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# Fourth Progress Report on the Promotion and Use of Energy from Renewable Sources in Greece

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Submitted under Article 22 of Directive  
2009/28/EC

2018

## **PREFACE**

Greece's commitments towards the higher penetration of RES in the Greek energy system have been translated into a series of regulatory initiatives and support programs, placing the exploitation of RES as a key driver towards sustainable development and ensuring of energy supply.

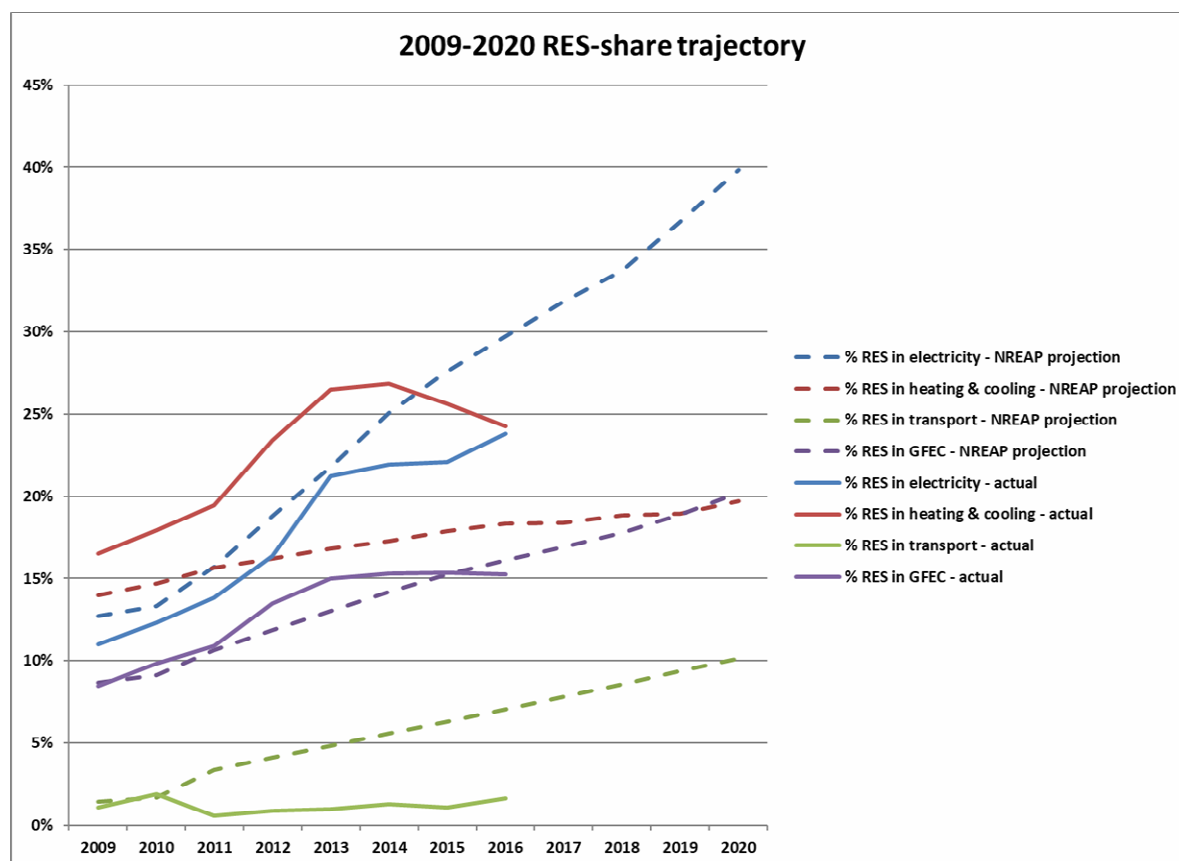
Ministry of Environment and Energy (MEE) considers this progress report as a part of the comprehensive national energy planning to 2020 and beyond whereas RES increased penetration, energy efficiency improvement at end-use and cost effectiveness of the energy mix is of high importance and that it exhibits both the progress and commitment towards the 2020 RES targets.

The present progress report is submitted under Art. 22 of Directive 2009/28/EC and it discusses all issues regarding the progress of RES penetration in the Green energy system, whether this concerns statistical reporting of renewable energy production and final consumption, or in regards to adoption of measures to support RE deployment in all relevant sectors.

This report prepared under the supervision of Directorate for Renewable Energy Sources and Alternative Fuels of the MEE in collaboration with the competent authorities of General Secretariat for Energy and Mineral Raw Materials of the MEE and the technical and scientific support by the Centre for Renewable Energy Sources and Saving (CRES), according to Art. 27 of Law 4062/2012.

# 1. Sectoral and overall shares and actual consumption of energy from renewable sources in 2015 and 2016 (*Article 22 (1) a of Directive 2009/28/EC*).

The penetration of RES in the gross final energy consumption (G FEC) remained relatively stable in 2016 compared to 2014, leading to a small deviation from the respective projected penetration of the National Renewable Energy Action Plan (NREAP) as presented in Figure 1.



**Figure 1: RES share trajectory from 2009 to 2020.**

The penetration of RES for heating already stands at 24.2% in 2016 surpassing even the corresponding indicative target for 2020, as presented at the NREAP (20%). Nevertheless, the utilization of RES for heating purposes decreased 10% in 2016 compared to 2014. The main reason for this reduction was the fact that the use of biomass decreased 8% in 2016 compared to 2014. Moreover, the solar thermal systems have steadily attained an important position in RES applications for domestic hot water production, with a gradual increased penetration (4% in 2016 compared to 2014), while the penetration of heat pumps for space heating has exhibited a significant growth rate in the last two years leading to an increase of 42% in 2016 compared to 2014.

Regarding the penetration of RES in gross final electricity consumption, an increase has been observed (9% in 2016 compared to 2014). However, a small offset from the projected figures for 2016 in the NREAP is evident (see Figure 1). The installed capacity of RES stations increased 5% in 2016 compared to 2014, mainly due to the installation of wind parks (additional installation of 392 MW in the period 2015-2016) and biomass stations (additional installation of 11 MW in the period 2015-2016). The penetration of the remaining RES technologies for electricity production remained relatively stable, while the development of the new support scheme (Law 4414/2016) is expected to boost the installation of new RES stations.

Finally, even if the penetration of RES in transport increases with a smooth rate (increase 29% in 2016 compared to 2014) a significant deviation from the foreseen target has been observed.

Although until October 2016 data regarding compliance with the sustainability criteria for biodiesel are not available, the provisions for the allocation of biodiesel including tax controls provide information for the connection of raw materials used with the final product (biodiesel) that was produced and consumed in Greece. Given the fact that biofuels produced from wastes and residues need only to fulfil the criterion of article 17(2) and the fact that GHG saving for waste vegetable oil/animal fat and cotton seed biodiesel is 88% and 80% respectively, according to the typical values in part A of Annex B of law 4062/2012, the reported amounts could be regarded as quasi-compliant with the sustainability criteria.

Moreover, it has to be mentioned that the targets (in principle in absolute values per technology) set for the penetration of renewable energy in the national energy system in 2020 may be revised in the near future, in the framework of the upcoming national energy roadmap to 2030 and the assessment of the national energy mix. The new plan, in view of the urgent need for a more cost-effective energy mix, will consider, among others, the degree of effectiveness of implemented policies, the actual penetration of specific RES technologies in the last years, the development of investment costs for all RES technologies, as well as the consequences of the economic recession both in shaping the energy demand of end use sectors and in the investing environment. To this end, it is worth mentioning that the actual final energy consumption in Greece in 2016 was approximately 16.7 Mtoe, while the respective projection in NREAP has been estimated in 21.5 Mtoe.

**Table 1:**  
**The sectoral (electricity, heating and cooling, and transport) and overall shares of energy from renewable sources<sup>1</sup>**

	2015	2016
RES-H&C <sup>2</sup> (%)	25.61%	24.24%
RES-E <sup>3</sup> (%)	22.09%	23.80%
RES-T <sup>4</sup> (%)	1.08%	1.68%
Overall RES share <sup>5</sup> (%)	15.33%	15.23%
<i>Of which from cooperation mechanism<sup>6</sup> (%)</i>		
<i>Surplus for cooperation mechanism<sup>7</sup> (%)</i>		

<sup>1</sup> Facilitates comparison with Table 3 and Table 4a of the NREAPs.

<sup>2</sup> 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.

<sup>3</sup> 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.

<sup>4</sup> 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.

<sup>5</sup> Share of renewable energy in gross final energy consumption. The same methodology as in Table 3 of NREAPs applies.

<sup>6</sup> In percentage point of overall RES share.

<sup>7</sup> In percentage point of overall RES share.

**Table 1a:**  
**Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)<sup>8</sup>**

	2015	2016
(A) Gross final consumption of RES for heating and cooling	1,485.0	1,359.1
(B) Gross final consumption of electricity from RES	1,158.3	1,227.1
(C) Gross final consumption of energy from RES in transport	30.6	57.3
(D) Gross total RES consumption <sup>9</sup>	2,673.9	2,640.1
(E) Transfer of RES to other Member States	0.0	0.0
(F) Transfer of RES from other Member States and 3rd countries	0.0	0.0
(G) RES consumption adjusted for target (D)-(E)+(F)	2,673.9	2,640.1

**Table 1b:**  
**Total actual contribution (installed capacity, gross electricity generation) from each renewable energy technology in Greece to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity<sup>10</sup>**

	2015		2016	
	MW	GWh	MW	GWh
Hydro <sup>11</sup> :	3,392.0	4,941.8	3,392.0	5,154.4
non pumped	2,693.0	4,529.2	2,693.0	4,698.8
<1MW	35.0	125.4	35.0	127.7
1MW–10 MW	188.0	546.3	188.0	559.4
>10MW	2,470.0	4,390.6	2,470.0	4,572.5
pumped	0.0		0.0	
mixed <sup>12</sup>	699.0	533.0	699.0	560.8
Geothermal	0.0	0.0	0.0	0.0
Solar:	2,604.0	3,899.6	2,604.0	3,929.7
photovoltaic	2,604.0	3,899.6	2,604.0	3,929.7
concentrated solar power	0.0	0.0	0.0	0.0
Tide, wave, ocean	0.0	0.0	0.0	0.0
Wind:	2,091.0	4,496.6	2,370.0	4,964.0
onshore				
offshore				
Biomass <sup>13</sup> :	51.0	231.4	58.0	274.2
solid biomass	2.0	1.1	2.0	4.6
biogas	49.0	230.4	56.0	269.6
bioliquids	0.0	0.0	0.0	0.0
<b>TOTAL</b>	8,138.0	13,569.4	8,424.0	14,322.4
of which in CHP		196.7		236.9

<sup>8</sup> Facilitates comparison with Table 4a of the NREAPs

<sup>9</sup> According to Art.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.

<sup>10</sup> Facilitates comparison with Table 10a of the NREAPs.

<sup>11</sup> Normalised in accordance with Directive 2009/28/EC and Eurostat methodology.

<sup>12</sup> In accordance with new Eurostat methodology.

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

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

	2015	2016
Geothermal (excluding low temperature geothermal heat in heat pump applications)	9.9	10.1
Solar	196.4	200.2
Biomass <sup>16</sup> :	1,072.1	910.2
<i>solid biomass</i>	1,056.3	895.7
<i>biogas</i>	15.8	14.5
<i>bioliquids</i>	0.0	0.0
Renewable energy from heat pumps: - of which aerothermal - of which geothermal - of which hydrothermal	206.7	238.6
<b>TOTAL</b>	1485,1	1120,5
<i>Of which DH<sup>17</sup></i>	0.0	0.0
<i>Of which biomass in households<sup>18</sup></i>	0.0	0.0

**Table 1d:**  
**Total actual contribution from each renewable energy technology in Greece to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the transport sector (ktoe)<sup>19 20</sup>**

	2015	2016
- Bioethanol		
- Biodiesel (FAME)		
- Hydrotreated Vegetable Oil (HVO)		
-Biomethane		
- Fischer-Tropsch diesel		
- Bio-ETBE		
- Bio MTBE		
- Bio-DME		
- Bio-TAEE		
Biobutanol		
- Biomethanol		
- Pure vegetable oil		
Total sustainable biofuels	22.1	49.5
Of which		
sustainable biofuels produced from feedstock listed in Annex IX Part A		

<sup>14</sup> Direct use and district heat as defined in Article 5.4 of Directive 2009/28/EC.

<sup>15</sup> Facilitates comparison with Table 11 of the NREAPs.

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

<sup>17</sup> District heating and / or cooling from total renewable heating and cooling consumption (RES- DH).

<sup>18</sup> From the total renewable heating and cooling consumption.

<sup>19</sup> For biofuels take into account only those compliant with the sustainability criteria, cf. Article 5(1) last subparagraph.

<sup>20</sup> Facilitates comparison with Table 12 of the NREAPs.

other sustainable biofuels eligible for the target set out in Article 3(4)e	7.1	6.2
sustainable biofuels produced from feedstock listed in Annex IX Part B	15.0	20.3
sustainable biofuels for which the contribution towards the renewable energy target is limited according to Article 3(4)d		23.0
Imported from third countries		0.8
Hydrogen from renewables		
Renewable electricity	8.5	7.8
Of which		
consumed in road transport	0.5	0.5
consumed in rail transport	4.0	3.8
consumed in other transport sectors	3.9	3.4
others (Please specify)		
others (Please specify)		

**2. Measures taken in the preceding 2 years 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 your 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*	Expected result**	Targeted group and or activity***	Existing or planned****	Start and end dates of the measure
1. Energy Communities and other provisions (L.4513/2018, OG A 9/23.01.2018)	Regulatory		Public administration, energy administrative authorities, local authorities, energy companies/ investors, producers, citizens	Complementary to NREAP	2018
2. RAE's Decision 908/2017 (OG B 4461/19.12.2017) Allocation of all non-interconnected island systems from the electricity supply derogation from 01.01.2018 according to the 2014/536 European Commission Decision and par. 1 of Art.137A/2017 of L.4001/2011	Technical		Energy administrative authorities, energy companies/ producers, end users,	Complementary to NREAP	2018
3. Establishment of the technologies and/or the categories of RES and HECHP power plants falling within the scope of the competitive bidding processes, whether competitive bidding processes can be characterised as 'technologically neutral' or not, the methodology and the power allocation procedure provided for the participation of RES power plants established in countries outside the European Economic Area, provided that there is active cross-border trade in energy with such countries, according to par. 2, Art. 7 of L. 4414/2016 (MD AΠEEK/A/Φ1/οικ. 184573/13/12/2017, OG B 4488/19/12/2017)	Regulatory		Public administration, energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2017
4. Production of electricity in agricultural areas of high productivity with exploitation of biomass, biogas or bioliquids (Art.26, L.4496/2017, OG A 170 08.11.2017)	Regulatory		energy administrative authorities, biomass-biogas-bioliquids energy companies/ investors, producers	Complementary to NREAP	2017
5. Amendments to provisions of L.4414/2016 and other provisions (Art.129-133 & 150-151, L.4495/2017, OG A 167 03.11.2017)	Regulatory		Public administration, energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2017
6. Allocation of biodiesel for the year 2017 in accordance with the provisions of art. 15A of law 3054/2002 (JMD οικ.176636/16.5.2017, OG B 1881/2016)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2017
7. PV Net Metering and Virtual Net Metering installations' framework according to L.3468/2006, Art.14A (MD AΠΕΗΛ/A/Φ1/οικ.175067/ 19.04.2017, OG B 1547/05.05.2017)	Regulatory		PV investors, PV plant owners, end users	Complementary to NREAP	2017
8. Amendments to forest legislation provisions and other provisions (Article 10: Amendments to L. 4414/2016) (L. 4467/2017, OG A 56/ 13.04.2017)	Regulatory		Public administration, energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2017



9. RAE's Decision 150/2017 Determination of values for regulatory parameters for the application of the methodology of calculation of the revenue of the Market Sub-Account of the Special Account for RES and CHP	Technical		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2017
10. RAE's Decision 149/2017 Amendment of the Electricity Transactions Code regarding the methodology of calculation of the revenue of the Market Sub-account of the Special RES and HECHP	Technical		Energy administrative authorities, energy companies/ producers	Complementary to NREAP	2017
11. Invitation for the participation in 2017 biodiesel allocation MD οικ. 171024/26.1.2017, OG B 219/2017)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2017
12. RAE's Decision 618/2016 (A) Modification of the Electricity Transactions Code, (B) Modification of the Operation Code of the Greek Power Transmission System, (C) Modification of the Electricity Transaction Code for the Forward Electricity Products Auctions System	Technical		Energy administrative authorities, energy companies/ producers	Complementary to NREAP	2017
13. RAE's Decision 410/2016 Amendment of 1599/2011 RAE's Decision, with which it was approved the dossier of "Meter Specifications and Measurements under the requirements of Δ6/Φ1/οικ.8786/6.5.2010 Ministerial Decision for the implementation of the Origin Guarantee System for Electricity from RES and HECHP and its Safeguarding Mechanism" (OG B 4081/20.12.2016)	Technical		Energy administrative authorities, energy companies/ producers	Complementary to NREAP	2017
14. RAE's Decision 516/2016 (A) Amendment of the Electricity Transactions Code (B) Amendment of the Transactions Code for the Forward Electricity Products Auctions System	Technical		Energy administrative authorities, energy companies/ producers	Complementary to NREAP	2017
15. RAE's Decision 395/2016 Operation Code of the Greek Power Transmission System as approved by the OG B 78/20.01.2017	Technical		Energy administrative authorities, energy companies/ producers	Complementary to NREAP	2017
16. RAE's Decision 334/2016 Amendment of the Electricity Transactions Code and its Manual for the application of the provisions for the charges imposed on load representatives	Technical		Energy administrative authorities, load representatives	Complementary to NREAP	2016
17. Spatial Planning - Sustainable Development and Other Provisions (Article 28: Provisions for the Conclusion of Operating Aid Contracts for RES and CHP and issues for Power Production Permits of RES & HECHP) (L. 4447/2016, OG A 241/ 23.12.2016)	Regulatory		Public administration, energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016
18. Type and content of Differential Premium Operating Aid Contracts for dispatchable Solar Thermal power plants in Non Interconnected Islands., according to par. 3, Art. 10, L.4414/2016 (MD ΑΠΕΗΛ/Α/Φ1/οικ.187702/ 12.12.2016, OG B 4073/19.12.2016)	Regulatory		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016
19. Type and content of Differential Premium Operating Aid Contracts for RES and HECHP power plants (excluding hybrid power plants) in the Interconnected System and the Interconnected Network, according to par. 3, Art. 9, L.4414/2016 (MD ΑΠΕΗΛ/Α/Φ1/οικ.187706/ 12.12.2016, OG B 4072/19.12.2016)	Regulatory		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016
20. Type and content of Fixed Price Operating Aid Contracts for non dispatchable RES power plants in Non Interconnected Islands, which are subject to rules of integration and operation, according to par. 3, Art. 10, L.4414/2016 (MD ΑΠΕΗΛ/Α/Φ1/οικ.187705/ 12.12.2016, OG B 4069/19.12.2016)	Regulatory		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016
21. Type and content of Fixed Price Operating Aid Contracts for RES and HECHP power plants (excluding hybrid power plants) in the Interconnected System and the Interconnected Network, according to par. 3, Art. 10, L.4414/2016 (MD ΑΠΕΗΛ/Α/Φ1/οικ.187701/ 12.12.2016, OG B 4068/19.12.2016)	Regulatory		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016

22. Type and content of Fixed Price Operating Aid Contracts for non dispatchable RES power plants in Non Interconnected Islands, which are not subject to rules of integration and operation, according to par. 3, Art. 10, L.4414/2016 (MD ΑΠΕΗΛ/Α/Φ1/οικ.187704/12.12.2016, OG B 4046/16.12.2016)	Regulatory		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016
23. Type and content of Fixed Price Operating Aid Contracts for dispatchable Biomass power plants in Non Interconnected Islands, according to par. 3, Art. 10, L.4414/2016 (MD ΑΠΕΗΛ/Α/Φ1/οικ.187703/12.12.2016, OG B 4045/16.12.2016)	Regulatory		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016
24. Methodology for calculating the special purchase price per RES and HECHP technology, criteria and limitations and payment process of the Market Participation Readiness Development Premium, as well as the procedure for reducing the Operating Aid revenue for the stations that have received investment aid, according to Art. 3, 5 and 6 of L.4414/2016. (MD ΑΠΕΗΛ/Α/Φ1/οικ.187480/07.12.2016, OG B 3955/09.12.2016)	Regulatory		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016
25. Chemical Council decision 52/2016 setting common specifications for biodiesel (FAME) used in transport and heating (JMD OG B 3953/2016)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2016-
26. RAE's Decision 417/2016 for Pilot Competitive Bidding Process (OG B 3627/09.11.2016)	Technical		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016
27. Allocation of biodiesel for the year 2016 in accordance with the provisions of art. 15A of law 3054/2002 (JMD οικ.177451/12.5.2016 OG B 1417/2016 amended by οικ. 181547/27.10.2016, OG B 3534/2016)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2016
28. RAE's Decision 238/2016 Energy Efficiency Assessment for granting Production Permits for PV power plants (OG B 3286/13.10.2016)	Technical		energy administrative authorities, energy companies/ investors, producers of pv power plants	Complementary to NREAP	2016
29. Categories of infringements and determination of the procedure of fines enforcement regarding compliance with biofuels and bioliquids sustainability criteria" (MD 184182/05.10.2016, OG B 3278/2016)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2016-
30. RAE's Decision 280/2016 Approval of the 10-year Development Program of the National Electricity Transmission System of period 2017-2026 (OG B2534/17.08.2016)	Technical		Energy administrative authorities	Complementary to NREAP	2017-2026
31. RAE's Decision 207/2016 Determination of "Methodology for calculating the variable cost of Hydro power plants" and amendment of the Electricity Transactions Code, the Manual of the Electricity Transactions Code, as well as the Operation Code of the Greek Power Transmission System	Technical		energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016
32. New support scheme for renewable energy sources power plants and high efficiency combined heat and power plants.- Provisions on the legal and functional separation of the supply and distribution branches in the natural gas market and other provisions. (L.4416/2016, OG A 149/ 09.08.2016)	Regulatory		Public administration, energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2016

33. Framework for the security in offshore works for exploration and exploitation of hydrocarbons, transposition of the Directive 2013/30/EC, amendment of PD 148/2009 and other provisions (L.4409/2016, OG A136, 28.07.2016, Art. 39, 44, 46-47 – special provisions for solar thermal power plants and farmers that own pv power plants)	Regulatory		Public administration, energy administrative authorities, companies/ investors of solar thermal power stations, farmers-owners pv power plants	Complementary to NREAP	2016
34. Biofuels and bioliquids sustainability system” (JMD оук.175700/14.04.2016, OG B 1212/2016)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2016
35. Type and content of the electricity sales contract from solar thermal plants (with energy storage) on non-interconnected power grid, according to par. 3, Art. 12, L.3468/2006, as applicable (MD АПЕHA/A/Φ1/ оук.171302/29.01.2016, OG B 271/11.02.2016)	Regulatory		Energy administrative authorities, solar thermal plants	Complementary to NREAP	2016
36. Type and content of the electricity sales contract from hybrid plants (with energy storage) on non-interconnected power grid, according to par. 3, Art. 12, L.3468/2006, as applicable (MD АПЕHA/A/Φ1/ оук.185028/ 15.12.2015, OG B 3832/23.12.2015)	Regulatory		Energy administrative authorities, hybrid plants	Complementary to NREAP	2015
37. Invitation for the participation in 2016 biodiesel allocation оук. 184157/30.11.2015, OG B 2601/2015)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2016
38. HEDNO’s Infrastructure Action Plan approval, according to European Commission’s 2014/536/EK/14.08.2014 decision and implementation of the Management Code for Power Distribution Systems on non- interconnected islands (RAE 389/2015, OG B 2542/25.11.2015)	Technical		Energy administrative authorities, energy companies/ producers, end users,	Complementary to NREAP	2015
39. Law 4342/2015, Part C, production licenses and connection security payments (OG A 143/ 09.11.2015)	Regulatory		Energy companies/ investors, public administration, energy administrative authorities	Complementary to NREAP	2015
40. Law 4336/2015, paragraph B, Memorandum of Understanding for 3-year program of EFS (OG A 94/ 14.08.2015)	Regulatory		Public administration	Complementary to NREAP	2015-2018
41. Allocation of biodiesel for the year 2015 in accordance with the provisions of art. 15A of law 3054/2002 оук. 176374/18.5.2015 (OG 911/2015)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2015
42. Requirements for providing information at the sales point for biofuel blends (MD 1/2012, OG B 1288/11.4.2012 as amended by MD 33749, OG B 623/2015)	Regulatory		End users, public administration, retailers	Complementary to NREAP	2012
43. RES Net Metering installations’ framework according to L.3468/2006, Art.14A (MD АПЕHA/A/Φ1/оук.24461/ 30.12.2014, OG B 3583/31.12.2014)	Regulatory		PV and small wind plant investors, PV plant owners, end users	Complementary to NREAP	2014
44. Allocation of Special Levy for the domestic electricity consumption in areas with operating RES installations (MD АПЕHA/A/Φ1/ оук. 23840/23.12.2014, OG B 3583/31.12.2014)	Regulatory/ Financial		End users <sup>21</sup> , Local administration	Complementary to NREAP	2014
45. Law 4315/2014, Art. 54 concerning reviving of installation licences subjecting to judicial judgement (OG A 269/ 24.12.2014)	Regulatory		Energy companies/ investors, public administration	Complementary to NREAP	2014-2015

<sup>21</sup>Residents in areas with RES installations.

46. Invitation for the participation in 2015 biodiesel allocation ouk. 23327/19.12.2014, OG B 3549/2015)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2015
47. Amendment of the Transaction Code of Electricity Market, regarding accounting issues of the Special Account for RES (RAE 625/2014, OG B 3305/2014)	Financial		Public administration, energy administrative authorities	Complementary to NREAP	2015
48. Law 4296/2014, Art. 8 concerning priority of licencing of specific RES and Biomass, Biogas or Biofuel installations (OG A 214/ 02.10.2014)	Regulatory		Energy companies/ investors, public administration	Complementary to NREAP	2014
49. Law 4281/2014, Art. 210 concerning Ministry's RES electronic registry (OG A 160/ 08.08.2014)	Regulatory		Public administration, energy administrative authorities	Complementary to NREAP	2014
50. Allocation of biodiesel for the year 2014 in accordance with the provisions of art. 15A of law 3054/2002 Δ1/A/ouk.13316/7.8.2014 (OG B 2220/2014)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2014
51. Law 4277/2014, Art. 47 concerning financial resources of special RES account of L.4001/2011, Art. 143(OG A 156/ 01.08.2014)	Financial		Public administration, energy administrative authorities	Complementary to NREAP	2014
52. Invitation for the participation in 2014 biodiesel allocation (MD Δ1/A/ouk.6769/14.04.2014, OG B 937/2014)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2014
53. Law 4254/2014 "Support and development measures of Greek economy in the context of implementation of Law 4062/2012 and other provisions" (OG A 85/07.04.2014)	Regulatory/ Financial		Public administration, energy administrative authorities, energy companies/ investors, producers	Complementary to NREAP	2014
54. Supplementation of RAE 560/2013 referring to "IPTO's Ten-year Development Program of Hellenic Electricity Transmission System 2014-2023" (RAE 77A/2014, OG B 556/2014)	Technical		Energy administrative authorities, energy companies/investors, end users,	Complementary to NREAP	2014-2023
55. Specification of criteria and methodology for the allocation of biodiesel (JMD Δ1/A/ouk. 2497, OG B 253/8.2.2013 amended by Δ1/A/ouk. 4075/5.3.2014, OG B 586/2014, ouk.185546/27.10.2016, OG B 3534/2016 and article 23 of Law 4447/2016, OG A 241 )	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2013-
56. Management Code for Power Distribution Systems on non- interconnected islands (RAE 39/2014, OG B 304/11.02.2014)	Technical		Energy administrative authorities, energy companies/ producers	Complementary to NREAP	2013
57. IPTO's Ten-year Development Program of Hellenic Electricity Transmission System 2014-2023 (RAE 560/2013, OG B 3297/2013)	Technical		Energy administrative authorities, energy companies/ producers, end users,	Complementary to NREAP	2014-2023
58. Law 4203/2013 "Arrangement of topics on Renewable Energy Sources and other provisions" (OG A 235/01.11.2013)	Regulatory		Investors, end users, public administration	Complementary to NREAP	2013-2020
59. Solid biomass fuels for non-industrial use - Requirements and testing methods (MD 198, OG B 2499/04.10.2013)	Regulatory		End users, biomass production companies	Complementary to NREAP	2013-2020

60. Technical regulation for storage and transport of biofuels at oil refineries and oil products facilities (Δ3/A/οικ. 15225, OG B 2055/23.8.2013)	Regulatory		Public administration, biofuel producers/importers, refineries, wholesalers	Complementary to NREAP	2013
61. Determination of the coefficients related to the allocation methodology of the Special Levy, as defined in Article 143, par. 2, case c of L.4001/2011, for the second semester of 2013 (RAE, 323/2013, OG B 1784/24.07.2013)	Financial		Investors, end users, public administration	Complementary to NREAP	2013
62. Allocation of 92,000 kiloliters of biodiesel for the year 2013 in accordance with the provisions of art. 15A of law 3054/2002 (JMD Δ1/A/οικ. 11750/14.6.2013, OG B 1452/14.6.2013)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2013
63. Supplementation to MD Y.A.Π.E./Φ1/1289/9012 which amended the special program for the deployment of photovoltaics up to 10kW on buildings and especially roofs (MD Y.A.Π.E./Φ1/1506/οικ. 10662, OG B 1310/30.05.2013)	Financial		Investors, public administration	Complementary to NREAP	2013-2020
64. Law 4146/2013 "Establishment of a friendly developmental environment for strategic and private investment and other provisions" (OG A 90/18.04.2013), as amended by Art.68 of Law 4155/2013 (OG A 120/29.05.2013): Provisions for tax incentives for all RES technologies and investment subsidies for hydro, pumped hydro, hybrid, biomass and biogas stations	Financial		Investors, public administration	Complementary to NREAP	2014-2020
65. Law 4152/2013 "Urgent measures for implementing laws 4046/2012, 4093/2012 and 4027/2013" (OG A 107/09.05.2013): Section I - Arrangements concerning Renewable Energy Sources	Regulatory		Investors, public administration	Complementary to NREAP	2013-2020
66. Amendment of the special program for the deployment of photovoltaics on buildings and especially roofs (MD Y.A.Π.E./Φ1/1289/9012, OG B 1103/02.05.2013)	Financial		Investors, public administration	Complementary to NREAP	2013-2020
67. Amendment of MD Y.A.Π.E./Φ1/οικ.2262/31.01.2012 concerning the feed-in tariffs for electricity produced by photovoltaics, as applicable (MD Y.A.Π.E./Φ1/1288/9011, OG B 1103/02.05.2013)	Financial		Investors, public administration	Complementary to NREAP	2013-2020
68. Invitation for the participation in 2013 biodiesel allocation (MD Δ1/A/οικ.3008/18.2.2013, OG B 335/2013 as amended by Δ1/A/οικ. 5206/14.3.2013, OG B 626/2013)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2013
69. Additional obligations for the environmental licensing of electricity and thermal energy production units using biogas from anaerobic digestion of biomass (MD οικ. 166640, OG B 554/08.03.2013)	Regulatory		Investors, public administration	Complementary to NREAP	2013-2020
70. Law 4123/2013, Art. 24 concerning PV connection contracts, guarantees and farmer PV plants (OG A 43/19.02.2013)	Regulatory		Investors, public administration	Complementary to NREAP	2013-2015
71. Law 4122/2013 "Energy Performance of Buildings - 2010/31/EC Directive Transposition and other provisions" (OG A 42/19.02.2013)	Regulatory		Energy auditors, energy companies, end users, public administration	Complementary to NREAP	2013-2020
72. Assessment based on the energy efficiency criterion for granting a production license to geothermal power plants (MD 120/2013 OG B 240/08.02.2013)	Regulatory		Investors, public administration	Complementary to NREAP	2013-2021
73. SupPLEMENTING 1291/2011 RAE decision regarding the margin for the deployment of photovoltaics in Evia (RAE, 2/2013, OG B 240/08.02.2013)	Regulatory		Investors, public administration	Complementary to NREAP	2013-2020
74. Standard Environmental Commitments (SEC) for RES projects classified in category B of group 10 "Renewable Energy" of Annex X of MD 1958/2012 (MD 3791, OG B 104/24.01.2013)	Regulatory		Investors, public administration	Complementary to NREAP	2013-2020
75. Determination of the coefficients related to the allocation methodology of the Special Levy, as defined in Article 143, par. 2, case c of L.4001/2011, for the first semester of 2013 (RAE, 1/2013, OG B 14/10.01.2013)	Financial		Investors, end users, public administration	Complementary to NREAP	2013

76. "Demonstration projects utilizing Renewable Energy and Energy Saving measures in new, under construction or existing buildings, gyms and swimming pools, belonging to public authorities and municipal enterprises" Program (NSRF 2007-2013)	Financial		Public administration, public authorities, planners	Complementary to NREAP	2013-2015
77. Law 4093/2012 "Approval of the Medium Term Fiscal Strategy Program 2013 - 2016 - Urgent Measures for implementing L.4046/2012 and the Medium Term Fiscal Strategy Program 2013-2016" (OG A 222/12.11.2012): Section I.2 - Arrangements concerning RES and CHP	Regulatory		Investors, public administration	Complementary to NREAP	2012-2016
78. Licensing for the production and trade of biofuels or bioliquids (MD Δ2/A/22285/9.11.2012, OG B 2998/12.11.2012)	Regulatory		Public administration, biofuel producers/importers	Complementary to NREAP	2012
79. Modifications on provisions regarding the electricity transactions code (MD 771, OG B 2673/02.10.2012): RES registry development and maintenance by the Electricity Market Operator	Regulatory		Electricity Market Operator	Complementary to NREAP	2012-2020
80. Suspension of the licensing procedure and the issuance of grid connection offers for photovoltaic plants due to having met the targets set by the MD A.Y./F1/oik.19598 (MD Y.A.Π.E. /Φ1/2300/oik.16932, OG B 2317/10.08.2012)	Regulatory		Investors, public administration	Complementary to NREAP	2012-2020
81. Amendment of the special program for the deployment of photovoltaics up to 10kW on buildings and especially roofs (MD Y.A.Π.E./Φ1/2302/oik.16934, OG B 2317/10.08.2012)	Regulatory/ Financial		Investors, public administration	Complementary to NREAP	2012-2020
82. Procedure for granting grid access to groups of small-scaled RES producers in cases where there is no sufficient local medium- or low-voltage grid capacity (RAE, 787/2012, OG B 2655/28.09.2012)	Regulatory		Investors, public administration	Complementary to NREAP	2012-2020
83. Management system of data and information for the surveillance of production, refining, storage, import, export and transport of crude oil semi-processed and final oil products (MDΔ1/B/7364, OG B 1116/10.4.2012 as amended by Δ1/oik. 16421 OG B 2328/16.8.2012)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2012
84. Determination of the coefficients related to the allocation methodology of the Special Levy, as defined in Article 143, par. 2, case c of L.4001/2011, for the period August 2012-June 2013 (RAE, 698/2012, OG B 2325/16.08.2012)	Financial		Investors, end users, public administration	Complementary to NREAP	2012-2013
85. Amendment of MD Y.A.Π.E./Φ1/2262 regarding the feed-in tariffs for electricity produced by photovoltaics (MD Y.A.Π.E./Φ1/2301/oik.16933, OG B 2317/10.08.2012)	Financial		Investors, public administration	Complementary to NREAP	2012-2020
86. Determination of the share of contribution to ERT SA according to article 14 of L.1730/1987, which is a resource of the Special Account of Article 40 of L2773/1999 (MD Y.A.Π.E. /Φ1/2303/oik.16935, OG B 2317/10.08.2012)	Financial		Investors, public administration, Electricity Market Operator	Complementary to NREAP	2012-2020
87. Peloponnesus: Declaration of power grid as congested for absorption of RES electricity load and ascertainment of safe RES load limits (RAE 699/2012)	Technical		Energy administrative authorities, investors	Complementary to NREAP	2012
88. Specification of raw materials for biofuels whose contribution is double counted towards RES targets ( JMD Δ1/A/oik. 10839, OG B 1667/16.5.2012)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2012
89. Bureau for the Monitoring of Sustainability of Biofuels and Bioliquids (JMD Δ1/A/oik. 10838, OG B 1661/15.5.2012)	Regulatory		Public administration, economic operators, biodiesel producers, refineries, wholesalers	Complementary to NREAP	2012
90. Amending and supplementing MD 1958/2012 (MD 20741/12, OG B 1565/08.05.2012)	Regulatory		Investors, public administration	Complementary to NREAP	2013-2020
91. Environmental licensing of electricity and thermal energy production units using biogas from biomass anaerobic digestion (Circular oik. 1604.81/03.04.2012)	Regulatory		Investors, public administration	Complementary to NREAP	2013-2020

92. Law 4062/2012 "Utilization of the former Airport at Elliniko - HELIOS Project - Promoting the use of energy from renewable sources (Transposition of Directive 2009/28/EC) - Sustainability criteria of biofuels and bioliquids (Transposition of Directive 2009/30/EC)" (OG A 70/30.03.2012)	Regulatory		Investors, end users, public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2012-2020
93. Modification of the JMD ΦB1/E2.1/244/6/26.01.2011 for the implementation of the "Energy Efficiency at Household Buildings" Program (MD ΦB1/2.1/5332/238 OG B 675/07.03.2012): Eligible interventions including the installation of RES systems in buildings	Financial		End users, energy companies, energy auditors, public administration	Complementary to NREAP	2012 until program budget per region has been spent
94. Supreme Chemical Council decision 316/2010 transposing directive 2009/30/EC and setting specifications for gasoline-bioethanol blends (OG B 501/29.02.2012)	Regulatory		Public administration, biofuel producers, refineries, wholesalers	Complementary to NREAP	2012
95. Law 4042/2012 "Protection of the environment through criminal law - Transposition into national law of Directive 2008/99/EC – Framework for the production and the treatment of waste - Transposition into national law of Directive 2008/98/EC – Arrangement of issues related to the Ministry of Environment, Energy and Climate Change" (OG A 24/13.02.2012)	Financial		Investors, end users, public administration	Complementary to NREAP	2012-2020
96. Amendment of the special program for the deployment of photovoltaics up to 10kW on buildings and especially roofs (MD Y.A.II.E. /Φ1/οικ.2266, OG B 97/31.01.2012)	Financial		Investors, public administration	Complementary to NREAP	2012-2020
97. Feed-in tariffs for electricity produced by photovoltaics (MD Y.A.II.E. /Φ1/οικ.2262, OG B 97/31.01.2012)	Financial		Investors, public administration	Complementary to NREAP	2012-2020
98. Projects and activities classification into categories/subcategories according to their potential environmental impacts as well as into groups of similar projects-activities (MD 1958/12, OG B 21/13.01.2012)	Regulatory		Investors, public administration	Complementary to NREAP	2013-2020
99. Modification on the MD 9154/28.02.2011 regarding the special terms for the deployment of photovoltaics and solar systems on fields and buildings (MD οικ.52911, OG B 14/11.01.2012)	Regulatory		Investors, public administration	Complementary to NREAP	2012-2020
100. Allocation of 132,000 kiloliters for the year 2011 in accordance with the provisions of art. 15A of law 3054/2002 (JMD Δ1/A/17970/29.7.2011, OG B 1700/29.7.2011)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2011
101. Invitation for the participation in 2011 biodiesel allocation (MD Δ1/A/13972/16.6.2011, OG B 1307/16.6.2011)	Regulatory		Public administration, biodiesel producers/importers, refineries, wholesalers	Complementary to NREAP	2011-2012
102. Report under article 19 (2) of directive 2009/28/EC on the promotion on the use of energy from renewable sources	Regulatory		Public administration, biofuel producers/importers, refineries, wholesalers	Complementary to NREAP	2012-2020
103. Reinforcement of the interconnection capacity with neighbouring countries (increase of NTC on the existing interconnections + new interconnection with Turkey). Further actions and projects for the integration of the electricity system into the European grid through western Balkans	Technical		Investors, public administration, planners	Existing/ planned in NREAP	2010-2020
104. Development of storage facilities in the interconnected system by exploiting hydro pumping system at existing large hydro plants and new installations (public consultation RAE)	Technical		public administration, planners	Planned in NREAP	2014-2020
105. 10-year Plan for the Development of the Electricity Transmission System, elaborated by the System Operator	Technical		Investors, public administration	Complementary to NREAP	2014-2023
106. Interconnection of Cyclades with the mainland by 2017	Technical		Investors, public administration	Complementary to NREAP	2014-2022

\* 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).**

With increasing shares of RES in the electricity mix, the transition to a support scheme that facilitates the integration of RES into the national electricity market became necessary and led to issuing of L.4414/2016 “New Support Scheme for Renewable Energy Power Plants and High Efficiency Combined Heat and Power Plants”. Also, the EC Guidelines on State aid for environmental protection and energy for the period 2014-2020 (EEAG) that have come into force on July 1<sup>st</sup>, 2014 have defined new criteria and timelines for national RES support schemes in order to be eligible for approval by the EC.

Law 4414/2016 provided for the extension of the national net-metering scheme to other technologies (PV, small wind, biomass/biogas/bioliquid, small hydro-power, CHP) as well as the establishment of the possibility of virtual net-metering for solar PV and small wind projects installed by public law entities and private law entities pursuing welfare objectives or other purposes in the public interest as well as farmers and agricultural holdings. Under standard net-metering, the RES plant has to be installed in the same or adjacent area to the consumer installation of the auto-producer and has to be connected to the network through the power supply of this consumer installation. Virtual net-metering, defined under Article 2 of Law 3468/2006 as the offsetting of electricity generated by a RES auto-producer and consumed by installations of the auto-producer, at least one of which is not located in the same or adjacent area as the RES plant or is connected to a different power supply.

Law 4513/2018 introduces the institutional framework for the establishment and operation of the Energy Communities. Through this legislative initiative it is possible to boost the potential for local communities, individuals-citizens, Regional and Local Authorities and other public and private law entities to develop investment projects in the energy field. The framework is designed to allow further decentralization of electricity generation and to make energy transition more efficient, taking into account and pointing on innovative energy production based on local ownership and initiatives. The law creates a favorable framework for the development of RES power plants from the Energy Communities, offering some significant economic and tax incentives for them. Thus, it enables the local communities in becoming active in the promotion of clean energy in Greece within the framework of achieving the target for participation of RES in the energy balance, with high added value but also in an optimal way in terms of cost and benefit for local communities. One of the major incentives, which the law provides for the Energy Communities in order to develop RES power plants, is that they are given the opportunity to install RES stations using the virtual net metering scheme. In that way, the Energy Community is allowed to meet the energy needs of their members and vulnerable consumers or citizens living below the poverty threshold within the region in which Energy Community is established.

The JMD “Biofuels and bioliquids sustainability system” (JMD οικ.175700/14.04.2016, OG B 1212/2016) sets the requirements and the procedures for the certification and verification of compliance with the sustainability criteria and specifies the ways of demonstrating compliance, the reporting items and the economic operators with reporting obligations.

Following the “Biofuels and bioliquids sustainability system” JMD, the MD “Categories of infringements and determination of the procedure of fines enforcement regarding compliance with biofuels and bioliquids sustainability criteria” (184182/05.10.2016, OG B 3278/2016) was issued to set categories of infringements and to determine the procedure of fines enforcement regarding compliance with biofuels and bioliquids sustainability criteria.

Currently, all producers/traders of biofuels are certified by a voluntary scheme.



**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).**

According to the approved Development Program of the Hellenic Power Transmission Operator (ADMIE) for the period 2017 - 2026 (RAE Resolution 280/2016, Government Gazette B 2534), a number of projects for the interconnection of major NII's systems are currently promoted, removing gradually much of the technical limitations for the further penetration of RES in the Aegean islands:

- The Cyclades interconnection project which, according to the revised scheduling, consists of 3 phases:  
Phase I: Interconnection line (200 MVA) between Syros island and Lavrio (Attica), as well as interconnection lines of the islands of Paros, Mykonos and Tinos with Syros. Phase I has already been completed.  
Phase II: The interconnection of Paros with Naxos island, the interconnection of Naxos with Mykonos and the upgrade of the interconnection of Evia with Andros and Andros with Tinos  
Phase III: The laying of a second Lavrion - Syros cable of 200 MVA.  
Also, a fourth phase concerning interconnection of islands of Milos and Santorini is being studied.
- The interconnection of Crete is planned in two phases  
Phase I: Interconnection to Peloponnese with AC 150kV – capacity of 2 x 200MVA – and  
Phase II: Interconnection to Attica with DC 2 x 350MW. ADMIE estimates that the project will be completed till 2025.

Both the interconnection cost of Cyclades islands and the interconnection cost of Crete to the mainland will be recovered by the consumers through their electricity bills.

Moreover, it is noted that a new HV interconnection line between South Evia and Attica was developed (Evia has been declared as area with saturated grid, therefore the installation of new non-controllable RES power plants is limited). This new interconnection infrastructure is expected to enable the installation of approximately 600 MW of new wind power plants, while the installation cost will be recovered by the RES producers that will benefit from it.

**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).**

**Previous Feed-in-Tariff (FiT) Support Scheme**

Until 31.12.2015, in terms of compensation prices for electricity from RES, the main support scheme in Greece was based exclusively on the principle of FiT compensation price scale, as initialized by L.3468/2006 and reviewed by L.3851/2010 and L.4254/2014 in order to take into account the continuous cost reduction of RES technologies per kW of installed capacity and to

ensure the sustainability of the RES Special Account, as described in the Second and Third Progress Report.

The compensation prices for all RES technologies except PV, as well as the calculation method for the compensation price for PV stations (which led to relatively low compensation prices for PV), has not altered since the previous Progress Report. As a result, although in installed capacity of technologies like wind there was clearly an upward trend, many PV projects in different stages in licensing procedure remained postponed, waiting to examine joining the new support scheme, or were cancelled, as depicted to the expansion figures of RES during the period 2013-2017.

The aforementioned RES prices are also valid for projects that signed PPAs before January 1<sup>st</sup> 2016, through the transition period up to the full deployment of the new RES support scheme, which is valid retroactively from 01.01.2016. These stations need to be commissioned up to a certain time limit (up to March 31<sup>st</sup>, 2019 for wind, small hydro and biomass/biogas stations, and up to December 31<sup>st</sup>, 2017 for the rest), otherwise they will be obliged to join the new support scheme, according to L.4414/2016.

### **The new RES support scheme, effective from the January 1<sup>st</sup>, 2016**

The L.4414/2016 entered into force on the 9<sup>th</sup> of August 2016, effective from January 1<sup>st</sup>, 2016 onwards. The provisions of this law reformed the support scheme of electricity production from RES and CHP power plants in order to achieve the progressive integration and participation of these generation units into the electricity market in an optimal and cost-effective way. This law introduced a new RES support scheme in Greece based on feed-in premiums (FIP) for larger RES projects, along with the obligation to participate in the electricity market. Their remuneration takes place on the basis of a contract for difference (CfD) against the applicable reference tariffs (RTs) as per published list by technology or as auctioned, after taking into account the market value of renewable electricity per technology. FIP provides an incentive for RES generators to respond to price signals of the electricity market, i.e. to produce electricity when demand is high and/or production from other energy sources is low. They also encourage RES investors to consider expected load patterns in the engineering and operation of the RES project (e.g. choice of site and turbine type for wind parks, orientation of PV modules), if this is linked with a properly formed technology-specific Reference Market Price. FIP therefore contribute to an increased integration of RES into the electricity market, resulting in a more efficient combination of supply with demand. Exceptions include the following:

- Small scale (<3 MW wind, <500 kW other RES) and demonstration projects are exempt from the new scheme, in which case a standard PPA with FIT is concluded in line with Law 4414/2016.
- Projects entering into commercial or trial operation in the Non-Interconnected Islands (NIIs) after the 1<sup>st</sup> of January 2016 continue to access a FIT-based scheme (through PPA) as long as these islands are either not interconnected with the mainland of Greece or do not have a fully operational daily electricity market.

Also, there is the possibility for RES plants with capacity above 5 MW, with PPA for FIT of the previous RES support scheme, to voluntarily shift to the new RES support scheme.

The FIP is calculated on a monthly basis as the difference between technology- and capacity-specific RTs, and technology-specific reference market prices. RES generators that participate in the electricity market are subject to a gradual transfer of balancing responsibilities. The law foresees a management premium in order to cover the additional market participation costs for RES generators especially in the context of the transitory mechanism for accurate forecasting. This premium will amount initially to 3 €/MWh for wind parks with an installed capacity up to 10 MW and to 2 €/MWh for all other renewable energy projects (including wind parks with an installed

capacity above 10 MW) and will be reviewed annually. The law also provides the basis for the establishment of RES aggregators as new market participants.

On the 16<sup>th</sup> of November 2016, the new RES support scheme has been officially approved by the DG COMP of the EC (SA 44666) under the Decision C (2016)7272. Following this approval, a number of Ministerial Decisions (MDs) have been adopted in December 2016 under which the detailed provisions of the new RES support scheme are defined. The MD ΑΠΕΗΛ/Α/Φ1/οικ.187480 that was adopted on the 7<sup>th</sup> of December 2016 defines the methodology for the calculation of the reference market prices, the criteria and restrictions for the payment of the management premium as well as the procedures for the adjustment of operating aid in the case of RES projects that have been granted investment aid.

The six MDs ΑΠΕΗΛ/Α/Φ1/οικ.187701-187706 that were adopted on the 12<sup>th</sup> of December 2016 establish the new model contracts for the support of new RES and CHP installations, both in the interconnected system as well as on the non-interconnected islands. The term of the new FIP and FIT contracts, and therefore of the associated operating aid, will be 20 years for all renewable energy projects, other than solar thermal power plants which will enjoy a 25 year term. On this basis, LAGIE and DEDDIE have started in December 2016 to sign the first contracts under the new RES support scheme.

Law 4414/2016 also foresees a shift towards a general RES tendering scheme from the 1<sup>st</sup> of January 2017, including a partial opening for RES projects from other European Economic Area (EEA) countries. The details of this tendering scheme were defined by the MD ΑΠΕΕΚ/Α/Φ1/οικ.184573/13.12.2017, OG B 4488/13/12/2017, which established

- the technologies (PV and Wind) and/or the categories of RES and HECHP power plants falling within the scope of the competitive bidding processes,
- the conditions under which the technologies and/or the categories of RES power plants excepted from competitive bidding processes until the end of 2020 will be included,
- the types of tenders (technology specific, neutral, site specific),
- the methodology and procedure for power allocation of participation in the tendering processes of RES stations established in other European Economic Area countries with cross-border electricity trade with Greece.

As of January 1<sup>st</sup>, 2017 and until the publication of the abovementioned MD, RES projects of a capacity higher than 1 MW or 6 MW for wind parks, were not allowed to conclude CfDs, following the provisions of law 4447/2016 that entered in force on December 23<sup>rd</sup>.

A revision of the aforementioned MD is pending, providing the ability for PV projects below 500kW and PV projects that belong to Energy Communities below or equal to 1MW and above 500kW to participate voluntarily in competitive bidding processes. Also, a second MD is currently pending, in order to define the schedule for minimum number of tenders to be held until the end of 2020, per year and per tender type, and the ceiling prices for the first tender of each kind. The tendering scheme has been officially approved by the DG COMP of the EC (SA 48143) under the Decision C (201)9102 on January 4<sup>th</sup>, 2018.

For new PV projects above 500 kW, it has been already foreseen by the law 4416/2016 that they will only be supported if they successfully participate in a tender. In this context, a pilot tender for capacity of 40 MW of new PV installations has been held by RAE on December 12<sup>th</sup>, 2016. The tender was competitive in the sense that the volumes of bids submitted exceed the tender volume by more than 40%. The tender consisted of two lots for PV projects with an installed capacity below and above 1 MW (i.e. with and without exemption from the obtainment of a production license) and has been conducted through an electronic continuous bidding process among the participants. Under the first tender lot, 9 PV projects with a total capacity of around 4.8 MW were selected (mean capacity per project of around 530kW) at an average weighted reference tariff of 98.99 €/MWh (compared with a price ceiling of 104 €/MWh). Under the second tender lot, 7 PV projects

with a total capacity of around 35.1 MW (mean capacity per project of around 5 MW) were selected at an average weighted reference tariff of 83.3 €/MWh (compared with a price ceiling of 94 €/MWh).

Law 4414/2016 also foresees the establishment of a monitoring mechanism in order to monitor the support provided for RES generation, to assess the levelised cost of electricity (LCOE) of the new RES plants, while also providing projections on the sustainability of the RES special account. Moreover, an online database and platform for the RES support scheme was established in 2017. This platform is a necessary instrument in order to be complied with the transparency requirements under the EC State Aid Guidelines for Environmental Protection and Energy (EEAG), and will help to gather all the appropriate information in order to complete the Transparency Award Module for State aid. The main objective of this electronic platform and tool is to validate and monitor the approvals and disbursements of state aid under the new RES support scheme and to publicize the relevant required minimum information per beneficiary.

Reference tariffs (or “strike prices”) reflect the overall average remuneration which is required by RES generators. The same reference tariff is applied throughout the entire duration of the period during which a given RES project is entitled for support (e.g. 20 years). The reference tariffs are determined by capacity categories for the different RES technologies. RES projects are entitled to the reference tariff that is active at the time of commissioning of the project. For RES projects that fall under the FIT scheme, the reference tariff is equal to the FIT. For RES projects under the FIP, an average monthly market reference price is deducted from the reference tariff in order to arrive at the FIP that is being paid to RES generators. The reference tariff levels under the new RES support scheme in Greece are defined per plant category and technology and are illustrated in the Table 3.

**Table 3: Reference tariffs for RES projects in Greece (2016)**

<b>RES technology / capacity category</b>	<b>Reference tariff (€/MWh)</b>
Wind installations in the interconnected system	98
Wind installations on the non-interconnected islands	98
Small Hydro $\leq 3$ MW	100
$3 \text{ MW} < \text{Small Hydro} \leq 15 \text{ MW}$	97
Solid Biomass (or bio-liquids) exploited through thermal processes except gasification, from stations with installed capacity $\leq 1\text{MW}$ (excluding the biodegradable fraction of municipal waste)	184
Solid Biomass (or bio-liquids) exploited via gasification process from stations with installed capacity $\leq 1\text{MW}$ (excluding the biodegradable fraction of municipal waste)	193
Solid Biomass (or bio-liquids) exploited through thermal processes from stations with installed capacity $1\text{MW} < P \leq 5\text{MW}$ (excluding the biodegradable fraction of municipal waste)	162
Solid Biomass (or bio-liquids) exploited through thermal processes from stations with installed capacity $P > 5\text{MW}$ (excluding the biodegradable fraction of municipal waste)	140
Gas from landfills and biological sewage treatment plants and biogas from anaerobic digestion of biodegradable material of wastewater and sewage sludge $\leq 2 \text{ MW}$	129
Gas from landfills and biological sewage treatment plants and biogas from anaerobic digestion of biodegradable material of wastewater and sewage sludge $> 2 \text{ MW}$	106
Biogas from anaerobic digestion of biomass $\leq 3 \text{ MW}$	225
Biogas from anaerobic digestion of biomass $> 3 \text{ MW}$	204
Solar thermal stations without storage	257
Solar thermal stations with storage (min 2 hours)	278

<b>RES technology / capacity category</b>	<b>Reference tariff (€/MWh)</b>
Geothermal stations $\leq 5$ MW	139
Geothermal stations $> 5$ MW	108
Other RES (including energy recovery plants utilizing the fraction of the biodegradable municipal waste falling outside another category of the table that meet the requirements of the current European legislation)	90

Under the new RES support scheme, the remuneration levels for all photovoltaic projects above 500 kW will be defined in the context of tenders. Photovoltaic installations with a capacity below 10 kWp that are included in the Special Roof-top Photovoltaic Program will continue to be remunerated in line with the provisions of this program. Other photovoltaic installations with a capacity below 500 kW have the possibility to participate in the relevant tenders or otherwise to proceed in the signing of an operating aid contract under the provisions of Law 3734/2009, which however provides them tariffs associated with the SMP price of the previous year (ie. multiplied by a factor of 1.2 for PV systems with a capacity of 100 kWp and below, and a factor of 1.1 for PV systems with a capacity above 100 kWp as well as for PV systems installed on the non-interconnected islands) that are regulated without directly considering the actual LCOE for these type of projects (i.e. the resulting tariff for 2016 was ranging between 57-62€/MWh).

### **RES generators with PPAs near expiration**

As provided by L.4414/2016, RES generators with PPAs conducted under previous support schemes that expire, that choose to continue operating their stations after expiration for a period without repowering, will be compensated only through their mandatory participation in the market and not under a support scheme. A relevant MD concerning the choices of participating in the market offered to the RES generators, as well as the transitional period after their PPA expiration, is currently pending.

### **Financing mechanism of the RES support scheme**

The operating aid under the RES support scheme is reimbursed to RES producers through the RES Special Account which is managed by the Operator of the Electricity Market (LAGIE). The revenues of this account are currently consisted of the following:

- The day-ahead scheduling (DAS) revenues, derived from the participation of the RES plants to the day-ahead market, with the amount of electricity (MWh/h) being forecasted by the Independent Power Transmission Operator (ADMIE) and being cleared by the Operator of the Electricity Market (LAGIE) by using the relevant system marginal price.
- The wholesale market revenues of LAGIE derived from the sale of RES electricity at the system marginal price (after May 2013 and under the Law 4152/2013, RES electricity sales are realized on either the electricity wholesale market clearing price (SMP) or the average variable cost of thermal power plants, whichever the highest). This measure resulted to almost 30M€ cumulative revenues in 2015 and more than 35M€ in 2016.
- Revenues (or costs) of the settlement of imbalances resulting from RES production.
- Payments from the electricity suppliers on the non-interconnected islands (NII) to HEDNO for the production of RES based on the average variable costs of conventional units on the NII.

In total in the period 2015 - 2016 the revenues from the RES electricity sales have amounted to about 1.119 M€, whereas the estimation for the period 2017 - 2018 exceeds 1.410 M€.

- The Special Levy for GHG emissions reduction (ETMEAR), which constitutes a significant revenue of the RES Special Account, is being reassessed annually according to Art. 32 of L.4111/2013, which amended Art.143 of L.4001/2011. The ETMEAR has been calculated with a weighted average of 17.91 €/MWh for 2017, down from 19,73 €/MWh in 2014 (9-month period) and 2015 (RAE decisions 175/2014, 465/2015, 621/2016), and is differentiated by types of electricity consumers and voltage levels with current levels at the beginning of 2017 ranging from 2.51 €/MWh for HV and large MV consumers to 24.77 €/MWh for households and 27.79 €/MWh for other LV consumers, as shown in the following table which presents its breakdown by end consumer category. Also, with art. 17 of L.4324/2015 the implementation of RAE 772/2014, which provided increase of the Special Levy for 2015 was suspended. In total the revenues of the Special Levy have amounted to 1050.57 M€ for the year 2015 and 949.83M€ for the year 2016.

**Table 3b. Readjustment of the Special Levy for GHG emissions reduction per end consumer category**

End consumer category	Special Levy for GHG emissions reduction (€/MWh)		
	01.04.2014 – 31.12.2015	2016	2017
High voltage consumers	2,23	2,41	2,51
Medium voltage consumers with consumption >13MWh	2,31	2,48	2,51
Medium voltage consumers – agricultural	10,83	10,12	9,71
Medium voltage consumers with consumption <13MWh	12,77	10,12	9,76
Low voltage consumers – agricultural	11,39	10,69	10,47
Low voltage consumers – residential	26,30	24,87	24,77
Low voltage consumers – other	30,89	28,21	27,79

In addition, apart from the additional measures that were taken since 2012 and are still valid, mentioned in the Third Progress Report, aiming either at increasing the revenues or decreasing the outflows of the RES Special Account to eliminate its deficit and ensure its financial sustainability, a new charge for electricity suppliers on the basis of their market shares has introduced by Law 4414/2016, which substantially restructured the RES Special Account and its financing. The new levy, is expected to significantly contribute to the permanent elimination of the deficit in the RES Special Account (at the end of 2017 and beyond), in line with the provisions of Law 4414/2016 and Law 4425/2016, but also to stabilize and even reduce the level of ETMEAR charges. This additional variable charge is levied on electricity suppliers based on avoided average cost for electricity purchased through the wholesale electricity market, had there not been any renewable electricity available.

The measures that are still valid today and consist revenues of the RES Special Account are presented in Table 3c:

**Table 3c: Cumulative revenues of additional measures to ensure the financial sustainability of the RES Special Account**

Measure	Beginning/amendment of measure	Cumulative revenues (M€)	
		2015-2016	2017-2018 (est.)
GHG rights auctioning	March 2012	264,28	321,38
Lignite special levy	February 2012	68.64	64.67
Suppliers' Charge	August 2016	31.92	786.39

Further, the laws provide also the framework for the establishment of a secondary special market for certificates of origin in Greece for renewable electricity. The specific methodology for the integration of this wholesale market mechanism into the Reference Market Price for the RES projects under the FIP scheme (which is analyzed below) is still pending and has to be integrated in the relevant Power Market Exchange Code.

With L.4414/2016, which amended L.4001/2011, the Special Account for RES is separated on the grounds of accounting and management into two sub-accounts:

- a. The Market Sub-account (Market part) incorporates as inflows the market revenues for RES energy that is compensated with Feed-in-tariff (FiT) and as outflows part of the RES compensation for plants under the feed-in-tariff (FiT),
- b. The Aid Sub-account (Aid part) incorporates as inflows the revenues from ETMEAR, Lignite levy, CO2 allowances, etc. and as outflows the remaining part of the RES and CHP compensation for plants under the feed-in-tariff (FiT) as well as the remaining part of the RES and CHP compensation for the plants under the feed-in-premium (FiP). Namely, it completes, in addition to the market revenue, the final compensation (guaranteed price or Reference Value respectively) for the beneficiaries of the two (2) support schemes.

As referred to the Third Progress Report, the deficit of the RES Special Account was reduced to almost -84 M€ at the end of 2015, due to the reform of the previous support scheme for RES by virtue of L.4254/2014 and all the relevant additional measures. However, the increasing participation of RES electricity in the market leads to the calculation of a proportionally lower SMP and, subsequently, to lower day-ahead scheduling (DAS) revenues by the suppliers to the RES Special Account. As a result, at the end of 2016 the deficit increased to more than -241 M€. With the imposition of the new charge for electricity suppliers since the issuing of L.4414/2016, that presented above, this trend has already been reversed: at the end of 2017 there was a surplus of more than +42 M€, contributing to the establishment of a secure investment environment in view of the achievement of the 2020 targets.

Table 3.iv, presents the total financial support offered in 2016 and 2017 to RES plants, through the RES support schemes. It is worth mentioning that RES power plants on the non-interconnected islands continued to act beneficially to the total power generation cost, due to the high operation cost of diesel units, although the total RES support considering balance from electricity sales has turned positive since 2015.

**Table 3d: Support schemes for renewable energy**

<b>RES support schemes year 2016</b>	<b>Total support from support schemes (M€)</b>	<b>Total RES support considering balance from electricity sales (M€)<sup>22</sup></b>
<b>Interconnected system</b>		
Wind	387.4	
Small hydro plants	62.7	
Biogas/Biomass	29.4	
PV (incl. PV in buildings roofs for the whole country)	1,112.6	
<b>Total interconnected system</b>	<b>1,592.1</b>	<b>1,230.54</b>
<b>Non-interconnected islands</b>		
Wind	79.1	
Small hydro plants	0.04	
PV	90.9	
<b>Total non-interconnected islands</b>	<b>170.04</b>	<b>56.35</b>
<b>Total RES-E annual support</b>		<b>1,286.89</b>

<sup>22</sup> The electricity sales are adjusted after having estimated the part of the electricity sales attributed to high efficiency cogeneration

<b>RES support schemes year 2017</b>	<b>Total support from support schemes (M€)</b>	<b>Total RES support considering balance from electricity sales (M€)</b>
<b>Interconnected system</b>		
Wind	435.3	
Small hydro plants	51.6	
Biogas/Biomass	36.6	
PV (incl. PV in buildings roofs for the whole country)	1,129.4	
<b>Total interconnected system</b>	<b>1,652.9</b>	<b>1,192.79</b>
<b>Non-interconnected islands</b>		
Wind	73.82	
Small hydro plants	0.04	
PV	88.50	
Biogas/Biomass	0.46	
<b>Total non-interconnected islands</b>	<b>162.82</b>	<b>34.43</b>
<b>Total RES-E annual support</b>		<b>1,227.22</b>

### Subsidies on investment

In accordance to the Programming Period 2014-2020, a new investment law (4399/2016) has been put into force in the summer of 2016. As far as RES investments are concerned, the new investment law provides subsidies only to small hydro stations (up to 15MW), pumped hydro-hybrid stations up to 5 MW in NIIs, HECHP stations that use RES, heating and cooling stations, and district heating and cooling stations.

### Net-metering scheme

As referred to the third Progress Report, a national net-metering scheme for self-produced electricity from photovoltaic energy has been adopted by MD ΑΠΕΗΛ/Α/Φ1/οικ. 24461/31.12.2014. HEDNO commenced accepting net-metering applications for photovoltaic systems to connect to the low voltage grid in May 2015 and a second round of applications for PV systems to connect directly to the medium voltage grid started in October 2015. According to HEDNO, during 2016 almost 287 applications were approved with a signed connection contract corresponding to a cumulative 11.4 MW of PV capacity for the interconnected system and the NIIs. Until the end of January 2017, a total of 494 net-metering PV systems with a total capacity of around 6.6 MWp have been installed and are in operation. The time period between application and entry into operation of the systems varies considerably between 1.2 and 18 months with an average of 5 months. The vast majority of these systems are installed at the low voltage level and only 3 systems with a total capacity of 186 kWp are installed at the medium voltage level. The capacity of the systems ranges from 1.2 kWp to 100 kWp, with an average capacity of around 13.4 kWp. Currently, there are 271 pending applications with a total capacity of around 9.5 MWp, i.e. an average capacity of 35 kWp per system. More than half of this capacity (e.g. 56%) corresponds to 30 PV systems that are planned to be installed at the medium voltage level, half of which relate to systems with a foreseen installed capacity of more than 100 kWp and up to 500 kWp.

Law 4414/2016 provided for the extension of the national net-metering scheme to other technologies (PV, small wind, biomass/biogas/bioliquid, small hydro-power, CHP) as well as the establishment of the possibility of virtual net-metering for solar PV and small wind projects installed by legal entities pursuing welfare objectives or other purposes in the public interest as well as farmers and agricultural holdings. The details of the net-metering scheme for PV systems, including the specific provisions for virtual net-metering, were defined by the MD ΑΠΕΗΛ/Α/Φ1/οικ.175067/19.04.2017, which improves the existing framework for net-metering and adopts virtual net-metering, introducing a major change in the concept of net metering that will be extended to



cover other technologies in the following years. The main objective was to enhance self-production as a means of energy saving and reducing energy costs, with an emphasis on active participation of self-producers and consumers. In particular, with virtual net metering, it is possible to offset the electricity produced with the total electricity consumed for autoproducers, irrespective of the place that the electricity is produced and consumed. The implementation of virtual net metering, at this first phase, involves only autoproducers who are public or private legal entities that pursue public benefit purposes or persons or entities registered in the Register of Farmers and Agricultural Holdings of Law 3874/2010. Also, every three years and at the end of the net metering contract an extraordinary counting is taking place in order to eliminate any electricity surplus on behalf of the RES Special Account. The contracts between producers and suppliers are conducted for a 25-year period in total. Regarding ETMEAR and other regulated charges, these are calculated on the electricity bill depending on the energy consumption of the autoproducer's facilities.

Currently, the Ministry is preparing a new MD in order to broaden the net metering and virtual net metering scheme, regarding the applied technologies, the eligible entities and the possibility for Energy Communities to join.

### **Energy Communities**

Law 4513/2018 introduces the institutional framework for the establishment and operation of the Energy Communities with a view to promoting social and solidarity-based economy and innovation in the energy sector, tackling energy poverty, promoting energy sustainability and innovation, production, storage, self-consumption, distribution and supply of energy as well as improving local acceptance of RES and energy efficiency in end-use at local and regional level. The law takes into account the proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources (recast) and the proposal for a Directive of the European Parliament and of the Council concerning common rules for the internal market in electricity (recast).

The Energy Communities are active in the fields of Renewable Energy Sources (RES), Combined Heat and Power (CHP), Rational Energy Use, Energy Efficiency, Sustainable Transport, Management of demand and production, Distribution and Supply of energy at local and regional level. Not aiming at profit generally, they have as their basic principle the diffusion of the benefits to the members of the energy community as well as to the local community. The element of locality is central to their design, as the basic aim of the law is to generate added value for local communities as well as combating serious issues, such as energy poverty. The central aim of the law is to strengthen the role of citizens and local actors in the energy sector, which is a provision that the European Commission also outlines.

### **Biofuels**

According to the provisions of law 3054/2002 biodiesel quantities are allocated every year, after a relevant call for tenders and an evaluation and allocation procedure, to stakeholders, producers or importers, who are interested in participating in this quota system. Through the evaluation procedure which is based on specific criteria and a specified formula, raw materials, i.e energy crops, agro-industrial by-products (cottonseed) and wastes (animal fats and used vegetable oils), are approved for biodiesel production. Moreover, motives are provided for financing research in the field of advanced biofuels and special provisions are set to prevent fraud in the used cooking oil and animal fat trade.

According to the relevant Ministerial Decision of the Ministry of Finance, the Ministry of Environment, Energy and Climate Change and the Ministry of Rural Development and Food, a specific quantity of pure biodiesel is allocated to beneficiaries in order to achieve the mandatory percentage of biodiesel blended in diesel of 7%. The allocated quantity corresponds to 85% of the

biodiesel that is anticipated to be consumed throughout the year. The remaining 15% is free marketed among refineries, wholesalers and biodiesel producers or importers.

Moreover, an amendment of law 3054/2002 is expected to be published in early 2018 setting a blending obligation of bioethanol or bioethers in petrol starting in 2019.

**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 provisions of Article 3(6) of Directive 2003/54/EC are met by virtue of laws 3426/2005 and 4001/2011, as it was described in the first progress report for RES.

**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*).**

The new support scheme, which was introduced by Law 4414/2016, has been set up considering the higher cost of those RES technologies that may have additional benefits, as it was described in detail in the first progress report for RES.

Regarding biodiesel allocation, biodiesel quantities are allocated every year through an evaluation procedure which is based on specific criteria and a specified formula, according to the provisions of the JMD Δ1/A/2497.

One of the criteria is the participation of biodiesel producers or importers in research programs relevant to the production of biofuels, bioliquids or biogas from waste and residues. This criterion allocates 4.75% of the total quantity of biodiesel to the beneficiaries.

Another criterion is based on the quantities of used cooking oil and animal fat that the beneficiaries use for the production of biodiesel. This criterion allocates 12.5% of the total quantity of biodiesel to the beneficiaries.

**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*).**

The functioning of the system of guaranteed of origin for electricity and heating and cooling from RES was described in the first progress report for RES.

The following tables present statistical data regarding the information that is kept in the electronic registry information system and refer to the period 2015-2016 (source: Hellenic Electricity Market Operator - LAGIE S.A.).

**Table 5: Statistical data of the GoO system for the period 01/01/2015-31/12/2016**

<b>Issued GoO (MWh)</b>	<b>PV</b>	<b>Wind</b>	<b>Hydro</b>	<b>Total</b>
Q1/2015	11,262	50,374	2,619,553	2,681,189
Q2/2015	1,744	0	10,908	12,652
Q3/2015	2,180	0	9,711	11,891
Q4/2015	34	0	0	34
Q1/2016	38,706	103,404	3,642,941	3,785,051
Q2/2016	4,340	42,255	1,268,899	1,315,494
Q3/2016	6,861	145,943	604,267	757,071
Q4/2016	19,958	28,632	718,424	767,014
<b>Total</b>	<b>85,085</b>	<b>370,608</b>	<b>8,874,703</b>	<b>9,330,396</b>
<b>Cancelled GoO (MWh)</b>	<b>PV</b>	<b>Wind</b>	<b>Hydro</b>	<b>Total</b>
Q1/2015	22,670	553,395	4,395	580,460
Q2/2015	15,639	0	10,571	26,210
Q3/2015	9,506	0	5,922	15,428
Q4/2015	122,291	310,470	2,204,853	2,637,614
Q1/2016	1,108	0	5,242	6,350
Q2/2016	2,095	0	10,877	12,972
Q3/2016	873	0	4,500	5,373
Q4/2016	36,272	89,710	9,111	135,093
<b>Total</b>	<b>210,454</b>	<b>953,575</b>	<b>2,255,471</b>	<b>3,419,500</b>
<b>Transferred GoO (MWh)</b>	<b>PV</b>	<b>Wind</b>	<b>Hydro</b>	<b>Total</b>
Q1/2015	0	0	591,589	591,589
Q2/2015	0	0	0	0
Q3/2015	0	0	0	0
Q4/2015	0	0	0	0
Q1/2016	0	0	453,002	453,002
Q2/2016	0	0	2,004	2,004
Q3/2016	0	0	2,955	2,955
Q4/2016	0	0	37,812	37,812
<b>Total</b>	<b>0</b>	<b>0</b>	<b>1,087,362</b>	<b>1,087,362</b>

**Table 5a: New entrants of plants at the GO register**

	<b>PV</b>		<b>Wind</b>		<b>Hydro</b>		<b>Total</b>	
	<b>number</b>	<b>MW</b>	<b>number</b>	<b>MW</b>	<b>number</b>	<b>MW</b>	<b>number</b>	<b>MW</b>
Q1/2015	19	3.15					19	3.2
Q2/2015	19	20.65	3	59.8			22	80.5
Q3/2015			1	21			1	21.0
Q4/2015	13	1.3					13	1.3
Q1/2016					5	7.16	0	0.0
Q2/2016			1	14	2	5.03	1	14.0
Q3/2016							0	0.0
Q4/2016	1	1.997	10	175.9	1	4.95	11	177.9
<b>Total</b>	<b>52</b>	<b>27.1</b>	<b>15</b>	<b>270.7</b>	<b>8</b>	<b>17.14</b>	<b>67</b>	<b>297.8</b>

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

Information about the availability and use of the biomass for energy purposes is presented in Tables 6 and 6a.

**Table 6: Biomass supply for energy use**

	Amount of domestic raw material (*)		Primary energy in domestic raw material (ktoe)		Amount of imported raw material from EU (*)		Primary energy in amount of imported raw material from EU (ktoe)		Amount of imported raw material from non EU(*)		Primary energy in amount of imported raw material from non EU (ktoe)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
<b>Biomass supply for heating and electricity:</b>												
Direct supply of wood biomass from forests and other wooded land energy generation (fellingsetc.)**	721,338	604,644	230.3	187.7	122,835	123,757	42.3	42.7	26,486	6,027	9.1	2.1
Indirect supply of wood biomass (residues and co-products from wood industry etc.)**	65,973	85,330	26.4	33.6	21,174	27,527	9	11.9	5,494	4,213	2.3	1.8
Agricultural by-products / processed residues and fishery by-products **	1,961,037	1,400,658	689.4	488								
Biomass from waste (municipal, industrial etc.) **	8,552	4,182	2.9	1.6								
Energy crops (grasses, etc.) and short rotation trees (please specify)												
Others (please specify)												
<b>Biomass supply for transport:</b>												
Common arable crops for biofuels (please specify main types)		33 k tn sunflower seed 1 k tn rapeseed 15 ktn soyabeen		11.5 ktoe biodiesel from sunflower <0.9 ktoe biodiesel from rapeseed 2.7 ktoe biodiesel from				<0.9 ktoe biodiesel from sunflower 8 ktoe biodiesel from rapeseed				<0.9 ktoe biodiesel from rapeseed <0.9 ktoe biodiesel from

				soyabeen								palmoil
Energy crops (grasses,etc.) and short rotation trees for biofuels (please specify main types)												
Others (please specify)	61 ktn cotton seed 18 ktn UCOs and animal fats	60 ktn cotton seed 24 ktn UCOs and animal fats	7.1 ktoe biodiesel from cottonseed 15 ktoe biodiesel from UCOs and animal fats	6.2 ktoe biodiesel from cottonseed 20.3 ktoe biodiesel from UCOs and animal fats				0.8 ktoe biodiesel from UCOs				

\* Amount of raw material if possible in **m3**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

**Table 6a: Current domestic agricultural land use for production of crops dedicated to energy production (ha)**

Land use	Surface (ha)	
	2015	2016
1. Land used for common arable crops (wheat, sugar beet etc.) and oilseeds (rapeseed, sunflower etc.) (Please specify main types)	102,544.5	77,482.5
2. Land used for short rotation trees (willows, poplars). (Please specify main types)	-	-
3. Land used for other energy crops such as grasses (reed canary grass, switch grass, Miscanthus), sorghum. (Please specify main types)	261.5	72.2

In the above table, biomass and the respective biofuel quantities used in the transport sector are reported as follows:

The total amount of domestic UCOs, animal fats and cottonseed quantities approved to be used for biodiesel production within 2015 and 2016 are reported as quasi compliant. From these quantities, 6 ktn biodiesel produced from domestic UCOs and animal fats and <1 ktn biodiesel produced from imported UCOs, reported in 2016, are certified sustainable biodiesel quantities distributed in the Greek market within the period November – December 2016 i.e. after the sustainability system JMD was put into force. It is noted that in the preceding progress report, the quantities of UCOs, animal fats and cottonseed were reported according to data collected from the national information system fuelstats.

Arable crops quantities correspond to certified sustainable biodiesel distributed in the Greek market within the period November – December 2016 i.e. after the sustainability system JMD was put into force.

**7. Please provide information on any changes in commodity prices and land use within your Member State in the preceding 2 years associated with increased use of biomass and other forms of energy 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).**

The main commodities used for energy production during the years 2015 and 2016 are saw dust and chips, fire wood, rice husks, exhausted olive cakes, fruit kernels, pellets for heating and sunflower/rapeseed seeds for biodiesel production.

Table 7 presents an estimation of the weighted average price of the aforementioned commodities from 2009 to 2016. However, it only serves as a rough indication of the development of market prices.

**Table 7: Commodity prices (in €/tn)**

<i>fuel (€/tn)</i>	2009	2010	2011	2012	2013	2014	2015	2016
Forest residues (Saw dust, chips etc.) <sup>23</sup>	36.52	41.79	29.77	20.43	22.96	11.88	7.80	13.56
Fire wood – imports <sup>24</sup>	50.69	44.65	56.55	76.86	65.90	68.71	71.54	72.63
Fire wood – primary production <sup>25</sup>	18.07	18.07	18.07	19.37	20.34	21.35	21.81	21.81
Rice – cotton husks <sup>23</sup>	6.83	1.56	0.17	4.12	14.63	13.33	13.76	11.37
Exhausted olive cakes <sup>23</sup>	43.66	57.04	60.75	63.31	77.13	82.66	73.12	66.12
Fruit kernels <sup>23</sup>	50.00	75.00	75.00	75.00	75.00	80.00	70.00	70.00
Pellets - imports <sup>24</sup>	112.46	147.22	149.80	178.54	168.63	167.35	157.04	173.82
Pellets - primary production <sup>23</sup>	195.00	180.00	186.42	179.86	196.09	231.58	237.66	233.89

The prices of forest residues, as recorded in questionnaires sent by CRES to several biomass users have exhibited a slight decrease until 2015. Nevertheless, a considerable increase was occurred in

<sup>23</sup> Primary research based on questionnaires conducted by CRES

<sup>24</sup> National Statistical Services (ELSTAT)

<sup>25</sup> General Secretariat of Forests, Ministry of Environment, Energy and Climate Change

2016. Firewood recorded a relative increase of prices in the period 2011-2016, while the prices for the exhausted olive cakes decreased in the period 2015-2016 after the continuous increase until 2014. The firewood imports prices increased the period 2015-2016 after the temporary decrease in 2013 and 2014 obviously depending on the countries of origin.

When biomass exploitation investments start, as a consequence of the favourable legal framework for bioenergy production, imports of firewood are expected to rise, while exhausted olive cakes may be exploited locally rather than exported.

The prices of imported pellets have also recorded a relative increase in the years 2009 to 2012, while a decline has been observed the following three years in relation with 2012. Nevertheless, an increase was recorded in 2016. Finally, it should be noted that sunflower seed prices ranged from 40-45 €/tn.

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

The development and share of biofuels made from wastes, residues, non-food cellulosic material, and ligno cellulosic material is presented in Table 8.

**Table 8: Development in Biofuels (ktoe)**

<i>Feedstock as listed in Annex IX Part A of Directive 2009/28/EC</i>	<b>2016</b>	<b>2015</b>
(a) <i>Algae if cultivated on land in ponds or photobioreactors</i>		
(b) <i>Biomass fraction of mixed municipal waste, but not separated household waste subject to recycling targets under point (a) of Article 11(2) of Directive 2008/98/EC</i>		
(c) <i>Bio-waste as defined in Article 3(4) of Directive 2008/98/EC from private households subject to separate collection as defined in Article 3(11) of that Directive</i>		
(d) <i>Biomass fraction of industrial waste not fit for use in the food or feed chain, including material from retail and wholesale and the agro-food and fish and aquaculture industry, and excluding feedstocks listed in part B of this Annex</i>		
(e) <i>Straw</i>		
(f) <i>Animal manure and sewage sludge</i>		
(g) <i>Palm oil mill effluent and empty palm fruit bunches</i>		
(h) <i>Tall oil pitch</i>		
(i) <i>Crude glycerine</i>		
(j) <i>Bagasse</i>		
(k) <i>Grapemarcs and wine lees</i>		
(l) <i>Nut shells</i>		
(m) <i>Husks</i>		
(n) <i>Cobs cleaned of kernels of corn</i>		
(o) <i>Biomass fraction of wastes and residues from forestry and forest-based industries, i.e. bark, branches, pre-commercial thinnings, leaves, needles, tree tops, saw dust, cutter shavings, black liquor, brown liquor, fibre sludge, lignin and tall oil</i>		
(p) <i>Other non-food cellulosic material as defined in point (s) of the second paragraph of Article 2</i>		
(q) <i>Other ligno-cellulosic material as defined in point (r) of the second paragraph of Article 2 except saw logs and veneer logs</i>		
<b><i>Feedstock as listed in Annex IX Part B of Directive 2009/28/EC</i></b>	<b>2016</b>	<b>2015</b>
(a) <i>Used cooking oil</i>	16.8	13.3
(b) <i>Animal fats classified as categories 1 and 2 in accordance with Regulation (EC) No 1069/2009 of the European Parliament and of the Council</i>	3.5	1.8

In the above table, the total amount of domestic UCOs, animal fats and cottonseed quantities approved to be used for biodiesel production within 2015 and 2016 are reported as quasi compliant. From these quantities, 5 ktn biodiesel produced from UCOs and 1 ktn biodiesel produced from animal fats, reported in 2016, are certified sustainable biodiesel quantities distributed in the Greek market within the period November – December 2016 i.e. after the sustainability system JMD was put into force. It is noted that in the preceding progress report, the quantities of UCOs and animal fats were reported according to data collected from the national information system fuelstats.

**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 in the preceding 2 years. 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 specific study has been performed to gauge the impact of the production of biofuels and bioliquids on biodiversity, water resources, water and soil quality within Greece so far. However, as it was concluded in the reply to the request of additional information in the framework of EU Pilot 3306/12/ENER no significant impact is expected due to the small-scale energy crops cultivated in the country and the appropriate legislation issued and applied.

**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).**

For the calculation of net greenhouse gas emission savings from the use of renewable energy other than solid and gaseous biomass and biofuels (i.e. hydro, wind, PV, solar thermal, geothermal and heat pumps), the methodology used was based on the emission factors that were presented in the national Annual Inventory Report, submitted in 2017 under the Convention and the Kyoto Protocol for greenhouse and other gases for the years 1990-2015.

**Table 10: Utilised emissions factors**

	CO2	CH4	N2O
	t/TJ	kg/TJ	kg/TJ
<b>Public Electricity and Heat Production</b>			
Liquid Fuels	77.01	3.00	0.60
Solid Fuels	121.23	1.00	1.50
Gaseous Fuels	55.79	1.00	0.10
<b>Manufacturing Industries and Construction</b>			
Liquid Fuels	83.14	1.97	4.86
Solid Fuels	93.90	1.00	1.50
Gaseous Fuels	55.74	1.00	0.10
<b>Other Sectors</b>			
Liquid Fuels	72.73	1.54	2.43
Solid Fuels	99.18	281.69	1.50
Gaseous Fuels	55.74	1.00	0.10
<b>Transport</b>			
Liquid Fuels	73.19	13.64	3.04
Gaseous Fuels	55.74	102.22	3.33

The estimation of GHG emissions presented in the aforementioned report was based on the methods described in the IPCC Guidelines, the IPCC Good Practice Guidance, the LULUCF Good Practice Guidance and the CORINAIR methodology. The emission factors used derived from the above-mentioned methodological sources with special attention paid in selecting the emission



factors so as to better reflect practices in Greece. Furthermore, emission factors were also obtained from installation specific information contained in EU ETS annual verified submissions.

The methodology used to calculate the net greenhouse gas emission savings from the use of renewable energy, other than solid and gaseous biomass and biofuels, in the current report is as follows.

For the calculation of net GHG saving from the use of renewable electricity (other than solid and gaseous biomass) the shares of coal, oil and gas in electricity in the total consumption of fossil fuels are firstly estimated. The amount of fossil fuels used in the national electricity mix that would produce the same amount of electricity is actually produced by RES is calculated next. The estimated primary energy saved is, then, allocated to each fuel (liquid, solid and gaseous fuels), according to the predefined shares, and is finally multiplied with the aforementioned emission factors.

A similar approach is followed for the estimation of net greenhouse gas emission savings due to the use of renewable energy sources, other than solid and gaseous biomass and biofuels, in heating and transport.

For the calculation of net greenhouse gas emission savings from the use of solid and gaseous biomass and biofuels, the methodology used is as follows.

- For biofuels: In accordance with Article 22(2) of Directive 2009/28/EC.
- For electricity and heat the weighted fossil fuel emission factors are again estimated on the basis of the emission factors for liquid, solid and gaseous fossil fuels (as presented in the national Annual Inventory Report, submitted in 2015 under the Convention and the Kyoto Protocol for greenhouse and other gases for the years 1990-2013).

Table 10a presents the estimates for GHG emission savings from the use of renewable energy in 1000t CO<sub>2eq</sub>, as estimated according to the approach described above.

**Table 10a: Estimated GHG emission savings from the use of renewable energy (1000 t CO<sub>2eq</sub>)**

Environmental aspects	2015	2016
<i>Total estimated net GHG emission saving from using renewable energy<sup>26</sup></i>	18,522	16,813
- Estimated net GHG saving from the use of renewable electricity	13,666	12,390
- Estimated net GHG saving from the use of renewable energy in heating and cooling	4,467	4,071
- Estimated net GHG saving from the use of renewable energy in transport	390	351

It should be noted that the estimated net GHG savings from the use of renewable electricity are higher in 2015 compared with 2016 despite the higher electricity production from RES due to the reduction of the lignite penetration leading to less avoided GHG emissions. Finally, the reduction of the GHG savings from the increased use of RES in transport in 2016 compared to 2015 can be justified by the fact that the derived biodiesel from common arable crops leads to less avoided GHG emissions due to higher value of emission factors than the remaining categories of biodiesel.

# **11. Please report on (for the preceding 2 years) and estimate (for the following years up to 2020) the excess/deficit production of energy from renewable sources compared to the indicative trajectory which could be transferred to/imported from other Member**

<sup>26</sup> 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.

**States and/or third countries, as well as estimated potential for joint projects until 2020. (Article 22 (1) l, m) of Directive 2009/28/EC)).**

The estimated excess production, which could be used for transfer to other MS, was submitted in the Greek NREAP (Table 9 of the Greek NREAP) and it is presented in Table 11. Moreover, Table 11 presents the calculation of the actual RES excess/deficit for the period 2010-2016 compared to the RES indicative trajectory prepared in 2009. According to the presented results a deficit, which is amounted to 162 ktoe, has been calculated for the period 2010-2016.

**Table 11: Actual and estimated excess and/or deficit (-) production of renewable energy compared to the indicative trajectory which could be transferred to/from other Member States and/or third countries in Greece (ktoe)<sup>27, 28</sup>**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Actual excess or deficit production	137	201	320	242	195	137	-162				
Estimated excess or deficit production	257	408	513	686	812	856	842	737	743	683	529

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

No developments have been made so far on statistical transfers, joint projects and joint support scheme decision rules.

**12. Please provide information on how the share for 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 energy produced from waste (municipal, industrial etc.) corresponds exclusively to biogas primary production deriving from landfill and sewage sludge biogas plants. Until now, no RDF/SRF are exploited for electricity production in Greece and thus no requirement has arisen to estimate the share for biodegradable waste in the reported figures.

**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).**

The JMD “Biofuels and bioliquids sustainability system” (JMD οικ.175700/14.04.2016, OG B 1212/2016), setting the requirements and the procedures for the certification and verification of compliance with the sustainability criteria, was put into force in October 2016. Thus, the quantities reported in the Table 13 correspond to certified sustainable biofuels and bioliquids distributed in the Greek market within the period November – December 2016.

<sup>27</sup> 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 Member State may correct the data of the previous reports.

<sup>28</sup> When filling in the table, for deficit production please mark the shortage of production using negative numbers (e.g. -x ktoe).

**Table 13: Amounts of biofuels and bioliquids in energy units (ktoe) corresponding to each category of feedstock group listed in part A of Annex VIII**

Feedstock group	2015	2016
Cereals and other starch-rich crops		
Sugars		
Oil crops		23.0