



MINISTRY OF
ENVIRONMENT
ENERGY &
CLIMATE
CHANGE

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

Submitted under Article 22 of Directive
2009/28/EC

2014

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, Energy & Climate Change (MEECC) 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 Assistance Office for Renewable Energy Sources Investments of the MEECC in collaboration with the competent authorities of General Secretariat for Energy and Climate Change of the MEECC and the technical and scientific support by the Centre for Renewable Energy Sources and Saving (CRESS), according to Art. 27 of Law 4062/2012.

I. SECTORAL AND OVERALL SHARES AND ACTUAL CONSUMPTION OF ENERGY FROM RENEWABLE SOURCES IN 2011 AND 2012 (ARTICLE 22 (1) A OF DIRECTIVE 2009/28/EC).

In the period 2011-2012, RES penetration in the gross final energy consumption (GFEC) has exhibited a remarkable increase, surpassing the respective projected penetration of the National Renewable Energy Action Plan (NREAP).

The main parameter shifting the overall share of RES in GFEC higher than expected was the use of RES for heating purposes in the final energy consumption, and, in specific, the residential sector. Specifically, in the last three years a significant increase in the use of biomass has been observed. This high increase is largely attributed to the final consumers' shift to biomass as a cheaper fuel to meet their heating needs, due to the consequences of the economic recession in the households' income. However, this increase in RES share for heating should not be ascribed only to the economic recession, but also to the effectiveness of various measures taken to improve energy efficiency at end use level (e.g. program for energy savings at households). In addition, solar thermal systems have steadily attained an important position in RES applications for domestic hot water, while the use of heat pumps for space heating has exhibited a significant growth rate in the last two years. The penetration of RES for heating in 2012 already stands at 24.5%, surpassing even the corresponding indicative target for 2020, presented at the NREAP (20%). It should be noted that the above surpassing relates not only to the actual increase of RES use for heating but also to a lower final gross energy consumption for heating than the one projected at NREAP (i.e. for years 2011 and 2012 the actual gross final energy consumption for heating purposes was 6.8Mtoe and 6.1Mtoe, substantially lower than the projected consumption at NREAP which was at the level of 8.4Mtoe for both years).

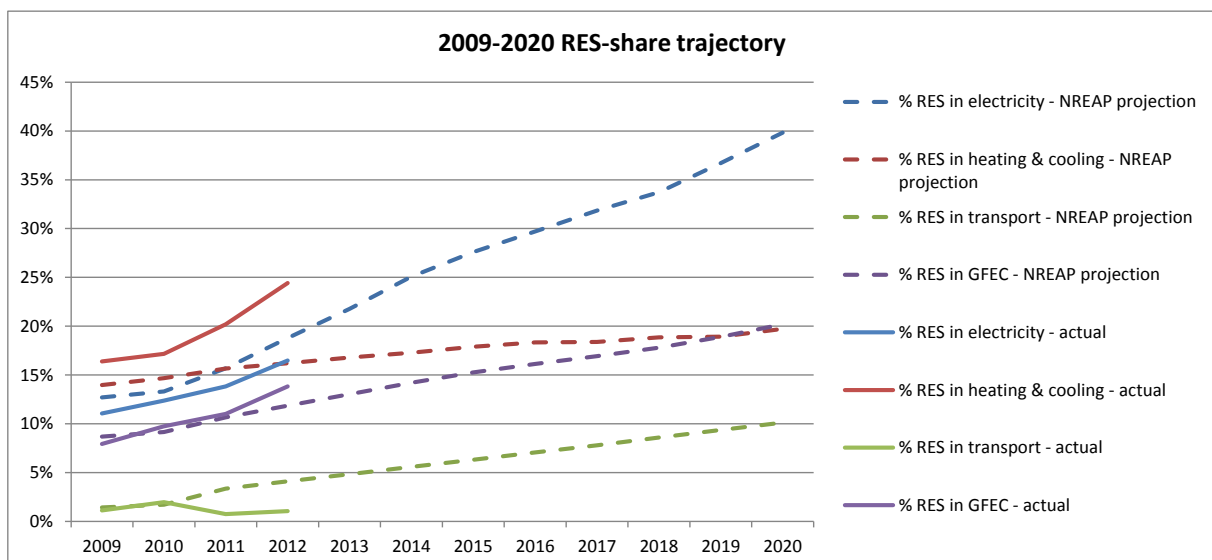


Figure 1. RES share trajectory from 2009 to 2020

Regarding the penetration of RES in gross final electricity consumption, a steady increase has undoubtedly been observed; however a small offset from the projected figures for 2012 in the NREAP is evident (see Figure 1). Although the total installed capacity surpassed the installed capacity projected in NREAP and this trend continued in 2013, the RES electricity mix was differentiated significantly from the NREAP projections, with the main share in the RES installed capacity being attained by photovoltaic stations instead of wind farms. Given the significantly lower capacity factors of photovoltaic stations than those of wind farms, the surpassing of the total installed capacity did not result into a similar surpassing of electricity production compared to the NREAP projections. It is worth mentioning, that preliminary estimations for the 2013 RES share in gross final electricity consumption indicate that it will meet or even surpass the respective share foreseen in the NREAP projections. However, this should not act as an indication for the evolution of RES-E share in the short term, since the growth rate of new RES installations is not expected to be as high in the next two years.

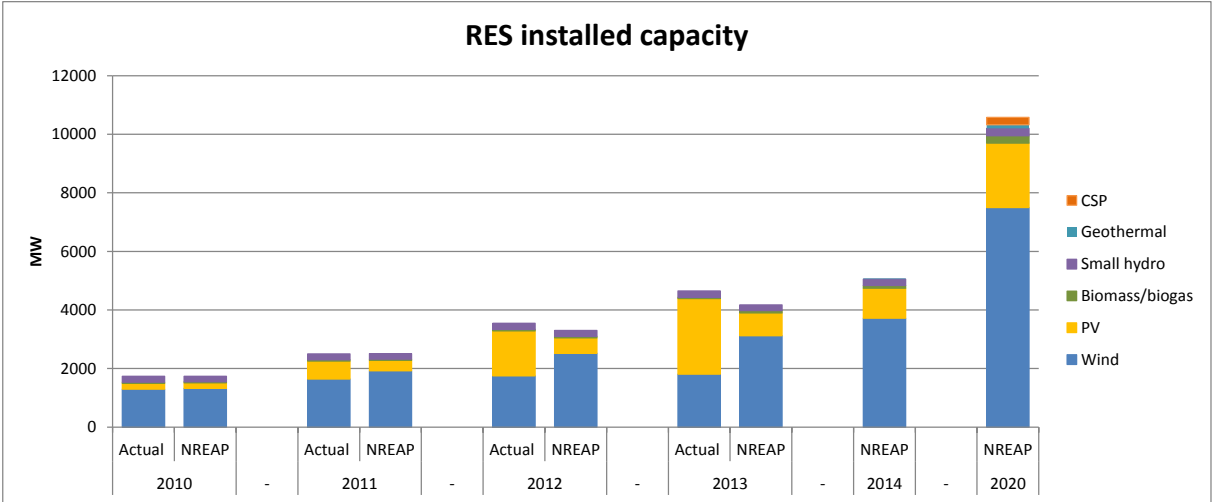


Figure 2. RES-E installed capacity per technology from 2010 to 2020

Although in the field of electricity generation from RES focus has been placed on both technologies (i.e. wind farms and photovoltaics) that have significant potential and high commercial maturity, the sector of photovoltaics (PV) has attracted particularly high investing interest, leading to a rapid growth, well over their estimated development. This fact is mainly attributed to the adoption of a favourable support scheme, as well as to the reduction of PV projects' development cost. A further factor leading to this significant increase was the adoption of different policy measures with regard to the streamlining of the licensing procedure (exemptions for the obligation of obtaining certain licenses for smaller-scaled installations). By the end of 2013 the total installed capacity of photovoltaic stations was 2578MW, with the vast majority of the PV installations, i.e. 92% of today's installed capacity, having been developed in the period after 2010.

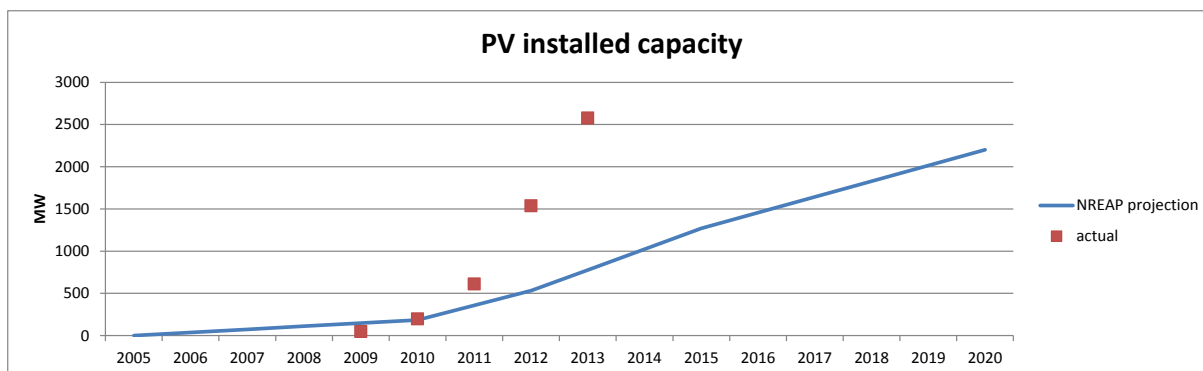


Figure 3. PV installed capacity from 2005 to 2020

Table 1.i. Number of PV installation and total installed capacity per type policy measure

| | Exemption from obligation to obtain an Environmental Terms Approval | Exemption from obtaining a Production License | Higher FiT for PV stations lower than 100kW | Number of PV stations by the end of 2013 | Total installed capacity by the end of 2013 (MW) |
|-----------------------------------|---|---|---|--|--|
| Interconnected System | | | | | |
| ≤100kW | ✓ | ✓ | ✓ | 11068 | 808 |
| 100kW-500kW | ✓ | ✓ | | 1134 | 418 |
| 500kW-1000kW | | ✓ | | 199 | 171 |
| ≥1000kW | | | | 211 | 673 |
| Non-interconnected islands | | | | | |
| ≤100kW | ✓ | ✓ | ✓ | 1731 | 133 |
| 100kW-500kW | ✓ | ✓ | | 15 | 3 |
| 500kW-1000kW | | ✓ | | 0 | 0 |
| ≥1000kW | | | | 0 | 0 |

Table 1.ii. Number of installation and total installed capacity of PV stations falling under the Special Program for the deployment of PV on building roofs

| PV stations up to 10kW (Special Program for the deployment of PV on building roofs) | Number of installations by the end of 2013 | Total installed capacity by the end of 2013 (MW) |
|---|--|--|
| Interconnected System | 38060 | 349 |
| Non-interconnected islands | 3157 | 23 |

As concerns wind farms and small hydro, the installed capacity has been growing relatively steadily, reaching 1809MW and 220MW respectively in 2013, demonstrating an increase of 39% and 12% compared to the end of 2010. In spite of that increase, wind installed capacity remains below the projected figure of NREAP in 2013, which accounted for 3119MW.

It is worth mentioning that, in view of streamlining and maintaining support for the promotion of RES, a process for the reformation of the support scheme for electricity from RES is currently in progress, while a series of amendments have already taken place during the last months, as it is thoroughly described in the following chapters. Alongside emphasis is laid on the design and implementation of projects for the enhancement of the transmission and

distribution system to allow greater penetration of RES and on the removal of barriers related to the licensing procedure to accelerate the implementation of RES electricity units.

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.

Table 1: The sectoral (electricity, heating and cooling, and transport) and overall shares of energy from renewable sources¹

| | 2011 | 2012 ² |
|--|--------|-------------------|
| RES-H&C ³ (%) | 20.23% | 24.43% |
| RES-E ⁴ (%) | 13.82% | 16.48% |
| RES-T ⁵ (%) | 0.74% | 1.06% |
| Overall RES share ⁶ (%) | 11.03% | 13.83% |
| <i>Of which from cooperation mechanism⁷ (%)</i> | | |
| <i>Surplus for cooperation mechanism⁸ (%)</i> | | |

Table 1a: Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)⁹

| | 2011 | 2012 |
|---|-----------|-----------|
| (A) Gross final consumption of RES for heating and cooling | 1355 | 1492 |
| (B) Gross final consumption of electricity from RES ¹⁰ | 739 (697) | 877 (885) |
| (C) Gross final consumption of energy from RES in transport ¹¹ | 46 | 51 |
| (D) Gross total RES consumption ¹² | 2140 | 2420 |
| (E) Transfer of RES to other Member States | 0 | 0 |
| (F) Transfer of RES from other Member States and 3rd countries | 0 | 0 |

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

² Since the oil energy statistics of 2012 are under revision, the calculated share of RES in heating and cooling as well as the overall RES share in gross final energy consumption for 2012 may need to be reassessed.

³Share 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.

⁴Share 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.

⁵Share 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.

⁶Share of renewable energy in gross final energy consumption. The same methodology as in Table 3 of NREAPs applies.

⁷In percentage point of overall RES share.

⁸In percentage point of overall RES share.

⁹ Facilitates comparison with Table 4a of the NREAPs

¹⁰ This figure refers to the normalized electricity generation from RES in 2011 and 2012, not including the renewable electricity consumed in transport. The figures in the parenthesis refer to the actual production, not normalized for hydro and wind and not including generation from water previously pumped uphill

¹¹ This figure includes renewable electricity consumed in transport as well as the respective multipliers (i.e. double counted sustainable biofuels and road RE electricity counted 2,5 times)

¹² 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.

| | | |
|---|------|------|
| (G) RES consumption adjusted for target (D)-(E)+(F) | 2140 | 2420 |
|---|------|------|

Table 1.b: 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 electricity¹³

| | 2011 | | 2012 | |
|--------------------------|------|-------------------|------|-------------------|
| | MW | GWh ¹⁴ | MW | GWh ¹⁴ |
| Hydro ¹⁵ : | 3224 | 4446 (4012) | 3236 | 4468 (4392) |
| non pumped | 2525 | 4106 (3676) | 2537 | 4127 (3956) |
| <1MW | 34 | 108 (96) | 34 | 109 (120) |
| 1MW–10 MW | 172 | 514 (485) | 184 | 549 (549) |
| >10MW | 2319 | 3484 (3094) | 2319 | 3468 (3287) |
| pumped | - | - | - | - |
| mixed ¹⁶ | 699 | 502 (336) | 699 | 499 (436) |
| Geothermal | - | - | - | - |
| Solar: | 612 | 610 | 1536 | 1694 |
| photovoltaic | 612 | 610 | 1536 | 1694 |
| concentrated solar power | - | - | - | - |
| Tide, wave, ocean | - | - | - | - |
| Wind: | 1640 | 3356 (3315) | 1753 | 3870 (3850) |
| onshore | 1640 | 3356 (3315) | 1753 | 3870 (3850) |
| offshore | - | - | - | - |
| Biomass ¹⁷ : | 45 | 199 | 45 | 197 |
| solid biomass | - | - | - | - |
| biogas | 45 | 199 | 45 | 197 |
| bioliquids | - | - | - | - |
| TOTAL | 5521 | 8611 (8136) | 6570 | 10229 (10133) |
| of which in CHP | | | | |

Table 1c: Total actual contribution (final energy consumption¹⁸) 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)¹⁹

| | 2011 | 2012 |
|--|------|------|
| Geothermal (excluding low temperature geothermal heat in heat pump applications) | 16 | 13 |
| Solar | 183 | 184 |
| Biomass ²⁰ : | 1093 | 1193 |
| solid biomass | 1078 | 1178 |
| biogas | 14,8 | 15,2 |
| bioliquids | - | - |
| Renewable energy from heat pumps: | 82 | 102 |
| - of which aérothermal | 75 | 93 |
| - of which geothermal | 7 | 9 |
| - of which hydrothermal | - | - |
| TOTAL | 1374 | 1492 |
| Of which DH ²¹ | 0 | 0 |
| Of which biomass in households ²² | 790 | 954 |

¹³ Facilitates comparison with Table 10a of the NREAPs.

¹⁴ The figures in the parenthesis refer to the actual production of hydro and wind respectively (without the normalization rules)

¹⁵ Normalised in accordance with Directive 2009/28/EC and Eurostat methodology.

¹⁶ In accordance with new Eurostat methodology. This figure includes electricity generation of mixed pumped power plants not considering electricity produced from pumping.

¹⁷ Take into account only those complying with applicable sustainability criteria, cf. Article 5(1) of Directive 2009/28/EC last subparagraph.

¹⁸ Direct use and district heat as defined in Article 5.4 of Directive 2009/28/EC.

¹⁹ Facilitates comparison with Table 11 of the NREAPs.

²⁰ Take into account only those complying with applicable sustainability criteria, cf. Article 5(1) last subparagraph of Directive 2009/28/EC.

²¹ District heating and / or cooling from total renewable heating and cooling consumption (RES- DH).

²² From the total renewable heating and cooling consumption.

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)^{23, 24}

| | 2011 | 2012 |
|---|-------------|-------------|
| Bioethanol/ bio-ETBE | - | - |
| <i>Of which Biofuels²⁵ Article 21.2</i> | - | - |
| <i>Of which imported²⁶</i> | - | - |
| Biodiesel ²⁷ | 20 | 24 |
| <i>Of which Biofuels²⁸ Article 21.2</i> | 20 | 24 |
| <i>Of which imported²⁹</i> | | |
| Hydrogen from renewable | - | - |
| Renewable electricity | 3.3 | 3.2 |
| <i>Of which road transport</i> | 2.1 | 2.2 |
| <i>Of which non-road transport</i> | 1.3 | 1.0 |
| Others (as biogas, vegetable oils, etc.) – please specify | - | - |
| <i>Of which Biofuels³⁰ Article 21.2</i> | - | - |
| TOTAL | 23.3 | 27.2 |

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. 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 |
| 2. 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 |
| 3. Law 4122/2013 "Energy Performance of Buildings - 2010/31/EC Directive Transposition and other provisions" (OG A 42/19.03.2013) | Regulatory | | Energy auditors, energy companies, end users, public administration | Complementary to NREAP | 2013-2020 |

²³For biofuels take into account only those compliant with the sustainability criteria, cf. Article 5(1) last subparagraph.

²⁴Facilitates comparison with Table 12 of the NREAPs.

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

²⁶From the whole amount of bioethanol / bio-ETBE.

²⁷Although for the period 2011-2012 compliance with the sustainability criteria for biodiesel was not verified, the provisions for the allocation of biodiesel and MD Δ1/B/7364 (see 24 of Table 2) provide data for the raw materials used for biodiesel that was produced and consumed in Greece. The amounts reported correspond to biodiesel produced by used cooking oil, animal fat and cottonseed oil according to conversion factors set by yearly allocation decisions.

Given the fact that biofuels produced from waste and residues need only to fulfil the criterion of article 17 (2) and the fact that greenhouse gas emission saving for waste vegetable oil/animal fat and cotton seed biodiesel is 88% and 80% respectively, according to the typical values in part D of Annex V and law 4062/2012, the reported amounts should be regarded as compliant with sustainability criteria.

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

²⁹From the whole amount of biodiesel.

³⁰Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

| | | | | | |
|--|--------------------------|--|---|------------------------|-----------|
| 4. 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 |
| 5. 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 |
| 6. 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 |
| 7. Amending and supplementing MD 1958/2012 (MD 20741/12, OG B 1565/08.05.2012) | Regulatory | | Investors, public administration | Complementary to NREAP | 2013-2020 |
| 8. Environmental licensing of electricity and thermal energy production units using biogas from biomass anaerobic digestion (Circular ouk. 1604.81/03.04.2012) | Regulatory | | Investors, public administration | Complementary to NREAP | 2013-2020 |
| 9. 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 |
| 10. 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 |
| 11. 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 |
| 12. 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/ouk.19598 (MD Y.A.I.E./Φ1/2300/ouk.16932, OG B 2317/10.08.2012) | Regulatory | | Investors, public administration | Complementary to NREAP | 2012-2020 |
| 13. Amendment of the special program for the deployment of photovoltaics up to 10kW on buildings and especially roofs (MD Y.A.I.E./Φ1/2302/ouk.16934, OG B 2317/10.08.2012) | Regulatory/ Financial | | Investors, public administration | Complementary to NREAP | 2012-2020 |
| 14. 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 ouk.52911, OG B 14/11.01.2012) | Regulatory | | Investors, public administration | Complementary to NREAP | 2012-2020 |
| 15. Technical regulation for storage and transport of biofuels at oil refineries and oil products facilities (Δ3/A/ouk. 15225, OG B 2055/23.8.2013) | Regulatory | | Public administration, biofuel producers/importers, refineries, wholesalers | Complementary to NREAP | 2013 |
| 16. Allocation of 92,000 kiloliters of biodiesel for the year 2013 and 132,000 kiloliters for the year 2011 in accordance with the provisions of art. 15A of law 3054/2002 (JMD Δ1/A/ouk. 11750/14.6.2013, OG B 1452/14.6.2013 and Δ1/A/17970/29.7.2011, OG B 1700/29.7.2011 respectively) | Regulatory | | Public administration, biodiesel producers/importers, refineries, wholesalers | Complementary to NREAP | 2011 |
| 17. Invitation for the participation in 2013 and 2011 biodiesel allocation (MD Δ1/A/ouk.3008/18.2.2013, OG B 335/2013 as amended by Δ1/A/ouk. 5206/14.3.2013, OG B 335/2013 and Δ1/A/13972/16.6.2011, OG B 1307/16.6.2011 respectively) | Regulatory | | Public administration, biodiesel producers/importers, refineries, wholesalers | Complementary to NREAP | 2011 |
| 18. Specification of criteria and methodology for the allocation of biodiesel (JMD Δ1/A/ouk. 2497, OG B 253/8.2.2013) | Regulatory | | Public administration, biodiesel producers/importers, refineries, wholesalers | Complementary to NREAP | 2013 |
| 19. 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 |

| | | | | | |
|---|------------|--|--|------------------------|-----------|
| 20. 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 |
| 21. Specification of raw materials for biofuels whose contribution is double counted towards RES targets (JMD Δ1/A/ouk. 10839, OG B 1667/16.5.2012) | Regulatory | | Public administration, biodiesel producers/importers, refineries, wholesalers | Complementary to NREAP | 2012-2020 |
| 22. Bureau for the Monitoring of Sustainability of Biofuels and Bioliquids (JMD Δ1/A/ouk. 10838, OG B 1661/15.5.2012) | Regulatory | | Public administration, economic operators, biodiesel producers, refineries, wholesalers | Complementary to NREAP | 2012-2020 |
| 23. Requirements for indication at the sales point for biofuel blends that exceed 10% (MD 1/2012, OG B 1288/11.4.2012) | Regulatory | | End users, public administration, biodiesel producers/importers, refineries, wholesalers | Complementary to NREAP | 2012-2020 |
| 24. 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/ouk. 16421 OG B 2328/16.8.2012) | Regulatory | | Public administration, biodiesel producers/importers, refineries, wholesalers | Complementary to NREAP | 2012 |
| 25. Supreme Chemical Council decision 316/2010 transposing directive 2009/30/EC and setting specifications for gasoline-bioethanol blends (OG B 501/29.2.2012) | Regulatory | | Public administration, biofuel producers, refineries, wholesalers | Complementary to NREAP | 2012 |
| 26. Additional obligations for the environmental licensing of electricity and thermal energy production units using biogas from anaerobic digestion of biomass (MD ouk. 166640, OG B 554/08.03.2013) | Regulatory | | Investors, public administration | Complementary to NREAP | 2013-2020 |
| 27. 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 |
| 28. 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 |
| 29. 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 |
| 30. 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 |
| 31. Supplementation to MD Y.A.II.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.II.E./Φ1/1506/ouk. 10662, OG B 1310/30.05.2013) | Financial | | Investors, public administration | Complementary to NREAP | 2013-2020 |
| 32. Amendment of the special program for the deployment of photovoltaics on buildings and especially roofs (MD Y.A.II.E./Φ1/1289/9012, OG B 1103/02.05.2013) | Financial | | Investors, public administration | Complementary to NREAP | 2013-2020 |
| 33. Amendment of MD Y.A.II.E./Φ1/ouk.2262/31.01.2012 concerning the feed-in tariffs for electricity produced by photovoltaics, as applicable (MD Y.A.II.E./Φ1/1288/9011, OG B 1103/02.05.2013) | Financial | | Investors, public administration | Complementary to NREAP | 2013-2020 |
| 34. Amendment of MD Y.A.II.E./Φ1/2262 regarding the feed-in tariffs for electricity produced by photovoltaics (MD Y.A.II.E./Φ1/2301/ouk.16933, OG B 2317/10.08.2012) | Financial | | Investors, public administration | Complementary to NREAP | 2012-2020 |
| 35. Amendment of the special program for the deployment of photovoltaics up to 10kW on buildings and especially roofs (MD Y.A.II.E. /Φ1/ouk.2266, OG B 97/31.01.2012) | Financial | | Investors, public administration | Complementary to NREAP | 2012-2020 |

| | | | | | |
|---|-----------|--|---|---------------------------|---|
| 36. 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 |
| 37. 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.II.E. /Φ1/2303/οικ.16935, OG B 2317/10.08.2012) | Financial | | Investors, public administration, Electricity Market Operator | Complementary to NREAP | 2012-2020 |
| 38. Determination of the percentage of the contribution to the ERT SA (Article 14 of Law 1730/1987), which is a resource of the Special Account of Article 40 of Law 2773/1999 (MD Y.A.II.E./Φ1/2303/οικ.16935, OG B 2317/10.08.2012) | Financial | | Investors, end users, public administration | Complementary to NREAP | 2012-2020 |
| 39. 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 |
| 40. 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 |
| 41. 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 |
| 42. 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 |
| 43. 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 |
| 44. "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 |
| 45. 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 |
| 46. Interconnection of Cyclades with the mainland by 2017 | Technical | | Investors, public administration | Complementary to NREAP | 2014-2022 |
| 47. 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 |
| 48. 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 |

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).

Since 2012 a number of legislative amendments have taken place in Greece, suggesting measures to adjust to the changing environment of RES investments, to estimate the actual investing interest in materializing the huge number of applications that have been under evaluation by the licensing bodies and to ensure compliance with the trajectory of RES deployment towards 2020.

Law 4062/2012 fully transposed Directive 2009/28/EC into the Greek legislative framework, setting the regulatory grounds for statistical transfers, joint projects, joint support schemes, sustainability criteria for biofuels and bioliquids and verification of compliance, calculation of the biofuels and bioliquids impact on GHG. The provisions for sustainability criteria were additionally specified in the JMD for the Bureau for the monitoring of sustainability of biofuels and bioliquids (see 22 of Table 2) and the report under article 19 (2) (see 19 of Table 2). The public consultation of a draft Joint Ministerial Decision is expected to take place in early 2014, which will set the requirements and the procedures for the certification and verification of compliance with the sustainability criteria and will specify the ways of demonstrating compliance, the reporting items and the economic operators with reporting obligations.

To tackle problems arising from RES projects withholding significant electrical grid capacity after a Binding Connection Offer has been granted to them, Law 4152/2013 imposed an obligation of submitting a letter of guarantee upon acceptance of the Binding Connection Offer for RES stations. The above obligation includes also the stations for which a Binding Connection Offer has already been granted and no Connection Contract has been signed. RES plants that are installed on building roofs are excluded from this obligation.

Law 4152/2013 has, furthermore, introduced provisions to effectively tackle problems arising from production licenses which did not result in actual construction of RES plants over a reasonable time period. Hence, these provisions aim to manage the large number of applications and to filter out projects that do not exhibit a significant investing maturity level. In specific, according to Law 4152/2013, plants that have been granted a RES-E project production license are subject to an annual fee, which must be submitted in the first trimester of every year. The time frame for applying this obligation for all RES technologies, except for PV plants, is set to three years after having been granted the production license and is terminated after submission of the relevant letter of guarantee for applying for a Binding Connection Offer. As regards PV plants, it is compulsory to start submitting this annual fee one year after having been granted the production license. On the other hand, RES projects with special characteristics, namely, projects that require the construction of submarine grid connection to the mainland grid, wind parks with an installed capacity larger than 150MW and hybrid plants are expected to start submitting the aforementioned fee four years after having been granted the production license. Exemptions in case of RES plants in grid-congested areas are foreseen.

Recently, a new law regulating issues concerning RES (L.4203/2013) came into effect. This law foresees a stricter framework for RES projects that have obtained an installation license, setting tight timeframes for the validity of the installation license, so as to prompt for the realization of projects in reasonable time frames. For certain RES projects a predefined prolongation can be granted with proof of a certain degree of maturity of the investment. Moreover, RES projects that require the construction of submarine grid connection to the mainland grid, wind parks with an installed capacity larger than 150MW, hybrid plants and large hydro plants may apply for a prolongation of the installation license based on a justified business plan timetable.

In addition, the same law introduces provisions regarding the establishment of a net metering scheme for small wind and PV installations. The details for this net metering scheme will be determined through a Ministerial Decision.

According to the provisions of the same Law, a new special program for small wind plants up to 50 kW in fields and buildings will be released by June 2014 and probably a new FiT will be defined.

As far as the environmental licensing is concerned, Ministerial Decision (MD)1958/2012, as amended by MD 20741/2012, mandates that all projects and activities that require environmental authorization are classified into three categories, depending on the severity of their environmental impact. RES plants are divided in 9 types based on the technology (wind/ PV/ solar thermal/ geothermal/ biofuels/ biogas/ biomass/ hydro/ hybrid). In order to accelerate the environmental authorization of small-scale RES projects, MD 3791/2013 was issued defining Standard Environmental Commitments to comply with during the construction and operation of renewable energy projects classified in the lower severity category.

It is worth mentioning that by virtue of MD YAPE/F1/οικ. 24840 (OG B 1900, 03.12.2010), the Assistance Office for Renewable Energy Sources Investments of the MEECC has developed and maintains two separate e-registries, i.e. the Registry of RES power stations and the Registry of Operating RES power stations Information.

The first e-registry (Registry of RES power stations) refers to data related to the progress of the licensing procedure for each station until its entry into operation, while the second one (Registry of Operating RES power stations Information) includes data related to the electricity production and the overall operation of each station that has started operation. Both registries are used for the monitoring of the different stages of the licensing procedure, as well as the actual penetration of renewables in the Greek electricity system. The following table presents the progress of the licensing procedure for RES-E installations by the end of 2012 and March 2013.

Table 2.i. Progress of licensing procedure per RES technology

| in MW | Application for production license ³¹ | | Production license ³² | | Binding Connection Offer ³³ | | Installation license ³⁴ | | Power Purchase Agreement ³⁵ | |
|----------------------------|--|------------------|----------------------------------|------------------|--|------------------|------------------------------------|------------------|--|------------------|
| | until end 2012 | until March 2013 | until end 2012 | until March 2013 | until end 2012 | until March 2013 | until end 2012 | until March 2013 | until end 2012 | until March 2013 |
| Wind | 20788 | 23526 | 23349 | 23325 | 4285 | 4201 | 1553 | 1623 | 766 | 787 |
| Biomass | 192 | 173 | 447 | 447 | 145 | 149 | 34 | 25 | 13 | 13 |
| Geothermal energy | 20 | 20 | 8 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Small Hydro | 110 | 153 | 968 | 968 | 130 | 92 | 71 | 50 | 18 | 21 |
| Photovoltaic ³⁶ | 100 | 100 | 4454 | 4454 | 2450 | 2360 | 601 | 634 | 1843 | 1132 |
| CSP | 424 | 424 | 418 | 418 | 50 | 50 | 38 | 38 | 0 | 0 |
| Hybrid | 506 | 506 | 295 | 295 | 0 | 4 | 0 | 0 | 0 | 0 |
| TOTAL | 22140 | 24901 | 29938 | 29914 | 7061 | 6857 | 2297 | 2370 | 2640 | 1953 |

2.b. 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).

Law 4152/2013 modified a number of provisions regarding the access to the grid for RES plants, setting specific deadlines both for the competent System/Network Operator and the RES producer and allowing for a common application for a Connection Offer of multiple RES producers.

Recently enacted Law 4203/2013 provides for the possibility of exceeding by 20% the congestion limits of the grid in areas declared congested by RAE decision, allowing the System Operator to continue granting Binding Connection Offers to RES projects until this limit is reached. However, it also provides for those RES projects to be subject to energy curtailment, in case other RES plants are installed in the same area, which had been granted a Binding Connection Offer at an earlier stage.

Moreover, RAE Decision 787/2013 describes the procedure that is to be followed to grant grid access to groups of small-scaled RES producers in case of locally insufficient medium- or low-voltage grid capacity. The specific Decision sets the procedure as well as the rules for costs sharing, competencies sharing, contract signing and any other related issue.

³¹ All the applications for RES projects starting their licensing procedure through an application to RAE for granting a production license

³² All the projects for which a production license has been granted

³³ Projects for which the competent System/Network Operator has determined where and how the projects will be connected and a Connection Offer binding the Operators has been granted

³⁴ Projects with a production license for which an installation license has been granted (not including projects with an operation license)

³⁵ Projects for which the producers have signed 20-year contracts for selling the produced electricity

³⁶ The PV stations that are in operation are only those that are connected to the national electricity system (incl. the non-connected islands) and are relevant for the licensing procedure, thus they do not include the stand-alone PV systems.

3. 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).

Feed in Tariffs

The main support instrument in Greece for electricity from renewable energy sources remains the Feed in Tariff regime, which differentiates the tariffs depending on the technology and project size, having considered co-benefits and project development costs. The FiTs for all technologies except PVs are still regulated by provisions of L.3851/2010, and are readjusted annually, indexed at 25% of the annual consumer index, as imposed recently by L.4203/2013, amending the previous 50% annual readjustment.

In the case of PVs, the rapid cost reduction observed in the last years combined with disproportionately high FiTs, foreseen in previously enforced regime, has led to a high profit margin of such investments, an abrupt increase of the investing interest and subsequently to a significant growth of the PV installed capacity. This unpredicted high penetration of PV plants resulted in an increase of the required amount that had to be paid back to RES producers as foreseen by the guaranteed FiT scheme. As a consequence, a gradually increasing deficit has been observed in the RES Special Account, which is managed by the Electricity Market Operator (LAGIE S.A.) and through which the payments to RES producers are realized³⁷.

To ensure the sustainability of the RES Special Account it is foreseen that every six months RAE reassesses the Special Levy for GHG reduction, which constitutes revenue of the RES Special Account. The latest reassessment of the Special Levy for GHG reduction for the second semester of 2013 led to an increase of the weighted average Levy from 1,84 €/MWh in 2011 to 14,96 €/MWh. The following table presents the breakdown of the Special Levy for GHG reduction per end consumer category (RAE Decision 323/19.07.2013). In total from the beginning of 2012 until the end of 2013 the revenues of the Special Levy for GHG reduction have amounted to 962 M€.

Table 3.i. Readjustment of the Special Fee for GHG reduction per end consumer category

| End consumer category | Special Fee for GHG reduction (€/MWh) |
|---|--|
| High voltage consumers | 1,79 |
| Medium voltage consumers – agricultural | 6,97 |
| Medium voltage consumers – other | 8,87 |
| Low voltage consumers – agricultural | 7,33 |
| Low voltage consumers – residential | 20,80 |
| Low voltage consumers – other | 21,77 |

³⁷The core concept of developing and maintaining the RES Special Account was to derive its revenues from the RES electricity sales, calculated according to the hourly market clearing price, the respective RES electricity sales in the non-interconnected islands, calculated according to the electricity generation average variable cost, and a Special Levy for GHG reduction paid by the electricity end consumers. Through this account the payments to High Efficiency Cogeneration Producers are realised as well.

In addition, to ensure the financial sustainability of the RES Special Account and eliminate its deficit, a number of additional emergency measures were taken, aiming either at increasing the revenues or decreasing the outflows of the Account.

In specific, to increase the revenues of the RES Special Account, the measures taken include the following:

- A special fee of 2€/MWh is imposed to electricity produced by lignite and is directly attributed to the RES Account (L.4001/2011, as amended by L.4042/2012).
- The total amount of revenues from the auctioning of the rights of the greenhouse gas emissions (GHG) are attributed to the RES Account (L.3468/2006 as amended by L.4001/2011 and L.4062/2012),
- 25% percent of the levy for the Public Broadcast Company (ERT S.A.), foreseen in L.1730/1987, is attributed to the RES Special Account (MD Y.A.Π.E./Φ1/2303/οικ.16935)

On the other hand, measures taken to decrease the outflows of the Account refer to the following:

- Readjustment of feed-in tariffs for the energy produced by PV plants for new entrant producers (MD Y.A.Π.E. /Φ1/οικ.2262/31.01.2012, MD Y.A.Π.E./Φ1/2301/οικ.16933/10.08.2012, MD Y.A.Π.E./Φ1/1288/9011/02.05.2013). The following table presents the evolution of the FiTs for PVs according to the period in which a power purchase agreement was signed and, recently with law 4093/2012, according to the period the station was put into operation.

Table 3.ii.Evolution of the FiTs for PVs

| Year | | | Guaranteed Feed in Tariff (€/MWh) | | | |
|------|---|---|-----------------------------------|---------|----------------------------|---------|
| | | | Interconnected System | | Non-Interconnected islands | |
| | | | >100kW | <=100kW | >100kW | <=100kW |
| 2009 | Period in which a Power Purchase Agreement was signed | February 2009 – July 2009 | 400,00 | 450,00 | 450,00 | 500,00 |
| | | August 2009 – January 2010 | 400,00 | 450,00 | 450,00 | 500,00 |
| 2010 | | February 2010 – July 2010 | 400,00 | 450,00 | 450,00 | 500,00 |
| | | August 2010 – January 2011 | 392,04 | 441,05 | 441,05 | |
| 2011 | | February 2011 – July 2011 | 372,83 | 419,43 | 419,43 | |
| | | August 2011 – January 2012 | 351,01 | 394,89 | 394,89 | |
| 2012 | | February 2012 – July 2012 | 292,08 | 328,60 | 328,60 | |
| | | Period in which the station started operation | August 2012 – January 2013 | 180,00 | 225,00 | 225,00 |
| 2013 | February 2013 – July 2013 | | 95,00 | 120,00 | 100,00 | |
| | August 2013 – January 2014 | | 95,00 | 120,00 | 100,00 | |

- Apart from the above FiT readjustment, a significant readjustment of FiT took place consecutively since January 2012 for the installations under the Special Program for the deployment of PVs up to 10kW on buildings, and especially roofs (MD Y.A.Π.E. /Φ1/οικ.2266/31.01.2012, MD Y.A.Π.E./Φ1/2302/οικ16934/10.08.2012, MD Y.A.Π.E./Φ1/1289/9012/02.05.2013). In specific, the current guaranteed FiT for such

installations is 125€/MWh and will be decreasing 5€/MWh annually until 2019. A Special Solidarity contribution (SSc), that is proportional to the electricity produced and injected to the grid, is imposed to RES producers and attributed to the RES Special Account (L. 4093/2012) with the exemption of installations under the Special Program for the deployment of PVs up to 10kW on buildings, and especially roofs. The SSc was increased for PV installations put in operation after 2013, by virtue of L.4152/2013.

- The selling price for PVs is defined according to the FiT in force at the time the station is put into operation, instead of the previous regime that foresaw to maintain the same FiT that was in force at the time the Power Purchase Agreement was signed for 18 months (6 months for PVs under the Special Program for buildings) .
- Suspension of the licensing procedure for new PV plants applications (MD Y.A.Π.E. /Φ1/2300/οικ.16932/10.08.2012) with the exemption of installations under the Special Program for the deployment of PVs up to 10kW on buildings, and especially roofs.
- Suspension of signing the grid connection contract and power purchase agreement of new PV plants until the end of 2013 (L. 4152/2013) with the exemption of installations under the Special Program for the deployment of PVs up to 10kW on buildings, and especially roofs.

A potential lift of the aforementioned suspensions will be assessed after the preparation of the upcoming national energy roadmap to 2030 and the assessment of the national energy mix.

Moreover, a corrective action regarding the revenues of the RES Special Account from the RES electricity sales in the wholesale market was applied by L 4152/2013. In specific, according to this law the RES electricity sales are realised on either the electricity wholesale market clearing price or the average variable cost of thermal power plants, whichever the highest. This action resulted to more than 83M€ cumulative revenues in 2013 since its application in May 2013. In total from the beginning of 2012 until the end of 2013 the revenues from the RES electricity sales have amounted to 1052 M€.

The revenues from each emergency measure since its respective application are presented in the following table:

Table 3.iii. Cumulative revenues of emergency measures to ensure the financial sustainability of the RES Special Account

| Measure | Beginning/amendment of measure | Estimated cumulative revenues until the end of 2013 (M€) |
|---------------------------------------|--------------------------------|--|
| Lignite fee | February 2012 | 94.76 |
| GHG rights auctioning | March 2012 | 221.54 |
| ERT S.A. levy contribution | August 2012 | 64.99 |
| Special Solidarity contribution (SSc) | November 2012/May 2013 | 548.88 |

The aforementioned structural measures along with the expected reform of the support scheme for RES are expected to ensure the viability of the RES Special Account and to contribute to the establishment of a secure investment environment in view of the achievement of the 2020 targets.

Table 3, presents the total financial support given in 2012 and 2013 to RES plants, through the FiT scheme. It is worth mentioning that for 2012 RES power plants on the non-

interconnected islands acted beneficially to the total power generation cost, since the total RES support considering balance from electricity sales was negative.

Table 3: Support schemes for renewable energy

| RES support schemes year 2012: Feed-in tariffs | Total support from FIT scheme (M€) | Total support from FIT scheme excluding SSc (M€) | Total support considering balance from electricity sales (M€)³⁸ |
|--|---|---|---|
| Interconnected system | | | |
| Wind | 285.2 | | |
| Small hydro plants | 59.5 | | |
| Biogas | 20.4 | | |
| PV (incl. PV in buildings roofs for the whole country) | 671.2 | | |
| Total interconnected system | 1036.3 | 929.0 | 616.4 |
| Non-interconnected islands | | | |
| Wind | 69.5 | | |
| Small hydro plants | 0.1 | | |
| PV | 89.1 | | |
| Total non-interconnected islands | 158.7 | 142.9 | -24.9 |
| Total RES-E annual support | | | 591.5 |
| RES support schemes year 2013: Feed-in tariffs | Total support from FIT scheme (M€) | Total support from FIT scheme excluding SSc (M€) | Total support considering balance from electricity sales (M€) |
| Interconnected system | | | |
| Wind | 309.7 | | |
| Small hydro plants | 69.4 | | |
| Biogas | 22.5 | | |
| PV (incl. PV in buildings roofs for the whole country) | 1403.8 | | |
| Total interconnected system | 1805.4 | 1416.6 | 1081.14 |
| Non-interconnected islands | | | |
| Wind | 76.2 | | |
| Small hydro plants | 0.05 | | |
| PV | 112.2 | | |
| Total non-interconnected islands | 188.45 | 151.5 | -31.0 |
| Total RES-E annual support | | | 1050.2 |

Subsidies on investment

All RES technologies, except photovoltaics could apply for investment subsidies according to the enforced investment law until 2013. However, the recently enacted new investment law (L.4146/2013) followed by an amendment introduced through Art.68 of L.4155/2013 narrowed investment subsidies only to hydro, pumped hydro, hybrid, biomass and biogas stations for all the investment plans submitted after the 01.01.2014. However, all RES technologies are eligible for tax incentives.

³⁸ The electricity sales are adjusted after having estimated the part of the electricity sales attributed to high efficiency cogeneration

Biodiesel allocation

According to the provisions of law 3054/2002, as amended by law 4062/2012 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 (see 18 of Table 2), raw materials like energy crops, agro-industrial by-products (cottonseed) and wastes (animal fats and used vegetable oils) are approved for biofuel 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 (see 16 of Table 2), 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.

3.a. 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. 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 FiT support scheme 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.

Moreover, as regards 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 (see 18 of Table 2).

One of the criteria is the participation of biodiesel producers or importers in research programs relevant to the production of biofuels, bioliquids or biogas whose contribution is double counted towards RES targets, i.e. produced from raw materials that are specified in JMD Δ1/A/οικ. 10839 (see 8 of Table 2). 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. 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 between the last trimester of 2011 and the last trimester of 2012 (source: Hellenic Electricity Market Operator – LAGIE S.A.)

Table 5.i. Statistical data of the GoO system for the period 1/10/2011-31/12/2012

| Issued GoO (MWh) | PV | Wind | Hydro | Total |
|------------------------------|---------------|----------------|------------------|------------------|
| Q4/2011 | 3,203 | 4,326 | 6,453 | 13,982 |
| Q1/2012 | 3,306 | 605,281 | 2,344,262 | 2,952,849 |
| Q2/2012 | 19,662 | 336,388 | 8,663 | 364,713 |
| Q3/2012 | 17,146 | 17,146 | | |
| Q4/2012 | 40 | 9,252 | 9,292 | |
| TOTAL | 43,357 | 945,995 | 2,368,630 | 3,357,982 |
| Cancelled GoO (MWh) | PV | Wind | Hydro | Total |
| Q4/2011 | 0 | 0 | 1,760,416 | 1,760,416 |
| Q1/2012 | 7,374 | 290,942 | 4,870 | 303,186 |
| Q2/2012 | 5,112 | 7,934 | 10,066 | 23,112 |
| Q3/2012 | 2,958 | 5,326 | 3,675 | 11,959 |
| Q4/2012 | 4,748 | 608,000 | 1,940,980 | 2,553,728 |
| TOTAL | 20,192 | 912,202 | 3,720,007 | 4,652,401 |
| Transferred GoO (MWh) | PV | Wind | Hydro | Total |
| Q4/2011 | 0 | 0 | 0 | 0 |
| Q1/2012 | 0 | 21,014 | 544,085 | 565,099 |
| Q2/2012 | 0 | 0 | 406,060 | 406,060 |
| Q3/2012 | 0 | 0 | 0 | 0 |
| Q4/2012 | 0 | 0 | 0 | 0 |
| TOTAL | 0 | 21,014 | 950,145 | 971,159 |

Table 5.ii.New entrant plants at the GO register

| | PV | | Wind | | Small Hydro | | Large Hydro | | Total | |
|--------------|---------------|--------------|---------------|---------------|--------------------|-----------|--------------------|-----------|---------------|---------------|
| | number | MW | number | MW | number | MW | number | MW | number | MW |
| Q4/2011 | 7 | 2.62 | 5 | 95.7 | | | | | 12 | 98.32 |
| Q1/2012 | 3 | 0.3 | 8 | 173.55 | | | | | 11 | 173.85 |
| Q2/2012 | 25 | 12.84 | | 0 | | | | | 25 | 12.84 |
| Q3/2012 | 19 | 1.67 | | 0 | | | | | 19 | 1.67 |
| Q4/2012 | 4 | 7.11 | | 0 | | | | | 4 | 7.11 |
| Total | 58 | 24.53 | 13 | 269.25 | | | 0 | 0 | 71 | 293.78 |

| | | | | | | | | | | |
|------------------------------|------------|--------------|-----------|--------------|----------|-------------|----------|-------------|------------|----------------|
| Total until 9/2011 | 155 | 14.29 | 19 | 265.25 | 2 | 10.7 | 8 | 1987 | 184 | 2277.24 |
| Total 10/2010-12/2012 | 213 | 38.82 | 32 | 534.5 | 2 | 10.7 | 8 | 1987 | 255 | 2571.02 |

6. DESCRIPTION OF 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)).

Table 4: Biomass supply for energy use

| | Amount of domestic raw material ^{39, 40} | | Primary energy in domestic raw material (ktoe) | | Amount of imported raw material from EU ³⁹ | | Primary energy in amount of imported raw material from EU (ktoe) | | Amount of imported raw material from non EU ³⁹ | | Primary energy in amount of imported raw material from non EU (ktoe) | |
|--|---|-------------|--|------|---|---------|--|------|---|---------|--|------|
| | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 | 2011 | 2012 |
| Biomass supply for heating and electricity: | | | | | | | | | | | | |
| Direct supply of wood biomass from forests and other wooded land energy generation (fellings etc.) | 985,295 | 690,606 | 321 | 223 | 213,150 | 274,358 | 91 | 93 | 16,205 | 109,967 | 7 | 37 |
| Indirect supply of wood biomass (residues and co-products from wood industry etc.) | 124,321 | 88,255 | 48 | 32 | - | 7,268 | - | 3 | - | 10,644 | - | 5 |
| Energy crops (grasses, etc.) and short rotation trees (please specify) | - | - | - | - | - | - | - | - | - | - | - | - |
| Agricultural by-products / processed residues and fishery by-products | 1.759.420 | 2,111,897 | 572 | 745 | - | - | - | - | - | - | - | - |
| Biomass from waste (municipal, industrial etc.) | 158,191,190 | 167,007,980 | 73 | 89 | - | - | - | - | - | - | - | - |
| Others (please specify) | - | - | - | - | - | - | - | - | - | - | - | - |
| Biomass supply for transport: | | | | | | | | | | | | |
| Common | | | | | | | | | | | | |

³⁹ Amount of raw material is reported in tonnes for all types of biomass

⁴⁰ The reported figures refer to the total amount of raw material produced domestically without considering the exported quantity

| | | | | | | | | | | | | |
|--|---|---|----|----|--|--|--|--|--|--|--|--|
| arable crops for biofuels (please specify main types) | | | | | | | | | | | | |
| Energy crops (grasses, etc.) and short rotation trees for biofuels (please specify main types) | | | | | | | | | | | | |
| Others (cotton seed, used cooking oils and animal fats) | 27.459 cotton seed, 6.658 cotton oil and 15.024 used cooking oils and animal fats | 68.212 cotton seed, 2.712 cotton oil and 20.063 used cooking oils and animal fats | 20 | 24 | | | | | | | | |

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

| Land use | Surface (ha) | |
|--|--------------|-------|
| | 2011 | 2012 |
| 1. Land used for common arable crops (wheat, sugar beet etc.) and oil seeds (rapeseed, sunflower etc.) (Main types: sunflower seed, rapeseed, soya seed) | 88975 | 67389 |
| 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) | - | - |

In this table only oil seeds have been included because at present it is the only type of crops used for biofuels in Greece.

7. INFORMATION ON ANY CHANGES IN COMMODITY PRICES AND LAND USE WITHIN GREECE 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 2011 and 2012 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.i presents an estimation of the weighted average price of the aforementioned commodities from 2009 to 2012. However, it only serves as a rough indication of the development of market prices.

Table 7.i. Commodity prices (in €/t)⁴¹

| Type of biomass | 2009 | 2010 | 2011 | 2012 |
|-----------------|------|------|------|------|
| | | | | |

⁴¹ Prices do not include VAT (23%)

| | | | | |
|--|-------------------------------------|-------|-----------|-----------|
| Forest residues (Saw dust, chipsetc.) ⁴² | 36,5 | 41,8 | 29,8 | 20,4 |
| Fire wood (imports) ⁴³ | 50,7 | 44,7 | 56,5 | 76,9 |
| Fire wood (primary production) ⁴⁴ | 18,1 | 18,1 | 18,1 | 19,4 |
| Ricehusks | Error! Bookmark not defined. | 6,8 | 1,6 | 0,2 |
| Exhausted olive cakes | Error! Bookmark not defined. | 43,7 | 57,0 | 60,8 |
| Fruit kermels | Error! Bookmark not defined. | 50,0 | 75,0 | 75,0 |
| Pellets (imports) | Error! Bookmark not defined. | 112,5 | 147,2 | 149,8 |
| Pellets(primary production) ⁴⁵ | 195,0 | 180,0 | 186,4 | 179,9 |
| Sunflower seeds ⁴⁶ | n/a | n/a | 40- 44 | 40- 44 |

The prices of forest residues, as recorded in questionnaires sent by CRES to several biomass users have exhibited a slight decrease.

Firewood imports and exhausted olive cakes recorded a relative increase of prices in 2011-2012 with firewood imports prices depending highly to the countries of origin. On the other hand, locally produced and consumed firewood remained at the same price.

When biomass exploitation investments start, as a consequence of the favorable 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. However, given that the market is still at its infancy, no conclusion can be drawn from these data, although, it is expected that the local market will be further developed in the coming years, considering the high increase of the oil prices for heating purposes in the domestic sector.

Regarding sunflower prices, seed prices ranged from 40-45 €/t.

The harvested area allocated to the oil crops grown in Greece for biofuel production is depicted in the following Table.

Table 7.ii. Harvested area allocated to oil crops grown for biofuel production

| | Harvested Area (ha) | |
|-----------------|---------------------|-------|
| | 2011 | 2012 |
| Sunflower seeds | 72512 | 60808 |
| Rapeseed | 15000 | 5104 |
| Cardoon | 716 | 489 |
| Soya | 645 | 870 |
| Other | 102 | 118 |
| TOTAL | 88975 | 67389 |

⁴² Primary research based on questionnaires conducted by CRES

⁴³ National Statistical Services (ELSTAT)

⁴⁴ General Secretariat of Forests, Ministry of Environment, Energy and Climate Change

⁴⁵ Agricultural University of Athens

⁴⁶ Ministry of Rural Development and Food

8. DESCRIPTION OF THE DEVELOPMENT AND SHARE OF BIOFUELS MADE FROM WASTES, RESIDUES, NON-FOOD CELLULOSIC MATERIAL, AND LINGO CELLULOSIC MATERIAL. (ARTICLE 22(1) I) OF DIRECTIVE 2009/28/EC).

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

| Article 21(2) biofuels ⁴⁷ | 2011 | 2012 |
|--|--------|--------|
| Production – Biodiesel from cottonseed oil | 8 | 10 |
| Consumption – Biodiesel from cottonseed oil | 8 | 10 |
| Production – Biodiesel from used cooking oils and animal fats | 12 | 14 |
| Consumption – Biodiesel from used cooking oils and animal fats | 12 | 14 |
| Total production Art.21.2.biofuels | 20 | 24 |
| Total consumption Art.21.2. biofuels | 20 | 24 |
| % share of 21.2. fuels from total RES-T ⁴⁸ | 85.84% | 88.24% |

Although for the period 2011-2012 compliance with the sustainability criteria for biodiesel was not verified, the provisions for the allocation of biodiesel and MD Δ1/B/7364 (see 23 of Table 2) provide data for the raw materials used for biodiesel that was produced and consumed in Greece. The amounts reported correspond to biodiesel produced by used cooking oil, animal fat and cottonseed oil according to conversion factors set by yearly allocation decisions.

Given the fact that biofuels produced from waste and residues need only to fulfill the criterion of article 17 (2) and the fact that greenhouse gas emission saving for waste vegetable oil/animal fat and cotton seed biodiesel is 88% and 80% respectively, according to the typical values in part D of Annex V and law 4062/2012, the reported amounts should be regarded as compliant with sustainability criteria.

9. 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. 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.

⁴⁷Biofuels made from wastes, residues, non-food cellulosic material, and lignocellulosic material.

⁴⁸This figure is calculated without considering the multipliers for Art. 21.2. biofuels and road electricity

10. ESTIMATION OF 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 2013 under the Convention and the Kyoto Protocol for greenhouse and other gases for the years 1990-2011.

Table 10.i.: Emission factors used to estimated GHG emission savings from the use of renewable energy

| | CO2 t/TJ | CH4 (kg/TJ) | N2O (kg/TJ) |
|--|---------------------|------------------------|------------------------|
| Electricity and Heat Production | | | |
| Liquid Fuels | 75.48 | 3.000 | 0.600 |
| Solid Fuels | 126.12 | 1.000 | 1.500 |
| Gaseous Fuels | 55.10 | 1.000 | 0.100 |
| Manufacturing Industries and Construction | | | |
| Liquid Fuels | 67.51 | 1.024 | 0.730 |
| Solid Fuels | 96.13 | 1.156 | 1.430 |
| Gaseous Fuels | 55.24 | 1.000 | 0.735 |
| Other Sectors | | | |
| Liquid Fuels | 72.97 | 3.109 | 5.733 |
| Solid Fuels | 99.18 | 1.000 | 1.500 |
| Gaseous Fuels | 55.24 | 1.000 | 0.100 |
| Transport | | | |
| Liquid Fuels | 70.72 | 13.370 | 2.925 |
| Gaseous Fuels | 55.38 | 69.826 | 2.633 |

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 2013 under the Convention and the Kyoto Protocol for greenhouse and other gases for the years 1990-2011).

Table 6 presents the estimates for GHG emission savings from the use of renewable energy in 1000t CO₂eq, as estimated according to the approach described above.

Table 6: Estimated GHG emission savings from the use of renewable energy (1000t CO₂eq)

| Environmental aspects | Year 2011 | Year 2012 |
|---|-----------|-----------|
| Total estimated net GHG emission saving from using renewable energy⁴⁹ | 12443 | 13596 |
| - Estimated net GHG saving from the use of renewable electricity ⁵⁰ | 8264 | 9278 |
| - Estimated net GHG saving from the use of renewable energy in heating and cooling | 3896 | 3947 |
| - Estimated net GHG saving from the use of renewable energy in transport | 283 | 371 |

11. REPORT ON (FOR THE PRECEDING 2 YEARS) AND ESTIMATION OF (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 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 the following table.

Moreover, table 7 presents the actual RES excess for the period 2010-2012, compared to the RES indicative trajectory prepared in 2009.

Table 7: 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)

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-----------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Actual excess production | 166 | 209 | 345 | | | | | | | | |
| Estimated excess production | 257 | 408 | 513 | 686 | 812 | 856 | 842 | 737 | 743 | 683 | 529 |

⁴⁹The 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.

⁵⁰The estimated net GHG saving from the use of renewable electricity are calculated on the basis of the actual RES production and not the normalized production of hydro and wind

11.a. 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. 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.