Progress Report from the Republic of Estonia to the European Commission on the Promotion and Use of Energy from Renewable Sources, in accordance with Directive 2009/28/EC

Tallinn 2017

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TOCSUMMARY

This report has been drawn up in accordance with Article 22 of Directive 2009/28/EC, which requires Member States to submit a report to the Commission on progress in the promotion and use of energy from renewable sources by 31 December 2011, and every two years thereafter.

Under Directive 2009/28/EC, Estonia must ensure that in 2020 the share of energy from renewable sources amounts to 25% of gross final energy consumption, and 10% of energy consumption in the transport sector. The activities designed to achieve this are described in the Estonian National Renewable Energy Action Plan up to 2020, which was approved by government order No 452 of 26 November 2010.

This report covers the progress achieved in introducing renewable energy in 2015 and 2016. The report shows that the development of renewable energy in Estonia has been progressing steadily in recent years. In summary, the proportion of renewable energy in final consumption was greater than planned in 2015 and 2016. The Estonian National Renewable Energy Action Plan up to 2020 predicted that the share of renewable energy would be 23.6% in 2015, whereas in reality the proportion of renewable energy in final consumption was 28.63%. The objective for 2016 had been set at 23.7%, but in reality we exceeded that by 5.13%.

The results from 2015 and 2016 indicate that in the coming years we will need to devote even greater attention to encouraging the use of renewable energy in the transport sector. It must be ensured that the share of renewable energy is 90–100 ktoe in the transport sector.

INTRODUCTION

Article 22 of Directive 2009/28/EC requires all Member States to submit a report to the Commission on progress in the promotion and use of energy from renewable sources by 31 December 2011, and once every two years thereafter. The sixth report, to be submitted by 31 December 2021, will be the last report required. This report covers the period from 2015 to 2016.

Member State reports will be important for monitoring overall renewable energy policy developments and Member State compliance with the measures set out in the Directive 2009/28/EC and the National Renewable Energy Action Plans of each Member State.

The report has been drawn up using the relevant template prepared by the European Commission. The purpose of the template is to help ensure that Member State reports are complete, cover all the requirements laid down in Article 22 of the Directive and are comparable with each other over time and with National Renewable Energy Action Plans submitted by Member States in 2010. Much of the template draws on the template for the National Renewable Energy Action Plans.

The inputs required to prepare the report were provided by AS Elering, the Ministry of the Environment, the Ministry of Rural Affairs, the Environment Agency and the Estonian

Institute of Economic Research.

1. Progress IN THE AREA OF RENEWABLE ENERGY IN ESTONIA

1.1. Sectoral and overall shares of energy from renewable sources

1. Sectoral and overall shares and actual consumption of energy from renewable sources in the preceding two calendar years (n-1; n-2 e.g. 2010 and 2009) (Article 22(1)(a) of Directive 2009/28/EC).

The sectoral (electricity, heating and cooling, and transport) and overall shares of energy from renewable sources [1]

	Year 2015	Year 2016
RES-H&C[2] (%)	49.6	50.5
RES-E[3] (%)	15.1	13.6
RES-T[4] (%)	0.4	0.5
Overall RES share [5] (%)	28.63	28.83
Of which from cooperation mechanism (%)[6]	0	0
Surplus for cooperation mechanism [7] *(%)*	3.6	3.8

Table 1a: Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)[8]

	Year 2015	Year 2016
(A) Gross final consumption of RES for heating and cooling	754.2	779.2
(B) Gross final consumption of electricity from RES	123.4	136.0
(C) Gross final consumption of energy from RES in transport	1.03	1.13

[1] Facilitates comparison with Table 3 and Table 4a of the NREAPs.

[2] Share of renewable energy in heating and cooling: gross final consumption of energy from renewable sources for heating and cooling (as defined in Articles 5(1)b) and 5(4) of Directive 2009/28/EC) divided by gross final consumption of energy for heating and cooling. The same methodology as in Table 3 of NREAPs applies.

[3] Share of renewable energy in electricity: gross final consumption of electricity from renewable sources for electricity (as defined in Articles 5(1)(a) and 5(3) of Directive 2009/28/EC) divided by total gross final consumption of electricity. The same methodology as in Table 3 of NREAPs applies.

[4] Share of renewable energy in transport: final energy from renewable sources consumed in transport (cf. Article 5(1)(c) and 5(5) of Directive 2009/28/EC) divided by the consumption in transport of 1) petrol; 2) diesel; 3) biofuels used in road and rail transport and 4) electricity in land transport (as reflected in row 3 of Table 1). The same methodology as in Table 3 of NREAPs applies.

[5] Share of renewable energy in gross final energy consumption. The same methodology as in Table 3 of NREAPs applies.

[6] In percentage point of overall RES share.

[7] In percentage point of overall RES share.

[8] Facilitates comparison with Table 4a of the NREAPs

(D) Gross total RES consumption[9]	**877.61**	**914.1**
(E) Transfer of RES to other Member States	**0**	**0**
(F) Transfer of RES from other Member States and 3rd countries	**0**	**0**
(G) RES consumption adjusted for target (D)-(E)+(F)	**877.6**	**914.1**

Table 1.b: Total actual contribution (installed capacity, gross electricity generation) from each renewable energy technology in Estonia to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity generation[10]

	Year 2015		**Year 2016**	
	MW	**GWh**	**MW**	**GWh**
Hydro[11]:	**7.2**	**27**	**7.3**	**35**
non pumped				
< 1MW	**6**		**6**	
1MW-10 MW	**0.0**		**0.0**	
>10MW	**0.0**		**0.0**	
pumped				
mixed[12]				
Geothermal				
Solar:	**6.5**	**1.5**	**11.04**	**3**
photovoltaic energy				
concentrated solar power				
Tide, wave, ocean				
Wind:		**715**		**594**
onshore	**300**		**331**	
offshore	**0.0**	**0.0**	**0.0**	**0.0**
Biomass[13]:	**87.45**	**779**	**223.35**	**789**
solid biomass	**165**		**165**	
biogas	**11**	**49**	**11**	**46**
bioliquids				
TOTAL	**407.15**	**1522.5**	**578.7**	**1421**
of which in CHP cogeneration:				

[9] According to Article 5(1) of Directive 2009/28/EC gas, electricity and hydrogen from renewable energy sources shall only be considered once. No double counting is allowed.

[10] Facilitates comparison with Table 10a of the NREAPs

[11] Normalised in accordance with Directive2009/28/EC and Eurostat methodology.

[12] In accordance with the new Eurostat methodology.

[13] Take into account only those complying with applicable sustainability criteria, cf. Article 5(1) last subparagraph of Directive 2009/28/EC.

Table 1c: Total actual contribution (final energy consumption[14]) from each renewable energy technology in Estonia to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in heating and cooling (ktoe) [15]

	Year 2015	Year 2016
Geothermal (excluding low temperature geothermal heat in heat pump applications)	**0.0**	**0.0**
Solar	**0.0**	**0.0**
Biomass[16]:		
solid biomass		
biogas		
bioliquids		
Renewable energy from heat pumps: **- of which aerothermal** **- of which geothermal** **- of which hydrothermal**	**55.6**	**62.4**
TOTAL	**754.2**	**779.2**
Of which DH[17]	**ca 50 %**	**ca 50 %**
Of which biomass in households[18]	**361.4**	**383.8**

Table 1d: Total actual contribution from each renewable energy technology in Estonia to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the transport sector (ktoe)[19],[20]

	Year 2015	Year 2016
Bioethanol/bio-ETBE	**0.0**	**0.0**
Of which Biofuels[21] under Article 21.2	**0.0**	**0.0**
Of which imported[22]	**0.0**	**0.0**
Biodiesel	**0.0**	**0.0**
Of which Biofuels[23] under Article 21.2	**0.0**	**0.0**
Of which imported[24]	**0.0**	**0.0**
Hydrogen from renewables	**0.0**	**0.0**
Renewable electricity	**1.024**	**1.1**
Of which road transport	**0.4**	**0.4**
Of which non-road transport	**0.3**	**0.3**

[14] Direct use and district heat as defined in Article 5(4) of Directive 2009/28/EC.

[15] Facilitates comparison with Table 11 of the NREAPs.

[16] Take into account only those complying with applicable sustainability criteria, cf. Article 5(1) last subparagraph of Directive 2009/28/EC.

[17] District heating and/or cooling from total renewable heating and cooling consumption (RES-DH).

[18] From the total renewable heating and cooling consumption.

[19] For biofuels take into account only those compliant with the sustainability criteria, cf. Article 5(1) last subparagraph.

[20] Facilitates comparison with Table 12 of the NREAPs.

[21] Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

[22] From the whole amount of bioethanol/bio-ETBE.

[23] Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

[24] From the whole amount of biodiesel.

Others (biogas, vegetable oils, etc.) – please specify	**0.0**	**0.0**
Of which Biofuels[25] under Article 21.2	**0.0**	**0.0**
TOTAL	**1.024**	**1.1**

1.2. Measures taken to increase the share of energy from renewable sources

2. Measures taken <u>in the preceding 2 calendar years</u> and/or planned at national level to promote the growth of energy from renewable sources taking into account the indicative trajectory for achieving the national RES targets as outlined in Estonia's National Renewable Energy Action Plan. ***(Article 22(1)(a) of Directive 2009/28/EC)***

Table 2: Overview of all policies and measures

Name and reference of the measure	Type of measure*	Anticipated result**	Targeted group and or activity***	Existing or planned ****	Start and end dates of the measure
Support for modernising the heating systems of small residential buildings (RT I, 14.10.2016, 7)	**Monetary**	**Energy production**	**Natural persons who own small residential buildings.** **The replacement of boilers that use liquid fuels with heating devices that use renewable energy sources**	**Existing**	**2014 -...**
The renovation and/or construction of district heating boilers and fuel changeover	**Monetary**	**Installed capacity by 2023 86 MW**	**District heating companies, local authorities**	**Existing**	**2016 - 2023**
Conditions for supporting the consumption of biomethane in the transport sector	**Monetary**	**Annual quantity of biomethane produced and used in transport (4ktoe), biomethane filling stations (10).**	**Companies that sell fuel, local authorities, private individuals, companies**	**Existing**	**2015 - 2021**
Conditions for providing support for investment in heating systems (RT I, 31.01.2017, 26)	**Monetary**	**As a result of the support, final energy consumption will decrease due to the more efficient production and transmission of thermal energy.**	**The aim of the support is to increase the effectiveness of energy use in district heating systems and to reduce the quantities of pollutants emitted from generation systems in heating companies, local authorities or units thereof.**		

[25] Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

Electricity Market Act (RT I, 30.06.2017, 27)	**Regulatory Monetary**	**Electricity generation in an efficient cogeneration process, including using renewable energy sources.**	**Producers**		**2010 - 2017**
Liquid Fuel Act (RT I, 16.06.2017, 36)	**Regulatory**	**Implementation of renewable energy sources in transportation**	**The target group for this measure is producers, who are required to ensure a certain proportion of biofuel in the overall quantity of fuel they sell, and in the case of some fuels also in each unit of fuel they sell**		**2018 May - ...**
Conditions for support for preparing a heating infrastructure development plan (RT I, 29.11.2017, 9)	**Monetary**	**The anticipated result of the support is 200 approved modern heating infrastructure development plans, the implementation of which would contribute to the more efficient production of energy through the use of more cost-efficient sources of heat generation.**	**Making heating infrastructure more effective in local authorities.**		**2015 - 2023**
Environmental programme (Atmospheric air protection programme) (Regulation No 13 of the Minister for the Environment, 17 February 2006)	**Monetary**	**4.3 MW of renewable energy capacity in 2015-2016**	**Companies, local authorities**	**current**	**Recurrent**
Support for the reconstruction of small residential buildings	**Monetary**	**Production capacity and electricity generation**	**Natural persons who are owners of small residential buildings.** **Making small residential buildings more energy efficient (the list of eligible work includes the installation of electricity generation devices that use sustainable energy).**	**current**	**2014 - ...**

Support for the reconstruction of apartment buildings	**Monetary**	**Production capacity and electricity generation**	**Apartment associations and local authorities** Making **apartment buildings more energy efficient (the list of eligible work includes the installation of electricity generation devices that use sustainable energy).**		**2015 - 2017**
Commissioning of construction projects for nearly zero-energy buildings	**Regulatory/ modest**	**Changing construction solutions**	**End users, planners, builders, developers.** **In connection with the new minimum requirements for energy efficiency, sample solutions for the construction of nearly zero-energy buildings will be issued. The concept of the nearly zero-energy building also presumes that renewable energy production will be used locally. In general, it may be said that solar panels should be installed on the roof of every building.**	**current**	**2016 - 2017**

* Indicate if the measure is (predominantly) regulatory, financial or soft (i.e. information campaign).
**Is the expected result behavioural change, installed capacity (MW; t/year), energy generated (ktoe)?
***Who are the targeted persons: investors, end users, public administration, planners, architects, installers, etc? or what is the targeted activity / sector: biofuel production, energetic use of animal manure, etc)?
**** Does this measure replace or complement measures contained in Table 5 of the NREAP?

2.a Please describe the progress made in evaluating and improving administrative procedures to remove regulatory and non-regulatory barriers to the development of renewable energy. *(Article 22(1)(e) of Directive 2009/28/EC).*

Estonia is a transparent country where problems are rapidly solved using the best possible know-how and in cooperation with other agencies and ministries.

The authorisation procedures for wind farms are a good example of how administrative procedures have been simplified and expedited. Before 2015, the Estonian government processed and issued construction permits for wind farms, but since the amendment of the Water Act, authorisation procedures are carried out by the technical Regulatory Authority. This rules out decisions being made for political reasons and significantly expedites the administrative procedure.
The development of wind farms in Estonia is also facilitated by two pilot projects together with maritime planning activities, which sketch out the suitable locations for the creation of wind farms in the maritime areas around the island of Hiiumaa and Pärnumaa County.
Several expert groups have been set up in order to solve problems in the field of renewable energy and to promote topics of interest. For instance, there is a working group at the Ministry of Defence that focuses on the interactions between areas of national military importance and planned wind farms, and seeks solutions for the achievement of national defence objectives in the event of the broader implementation of wind energy.
A working group on statistical trade in renewable energy has also been convened, since there is deep interest in the promotion of cooperative mechanisms in Estonia, and the judicial area is ripe for international cooperation. The working group was convened under the expert forum of the Economic Development Committee, and it includes representatives from the renewable energy sector and the public sector. The working group's activities are coordinated by the Strategy Office of the State Chancellery.
In addition to legislative amendments, pilot projects and working groups, there is also close cooperation between various ministries in the field of scientific research. Since responsibility for bioeconomy is divided between three ministries, terms of reference for a study of bioeconomy that would take into account all of the existing resources and all of the ministries' interests were drawn up through cooperation between them.

2.b Please describe the measures in ensuring the transmission and distribution of electricity produced from renewable energy sources and in improving the framework or rules for bearing and sharing of costs related to grid connections and grid reinforcements. *(Article 22(1)f) of Directive 2009/28/EC)).*

Pursuant to the Electricity Market Act, a network operator provides network services, including connecting electrical installations to the network and transmission of electrical energy, to all market participants on an equal basis. Network operators have the right to refuse to provide network services only in cases stipulated in that act. The terms and conditions for connecting to the network have been

laid down in a Regulation of the Republic of the Government, the 'Grid Code'.
The grounds for the calculation of network charges and the coordination of standard terms and conditions thereof have been laid down in the Electricity Market Act. Network charges are implemented on the basis of the principle of equal treatment.

1.3. Description of existing support measures

3. Please describe the support schemes and other measures currently in place that are applied to promote energy from renewable sources and report on any developments in the measures used with respect to those set out in your National Renewable Energy Action Plan. *(Article 22(1)b) of Directive 2009/28/EC)).*

1) Estonia's energy development plan to 2030 (ENMAK 2030)

ENMAK 2030 describes the vision for the development of energy management in Estonia and selects the optimal means for achieving these, based on the overall objective of ensuring that consumers can have energy supply with market-oriented prices and availability. This is in line with the European Union's long-term energy and climate policy objectives, while at the same time contributing to the improvement of Estonia's economic climate and environmental conditions and to the development of long-term competitiveness.

2) Estonian National Renewable Energy Action Plan up to 2020

This is a source document that sets sectoral objectives and trajectories and designates the measures to be implemented for achieving the objectives.

3) Conditions for supporting the consumption of biomethane in the transport sector

This aid is granted to accelerate the consumption and supply of biomethane, in order to achieve the renewable energy transport objective, by creating demand for fuels from renewable sources, thereby increasing the production of biomethane and contributing to the development of the sector.
The anticipated result of granting the aid is annual consumption of at least 4 000 tonnes of oil equivalent (toe) of biomethane consumption in 2020, which will also launch the production of an equivalent quantity of biomethane.

4) Conditions and procedure for the use of aid for the development of a biomethane market

The objective of granting the aid is to contribute towards boosting the production and consumption of biomethane and to support activities which contribute towards achieving the target of fuel produced from renewable energy sources accounting for 10% of transport fuel consumption by 2020.

5) Support for electricity generated through cogeneration

Support for the introduction of renewable sources of energy, increasing the effectiveness of the energy

sector and ensuring the security/adequate capacity of domestic energy is granted in accordance with Section 59 of the Electricity Market Act. Support is granted for electricity that has been generated from renewable sources, from biomass in a cogeneration process, or in an efficient cogeneration process.

6) Support for the generation of wind energy

Under Section 591(5) of the Electricity Market Act, a producer who uses wind as the source of energy may receive support until the total amount of 600 GWh electricity is generated from wind power in Estonia in a calendar year. Pursuant to the Act, this support is paid by the transmission network operator (AS Elering).

7) The construction of local heating solutions in place of district heating solutions The

aim of the support is to achieve 10 MW of installed capacity by 2023.

8) Investment support for improving the performance of agricultural holdings

The overall objective of the support is to improve the performance of agricultural holdings and to develop environmentally-sustainable agricultural production, including raising the security of supply of environmentally-friendly energy in agricultural holdings.

Table 3: RES support schemes for electricity generation in 2016

RES support schemes 2016			**Per unit support (EUR/kWh)**	**Total (M EUR)***
All technologies for electricity generation from renewable energy sources				
Support mechanism for companies that generate electricity from RES under the Electricity Market Act (AS Elering)	***Obligation/quota (%)***			
	Penalty/Buy out option/ Buy out price (EUR/unit)			
	Average certificate price			
	Tax exemption/refund			
	Investment subsidies (capital grants or loans) (€/unit)			
	Production incentives			
		Feed-in tariff		
		Feed-in premiums	***5.37***	***67.2***
		Procurement procedures		
Total annual estimated support in the electricity sector				***67.2***
Total annual estimated support in the heating sector				
Total annual estimated support in the transport sector				
Generation of electricity in efficient cogeneration plants				
Support is granted for electricity that has been generated from renewable sources, from biomass in a cogeneration process, or in an efficient cogeneration process. (AS Elering)	***Obligation/quota (%)***			
	Penalty/Buy out option/ Buy out price (EUR/unit)			
	Average certificate price			
	Tax exemption/refund			

	Investment subsidies (capital grants or loans) (€/unit)			
	Production incentives			
		Feed-in tariff		
		Feed-in premiums	***3.2***	***6.8***
		Procurement procedures		
Total annual estimated support in the electricity sector				***6.8***
Total annual estimated support in the heating sector				
Total annual estimated support in the transport sector				

3.1. Please provide the information on how supported electricity is allocated to final customers for purposes of Article 3(6) of Directive 2003/54/EC. ***(Article 22(1)b) of Directive 2009/28/EC)).***

The electricity bill for the final customer consists of four components: the cost of electricity, network charges, the renewable energy charge and national taxes, such as excise duty and VAT on electricity. The renewable energy charge is on a separate line of the electricity bill, so the customer can see exactly how much they pay for financing the support to electricity generated from renewable sources and in an effective cogeneration process.

The renewable energy charge is the additional cost, as determined in accordance with the Electricity Market Act, of support to electricity generated from renewable sources or in an efficient cogeneration process and supplied to the network. The renewable energy charge is paid by all final customers of electricity in Estonia, and is proportional to the volume of network services they use.

The renewable energy charge is calculated by the transmission network operator in compliance with approved methodology and Section 59 of the Electricity Market Act. The charge is calculated on the basis of the support to be paid for renewable energy and the estimated amount of the network services to be used in the following calendar year. By 1 December each year, the transmission network operator publishes the renewable energy charge for the following calendar year on its website.

Network operators pay the renewable energy charge received from electricity customers each month to the transmission network operator in full and do not ask for a service charge on this. The transmission network operator uses the renewable energy charge collected from all electricity customers to pay support to economic operators who generate electricity from renewable sources or in an efficient cogeneration process. Renewable energy support is paid on the basis of the amount of renewable energy generated.

Electricity generated from renewable sources of energy is transmitted through the transmission or distribution system for final consumption by all consumers who are connected to the network. Each consumer is provided with information on their electricity bill concerning how much of the electricity they consumed was generated from renewable sources of energy.

1.4. Structuring of support schemes to take into account additional benefits

4. Please provide information on how, where applicable, the support schemes have been structured to take into account RES applications that give additional benefits, but may also have higher costs, including biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material?) *(Article 22 (1)c of Directive 2009/28/EC).*

In Estonia, support schemes are structured so as to maximise the cumulative benefit that could arise. One example of this is the development of a biomethane market.

The development and functioning of a biomethane market is promoted in Estonia through two complementary support measures that create common ground for achieving the objective (which is 3% of the biomethane transport objective by 2020). The support measure 'Conditions and procedure for the use of aid for the development of a biomethane market' lays the groundwork for biomethane to be brought to the market in Estonia and for expansion of the consumption of biomethane, enabling end consumers to consumer biomethane at the same price as natural gas, while also ensuring the intensification of market-based production and providing investment certainty in this sector. In addition to this measure, other 'supporting measures' support biomethane reaching the transport sector, through the measure 'Conditions for supporting the consumption of biomethane in the transport sector', where the only possibility [Translator's note: sic! condition?] for obtaining support is to introduce biomethane in the transport sector (i.e. at refuelling points and in gas-powered buses). Therefore plants that produce biomethane can provide refuelling points with input with which gas-powered buses can satisfy their refuelling needs. Thus the three above-mentioned actions together create a favourable basis for each other, solving the so-called chicken and egg conundrum by simultaneously creating consumption and production.

In addition to the synergy between the support measures, the promotion of a biomethane market will lead to broader-based cumulative benefits and solutions to existing problems. The development of a biomethane market at national level through the above-mentioned measures will encourage several market participants to produce and thereby also consume biomethane, providing investors with investment certainty in the sector. The development of the sector would significantly increase Estonia's energy independence and energy security, since fuel produced using domestic raw materials would be placed on the market. Investment in the production of biomethane would primarily be made in rural areas, which contain the resource required for its production. Therefore the demand for this domestic raw material would encourage the greater recycling of biowaste, the improved processing of sewage sludge, the increased energy independence of waste-water treatment plants, more efficient slurry management, thereby improving the characteristics of biofertilisers and reducing the spread of weed seeds and pathogens contained in slurry.

The development of the biomethane market would also result in improved productivity in the agricultural sector, and employment in rural areas would rise in biomethane production facilities, companies transporting the raw material, etc. In the area of environmental preservation, the introduction of biomethane would reduce carbon intensity in the transport sector, which would result in an improvement in the quality of ambient air and in the environment, because the quantity of pollutant emitted from the transport sector will fall due to the replacement of liquid fuels with biomethane and natural gas. In heavy transport, the replacement of diesel with biomethane will be particularly

important in the urban and peri-urban environment, because issues of air pollution and noise pollution are most acute in those areas.

1.5. Description of the system for issuing guarantees of origin

5. Please provide information on the functioning of the system of guarantees of origin for electricity and heating and cooling from RES, and the measures taken to ensure reliability and protection against fraud of the system. ***(Article 22(1)(d) of Directive 2009/28/EC)***

Elering is a member of the Association of Issuing Bodies (AIB), and issues guarantees of origin in accordance with European Energy Certificate System (EECS) rules. One of the foundations and most important principles of the above-mentioned rules is the avoidance of the double-issuing and double-use of guarantees of origin. The electronic system for guarantees of origin, which functions on the basis of internationally harmonised principles, enables more reliable proof of the origin of electricity than, for instance, bilateral agreements or other statistical methods and schemes devised by private companies and traders, not to mention overviews kept on paper or in Excel tables. The EECS, i.e. the standardised and internationally agreed upon rules for the administration of the system of guarantees of origin (the registration of market participants, the issuing, transfer, cancellation, expiration, etc. of guarantees of origin), was prepared over the years on the basis of the practice of the members of the association, and its timeliness is continually checked (including regular audits of members' compliance with the requirements, which are always carried out by one member organisation of the association and one external auditor).

Elering issues guarantees of origin in electronic format, which enables greater fraud-resistance (to ensure that the same guarantee of origin could not be used repeatedly to prove the origin of electricity to consumers) and to prevent double issuing (to ensure that it is not possible to issue several guarantees for the same megawatt hour) through multiple checks and security protocols. An electronic register is suitable (even the only conceivable solution) for the management of such an extensive volume of data. In addition, the electronic format is optimal for trading in guarantees of origin, because the AIB's central register, which interconnects all of the electronic registers of members of the AIB, also automatically checks all of the transactions carried out using it.

In Estonia, all generation devices have hour-based remote reading equipment for the gathering of measurement data, and the automated daily gathering of measurement data ensures that generation data and guarantees of origin are correctly calculated.

1.6. Developments in the availability and use of biomass resources for energy purposes

6. Please describe the developments <u>in the preceding 2 years</u> in the availability and use of biomass resources for energy purposes. ***(Article 22(1)(g) of Directive 2009/28/EC)***

Table 4: Biomass supply for energy use

	Quantity of domestic raw material (1000 m^3) ***		Primary energy in domestic raw material (ktoe)		Amount of imported raw material from EU (1000 m^3)		Primary energy in amount of imported raw material from EU (ktoe)		Amount of imported raw material from non EU (1000 m^3)		Primary energy in amount of imported raw material from non EU (ktoe)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Biomass supply for heating and electricity:												
Direct supply of wood biomass from forests and other wooded land energy generation (fellings etc.)**	3572	3864	648	701	5	10	1	2	2	1	0	0
Indirect supply of wood biomass (residues and co-products from wood industry etc.)**	2970	3629	496	607	137	128	23	21	27	21	5	4
Energy crops (grasses, etc.) and short rotation trees (please specify)												
Agricultural by-products / processed residues and fishery by-products **												

Biomass from waste (municipal, industrial etc.) **												
Others (please specify)												
Biomass supply for transport:												
Common arable crops for biofuels (please specify main types) ****												
Energy crops (grasses, etc.) and short rotation trees for biofuels (please specify main types) ****												
Other (please specify):												

*** Amount of raw material if possible in m^3 for biomass from forestry and in tonnes for biomass from agriculture and fishery and biomass from waste**

**** The definition of this biomass category should be understood in line with table 7 of part 4.6.1 of Commission Decision C (2009) 5174 final establishing a template for National Renewable Energy Action Plans under Directive 2009/28/EC**

***** Also includes exported raw material.**

****** The Ministry of Economic Affairs and Communications is not aware of the production of biofuels in Estonia for use in the transport sector, and therefore there are no data on this field.**

Table 4a. Current domestic agricultural land use for production of crops dedicated to energy production (ha)

Land use	**Area *(thousands of hectares)***	
	Year 2015	**Year 2016**
1. Land used for common arable crops (wheat, sugar beet etc.) and oilseeds (rapeseed, sunflower etc.) (Please specify main types)	0.0	0.0
2. Land used for short rotation trees (willows, poplars). (Please specify main types)	0.0	0.0
3. Land used for other energy crops such as grasses (reed canary grass *(Phalaris arundinacea),* switch grass *(Panicum virgatum),* Miscanthus and sorghum (Please specify main types)	0.0	0.0

There are no data concerning the cultivation of crops for energy production in Estonia.

7. Please provide information on any changes in commodity prices and land use within your Member State <u>in the preceding 2 years</u> from renewable sources. Please provide where available references to relevant documentation on these impacts in your country *((Article 22(1)(h) of Directive 2009/28/EC).*

Changes in land use due to the increased use of energy from biomass and other renewable sources have not influenced prices for consumers.

1.7. Biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material.

8. Please describe the development and share of biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material. *Directive 2009/28/EC, Article 22(1)(i)*

Table 5: Production and consumption of Art.21(2) biofuels (ktoe)

Article 21(2) biofuels[26]	**Year 2015**	**Year 2016**
Production – Fuel type X (Please specify)	0.0	0.0
Consumption – Fuel type X (Please specify)	0.0	0.0
Total production Art.21.2.biofuels	0.0	0.0
Total consumption Art.21.2. biofuels	0.0	0.0
% share of 21.2. fuels from total RES-T	0.0	0.0

1.8. Environmental impact of biofuel production

9. Please provide information on the estimated impacts of the production of biofuels and bioliquids on biodiversity, water resources, water quality and soil quality within your country <u>in the preceding 2 years</u>. Please provide information on how these impacts were assessed, with references to relevant documentation on these impacts within your country. ***(Article 22 (1)(j) of Directive 2009/28/EC)***

No biofuels are produced in Estonia, and as a result there are no impacts yet. Other agricultural activities are not known to have become more environment-intensive than usual.

[26] Biofuels made from wastes, residues, non-food cellulosic material, and lignocellulosic material.

1.9. Greenhouse gas emission savings from renewable-energy use

10. Please estimate the net greenhouse gas emission savings due to the use of energy from renewable sources *(Article 22 (1) k) of Directive 2009/28/EC).*

Table 6: Estimated net GHG saving from the use of renewable electricity

Environmental aspects	Year 2015	Year 2016
Total estimated net GHG emission saving from using renewable energy[27]	**66521**	**121849**
- Estimated net GHG saving from the use of renewable electricity*	**66521**	**121849**
- Estimated net GHG saving from the use of renewable energy in heating and cooling*		
- Estimated net GHG saving from the use of renewable energy in transport*		

*** CO_2 volume (CO_2/MWh).**

No sector-based detailed calculation of GHG savings from the use of renewable energy sources in accordance with the guidelines laid down in Directive 2009/28/EC has yet been carried out. The calculations shown in table 6, which have been used to calculate the GHG savings in the electricity sector, are based on a study done in 2004 (available here: https://www.kik.ee/sites/default/files/3101.pdf), in which the CO_2 intensity of electricity generation in Estonia was found to be 0.91 t CO_2/MWh.

1.10. Statistical transfers

11. Please report on <u>(for the preceding 2 years)</u> and estimate <u>(for the following years up to 2020)</u> the excess/deficit production of energy from renewable sources compared to the indicative trajectory which could be transferred to/imported from other Member States and/or third countries, as well as estimated potential for joint projects until 2020. *(Article 22 (1)(l) and (m) of Directive 2009/28/EC)*

Thanks to the favourable conditions for the production of renewable energy and to the policies that have been implemented, Estonia achieved its overall renewable energy objective in 2011. The share of renewable energy in Estonia was 28.6% in 2015, and it is forecast that that will rise to more than 30% in 2020. Figure 1 below illustrates the trajectory of renewable energy in Estonia, and an indicative renewable energy trajectory.

[27] The contribution of gas, electricity and hydrogen from renewable energy sources should be reported depending on the final use (electricity, heating and cooling or transport) and only be counted once towards the total estimated net GHG savings.

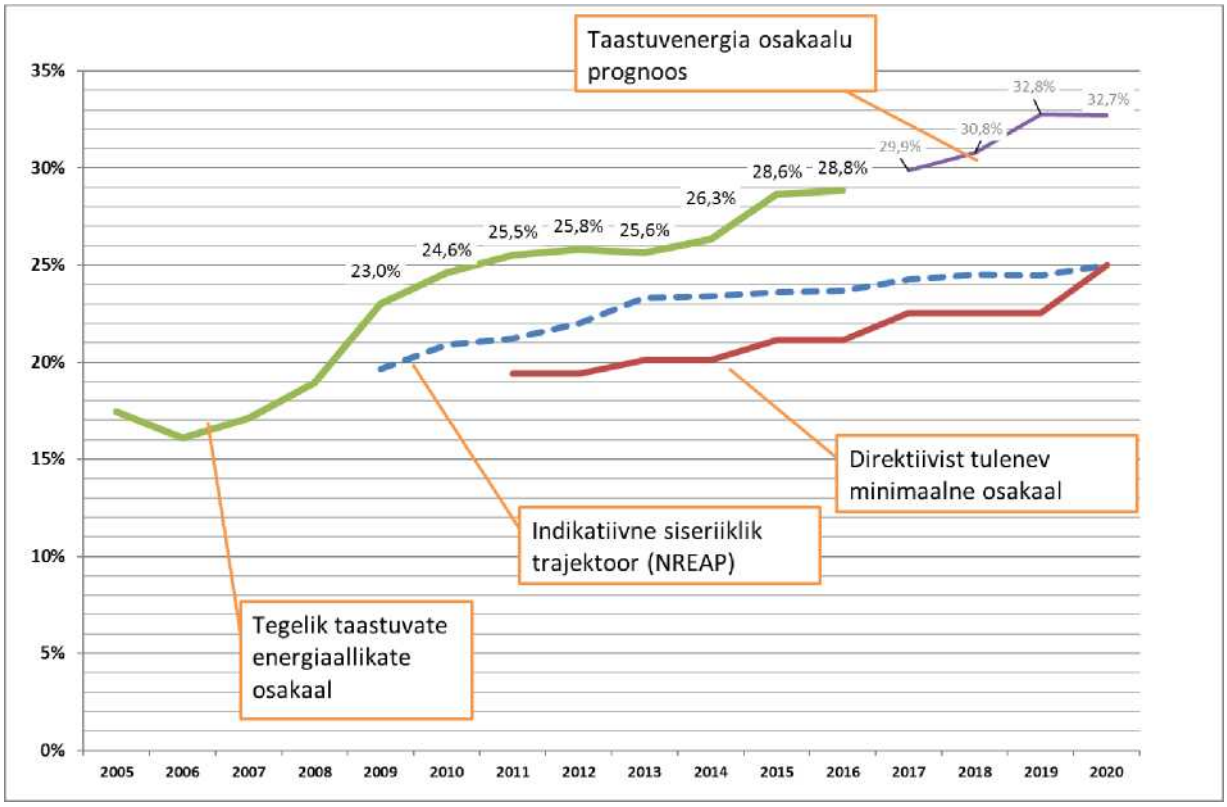

Figure 1: Estonia's renewable energy trajectory

Titles from Figure 1:

Taastuvenergia osakaalu prognoos: Forecast of share of renewable energy

Direktiivist tulenev minimaalne osakaal: Minimal share under the Directive

Indikatiivne siseriiklik trajektoor (NREAP): Indicative national trajectory

Tegelik taastuvate energiaallikate osakaal: Real share of renewable energy sources

Estonia has produced surplus renewable energy. Estonia is very interested in the implementation of cooperation mechanisms both up to 2020 and also beyond, taking into account the positive experience with statistical trading experienced in 2017 (see the reply to paragraph 11.1).

Figure 2: Real and estimated surplus production of renewable energy in Estonia compared to the indicative trajectory which could be transferred to other Member States or third countries (ktoe)[28],[29]

Title of Figure 2: **Oversupply of renewables for achievement of renewable energy objective, TWh**
Blue: Oversupply of renewables in relation to national trajectory, TWh
Red: Oversupply of renewables in relation to minimal permitted trajectory, TWh

11.1 Please provide details of statistical transfers, joint projects and joint support scheme decision rules.

On 7 November 2017, the Republic of Estonia and the Grand Duchy of Luxembourg entered into an agreement for statistical transfers, wherein Estonia was the seller of the statistics and Luxembourg was the buyer.

The statistical quantity of renewable energy transferred is not area-based, but is a summary overall statistical proportion of the renewable energy produced in Estonia. This consists mainly of thermal energy produced from renewable sources of energy (mainly firewood used in district heating and in households), electricity (wind power, combined heat and power plants that used biomass, etc.) and also statistical quantities of renewable energy that are generated in the transport sector.

The quantities and volume are divided in two:

[28] Please use actual figures to report on the excess production in the two years preceding submission of the report, and estimates for the following years up 2020. In each report the Member State may correct the data of the previous reports.
[29] When filling in the table, for deficit production please mark the shortage of production using negative numbers (e.g. –x ktoe).

a) Quantities ascertained for 2018 and 2020, for a total of 700 GWh.
b) Potential quantities are subject to agreement.

The price of the quantities sold are agreed upon through negotiations, in which the seller's estimated social cost of production of the renewable energy (i.e. EUR/MWh), determined as follows: [the total amount of State funds used in the production of renewable energy / the total quantity of renewable energy used in Estonia]) served as the basis, and on the buyer's side the opportunity cost of investing in the production of renewable energy.
The funds earned from the sale are placed in the Estonian national budget, and from there the revenue is targeted to compensating support for renewable energy. The transaction performed with Luxembourg represents roughly 1/3 of Estonia's annual surplus in 2018 and 2020. The Estonian State has the potential to carry out a couple more transactions of similar volume for the statistical sale of renewable energy.
In addition, Estonia has extensive practice and experience in carrying out joint implementation projects under the Kyoto Protocol.

1.11. The share of biodegradable waste in waste used for producing energy

12. Please provide information on how the share of biodegradable waste in waste used for producing energy has been estimated, and what steps have been taken to improve and verify such estimates. ***(Article 22(1)(n) of Directive 2009/28/EC)***

The question of assessing the share of biodegradable waste is primarily connected with the use of mixed municipal waste in electricity generation, which is carried out in Estonia by the Iru combined heat and power plant operated by Eesti Energia AS, which serves the Tallinn district heating system.
Estonia has regularly conducted studies on the sorting of mixed municipal waste (the Ministry of the Environment has commissioned such a study every two or three years), which provide a good overview of the share of biodegradable waste and also changes therein. These studies have revealed that 64.66% of municipal waste is biodegradable. Estonia has until now followed the example of southern regions and established plants that use biological and mechanical processing of waste to produce waste-derived fuel. The Iru waste incineration plant, which is functioning successfully, is significantly reducing the volume of waste deposited in landfills.

1.12. Amounts of biofuels and bioliquids taken into account for the purpose of complying with the renewable energy targets

13. Please provide the amounts of biofuels and bioliquids in energy units (ktoe) corresponding to each category of feedstock group listed in part A of Annex VIII taken into account by that Member State for the purpose of complying with the targets set out in Article 3(1) and (2), and in the first subparagraph of Article 3(4).

No biofuels or bioliquids were produced in Estonia in 2015 or 2016.

Feedstock group	Year 2015	Year 2016
Cereals and other starch rich crops	0.0	0.0
Sugar	0.0	0.0
Oil seed crops	0.0	0.0