks and to autonomously manage them;</p> <p>(b) can access all organised markets either directly or through aggregators or suppliers in a non-discriminatory manner;</p> <p>(c) benefit from a non-discriminatory treatment with regard to their activities, rights and obligations as final customers, generators, distribution system operators or aggregators;</p> <p>(d) are subject to fair, proportionate and transparent procedures and cost reflective charges.</p> <p><b>2.</b> Member States shall provide an enabling regulatory framework that ensures that:</p> <p>(a) participation in a local energy community is voluntary;</p> <p>(b) shareholders or members of a local energy community shall not lose their rights as household customers or active customers;</p> <p>(c) shareholders or members are allowed to leave a local energy community; in such cases Article 12 shall apply;</p> <p>(d) Article 8 (3) applies to generating capacity installed by local energy communities as long as such capacity can be considered small decentralised or distributed generation;</p> <p>(e) provisions of Chapter IV apply to local energy communities that perform activities of a distribution system operator;</p> <p>(f) where relevant, a local energy community may conclude an agreement with a distribution system operator to which their network is connected on the operation of the local energy community's network;</p> <p>(g) where relevant system users that are not shareholders or members of the local energy community connected to the distribution network operated by a local energy community shall be subject to fair and cost-reflective network charges. If such system users and local energy communities cannot reach an agreement on network charges, both parties may request the regulatory authority to determine the level of network charges in a relevant decision;</p> <p>(h) where relevant local energy communities are subject to appropriate network charges at the connection points between the community network and the distribution network outside the energy community. Such network charges shall account separately for the electricity fed into distribution network and the electricity consumed from the distribution network outside the local energy community in line with Article 59 (8).</p>	<p><b><u>1. For the purposes of this Directive, local energy communities shall be defined as distribution system operators if they own and operate networks.</u></b></p> <p><b>2.</b> Member States shall ensure that local energy communities:</p> <p>(a) are entitled to own, establish <b><u>and manage autonomously new community networks, in cases where the existing DSO cannot deliver a necessary service in accordance with conditions laid down by each Member State, or to lease them to the distribution system operator to which their network is connected;</u></b></p> <p>(b) can access all organised markets either directly or through aggregators or suppliers in a non-discriminatory manner;</p> <p>(c) benefit from a non-discriminatory treatment with regard to their activities, rights and obligations as final customers, generators, distribution system operators or aggregators;</p> <p>(d) are subject to fair, proportionate and transparent procedures and cost reflective charges <b><u>and;</u></b></p> <p><b><u>(e) contribute a cost-reflective and fair share of network charges and other system costs and charges, if local energy communities act as parallel infrastructure connected to the distribution system grids.</u></b></p> <p><b>3.</b> Member States shall provide an enabling regulatory framework that ensures that:</p> <p>(a) participation in a local energy community is voluntary;</p> <p>(b) shareholders or members of a local energy community shall not lose their rights as household customers or active customers;</p> <p>(c) shareholders or members are allowed to leave a local energy community; in such cases Article 12 shall apply;</p> <p>(d) Article 8 (3) applies to generating capacity installed by local energy communities as long as such capacity can be considered small decentralised or distributed generation;</p> <p>(e) provisions of Chapter IV apply to local energy communities that perform activities of a distribution system operator;</p> <p>(f) where relevant, a local energy community may conclude an agreement with a distribution system operator to which their network is connected on the operation of the local energy community's network. <b><u>The energy community's rights and duties shall be established in this cooperation agreement;</u></b></p> <p>(g) where relevant system users that are not shareholders or members of the local energy community connected to the distribution network operated by a local energy community shall be subject to fair and cost-reflective network charges. If such system users and local energy communities cannot reach an agreement on network charges, both parties may request the regulatory authority to determine the level of network charges in a relevant decision;</p> <p>(h) where relevant local energy communities are subject to appropriate network charges at the connection points between the community network and the distribution network outside the energy community. Such network charges shall account</p>	<p>Art. 16, par. 1 and 2</p>	<p><b><u>1. Suggestion was declined</u></b> (no text)</p> <p><b><u>Suggestion was declined</u></b></p> <p>2.Member States may provide in the enabling regulatory framework that citizen energy communities:</p> <p>(a) are open to cross-border participation;</p> <p><b><u>(b) are entitled to own, establish, purchase or lease distribution networks and to autonomously manage them subject to conditions set out in paragraph 4 of this Article;</u></b></p> <p>(c) are subject to the exemptions provided for in Article 38(2). <b><u>Suggestion was declined</u></b></p> <p>3.Member States shall ensure that citizen energy communities:</p> <p>(a) are able to access all electricity markets, either directly or through aggregation, in a non-discriminatory manner;</p> <p>(b) are treated in a non-discriminatory and proportionate manner with regard to their activities, rights and obligations as final customers, producers, suppliers, distribution system operators or market participants engaged in aggregation;</p> <p>(c) are financially responsible for the imbalances they cause in the electricity system; to that extent they shall be balance responsible parties or shall delegate their balancing responsibility in accordance with Article 5 of Regulation (EU) 2019/943;</p> <p>(d) with regard to consumption of self-generated electricity, citizen energy communities are treated like active customers in accordance with point (e) of Article 15(2);</p> <p>(e) are entitled to arrange within the citizen energy community the sharing of electricity that is produced by the production units owned by the community, subject to other requirements laid down in this Article and subject to the community members retaining their rights and obligations as final customers.</p> <p>For the purposes of point (e) of the first subparagraph, where electricity is shared, this shall be without prejudice to applicable network charges, tariffs and levies, in accordance with a transparent cost-benefit analysis of distributed energy resources developed by the competent national authority.</p>
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		separately for the electricity fed into distribution network and the electricity consumed from the distribution network outside the local energy community in line with Article 59 (8). <b><u>Charges shall be not only negatively but also positively non-discriminatory, namely in order to allow self-consumers to fairly contribute to system costs and other related costs. In such case, however, Member States may adopt specific measures to avoid that excessive burden may be placed to the final consumer and to ensure that self-consumption is incentivised, without neglecting the need for costs to be recovered.</u></b>		
Metering and aggregation				
Art. 20	Where smart metering is positively assessed as a result of cost-benefit assessment referred to in Article 19(2), or systematically rolled out, Member States shall implement smart metering systems in accordance with European standards, the provisions in Annex III, and in line with the following principles: (a) the metering systems accurately measure actual electricity consumption and provide to final customers information on actual time of use. That information shall be made easily available and visualised to final customers at no additional cost and at nearreal time in order to support automated energy efficiency programmes, demand response and other services; (b) the security of the smart metering systems and data communication is ensured in compliance with relevant Union security legislation having due regard of the best available techniques for ensuring the highest level of cybersecurity protection; (c) the privacy and data protection of final customers is	<b>1.</b> Where smart metering is positively assessed as a result of cost-benefit assessment referred to in Article 19(2), or systematically rolled out, Member States shall implement smart metering systems in accordance with European standards, the provisions in Annex III, and in line with the following principles: (a) the metering systems accurately measure actual electricity consumption and provide to final customers information on actual time of use. That information shall be made easily available and visualised to final customers at no additional cost and at nearreal time <b><u>where such communication is feasible</u></b> in order to support automated energy efficiency programmes, demand response and other services; (b) the security of the smart metering systems and data communication is ensured in compliance with relevant Union security legislation having due regard of the best available techniques for ensuring the highest level of cybersecurity protection; (c) the privacy and data protection of final customers is ensured in compliance with relevant Union data protection and privacy	Art. 20 Art. 19, par. 3	<b><u>Suggestion was declined</u></b>  Where the deployment of smart metering systems is positively assessed as a result of the cost-benefit assessment referred to in Article 19(2), or where smart metering systems are systematically deployed after 4 July 2019, Member States shall deploy smart metering systems in accordance with European standards, Annex II and the following requirements: (a) the smart metering systems shall accurately measure actual electricity consumption and shall be capable of providing to final customers information on actual time of use. Validated historical consumption data shall be made easily and securely available and visualised to final customers on request and at no additional cost. Non-validated near real-time consumption data shall also be made easily and securely available to final customers at no additional cost, through a standardised interface or through remote access, in order to support automated energy efficiency programmes, demand response and other services; (b) the security of the smart metering systems and data communication shall comply with relevant Union security rules,

	<p>ensured in compliance with relevant Union data protection and privacy legislation;</p> <p>(d) meter operators shall ensure that the meter or meters of active customers who self-generate electricity can account for electricity put into the grid from the active customers' premises;</p> <p>(e) if final customers request it, metering data on their electricity input and off-take shall be made available to them, via a local standardised communication interface and/or remote access, or to a third party acting on their behalf, in an easily understandable format as provided for in Article 24, allowing them to compare deals on a like-for-like basis;</p> <p>(f) appropriate advice and information shall be given to final customers at the time of installation of smart meters, in particular about their full potential with regard to meter reading management and the monitoring of energy consumption, and on the collection and processing of personal data in accordance with the applicable Union data protection legislation;</p> <p>(g) smart metering systems shall enable final customers to be metered and settled at the same time resolution as the imbalance period in the national market.</p>	<p>legislation;</p> <p>(d) meter operators shall ensure that the meter or meters of active customers who self-generate electricity can account for electricity put into the grid from the active customers' premises;</p> <p>(e) if final customers request it, metering data on their electricity input and off-take shall be made available to them, via a local standardised communication interface and/or remote access, or to a third party acting on their behalf, in an easily understandable format as provided for in Article 24, allowing them to compare deals on a like-for-like basis;</p> <p>(f) appropriate advice and information shall be given to final customers at the time of installation of smart meters, in particular about their full potential with regard to meter reading management and the monitoring of energy consumption, and on the collection and processing of personal data in accordance with the applicable Union data protection legislation;</p> <p>(g) smart metering systems shall enable final customers to be metered and settled at the same time resolution as the imbalance period in the national market.</p> <p><b><u>2. Smart meters shall not be required to comply with all minimum functionalities set out in paragraph 1 of this Article for those Member States that have initiated deployment before entering into force of this Directive.</u></b></p> <p><b><u>(a) The decision whether the switch should be one of the minimum requirements shall be left to the Member States to decide.</u></b></p>	<p>having due regard of the best available techniques for ensuring the highest level of cybersecurity protection while bearing in mind the costs and the principle of proportionality;</p> <p>(c) the privacy of final customers and the protection of their data shall comply with relevant Union data protection and privacy rules;</p> <p>(d) meter operators shall ensure that the meters of active customers who feed electricity into the grid can account for electricity fed into the grid from the active customers' premises;</p> <p>(e) if final customers request it, data on the electricity they fed into the grid and their electricity consumption data shall be made available to them, in accordance with the implementing acts adopted pursuant to Article 24, through a standardised communication interface or through remote access, or to a third party acting on their behalf, in an easily understandable format allowing them to compare offers on a like-for-like basis;</p> <p>(f) appropriate advice and information shall be given to final customers prior to or at the time of installation of smart meters, in particular concerning their full potential with regard to the management of meter reading and the monitoring of energy consumption, and concerning the collection and processing of personal data in accordance with the applicable Union data protection rules;</p> <p>(g) smart metering systems shall enable final customers to be metered and settled at the same time resolution as the imbalance settlement period in the national market.</p> <p>For the purposes of point (e) of the first subparagraph, it shall be possible for final customers to retrieve their metering data or transmit them to another party at no additional cost and in accordance with their right to data portability under Union data protection rules.</p> <p><b><u>Suggestion was accepted</u></b></p> <p>3. Member States that proceed with the deployment of smart metering systems shall adopt and publish the minimum functional and technical requirements for the smart metering systems to be deployed in their territories, in accordance with Article 20 and Annex II. Member States shall ensure the interoperability of those smart metering systems, as well as their ability to provide output for consumer energy management systems. In that respect, Member States shall have due regard to the use of the relevant available standards, including those enabling interoperability, to best practices and to the importance of the development of smart grids and the development of the internal market for electricity.</p>
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Active customers				
<p>Art. 15, par. 1 and 2</p>	<p>1. Member States shall ensure that final customers: (a) are entitled to generate, store, consume and sell self-generated electricity in all organised markets either individually or through aggregators without being subject to disproportionately burdensome procedures and charges that are not cost reflective; (b) are subject to cost reflective, transparent and non-discriminatory network charges, accounting separately for the electricity fed into the grid and the electricity consumed from the grid, in line with Article 59(8).</p> <p>2. The energy installation required for the activities of the active customer may be managed by a third party for installation, operation, including metering and maintenance.</p>	<p>1. Member States shall ensure that final customers: (a) are entitled to generate, store, consume and sell self-generated electricity in all organised markets either individually, <b>collectively</b> or through aggregators without being subject to disproportionately burdensome procedures and charges that are not cost reflective; (b) are subject to cost reflective, transparent and non-discriminatory network charges, accounting separately for the electricity fed into the grid and the electricity consumed from the grid, in line with Article 59(8). <b><u>Charges shall be not only negatively but also positively non-discriminatory, namely in order to allow self-consumers to fairly contribute to system costs and other related costs. In such case, however, Member States may adopt specific measures to avoid that excessive burden may be placed to the final consumer and to ensure that self-consumption is incentivised, without neglecting the need for costs to be recovered.</u></b></p> <p>2. The energy installation required for the activities of the active customer may be managed by a third party for installation, operation, and maintenance. <b><u>These third parties must be defined according to national law.</u></b></p>	<p>Art. 15, par. 2</p>	<p><b><u>Suggestion was declined</u></b></p> <p>2. Member States shall ensure that active customers are: (a) entitled to operate either directly or through aggregation; (b) entitled to sell self-generated electricity, including through power purchase agreements; (c) entitled to participate in flexibility schemes and energy efficiency schemes; (d) entitled to delegate to a third party the management of the installations required for their activities, including installation, operation, data handling and maintenance, without that third party being considered to be an active customer; (e) subject to cost-reflective, transparent and non-discriminatory network charges that account separately for the electricity fed into the grid and the electricity consumed from the grid, in accordance with Article 59(9) of this Directive and Article 18 of Regulation (EU) 2019/943, ensuring that they contribute in an adequate and balanced way to the overall cost sharing of the system; (f) financially responsible for the imbalances they cause in the electricity system; to that extent they shall be balance responsible parties or shall delegate their balancing responsibility in accordance with Article 5 of Regulation (EU) 2019/943.</p>

# ANNEX 1

## European Commission's legislative proposal on common rules for the internal market in electricity ESMIG proposals for amendments

Article	Commissions proposal	ESMIG amendment proposal	Article in final text	Final text
Art. 2, par. 18	18. 'smart <u>metering system</u> ' means an electronic <u>system</u> that can measure energy consumption, providing more information than a conventional meter, and can transmit and receive data for information, monitoring and control purposes, using a form of electronic communication;	18. "smart <u>meter</u> " means an electronic <u>device</u> that can measure energy consumption, providing more information than a conventional meter, and can transmit and receive data for information, monitoring and control purposes, using a form of electronic communication;	Art. 2, par. 23	<b><u>Suggestion was declined</u></b> 'smart metering system' means an electronic system that is capable of measuring electricity fed into the grid or electricity consumed from the grid, providing more information than a conventional meter, and that is capable of transmitting and receiving data for information, monitoring and control purposes, using a form of electronic communication;
/New/	/New/	18 a. " <b><u>Smart metering system</u></b> " is a system that includes one <b><u>or more smart meters and collects, validates, and distributes metering data.</u></b>	Art. 2, par. 23	<b><u>Suggestion was declined</u></b> 'smart metering system' means an electronic system that is capable of measuring electricity fed into the grid or electricity consumed from the grid, providing more information than a conventional meter, and that is capable of transmitting and receiving data for information, monitoring and control purposes, using a form of electronic communication;
Art. 12, par. 1	1. Member States shall ensure that a customer wishing to change supplier, while respecting contractual conditions, is entitled to such change within <u>three weeks</u> .	1. Member States shall ensure that a customer wishing to change supplier, while respecting contractual conditions <b><u>and right of withdrawal</u></b> , is entitled to such change within <b><u>seven days. This timeline should be shortened to 24 hours over a transition period of 5 years.</u></b>	Art. 12, par. 1	<b><u>Suggestion was partially accepted</u></b> Switching supplier or market participant engaged in aggregation shall be carried out within the shortest possible time. Member States shall ensure that a customer wishing to switch suppliers or market participants engaged in aggregation, while respecting contractual conditions, is entitled to such a switch within a maximum of three weeks from the date of the request. By no later than 2026, the technical process of switching supplier shall take no longer than 24 hours and shall be possible on any working day.
Art. 13, par. 4	4. Member States shall ensure that final customers are entitled to receive all relevant demand response data or data on supplied and sold electricity <b><u>at least once per year.</u></b>	4. Member States shall ensure that final customers are entitled to receive all relevant demand response data or data on supplied and sold electricity <b><u>of the last year at least every three months or within a month of asking.</u></b>	Art. 13, par. 3	<b><u>Suggestion was accepted</u></b> Member States shall ensure that final customers are entitled to receive all relevant demand response data or data on supplied and sold electricity free of charge at least once every billing period if requested by the customer.
Art. 19, par. 1	1. In order to promote energy efficiency and empower customers, Member States or, where a Member State has so provided, the regulatory authority shall strongly recommend that electricity undertakings and aggregators optimise the use of electricity, inter alia by providing energy management services, developing innovative pricing formulas, or introducing <u>interoperable</u> smart metering systems <u>or smart grids</u> , where appropriate.	1. In order to promote energy efficiency and empower customers, Member States or, where a Member State has so provided, the regulatory authority shall strongly recommend that electricity undertakings and aggregators optimise the use of electricity, inter alia by providing energy management services, developing innovative pricing formulas, or introducing smart metering systems <b><u>interoperable with a Consumer Energy Management device or system</u></b> where appropriate.	Art. 19, par. 1	<b><u>Suggestion was accepted</u></b> 1. In order to promote energy efficiency and to empower final customers, Member States or, where a Member State has so provided, the regulatory authority shall strongly recommend that electricity undertakings and other market participants optimise the use of electricity, inter alia, by providing energy management services, developing innovative pricing formulas, and introducing smart metering systems that are interoperable, in particular with consumer energy management systems and with smart grids, in accordance with the applicable Union data protection rules.
Art. 19, par. 5	5. When the deployment of smart metering is negatively assessed as a result of cost-benefit assessment referred to in paragraph 2, Member States shall ensure that this assessment is revised <u>periodically</u> in response to changes in the underlying assumptions and to technology and market developments. Member States shall notify to the responsible Commission services the outcome of their updated economic assessment as it becomes available.	5. When the deployment of smart metering is negatively assessed as a result of cost-benefit assessment referred to in paragraph 2, Member States shall ensure that this assessment is revised <b><u>two years after the directive is passed and every five years after that</u></b> in response to changes in the underlying assumptions and to technology and market developments. Member States shall notify to the responsible Commission services the outcome of their updated economic assessment as it becomes available."	Art. 19, par. 5	<b><u>Suggestion was declined</u></b> Where the deployment of smart metering systems has been negatively assessed as a result of the cost-benefit assessment referred to in paragraph 2, Member States shall ensure that this assessment is revised at least every four years, or more frequently, in response to significant changes in the underlying assumptions and in response to technological and market developments. Member States shall notify to the Commission the outcome of their updated cost- benefit assessment as it becomes available.

Art. 20, par. a)	(a) the metering systems accurately measure actual electricity consumption and provide <b>to</b> final customers information on actual time of use. That information shall be made easily available and visualised to final customers at no additional cost and at near-real time in order to support automated energy efficiency programmes, demand response and other services;	(a) the metering systems accurately measure actual electricity consumption and provide final customers <b>with</b> information on actual time of use. That information shall be made easily available and visualised to final customers at no additional cost and at near-real time in order to support automated energy efficiency programmes, demand response and other services; <b><u>consumption feedback and information should be provided by at least two channels: One of these feedback channels should be an In-Home Display (IHD) or smart phone app that is continuously updated. The other channel can be a website or an informative bill.</u></b>	Art. 20, par. a)	<b><u>Suggestion was declined</u></b> (a) the smart metering systems shall accurately measure actual electricity consumption and shall be capable of providing to final customers information on actual time of use. Validated historical consumption data shall be made easily and securely available and visualised to final customers on request and at no additional cost. Non-validated near real-time consumption data shall also be made easily and securely available to final customers at no additional cost, through a standardised interface or through remote access, in order to support automated energy efficiency programmes, demand response and other services;
Art. 21, par. 1	1. Where smart metering is <b><u>negatively assessed as a result of cost-benefit assessment referred to in Article 19(2), nor systematically rolled out</u></b> , Member States shall ensure that every final customer is entitled to have installed or, where applicable, to have upgraded, on request and under <b>fair and reasonable</b> conditions, a smart meter that complies with the following requirements:	1. Where smart metering is <b><u>only partially rolled-out</u></b> , Member States shall ensure that every final customer is entitled to have installed or, where applicable, to have upgraded, on request and under <b>similar</b> conditions, a smart meter that complies with the following requirements:	Art. 21, par. 1	<b><u>Suggestion was declined</u></b> Where the deployment of smart metering systems has been negatively assessed as a result of the cost-benefit assessment referred to in Article 19(2) and where smart metering systems are not systematically deployed, Member States shall ensure that every final customer is entitled on request, while bearing the associated costs, to have installed or, where applicable, to have upgraded, under fair, reasonable and cost-effective conditions, a smart meter that: [...]
Art. 23, par. 1	1. When setting up the rules regarding the management and exchange of data, Member States or, where a Member State has so provided, the designated competent authorities shall specify the eligible parties which may have access to data of the final customer with their explicit consent in accordance with Regulation (EU) 2016/679. For the purpose of <b><u>this Directive</u></b> , data shall include metering <b><u>and consumption</u></b> data as well as data required for consumer switching. Eligible parties shall include at least customers, suppliers, transmission and distribution system operators, aggregators, energy service companies, and other parties which provide energy or other services to customers.	1. When setting up the rules regarding the management and exchange of data, Member States or, where a Member State has so provided the designated competent authorities shall specify the eligible parties which may have access to data of the final customer with their explicit consent in accordance with Regulation (EU) 2016/679. For the purpose of <b><u>article 23 and 24</u></b> , data shall include <b><u>commercial</u></b> metering data <b><u>which includes energy consumption and generation data</u></b> , as well as data required for consumer switching. Eligible parties shall include at least customers, suppliers, transmission and distribution system operators, aggregators, energy service companies, and other parties which provide energy or other services to customers.	Art. 23, par. 1	<b><u>Suggestion was declined</u></b> 1. When laying down the rules regarding the management and exchange of data, Member States or, where a Member State has so provided, the designated competent authorities shall specify the rules on the access to data of the final customer by eligible parties in accordance with this Article and the applicable Union legal framework. For the purpose of this Directive, data shall be understood to include metering and consumption data as well as data required for customer switching, demand response and other services.