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RENEWABLE ENERGY DEVELOPMENT IN EU 27 (2009-2010)

Manjola Banja, Nicolae Scarlat, Fabio Monforti-Ferrario

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Contact information
Manjola Banja
Address: Joint Research Centre, Via Enrico Fermi 2749, TP 450, 21027 Ispra (VA), Italy
E-mail: Manjola.BANJA@ec.europa.eu
Tel.: +39 0332 783992
Fax: +39 0332 78 9268

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(2009-2010)

Manjola Banja, Nicolae Scarlat, Fabio Monforti-Ferrario

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Preface

EU 27 Member States (MS hereafter), according to Article 22 of Directive 2009/28/EC, had to submit, by 31 December 2011, a Progress Report[1] to the European Commission (EC) on the progress in the promotion and use of energy from renewable sources covering years 2009 and 2010. Similarly, progress reports will be submitted to the European Commission every two years thereafter.

European Commission has established a template[2] to ensure that the MS reports are complete, cover all the requirements of Article 22 of Directive and comparable with each other and with National Renewable Energy Action Plans (NREAPs). Progress Reports contain also a section on sustainability scheme for biofuels and bioliquids consumed in the EU and on the economic, social, and environmental impacts of this consumption.

Member States had to report on the policies and measures taken to promote the use of energy from renewable resources in electricity, heating and cooling and in transport. They had to explain their future strategy regarding fulfilment of the sustainability criteria for biofuels and bioliquids and verification of compliance with the scheme.

The Progress Reports had to include the contribution expected from energy efficiency and energy saving measures and the total contribution expected of each renewable energy technology to meet the binding 2020 targets and the *indicative interim trajecto*ry for the shares of energy from renewable resources in electricity, heating and cooling and transport.

All Member States, except Czech Republic, have submitted Progress Reports, describing the overall renewable energy technology, policy developments and their compliance with the measures set out in the Directive and in their National Renewable Energy Action Plans.

Based on the data contained in the Progress Reports, this document presents an analysis of the state of the art in the development of renewable energy by each technology and Member State for years 2009 and 2010, together with a comparative analysis with expected achievements and indicative interim trajectory provided by National Renewable Energy Action Plans for year 2010.

[1] The 27 renewable Energy Progress Reports can be found in their original language and in English in http://ec.europa.eu/energy/renewables/reports/2011_en.htm

[2] Commission Decision of 30.06.2009 – Establishing a Template for National Renewable Energy Action Plans under Directive 2009/28/EC http://ec.europa.eu/energy/renewables/doc/nreap__adoptedversion__30_june_en.pdf

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Executive Summary

EU 27 MS Renewable Energy Progress Reports were delivered to provide the European Commission official data about the development of renewable energy in years 2009 and 2010 and on the achievements of the 2010 deployments planned in the National Renewable Energy Action Plans.

A comprehensive overview of Member States progress in renewable energy development for 2009-2010 is described in the **first chapter** of this report. This overview presents the evolution of several indicators, including both absolute and relative development of gross final energy consumption, total renewable energy use, renewable energy contribution in each sector (heating/cooling, electricity and transport) and the deployment of each renewable energy technology (hydropower, geothermal, solar, marine, wind, biomass and biofuels) in each Member States.

Reports highlights related to 2009-2010 renewable energy development in EU 27 are sumarized as following:

- Overall RES share in gross final energy consumption rose from 11.9% in 2009 to 12.5% in 2010; RES contributions in heating/cooling, electricity and transport sector in 2010 were respectively 14.4%, 19.7% and 5.0%;
- Additional RES contribution in gross final energy consumption in the year 2010 amounted to 610.6 PJ (14.6 Mtoe) which represent almost one third of the increase of gross final energy consumption in 2010 of 2172 PJ (51.8 Mtoe);
- Additional RES contribution in heating/cooling sector in year 2010 amounted to 386 PJ (9.2 Mtoe), more than half of additional RES contribution in gross final energy consumption in EU 27 and almost 22% of increase of gross final energy consumption in this sector;
- Additional RES contribution in electricity sector in 2010 amounted to 162.4 PJ (3.9 Mtoe) which represent almost 35% of increase of gross final energy consumption in this sector (460.8 PJ or 11 Mtoe);
- Gross final energy consumption in transport sector overall decreased in 2010 by 44 PJ, while the additional RES contribution in transport sector was positive with +62.2 PJ (1.5 Mtoe);
- Additional RES installed capacity reached 24.3 GW in 2010, representing an increase by about 11% of total RES capacity in 2010 year;
- Additional hydropower installed capacity was 0.7 GW, an increase of 0.7% of hydropower installed capacity, representing only 3% of additional RES installed capacity;
- Additional geothermal installed capacity reached only 35 MW in 2010, an increase of 4.4% of the geothermal installed capacity, representing only 0.1% of the additional RES capacity in 2010. Energy generated from geothermal technology decreased in 2010 by 4.5% (-2.0 PJ) compared with 2009. The main contribution in this decrease was attributed to geothermal for heating/cooling which droped by 8.4% compared to 2009;
- Additional capacity registered for marine technology in 2010 compared with 2009 was only 0.1 MW;
- Additional solar installed capacity reached 12.2 GW in 2010, an increase by 77.6% of the solar installed capacity, representing more than 50% of total additional RES capacity in 2010. Additional energy generated from solar technology in 2010 was 39.7 PJ (+ 38.2%). The main contribution in this increase was attributed to solar electricity which reached in 2010 60.1% of electricity generated from this technology in 2009. The increase in solar thermal in 2010 was 17.2%;

- Additional wind installed capacity reached 9.2 GW in 2010, an increase by 12.3% of the wind installed capacity, representing about 38% of total additional RES capacity in 2010. Additional energy generated from wind increased by 13.6% in 2010 compared to 2009;
- In 2009 bioenergy in European Union reached 3552 PJ presenting 62.4% of total renewable energy. Additional bioenergy in 2010 was amounted to 468.8 PJ (11.2 Mtoe) representing 13.2% of bioenergy in 2009. The contribution of bioenergy in total renewable energy was 65.4%. The main contribution in this increase is attributed to bioheat which increased by 13.4% (+358.1 PJ) followed from biofuels by 12.8 % (+62.2 PJ) and bioelectricity by 12.4% (+48.2 PJ);
- Additional biomass installed capacity reached 2.1 GW in 2010, an increase of 9.3% of the biomass installed capacity, representing about 8.8% of total additional RES capacity in 2010;

Chapter 2 presents an assessment for 2010 of planned targets expected by MS in their National Renewable Energy Action Plans and the actual development reported in Renewable Energy Progress Reports. This report includes the updated version of the National Renewable Energy Action Planof Czech Republic resubmitted in May 2013.

Report highlights on 2010 planned targets assessment in EU 27 are presented below:

- Gross final energy consumption in EU 27 in year 2010 exceeded by 1.1% the planned target. Only 6 MS reduced their gross final energy consumption in 2010 in agreement with what they had planned in NREAPs;
- Gross final energy consumption in heating/cooling sector exceeded by 3.9% the planned target for year 2010 even that 8 MS consumed less energy than their planned targets in this sector;
- Gross final electricity consumption was at the level expected in the NREAPs, even that half of MS had an electricity consumption below their projected consumption in NREAPs;
- Gross final energy consumption in transport sector in year 2010 was 3.3% lower than the planned NREAPs target. 17 MS consumed less energy in this sector compared with the planned NREAPs consumptions;
- EU 27 exceeded since in 2009 the overall planned RES share in gross final energy consumption. In 2010, the the overall RES share in gross final energy consumption was 12.5, in comparison with 11.9% expected share, according to aggregated data from NREAPs. Only 7 MS had in 2010 an overall RES share in gross final energy consumption lower than their planned NREAPs shares while 20 MS reached in 2010 their RES minimum trajectory 2011/2012 since in 2009.
- In 2010 total RES contribution[3] in gross final energy consumption in EU 27 exceeded by 8.5% the planned NREAPs value reaching 6248.3 PJ (149.1 Mtoe). 21 MS exceeded their renewable energy generation plans for year 2010;
- Total RES consumption[4] exceeded by 8.3% the 2010 the planned NREAPs value reaching 6294.9 PJ (150.3 Mtoe). Only 5 MS consumed less renewable energy in 2010 compared with the planned NREAPs RES consumption;

[3] Total RES contribution in gross final energy consumption is calculated as sum of contrbutions of all renewable technologies in electricity, heating/cooling and transport sectors considered only once.

[4] According to Article 5(1) of the Directive 2009/28/EC in order to calculate the overall RES share in gross final energy consumption, the gross final consumption of renewable energy from renewable sources should be calculated as sum of: (a) gross final consumption of electricity from renewable energy sources; (b) gross final counsumption of energy from renewable sources for heating/cooling; and (c) final counsumption of energy from renewable sources in transport. Gas, electricity and hydrogen from renewable energy sources shall be considered only once in point (a), (b), or (c) of the first subparagraph, for calculating the share of gross final consumption of energy from renewable sources.

- 21 MS in EU 27 reached or exceeded their 2010 NREAPs planned value in RES H/C share since 2009. In 2010 the number of MS that reached or exceeded their NREAPs RES shares in heating/cooling sector was 22;
- Renewable energy contribution in heating/cooling sector reported for year 2010 was 3379.8 PJ, which is 528.2 PJ (12.6 Mtoe) or 18.5% higher than NREAPs value. The share of renewable energy in heating/cooling increased to 14.3% compared to the planned value of 12.5%. The share of renewable energy in total RES for this sector increased to 54% compared to the planned value of 50%. Most of the MS (21) reached or exceeded their RES contribution in this sector in year 2010;
- The majority of MS, or 21 MS in EU 27 reached or exceeded their 2010 NREAPs planned value in RES H/C share since 2009. In 2010 the number of MS that reached or exceeded their NREAPs RES shares in heating/cooling sector was 22;
- RES in electricity sector in 2010 represent 19.5% of gross final energy in this sector. A number of 11 MS reported since in 2009 a RES share in electricity sector higher than the 2010 NREAPs planned value;
- The contribution of renewable energy in electricity sector in 2010 was 2310.5 PJ (641.5 TWh or 55.2 Mtoe), which is 0.8% below the planned 2010 NREAPs value. The share of renewable electricity in total electricity increased to 19.5% compared to the planned value of 19.6%. The share in total RES also decreased from the planned 40% reaching only 37%. A number of 14 MS reached or exceed their NREAPs regarding the total renewable electricity contribution in this year;
- In 2010 RES share in transport sector, with multiple counting, was 4.96% while the planned share for EU 27 was 4.95%. The expected share for 2010 was exceeded since in 2009 by 7 MS and 10 MS exceeded it in 2010;
- RES consumption in transport in 2010 reached 604.6 PJ (14.4 Mtoe) being 4.1% less than planned value of 630.2 PJ (15 Mtoe). A few (9) MS consumed in this year more energy than their plans;
- In 2010 the total installed capacity in RES electricity in EU 27 reached 241.1 GW, which is 2.0% below the planned NREAPs capacity. 13 MS exceeded their planned renewable electricity installed capacity in EU 27;
- Hydropower capacity, excluding pumped storage in 2010 was 100.0 GW, which is 9% below the planned capacity. 16 MS were below their 2010 expected hydropower installed capacity. Hydropower energy generated in 2010 was 1.8% below the forecast of the NREAPs. Several (12) MS didn't reach their plans on hydropower energy generation;
- Geothermal energy missed the planned value for 2010 by 16.1% (-8.1 PJ). Six MS generated from geothermal technology more energy than in their NREAPs while ten MS produced less energy than these plans;
- Geothermal electricity production has still a marginal role in renewable electricity in the EU, with only 5 producing countries. Geothermal capacity in 2010 was 0.9% above the planned value while the generation electricity was 6% below the planned value;
- Geothermal in heating/cooling sector in 2010 was only 22.0 PJ (525 ktoe), which represents 23.6% below the planned target of 28.2 PJ (688 ktoe). Although geothermal energy was the heat source in 18 MS, 10 MS didn't reach their NREAPs values;
- Marine energy was used in only one MS (France), with a capacity in 2010 which was 1% below the NREAPs and the electricity generation was 4.6% below the target;
- Contribution of solar technology in renewable energy in 2010 was 7.2% higher than the planned value reaching 146.2 PJ. Half of MS had in 2010 a higher solar contribution to total RES than what they had planned;
- Solar electricity capacity reached 29.7 GW in 2010, which is 14.4% above the 26.0 GW expected solar capacity. A number of 18 MS had an installed solar capacity above their expected installed capacity. Solar electricity generated in 2010 was 83.5 PJ, 11.9% above

the forecast of 74.7 PJ in the NREAPs. Several (14) MS generated more solar electricity compared to their expected forecast;

- The use of solar heat reached 62.7 PJ (1497 Mtoe) in 2010, which is 1.6% above the 61.7 pj (1474 ktoe) expected solar heat use. A number of 11 MS used more solar heat in comparison with their projections for 2010;
- Wind power capacity reached 84.3 GW in 2010, which is 1.4% below the 85.5 GW expected wind capacity. A number of 13 MS had an installed wind capacity below their expected installed capacity. Wind electricity generated in 2010 was 558.7 PJ, 6.5% below the forecast of 596.9 PJ in the NREAPs. Several (20) MS generated less wind electricity compared to their expected forecast;
- Bioenergy in 2010 in EU 27 exceeded by 535.3 PJ (12.7 Mtoe) which represent 15% of the NREAPs planned value 3580 PJ (85.5 Mtoe). 23 MS produce in 2010 more bioenergy than what they had planned in their renewable energy action plans;
- Biomass power capacity reached 25.1 GW in 2010, which is 10.6% above the 22.7 GW expected biomass capacity. A number of 16 MS had an installed biomass capacity above their expected installed capacity. Biomass electricity generated in 2010 was 444.9 PJ, 8.2% above the forecast of 411.4 PJ in the NREAPs. Several (16) MS generated more biomass electricity compared to their expected forecast;
- The use of biomass heat reached 3112.5 PJ (74.3 Mtoe) in 2010, which is 20% above the 2593.6 PJ (61.9 Mtoe) expected biomass heat use. A number of 11 MS used more biomass heat in comparison with their projections for 2010;
- Biofuel contribution in transport in 2010 (558 PJ or 13.3 Mtoe) was 3.1% less than planned value (575.9 PJ or 13.8 (Mtoe). A number of 17 MS decreased their RES contribution in this sector in 2010 compared with their plans.

Annex I of this report presents data on RES based on Progress Reports and on most updated figures provided by Eurostat and Eurobserv'ER. A description of Eurostat and EurObserv'ER methodology is presented as well. Accuracy between these dataset is evaluated according to EurObserv'ER[5] methodology. Highlights of this comparison are presented below:

- The discrepancies between Progress Reports and Eurostat in total RES share in GFEC for 2009 and 2010 were found to be respectively 11.2% and 10% ;
- The discrepancies between Progress Reports and Eurostat in hydropower installed capacity for year 2009 and 2010 were found to be respectively 8.2% and 0.8%;
- The discrepancy between Progress Reports and Eurostat in electricity generation from hydropower for 2009 and 2010 was found to be respectively 0.4% and 9.1%;
- The discrepancies between Progress reports and Eurostat in wind installed capacity for 2009 and 2010 were found to be resepectively 3.8% and 2.4%. The discrepancies between Progress Reports and EurObserv'ER for the same time span were found to be -0.2% and -0.5%;
- The discrepancies between Progress Reports and Eurostat in electricity generated from wind for 2009 and 2010 were found to be respectively 2.4% and 3.8% while between Progress Reports and EurObserv'ER these discrepancies were 2.4% and 3.9%;
- The discrepancies between Progress Reports and Eurstat in photovoltaic installed capacity for 2009 and 2010 were found to be respectively -2.8% and -6.3%. Between Progress Reports and EurObserv'ER these discrepancies were found to be -4.2% and -8.2%;
- The discrepancies between Progress Reports and Eurostat in electricity generated from photovoltaics for 2009 and 2010 were found to be respectively -0.1% and 0.2%. The

[5] http://www.eurobserv-er.org/pdf/2013_Eurostat_Comparison.pdf

discrepancies between Progress Reports and EurObserv'ER for the same time span were found to be respectively -0.3% and -0.01%;

- The discrepancies between Progress Reports and Eurostat in geothermal installed capacity for year 2009 and 2010 were found to be respectively 7.8% and 7.3%. The discrepancies between Progress Reports and EurObserv'ER for the same technology and time span were found to be -12.3% and 12.2%;
- The discrepancies between Progress Reports and Eurostat in electricity generated from geothermal for 2009 and 2010 were found to be respectively 0.9% and 0%. The discrepancies between Progress Reports and EurObserv'ER for the same technology and time span were found to be 0.4% and 3.1%;
- The discrepancies between Progress Reports and EurObserv'ER in geothermal heat for 2009 and 2010 were found to be -11.4% and -13.7% respectively;
- The discrepancies between Progress Reports and Eurostat in biomass installed capacity for 2009 and 2010 were found to be -11.5% and -12.9% while in electricity generation from biomass the discrepancies were respectively 2% and -0.1%;
- The discrepancies between Progress Reports and Eurostat in solid biomass installed capacity for 2009 and 2010 were found to be resepectively -9.1% and -10.9%;
- The discrepancies between Progress Reports and Eurostat in electricity produced by solid biomss were found to be respectively 8.4% and 5% while between Progress Reports and EurObserv'ER the discrepancies for the same technology and time span were found 8% and 3.5%;
- The discrepancies between Progress Reports and EurObserv'ER in heat from solid biomass were found to be respectively -0.1% and -2.8%;
- The discrepancies between Progress Reports and Eurostat in biogas installed capacity for 2009 and 2010 were found to be -29% and -27.6%;
- The discrepancies between Progress reports and Eurostat in electricity produced by biogas for 2009 and 2010 were found to be -24.1% and -21.5% while between Progress Reports and EurObsev'ER these discrepancies were -24.6% and -22%;
- The discrepancies between Progress Reports and Eurostat in biofuels use in transport sector for 2009 and 2010 were found to be resepectively -2.9% and -2% while between Progress Reports and EurObserv'ER these discrepancies were -5.4% and -3.8%;
- The discrepancies between Progress Reports and Eurostat in bioethanol use in transport sector for 2009 and 2010 were found to be resepectively -4.2% and -5.6% while between Progress Reports and EurObserv'ER these discrepancies were -4.9% and -6.1%;
- The discrepancies between Progress Reports and Eurostat in biodiesel use in transport sector for 2009 and 2010 were found to be resepectively 0.1% and 2.4% while between Progress Reports and EurObserv'ER these discrepancies were -5.7% and -3.6%;
- The discrepancies between Progress Reports and Eurostat in other biofuels use in transport sector for 2009 and 2010 were found to be resepectively -50.9% and -65.2% while between Progress Reports and EurObserv'ER these discrepancies were 0.9% and 24.6%.

For commodity of the reader the summary of renewable energy development in EU 27 during period 2009-2010 and the comparison with 2010 NREAPs plans are presented in **Annex II** of this report.

Abbreviations

ETBE – Ethyl Tertiary Butyl Ether
GFEC – Gross Final Energy Consumption
GW – Gigawatt
GWh – Gigawatt-hour(s)
H/C – Heating /Cooling sector
ktoe – kilo-ton oil equivalent
Mtoe – Mega-ton oil equivalent
MS – Member States
NREAPs – National Renewable Energy Action Plans
PR – Renewable Energy Progress Reports
PV – Solar photovoltaic
PJ – Petajoule
RES – Renewable Energy Sources
RES-H/C- Renewable Energy Sources in Heating/Cooling sector
RES-E – Renewable Energy Sources in Electricity sector
RES-T – Renewable Energy Sources in Transport sector
TWh- Terrawatt-hour(s)

Units

General conversion factors for energy
1 Mtoe = 41.868 PJ = 11.63 TWh
1 ktoe = 41.868 TJ = 11.63 GWh
1 PJ = 0.278 TWh = 0.024 Mtoe
1 TWh = 3.6 PJ = 0.086 Mtoe
1 TJ = 277.8 MWh

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1. Renewable Energy in EU 27 (2009-2010)

Introduction

Data from Progress Reports are summarized following the same approach applied in the previous JRC Technical Reports on Member States National Renewable Energy Action Plans (JRC, 2011 and JRC, 2012).

As Progress Reports have been found to be of different quality and completeness, data check procedure has been applied in order to fix possible miscalculation and misreporting.

On the basis of this data check the some relevant facts were found:

a) Czech Republic 2011 Renewable Energy Progress report was incomplete and doesn't include any table in conformity with Template. In the Progress Report submitted by CZ only data on RES electricity share in GFEC for years 2009 (7.4%) and 2010 (8%) are reported. The overall RES share in GFEC for 2010 (8.3%) reported is equal to what is reported at NREAPs but it needs to be confirmed. For this reason no calculations of GFEC, RES consumption, installed capacity and energy generated for 2009 and 2010 are presented for CZ;

b) Gross final energy consumption: The template of 2011 Progress Reports didn't require Member States to report data on the overall Gross Final Energy Consumption. Only data on Gross Final Consumption of RES for each sector (Table 1a of the Template) and the sectoral share of RES in GFEC (Table 1 of the Template) were requested and reported. GFEC for each sector was estimated, based on the definitions for the calculation of renewable energies share in heating/cooling, electricity and transport sectors (presented below) taking into account data reported in Table 1 and 1a. The total GFEC has been estimated as the sum of each MS total GFEC which is calculated based on overall share of renewable energies in final consumption (Table 1);
   - Share of renewable energy in heating/cooling: Gross final energy consumption of energy from renewable sources in heating/cooling (according to article 5(1)(b) and Article 5(4) of Directive 2009/28/EC) divided by Gross Final Energy Consumption for heating/cooling sector;
   - Share of renewable energy in electricity: Gross final energy consumption of energy from renewable sources in electricity (as referred to Article 5(1)(a) and Article 5(3) of Directive 2009/28/EC divided by Gross final energy consumption for electricity;
   - Share of renewable energy in transport: End use of energy from renewable sources in transport (according to Article 5 (1) (c) and Article 5(5) of Directive 2009/28/EC divided by energy consumption in transport (petrol, diesel, biofuels used in road & rail, electricity used in road transport).

c) Even if not required (see previous point) Germany also reported the gross final energy consumption for years 2009 and 2010, together with its evolution in the three main sectors since 2005. The value for aviation sector was also reported for both years, but no adjustment was done in the total value of gross final energy consumption since this value was below 6.18%. A discrepancy less than 0.5% was found between the gross final energy consumption value reported for 2009 and 2010 and the same parameter calculated based on Table 1 and Table 1a of the template. For consistency with other MS, the value of gross final energy for Germany calculated based on data from Table 1 and 1a of the template is reported here and used for any further analysis ;

d) Bulgaria also reported the gross final energy consumption for 2009 and 2010. For the same consistency reason as for Germany the value calculated based on Table 1 and 1a of the template is reported here and used for any further analysis;
e) Not all MS reported in Table 1a a contribution of RES-T in energy consumption according to Article 5(1) (c) and 5(5) of the Directive 2009/28/EC. RES-T is recalculated to fulfil the above mentioned article of the Directive;
f) Hydropower: Progress Report Template requires MS to report normalized data in accordance with Directive 299/28/EC. All MS reported normalized data for hydropower (total and subcategories). Only for Greece, Latvia, Poland and Sweden calculations are used to determine the normalized data for subcategories based on given installed capacities;
g) Wind: According to methodology of Directive 2009/28/EC data on wind should be normalized. Only Latvia, Lithuania, Netherlands, Portugal, Romania, Sweden and United Kingdom have expressed clearly the status of wind data as normalized according to the methodology in Directive. For other MS no clear statement about normalization of reported wind data was found. In these cases, data were anyway normalized. Moreover, not all MS reported in correct way data on onshore and offshore wind. Sometimes they reported only the total value for wind. Some MS reported data only on installed capacity for wind subcategories. In this case generation is estimated based on given capacities;
h) Slovenia didn't report any data in Table 1d (RES-T) of the Template, but only the final consumption of RES-T in Table 1. In the calculations for RES this value was used as total of Table 1d without dividing into subcategories;
i) Denmark reported as RES-T contribution to the gross final energy consumption only the renewable electricity which is used to calculate the proper share:
j) Romania reported Table 1d as required by template (biofuels, hydrogen and renewable electricity) but biofuels were considered as not fulfilling the sustainability criteria for the contribution of RES-T in gross final energy consumption

Moreover, the following remarks on data analysis are worth to be listed:

- Total RES consumption : the total RES present the arithmetic sum of RES-H/C, RES-E and RES-T consumption;
- According to the definition of the share of RES-T in gross final energy consumption the total value of RES consumed in this sector is used to determine the share;
- Energy generation from RES in transport sector doesn't take into account the double counting;
- Multiple counting is used to calculate the achievement of 10% RES-T target;
- Biomass: Data are reported in accordance with sustainability criteria defined in Article 5(1) of the Directive;
- According to the Template drawn for Progress Reports table 1a should present the contribution of total RES in each sector and in gross final energy consumption. In 2010 Progress Reports discrepancy are found between table 1a and totals of tables 1b, 1c and 1d. In order to be in conformity with analysis at previous reports only totals of tables 1b, 1c and 1d of Progress Reports are compared with totals of tables 10 (a, b), 11 and 12 of NREAPs to assess the contribution of RES in gross final energy consumption.

1.1 Gross Final Energy Consumption (GFEC) [6]

According to MS Progress Reports 2009 and 2010 gross final energy consumption in EU 27[7] amounted respectively 46771 PJ (1117 Mtoe) and 48943 PJ (1169 Mtoe) showing an increase between 2009 and 2010 by 4.6% (2172 PJ or 51.8 Mtoe).

Heating/Cooling presented the highest sectoral share in gross final energy consumption for both years with 45.3% and 46.9% respectively. The share of electricity in gross final energy consumption decreased in 2010 by 0.1 percentage point (23.7%) compared to 2009 (23.8%) even if in absolute terms its contribution increased by 461 PJ (11 Mtoe). Transport sector presented a slightly decrease in 2010 in both absolute (from 12474 PJ to 12429 PJ) and relative (from 26.7% to 25.4%) contribution in gross final energy consumption. Nearly 4% of gross final energy consumption in EU 27 in both years originates from unaccounted sources[8] (Figure 1).

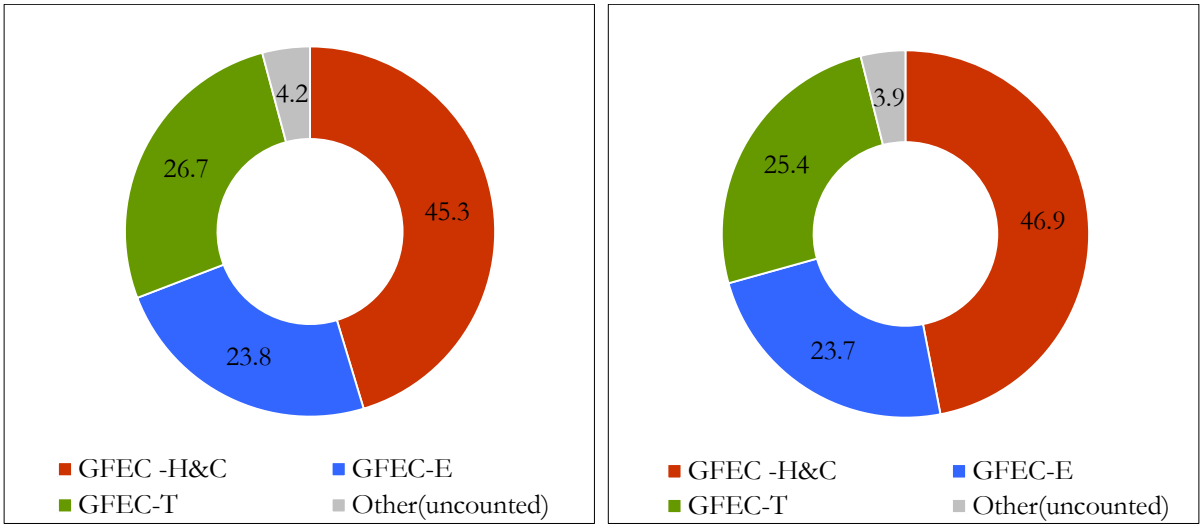

Figure 1. Subdivision of GFEC in EU 27 by sectors, 2009(left)-2010(right)

Figure 2 and Table 1 report the detailed GFEC development for each MS of EU 27 in 2009 and 2010.

Among all Member States, Germany reported the highest absolute gross final energy consumption in both years reaching in 2010 the amount of 9371 PJ (223.8 Mtoe) with an increase by 4.6% (413.4 PJ or 9.9 Mtoe) from 2009, followed by France with +4.8% increase (322 PJ or 7.7 Mtoe), United Kingdom with +3.7% (216 PJ or 5.1 Mtoe), Italy with + 2.1% (109 PJ or 2.6 Mtoe) and Spain with +2.5% (100 PJ or 2.4 Mtoe). Contribution of five most consuming MS in gross final energy consumption in EU 27 for years 2009 and 2010 changed from 65.3% to 63.4% since their individual contribution dropped in 2010.

The highest relative increase in gross final energy consumption in 2010 compared to 2009 was reported by Bulgaria with 13% (53 PJ or 1.3 Mtoe), followed by Belgium with 12.9% (187 PJ or 4.5 Mtoe), Portugal with 9.7% (74 PJ or 1.8 Mtoe) and Netherland with 9.4% (211 PJ or 5.0 Mtoe). Greece reported in 2010 a gross final energy consumption 5.6% lower than what reported for year

[6]Referring to Article 5(6) of the Directive 2009/28/EC, gross final energy consumption has to be reduced in order to compensate the relatively large share of aviation in the MS gross final consumption of energy. No data on aviation are reported in MS Progress Reports for years 2009 and 2010.

[7] CZ is not included in the analysis for years 2009 and 2010.

[8] The total GFEC is calculated based on the share of each sector and of overall RES in the final consumption and not as sum of absolute contribution of each sector.

2009. The decrease in gross final energy consumption for year 2010 in Ireland and Cyprus was very small, respectively 0.4% and 0.3%.

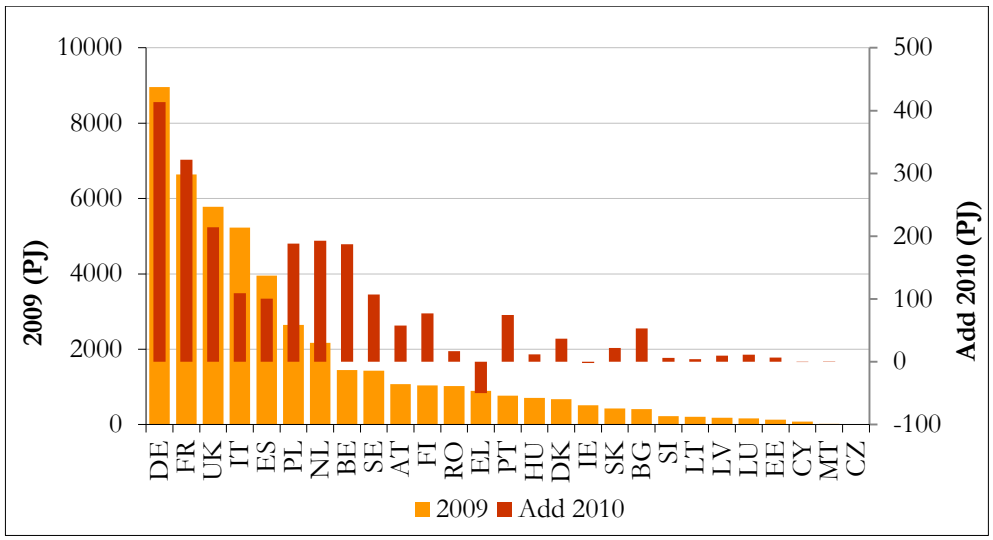

Figure 2[9]. Cummulative Gross Final Energy Consumption in EU 27, 2009 - 2010.

Table 1. Gross Final Energy Consumption in EU 27, 2009-2010.

	2009	**2010**	**Additional 2010**		**2009**	**2010**
	PJ	**PJ**	**PJ**	**%**	(GJ/Capita)	(GJ/Capita)
BE	1449	1636	187	12.9	134.8	151.0
BG	410	463	53	13.0	53.9	61.2
CZ	n.a*	n.a	n.a	n.a	n.a	n.a
DK	675	712	37	5.5	122.4	128.6
DE	8959	9372	413	4.6	109.2	114.6
EE	127	134	7	5.4	95.0	100.2
IE	509	507	-2	-0.4	114.5	113.6
EL	894	845	-50	-5.6	79.4	74.7
ES	3949	4050	100	2.5	86.2	88.1
FR	6639	6961	322	4.8	103.2	107.7
IT	5228	5337	109	2.1	87.1	88.5
CY	83	83	0	-0.3	103.7	100.7
LV	179	188	10	5.3	78.8	83.7
LT	207	212	4	2.0	61.9	63.6
LU	164	175	11	6.9	331.7	348.7
HU	705	717	12	1.7	70.3	71.6
MT	17	17	0	1.0	41.5	41.9
NL	2249	2460	193	9.4	131.7	142.6
AT	1076	1134	58	5.4	128.7	135.3
PL	2649	2837	188	7.1	69.5	74.3
PT	766	840	74	9.7	72.1	79.0
RO	1019	1036	17	1.7	47.4	48.2
SI	224	230	6	2.8	110.0	112.3
SK	426	449	22	5.2	78.8	82.7

[9] MS are ranked according to their contribution in GFEC in year 2009.

FI	1035	1112	77	7.4	194.3	207.8
SE	1431	1538	107	7.5	154.6	164.6
UK	5780	5994	216	3.7	93.8	96.7
EU 27	46771	48943	2172	4.6	93.6	97.7

* n.a – not available

1.1.1 Heating/Cooling sector

The final consumption of energy in heating/cooling sector in EU 27 for year 2009 reached 21196 PJ (506.3 Mtoe). In 2010 this sector showed an increase by 8.4% with and additional consumption of 1780 PJ (42.5 Mtoe).

Figure 3 and Table 2 report the detailed final energy consumption in the heating/cooling sector for EU MS in 2009 and 2010.

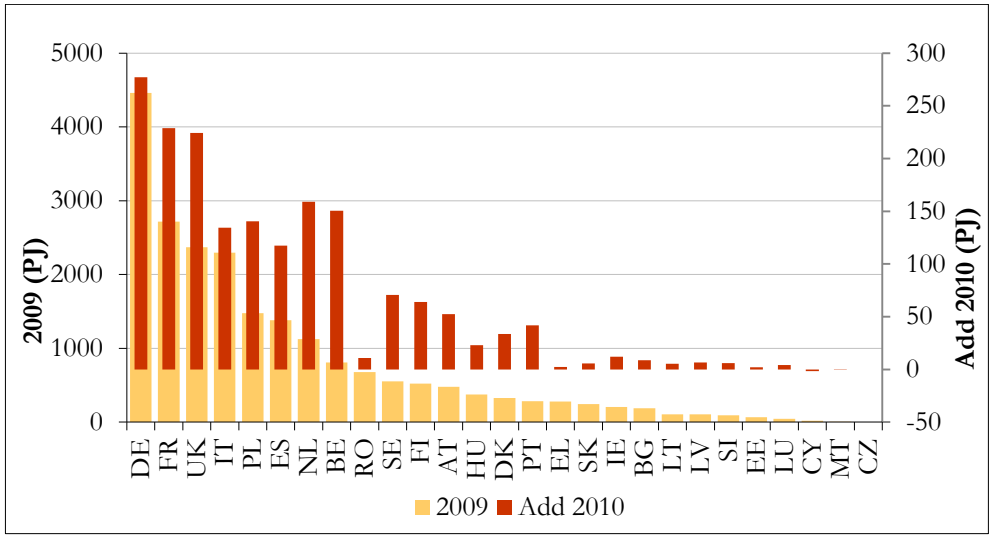

Figure 3[10]. Cumulative GFEC in Heating/Cooling sector in EU 27, 2009-2010

Germany reported the highest energy consumption in this sector in both 2009 and 2010 with respectively 4458 PJ (106.5 Mtoe) and 4735 PJ (113.1 Mtoe), but its share of the overall EU consumption decreased in 2010 from 21% to 20.6%. France followed with 2716 PJ (64.9 Mtoe) in 2009 and 2945 PJ (70.3 Mtoe) in 2010 maintaining the same share in final energy consumption in this sector (12.8%).
The third place was occupied by United Kingdom with 2371 PJ (56.6 Mtoe) in 2009 and 2595 PJ (62 Mtoe) in 2010 having an increase by 0.1 percentage points in its contribution to the final energy consumption in the sector. Italy followed with an increase in absolute terms from 2298 PJ (54.9 Mtoe) to 2432 PJ (58.1 Mtoe) but with a decrease in its contribution by 0.2 percentage points. Poland stayed in the fifth place with an additional energy consumption in 2010 by 140 PJ (3.4 Mtoe) keeping the same contribution of 7% in both years.

The overall contribution of these five MS in the final energy consumption in Heating/Cooling sector was ~62% in both 2009 and 2010. As for general trends, only Cyprus reported a decrease (-7.3%) in 2010 in energy consumption in this sector from 21 PJ to 19 PJ.

[10] MS are ranked according to their contribution in Heating/Cooling sector for year 2009

Table 2. Gross Final Energy Consumption in Heating/Cooling sector in EU 27, 2009-2010

	2009	2010	Additional 2010		2009	2010
	PJ	PJ	PJ	%	GJ/Capita	GJ/Capita
BE	807.9	958.4	150.5	18.6	75.1	88.4
BG	187.4	196.2	8.8	4.7	24.6	25.9
CZ	n.a	n.a	n.a	n.a	n.a	n.a
DK	325.2	358.8	33.6	10.3	59.0	64.8
DE	4458.1	4735.3	277.2	6.2	54.4	57.9
EE	65.0	67.0	2.0	3.1	48.5	50.0
IE	205.8	218.0	12.2	5.9	46.3	48.8
EL	280.7	282.9	2.2	0.8	24.9	25.0
ES	1380.6	1498.1	117.5	8.5	30.1	32.6
FR	2715.8	2944.7	228.9	8.4	42.2	45.5
IT	2298.1	2432.4	134.3	5.8	38.3	40.3
CY	20.7	19.2	-1.5	-7.3	26.0	23.5
LV	104.0	110.7	6.7	6.4	46.0	49.2
LT	106.4	111.8	5.3	5.0	31.8	33.6
LU	43.3	47.4	4.1	9.5	87.8	94.5
HU	375.7	398.7	22.9	6.1	37.5	39.8
MT	1.3	1.3	0.0	0.1	3.2	3.2
NL	1123.5	1282.4	158.9	14.1	68.1	77.4
AT	476.8	529.2	52.5	11.0	57.1	63.2
PL	1477.3	1617.7	140.3	9.5	38.7	42.4
PT	282.3	324.1	41.8	14.8	26.6	30.5
RO	676.2	687.2	11.0	1.6	31.5	32.0
SI	93.7	99.7	6.1	6.5	46.1	48.7
SK	243.8	249.4	5.5	2.3	45.1	46.0
FI	520.8	584.7	63.9	12.3	97.8	109.3
SE	554.6	625.3	70.7	12.7	59.9	66.9
UK	2371.2	2595.4	224.1	9.5	38.5	41.8
EU 27	21196.5	22976.0	1779.5	8.4	42.4	45.9

1.1.2 Electricity sector

The amount of energy consumed in electricity sector in 2009 was equal to 11154 PJ (266.4 Mtoe). In 2010 the energy consumption in this sector reached 11615 PJ (277.4 Mtoe) with an absolute increase of 461 PJ (11 Mtoe) even if its share in gross final energy consumption decreased by 0.1 percentage points.

Figure 4 and Table 3 report the detailed final energy consumption in the electricity sector for EU MS in 2009 and 2010.

Five MS that consumed more energy in electricity sector during period 2009-2010 were Germany with respectively 2079 PJ (49.6 Mtoe) and 2194 PJ (52.4 Mtoe) followed by France with 1788 PJ (42.7 Mtoe) and 1885 PJ (45 Mtoe), United Kingdom with 1356 PJ (32.4 Mtoe) and 1361 PJ (32.5 Mtoe), Italy with 1160 PJ (27.7 Mtoe) and 1197 PJ (28.6 Mtoe) and Spain with 1036 PJ (24.7 Mtoe) and 1361 PJ (25.1 Mtoe).

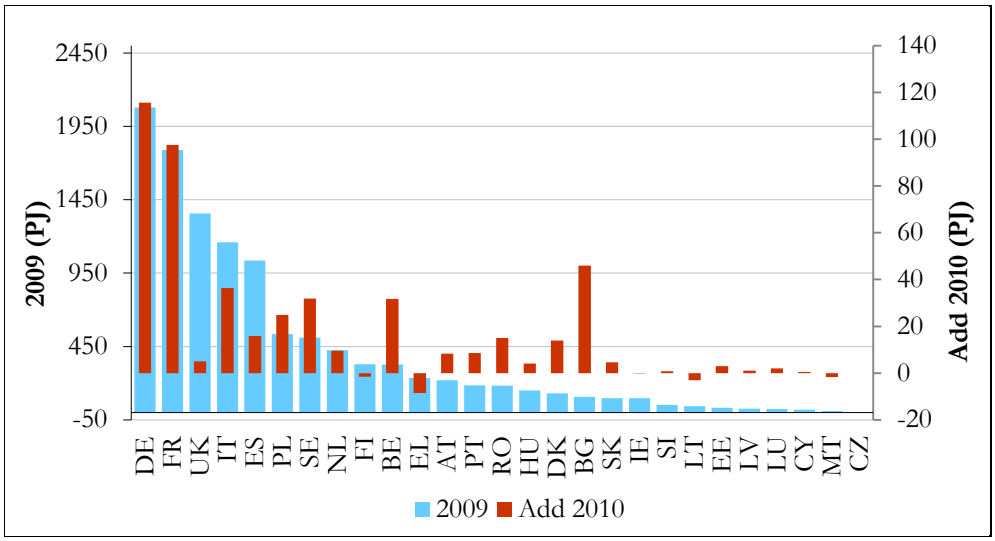

Figure 4[11]. Cumulative GFEC in Electricity sector in EU 27, 2009-2010

Contribution of these MS in final energy consumed in this sector dropped in 2010 to 65.5% from 66.5% that was in 2009, because, except Germany, their individual share to the final energy consumed became smaller, althoughincreasing in absolute value.

In absolute values, only four MS consumed in 2010 less energy in electricity sector compared with 2009: Malta (-18.4%). Latvia (-7.1%) Greece (-3.6%) and Finland (-0.5%)

Table 3. Gross Final Energy Consumption in Electricity sector in EU 27, 2009-2010

	2009	2010	Additional 2010		2009	2010
	PJ	PJ	PJ	%	GJ/Capita	GJ/Capita
BE	326.4	358.1	31.8	9.7	30.4	33.0
BG	106.6	152.5	45.9	43.0	14.0	20.2
CZ	n.a	n.a	n.a	n.a	n.a	n.a
DK	129.8	143.7	13.9	10.7	23.6	26.0
DE	2078.9	2194.4	115.6	5.6	25.4	26.8
EE	32.0	34.9	2.9	9.2	23.9	26.1
IE	97.5	97.4	0.0	0.0	21.9	21.8
EL	235.8	227.2	-8.6	-3.6	20.9	20.1
ES	1035.7	1051.5	15.8	1.5	22.6	22.9
FR	1787.8	1885.3	97.5	5.5	27.8	29.2
IT	1160.2	1196.6	36.4	3.1	19.3	19.8
CY	18.2	18.7	0.5	2.9	22.9	22.9
LV	26.0	27.0	1.0	3.8	11.5	12.0
LT	42.4	39.4	-3.0	-7.1	12.7	11.8
LU	23.4	25.4	1.9	8.3	47.5	50.6
HU	149.3	153.4	4.1	2.8	14.9	15.3
MT	9.5	7.8	-1.8	-18.4	23.1	18.8
NL	425.6	435.1	9.5	2.2	25.8	26.3
AT	219.6	227.9	8.3	3.8	26.3	27.2
PL	533.8	558.7	24.8	4.7	14.0	14.6

[11] MS are ranked according to their contribution in Electricity sector for year 2009

PT	186.2	194.7	8.5	4.6	17.5	18.3
RO	183.8	198.7	14.9	8.1	8.5	9.3
SI	52.3	53.1	0.8	1.5	25.7	25.9
SK	98.0	102.5	4.6	4.7	18.1	18.9
FI	329.6	328.1	-1.5	-0.5	61.9	61.3
SE	509.1	540.9	31.8	6.3	55.0	57.9
UK	1356.3	1361.3	5.1	0.4	22.0	21.9
EU 27	11153.8	11614.7	460.8	4.1	22.3	23.2

1.1.3 Transport sector

In transport sector, energy consumption in 2010 decreased by 0.4% (-44 PJ or -1.1 Mtoe) compared with 2009, reaching 12429 PJ (296.9 Mtoe). Its share in gross final energy consumption in 2010 decreased also from 26.7% to 25.4%.

Figure 5 and Table 4 report the detailed final energy consumption in the transport sector for EU MS in 2009 and 2010.

Eleven MS consumed in transport sector in year 2010 less energy that what was consumed in 2009. Estonia consumed in relative terms 16.5% less in 2010 compared with 2009, followed by Ireland (-10.6%), Netherland (-10.2%), Hungary (-8.3%), Greece (-7.2%), Spain (-3.3%), Italy and Romania (-2.7%), Portugal (-1.7%), Austria (-0.4%) and United Kingdom (-0.3%).

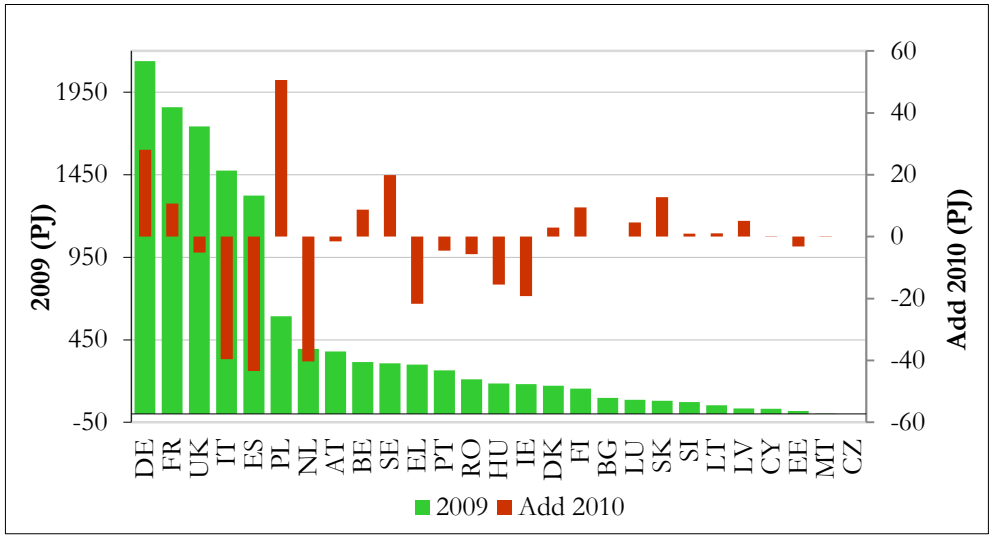

Figure 5[12]. Cumulative GFEC in Transport sector in EU 27, 2009-2010

Germany maintained the leading position in energy consumption in transport sector both in 2009 and 2010 with 2140 PJ (51.1 Mtoe) and 2168 PJ (51.8 Mtoe). France followed with respectively 1859 PJ (44.4 Mtoe) and 1870 PJ (44.7 Mtoe) together with United Kingdom that reported 1743 PJ (41.6 Mtoe) in 2009 and 1738 PJ (41.5 Mtoe) in 2010. Italy and Spain followed UK but their contribution in 2010 was smaller than in 2009. The overall contribution of these five leading MS in gross final energy consumption in transport sector decreased to 68.3% in 2010 r from 68.5% in 2009 even if only the contribution of Spain and Italy dropped.

[12] MS are ranked according to their contribution in Transport sector for year 2009

Table 4. Gross Final Energy Consumption in Transport sector in EU 27, 2009-2010

	2009	2010	Additional 2010		2009	2010
	PJ	PJ	PJ	%	GJ/Capita	GJ/Capita
BE	315.3	324.1	9	2.8	29.3	29.9
BG	97.7	97.7	0	0.0	12.8	12.9
CZ	n.a	n.a	n.a	n.a	n.a	n.a
DK	171.0	173.9	3	1.7	31.0	31.4
DE	2139.6	2167.7	28	1.3	26.1	26.5
EE	19.0	15.9	-3	-16.5	14.2	11.9
IE	181.4	162.2	-19	-10.6	40.8	36.3
EL	300.1	278.4	-22	-7.2	26.7	24.6
ES	1323.0	1279.6	-43	-3.3	28.9	27.8
FR	1859.2	1869.9	11	0.6	28.9	28.9
IT	1475.8	1436.2	-40	-2.7	24.6	23.8
CY	31.1	31.3	0	0.6	39.1	38.2
LV	34.3	39.3	5	14.8	15.1	17.5
LT	52.6	53.6	1	2.0	15.7	16.1
LU	85.7	90.3	5	5.4	173.6	179.9
HU	184.9	169.4	-15	-8.3	18.4	16.9
MT	3.3	3.5	0	4.8	8.0	8.4
NL	394.8	354.5	-40	-10.2	23.9	21.4
AT	379.4	377.9	-2	-0.4	45.4	45.1
PL	592.3	642.9	51	8.6	15.5	16.8
PT	265.6	261.1	-5	-1.7	25.0	24.5
RO	209.6	204.0	-6	-2.7	9.7	9.5
SI	72.8	73.7	1	1.3	35.8	36.0
SK	80.4	93.2	13	15.9	14.9	17.2
FI	154.4	163.8	9	6.1	29.0	30.6
SE	307.0	326.9	20	6.5	33.2	35.0
UK	1743.4	1738.2	-5	-0.3	28.3	28.0
EU 27	12473.6	12429.3	-44	-1.1	25.0	24.8

1.2 Total Renewable Energy (RES)

a. Total RES share

In 2009 almost 12% of gross final energy consumption in EU 27 was coming from renewable energy sources, in 2010 this share reached 12.6%. The contributions of total RES and in three consumption sectors in Gross Final Energy Consumption in period 2009-2010 are presented in Figure 6. Heating and cooling has been the sector that mostly contributed to RES consumption in gross final energy in EU 27 with 6.2% (2009) and 6.7% (2010) followed by RES consumption in electricity sector (4.6% and 4.7%) and RES consumption in transport sector (1.1% and 1.2%).

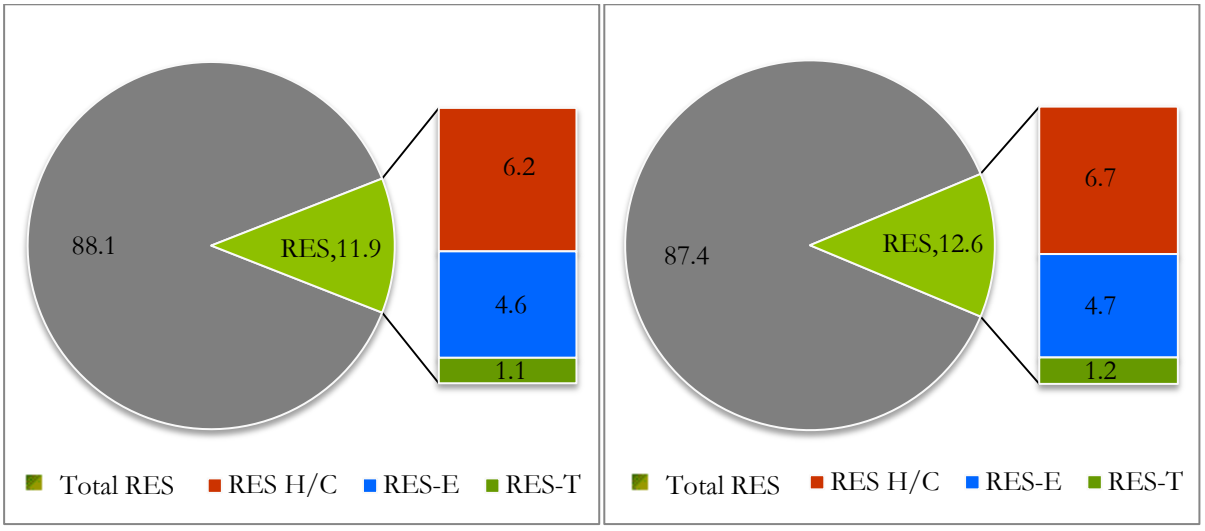

Figure 6. Contribution of total RES, RES-H/C, RES-E and RES-T in GFEC in EU 27, 2009 (left) – 2010 (right)

The main contribution of RES in each sector increased in 2010 compared with the contribution in 2009. The main contribution of RES is attributed to electricity sector with 19.1% (2009) and 19.7% (2010). RES in heating/cooling and transport sectors increased respectively from 13.7% and 4.2% in 2009 to 14.4% and 4.8% in 2010 (Figure 7).

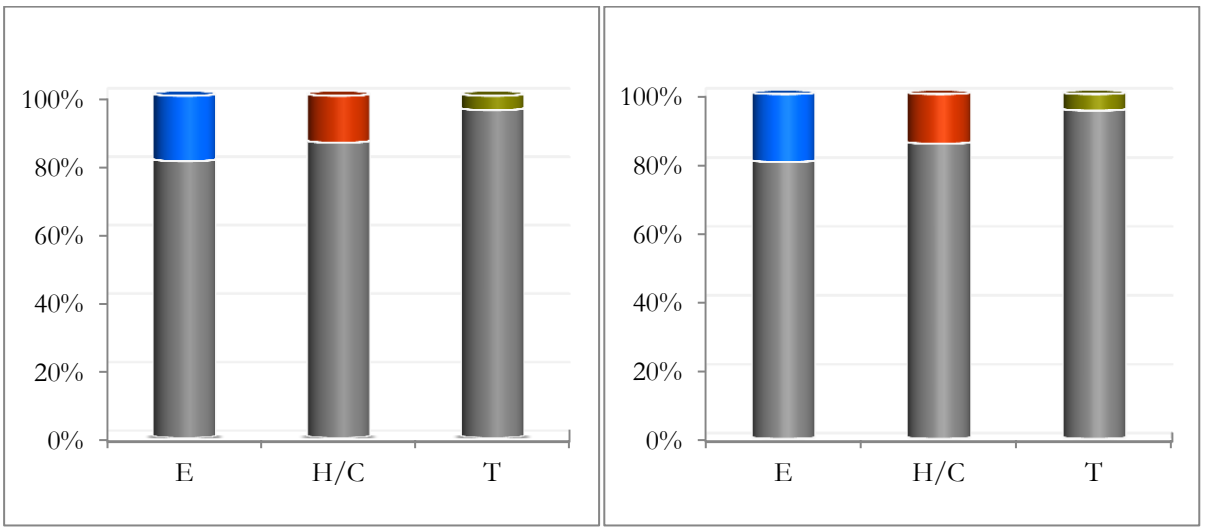

Figure 7. RES contribution in each sector in EU 27, 2009 (left) – 2010 (right)

Figure 8 and Table 5 report the total RES share in gross final energy consumption for EU MS in 2009 and 2010.

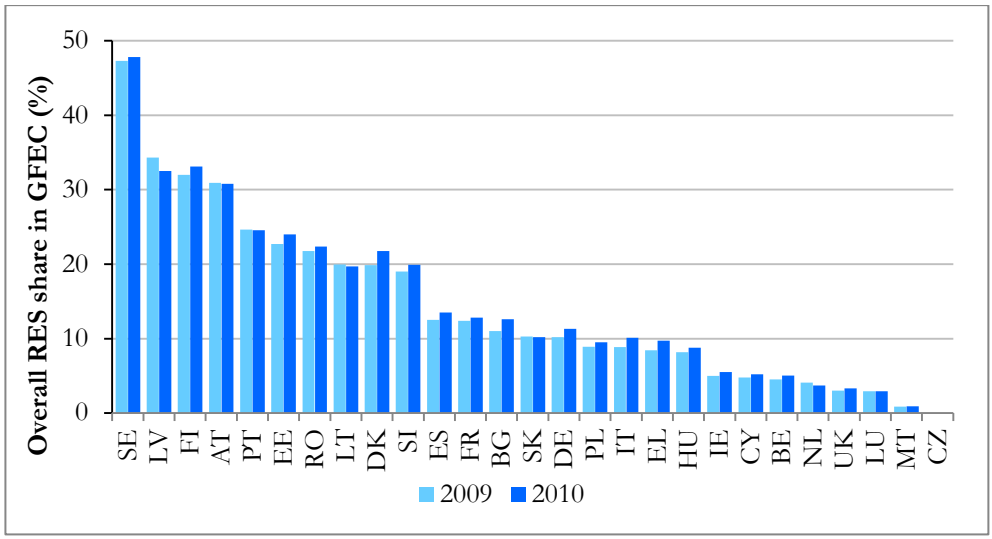

Figure 8[13]. Total RES share in GFEC in EU 27, 2009 - 2010.

EU 27 MS showed a very diverse pattern of RES consumption. Sweden reported for both 2009 and 2010 years the highest share of renewable energy sources in gross final energy consumption with respectively 47.3% and 47.8%, followed by Latvia (34.3% and 32.5%), Finland (32% and 33.1%) and Austria (30.9% and 30.8%). The lowest RES shares in gross final energy consumption were reported by Malta with 0.9% in both years, Luxemburg with 2.9% in 2009 and 3% in 2010 and United Kingdom with 3% in 2009 and 3.3% in 2010.

Only 6 MS reported in 2010 a total RES share in gross final energy consumption smaller than what reported for 2009: Latvia (from 34.3% in 2009 to 32.5% in 2010), Netherlands (from 4.1% to 3.7%), Lithuania (from 20% to 19.7%), Austria (from 30.9% to 30.8%), Slovakia (from 10.3% to 10.2%) and Portugal (from 24.63% to 24.57%).

The highest absolute increase in total RES share in 2010 compared with 2009 was reported by Denmark with +1.9 percentage points, Bulgaria with +1.6 percentage points, Greece and Italy with +1.3 percentage points and Germany with +1.1 percentage points.

Table 5. Total RES share in GFEC in EU 27, 2009-2010

	2009	2010	Increase/Decrease	
	%	%	% points	%
BE	4.5	5.1	0.5	12.0
BG	11.0	12.6	1.6	14.5
CZ[14]	n.a	8.3	n.a	n.a
DK	19.9	21.8	1.9	9.7
DE	10.2	11.3	1.1	10.8
EE	22.7	24.0	1.3	5.7
IE	5.0	5.5	0.5	10.0
EL	8.4	9.7	1.3	15.4
ES	12.5	13.5	1.0	8.0
FR	12.4	12.8	0.4	3.2
IT	8.9	10.1	1.3	14.1

[13] MS are ranked according to their overall RES share in 2009

[14] CZ reported an overall RES share for 2010 equal to 8.3% (the report also emphased that this value needs to be confirmed)

CY	4.8	5.2	0.4	8.3
LV	34.3	32.5	-1.8	-5.2
LT	20.0	19.7	-0.2	-1.2
LU	2.9	3.0	0.0	0.7
HU	8.2	8.8	0.6	7.5
MT	0.9	0.9	0.0	2.3
NL	4.1	3.7	-0.4	-9.8
AT	30.9	30.8	-0.1	-0.3
PL	8.9	9.5	0.6	6.7
PT	24.63	24.57	-0.06	-0.24
RO	21.8	22.4	0.6	2.8
SI	19.0	19.9	0.9	4.8
SK	10.3	10.2	-0.1	-1.0
FI	32.0	33.1	1.1	3.4
SE	47.3	47.8	0.5	1.1
UK	3.0	3.3	0.3	10.0
EU 27	11.9	12.6	0.7	6.1

b. Total RES consumption

Total RES consumption[15] in EU 27 for years 2009 and 2010 amounted to 5572 PJ (133.1 Mtoe) and 6187 PJ (147.8 Mtoe) respectively with an increase of +11%. The main contribution originated from heating/cooling sector in both years.

Figures 9 and 10 report the absolute and relative contributions of different sectors in total RES consumption in 2009 and 2010.

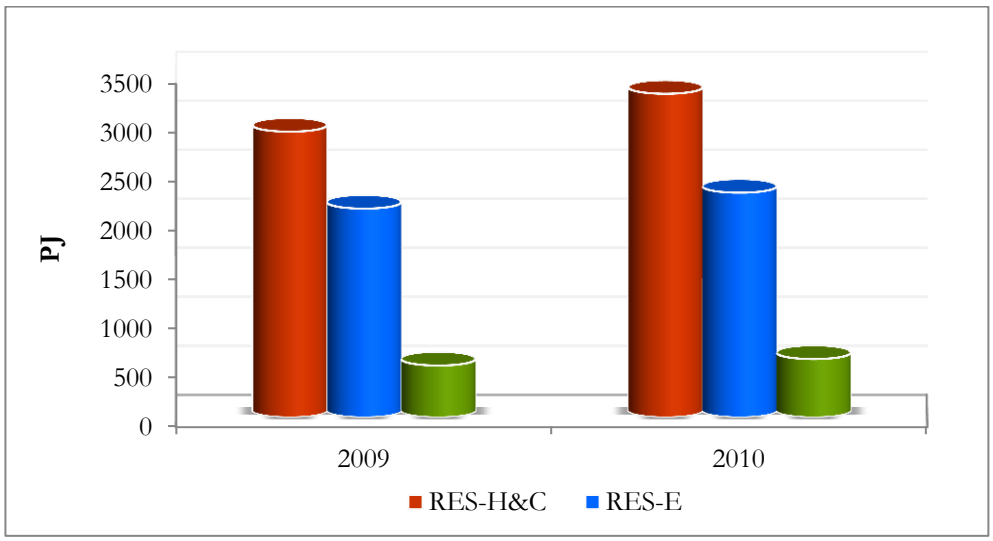

Figure 9. Total RES consumption in EU 27 by sectors, 2009-2010

[15] To calculate the contribution of transport in gross final energy consumption all sources are included (bioethanol, biodiesel, hydrogen, renewable electricity and others)

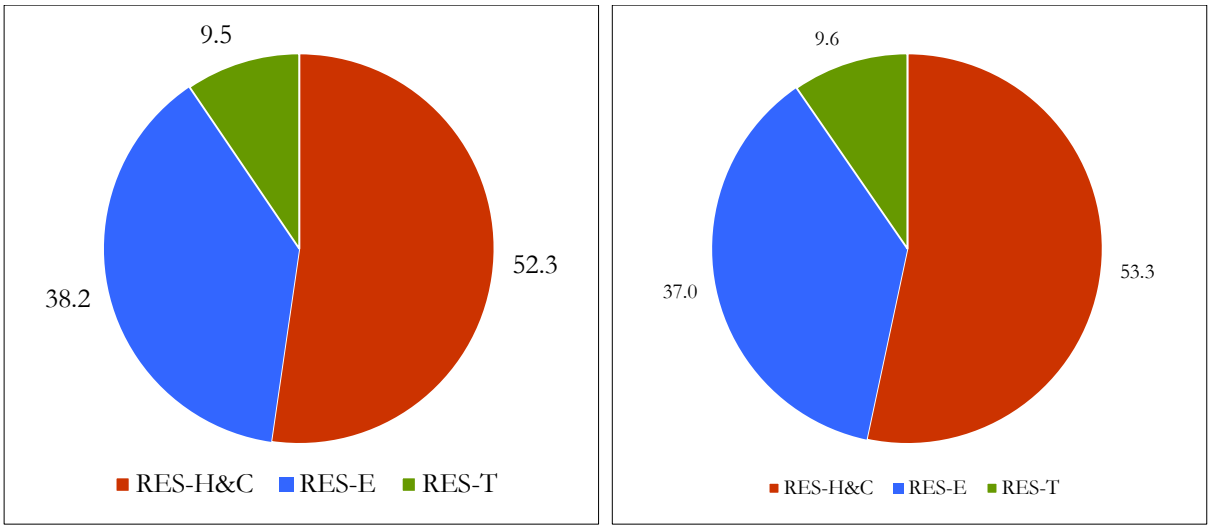

Figure 10. Subdivision of total RES consumption in EU 27 by sectors, 2009(left)-2010(right)

Heating/Cooling sector had the highest growth rate for 2009-2010 in absolute terms , +386.5 PJ (+13.3%) and its share in total RES consumption also increased from 52.3% to 53.3%. . Electricity sector followed with +162.4 PJ (+7.6%) but its share decreased from 38.2% to 37.0%. Transport sector had a slightly increase in absolute terms, with 65.5 PJ (+12.4%), with its share increasing from 9.5% to 9.6%.

Figure 11 and Table 6 report the detailed development of total RES consumption in each MS of EU 27 in years 2009 and 2010.

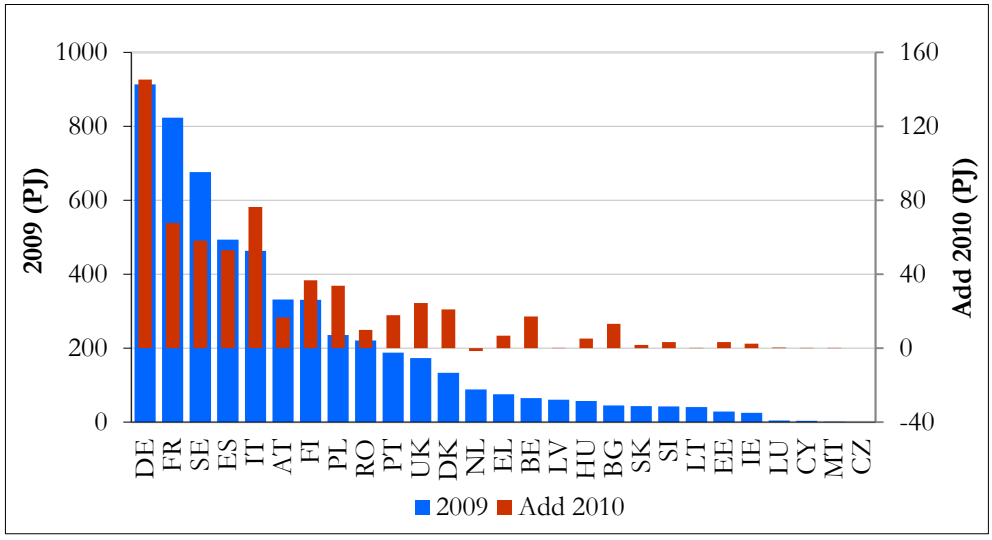

Figure 11. Cumulative total RES consumption in EU 27, 2009-2010

Germany was the MS that consumed the highest absolute amount of RES in EU 27 during period 2009-2010 with respectively 913.8 PJ (21.8 Mtoe) and 1059 PJ (25.3 Mtoe). France had the second highest cumulative consumption of RES during the same time period with 823.3 PJ (19.7 Mtoe) and 891 PJ (21.3 Mtoe) followed by Sweden with 676.8 PJ (16.2 Mtoe) and 735.1 PJ (17.6 Mtoe), Spain with 493.7 PJ (11.8 Mtoe) and 546.7 PJ (13.1 Mtoe) and Italy with 463.2 PJ (11.1 Mtoe) and 539.6 PJ (12.9 Mtoe).

Germany had also the highest increase in consumption of total RES (+145.3 PJ or 3.5 Mtoe) followed by Italy (+76 PJ or 1.8 Mtoe), France (+67.7 PJ or 1.6 Mtoe) and Sweden (+58 PJ or 1.4

Mtoe). The highest relative increase in total RES consumption during this period took place in Bulgaria with 29.4%, Belgium (+26.4%), Italy (+16.5%), Germany (+15.9%), Denmark (+15.7%) and Poland (+14.3%). The total RES consumption dropped only in the Netherlands with -1.7 % (-1.5 PJ or 37 ktoe).

Contribution of Germany, France, Sweden, Spain and Italy in total RES consumption during 2009-2010 period in EU 27 accounted for almost 61%.

Table 6. Total RES consumption in EU 27, 2009-2010

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	65.4	82.6	17.3	26.4
BG	45.1	58.3	13.3	29.4
CZ	n.a	n.a	n.a	n.a
DK	134.0	155.0	21.0	15.7
DE	913.8	1059.1	145.3	15.9
EE	28.9	32.2	3.3	11.4
IE	25.5	27.9	2.4	9.6
EL	75.4	82.2	6.8	9.0
ES	493.7	546.7	53.0	10.7
FR	823.3	891.0	67.7	8.2
IT	463.2	539.6	76.4	16.5
CY	4.0	4.3	0.3	8.2
LV	61.1	61.1	0.0	0.0
LT	41.4	41.7	0.3	0.8
LU	4.8	5.2	0.4	7.7
HU	57.7	63.0	5.3	9.3
MT	0.2	0.2	0.0	3.4
NL	89.0	87.5	-1.5	-1.7
AT	332.3	349.1	16.7	5.0
PL	235.7	269.5	33.8	14.3
PT	188.7	206.5	17.8	9.4
RO	221.5	231.5	10.0	4.5
SI	42.5	45.7	3.3	7.7
SK	43.9	45.7	1.8	4.1
FI	331.2	368.1	36.8	11.1
SE	676.8	735.1	58.3	8.6
UK	173.4	197.9	24.5	14.1
EU 27	5572	6187	614.3	11.0

c. Total RES installed capacity

EU 27 total RES installed capacity in 2009 and 2010 was accounted to reach respectively 213.7 GW and 238 GW with a growth rate of +11.4%.

Hydropower had the highest contribution in renewable energy installed capacity with 99 GW (46.4% of total RES installed capacity) in 2009 and almost 100 GW (41.7%) in 2010. The second

place was taken by wind with ~75 GW (35%) in 2009 and 84.3 GW (35.3%) in 2010. The contribution of biomass has stopped at nearly 11% with respectively 22.8 GW in 2009 and 25 GW in 2010 (Figure 12 and 13).

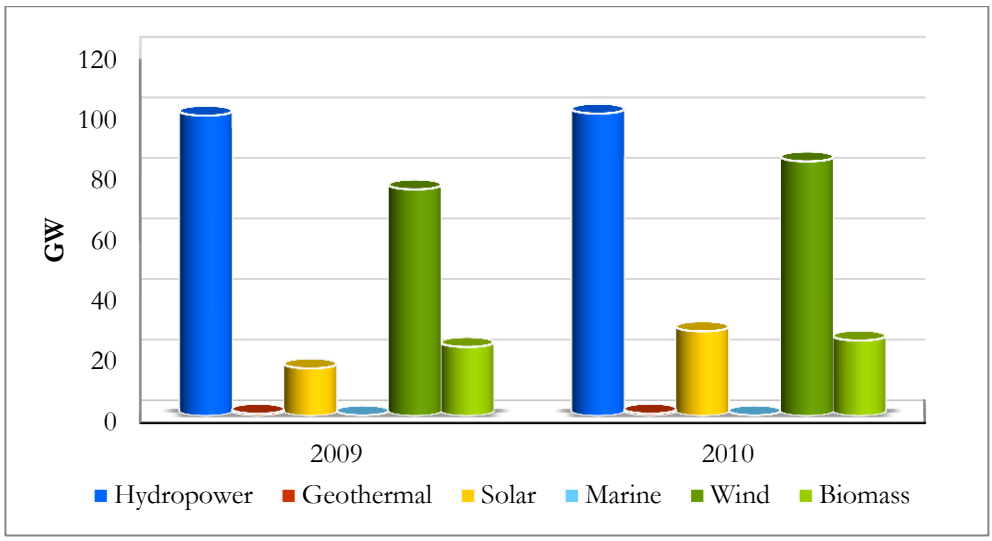

Figure 12. Total RES installed capacity in EU 27 in source breakdown, 2009-2010

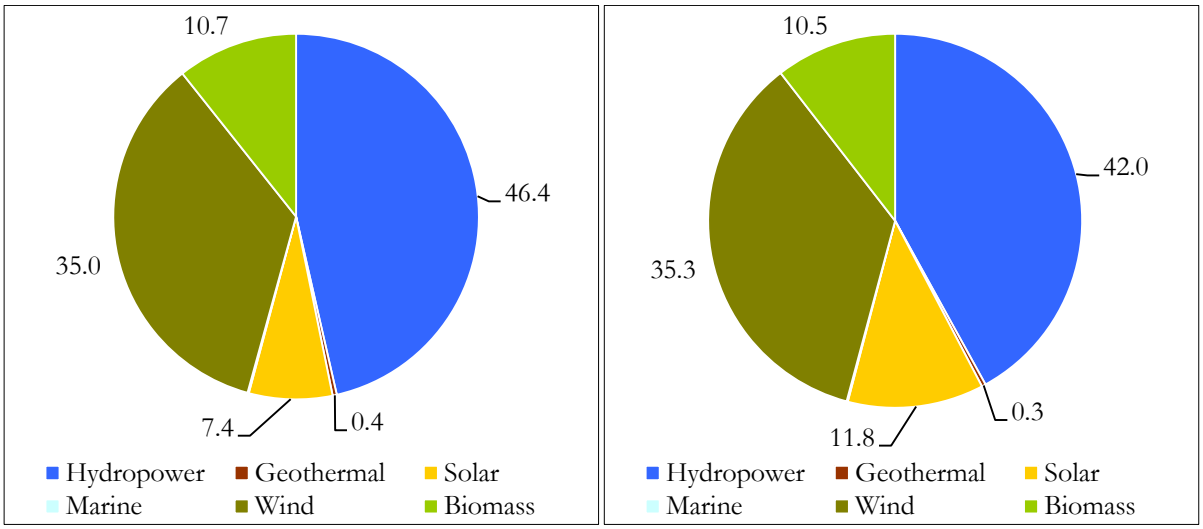

Figure 13. Subdivision of RES installed capacity in EU 27 by source, 2009(left)-2010(right)

Figure 14 and Table 7 report the detailed development of RES installed capacity in EU 27 during years 2009 and 2010.

Leading countries in total RES installed capacity in both years were Germany with respectively 45.9 GW and 55.6 GW followed by Spain with 36.9 GW and 39.4 GW, France with 24.6 GW and 26.5 GW, Italy with 22.6 GW and 26.3 GW and Sweden with 21.8 GW and 22.5 GW. Contribution of these countries in total RES installed capacity accounted in both years for almost 71%.

The highest absolute increase of total RES installed capacity took place in Germany with an additional installed capacity of 9.7 GW (+21.2%). The following Member States were Italy with an additional installed capacity of 3.8 GW (+16.6%) together with Spain, 2.5 GW (+6.8%), France, 1.9 GW (+7.6%) and United Kingdom 1.1 GW (+14.6%).

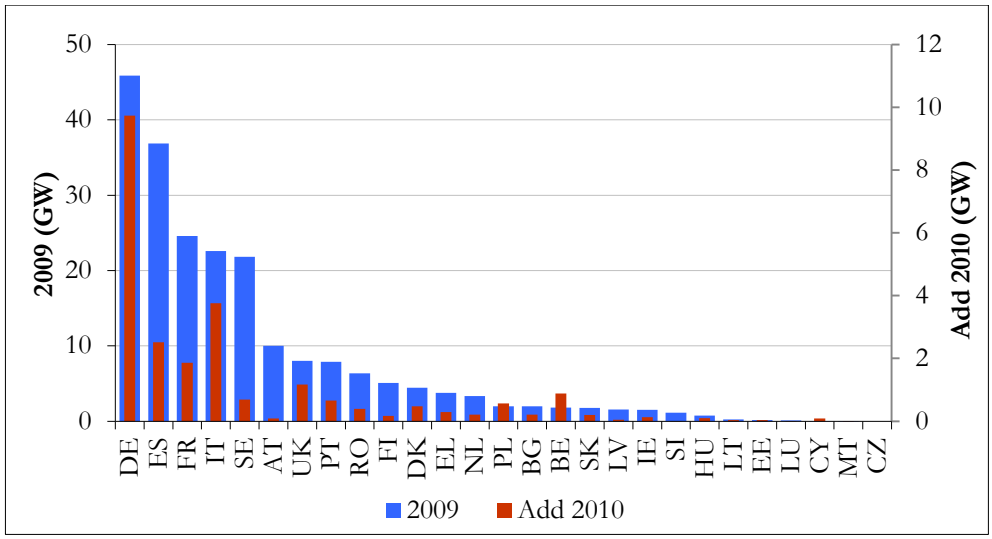

Figure 14[16]. Cumulative total RES installed capacity in EU 27, 2009-2010

In relative terms it was Cyprus who reported the highest increase from 2009 with 1170% (~13 times) due to the introduction of onshore wind in 2010 (82 MW). The second highest relative increase in total RES installed capacity was found in Belgium with 48.5% (+0.9 GW) due to increase in PV (+0.4 GW) and in offshore wind (+0.16 GW) installed capacity, followed by Poland with 28.3% (+0.6 GW) due to increase in onshore wind (+0.5 GW) installed capacity and Estonia with 22.3% (+33 MW) due to increase in biomass capacity (+30 MW).

Table 7. Total RES installed capacity in EU 27, 2009-2010

	2009	2010	Additional 2010		Share 2009	Share 2010
	MW	MW	MW	%	%	%
BE	1824	2710	885.3	48.5	0.9	1.1
BG	1959	2169	210	10.7	0.9	0.9
CZ	n.a	n.a	n.a	n.a	n.a	n.a
DK	4430	4906	476	10.7	2.1	2.1
DE	45860	55590	9730	21.2	21.5	23.4
EE	148	181	33	22.3	0.1	0.1
IE	1499	1627	128	8.5	0.7	0.7
EL	3767	4060	293	7.8	1.8	1.7
ES	36878	39391	2513	6.8	17.3	16.5
FR	24602	26469	1867	7.6	11.5	11.1
IT	22587	26343	3756	16.6	10.6	11.1
CY	7.6	96.5	89	1170	0.0	0.0
LV	1575	1622	47	3.0	0.7	0.7
LT	238	278	40	16.8	0.1	0.1
LU	120	124	4	3.3	0.1	0.1
HU	766	861.5	96	12.5	0.4	0.4
MT	1.53	1.67	0	9.2	0.0	0.0
NL	3355	3567	212	6.3	1.6	1.5
AT	10024	10112	88	0.9	4.7	4.2
PL	1993	2556	563	28.3	0.9	1.1

[16] MS are ranked according to their contribution in total RES installed capacity for year 2009

PT	7899	8553	654	8.3	3.7	3.6
RO	6373	6771	398	6.2	3.0	2.8
SI	1126	1135	9	0.8	0.5	0.5
SK	1764	1967	203	11.5	0.8	0.8
FI	5080	5245	165	3.2	2.4	2.2
SE	21814	22505	691	3.2	10.2	9.5
UK	8031	9204	1173	14.6	3.8	3.9
EU 27	213720	238044	24323	11.4		

d. Total RES generated

Total RES generated[17] in EU 27 for years 2009 and 2010 amounted respectively to 5529 PJ (132 Mtoe) and 6140 PJ (146.7 Mtoe) with an increase by +11 % (611 PJ or 14.7 Mtoe).

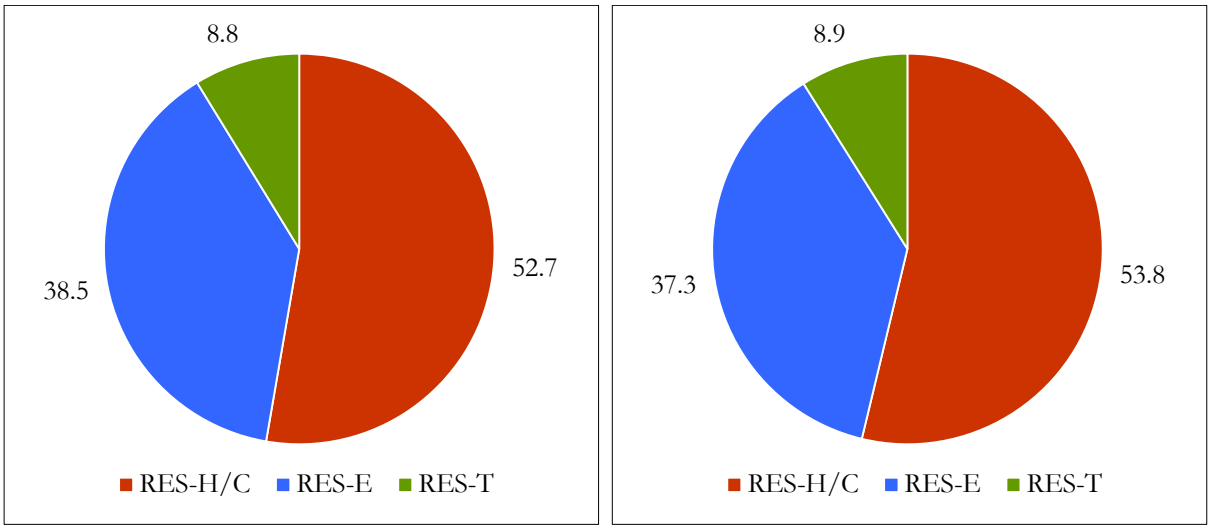

Figure 15. Subdivision of total RES generated by sectors in EU 27, 2009 (left) – 2010 (right)

Heating/Cooling sector had the main contribution in total RES generation for both 2009 and 2010 with respectively 52.7% and 53.8%. Electricity contribution in 2009 amounted to 38.5% and in 2010 its share decreases to 37.3% even that in absolute terms it changes by +162.4 PJ or +3.9 Mtoe. The contribution of transport sector remain almost the same, ~9%, with an increase in 2010 by +64PJ (+1.5 Mtoe) (Figure 15). Figure 16 and 17 show the absolute and relative contribution of different technologies in total RES generation in year 2009 and 2010.

Renewable technologies role analysis in total RES generation reveals that biomass remain the main contributor in both 2009 and 2010 with 55.5% (3066 PJ or 73.2 Mtoe) and 56.6% (3472 PJ or 82.9 Mtoe) respectively. Hydropower followed with 1177 PJ (28 Mtoe) in 2009 and 1194 PJ (28.5 Mtoe) in 2010 with a share decrease from 21.3% to 19.4%.

[17] No multiple counting

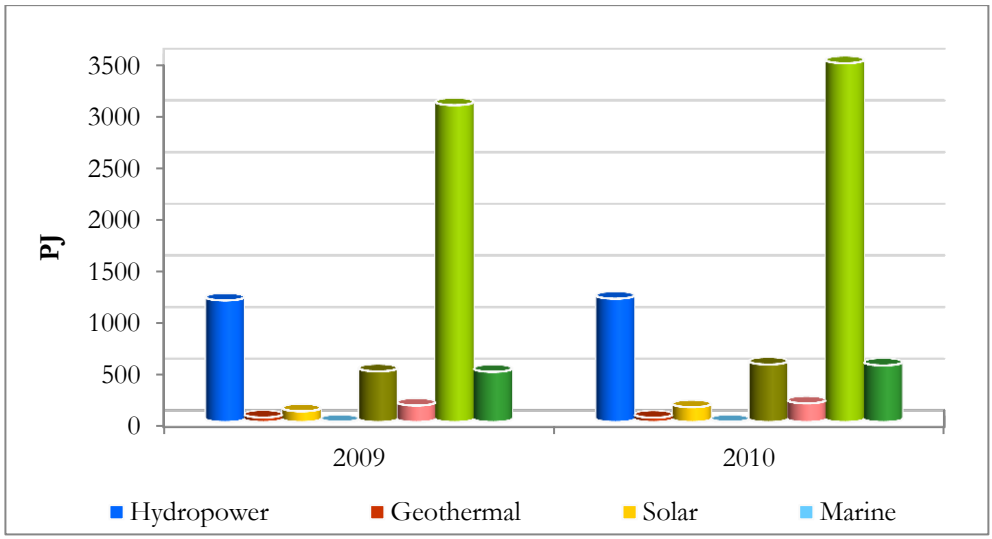

Figure 16. Total RES generated in EU 27 by technology, 2009-2010

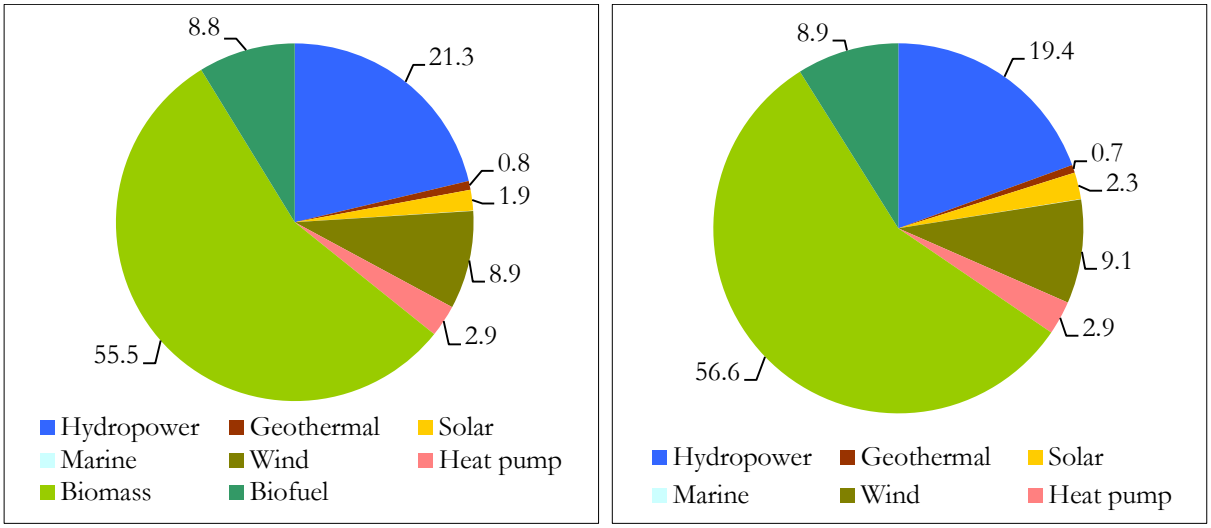

Figure 17. Subdivision of total RES generated in EU 27 by technology, 2009(left)-2010(right).

Figure 18 and Table 8 report both absolute and relative changes of total RES generated in each MS of EU 27 during period 2009 and 2010.

Germany has reported for both years the highest total RES generation with respectively 908 PJ (21.7 Mtoe) and 1052 PJ (25.1 Mtoe) with a relative increase almost 16% (144 PJ or 3.4 Mtoe). France follows Germany with 817 PJ (19.5 Mtoe) in 2009 and 884.5 PJ (25.1 Mtoe) together with Sweden that reported 663 PJ (15.8 Mtoe) in 2009 and 722 PJ (17.2 Mtoe) in 2010.

The highest relative change in total RES generation in 2010 compared to 2009 was reported by Bulgaria with +29.5% (13.3 PJ), followed by Belgium with +26.4% (17.3 PJ) and Italy with +16.6% (75.8 PJ). Only Netherland generated less energy in 2010 from renewable sources with 1.9% (-1.6 PJ).

Contribution of five leading countries in total RES generated in years 2009 and 2010 was almost 61%.

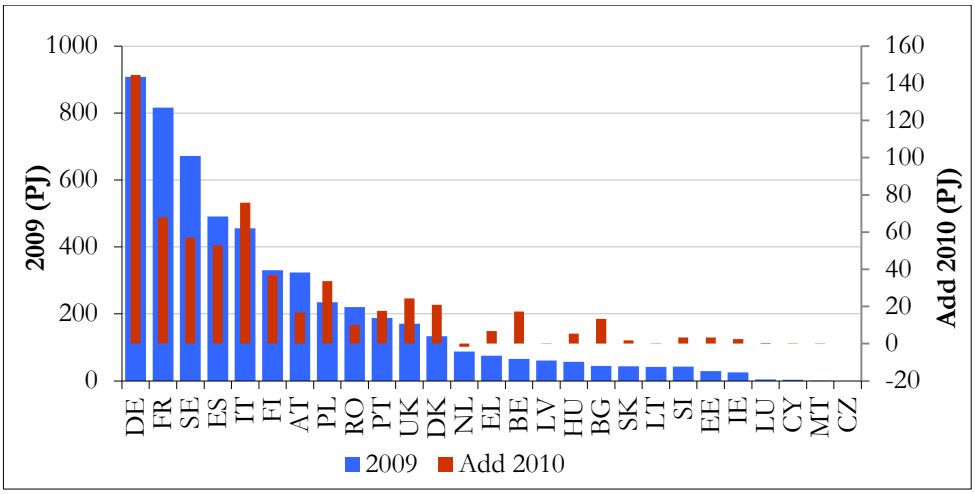

Figure 18[18]. Cumulative total RES generated in EU 27, 2009-2010

Table 8. Total RES generated in EU 27, 2009-2010

	2009	2010	Additional 2010		2009	2010
	PJ	PJ	PJ	%	GJ/Capita	GJ/Capita
BE	65.3	82.5	17.3	26.4	6.1	7.6
BG	44.9	58.2	13.3	29.5	5.9	7.7
CZ	n.a	n.a	n.a	n.a	n.a	n.a
DK	133.6	154.6	20.9	15.7	24.2	27.9
DE	907.8	1052.3	144.5	15.9	11.1	12.9
EE	28.9	32.2	3.3	11.5	21.5	24.0
IE	25.4	27.9	2.4	9.6	5.7	6.2
EL	75.3	82.1	6.8	9.0	6.7	7.3
ES	491.6	544.5	52.9	10.8	10.7	11.8
FR	816.7	884.5	67.8	8.3	12.7	13.7
IT	456.1	531.9	75.8	16.6	7.6	8.8
CY	4.0	4.3	0.3	8.2	5.0	5.2
LV	60.9	61.0	0.0	0.0	26.9	27.1
LT	41.4	41.7	0.3	0.8	12.3	12.5
LU	4.7	5.1	0.4	7.8	9.5	10.1
HU	57.0	62.4	5.4	9.4	5.7	6.2
MT	0.2	0.2	0.0	3.4	0.4	0.4
NL	88.1	86.4	-1.6	-1.9	5.3	5.2
AT	324.2	340.9	16.7	5.1	38.8	40.7
PL	235.1	268.7	33.6	14.3	6.2	7.0
PT	188.0	205.7	17.7	9.4	17.7	19.3
RO	220.1	230.1	10.0	4.6	10.2	10.7
SI	42.5	45.7	3.3	7.7	20.9	22.3
SK	43.6	45.4	1.8	4.1	8.1	8.4
FI	330.6	367.4	36.8	11.1	62.1	68.6
SE	672.2	729.2	57.0	8.5	72.6	78.1
UK	171.2	195.5	24.3	14.2	2.8	3.2
EU 27	5529	6140	611	11.0	11.1	12.3

[18] MS are ranked according to their contribution in total RES generated for year 2009

1.2.1 RES Heating/Cooling
a. RES-H/C share

Contribution of RES in heating/cooling sector increased to 14.4% from 13.7% from 2009 to 2010. Figure 19 and Table 9 report the RES share in heating/cooling sector for each MS of EU 27 during years 2009 and 2010.

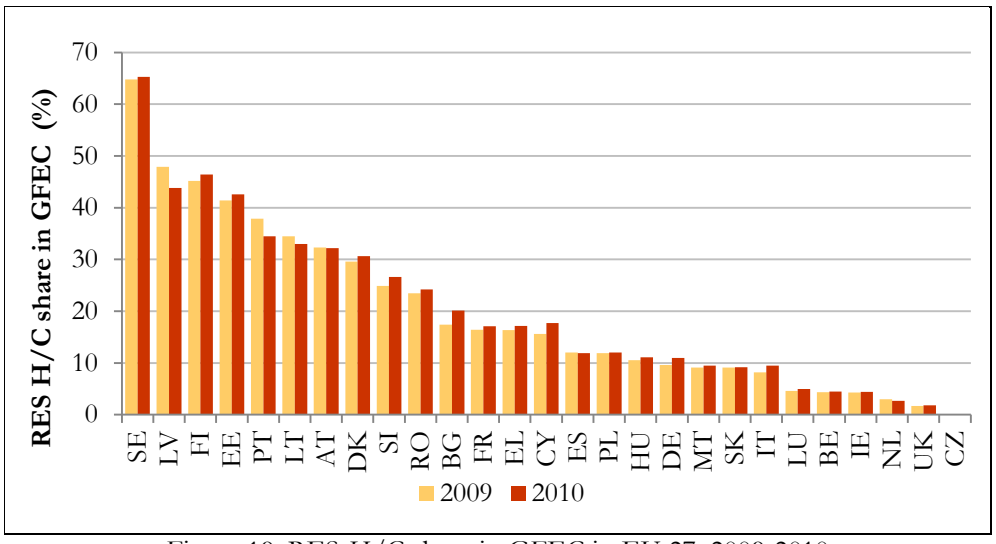

Figure 19. RES-H/C share in GFEC in EU 27, 2009-2010

Sweden had the highest RES share in heating/cooling sector in both years with 64.8% and 65.3%. Latvia followed with 47.9% in 2009 but its share dropped to 43.8% in 2010. Finland was positioned in third place with a share in heating/cooling that changed from 45.2% in 2009 to 46.4% in 2010 followed by Estonia (from 41.4% to 42.6%). The second highest RES contribution in heating and cooling decrease after Latvia (-4.1%) was reported by Portugal (-3.4%) followed by Lithuania (-1.5%), Austria and Spain (-0.1%).

Table 9. RES Heating/Cooling share in GFEC in EU 27, 2009-2010

	2009	2010	Increase/Decrease	
	%	%	% points	%
BE	4.4	4.5	0.2	3.7
BG	17.4	20.1	2.7	15.5
CZ[19]	n.a	n.a	n.a	n.a
DK	29.6	30.6	1.1	3.7
DE	9.6	11.0	1.4	14.6
EE	41.4	42.6	1.2	2.9
IE	4.3	4.4	0.1	2.3
EL	16.4	17.2	0.8	4.8
ES	12.0	11.9	-0.1	-0.8
FR	16.4	17.1	0.7	4.3
IT	8.2	9.5	1.3	15.4
CY	15.6	17.7	2.1	13.5
LV	47.9	43.8	-4.1	-8.6
LT	34.5	33.0	-1.5	-4.2

[19] CZ doesn't report for RES-H/C share

LU	4.6	5.0	0.4	8.0
HU	10.5	11.1	0.6	5.2
MT	9.1	9.5	0.4	4.4
NL	3.0	2.7	-0.3	-10.0
AT	32.3	32.2	-0.1	-0.3
PL	11.9	12.0	0.1	0.8
PT	37.9	34.5	-3.4	-9.0
RO	23.5	24.2	0.8	3.2
SI	24.9	26.6	1.7	6.9
SK	9.1	9.2	0.1	1.1
FI	45.2	46.4	1.2	2.7
SE	64.8	65.3	0.5	0.8
UK	1.7	1.8	0.1	5.9
EU 27	13.7	14.4	0.6	4.5

b. Contribution of RES in Heating/Cooling sector

Renewable energy contribution in heating/cooling sector amounted to 2914 PJ (69.6 Mtoe) in 2009 and 3301 PJ (78.8 Mtoe) in 2010.

The absolute contribute of all renewable thermal technologies except geothermal increased in 2010 compared to 2009 while their relative contributions remained almost constant. Biomass contribution accounted for ~ 92% with 2677.4 PJ (63.9 Mtoe) in 2009 and 3035 PJ (72.5 Mtoe) in 2010, followed by heat pumps 5.5% share (160PJ or 3.8 Mtoe and 181 PJ or 4.3 Mtoe), solar with a 1.9% share (53.2 PJ or 1.3 Mtoe and 62.3 PJ or 1.5 Mtoe) and geothermal with ~ 0.8% share (24 PJ or 0.6 Mtoe and 22.2 PJ or 0.5 Mtoe). The highest percentage increase in 2010 took place for the solar thermal technology with 17% and a share increased by 0.1 percentage point (Figure 20).

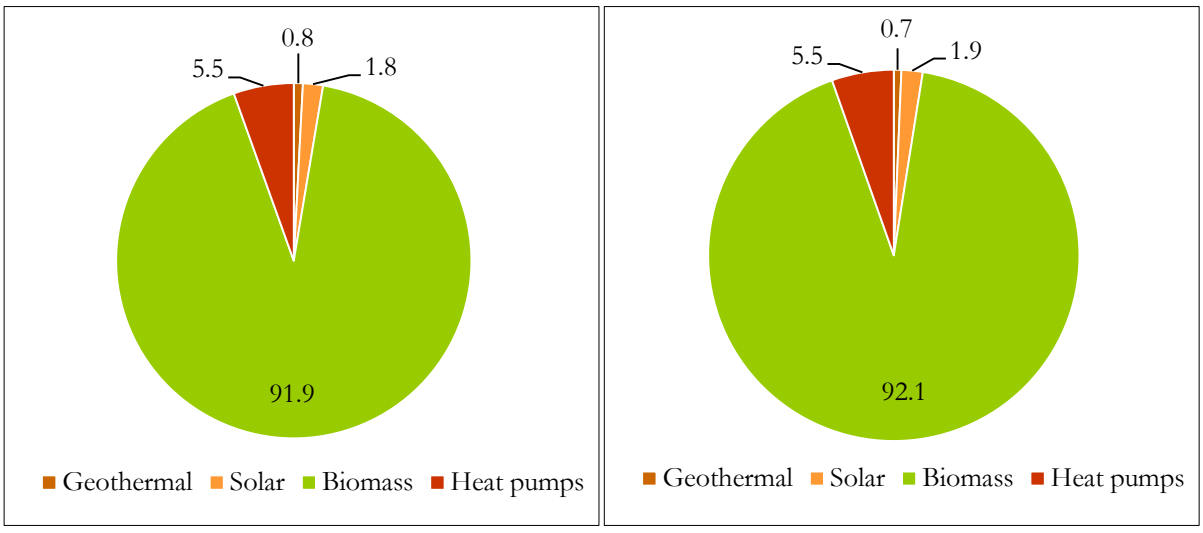

Figure 20. Subdivision of RES-H/C generated in EU 27 by technology, 2009(left)-2010(right)

Figure 21 and Table 10 reports the detailed RES contribution in heating/cooling sector for each MS of EU 27 during years 2009 and 2010.

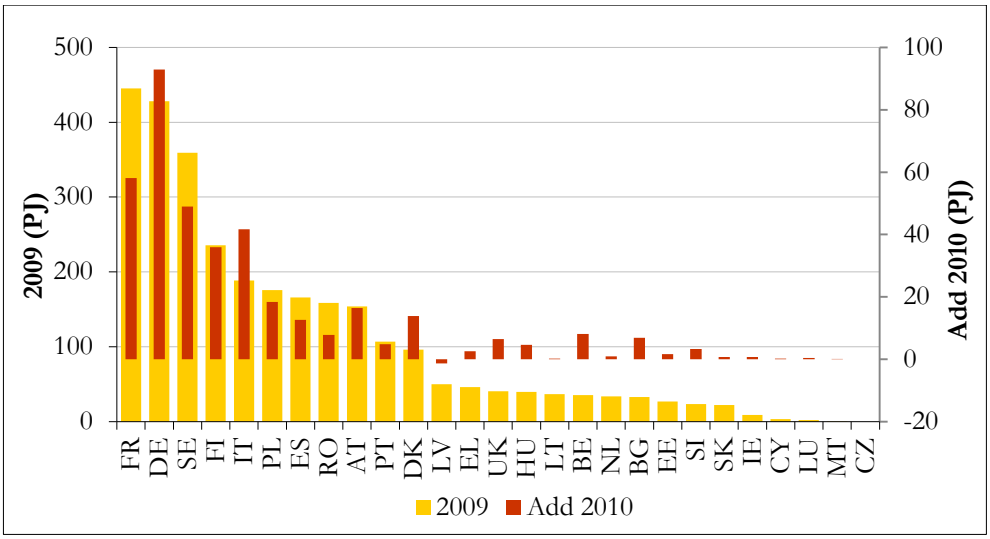

Figure 21[20]. Cumulative RES heating/cooling in EU 27, 2009-2010

France reported the highest amount of renewable energy in heating/cooling for year 2009 with 445.4 PJ (10.6 Mtoe) and the highest share (15.3%) while it was Germany that had the highest amount of renewable energy contribution in 2010 with 521 PJ (12.4 Mtoe) and the highest share as well (15.5%).

Germany reported also the highest increase in renewable energy contribution in this sector with +93 PJ (+2.2 Mtoe) followed by France with +58.2 PJ (+1.4 Mtoe), Sweden with +48.9 PJ (+1.2 Mtoe) and Italy with +41.7PJ (~1 Mtoe). Sweden had the third highest energy contribution in heating/cooling with 359.4 PJ (8.6 Mtoe) in 2009 and 408.3 PJ (9.7 Mtoe) in 2010. Finland followed with 235.4 PJ (5.6 Mtoe) in 2009 and 271.3 PJ (6.5 Mtoe) in 2010 together with Italy that contributied in 2009 with 188.4 PJ (4.5 Mtoe) and in 2010 with 230 PJ (5.5 Mtoe).

Contribution of France, Germany, Sweden, Finland and Italy in total RES in heating/cooling sector during period 2009-2010 changed from 57% to 59%.

Table 10. RES heating/cooling in EU 27, 2009-2010

	2009	**2010**	**Additional 2010**		**2009**	**2010**
	PJ	PJ	PJ	%	GJ/Capita	GJ/Capita
BE	35.1	43.2	8	23.0	3.3	4.0
BG	32.6	39.4	7	20.9	4.3	5.2
CZ	n.a	n.a	n.a	n.a	n.a	n.a
DK	96.1	109.9	14	14.4	17.4	19.9
DE	428.0	520.9	93	21.7	5.2	6.4
EE	26.9	28.6	2	6.1	20.1	21.3
IE	8.9	9.6	1	8.4	2.0	2.1
EL	46.0	48.6	3	5.6	4.1	4.3
ES	165.7	178.3	13	7.6	3.6	3.9
FR	445.4	503.5	58	13.1	6.9	7.8
IT	188.4	230.1	42	22.1	3.1	3.8
CY	3.2	3.4	0	5.2	4.1	4.2
LV	49.8	48.5	-1	-2.7	22.0	21.6

[20] MS are ranked according to their contribution in year 2009.

LT	36.7	36.9	0	0.6	10.9	11.1
LU	2.0	2.4	0	18.3	4.0	4.7
HU	39.6	44.2	5	11.6	3.9	4.4
MT	0.1	0.1	0	4.5	0.3	0.3
NL	33.7	34.6	1	2.7	2.0	2.1
AT	154.0	170.4	16	10.7	18.4	20.3
PL	175.8	194.1	18	10.4	4.6	5.1
PT	106.9	111.7	5	4.5	10.1	10.5
RO	158.6	166.4	8	4.9	7.4	7.8
SI	23.3	26.5	3	13.8	11.5	13.0
SK	22.2	22.9	1	3.4	4.1	4.2
FI	235.4	271.3	36	15.2	44.2	50.7
SE	359.4	408.3	49	13.6	38.8	43.7
UK	40.3	46.7	6	15.9	0.7	0.8
EU 27	2914	3301	386	13.3	5.8	6.6

1.2.2 RES Electricity

a. RES-E share

The weight of RES electricity in gross final energy consumption in this sector was equal to 19.1% in 2009 and in 2010 increased by 0.6 percentage points. Figure 22 and Table 11 report the RES share in electricity sector for each MS of EU 27 in years 2009 and 2010.

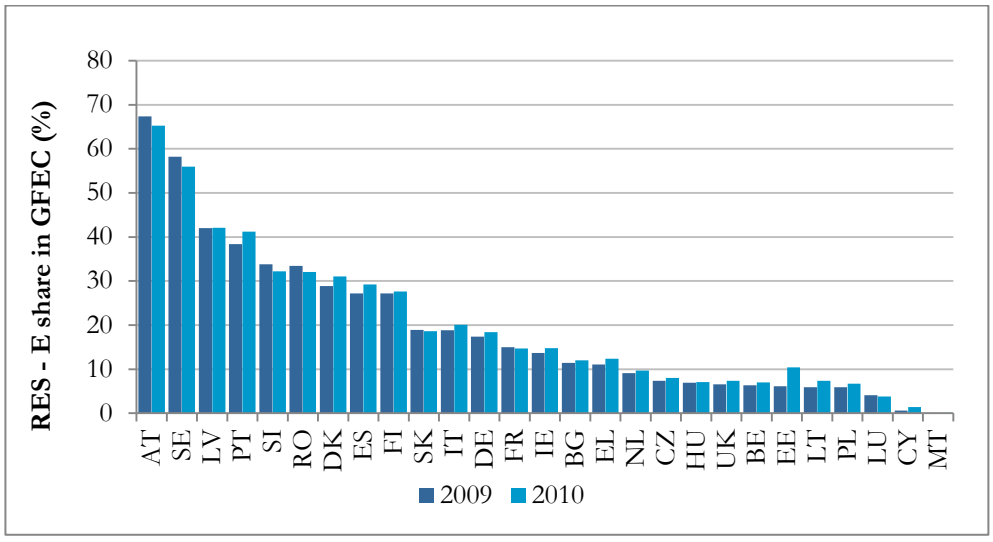

Figure 22[21]. RES-E share in GFEC in EU 27, 2009-2010

20 MS reported a RES share in the electricity sector higher in 2010 than in 2009. Austria reported for both years the highest RES share in the electricity sector with respectively 67.4% and 65.3% followed by Sweden (58.2% and 56%), Latvia (42% and 42.1%), Portugal (38.4% and 41.2%) and Slovenia (33.8% and 32.2%). Czech Republic reported the RES share in this sector for both years, respectively 7.4% and 8%. The RES electricity share dropped in 2010 compared to 2009 in Austria, Sweden, Slovenia, Romania, Slovakia, France and Luxemburg.

[21] MS are ranked according to their RES electricity share in 2009.

Table 11. RES electricity share in GFEC in EU 27, 2009-2010

	2009	2010	Increase/Decrease	
	%	%	% points	%
BE	6.3	7.0	0.6	10.1
BG	11.4	12.0	0.6	5.3
CZ	7.4	8.0	0.6	8.1
DK	28.9	31.0	2.2	7.5
DE	17.4	18.4	1.0	5.7
EE	6.1	10.4	4.3	70.5
IE	13.7	14.8	1.1	8.0
EL	11.0	12.4	1.3	12.1
ES	27.2	29.2	2.0	7.4
FR	15.0	14.7	-0.3	-2.0
IT	18.8	20.1	1.3	6.8
CY	0.6	1.4	0.8	133.3
LV	42.0	42.1	0.1	0.2
LT	5.9	7.4	1.5	25.4
LU	4.1	3.8	-0.3	-7.3
HU	7.0	7.1	0.1	1.9
MT	0.02	0.08	0.1	300.0
NL	9.1	9.7	0.6	6.6
AT	67.4	65.3	-2.1	-3.1
PL	5.9	6.7	0.8	13.6
PT	38.4	41.2	2.8	7.3
RO	33.5	32.1	-1.4	-4.2
SI	33.8	32.2	-1.6	-4.7
SK	18.9	18.6	-0.3	-1.6
FI	27.2	27.6	0.4	1.5
SE	58.2	56.0	-2.2	-3.8
UK	6.6	7.4	0.8	12.1
EU 27	19.1	19.7	0.6	3.4

b. Contribution of RES in electricity sector

Renewable energy contribution in electricity sector amounted to 2129 PJ (50.8 Mtoe) in 2009. In 2010 the renewable energy contribution in this sector reached 2292 PJ (54.7 Mtoe) with a 7.6% increase (162.4 PJ or 3.9 Mtoe).

Figure 23 and 24 present the absolute and relative development of RES electricity in EU 27 during 2009 and 2010.

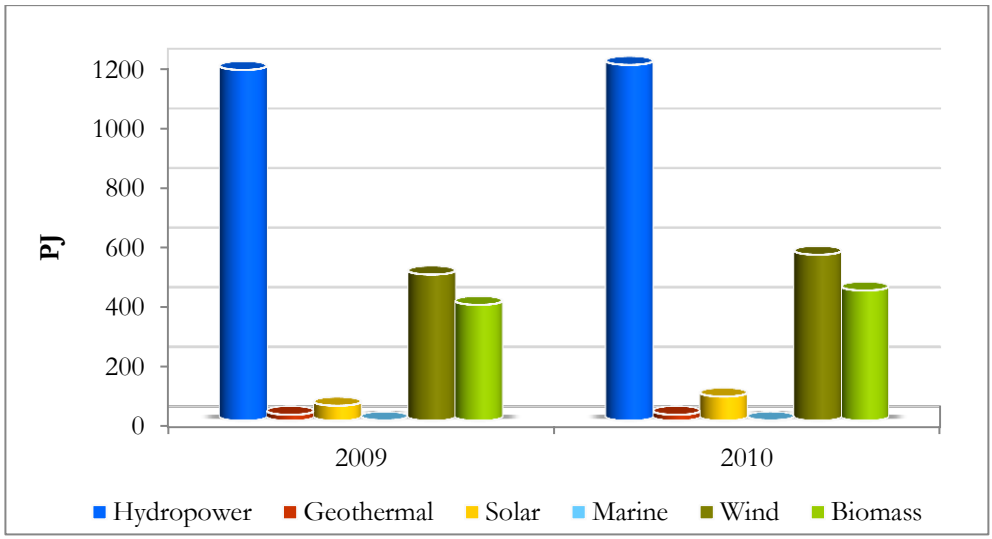

Figure 23. RES electricity in EU 27 by technology, 2009-2010

The main contribution in this increase came from solar technology which increased in 2010 by ~60% compared to 2009. Its share in energy generated in electricity sector changed from 2.4% in 2009 to 3.5% in 2010.

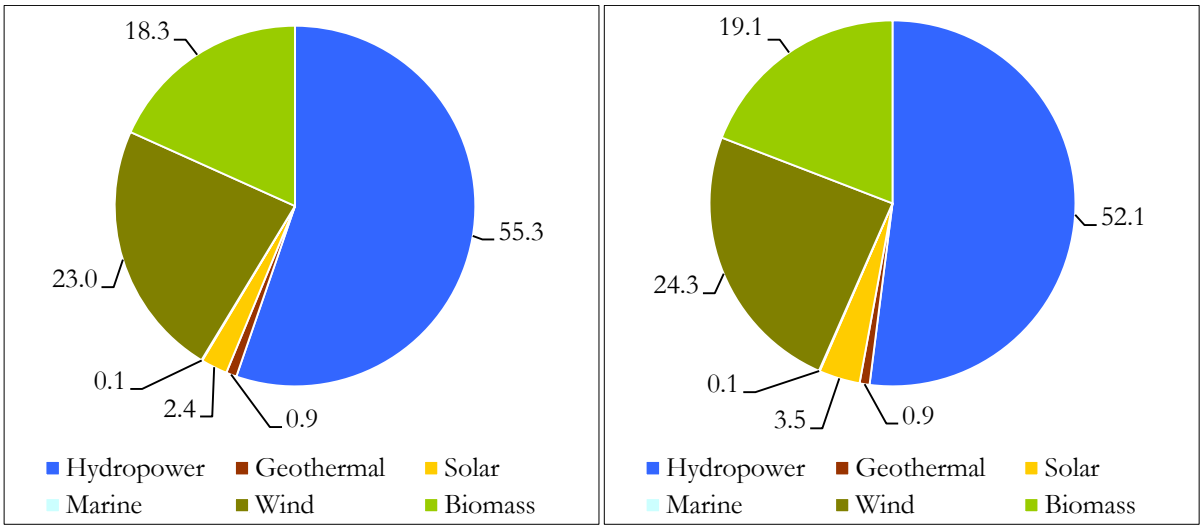

Figure 24. Subdivision of RES-E generated in EU 27 by technology, 2009(left)-2010(right)

Hydropower remained the leading technology generating energy in this sector with 1177 PJ (28.1 Mtoe) in 2009 and 1194 PJ (28.5 Mtoe) in 2010. Its contribution in energy generation in both years accounted for more than 50% but its share decreased in 2010 by 3.2 percentage points. Wind remains still in the second place even in electricity generation with a share that changed from 23% (490.7 PJ or 11.7 Mtoe) in 2009 to 24.3% (557.7 PJ or 13.3 Mtoe) in 2010 presenting the highest absolute additional energy production if compared with other technologies. The additional electricity generation in 2010 coming from biomass amounted to 48.2 PJ (1.1 Mtoe) representing 19.1% of RES electricity generated in this year.

Renewable energy contribution in electricity without hydropower amounted to 952 PJ (22.7 Mtoe) in 2009 increasing in 2010 by 15.3% and reaching 1098 PJ (26.2 Mtoe). Wind provided the main contribution in RES w/o hydropower with more than 50%, followed by biomass with ~40%.

Figure 25 and Table 12 report the detailed development of RES contribution in electricity sector in each MS of EU 27 in years 2009 and 2010.

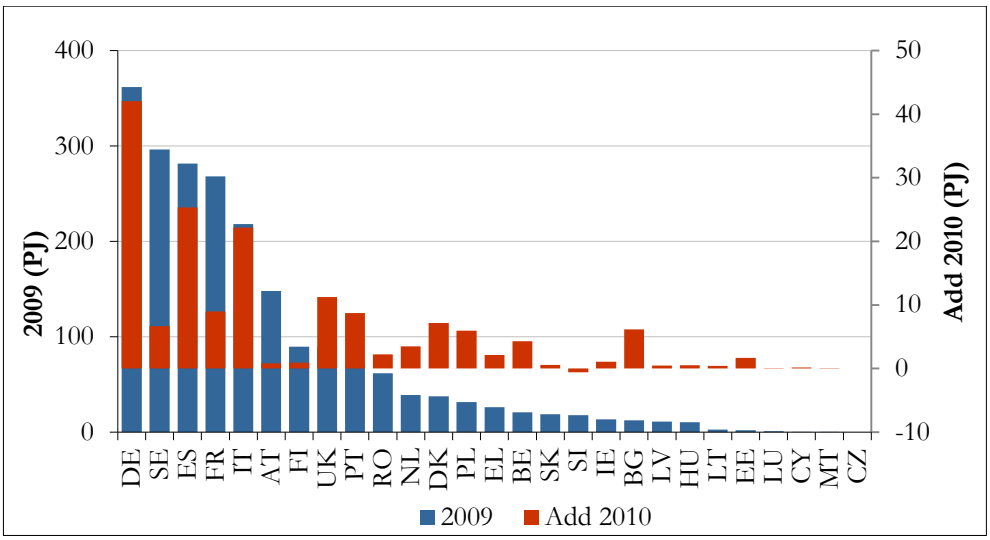

Figure 25[22]. Cumulative RES electricity in EU 27, 2009-2010

Except Slovenia all MS reported in 2010 an increase in renewable energy contribution in electricity sector in comparison with 2009. Germany reported the highest RES contribution in electricity sector in both years with respectively 361.7 PJ (100.5 TWh or 8.6 Mtoe) and 403.7 PJ (112 TWh or 9.6 Mtoe), followed by Sweden with 296 PJ (82.3 TWh or 7.1 Mtoe) and 302.9 PJ (84.1 TWh or 7.1 Mtoe) and Spain with 281.7 PJ (78.2 TWh or 6.7 Mtoe) and 307 PJ (85.3 TWh or 7.3 Mtoe).

Germany also had the highest additional RES contribution for year 2010 with 42 PJ (1 Mtoe) followed by Spain with 25.3 PJ (0.6 Mtoe), Italy with 22.2 PJ (0.5 Mtoe) and United Kingdom with 11.2 PJ (0.27 Mtoe).

Contribution of Germany, Sweden, Spain, France and Italy in the total RES in electricity sector remained almost 67% in both years.

Table 12. RES electricity in EU 27, 2009-2010

	2009	**2010**	**Additional 2010**		**2009**	**2010**
	PJ	PJ	PJ	%	GJ/Capita	GJ/Capita
BE	20.7	25.0	4.3	20.8	1.9	2.3
BG	12.2	18.3	6.1	50.6	1.6	2.4
CZ	n.a	n.a	n.a	n.a	n.a	n.a
DK	37.5	44.6	7.1	19.0	6.8	8.1
DE	361.7	403.8	42.1	11.6	4.4	4.9
EST	2.0	3.6	1.7	86.2	1.5	2.7
IE	13.4	14.4	1.1	8.0	3.0	3.2
GR	26.0	28.1	2.1	8.1	2.3	2.5
ES	281.7	307.0	25.3	9.0	6.1	6.7
FR	268.2	277.1	9.0	3.3	4.2	4.3
IT	218.2	240.4	22.2	10.2	3.6	4.0

[22] MS are ranked according to their contribution in RES-E generation for 2009

CY	0.1	0.3	0.2	140.2	0.1	0.3
LV	10.9	11.4	0.4	4.1	4.8	5.1
LT	2.5	2.9	0.4	16.5	0.7	0.9
LU	1.0	1.0	0.0	0.4	1.9	1.9
HU	10.4	10.9	0.5	4.7	1.0	1.1
MT	0.0	0.0	0.0	226.4	0.0	0.0
NL	38.7	42.2	3.5	9.0	2.3	2.5
AT	148.0	148.8	0.8	0.6	17.7	17.8
PL	31.5	37.4	5.9	18.8	0.8	1.0
PT	71.5	80.2	8.7	12.2	6.7	7.5
RO	61.5	63.7	2.2	3.6	2.9	3.0
SLO	17.7	17.1	-0.6	-3.3	8.7	8.3
SK	18.5	19.1	0.6	3.0	3.4	3.5
FI	89.6	90.6	0.9	1.0	16.8	16.9
SE	296.3	302.9	6.6	2.2	32.0	32.4
UK	89.5	100.7	11.2	12.5	1.5	1.6
EU 27	2129	2292	162.4	7.6	4.3	4.6

1.2.3 RES Transport

a. RES share

Contribution of RES to the gross final energy consumption in this sector increased from 4.2% in 2009 to 4.8% in 2010.

Figure 26 and Table 13 present the RES share in transport sector in each MS of EU 27 in years 2009 and 2010.

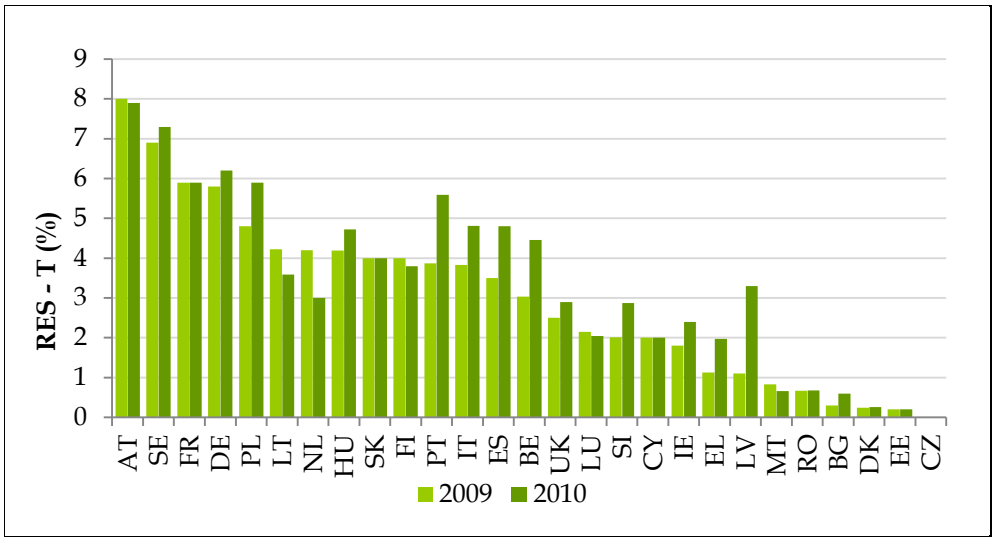

Figure 26[23]. RES-T share in GFEC in EU 27, 2009-2010

Austria reported the highest RES share in transport sector in both years with respectively 8% and 7.9% followed by Sweden (6.9% and 7.3%), France (5.9% in both years), Germany (5.8% and 6.2%) and Poland (4.8% and 5.9%). Six MS reported in 2010 a RES-T share smaller than in 2009.

[23] MS are ranked according to their RES-T share in 2009

This happened to Lithuania, Netherland, Austria, Finland, Luxemburg and Malta. The highest increase in RES-T share was found in Italy with +1.7 percentage points, followed by Belgium with +1.4 percentage points, Spain with +1.3 percentage points and Germany with +1.1 percentage points.

Table 13. RES transport share in GFEC in EU 27, 2009-2010

	2009	2010	Increase/Decrease	
	%	%	% point	%
BE	3.0	4.5	1.4	47.2
BG	0.3	0.6	0.3	100.0
CZ	n.a	n.a	n.a	n.a
DK	0.2	0.3	0.0	8.3
DE	5.8	6.2	0.4	6.9
EE	0.2	0.2	0.0	0.0
IE	1.8	2.4	0.6	33.3
EL	1.1	2.0	0.8	74.3
ES	3.5	4.8	1.3	37.1
FR	5.9	5.9	0.0	0.0
IT	3.8	4.8	1.0	25.6
CY	2.0	2.0	0.0	0.0
LV	1.1	3.3	2.2	200.0
LT	4.2	3.6	-0.6	-14.9
LU	2.2	2.0	-0.1	-5.1
HU	4.2	4.7	0.5	12.6
MT	0.8	0.7	-0.2	-20.5
NL	4.2	3.0	-1.2	-28.6
AT	8.0	7.9	-0.1	-1.3
PL	4.8	5.9	1.1	22.9
PT	3.9	5.6	1.7	44.4
RO	0.7	0.7	0.0	1.5
SI	2.0	2.9	0.9	42.8
SK	4.0	4.0	0.0	0.0
FI	4.0	3.8	-0.2	-5.0
SE	6.9	7.3	0.4	5.8
UK	2.5	2.9	0.4	16.0
EU 27	4.2	4.8	0.5	12.8

b. Contribution of RES in transport sector

Total RES[24] energy contribution in transport sector reached 486 PJ (11.6 Mtoe) in 2009 and 548 PJ (13.1 Mtoe) in 2010 with an increase of 12.8%. Figure 27 and 28 report the development (absolute and relative) of RES contribution in transport sector in EU 27 for years 2009 and 2010.

[24] Contribution of RES in transport sector is calculated without double counting. According Article 5 of the Directive 2009/28/EC the RES contribution in GFEC in transport sector to reach the 20% target includes double counting. The RES contribution for 10% target in transport sector includes multiple counting.

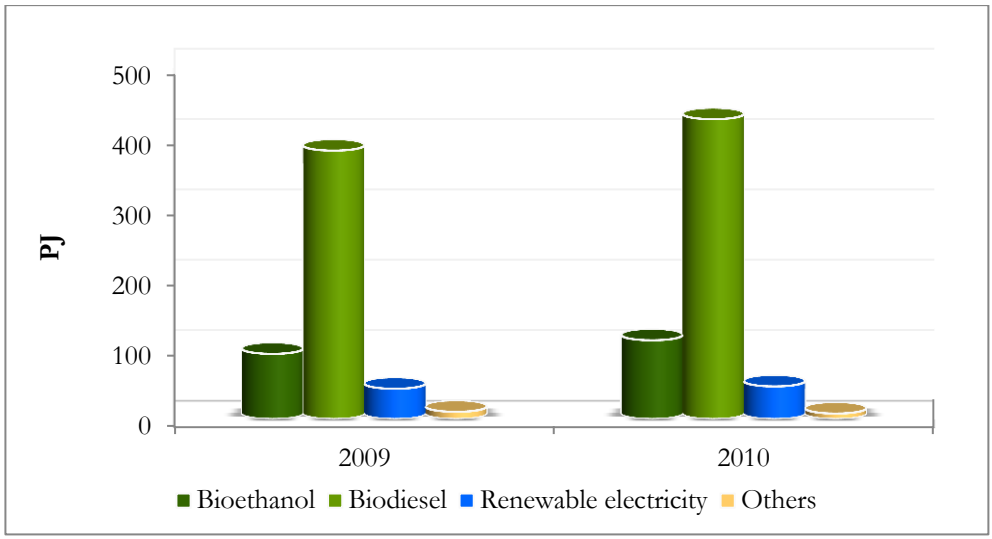

Figure 27. RES transport development in EU 27 by source, 2009-2010

With double counting the renewable energy contribution in this sector amounted to 529 PJ (12.6 Mtoe) in 2009 and 594.6 PJ (14.2 Mtoe) with an increase of 12.4%. With multiple counting in 2010 this contribution increase with 13.8% reaching the amount of 618.8 PJ (14.8 Mtoe).

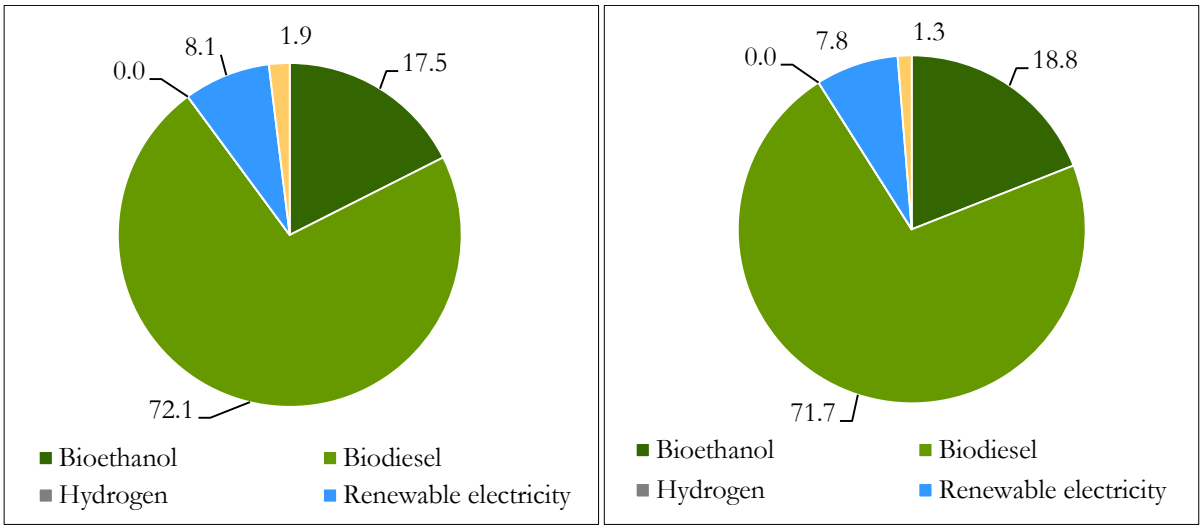

Figure 28. Subdivision of RES-T generated in EU 27, 2009(left) – 2010(right)

Biodiesel had in increase during period 2009-2010 in absolute values equal to 45 PJ (1.0 Mtoe) but its share in RES transport dropped in 2010 from 72.1% to 71.7%. In relative terms it was bioethanol that had the highest increase in 2010 with 21% (19 PJ or 0.5 Mtoe) with a share that changed from 17.5% to 18.8%. The increase of renewable electricity in transport sector was around 3PJ (0.08 Mtoe) but its share dropped from 8.1% to 7.8%. The contribution of others in total energy generated in transport sector decreased in 2010 with 0.6 percentage points showing a decrease of 24%.

Figure 29 and Table 14 report the development, absolute and relative, of RES in transport sector in each MS of EU 27 during period 2009-2010.

Among all MS it was Spain that had in 2010 the highest absolute increase in renewable energy contribution in transport sector compared with 2009 with 15 PJ (0.36 Mtoe). Meanwhile it was Latvia that had the highest relative increase in 2010 compared with 2009 with 440% due to

increase by ~ 10 times in biodiesel contribution. Germany had in both years the highest contribution in renewable energy in this sector with respectively 118 PJ (2.8 Mtoe) and 127.6 PJ (3 Mtoe). France had almost 103 PJ (2.5 Mtoe) in both years followed by Italy with 49 PJ (1.2 Mtoe) in 2009 and 61 PJ (1.5 Mtoe) in 2010. Renewable energy contribution in transport sector in 2010 dropped only in three MS: in the Netherlands with -38.6% followed by Malta with -16.7% and Lithuania with -13.5%.

Contribution of Germany, France, Italy, Spain and United Kingdom in total renewable energy in transport sector in EU 27 during period 2009-2010 was nearly 73%.

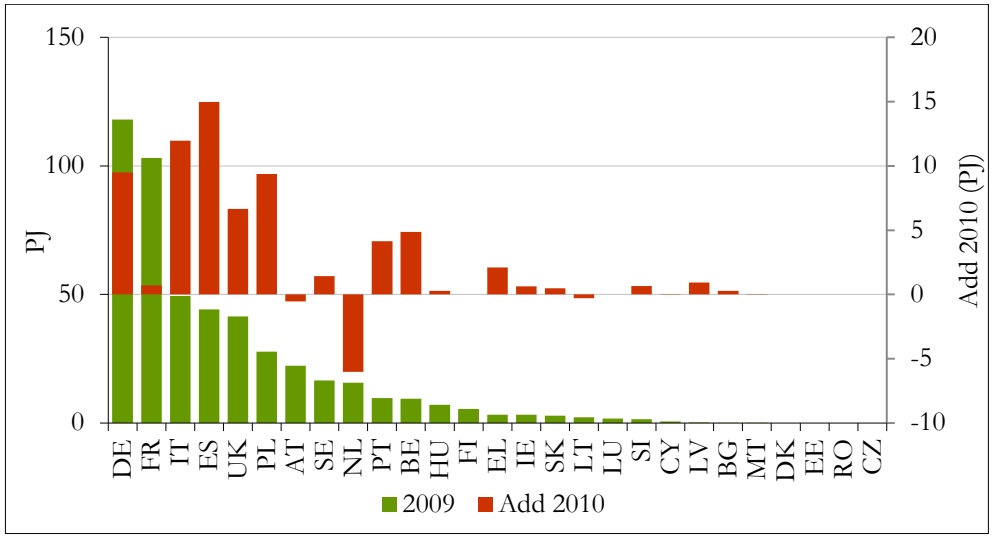

Figure 29[25]. Cumulative RES-T generated in EU 27, 2009-2010

Table 14. RES-T generated in EU 27, 2009-2010

	2009	2010	Additional 2010		2009	2010
	PJ	PJ	PJ	%	GJ/Capita	GJ/Capita
BE	9.5	14.4	4.9	51.5	0.9	1.3
BG	0.2	0.5	0.3	175.0	0.0	0.1
CZ	n.a	n.a	n.a	n.a	n.a	n.a
DK[26]	0.0	0.0	0.0		0.0	0.0
DE	118.1	127.6	9.5	8.0	1.4	1.6
EE	0.0	0.0	0.0		0.0	0.0
IE	3.2	3.9	0.6	19.4	0.7	0.9
EL	3.3	5.4	2.1	64.1	0.3	0.5
ES	44.2	59.2	15.0	33.9	1.0	1.3
FR	103.1	103.8	0.7	0.7	1.6	1.6
IT	49.4	61.4	12.0	24.2	0.8	1.0
CY	0.6	0.6	0.0	0.6	0.8	0.8
LV	0.2	1.1	0.9	440.0	0.1	0.5
LT	2.2	1.9	-0.3	-13.5	0.6	0.6
LU	1.8	1.8	0.0	0.0	3.6	3.5
HU	7.1	7.4	0.3	4.1	0.7	0.7

[25] MS are ranked according to their contribution in RES-T generation for year 2009

[26] DK and EE reported for RES-T only renewable electricity due to the fact that biofuels doesn't fulfil the sustainability criteria of the Directive 2009/28/EC

MT	0.03	0.02	0.0	-16.7	0.1	0.1
NL	15.6	9.6	-6.0	-38.6	0.9	0.6
AT	22.3	21.7	-0.5	-2.4	2.7	2.6
PL	27.8	37.1	9.4	33.8	0.7	1.0
PT	9.7	13.8	4.1	43.0	0.9	1.3
RO[27]	0.0	0.0	0.0		0.0	0.0
SI	1.5	2.1	0.7	44.6	0.7	1.0
SK	2.9	3.4	0.5	16.9	0.5	0.6
FI	5.5	5.5	0.0	0.0	1.0	1.0
SE	16.6	18.0	1.4	8.6	1.8	1.9
UK	41.4	48.1	6.7	16.1	0.7	0.8
EU 27	486.0	548.2	62.2	12.8	1.0	1.1

1.3 Renewable Energy Sources

1.3.1 Hydropower

Hydropower installed capacity in 2009 in EU 27 amounted to 99.2 GW showing an increase in 2010 by 0.7% (+686 MW). The main contribution in installed capacity in hydropower technology was coming from large hydropower installations (>10MW) which contribution in total hydropower installed capacity was almost 87% in both years.

Figure 30 and Table 15 report the detailed development of hydropower technology in each MS of EU 27.

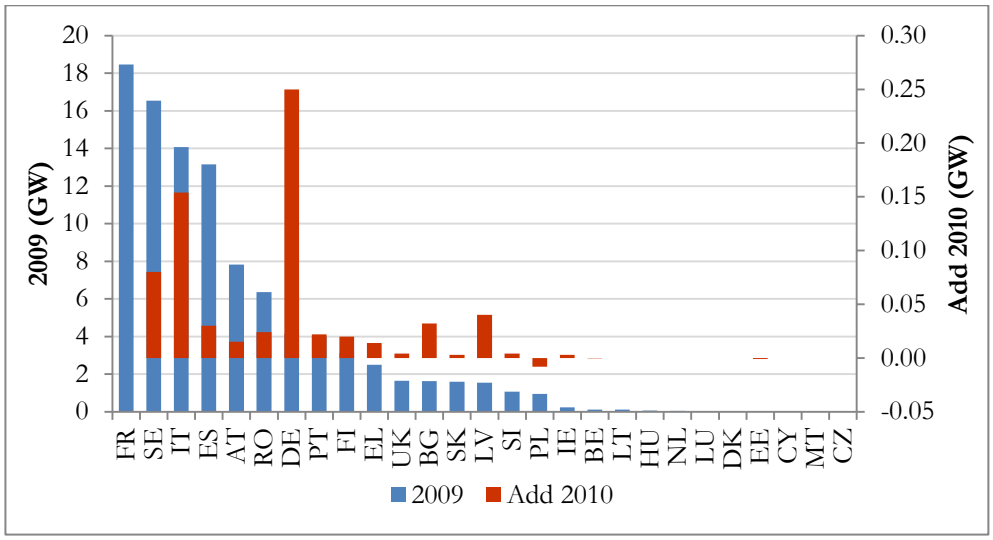

Figure 30[28]. Cumulative hydropower installed capacity in EU 27, 2009-2010

There were not big changes in hydropower installed capacity in EU 27 during this period. Only in Belgium, Estonia and Poland the hydropower installed capacity dropped slightly in 2010 compared to 2009. France was the leading country in hydropower installed capacity with 18.5 GW in both years. Sweden followed with ~16.6 GW together with Italy (~14 GW), Spain (~13.1 GW) and Austria (~7.8 GW). The contribution of these MS in total hydropower installed capacity in EU 27

[27] Romania reported for RES-T only renewable electricity due to the fact that biofuels doesn't fulfil the sustainability criteria of the Directive 2009/28/EC

[28] MS are ranked according to their contribution in hydropower installed capacity for year 2009

in 2009 and in 2010 was ~70%. The highest absolute increases in hydropower installed capacity happened in Germany with +250 MW and Italy with +154 MW.

Contribution of France, Sweden, Italy, Spain and Austria in total hydropower installed capacity was nearly 70% in both years.

Table 15. Hydropower installed capacity in EU 27, 2009-2010

	2009	**2010**	**Additional 2010**	
	MW	**MW**	**MW**	**%**
BE	119	119	-0.1	-0.1
BG	1621	1653	32	2.0
CZ	n.a	n.a	n.a	n.a
DK	9	9	0	0.0
DE	4150	4400	250	6.0
EE	7	6	-1.0	-14.3
IE	234	237	3	1.3
EL	2502	2516	14	0.6
ES	13158	13188	30	0.2
FR	18464	18464	0	0.0
IT	14080	14234	154	1.1
CY	0	0	0	
LV	1536	1576	40	2.6
LT	116	116	0	0.0
LU	34	34	0	0.0
HU	53	53	0	0.0
MT	0	0	0	
NL	37	37	0	0.0
AT	7828	7843	15	0.2
PL	945	937	-8	-0.9
PT	3991	4013	22	0.6
RO	6358	6382	24	0.4
SI	1070	1074	4	0.4
SK	1597	1600	3	0.2
FI	3120	3140	20	0.6
SE	16544	16624	80	0.5
UK	1645	1649	4	0.2
EU 27	**99218.01**	**99904**	686	0.7

The reported[29] renewable energy generated by hydropower during the same period had an increase by 1.7% moving from 1176.7 PJ (326.8 TWh) to 1193.6 PJ (331.5 TWh). Large hydropower technology (>10 MW) was still the main contributor in energy generation with 86.4%.

Figure 31 and Table 16 report the detailed development of hydropower energy in each MS of EU 27 during period 2009-2010.

[29] The electricity generated from hydropower shall be accounted for on the basis of the normalisation rules set out in Annex II according to which in order to take into account the climate variation a 15-yearHydropower energy should be normalized to include the effects of climate using a 15 years data series

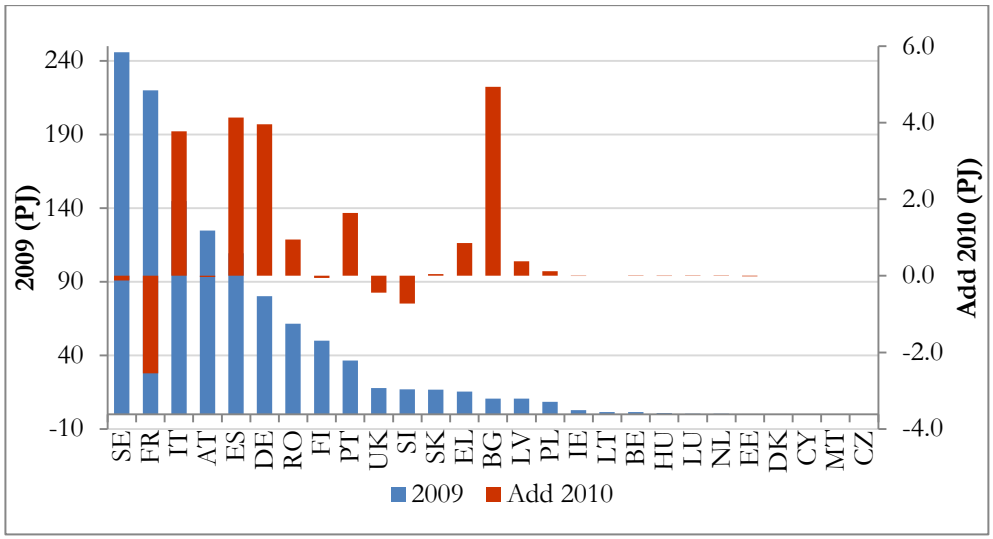

Figure 31[30]. Cumulative hydropower renewable energy generated in EU 27, 2009-2010

Bulgaria, Germany, Spain and Italy had the highest absolute increase in hydropower energy generated during this period. Energy generated from this technology dropped in 9 MS where France showed the highest absolute decrease with 2.5 PJ (708 GWh).

Sweden was the leading country in both years with almost the same amount of energy generated by hydropower, 246 PJ (63 TWh). France followed with respectively 220PJ (61.1 TWh) and 217 PJ (60.2 TWh) together with Italy (145 PJ and 148 PJ), Austria (~125 PJ) and Spain (109 PJ and 114 PJ). Contribution of these MS in total hydropower energy generated during the above mentioned period accounted for 71%.

Table16. Hydropower in EU 27, 2009-2010. Absolute and relative differences

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	1.3	1.3	0.0	0.1
BG	10.6	15.6	4.9	46.4
CZ	n.a	n.a	n.a	n.a
DK	0.1	0.1	0.0	0.0
DE	80.3	84.2	4.0	4.9
EE	0.1	0.1	0.0	-12.0
IE	2.7	2.7	0.0	-0.1
EL	15.4	16.3	0.9	5.6
ES	109.4	113.6	4.1	3.8
FR	220.1	217.5	-2.5	-1.2
IT	144.7	148.5	3.8	2.6
CY	0.0	0.0	0.0	
LV	10.5	10.9	0.4	3.6
LT	1.5	1.5	0.0	0.0
LU	0.4	0.4	0.0	1.9

[30] MS are ranked according to their contribution to hydropower electrity generation in year 2009

HU	0.8	0.8	0.0	-0.5
MT	0.0	0.0	0.0	
NL	0.4	0.4	0.0	1.0
AT	124.8	124.7	0.0	0.0
PL	8.5	8.6	0.1	1.5
PT	36.5	38.1	1.6	4.5
RO	61.4	62.4	0.9	1.5
SI	17.0	16.2	-0.7	-4.3
SK	16.6	16.6	0.0	0.3
FI	50.0	50.0	-0.1	-0.1
SE	246.0	245.9	-0.1	0.0
UK	17.7	17.2	-0.4	-2.5
EU 27	1177	1194	16.9	1.4

1.3.2 Geothermal

The use of geothermal energy for electricity, heating and cooling in EU 27 was 44.2 PJ (1055 ktoe) in 2009, decreasing by -1.9 PJ (-4.4%) to 42.2 PJ (1009 ktoe) in 2010. The contribution to the total renewable energy decreased by 0.1 percentage points (from 0.8% to 0.7%). Such a decrease is attributed to the drop by 8.4% of geothermal for heating/cooling in 2010.

Figure 32 and Table 17 report the detailed development of the use of geothermal energy for electricity, heating and cooling in each MS of EU 27 in years 2009-2010.

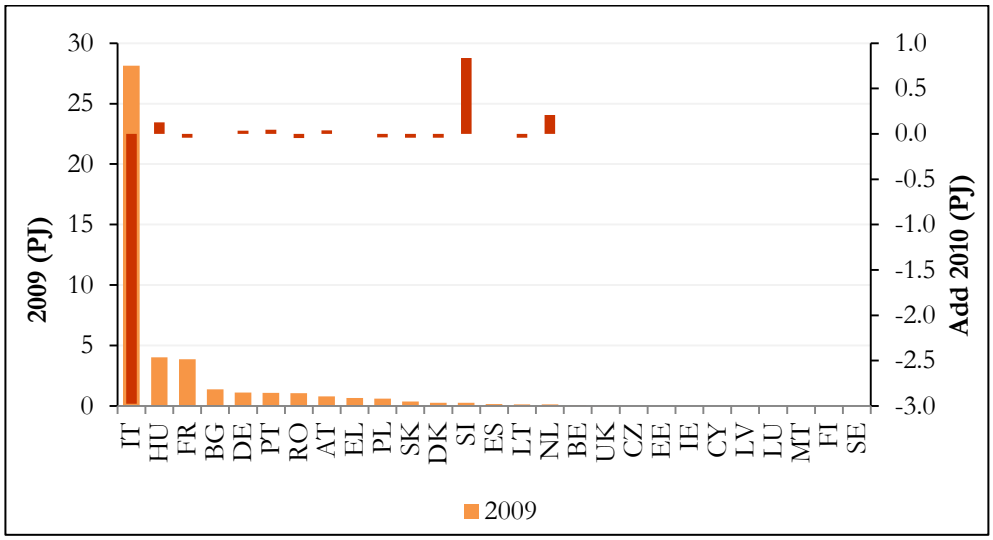

Figure 32[31]. Cumulative use of geothermal energy in EU 27, 2009-2010

The highest absolute increase in the use of geothermal energy for electricity, heating and cooling between 2009 and 2010 was registered in Slovenia with 0.8 PJ (+333.3%), followed by the Netherlands with 0.2 PJ (+166.7%), Hungary with 0.1 PJ (3.1%), Portugal with 0.05 PJ (+4.3%)

[31] MS are ranked according to their contribution to geothermal energy in 2009

and Austria with 0.04 PJ (+4.8%). A decrease in the use of geothermal energy was registered in Italy with -3.0 PJ (-10.6%) overcoming the modest increase in some other MS.

Italy was the leading country in use of geothermal energy in 2010, with 25.2 PJ, followed by Hungary with 4.1 PJ, France with 3.8 PJ, Bulgaria with 1.4 PJ, and Germany with 1.2 PJ. The contribution of these MS in the use of geothermal energy during 2010 was around 35.7 PJ, representing 84.5% of bioenergy generation in the EU 27.

Table 17. Geothermal energy (electricity, heating and cooling) in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	0.1	0.1	0.0	0.0
BG	1.4	1.4	0.0	0.0
CZ	0.0	0.0	0.0	
DK	0.3	0.2	0.0	-16.7
DE	1.1	1.2	0.0	3.2
EE	0.0	0.0	0.0	
IE	0.0	0.0	0.0	
EL	0.7	0.7	0.0	0.0
ES	0.2	0.2	0.0	0.0
FR	3.9	3.8	0.0	-1.1
IT	28.1	25.2	-3.0	-10.6
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	
LT	0.1	0.1	0.0	-33.3
LU	0.0	0.0	0.0	
HU	4.0	4.1	0.1	3.1
MT	0.0	0.0	0.0	
NL	0.1	0.3	0.2	166.7
AT	0.8	0.8	0.0	4.8
PL	0.6	0.6	0.0	-6.3
PT	1.1	1.1	0.0	4.3
RO	1.1	1.0	0.0	-4.4
SI	0.3	1.1	0.8	333.3
SK	0.4	0.3	0.0	-11.1
FI	0.0	0.0	0.0	
SE	0.0	0.0	0.0	
UK	0.0	0.0	0.0	0.0
EU 27	44.2	42.2	-1.9	-4.4

1.3.2.1 Geothermal electricity

Geothermal was a marginal technology in the total RES installed capacity in EU 27 during period 2009-2010. Its contribution in the total RES installed capacity during this period decreased slightly from 0.4% (2009) to 0.3% (2010) even if its absolute contribution increased from 788 MW up to 823 MW.

Figure 33 and Table 18 report the detailed development of geothermal installed capacity in EU 27 during period 2009-2010.

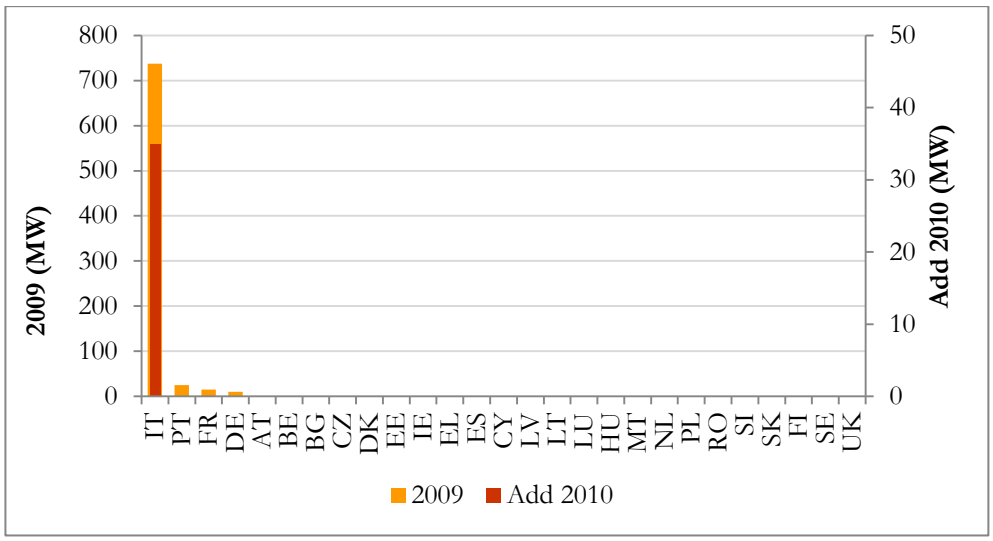

Figure 33[32]. Cumulative geothermal installed capacity in EU 27, 2009-2010

Only Germany, France, Italy, Austria and Portugal reported installed capacity and energy production from this technology. Italy was the only MS that reported an increase in geothermal installed capacity in 2010 with +35MW (+4.7%).

In 2010 the electricity generated by this technology reached 20.2 PJ (483 Mtoe or 5.6 TWh) with a very slightly increase (0.4%) from 2009. Its contribution to the total renewable electricity generated remains in the 0.4% levels while the share in the total energy generated by geothermal technology increased from 45.6% (2009) to 47.9% (2010).

Figure 34 and Table 18 report the detailed development of geothermal electricity in each MS of EU 27 in years 2009-2010.

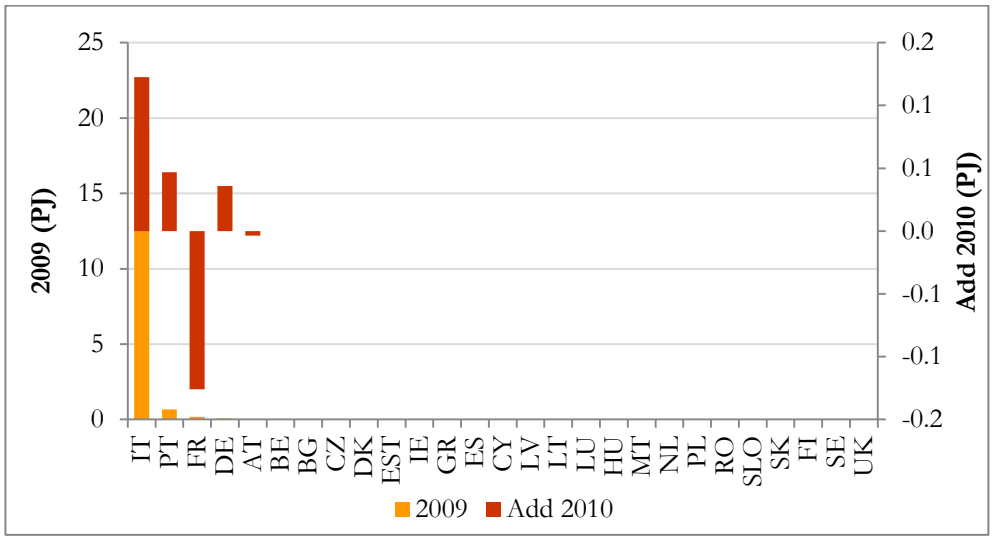

Figure 34[33]. Cumulative electricity generation from geothermal in EU 27, 2009-2010

[32] MS are ranked accordint to their contribution to geothermal installed capacity in 2009
[33] MS are ranked accordint to their contribution to geothermal electricity in 2009

Germany, France, Italy, Austria and Portugal were the MS that reported in electricity generated by geothermal in both years. Italy was still at the leading position in this technology with respectively 19.2 PJ (459.4 ktoe or 5.3 TWh) and 19.4 PJ (462 ktoe or 5.4 TWh) showing an increase of 0.6% (+0.12 PJ). The highest relative increase in electricity generated by geothermal in 2010 happened in Germany with 50% (+0.04 PJ) and the highest relative decrease was in France with 70% (-0.13PJ). Contribution of Italy to the geothermal electricity sector accounted for almost 96% in both 2009 and 2010.

Table 18. Geothermal electricity in EU 27, 2009-2010

	Installed				**Generated**			
	2009	2010	Additional 2010		2009	2010	Additional 2010	
	MW	MW	MW	%	PJ	PJ	PJ	%
BE	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0
CZ	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
DK	0	0	0	0	0	0	0	0
DE	10	10	0	0	0.1	0.1	0.04	50.0
EE	0	0	0	0	0	0	0	0
IE	0	0	0	0	0	0	0	0
EL	0	0	0	0	0	0	0	0
ES	0	0	0	0	0	0	0	0
FR	15	15	0	0	0.2	0.1	-0.13	-70.0
IT	737	772	35	4.7	19.2	19.4	0.12	0.6
CY	0	0	0	0	0	0.0	0	0
LV	0	0	0	0	0	0	0	0
LT	0	0	0	0	0	0	0	0
LU	0	0	0	0	0	0	0	0
HU	0	0	0	0	0	0.0	0	0
MT	0	0	0	0	0	0	0	0
NL	0	0	0	0	0	0	0	0
AT	1	1	0	0.0	0	0	0	-50.0
PL	0	0	0	0	0	0	0	0
PT	25	25	0	0.0	0.7	0.7	0.05	7.1
RO	0	0	0	0	0	0	0	0
SI	0	0	0	0	0	0	0	0
SK	0	0	0	0	0	0	0	0
FI	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0
UK	0	0	0	0	0	0	0	0
EU 27	788	823	35	4.4	20.2	20.2	0.08	0.4

1.3.2.2 Geothermal Heating/Cooling

In 2010, geothermal energy for heating/cooling decreased to 22 PJ (525 ktoe) from 24 PJ (573 ktoe) in 2009. Heating/cooling accounts for the largest share of the total energy generated by geothermal with 54.4% in 2009 and 52.1% in 2010. Its contribution in total renewable energy remained at the same levels of 0.4% as the geothermal electricity.

Figure 35 and Table 19 report the detailed development of geothermal heating/cooling in EU 27 in years 2009-2010.

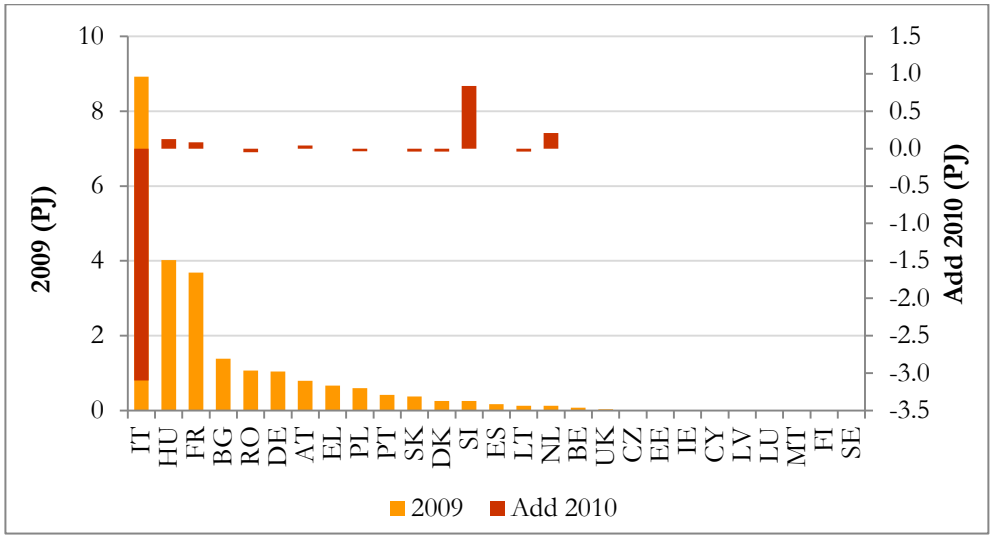

Figure 35[34]. Cumulative thermal energy generation from geothermal in EU 27, 2009-2010

Geothermal heat was mostly generated in 2010 in Italy with 5.8 PJ (139 ktoe), Hungary with 4.1 PJ (99 ktoe), France with 3.8 PJ (90 ktoe), Bulgaria with 1.4 PJ (33 ktoe) and Slovenia with 1.1 PJ (26 ktoe). Leading countries in the share of geothermal heat in total RES heat in 2010 were Hungary with 9.4%, Slovenia with 4.1%, Bulgaria with 3.5%, Italy with 2.5% and Slovakia with 1.5%.

Only 11 MS reported for 2010 changes in energy generated from thermal geothermal technology. The highest absolute and relative increase in geothermal for heating/cooling happened in Slovenia with 0.8 PJ or 20 ktoe (+333%). In contrary with geothermal electricity Italy had a significant decrease in 2010 by 3.1 PJ or 74 ktoe (-34.7%)

Table 19. Geothermal development in heating/cooling in EU 27, 2009-2010

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	0.08	0.08	0	0
BG	1.4	1.4	0	0
CZ	n.a	n.a	n.a	n.a
DK	0.25	0.21	-0.04	-16.7
DE	1.05	1.05	0	0
EE	0	0	0	0
IE	0	0	0	0
EL	0.67	0.67	0	0
ES	0.17	0.17	0	0

[34] MS are ranked according to their contribution to geothermal heat in 2009

FR	3.68	3.77	0.08	2
IT	8.92	5.82	-3.10	-34.7
CY	0	0	0	0
LV	0	0	0	0
LT	0.13	0.08	-0.04	-33.3
LU	0	0	0	0
HU	4.02	4.14	0.13	3
MT	0	0	0	0
NL	0.13	0.33	0.21	166.7
AT	0.80	0.84	0.04	5.3
PL	0.60	0.56	-0.04	-6.3
PT	0.42	0.42	0	0
RO	1.07	1.02	-0.05	-4.4
SI	0.25	1.09	0.84	333.3
SK	0.38	0.33	-0.04	-11.1
FI	0	0	0	0
SE	0	0	0	0
UK	0.03	0.03	0	0
EU 27	24.01	22.00	-2.01	-8.4

1.3.3 Marine

Marine installed capacity remained almost the same in years 2009 and 2010 with a value equal to 242.5 MW. The contribution of marine technology in total renewables installed capacity in EU 27 was very marginal with 0.1% in both years.
Figure 36 and Table 20 report the detailed development of marine installed capacity in EU 27 in years 2009-2010.

Only France with 240 MW and United Kingdom with 2.6 MW reported in this technology for period 2009-2010. Only United Kingdom had an increase in installed capacity of this technology with 4% (+0.1 MW).

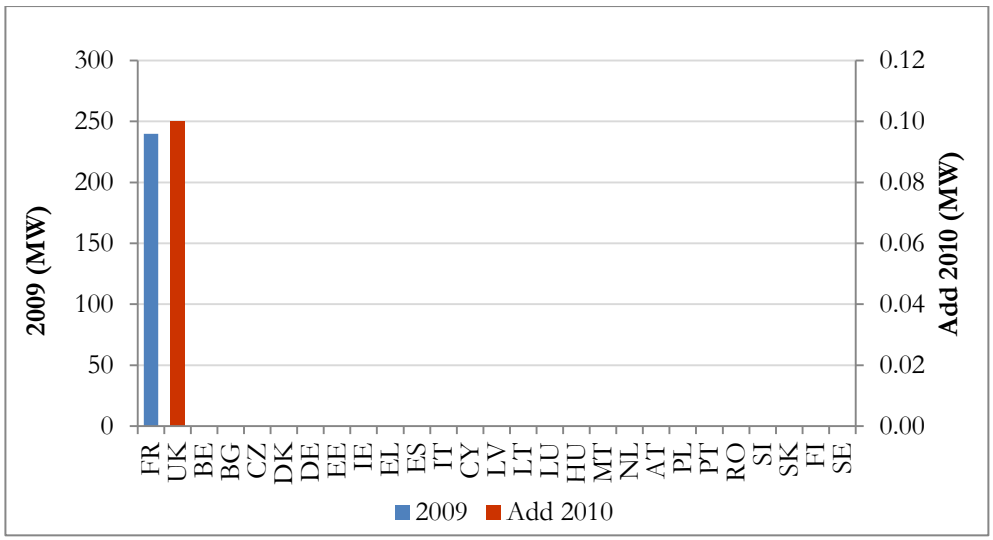

Figure 36[35]. Cumulative marine installed capacity in EU 27, 2009-2010

[35] MS are ranked according to their contribution to marine installed capacity in 2009

Marine energy was also a minor contributor in electricity generation in EU 27 during year 2010 with nearly 1.72 PJ (477.8 GWh or 41 ktoe) showing an increase of 6.5% from 2009. France contribution in both years in electricity generation from this technology was above 99.5% with an increase in 2010 with 6.25% (+28 GWh or 0.1 PJ).

Figure 37 and Table 20 report the detailed development of marine electricity generation in EU 27 in years 2009-2010.

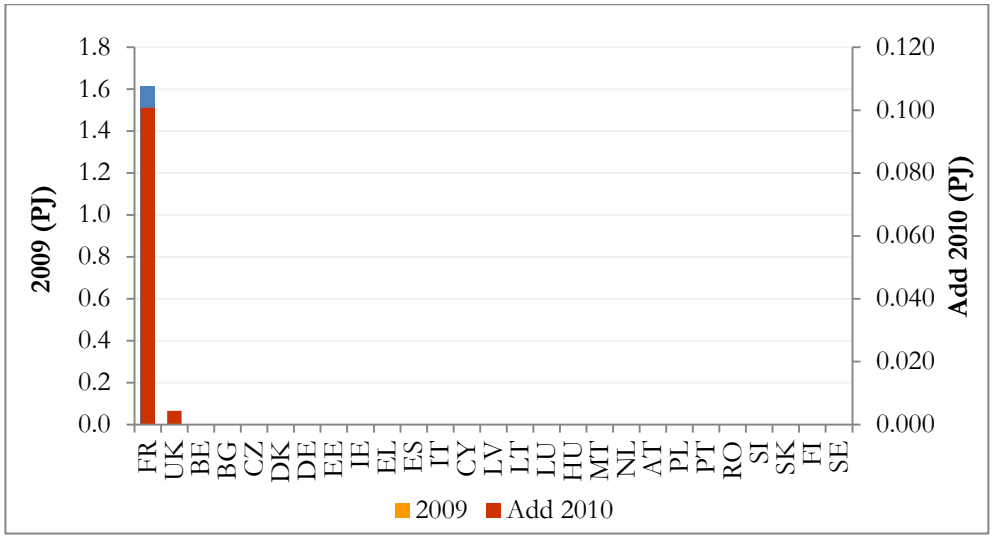

Figure 37[36]. Cumulative marine energy generation in EU 27, 2009-2010

Table 20. Marine technology development in EU 27, 2009-2010

	Installed				Generated			
	2009	2010	Additional 2010		2009	2010	Additional 2010	
	MW	MW	MW	%	PJ	PJ	PJ	%
BE	0	0	0	0	0	0	0	0
BG	0	0	0	0	0	0	0	0
CZ	0	0	0	0	0	0	0	0
DK	0	0	0	0	0	0	0	0
DE	0	0	0	0	0	0	0	0
EE	0	0	0	0	0	0	0	0
IE	0	0	0	0	0	0	0	0
EL	0	0	0	0	0	0	0	0
ES	0	0	0	0	0	0	0	
FR	240	240	0	0	1.61	1.71	0.10	6.25
IT	0	0	0	0	0	0	0	0
CY	0	0	0	0	0	0	0	0
LV	0	0	0	0	0	0	0	0
LT	0	0	0	0	0	0	0	0
LU	0	0	0	0	0	0	0	0
HU	0	0	0	0	0	0	0	0

[36] MS are ranked according to their contribution to marine energy in 2009

MT	0	0	0	0	0	0	0	0
NL	0	0	0	0	0	0	0	0
AT	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0
PT	0	0	0	0	0	0	0	0
RO	0	0	0	0	0	0	0	0
SI	0	0	0	0	0	0	0	0
SK	0	0	0	0	0	0	0	0
FI	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0
UK	2.5	2.6	0.10	4.0	0.002	0.006	0.004	200
EU 27	242.5	242.6	0.1	0.04	1.61	1.72	0.11	6.5

1.3.4 Solar

Solar thermal and solar electricity generation in EU 27 reached 104.1 PJ (2.5 Mtoe) in 2009 and 143.6 PJ (3.4 Mtoe) in 2010, increasing by +39.7 PJ (+38.2%).

Figure 38 and Table 21 report the detailed development of solar thermal / solar electricity in each MS of EU 27 in years 2009-2010.

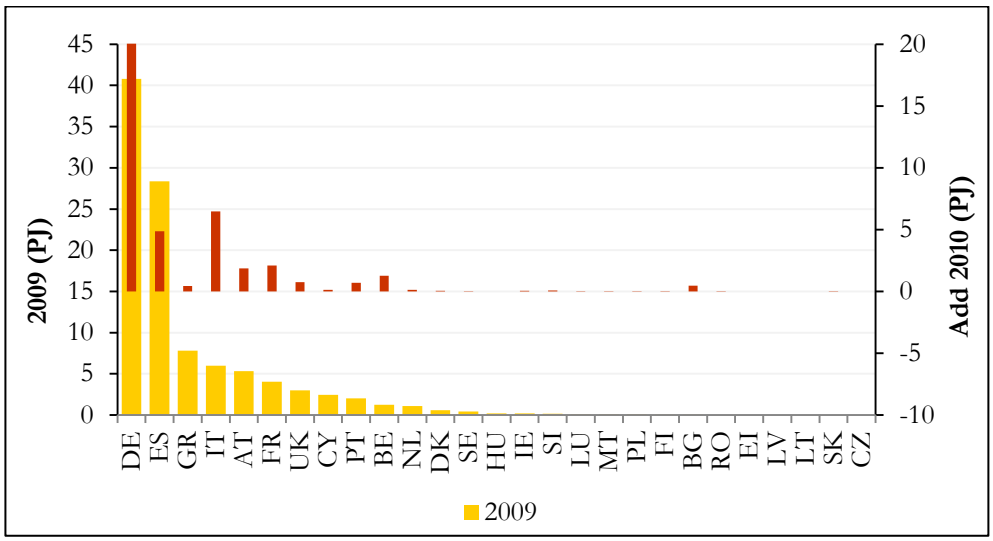

Figure 38[37]. Cumulative solar energy in EU 27, 2009-2010

The highest absolute increase in solar energy generation between 2009 and 2010 was registered in Germany with 20.0 PJ (+49.1%), followed by Italy with 6.5 PJ (+108.1%), Spain with 4.9 PJ (17.2%), France with 2.1 PJ (+51.8%) and Austria with 1.9 PJ (+34.9%). The growth registered in these five MS accounted for 35.4 PJ, representing about 84.0% of the total growth in the solar energy in the EU27 in 2010.

Germany was the leading country in bioenergy generation in 2010, with 60.8 PJ, followed by Spain with 33.2 PJ, Italy with 12.5 PJ, Greece with 8.3 PJ, and Austria with 7.2 PJ. The contribution of

[37] MS are ranked according to their contribution to solar energy in 2009

these MS in bioenergy generation during 2010 was around 122.0 PJ, representing 83.4% of solar thermal / solar electricity generation in the EU 27.

Table 21. Solar energy generation in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	1.3	2.5	1.3	100.6
BG	0.0	0.5	0.5	4276.7
CZ	n.a.	n.a.	n.a.	n.a.
DK	0.6	0.6	0.0	8.2
DE	40.8	60.8	20.0	49.1
EE	0.0	0.0	0.0	
IE	0.2	0.2	0.0	25.9
EL	7.8	8.3	0.4	5.7
ES	28.4	33.2	4.9	17.2
FR	4.1	6.2	2.1	51.8
IT	6.0	12.5	6.5	108.1
CY	2.5	2.6	0.1	5.3
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.1	0.1	0.0	11.8
HU	0.2	0.2	0.0	0.0
MT	0.1	0.1	0.0	11.6
NL	1.1	1.2	0.1	12.3
AT	5.3	7.2	1.9	34.9
PL	0.1	0.1	0.0	20.3
PT	2.0	2.7	0.7	33.9
RO	0.0	0.0	0.0	566.7
SI	0.2	0.3	0.1	40.8
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	25.0
SE	0.4	0.5	0.0	1.6
UK	3.0	3.8	0.8	25.3
EU 27	104.1	143.6	39.7	38.2

1.3.4.1 Solar electricity

Solar electricity installed capacity in the EU 27 reached 15763 MW in 2009 and 29650 MW in 2010, showing a large increase in 2010 by 77.6% (+12,237 MW). The main contribution in solar electricity capacity came from photovoltaic technology with about 97.6% in 2010. Only Spain reported installed capacity on concentrated solar power with respectively 282 MW and 682 MW in 2009 and 2010.

Figure 39 and Table 22 report the detailed development of solar electricity installed capacity in EU 27 in years 2009-2010.

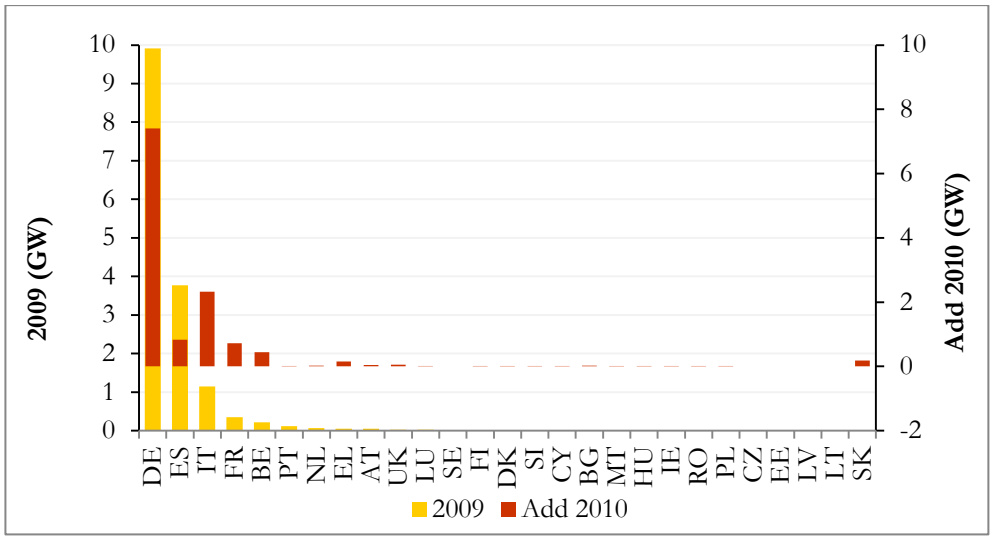

Figure 39[38]. Cumulative solar electricity installed capacity in EU 27, 2009-2010

The highest absolute increases in solar electricity installed capacity took place in Germany with +7410 MW (+74.8%), Italy with +2326 MW (+203.3%), Spain with 828 MW (+22%), France with 724 MW (+208.0%) and Belgium with 442 MW (+202.5). The growth registered in the five MS accounted for 11730 MW, representing about 84.5% of the total growth in the solar installed capacity in the EU27 in 2010.

Germany was the leading country in solar electricity installed capacity with 17320 W in 2010. Spain followed with 4598 MW together with Italy with 3470 MW, France with 1072 MW and Belgium with 661 MW. The contribution of these MS in total solar installed capacity in EU 27 in 2010 was 27120 MW, representing 90.5% of the total installed capacity in the EU 27.

Table 22. Solar electricity installed capacity in EU 27, 2009-2010

	2009	2010	Additional 2010	
	MW	MW	MW	%
BE	218	661	442	202.5
BG	2	25	23	1150.0
CZ	n.a	n.a	n.a	n.a
DK	5	7	2	40.0
DE	9910	17320	7,410	74.8
EE	0	0	0	
IE	1	1	0	6.6
EL	53	203	150	283.0
ES	3770	4598	828	22.0
FR	348	1072	724	208.0
IT	1144	3470	2,326	203.3
CY	3	7	3	97.0
LV	0	0	0	
LT	0	0	0	
LU	26	29	3	11.5
HU	1	2	1	100.0
MT	2	2	0	9.2

[38] MS are ranked according to their contribution to solar installed capacity in 2009

NL	68	88	20	29.4
AT	51	93	42	82.4
PL	0	0	0	3200.0
PT	115	132	17	14.8
RO	0	0	0	300.0
SI	4	12	8	200.0
SK	0	186	186	
FI	6	7	1	16.7
SE	9	9	0	0.0
UK	27	77	50	185.2
EU 27	15763	28000	12237	77.6

Electricity generated by solar energy between 2009 and 2010 had an increase of 30.5 PJ, increasing from 50.8 PJ in 2009 to 81.3 PJ in 2010, representing 60.1% of the electricity generation from solar in 2009.

Figure 40 and Table 23 report the detailed development of solar electricity generated in EU 27 in years 2009-2010.

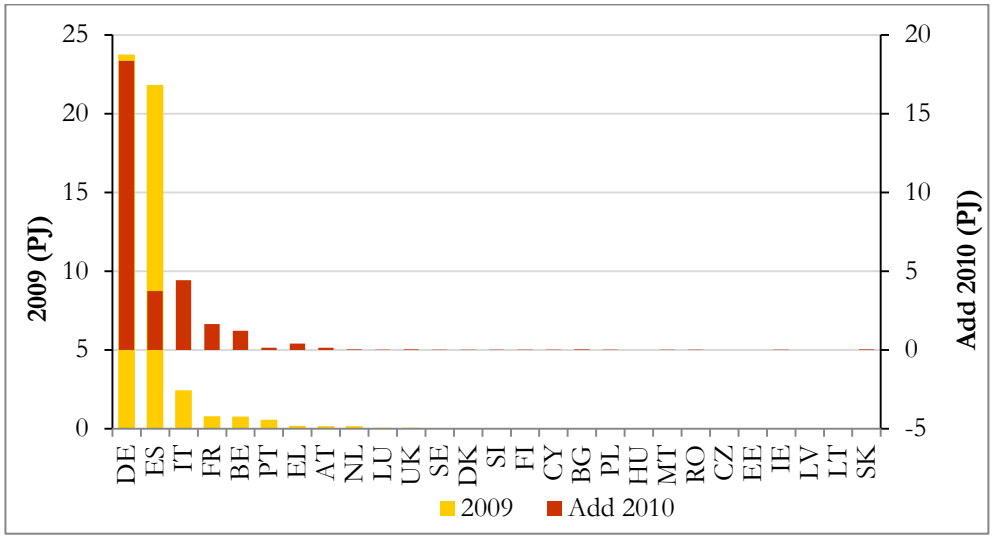

Figure 40[39]. Cumulative solar electricity energy generated in EU 27, 2009-2010

The highest absolute increase in generated solar electricity energy between 2009 and 2010 was registered in Germany with 18.4 PJ (+77.3%), followed by Italy with 4.4 PJ (+182.0%), Spain with 3.7 PJ (+17.2%), France with 1.6 PJ (+207.3%) and Belgium with 1.2 PJ (+155.3%). The growth registered in the five MS accounted for 29.4 PJ, representing about 90.7% of the total growth in the solar electricity generated in the EU27 in 2010.

Germany was the leading country in solar electricity generation in 2010, with 42.1 PJ. Spain followed with 25.6 PJ together with Italy with 6.9 PJ, France with 2.4 PJ Belgium with 2.0 PJ. The contribution of these MS in total solar electricity generation in the EU 27 in 2010 was 79.0 PJ, representing 94.6% of the total solar electricity generation in the EU 27.

[39] MS are ranked according to their contribution to solar electricity in 2009

Table 23. Solar electricity generation in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	0.6	2.0	1.4	229.1
BG	0.0	0.1	0.0	400.0
CZ	n,a	n.a	n.a	
DK	0.0	0.0	0.0	50.0
DE	23.8	42.1	18.4	77.3
EE	0.0	0.0	0.0	
IE	0.0	0.0	0.0	7.1
EL	0.2	0.6	0.4	209.3
ES	21.8	25.6	3.7	17.2
FR	0.8	2.4	1.6	207.3
IT	2.4	6.9	4.4	182.0
CY	0.0	0.0	0.0	66.8
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.1	0.1	0.0	5.0
HU	0.0	0.0	0.0	0.0
MT	0.0	0.0	0.0	226.4
NL	0.2	0.2	0.1	30.4
AT	0.2	0.3	0.1	81.6
PL	0.0	0.0	0.0	25.9
PT	0.6	0.7	0.1	25.6
RO	0.0	0.0	0.0	566.7
SI	0.0	0.0	0.0	225.0
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	25.0
SE	0.0	0.0	0.0	28.6
UK	0.1	0.1	0.0	65.0
EU 27	50.8	81.3	30.5	60.1

1.3.4.2 Solar heating/cooling

Solar heating and cooling generated by solar energy during 2009-2010 had a growth of 9.2 PJ, increasing from 53.2 PJ in 2009 to 62.3 PJ in 2010, representing 17.2% of the heating and cooling from solar.

Figure 41 and Table 24 report the detailed development of solar heating/cooling in each MS of EU 27 in years 2009-2010.

The highest absolute increase in solar heating and cooling energy between 2009 and 2010 as registered in Italy with 2.1 PJ (+57.6%), followed by Austria with 1.7 PJ (+33.3%), Germany with 1.7 PJ (+9.8%), Spain with 1.1 PJ (+17.3%) and UK with 0.7 PJ (+24.3 %). The growth registered in the five MS accounted for 7.3 PJ, representing about 77.1% of the total growth in the solar heat generated in the EU27 in 2010.

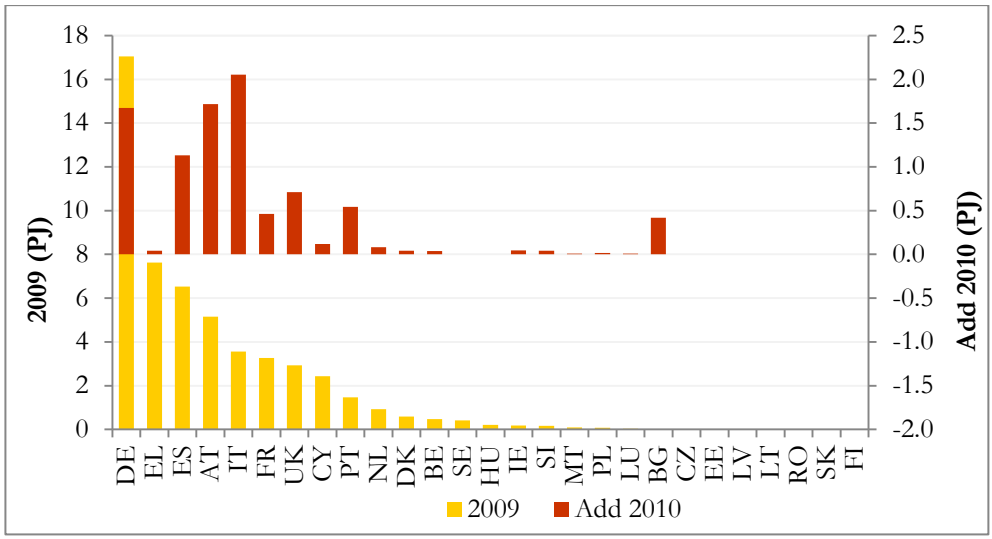

Figure 41[40]. Solar heating and cooling generated in EU 27, 2009-2010

Germany was the leading country in solar heating and cooling generation in 2010, with 18.7 PJ, following by Spain with 7.7 PJ, Greece with 7.7 PJ, Austria with 6.9 PJ and Italy with 5.6 PJ. The contribution of these MS in total solar electricity generation in the EU 27 in 2010 was 46.5 PJ, representing 74.3% of the total solar heating and cooling in the EU 27.

Table 24. Solar heating and cooling in EU 27, 2009-2010

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	0.5	0.5	0.0	8.1
BG	0.0	0.4	0.4	
CZ	n.a	n.a	n.a	n.a
DK	0.6	0.6	0.0	7.1
DE	17.0	18.7	1.7	9.8
EE	0.0	0.0	0.0	
IE	0.2	0.2	0.0	25.0
EL	7.6	7.7	0.0	0.5
ES	6.5	7.7	1.1	17.3
FR	3.3	3.7	0.5	14.1
IT	3.6	5.6	2.1	57.6
CY	2.4	2.6	0.1	4.9
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	28.6
HU	0.2	0.2	0.0	0.0
MT	0.1	0.1	0.0	7.4
NL	0.9	1.0	0.1	9.1
AT	5.1	6.9	1.7	33.3
PL	0.1	0.1	0.0	20.0
PT	1.5	2.0	0.5	37.1
RO	0.0	0.0	0.0	

[40] MS are ranked according to their contribution to solar heating/cooling in 2009

SI	0.2	0.2	0.0	25.0
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	
SE	0.4	0.4	0.0	0.0
UK	2.9	3.6	0.7	24.3
EU 27	53.2	62.3	9.2	17.2

1.3.5 Wind

Wind power installed capacity in the EU 27 reached 74872 MW in 2009 and 84104 MW in 2010, showing an increase in 2010 by 12.3% (+9,233 MW). Figure 42 and Table 25 report the detailed development of wind power capacity in each MS of EU 27 in years 2009-2010.

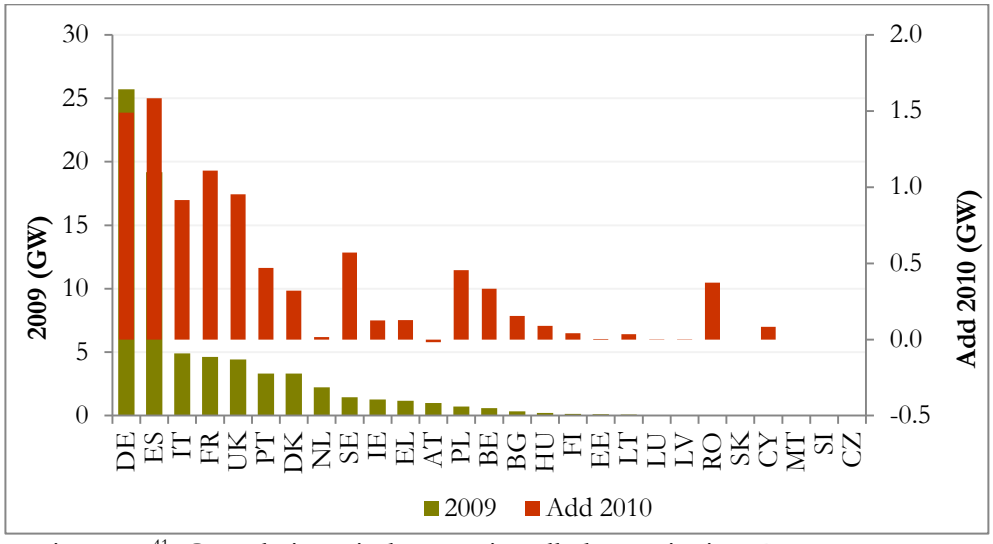

Figure 42[41]. Cumulative wind power installed capacity in EU 27, 2009-2010

The highest absolute increases in wind power installed capacity took place in Spain with +1583 MW (+8.3%), Germany with +1490 MW (+5.8%), France with +1108 MW (+24.0%), UK with 954 MW (+21.6%) and Italy with 916 MW (+18.7%). The growth registered in these five MS accounted for 6051 MW, representing about 63.9% of the total growth in the wind power capacity in the EU27 in 2010.

Germany was the leading country in wind power installed capacity with 27210 W in 2010. Spain followed with 20759 MW, together with Italy with 5814 MW, France with 5729 MW and UK with 5378 MW. The contribution of these MS in total wind power installed capacity in EU 27 in 2010 was 64890 MW, representing 76.9% of the total installed capacity in the EU 27.

Table 25. Wind power installed capacity in EU 27, 2009-2010

	2009	**2010**	Additional 2010	
	MW	MW	MW	%
BE	586	920	333	56.8
BG	333	488	155	46.5
CZ	n.a	n.a	n.a	n.a
DK	3322	3642	320	9.6
DE	25720	27210	1490	5.8

[41] MS are ranked according to their contribution to wind power installed capacity in 2009

EE	104	108	4	3.8
IE	1264	1389	125	9.9
EL	1171	1298	127	10.8
ES	19176	20759	1583	8.3
FR	4621	5729	1108	24.0
IT	4898	5814	916	18.7
CY	0	82	82	
LV	29	30	1	3.4
LT	98	133	35	35.7
LU	43	44	1	2.3
HU	203	293	90	44.3
MT	0	0	0	
NL	2222	2237	15	0.7
AT	994	977	-17	-1.7
PL	725	1180	456	62.9
PT	3326	3796	470	14.1
RO	15	389	374	2571.2
SI	0	0	0	
SK	3	3	0	0.0
FI	147	188	41	27.9
SE	1448	2018	570	39.4
UK	4424	5378	954	21.6
EU 27	74872	84104	9233	12.3

Energy generated by wind energy during the same period had an increase of 66.5 PJ (18473 GWh), increasing from 490.6 PJ (136268 GWh) in 2009 to 557.1 PJ (154,741 GWh) in 2010, representing a growth of 13.6% of the wind power generation in 2009. Figure 43 and Table 26 report the detailed development of wind energy in each MS of EU 27 in years 2009-2010.

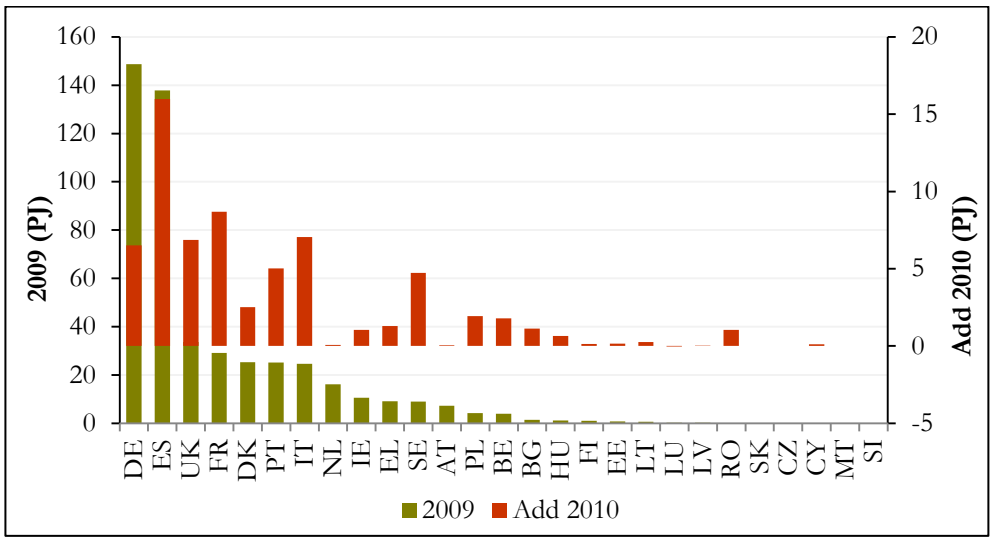

Figure 43[42]. Cumulative wind power generated in EU 27, 2009-2010

[42] MS are ranked according to their contribution to wind power energy in 2009

The highest absolute increase in wind electricity energy between 2009 and 2010 as registered in Spain with 16.0 PJ (+11.6%), followed by France with 8.7 PJ (+29.8%), Italy with 7.0 PJ (+28.7%), UK with 6.9 PJ (+20.4%) and Germany with 6.5 PJ (+4.4%). The growth registered in the five MS accounted for 45.1 PJ, representing about 65.7% of the total growth in the wind electricity generation in the EU27 in 2010.

Germany was the leading country in wind power generation in 2010, with 155.2 PJ. Spain followed with 153.8 PJ together with UK with 40.5 PJ, France with 37.8 PJ and Italy with 31.6 PJ. The contribution of these MS in total wind power generated during 2010 was around 418.9 PJ, representing 75.0% of wind power generated in the EU 27.

Table 26. Wind power generation in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	3.9	5.7	1.8	45.4
BG	1.5	2.6	1.1	75.2
CZ	n.a	n.a	n.a	n.a
DK	25.3	27.8	2.5	9.9
DE	148.5	155.2	6.7	4.5
EE	0.7	0.9	0.2	21.1
IE	10.6	11.6	1.1	9.9
EL	9.6	10.5	0.8	8.8
ES	137.9	153.8	16.0	11.6
FR	29.1	37.8	8.7	29.8
IT	24.6	31.6	7.0	28.7
CY	0.0	0.1	0.1	
LV	0.2	0.2	0.0	1.9
LT	0.6	0.9	0.3	40.2
LU	0.2	0.2	0.0	-12.7
HU	1.2	1.9	0.6	53.3
MT	0.0	0.0	0.0	
NL	16.1	16.2	0.1	0.5
AT	7.3	7.3	0.0	0.5
PL	4.2	6.1	1.9	46.1
PT	25.2	30.2	5.0	19.9
RO	0.0	1.1	1.0	2966.3
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	0.0
FI	1.0	1.1	0.1	12.5
SE	9.2	13.7	4.5	49.4
UK	33.6	40.5	6.9	20.4
EU 27	490.6	557.1	66.5	13.6

1.3.5.1 Onshore wind

Onshore wind installed capacity in 2010 in EU 27 reached the amount of 81.2 GW increasing by 11.5% (+8.4 GW) from year 2009. The share of onshore wind in total wind installed capacity moved from 97.3% in 2009 to 96.6% in 2010.

Figure 44 and Table 27 report the detailed development of onshore wind installed capacity in EU 27 during period 2009-2010.

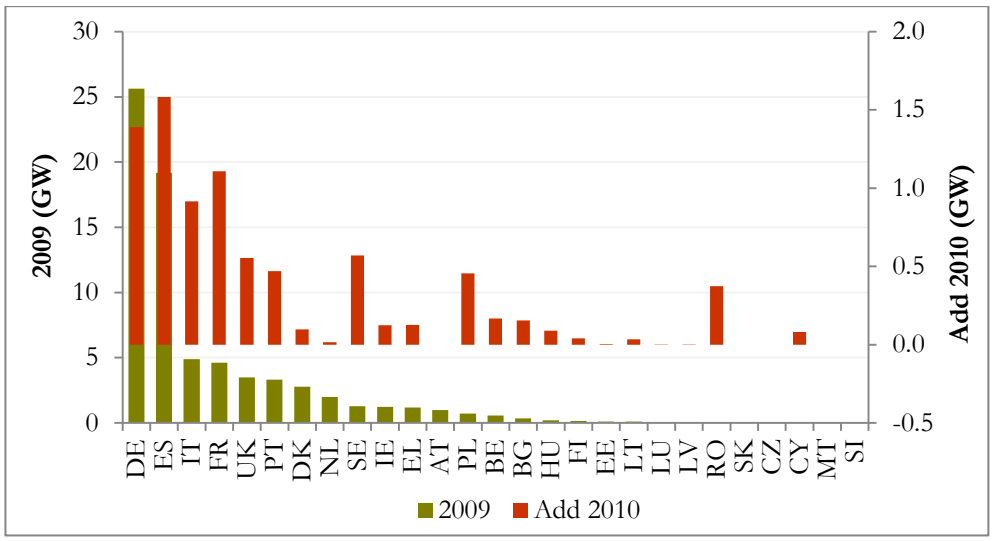

Figure 44[43]. Cumulative wind onshore capacity in EU 27, 2009-2010

Germany had the highest onshore wind installed capacity in both years with respectively 25.6 GW and 27GW. Spain followed with 19.2 GW and 20.7 GW together with Italy (4.9 GW and 5.8 GW), France (4.6 GW and 5.7 GW) and United Kingdom (3.5 GW and 4 GW).

Spain had the highest absolute increase in 2010 with +1.6 GW followed by Germany with +1.4 GW, France with +1.1 GW, Italy with 0.9 GW and Sweden with 0.6 GW.

The highest relative increase in onshore wind installed capacity in 2010 compared with 2009 was reported by Romania with 2571% (+374 MW).

Table 27 . Onshore wind installed capacity in EU 27, 2009-2010

	2009	2010	Additional 2010	
	MW	MW	MW	%
BE	555	723	168	30.3
BG	333	488	155	46.5
CZ	n.a	n.a	n.a	n.a
DK	2780	2877	97	3.5
DE	25640	27030	1390	5.4
EE	104	108	4	3.8
IE	1239	1364	125	10.1
EL	1171	1298	127	10.8
ES	19176	20759	1583	8.3
FR	4621	5729	1108	24.0
IT	4898	5814	916	18.7
CY	0	82	82	
LV	29	30	1	3.4
LT	98	133	35	35.7
LU	43	44	1	2.3

[43] MS are ranked according to their contribution to onshore wind installed capacity in 2009

HU	203	293	90	44.3
MT	0	0	0	
NL	1994	2009	15	0.8
AT	994	994	0	0.0
PL	724.7	1180.3	456	62.9
PT	3326	3796	470	14.1
RO	14.5	388.6	374	2571.2
SI	0	0	0	
SK	3	3	0	0.0
FI	147	188	41	27.9
SE	1285	1855	570	44.4
UK	3483	4037	554	15.9
EU 27	72861.1	81222.9	8362	11.5

Electricity generated from onshore wind capacity reached in 2010 the amount of 535.3 PJ (148.7 TWh) increasing by 60.4 PJ (16.7 TWh) from electricity generated in 2009 (475 PJ or 132 TWh).

Figure 45 and Table 28 report the detailed development of electricity generated by onshore wind in EU 27 in years 2009-2010.

Germany had the highest electricity generated by onshore wind in both years with respectively 148.3 PJ (41.2 TWh) and 154 PJ (42.9 TWh). In 2010 Spain followed Germany with 153.8 PJ (42.7 TWh) together with France with 37.8 PJ (10.5 TWh), Italy 31.6 PJ, Portugal and United Kingdom and 30.2 PJ (8395 TWh and 8932 TWh).

The highest absolute increase in electricity generated from onshore wind took place in Spain with +16 PJ (4.4 TWh) together with France with +8.7 PJ (2.4 TWh), Italy with +7 PJ (1.9 TWh), Germany with 6.1 PJ (1.7 TWh) and Portugal with +5 PJ (1.4 TWh).

The highest relative increase in wind onshore electricity generation was found still in Romania with 2966% (+1 PJ).

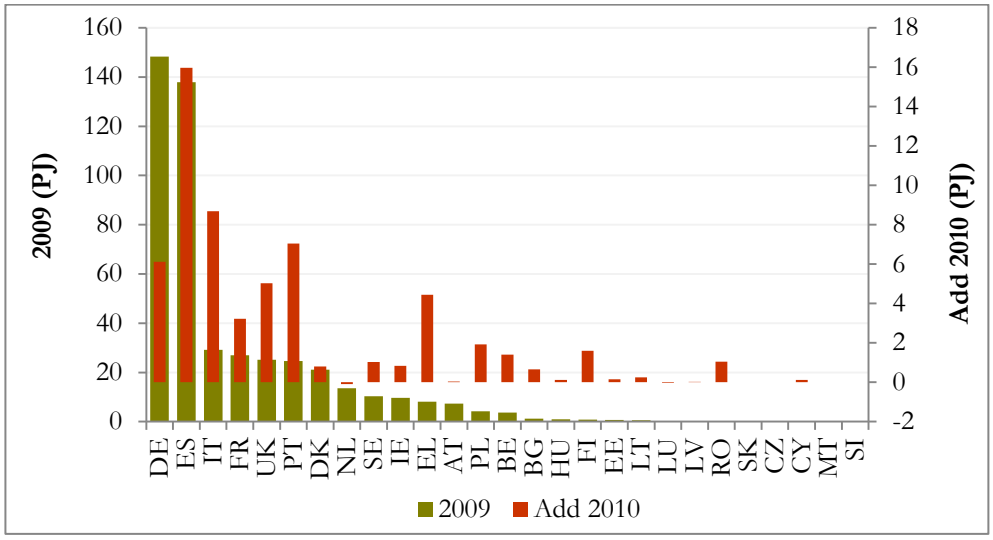

Figure 45[44]. Cumulative onshore wind electricity generated in EU 27, 2009-2010

[44] MS are ranked according to their contribution to onshore wind electricity in 2009

Table 28. Onshore wind electricity generated in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	3.6	5.0	1.4	38.5
BG	0.9	2.5	1.6	187.3
CZ	0.0	0.0	0.0	
DK	21.2	22.0	0.8	3.8
DE	148.3	154.4	6.1	4.1
EE	0.7	0.9	0.2	21.1
IE	10.4	11.4	1.0	9.9
EL	9.6	10.5	0.8	8.8
ES	137.9	153.8	16.0	11.6
FR	29.1	37.8	8.7	29.8
IT	24.6	31.6	7.0	28.7
CY	0.0	0.1	0.1	
LV	0.2	0.2	0.0	1.9
LT	0.6	0.9	0.3	40.2
LU	0.2	0.2	0.0	-12.7
HU	1.2	1.9	0.6	53.3
MT	0.0	0.0	0.0	
NL	13.5	13.5	-0.1	-0.7
AT	7.3	7.3	0.0	0.5
PL	4.2	6.1	1.9	46.1
PT	25.2	30.2	5.0	19.9
RO	0.0	1.1	1.0	2966.3
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	0.0
FI	1.0	1.1	0.1	12.5
SE	8.1	12.6	4.4	54.7
UK	27.0	30.2	3.2	11.9
EU 27	474.9	535.3	60.4	12.7

1.3.5.2 Offshore wind

Offshore wind installed capacity in the EU 27 reached 2001 MW in 2009 and 2899 MW in 2010, showing an increase in 2010 by 44.9% (+898 MW).

Figure 46 and Table 29 report the detailed development of offshore wind installed capacity in each MS of EU 27 in years 2009-2010.

Increases in wind offshore electricity installed capacity took place in four MS: UK with +400 MW (+42.5%), Denmark with +223 MW (+41.1%), Belgium with 165 MW (+523.8%) and Germany with 110 MW (+157.1%).

The leading countries in offshore wind power installed capacity in 2010 were UK with 1341 MW, followed by Denmark with 765 MW, The Netherlands with 228 MW, Belgium with 197 MW and Germany with 180 MW. The installed capacity of offshore wind plants in these five countries reached 64890 MW in 2010, representing 93.5% of the offshore wind plant capacity in EU27.

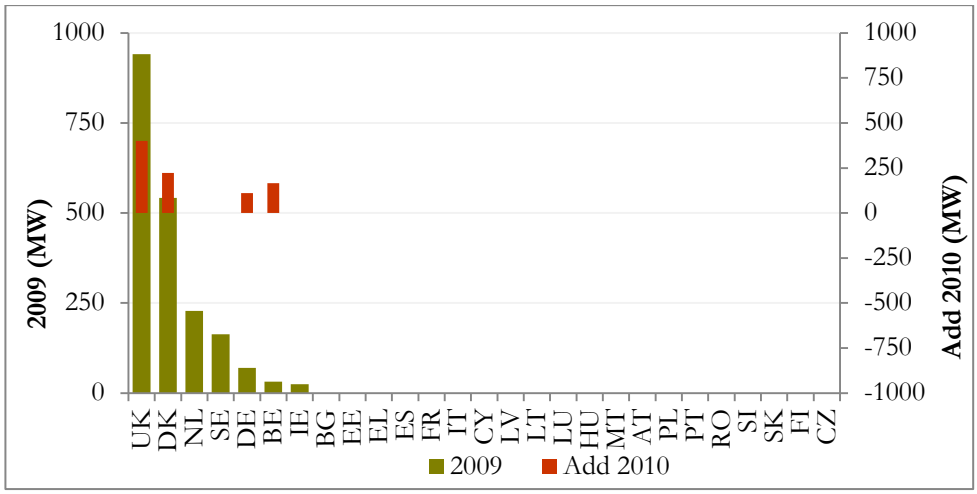

Figure 46[45]. Cumulative offshore wind installed capacity in EU 27, 2009-2010

Table 29 . Offshore wind installed capacity in EU 27, 2009-2010

	2009	2010	Additional 2010	
	MW	MW	MW	%
BE	32	197	165	523.8
BG	0	0	0	
CZ	n.a	n.a	n.a	n.a
DK	542	765	223	41.1
DE	70	180	110	157.1
EE	0	0	0	
IE	25	25	0	0.0
EL	0	0	0	
ES	0	0	0	
FR	0	0	0	
IT	0	0	0	
CY	0	0	0	
LV	0	0	0	
LT	0	0	0	
LU	0	0	0	
HU	0	0	0	
MT	0	0	0	
NL	228	228	0	0.0
AT	0	0	0	
PL	0	0	0	
PT	0	0	0	
RO	0	0	0	
SI	0	0	0	
SK	0	0	0	
FI	0	0	0	
SE	163	163	0	0.0
UK	941	1341	400	42.5
EU 27	2001	2899	898	44.9

[45] MS are ranked according to their contribution to offshore wind installed capacity in 2009

Electricity generated in offshore wind between 2009 and 2010 had an increase by 1956 GWh (21.8 PJ), increasing from 4090 GWh (14.7 PJ) in 2009 to 6043 GWh (21.8 PJ) in 2010, representing 47.8% of the electricity generation from offshore wind in 2009.

Figure 47 and Table 30 report the detailed development of offshore wind electricity generated in each MS of EU 27 in years 2009-2010.

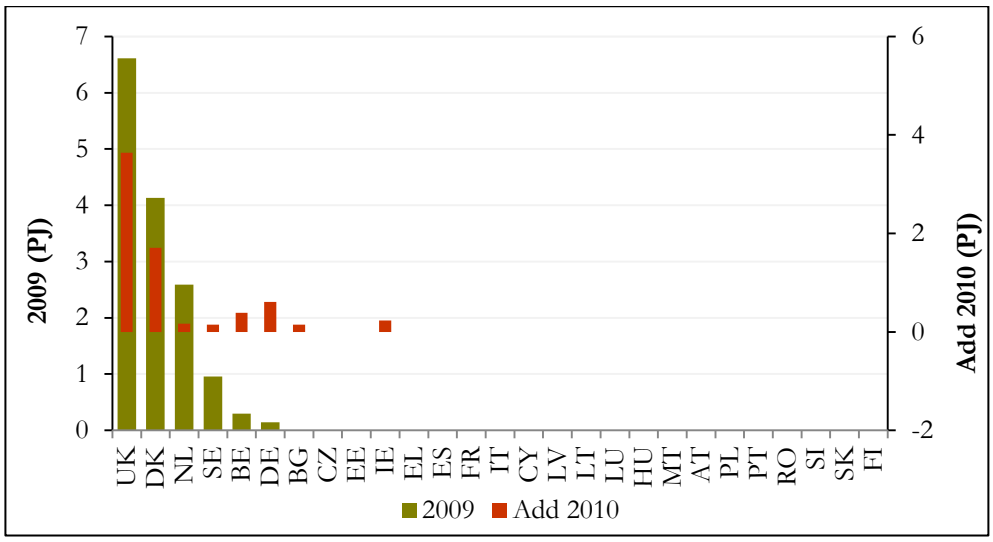

Figure 47[46]. Cumulative offshore wind electricity generated in EU 27, 2009-2010

The highest absolute increase in offshore wind electricity energy between 2009 and 2010 was registered in UK with 1011 GWh or 3.6 PJ (+55.1%), followed by Denmark with 475 GWh or 1.7 PJ (+41.4%), Germany with 170 GWh or 0.6 PJ (+425%), Belgium with 108 GWh or 0.2 PJ (+131.2%) and Ireland with 65 GWh or 0.2 PJ. The growth registered in the five MS accounted for 1828 GWh or 6.6 PJ, representing about 93.5% of the total growth in the offshore wind electricity generated in the EU27 in 2010.

Leading countries in wind offshore power production in 2010 were UK with 2847 GWh (10.2 PJ), Denmark with 1622 GWh (5.8 PJ), the Netherlands with 765 GWh (2.8), Sweden with 450 GWh (1.6 PJ) and Germany with 210 GWh (0.8 PJ). The installed capacity of wind offshore plants in these five countries reached 5751 GWh (20.7 PJ) in 2010, representing 95.1% of the wind offshore electricity generation in the EU27.

Table 30. Wind offshore electricity in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	0.3	0.7	0.4	131.2
BG	0.0	0.1	0.1	
CZ	n.a	n.a	n.a	n.a
DK	4.1	5.8	1.7	41.4
DE	0.1	0.8	0.6	425.0
EE	0.0	0.0	0.0	
IE	0.0	0.2	0.2	
EL	0.0	0.0	0.0	
ES	0.0	0.0	0.0	

[46] MS are ranked according to their contribution to offshore wind electricity in 2009

FR	0.0	0.0	0.0	
IT	0.0	0.0	0.0	
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	2.6	2.8	0.2	6.4
AT	0.0	0.0	0.0	
PL	0.0	0.0	0.0	
PT	0.0	0.0	0.0	
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	
SE	1.0	1.1	0.1	15.4
UK	6.6	10.2	3.6	55.1
EU 27	14.7	21.8	7.0	47.8

1.3.6 Heat pumps

Heat generated from heat pumps reached 180.9 PJ in 2010, increasing by 21.2 PJ or 13.3% compared to 159.7 PJ produced in 2009. This represented 5.5% and 5.4% of the renewable heat generated in 2009 and 2010, respectively.

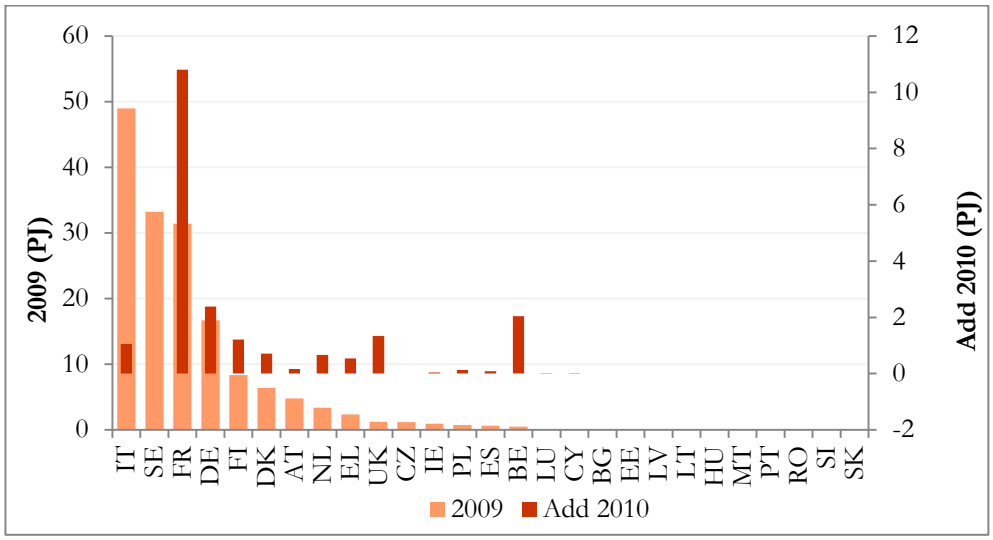

Figure 48[47]. Heat generation in heat pumps in EU 27, 2009-2010

Figure 48 and Table 31 report the detailed development of heat generated in heat pumps in each MS of EU 27 in years 2009-2010.

Several MS reported some changes in 2010 in the heat generated from heat pumps. The highest absolute increase in heat generated from heat pumps in 2010 in comparison with 2009 was

[47] MS are ranked according to their contribution to heat generation in heat pumps in 2009

registered in France with 10.8 PJ (34.4% increase), followed by Germany, with 2.4 PJ (14.3% increase), Belgium with 2.0 PJ (430.0%), UK with 1.3 PJ (110.3% increase) and Finland with 1.2 PJ (14.5% increase). The growth registered in these five MS accounted for 17.8 PJ, representing about 77.0% of the total growth in the heat generation by heat pumps in the EU27 in 2010.

Leading countries in heat production from heat pumps in 2010 were Italy with 50.0 PJ, France with 42.2 PJ, Sweden with 33.2 PJ, Germany with 16.7 PJ and Finland with 9.6 PJ. These five countries produced 154.1 PJ in 2010, representing about 84.7% of the heat generated from heat pumps in 2010.

Table 31 . Heat generated from heat pumps in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	0.5	2.5	2.0	428.9
BG	0.0	0.0	0.0	
CZ	n.a	n.a	n.a	n.a
DK	6.4	7.1	0.7	11.1
DE	16.7	19.1	2.4	14.3
EE	0.0	0.0	0.0	
IE	0.9	1.0	0.0	4.5
EL	2.3	2.9	0.5	23.2
ES	0.6	0.7	0.1	13.3
FR	31.4	42.2	10.8	34.4
IT	49.0	50.0	1.0	2.1
CY	0.0	0.0	0.0	114.3
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	25.0
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	3.4	4.1	0.7	19.8
AT	4.8	5.0	0.2	3.5
PL	0.8	0.9	0.1	17.1
PT	0.0	0.0	0.0	
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	8.4	9.6	1.2	14.5
SE	33.2	33.2	0.0	0.0
UK	1.2	2.6	1.3	110.3
EU 27	159.7	180.9	21.2	13.3

1.3.7 Bioenergy

Bioenergy in EU 27 was 3550.9 PJ in 2009, increasing by +470.0 PJ (+13.2%) to 4021 PJ in 2010. The contribution of bioenergy in total renewable energy increased from 62.4% in 2009 to 65.4% in 2010.

Figure 49 and Table 32 report the detailed development of bioenergy (electricity, heating and cooling and biofuels) in each MS of EU 27 in years 2009-2010.

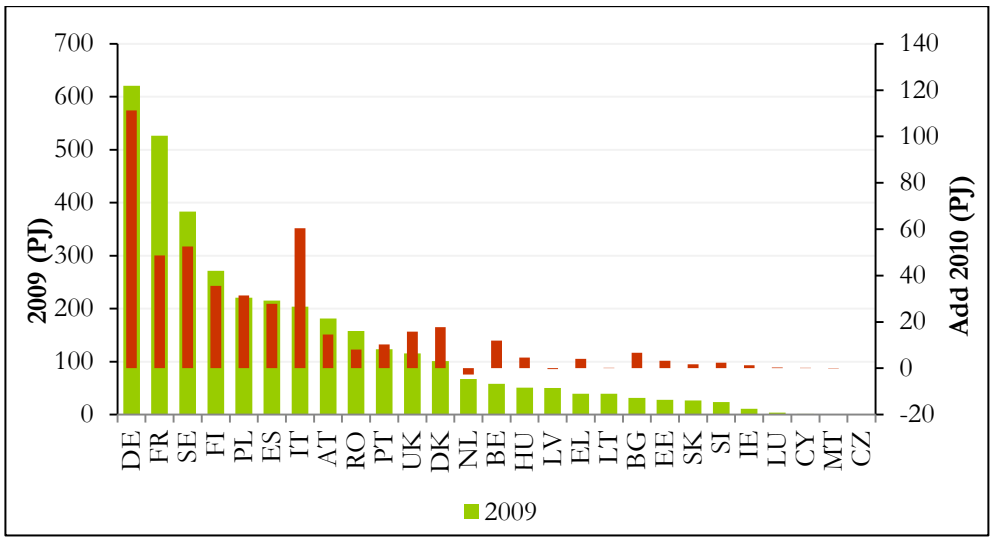

Figure 49[48]. Cumulative bioenergy in EU 27, 2009-2010

The highest absolute increase in bioenergy generation between 2009 and 2010 was registered in Germany with 113.3 PJ (+17.9%), followed by Italy with 60.4 PJ (+29.7%), Sweden with 52.6 PJ (13.7%), France with 48.7 PJ (+9.2%) and Finland with 35.5 PJ (+13.1%). The growth registered in these five MS accounted for 310.5 PJ, representing about 66% of the total growth in the bioenergy in the EU27 in 2010.

Germany was the leading country in bioenergy generation in 2010, with 731.7 PJ, followed by France with 575.2 PJ, Sweden with 436.0 PJ, Finland with 306.6 PJ, and Italy with 264.0 PJ. The contribution of these MS in bioenergy generation during 2010 was around 2313.6 PJ, representing 57.5% of bioenergy generation in the EU 27.

Table 32. Bioenergy generation in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	58.4	70.4	12	20.5
BG	31.4	38.2	6.8	21.7
CZ	0		0	
DK	101	118.7	17.7	17.5
DE	620.4	731.7	111.3	17.9
EE	28	31.2	3.2	11.4
IE	11	12.4	1.4	12.7
EL	39.4	43.5	4.1	10.4
ES	215.1	243	27.9	13.0
FR	526.5	575.2	48.7	9.2
IT	203.6	264	60.4	29.7
CY	1.5	1.6	0.1	6.7
LV	50.2	49.9	-0.3	-0.6
LT	39.1	39.2	0.1	0.3

[48] MS are ranked according to their contribution to bioenergy in 2009

LU	4	4.3	0.3	7.5
HU	50.8	55.4	4.6	9.1
MT	0.1	0	-0.1	-100.0
NL	66.9	64.2	-2.7	-4.0
AT	181.2	195.8	14.6	8.1
PL	220.9	252.4	31.5	14.3
PT	123.2	133.5	10.3	8.4
RO	157.6	165.7	8.1	5.1
SI	23.6	28.2	4.6	19.5
SK	26.7	28.4	1.7	6.4
FI	271.1	306.6	35.5	13.1
SE	383.4	436	52.6	13.7
UK	115.7	131.4	15.7	13.6
EU 27	3551	4021	470	13.2

1.3.7.1 Biomass

a. Biomass electricity

Biomass electricity installed capacity in EU 27 reached 22837 MW in 2009 and 24970 MW in 2010, showing an increase by 9.3% (+2133 MW) in 2010.

Figure 50 and Table 33 report the detailed development of biomass electricity installed capacity in each MS of EU 27 in years 2009-2010.

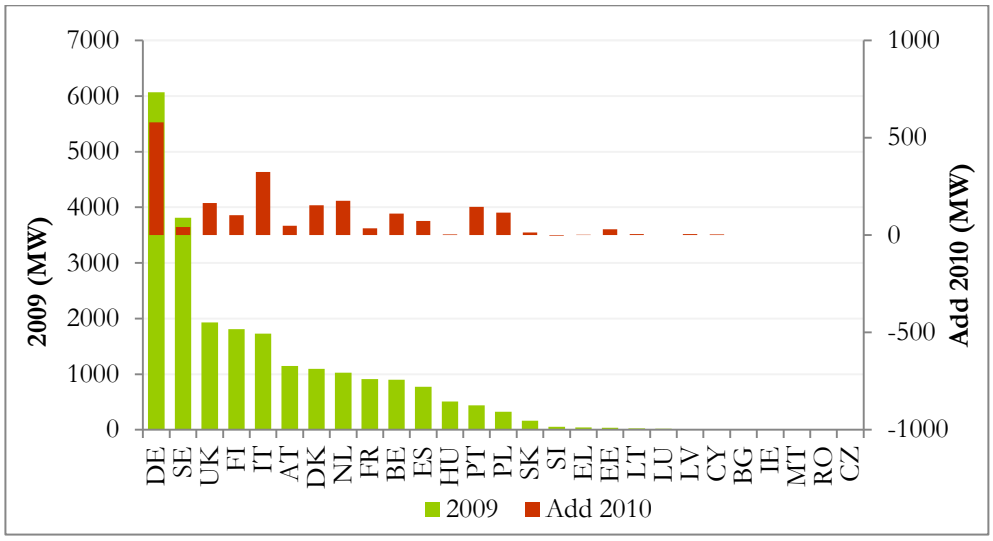

Figure 50[49]. Biomass electricity installed capacity in EU 27, 2009-2010

The highest absolute increases in biomass electricity installed capacity took place in Germany with +580 MW (+9.6%), Italy with +325 MW (+18.8%), the Netherlands with +177 MW (17.2%), UK with 165 MW (+8.5%) and Denmark with 154 MW (14.1%). The growth registered in these five MS accounted for 1401 MW, representing about 62.4% of the total growth in the biomass power capacity in the EU27 in 2010.

[49] MS are ranked according to their contribution to biomass electricity installed capacity in 2009

Germany was the leading country in biomass electricity installed capacity with 6650 MW in 2010, followed by Sweden with 3854 MW, UK with 1932 MW, Italy with 2053 MW and Finland with 1910 MW. The contribution of these five MS in total biomass electricity installed capacity in EU 27 in 2010 was 16564 MW, representing 66.0% of the total installed capacity in the EU 27.

Table 33. Biomass electricity installed capacity in EU 27, 2009-2010

	2009	2010	Additional 2010	
	MW	MW	MW	%
BE	901	1011	110	12.2
BG	3	3	0	0.0
CZ	n.a	n.a	n.a	n.a
DK	1094	1248	154	14.1
DE	6070	6650	580	9.6
EE	37	67	30	81.1
IE	0	0	0	
EL	41	43	2	4.9
ES	774	846	72	9.3
FR	914	949	35	3.8
IT	1728	2053	325	18.8
CY	4	8	4	85.9
LV	10	16	6	60.0
LT	24	29	5	20.8
LU	17	17	0	0.0
HU	509	514	5	0.9
MT	0	0	0	
NL	1028	1205	177	17.2
AT	1150	1198	48	4.2
PL	323	439	116	35.8
PT	442	587	145	32.8
RO	0	0	0	
SI	52	49	-3	-5.8
SK	164	178	14	8.5
FI	1807	1910	103	5.7
SE	3813	3854	41	1.1
UK	1932	2097	165	8.5
EU 27	22837	24970	2133	9.3

Electricity generated from biomass in EU 27 was 389.0 PJ in 2009, increasing by +48.2 PJ (+12.4%) to 437.2 PJ in 2010.

Figure 51 and Table 34 report the detailed development of biomass electricity generated in each MS of EU 27 in years 2009-2010.

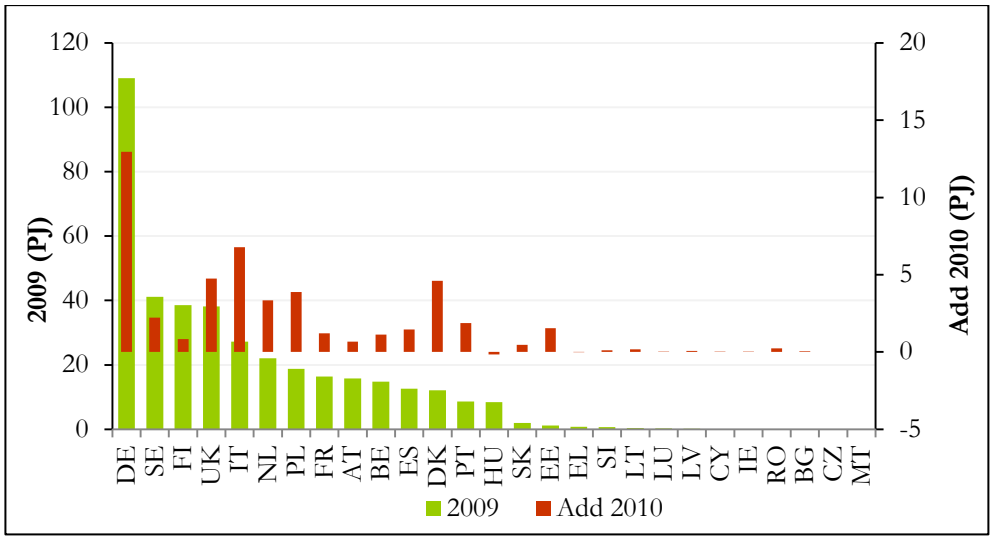

Figure 51[50]. Cumulative biomass electricity generated in EU 27, 2009-2010

The highest absolute increase in generated electricity from biomass between 2009 and 2010 was registered in Germany with 13.0 PJ (+11.9%), followed by Italy with 6.8 PJ (+24.9%), UK with 4.7 PJ (12.4%), Denmark with 4.6 PJ (+38.2%) and Poland with 3.9 PJ (+20.7%) and the Netherlands with 3.3 PJ (+15.2%). The growth registered in these five MS accounted for 33.0 PJ, representing about 59.8% of the total growth in the biomass electricity generation in the EU27 in 2010.

Germany was the leading country in biomass electricity generation in 2010, with 122.0 PJ, followed by Sweden with 43.3.8 PJ, UK with 42.9 PJ, Finland with 39.4 PJ, and Italy with 34.0 PJ. The contribution of these MS in total biomass electricity generated during 2010 was around 281.6 PJ, representing 63.9% of biomass electricity generated in the EU 27.

Table 34. Biomass electricity generation in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	14.8	15.9	1.1	7.6
BG	0.01	0.06	0.05	300.0
CZ	n.a	n.a	n.a	n.a
DK	12.1	16.7	4.6	38.2
DE	109.1	122.0	13.0	11.9
EE	1.1	2.7	1.5	136.4
IE	0.1	0.1	0.0	22.7
EL	0.8	0.8	0.0	-0.9
ES	12.6	14.0	1.5	11.6
FR	16.3	17.6	1.2	7.4
IT	27.2	34.0	6.8	24.9
CY	0.1	0.1	0.0	32.5
LV	0.2	0.2	0.1	34.7
LT	0.4	0.5	0.2	44.1
LU	0.3	0.3	0.0	7.7
HU	8.4	8.2	-0.2	-1.9
MT	0.0	0.0	0.0	

[50] MS are ranked according to their contribution to biomass electricity in 2009

NL	22.1	25.4	3.3	15.2
AT	15.7	16.4	0.7	4.2
PL	18.8	22.7	3.9	20.7
PT	8.6	10.5	1.9	21.8
RO	0.0	0.3	0.2	1234.5
SI	0.7	0.8	0.1	15.0
SK	1.9	2.4	0.5	24.4
FI	38.6	39.4	0.8	2.1
SE	41.1	43.3	2.2	5.4
UK	38.1	42.9	4.7	12.4
EU 27	389.0	437.2	48.2	12.4

b. Biomass heating/cooling

Heat generated from biomass reached 3035.4 PJ in 2010, increasing by 13.4% compared to 2677.4 PJ produced in 2009. This represented 91.8% and 91.9% of the renewable heat generated in 2009 and 2010 in EU 27, respectively.

Figure 52 and Table 35 report the detailed development of biomass heating in each MS of EU 27 in years 2009-2010.

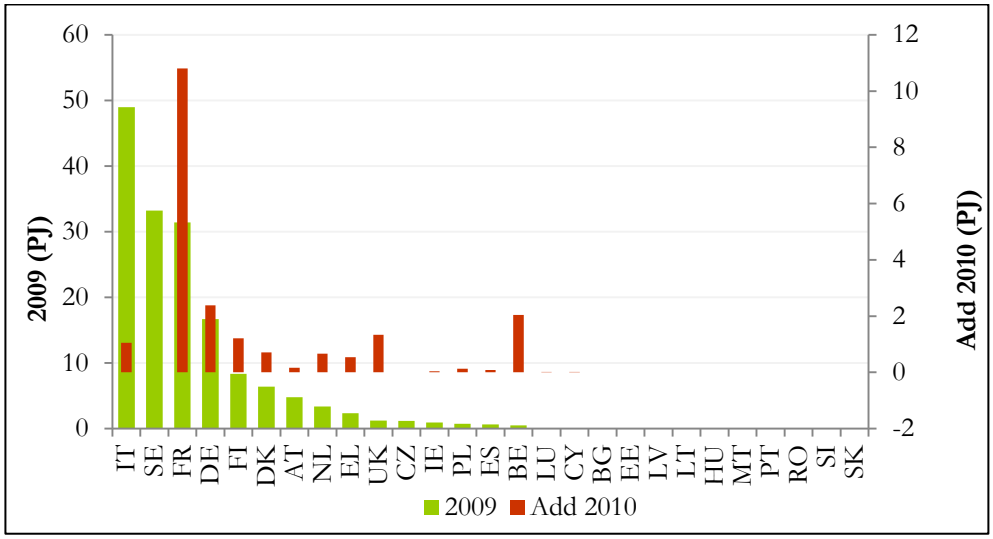

Figure 52[51]. Cumulative biomass heating in EU 27, 2009-2010

Most of the MS reported some growth in 2010 in the heat generated from biomass. The highest increase in 2010 in comparison with 2009 was registered in Germany with 88.8 PJ (22.6%), followed by Sweden with 48.9 PJ (15.0%), France with 46.8 PJ (11.5%), Italy with 41.7 PJ (32.8%) and Finland with 34.7 PJ (15.3%). The growth registered in the five MS accounted for 260.9 PJ, representing about 61.1% of the total growth in the biomass electricity generation in the EU27 in 2010.

Leading countries in heat production from biomass in 2010 were Germany with 482.0 PJ, France with 453.8 PJ, Sweden with 374.7 PJ, Finland with 261.7 PJ and Poland with 192.6 PJ. These countries produced 1764.8 PJ in 2010, representing about 56.9% of the heat generated from biomass in 2010.

[51] MS are ranked according to their contribution to biomass heating in 2009

Table 35. Biomass heating generated in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	34.1	40.1	6.0	17.6
BG	31.2	37.6	6.4	20.5
CZ	n.a	n.a	n.a	n.a
DK	88.9	102.0	13.1	14.7
DE	393.2	482.0	88.8	22.6
EE	26.9	28.6	1.6	6.1
IE	7.7	8.4	0.7	8.4
EL	35.3	37.3	2.0	5.7
ES	158.3	169.7	11.4	7.2
FR	407.0	453.8	46.8	11.5
IT	127.0	168.6	41.7	32.8
CY	0.8	0.8	0.0	4.0
LV	49.8	48.5	-1.3	-2.7
LT	36.6	36.8	0.3	0.7
LU	1.9	2.3	0.3	18.0
HU	35.3	39.8	4.5	12.7
MT	0.0	0.0	0.0	-6.7
NL	29.3	29.2	0.0	-0.1
AT	143.2	157.7	14.5	10.1
PL	174.4	192.6	18.2	10.4
PT	105.0	109.2	4.2	4.0
RO	157.6	165.4	7.8	5.0
SI	22.9	25.2	2.3	10.2
SK	21.8	22.6	0.8	3.6
FI	227.1	261.7	34.7	15.3
SE	325.7	374.7	48.9	15.0
UK	36.1	40.5	4.4	12.1
EU 27	2677.4	3035.4	358.1	13.4

1.3.7.1.1 Solid biomass

a. Solid biomass electricity

Solid biomass electricity installed capacity in the EU 27 reached 18023 MW in 2009 and 19158 MW in 2010, showing an increase by 6.3% (+1135 MW) in 2010. Figure 46 and Table 30 report the detailed development of solid biomass electricity capacity in each MS of EU 27 in years 2009-2010.

Figure 53 and Table 36 report the detailed development of solid biomass electricity capacity in EU 27 in years 2009-2010.

The highest absolute increases in solid biomass electricity installed capacity in 2010 took place in the Netherlands with +167 MW (+20.2%), UK with +165 MW (+8.5%), Denmark with +151 MW (+14.8%), Portugal with 140 MW (+33.2%) and Poland with 104 MW (+41.1%). The growth registered in these five MS accounted for 727 MW, representing about 64.0% of the total growth in the solid biomass installed capacity in the EU27 in 2010.

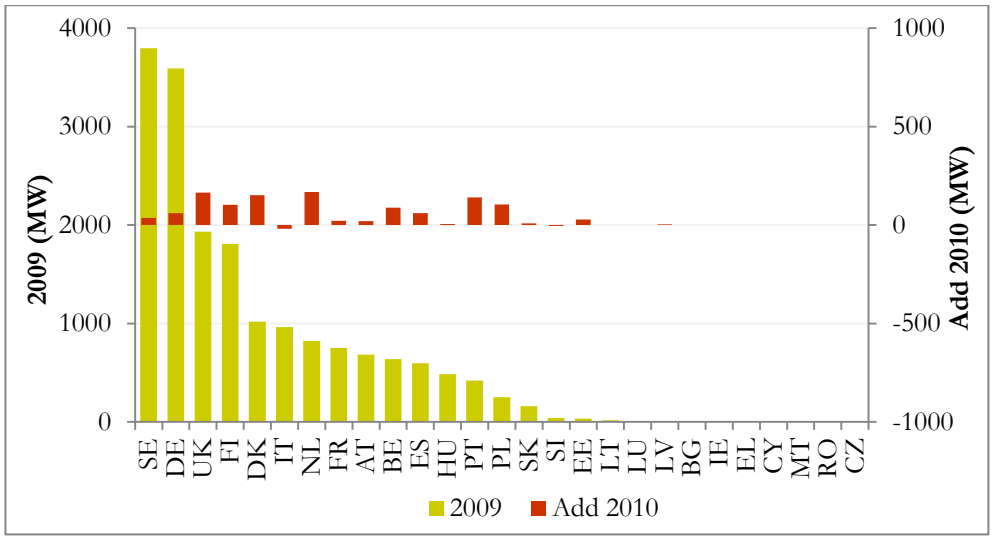

Figure 53[52]. Cumulative solid biomass electricity installed capacity in EU 27, 2009-2010

Germany was the leading country in biomass electricity installed capacity with 6650 MW in 2010, followed by Sweden with 3854 MW, UK with 1932 MW, Italy with 2053 MW and Finland with 1910 MW. The contribution of these five MS in total biomass electricity installed capacity in EU 27 in 2010 was 16564 MW, representing 66.0% of the total installed capacity in the EU 27.

Table 36. Solid biomass electricity installed capacity in EU 27, 2009-2010

	2009	2010	Additional 2010	
	MW	MW	MW	%
BE	638	727	89	13.9
BG	0	0	0	0
CZ	n.a	n.a	n.a	n.a
DK	1,017	1,168	151	14.8
DE	3,590	3,650	60	1.7
EE	35	63	28	80.0
IE	0	0	0	0
EL	0	0	0	
ES	597	657	60	10.1
FR	753	774	21	2.8
IT	964	944	-20	-2.1
CY	0	0	0	0
LV	2	5	3	150.0
LT	16	16	0	0.0
LU	8	8	0	0.0
HU	485	490	5	0.9
MT	0	0	0	,
NL	825	992	167	20.2
AT	684	704	20	2.9
PL	252	356	104	41.1
PT	422	562	140	33.2

[52] MS are ranked according to their contribution to solid biomass electricity installed capacity in 2009

RO	0	0	0	,
SI	40	35	-5	-12.5
SK	160	169	9	5.6
FI	1,807	1,910	103	5.7
SE	3,796	3,832	36	0.9
UK	1,932	2,097	165	8.5
EU 27	18,023	19,158	1135	6.3

Electricity generated from solid biomass in the EU 27 was 301.2 PJ in 2009, increasing by +27.4 PJ (+9.1%) to 328.6 PJ in 2010. Figure 47 and Table 31 report the d development of solid biomass electricity generated in each MS of EU 27 in years 2009-2010.

Figure 54 and Table 37 report the detailed development of solid biomass electricity generated in EU 27 in years 2009-2010.

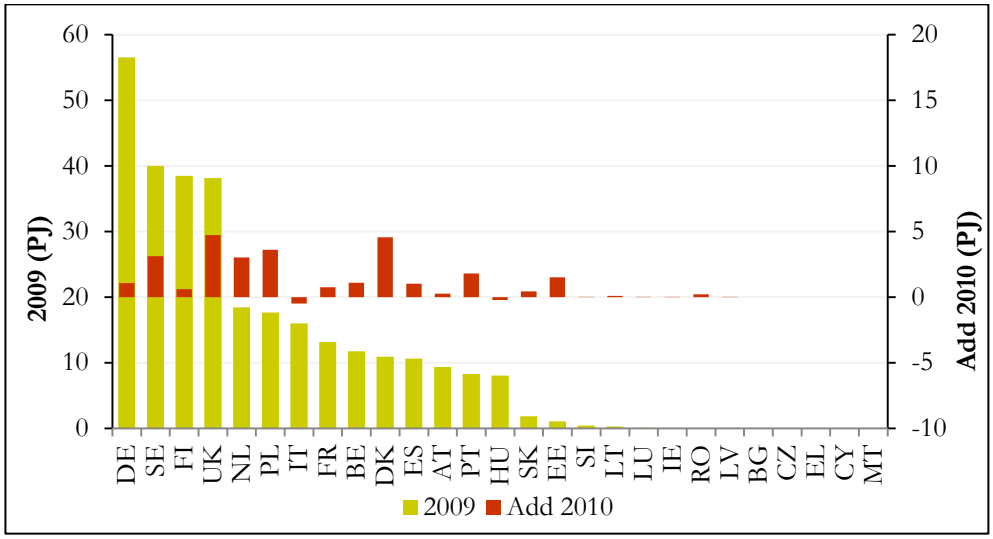

Figure 54[53]. Cumulative solid biomass electricity generation in EU 27, 2009-2010

The highest absolute increase in electricity generation from solid biomass between 2009 and 2010 was registered in UK with 4.7 PJ (+12.4%), followed by Denmark with 4.6 PJ (+41.8%), Poland with 3.6 PJ (+20.4%), Sweden with 3.1 PJ (+7.8%) and the Netherlands with 3.0 PJ (+16.4%). The growth registered in the five MS accounted for 19.1 PJ, representing about 64.6% of the total growth in the EU27 in 2010.

Two MS registered some decrease in the electricity generation from solid biomass in 2010 compared to 2009: Italy with 0.5 PJ (-3.1%) and Hungary with 0.2 PJ (-2.7%).

The leading country in solid biomass electricity generation in 2010 was Germany with 57.6 PJ, followed by Sweden with 43.1 PJ, UK with 42.9 PJ, Finland with 39.1 PJ and the Netherlands with 21.5 PJ. The contribution of these MS in total biomass electricity generated during 2010 was around 204.2 PJ, representing 61.3% of electricity generated from solid biomass in the EU 27.

[53] MS are ranked according to their contribution to solid biomass electricity in 2009

Table 37. Solid biomass electricity generation in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	11.8	12.9	1.1	9.4
BG	0.0	0.0	0.0	
CZ	n.a	0.0	n.a	n.a
DK	10.9	15.5	4.6	41.8
DE	56.5	57.6	1.1	1.9
EE	1.1	2.6	1.5	138.6
IE	0.0	0.0	0.0	50.0
EL	0.0	0.0	0.0	
ES	10.6	11.7	1.0	9.6
FR	13.2	13.9	0.8	5.7
IT	16.0	15.5	-0.5	-3.1
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	125.0
LT	0.3	0.4	0.1	33.3
LU	0.1	0.1	0.0	12.0
HU	8.1	7.8	-0.2	-2.7
MT	0.0	0.0	0.0	
NL	18.4	21.5	3.0	16.4
AT	9.4	9.6	0.3	2.9
PL	17.7	21.3	3.6	20.4
PT	8.3	10.1	1.8	21.9
RO	0.0	0.2	0.2	1296.0
SI	0.4	0.5	0.0	0.8
SK	1.9	2.3	0.4	23.5
FI	38.5	39.1	0.6	1.6
SE	40.0	43.1	3.1	7.8
UK	38.1	42.9	4.7	12.4
EU 27	301.2	328.6	27.4	9.1

b. Solid biomass heating/cooling

The use of solid biomass for heating/cooling in the EU 27 was 2508.9 PJ in 2009, increasing by +315.1 PJ (+12.6%) to 2824.0 PJ in 2010.

Figure 55 and Table 38 report the detailed development of solid biomass heating/cooling in each MS of EU 27 in years 2009-2010.

The highest absolute increase in the use of heating/cooling from solid biomass between 2009 and 2010 was registered in Germany with 57.7 PJ (+16.9%), followed by Sweden with 48.4 PJ (+15.3%), France with 46.3 PJ (+11.5%), Italy with 40.1 PJ (+34.7%) and Finland with 34.2 PJ (+15.1%). The growth registered in the five MS accounted for 226.8 PJ, representing about 72.0% of the total growth in the biomass electricity generation in the EU27 in 2010.

A few MS registered some decrease in the heating and cooling from solid biomass in 2010 compared to 2009: Latvia with 1.4 PJ (-2.8%), Cyprus with 0.03 PJ (-3.9%) and Malta with 0.07 PJ (34.0%).

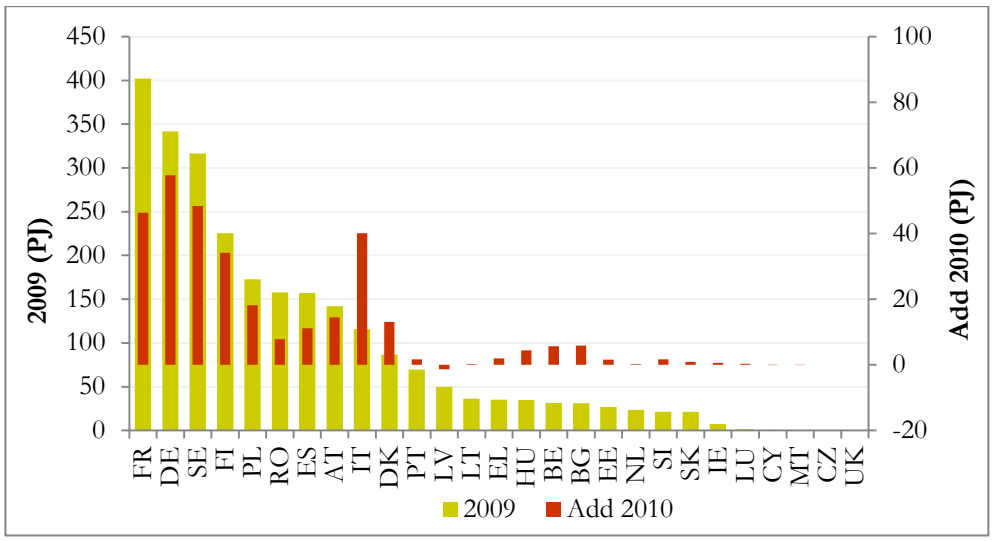

Figure 55[54]. Cumulative solid biomass heating/cooling in EU 27, 2009-2010

The leading country in heating and cooling from solid biomass in 2010 was France with 448.4 PJ, followed by Germany with 399.3 PJ, Sweden with 364.8 PJ, Finland with 259.7 PJ and Poland with 190.7 PJ. The contribution of these five MS in total heating and cooling from solid biomass during 2010 was around 1662.9 PJ, representing 57.4% of heating and cooling from solid biomass in the EU 27.

Table 38. Biomass heating and cooling in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	31.6	37.3	5.7	17.9
BG	31.1	37.0	5.9	19.0
CZ	n.a	n.a	n.a	n.a
DK	86.9	99.9	13.1	15.0
DE	341.6	399.3	57.7	16.9
EE	26.9	28.5	1.5	5.8
IE	7.5	8.1	0.6	8.4
EL	35.3	37.3	2.0	5.6
ES	157.0	168.1	11.1	7.1
FR	402.1	448.4	46.3	11.5
IT	115.7	155.8	40.1	34.7
CY	0.7	0.7	0.0	-3.9
LV	49.7	48.3	-1.4	-2.8
LT	36.4	36.6	0.2	0.5
LU	1.7	2.0	0.3	20.1
HU	35.0	39.4	4.4	12.7
MT	0.0	0.0	0.0	-34.0
NL	23.7	23.8	0.2	0.7

[54] MS are ranked according to their contribution to solid biomass heating/cooling in 2009

AT	141.8	156.3	14.5	10.2
PL	172.6	190.7	18.1	10.5
PT	69.4	71.1	1.7	2.5
RO	157.5	165.4	7.8	5.0
SI	21.4	23.1	1.7	7.8
SK	21.4	22.3	0.9	4.3
FI	225.5	259.7	34.2	15.1
SE	316.4	364.8	48.4	15.3
UK	0.0	0.0	0.0	
EU 27	2508.9	2824.0	315.1	12.6

1.3.7.1.2 Biogas

a. Biogas electricity

Biogas electricity installed capacity in the EU 27 reached 3625 MW in 2009 and 4440 MW in 2010, showing an increase by 22.5% (+815 MW) in 2010.

Figure 56 and Table 39 report the detailed development of biogas electricity capacity in each MS of EU 27 in years 2009-2010.

The highest absolute increases in biogas electricity in 2010 installed capacity took place in Germany with +580 MW (+27.0%), Italy with +130 MW (+34.4%), the Netherlands with +10 MW (+5.4%%), Spain with 12 MW (+6.8%) and France with 14 MW (+8.7%). The growth registered in the five MS accounted for 748 MW, representing about 80.6% of the total growth in the biogas electricity generation in the EU27 in 2010.

Germany was the leading country in biogas electricity installed capacity with 2730 MW in 2010, followed by Italy with 508 MW, the Netherlands with 196 MW, Spain with 189 MW and France with 175 MW. The contribution of these MS in total biogas electricity installed capacity in EU 27 in 2010 was 3798 MW, representing 83.4% of the total biogas installed capacity in the EU 27.

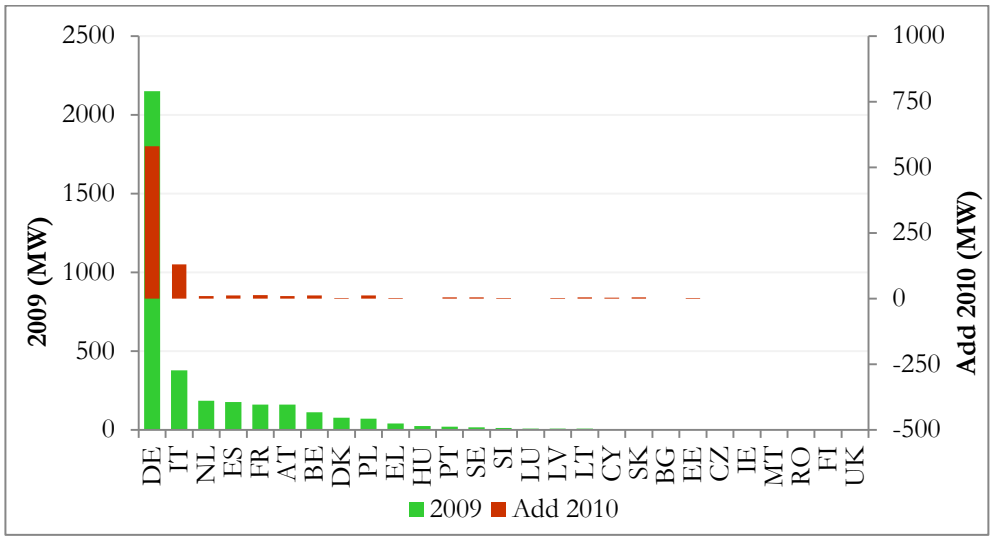

Figure 53[55]. Cumulative biogas electricity installed capacity in EU 27, 2009-2010

[55] MS are ranked according to their contribution to biogas electricity installed capacity in 2009

Table 39. Biogas electricity installed capacity in EU 27, 2009-2010

	2009	2010	Additional 2010	
	MW	MW	MW	%
BE	112	124	12	10.6
BG	3	3	0	0.0
CZ	n.a	n.a	n.a	n.a
DK	77	80	3	3.9
DE	2150	2730	580	27.0
EE	2	4	2	100.0
IE	0	0	0	
EL	41	43	2	4.9
ES	177	189	12	6.8
FR	161	175	14	8.7
IT	378	508	130	34.4
CY	4	8	4	85.9
LV	8	11	3	37.5
LT	8	13	5	62.5
LU	9	9	0	0.0
HU	24	24	0	0.0
MT	0	0	0	
NL	186	196	10	5.4
AT	161	171	10	6.2
PL	71	83	12	16.9
PT	20	25	5	25.0
RO	0	0	0	
SI	12	14	2	16.7
SK	4	9	5	125.0
FI	0	0	0	
SE	17	22	5	29.4
UK	0	0	0	
EU 27	3625	4440	815	22.5

Electricity generated from biogas in the EU 27 was 68.6 PJ (19047 GWh) in 2009, increasing by +17.2 PJ or 4771 GWh (+25.0%) to 85.7 PJ (23818 GWh) in 2010.

Figure 57 and Table 40 report the detailed development of biogas electricity generated in each MS of EU 27 in years 2009-2010.

The highest absolute increase in electricity generation from biogas between 2009 and 2010 was registered in Germany with 13.0 PJ (+28.6%), followed by Italy with 1.4 PJ (+23.4%), France with 0.5 PJ (+14.5%), Spain with 0.4 PJ (+23.2%) and the Netherlands with 0.4 PJ (+11.8%). The growth registered in the five MS accounted for 17.5 PJ, representing about 90.2% of the total growth in the biogas electricity generation in the EU27 in 2010.
The leading country in biogas electricity generation in 2010 was Germany with 58.3 PJ, followed by Italy with 7.4 PJ, the Netherlands with 3.8 PJ, France with 3.6 PJ and Spain with 2.4 PJ. The contribution of these five MS in total biogas electricity generated during 2010 was around 75.5 PJ, representing 85.8% of electricity generated from biogas in the EU 27.

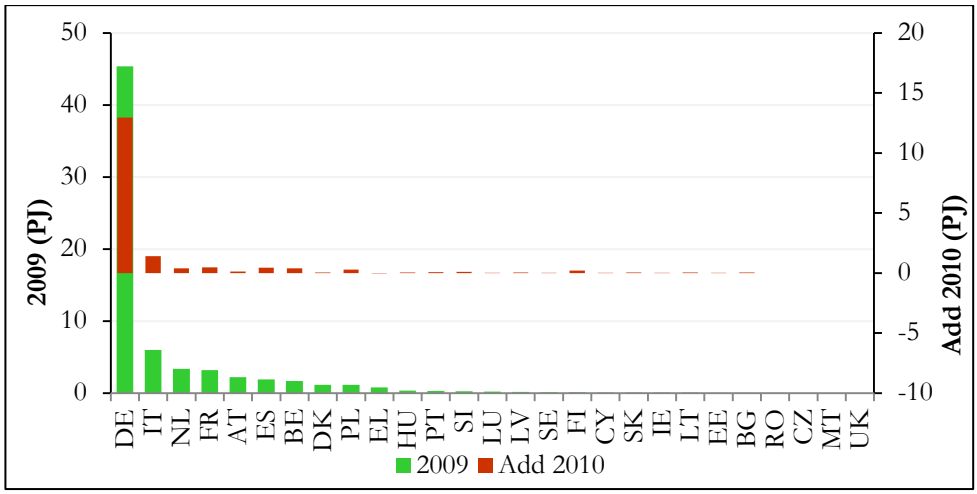

Figure 57[56]. Cumulative biogas electricity generation in EU 27, 2009-2010.

Table 40. Biogas electricity generation in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	1.7	2.0	0.4	22.9
BG	0.0	0.1	0.0	300.0
CZ				
DK	1.2	1.2	0.0	4.1
DE	45.4	58.3	13.0	28.6
EE	0.0	0.0	0.0	42.9
IE	0.1	0.1	0.0	12.5
EL	0.8	0.8	0.0	-0.9
ES	1.9	2.4	0.4	23.2
FR	3.2	3.6	0.5	14.5
IT	6.0	7.4	1.4	23.4
CY	0.1	0.1	0.0	32.5
LV	0.2	0.2	0.0	26.7
LT	0.1	0.1	0.1	106.7
LU	0.2	0.2	0.0	5.7
HU	0.3	0.4	0.1	16.7
MT	0.0	0.0	0.0	
NL	3.4	3.8	0.4	11.8
AT	2.2	2.3	0.1	6.2
PL	1.1	1.4	0.3	24.8
PT	0.3	0.4	0.1	20.5
RO	0.0	0.0	0.0	-0.8
SI	0.2	0.3	0.1	40.6
SK	0.1	0.1	0.0	45.5
FI	0.1	0.3	0.2	178.1
SE	0.1	0.1	0.0	5.9
UK	0.0	0.0	0.0	
EU 27	68.6	85.7	17.2	25.0

[56] MS are ranked according to their contribution to biogas electricity in 2009

1.3.7.2 Biogas heating/cooling

The energy produced by biogas for heating/cooling in the EU 27 amounted to 60.6 PJ (1448 ktoe) in 2009, increasing by 20.2 PJ or 482 ktoe (+33.3%) to 80.8 PJ (1929 ktoe) in 2010.

Figure 58 and Table 41 report the detailed development of biogas in heating/cooling in each MS of EU 27 in years 2009-2010.

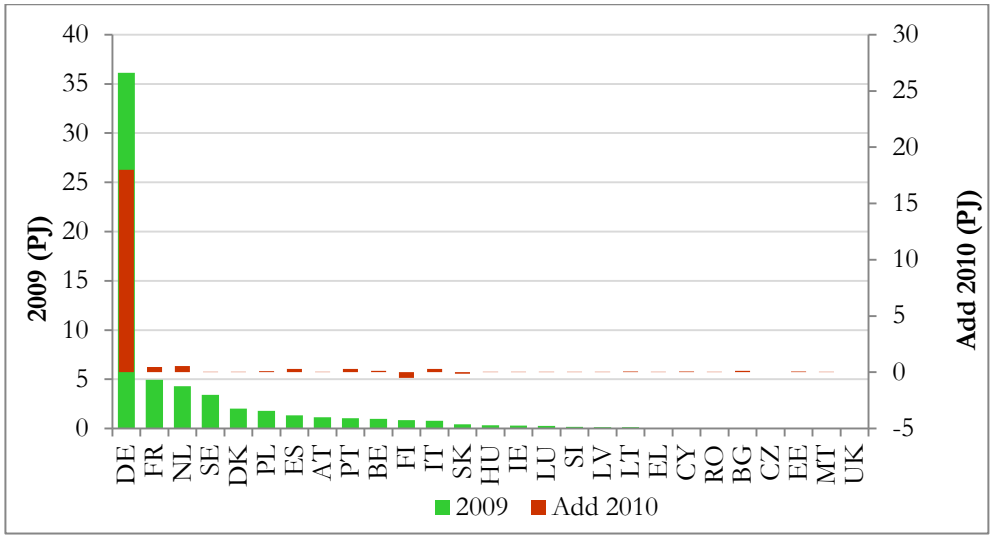

Figure 58[57]. Cumulative biogas heating/cooling in EU 27, 2009-2010.

The highest absolute increase in the use of heating/cooling from biogas between 2009 and 2010 was registered in Germany with 18.0 PJ (+49.8%), followed by the Netherlands with 0.5 PJ (+12.6%), France with 0.5 PJ (+9.3%), Spain with 0.3 PJ (+21.9%) and Portugal with 0.3 PJ (+28.0%). The growth registered in these five MS accounted for 21.5 PJ, representing about 96.2% of the total growth in the biogas heating/cooling in the EU27 in 2010.

Two MS registered some decrease in the heating/cooling from biogas in 2010 compared to 2009: Finland with 0.5 PJ (-60.0%) and Slovakia with 0.1 PJ (-30.0%).

The leading country in heating and cooling from biogas in 2010 was Germany with 54.1 PJ, followed by far by France with 5.4 PJ, the Netherlands with 4.9 PJ, Sweden with 3.5 PJ and Denmark with 2.1 PJ. The contribution of these five MS was around 69.9 PJ, representing 84.3% of heating and cooling from biogas in the EU 27 in 2010.

Table 41. Biogas heating and cooling in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	1.0	1.1	0.1	11.5
BG	0.0	0.1	0.1	
CZ	n.a	n.a	n.a	n.a
DK	2.0	2.1	0.0	2.1
DE	36.1	54.1	18.0	49.8
EE	0.0	0.1	0.1	
IE	0.3	0.3	0.0	8.6

[57] MS are ranked according to their contribution to biogas heating/cooling in 2009

EL	0.1	0.1	0.0	53.8
ES	1.3	1.6	0.3	21.9
FR	4.9	5.4	0.5	9.3
IT	0.8	1.1	0.3	36.8
CY	0.0	0.1	0.1	149.0
LV	0.1	0.2	0.0	33.3
LT	0.1	0.2	0.1	66.7
LU	0.3	0.3	0.0	4.8
HU	0.3	0.4	0.0	12.5
MT	0.0	0.0	0.0	
NL	4.3	4.9	0.5	12.6
AT	1.1	1.2	0.0	3.7
PL	1.8	1.9	0.1	5.6
PT	1.0	1.3	0.3	28.0
RO	0.0	0.0	0.0	34.4
SI	0.2	0.2	0.0	25.0
SK	0.4	0.3	-0.1	-30.0
FI	0.8	0.3	-0.5	-60.0
SE	3.4	3.5	0.0	1.2
UK	0.0	0.0	0.0	
EU 27	60.6	80.8	20.2	33.3

1.3.7.1.3 Bioliquids

a. Bioliquids for electricity

Bioliquids electricity installed capacity in the EU 27 reached 1188 MW in 2009 and 1382 MW in 2010, showing an increase by 16.4% (+194 MW) in 2010. Some increase in bioliquids electricity in 2010 installed capacity took place a few Member States: in Italy with +216 MW (+56.1%), Austria with +19 MW (+6.2%) and Belgium with +9 MW (+6.2%). A reduction in the installed bioliquids capacity was registered in Germany, with a decrease of 50 MW (-15.2%). Figure 59 and Table 42 report the detailed development of bioliquids electricity capacity in each MS of EU 27 in years 2009-2010.

Figure 59[58]. Cumulative bioliquids electricity installed capacity in EU 27, 2009-2010

[58] MS are ranked according to their contribution to bioliquids electricity installed capacity in 2009

Table 42. Bioliquids electricity installed capacity in EU 27, 2009-2010

	2009	2010	Additional 2010	
	MW	MW	MW	%
BE	151	160	9	6.2
BG	0	0	0	
CZ				
DK	0	0	0	
DE	330	280	-50	-15.2
EE	0	0	0	
IE	0	0	0	
EL	0	0	0	
ES	0	0	0	
FR	0	0	0	
IT	385	601	216	56.1
CY	0	0	0	
LV	0	0	0	
LT	0	0	0	
LU	0	0	0	
HU	0	0	0	
MT	0	0	0	
NL	17	17	0	0.0
AT	305	324	19	6.2
PL	0	0	0	
PT	0	0	0	
RO	0	0	0	
SI	0	0	0	
SK	0	0	0	
FI	0	0	0	
SE	0	0	0	
UK	0	0	0	
EU 27	1,188	1,382	194	16.4

Electricity generated from bioliquids in the EU 27 reached 19.2 PJ (5330 GWh) in 2009, increasing by +3.7 PJ or 1021 GWh (+19.1%) to 22.9 PJ (6351 GWh) in 2010.

Figure 60 and Table 43 report the detailed development of bioliquids electricity generated in each MS of EU 27 in years 2009-2010.

Few MS registered some increase in the electricity generation from bioliquids between 2009 and 2010: Italy with 5.9 PJ (+112.6%) and Austria with 0.3 PJ (+6.2%). In other MS, there was a decrease in the electricity generation from bioliquids. Germany with 1.1 PJ (-15.0%), Sweden with 0.9 PJ (-93.8%), Belgium with 0.4 PJ (-27.8%) and the Netherlands with 0.1 PJ (-27.0%).

The leading country in bioliquids electricity generation in 2010 was Italy with 11.1 PJ, followed by Germany with 6.1 PJ, Austria with 4.4 PJ, Belgium with 1.0 PJ and the Netherlands with 0.2 PJ.

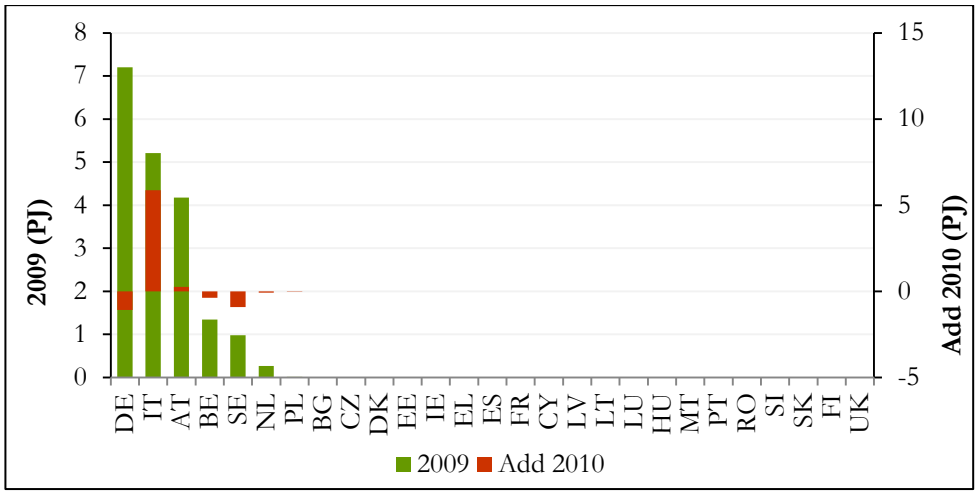

Figure 60[59]. Cumulative bioliquids electricity generation in EU 27, 2009-2010.

Table 43. Bioliquids electricity generation in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	1.3	1.0	-0.4	-27.8
BG	0.0	0.0	0.0	
CZ	0.0	0.0	0.0	
DK	0.0	0.0	0.0	
DE	7.2	6.1	-1.1	-15.0
EE	0.0	0.0	0.0	
IE	0.0	0.0	0.0	
EL	0.0	0.0	0.0	
ES	0.0	0.0	0.0	
FR	0.0	0.0	0.0	
IT	5.2	11.1	5.9	112.6
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	0.3	0.2	-0.1	-27.0
AT	4.2	4.4	0.3	6.2
PL	0.0	0.0	0.0	-99.7
PT	0.0	0.0	0.0	
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	
SE	1.0	0.1	-0.9	-93.8
UK	0.0	0.0	0.0	
EU 27	19.2	22.9	3.7	19.1

[59] MS are ranked according to their contribution to bioliquids electricity in 2009

b. Bioliquids heating/cooling

The energy produced by bioliquids for heating/cooling in the EU 27 amounted to 72.0 PJ (1721 ktoe) in 2009, increasing by 18.1 PJ or 433 ktoe (+25.2%) to 90.2 PJ (2154 ktoe) in 2010.

Figure 61 and Table 44 report the detailed development of bioliquids in heating/cooling in each MS of EU 27 in years 2009-2010.

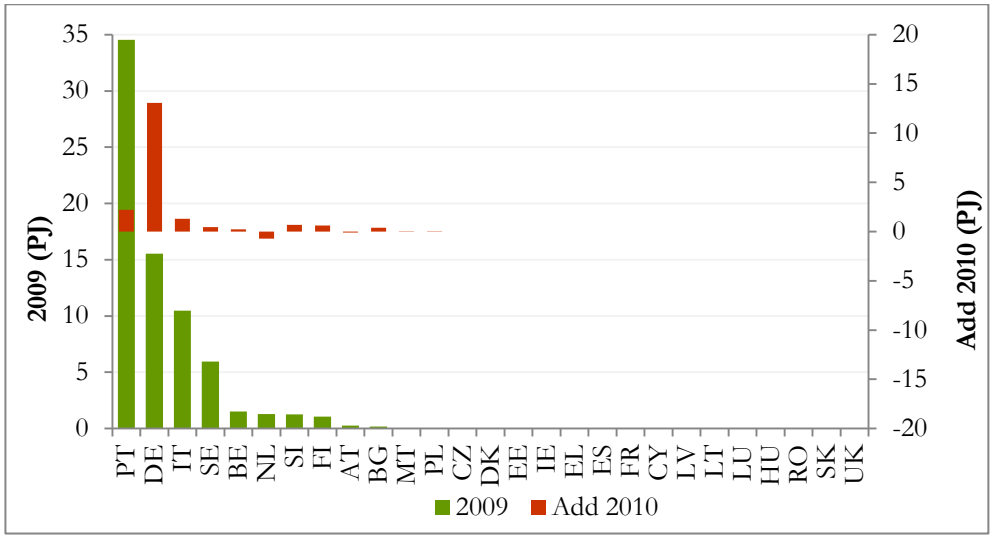

Figure 61[60]. Cumulative bioliquids heating/cooling in EU 27, 2009-2010.

The highest absolute increase in the use of heating/cooling from bioliquids between 2009 and 2010 was registered in Germany with 13.1 PJ (+84.1%), followed by Portugal with 2.2 PJ (+6.4%), Italy with 1.3 PJ (+12.4%), Sloveniua with 0.7 PJ (+53.3%) and Finland with 0.6 PJ (+60.0%), etc.

Two MS registered some decrease in the heating/cooling from bioliquids in 2010 compared to 2009: the Netherlands with 0.7 PJ (-54.8%) and Austria with 0.1 PJ (-33.3%).

The leading country in heating and cooling from bioliquids in 2010 was Portugal with 36.8 PJ, followed by Germany with 28.6 PJ, Italy with 11.8 PJ, Sweden with 6.4 PJ and Slovenia with 1.9 PJ. The contribution of these five MS was around 85.5 PJ, representing 94.8% of heating and cooling from bioliquids in the EU 27 in 2010.

Table 44. Bioliquids heating and cooling in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	1.5	1.7	0.2	14.3
BG	0.2	0.5	0.4	225.0
CZ	n.a.	n.a.	n.a.	n.a.
DK	0.0	0.0	0.0	
DE	15.5	28.6	13.1	84.1
EE	0.0	0.0	0.0	
IE	0.0	0.0	0.0	
EL	0.0	0.0	0.0	
ES	0.0	0.0	0.0	

[60] MS are ranked according to their contribution to bioliquids heating/cooling in 2009

FR	0.0	0.0	0.0	
IT	10.5	11.8	1.3	12.4
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	-20.0
NL	1.3	0.6	-0.7	-54.8
AT	0.3	0.2	-0.1	-33.3
PL	0.0	0.0	0.0	-100.0
PT	34.5	36.8	2.2	6.4
RO	0.0	0.0	0.0	
SI	1.3	1.9	0.7	53.3
SK	0.0	0.0	0.0	
FI	1.0	1.7	0.6	60.0
SE	5.9	6.4	0.5	7.7
UK	0.0	0.0	0.0	
EU 27	72.0	90.2	18.1	25.2

1.3.7.1.4 Biomass use in households

The biomass use in households in the EU 27 was 1317.1 PJ (31,457 ktoe) in 2009, increasing by +238.5 PJ or 5696 ktoe (+18.1%) to 1555.5 PJ (37,153 ktoe) in 2010.

Figure 62 and Table 45 report the detailed development of biomass used in households in each MS of EU 27 in years 2009-2010.

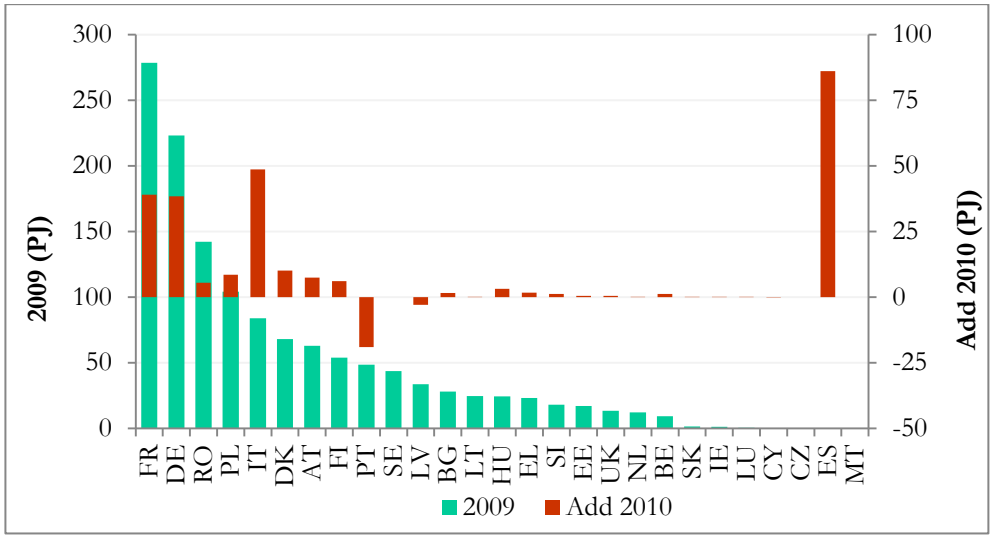

Figure 62[61]. Cumulative biomass in households in EU 27, 2009-2010

The highest absolute increase in the biomass use in households between 2009 and 2010 was registered in Spain with 86.0 PJ, followed by Italy with 48.6 PJ (+58.0%), France with 39.0 PJ

[61] MS are ranked according to their contribution to biomass in households in 2009

(+14.0%), Germany with 38.5 PJ (+17.2%) and Denmark with 10.1 PJ (+14.9%). The growth registered in the five MS accounted for 222.2 PJ, representing about 78.2% of the total growth in the biomass use in households in the EU27 in 2010.

Several MS registered some decrease in the biomass use in households in 2010 compared to 2009: Portugal with 19.0 PJ (-39.2%), Latvia with 2.9 PJ (-8.7%) and Cyprus with 0.1 PJ (-33.1%).

Leading countries in biomass use in households in 2010 were France with 317.4 PJ (7581 ktoe), Germany with 261.7 PJ (9537 ktoe), Romania with 147.6 PJ (3526 ktoe), Estonia with 86.0 PJ (2055 ktoe) and Denmark with 78.2 PJ (1867 ktoe). The first five countries used about 972.0 PJ (23215 ktoe) biomass in households, representing about 60.7% of the biomass in households in the EU27.

Table 45. Biomass use in households in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	9.2	10.4	1.2	12.9
BG	28.1	29.7	1.6	5.7
CZ	n.a	n.a	n.a	n.a
DK	68.0	78.2	10.1	14.9
DE	223.2	261.7	38.5	17.2
EE	17.2	17.7	0.5	2.9
IE	1.2	1.3	0.2	14.3
EL	23.2	24.9	1.7	7.2
ES	0.0	86.0	86.0	
FR	278.4	317.4	39.0	14.0
IT	83.9	132.5	48.6	58.0
CY	0.3	0.2	-0.1	-33.1
LV	33.7	30.8	-2.9	-8.7
LT	24.6	24.7	0.1	0.6
LU	0.6	0.8	0.2	25.2
HU	24.3	27.5	3.2	13.3
MT	0.0	0.0	0.0	
NL	12.2	12.4	0.1	1.0
AT	63.0	70.4	7.4	11.8
PL	104.2	112.7	8.6	8.2
PT	48.6	29.6	-19.0	-39.2
RO	142.1	147.6	5.5	3.9
SI	18.1	19.3	1.2	6.7
SK	1.6	1.8	0.2	10.3
FI	53.9	60.0	6.1	11.3
SE	43.8	43.8	0.0	0.0
UK	13.5	14.0	0.5	4.0
EU 27	1317.1	1555.5	238.5	18.1

1.3.7.2 Biofuels

Biofuel use in transport reached 548.2 PJ (13093.5 ktoe) in 2010, increasing by 62.2 PJ (1485 ktoe), + 12.8% compared to 486.0 PJ (11608.6 ktoe) in 2009. This represented 4.1% and 4.6% of the energy use in transport in 2009 and 2010, respectively.
Figure 63 and Table 46 report the detailed development of biofuels in each MS of EU 27 in years 2009-2010.

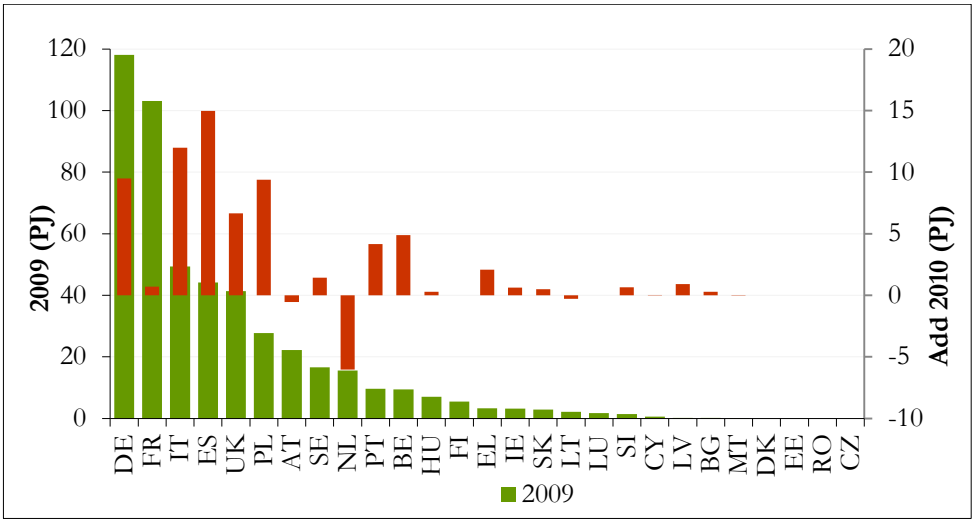

Figure 63[62]. Cumulative biofuels in transport in EU 27, 2009-2010

Most of the MS reported some growth in 2010 in the use of biofuels in transport. The highest absolute increase in biofuel use in transport in 2010 in comparison with 2009 was registered in Spain with 15.0 PJ (+33.9% increase), followed by Italy with 12.0 PJ (+24.2% increase), Germany with 9.5 PJ (+8.0% increase), Poland with 9.4 PJ (33.8% increase) and UK with 6.7 PJ (16.1% increase). The growth registered in the five MS accounted for 52.5 PJ, representing about 72.4% of the total growth in the biofuel use in transport in the EU27 in 2010.

A few MS registered some reductions in the use of biofuels in transport, including the Netherlands with 6.0 PJ (-38.6%), Austria with 0.5 PJ (-2.4%), and Lithuania with 0.3 PJ (-13.5%).

Leading countries in the use of biofuels in transport from biomass in 2010 were Germany with 127.6 PJ, France with 103.8 PJ, Italy with 61.4 PJ, Spain with 59.2 PJ and UK with 48.1 PJ. These five countries used 400.1 PJ of biofuels in 2010, representing about 40.6% of the total amount of biofuels used in 2010 in the EU27.

Table 46. Biofuel use in transport in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	9.5	14.4	4.9	51.5
BG	0.2	0.5	0.3	175.0
CZ	0.0	0.0	0.0	
DK	0.0	0.0	0.0	
DE	118.1	127.6	9.5	8.0
EE	0.0	0.0	0.0	

[62] MS are ranked according to their contribution to biofuels in 2009

IE	3.2	3.9	0.6	19.4
EL	3.3	5.4	2.1	64.1
ES	44.2	59.2	15.0	33.9
FR	103.1	103.8	0.7	0.7
IT	49.4	61.4	12.0	24.2
CY	0.6	0.6	0.0	0.6
LV	0.2	1.1	0.9	440.0
LT	2.2	1.9	-0.3	-13.5
LU	1.8	1.8	0.0	0.0
HU	7.1	7.4	0.3	4.1
MT	0.03	0.02	0.0	-16.7
NL	15.6	9.6	-6.0	-38.6
AT	22.3	21.7	-0.5	-2.4
PL	27.8	37.1	9.4	33.8
PT	9.7	13.8	4.1	43.0
RO	0.0	0.0	0.0	
SI[63]	1.5	2.1	0.7	44.6
SK	2.9	3.4	0.5	16.9
FI	5.5	5.5	0.0	0.0
SE	16.6	18.0	1.4	8.6
UK	41.4	48.1	6.7	16.1
EU 27	486.0	548.2	62.2	12.8

1.3.7.2.1 Bioethanol/bio-ETBE

Bioethanol/bio-ETBE use in transport reached 112.0 PJ (2674.8 ktoe) in 2010, increasing by 19.4 PJ or 469 ktoe (20.9%) in comparison with 96.1 PJ (2295 ktoe) in 2009. This represented 0.8% and 0.9% of the energy use in transport in 2009 and 2010, respectively.
Figure 64 and Table 47 report the detailed development of bioethanol in each MS of EU 27 in years 2009-2010.

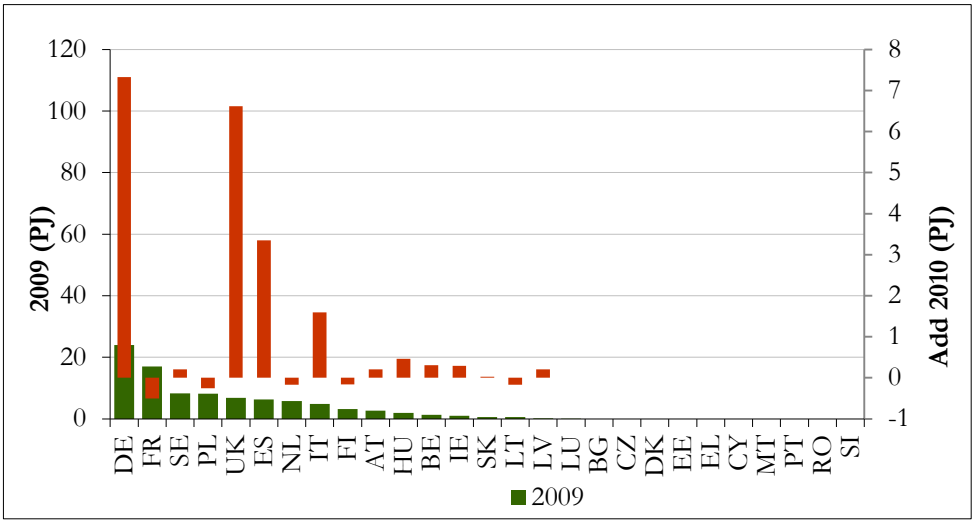

Figure 64[64]. Cumulative bioethanol/bio-ETBE in transport in EU 27, 2009-2010

[63] Slovenia didn't report any data in Table 1d (RES-T) of the Progress Report , but only the final consumption of RES-T in Table 1. This contribution is included as total value for biofuels without dividing it in subcategories.

Most of the MS reported some growth in 2010 in the use of bioethanol/bio-ETBE in transport. The highest absolute increase in the use of bioethanol/bio-ETBE in transport in 2010 in comparison with 2009 was registered in Germany with 7.3 PJ (+30.5%), followed by UK with 6.6 PJ (+96.9%), Spain with 3.3 PJ (+53.0%), Italy with 1.6 PJ (32.5%) and Hungary with 0.5 PJ (23.9%). The growth registered in the five MS accounted for 19.3 PJ, representing almost all the total growth in the bioethanol/bio-ETBE use in transport in the EU27 in 2010.
Several MS registered a reduction in the use of bioethanol/bio-ETBE in transport in 2010 in comparison with 2009: France with 0.5 PJ (-3.0%), followed by Poland with 0.3 PJ (-3.1%), the Netherlands with 0.2 PJ (-2.9%), Lithuania with 0.2 PJ (-28.6%) and Finland with 0.2 PJ (-5.0%).

Leading countries in the use of bioethanol/bio-ETBE in transport from biomass in 2010 were Germany with 31.4 PJ, France with 16.5 PJ, UK with 13.4 PJ, Spain with 9.7 PJ and Sweden with 8.5 PJ. These five countries used 79.5 PJ bioethanol/bio-ETBE in 2010, representing about 66.6% of the total amount of bioethanol/bio-ETBE used in 2010 in the EU27.

Table 47. Bioethanol/bio-ETBE use in transport in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	1.3	1.6	0.3	24.0
BG	0.0	0.0	0.0	
CZ	0.0	0.0	0.0	
DK	0.0	0.0	0.0	
DE	24.0	31.4	7.3	30.5
EE	0.0	0.0	0.0	
IE	1.0	1.3	0.3	30.4
EL	0.0	0.0	0.0	
ES	6.3	9.7	3.3	53.0
FR	17.0	16.5	-0.5	-3.0
IT	4.9	6.5	1.6	32.5
CY	0.0	0.0	0.0	
LV	0.1	0.3	0.2	166.7
LT	0.6	0.4	-0.2	-28.6
LU	0.0	0.0	0.0	0.0
HU	1.9	2.4	0.5	23.9
MT	0.0	0.0	0.0	
NL	5.8	5.6	-0.2	-2.9
AT	2.6	2.8	0.2	7.9
PL	8.2	7.9	-0.3	-3.1
PT	0.0	0.0	0.0	
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.6	0.6	0.0	4.1
FI	3.2	3.0	-0.2	-5.0
SE	8.3	8.5	0.2	2.5
UK	6.8	13.4	6.6	96.9
EU 27	92.6	112.0	19.4	20.9

[64] MS are ranked according to their contribution to bioethanol/bio-ETBE in 2009

1.3.7.2.2 Biodiesel

Biodiesel use in transport reached 426.3 PJ (10181 ktoe) in 2010, increasing by 44.6 PJ or 1066 ktoe (11.7%) in comparison with 381.6 PJ (9115 ktoe) in 2009. This represented 3.1% and 3.5% of the energy use in transport in 2009 and 2010, respectively.

Figure 65 and Table 48 report the detailed development of biodiesel in each MS of EU 27 in years 2009-2010.

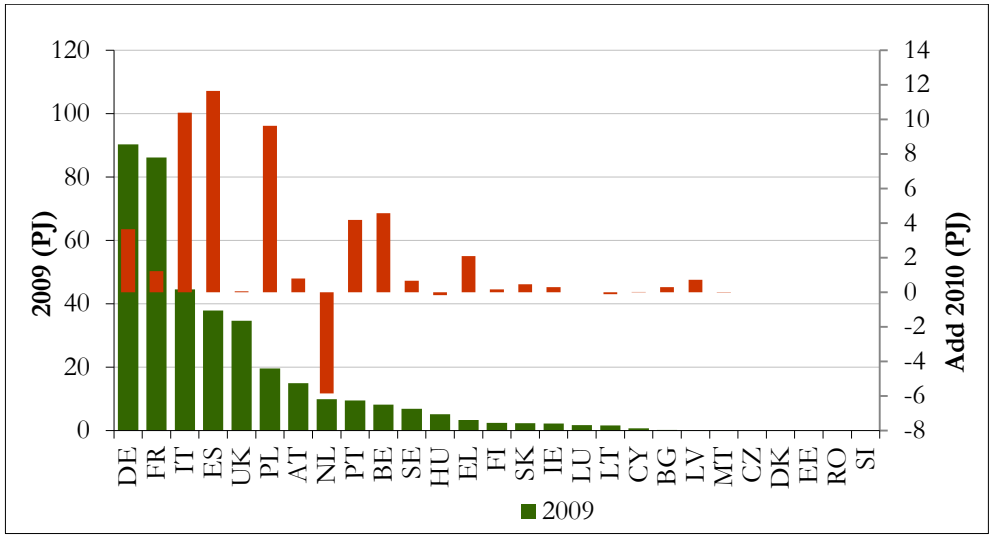

Figure 65[65]. Cumulative biodiesel use in transport in EU 27, 2009-2010

Most of the MS reported some growth in 2010 in the use of biodiesel in transport. The highest absolute increase in the use of biodiesel in transport in 2010 in comparison with 2009 was registered in Spain with 11.6 PJ (+30.7% increase), followed by Italy with 10.4 PJ (+23.3% increase), Poland with 9.6 PJ (+53.0% increase), Belgium with 4.6 PJ (+55.8% increase) and Portugal with 4.2 PJ (44.2% increase). The growth registered in the five MS accounted for 40.2 PJ, representing about 78.2% of the total growth in the biodiesel use in transport in the EU27 in 2010.

Several MS registered a reduction in the use of biodiesel in transport in 2010 in comparison with 2009: the Netherlands with 5.9 PJ (-59.6, Hungary with 0.2 PJ (-3.3%) and Lithuania with 0.1 PJ (-7.9%).

Table 48. Biodiesel use in transport in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	8.2	12.8	4.6	55.8
BG	0.2	0.5	0.3	
CZ	0.0	0.0	0.0	
DK	0.0	0.0	0.0	
DE	90.3	94.0	3.6	4.0
EE	0.0	0.0	0.0	
IE	2.2	2.5	0.3	13.2
EL	3.3	5.4	2.1	
ES	37.9	49.5	11.6	30.7

[65] MS are ranked according to their contribution to biodiesel in 2009

FR	86.1	87.3	1.2	1.4
IT	44.5	54.9	10.4	23.3
CY	0.6	0.6	0.0	
LV	0.1	0.8	0.7	850.0
LT	1.6	1.5	-0.1	-7.9
LU	1.7	1.7	0.0	0.0
HU	5.1	5.0	-0.2	-3.3
MT	0.0	0.0	0.0	
NL	9.8	4.0	-5.9	-59.6
AT	14.9	15.7	0.8	5.4
PL	19.6	29.2	9.6	49.1
PT	9.5	13.6	4.2	
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	2.3	2.8	0.5	20.2
FI	2.4	2.5	0.2	6.8
SE	6.8	7.5	0.7	9.9
UK	34.6	34.6	0.0	0.1
EU 27	381.6	426.3	44.6	11.7

1.3.7.2.3 Other biofuels

The use of other biofuels (biogas, vegetable oils, etc.) in transport reached 7.8 PJ (187 ktoe) in 2010, decreasing by 2.5 PJ or 59 ktoe (24.0%) in comparison with 10.3 PJ (246 ktoe) in 2009. This represented 0.08% and 0.06% of the energy use in transport in 2009 and 2010, respectively.

Figure 66 and Table 49 report the detailed development of other biofuels in each MS of EU 27 in years 2009-2010.

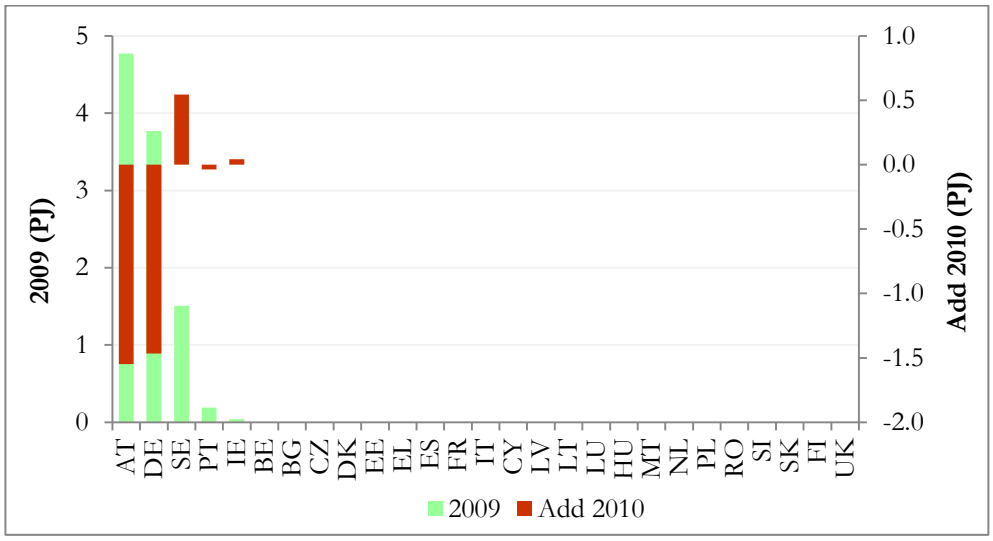

Figure 66[66]. Cumulative of other biofuels in transport in EU 27, 2009-2010

[66] MS are ranked according to their contribution to other biofuels in 2009

Two MS reported some growth in the use of other biofuels (biogas, vegetable oils, etc.) in transport in 2010 in comparison with 2009: Denmark with 0.5 PJ (+36.1%) and Austria with 0.04 PJ (+100%).

Two MS registered a reduction in the use of other biofuels (biogas, vegetable oils, etc.) in transport in 2010 in comparison with 2009: Lithuania with 1.5 PJ (-32.5%) and UK with 1.5 PJ (-38.9%) and Bulgaria with 0.04 PJ (-20.0%).

Table 49. Other biofuels use in transport in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	0.0	0.0	0.0	
BG	0.0	0.0	0.0	
CZ	n.a	n.a	n.a	n.a
DK	0.0	0.0	0.0	
DE	3.8	2.3	-1.5	-38.9
EE	0.0	0.0	0.0	
IE	0.0	0.1	0.0	100.0
EL	0.0	0.0	0.0	
ES	0.0	0.0	0.0	
FR	0.0	0.0	0.0	
IT	0.0	0.0	0.0	
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	0.0	0.0	0.0	
AT	4.8	3.2	-1.5	-32.5
PL	0.0	0.0	0.0	
PT	0.2	0.2	0.0	-20.0
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	
SE	1.5	2.1	0.5	36.1
UK	0.0	0.0	0.0	
EU 27	10.3	7.8	-2.5	-24.0

1.3.7.2.4 Biofuels Article 21.2

The use of biofuels art 21.2 (biofuels from wastes, residues, ligno-cellulosic material) in transport reached 23.8 PJ (567.5 ktoe) in 2010, increasing by 9.7 PJ or 231 ktoe (68.6%) in comparison with 14.1 PJ (336.6 ktoe) in 2009.

Figure 67 and Table 50 report the detailed development of biofuelsarticle 21.2 in each MS of EU 27 in years 2009-2010.

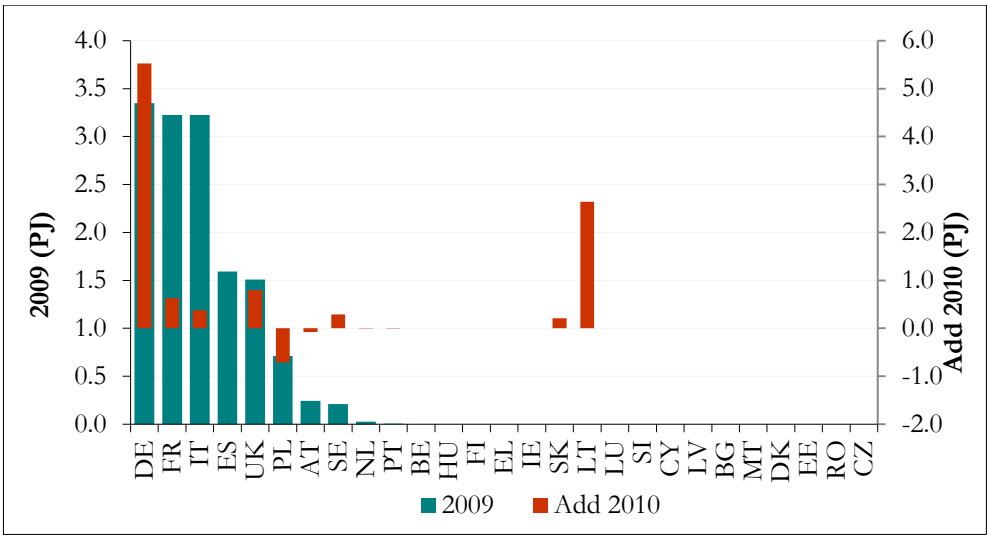

Figure 67[67]. Cumulative use of biofuels art 21.2 use in transport in EU 27, 2009-2010

The contribution of biofuels article 21.2 represented 4.1% and 5.1% of the biofuel use in transport in 2009 and 2010, respectively. In comparison with the energy use in transport, they represented 0.3% and 0.5% of the in 2009 and 2010, respectively.

Several MS reported some growth in the use of art 21.2 biofuels in transport in 2010 in comparison with 2009: Poland with +5.5PJ (+165.0%), France with +2.6 PJ, Sweden with +0.8 PJ (+52.8%), Ireland with +0.6 PJ (+19.5 PJ) and the Netherlands with +0.4 PJ (+11.7%). The growth registered in the five MS accounted for 40.2 PJ, representing about 78.2% of the total growth in the use of biofuels from wastes, residues, ligno-cellulosic material in transport in the EU27 in 2010.

A few MS registered a reduction in the use of art 21.2 biofuels in transport in 2010 in comparison with 2009: Romania with -1.5 PJ (-23.9%), Germany with -0.7 PJ (-100%) and Portugal with -0.1 PJ (-32.8%).

Table 50. The use of biofuels art 21.2 in transport in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	0.0	0.0	0.0	
BG	0.0	0.0	0.0	
CZ	0.0	0.0	0.0	
DK	0.0	0.0	0.0	
DE	0.7	0.0	-0.7	-100.0
EE	0.0	0.0	0.0	
IE	3.2	3.9	0.6	19.5
EL	0.2	0.5	0.3	
ES	0.0	0.2	0.2	
FR	0.0	2.6	2.6	
IT	1.6	1.6	0.0	
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	

[67] MS are ranked according to their contribution to biofuels art. 21.2 in 2009

LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	3.2	3.6	0.4	
AT	0.0	0.0	0.0	
PL	3.3	8.9	5.5	
PT	0.2	0.2	-0.1	-32.8
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	
SE	1.5	2.3	0.8	52.8
UK	0.0	0.0	0.0	
EU 27	14.1	23.8	9.7	68.6

1.3.7.2.5 Biofuels from import[68]

The use of biofuels from import in transport reached 184.8 PJ (4414 ktoe) in 2010, increasing by 66.7 PJ or 1594 ktoe (56.5%) in comparison with 118.1 PJ (2820 ktoe) biofuels imported in 2009. The share of biofuels from import in the total use of biofuels in transport reached 23.9% in 2009 and 32.6% in 2010. The contribution of biofuels from import in the energy use in transport represented 0.9% and 1.5% of in 2009 and 2010, respectively.

Figure 68 and Table 51 report the detailed development of biofuels from import in each MS of EU 27 in years 2009-2010.

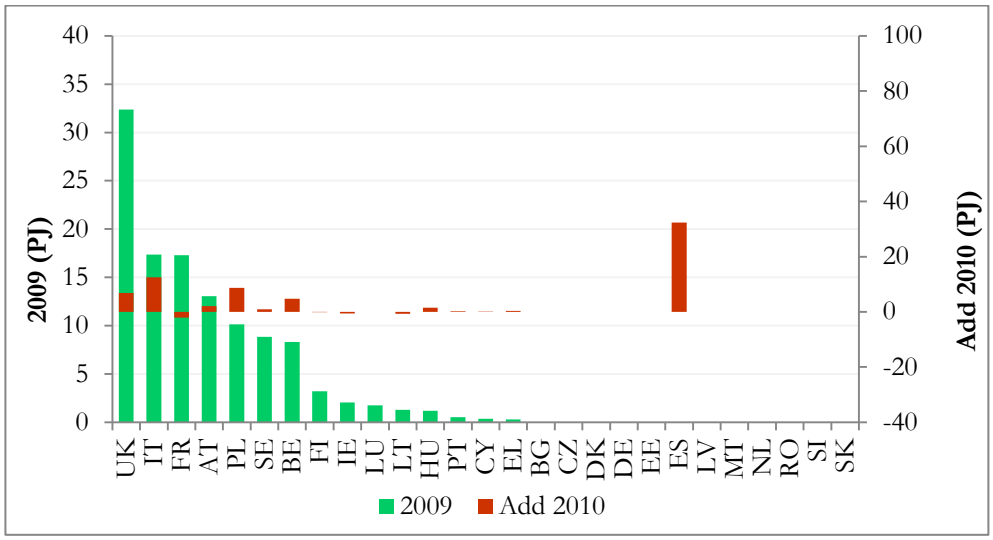

Figure 68[69]. Cumulative of biofuels from import in transport in EU 27, 2009-2010

The highest increases in the use of biofuels from import in 2010 in comparison with 2010 were registered in Spain with 0.5 PJ (+32.4%), Italy with 12.5 PJ (+12.5%), Poland with 8.7 PJ (85.5%), UK with 6.9 PJ (+21.2%) and Belgium with 4.7 PJ (+56.8%). The growth registered in the five MS

[68] Origin of imported biofuels used in transport sector is not reported by MS
[69] MS are ranked according to their contribution to biofuels from import in 2009

accounted for 65.1 PJ, representing about 97.6% of the total growth in the use of biofuels from import in transport in the EU27 in 2010.

The use of biofuels from import decreased in four MS: Lithuania with 2.1 PJ (-12.1%), Ireland with 0.7 PJ (-51.6%) and Finland with 0.1 PJ (-2.3%).

Table 51. The use of biofuels from import in transport in EU 27, 2009-2010.

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
BE	8.3	13.0	4.7	56.8
BG	0.0	0.0	0.0	
CZ				
DK	0.0	0.0	0.0	
DE	0.0	0.0	0.0	
EE	0.0	0.0	0.0	
IE	2.1	1.5	-0.6	-28.6
EL	0.3	0.6	0.3	114.3
ES	0.0	32.4	32.4	
FR	17.3	15.2	-2.1	-12.1
IT	17.4	29.9	12.5	71.8
CY	0.4	0.4	0.1	16.8
LV	0.0	0.0	0.0	
LT	1.3	0.6	-0.7	-51.6
LU	1.8	1.8	0.0	0.0
HU	1.2	2.7	1.5	132.1
MT	0.0	0.0	0.0	
NL	0.0	0.0	0.0	
AT	13.1	15.1	2.1	15.7
PL	10.1	18.8	8.7	85.5
PT	0.5	0.7	0.2	36.6
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	3.2	3.1	-0.1	-2.3
SE	8.9	9.7	0.9	9.9
UK	32.4	39.2	6.9	21.2
EU 27	118.1	184.8	66.7	56.5

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2. Meeting 2010 NREAPs targets

Introduction

This chapter presents a detailed analysis assessing the significant differences between the data reported in the Progress Reports for 2010 and the NREAPs planned targets for the same year. Deviations from 2010 NREAPs targets are assessed for the overall GFEC and GFEC in each consumption sectors, the overall RES consumption and RES consumption in each sector and for each technology. Because of the already mentioned lack of reported data, and for the sake of consistency, the comparative analysis between planned and achieved 2010 target at the EU27 level is performed on the basis of the working hypothesis that Czech Republic has reached exactly its 2010 targets as reported in the NREAP[70],[71].

As the overall gross final energy consumption is not explicitly reported in Progress Reports, its value has been computed on the basis of on consumptions and shares for each sector reported in Progress Reports and compared with 2010 gross final energy consumption[72] according the AEE (Additional Energy Efficiency) scenario reported in the NREAPs.

For RES shares, Table 1 of Progress Reports is compared with Table 3 of NREAPs. For overall RES the comparison with RES minimum trajectory for 2011/2012 is presented as well. Tables 1b, 1c and 1d of Progress Reports are then compared with Table 10 (a, b), 11 and 12 of NREAPs in order to assess the fulfilment of 2010 targets for each technology.

2.1 Gross Final Energy Consumption

In 2010 gross final energy consumption in EU 27 amounted to 50175.5 PJ (1198 Mtoe) exceeding the NREAPs target by 566 PJ (13.5 Mtoe) i.e., 1.1%.

Figure 69 and Table 52 report the fulfilment of 2010 NREAPs targets in each MS of EU 27 regarding gross final energy consumption.

Only 6 Member States in EU 27: Belgium, Greece, Italy, Romania, Malta, Hungary reduced their GFEC enough to meet their 2010 gross final energy consumption target reported in the NREAPs.

The highest absolute difference between actual GFEC and 2010 NREAP was reported by Italy with 181 PJ (4.3 Mtoe) less (-3.3%), followed by Greece with 94 PJ (2.2 Mtoe) less (-10%), Romania and Hungary with 47 PJ (1.1 Mtoe) less (respectively -4.4% and -6.2%).

All other MS exceeded the 2010 gross final energy consumption of their NREAPs. A significant relative exceedance was reported by Cyprus with 33.7% (0.5 Mtoe) followed by Netherlands with 17% (8.5 Mtoe), Latvia with 14.6% (0.6 Mtoe), Slovenia with 11.4% (0.6 Mtoe).

[70] Czech Republic has resubmitted in March 2013 its NREAP. For this reason the overall values of GFEC, RES and technologies in this report will differ from the values reported at previous JRC reports.
[71] Due to the hypothesis that Czech Republic has reached its 2010 targets as in NREAP the overall values of GFEC, RES and technologies reported in this chapter for this year will differ from the values reported in the first chapter, where missing data were excluded from the analysis.
[72] For consistency to the analysis of gross final energy consumption presented at the first chapter the comparison is conducted between NREAPs gross final energy consumption "after aviation" and Progress Reports gross final energy consumption calculated as described above. Comparative analysis of gross final energy consumption in sectors breakdown will be presented separately.

Nevertheless, in absolute terms Netherlands reported the highest exceedence from 2010 reported gross final energy consumption, +357 PJ or 8.5 Mtoe, followed by Poland with 270 PJ or 6.4 Mtoe and France with 80 PJ or 1.9 Mtoe.

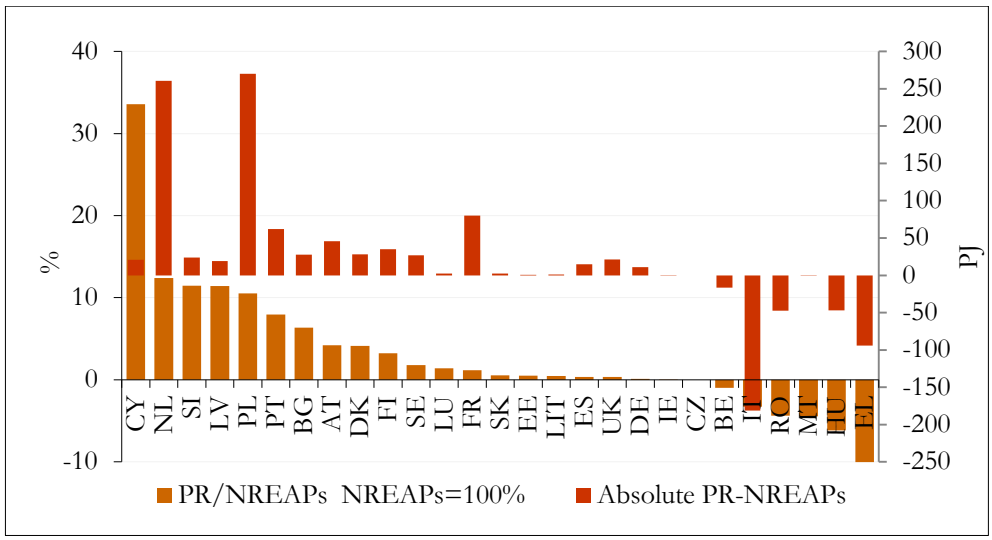

Figure 69[73]. EU 27 MS deviations from NREAPs in GFEC, 2010

Leading MS in gross final energy consumption in EU 27 for year 2010 were Germany with 9372 PJ (223.8 Mtoe), France with 6961 PJ (166.3 Mtoe), United Kingdom with 5996 PJ (143.2 Mtoe), Italy with 5337 PJ (127.5 Mtoe) and Spain with 4050 PJ (96.7 Mtoe). Contribution of these MS in EU 27 gross final energy consumption for year 2010 was 63.2%.

Table 52. GFEC in EU 27 and deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	**PJ**	**PJ**	**%**
BE	1653	1636	-16	-1.0
BG	435	463	28	6.3
CZ	1232	1232	0	0.0
DK	683	712	28	4.1
DE	9361	9372	11	0.1
E	134	134	1	0.5
IE	507	507	0	0.00
EL	939	845	-94	-10.0
ES	4035	4050	15	0.4
FR	6881	6961	80	1.2
IT	5518	5337	-181	-3.3
CY	62	83	21	33.6
LV	169	188	19	11.4
LIT	211	212	1	0.5
LU	173	175	2	1.4
HU	764	717	-47	-6.2
MT	18	17	-1	-4.4
NL	2103	2364	260	12.4

[73] MS are ranked according to their relative deviation from 2010 NREAPs plans

AT	1088	1133	46	4.2
PL	2567	2837	270	10.5
PT	778	840	62	8.0
RO	1083	1035	-47	-4.4
SI	206	230	24	11.4
SK	446	448	2	0.5
FI	1077	1112	35	3.2
SE	1511	1538	27	1.8
UK	5975	5996	21	0.4
EU 27	49609.2	50175.5	566.3	1.1

2.1.1 Heating/Cooling sector

The energy consumption in the heating and cooling sector in EU 27 in year 2010 amounted to 23699 PJ (566 Mtoe) exceeding the NREAPs target by 893 PJ (21.3 Mtoe). Its share in total gross final energy consumption increased by 1 percentage points, from planned share of 46% to 47%.

Figure 70 and Table 53 show how each MS of EU 27 has fulfilled the 2010 target in energy consumption in heating/cooling sector.

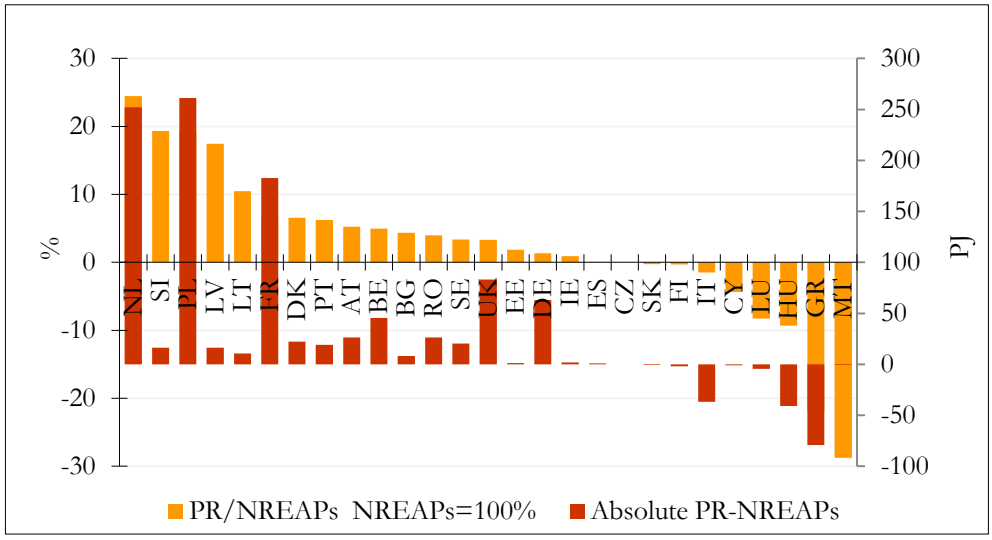

Figure 70[74]. EU 27 M deviations from NREAPs in GFEC-H/C, 2010

7 MS, Greece, Italy, Cyprus, Luxemburg, Hungary, Malta, Slovakia and Finland consumed less energy in 2010 in Heating/Cooling sector than what was planned in NREAPs. All other MS consumed in 2010 an amount of energy equal or higher than their plans for this year.

Poland reported an exceedance in energy consumption of +261 PJ (+6.2 Mtoe) followed by Netherland with +251 PJ (+6 Mtoe) which had also the highest relative increase (+24.4% to be compared with +19.3% from Poland) in final energy consumed in this sector.

Malta was the MS with the highest reduction in 2010 energy consumption in this sector compared to the NREAP planned figure , with a relative deviation of -29%. Greece had the highest absolute

[74] MS are ranked according to their relative deviation from 2010 NREAPs plans

negative deviation in energy consumed in this sector with -79PJ (-1.9 Mtoe) with a relative deviation of -21.8%.

Spain was the only MS that consumed in 2010 almost the same gross final energy as planned in its NREAP (1 PJ above the planned value).
Leading countries in gross final energy consumption in heating/cooling sector for year 2010 were Germany with 4735 PJ (113.1 Mtoe), France with 2945 PJ (70.3 Mtoe), United Kingdom with 2595 PJ (62 Mtoe), Italy with 2432 PJ (58.1 Mtoe) and Poland with 1618 PJ (.... Mtoe). Contribution of these MS in EU 27 gross final energy consumption in this sector in year 2010 was 60%.

Table 53. 2010 GFEC-H/C in EU 27 and deviations from NREAPs

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	**PJ**	**PJ**	**%**
BE	913	958	46	5.0
BG	188	196	8	4.3
CZ	724	724	0	0.0
DK	337	359	22	6.6
DE	4672	4735	63	1.3
E	66	67	1	1.8
IE	216	218	2	0.9
EL	362	283	-79	-21.8
ES	1497	1498	1	0.1
FR	2762	2945	183	6.6
IT	2469	2432	-37	-1.5
CY	20	19	-1	-4.4
LV	94	111	16	17.5
LIT	101	112	11	10.5
LU	52	47	-4	-8.3
HU	439	399	-41	-9.3
MT	2	1	-1	-28.7
NL	1030	1282	252	24.4
AT	503	529	26	5.3
PL	1357	1618	261	19.3
PT	305	324	19	6.3
RO	661	687	26	4.0
SI	84	100	16	19.3
SK	250	249	-1	-0.2
FI	587	585	-2	-0.3
SE	605	625	20	3.4
UK	2512	2595	83	3.3
EU 27	22807	23699	893	3.9

2.2.2 Electricity sector

Gross final energy consumption in electricity sector in EU 27 almost met the 2010 target reported in NREAPs (11866 PJ or 283.42 Mtoe) reaching 11867 PJ (283.45 Mtoe). Its share in total gross final energy consumption remained at the same at level of 24%.

Figure 71 and Table 54 report the fulfilment of this target in each MS of EU 27.

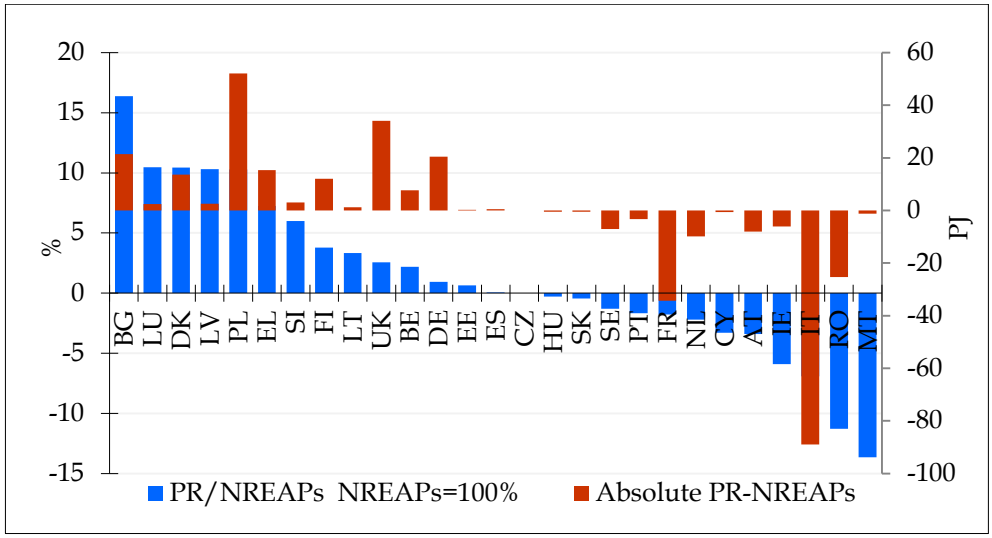

Figure 71[75]. EU 27 MS absolute and relative deviations from NREAPs in GFEC-E, 2010

14 Member States consumed more electricity in 2010 than their planned NREAP amount. Poland reported the highest absolute exceedance from its 2010 plan with +52 PJ (1.2 Mtoe) while Bulgaria had the highest relative exceedance with +16.4% (21.5 PJ or 0.5 Mtoe). United Kingdom had the second highest absolute exceedance from the NREAPs for year 2010 in electricity sector with +34.1 PJ (0.84 Mtoe), with a relative exceedance of +2.6%.

Italy reported the highest negative difference between energy consumed in this sector and NREAP planned value with -89 PJ (-2.1 Mtoe), followed by France with -34.3 PJ (-0.8 Mtoe) and Romania with -25.3 PJ (-0.6 Mtoe).

Germany was the leading MS in gross final energy consumption in electricity sector in 2010 with 2194 PJ (52.4 Mtoe) followed by France with 1885 PJ (45 Mtoe), United Kingdom with 1361 PJ (32.5 Mtoe), Italy with 1197 PJ (28.6 Mtoe) and Spain with 1052 PJ (25.1 Mtoe).

Table 54. 2010 GFEC-E in EU 27 and deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	350.5	358.1	7.7	2.2
BG	131.0	152.5	21.5	16.4
CZ	252.7	252.7	0.0	0.0
DK	130.1	143.7	13.6	10.4
DE	2174.0	2194.4	20.4	0.9
E	34.7	34.9	0.2	0.6
IE	103.5	97.4	-6.1	-5.9

[75] MS are ranked according to their relative deviation from 2010 NREAPs plans

EL	211.9	227.2	15.3	7.2
ES	1051.1	1051.5	0.5	0.0
FR	1919.6	1885.3	-34.3	-1.8
IT	1285.5	1196.6	-88.9	-6.9
CY	19.4	18.7	-0.6	-3.3
LV	24.5	27.0	2.5	10.3
LIT	38.1	39.4	1.3	3.3
LU	23.0	25.4	2.4	10.5
HU	153.9	153.4	-0.4	-0.3
MT	9.0	7.8	-1.2	-13.6
NL	444.9	435.1	-9.8	-2.2
AT	235.9	227.9	-8.0	-3.4
PL	506.6	558.7	52.1	10.3
PT	198.0	194.7	-3.3	-1.7
RO	224.0	198.7	-25.3	-11.3
SI	50.1	53.1	3.0	6.0
SK	103.0	102.5	-0.5	-0.4
FI	316.1	328.1	12.0	3.8
SE	548.0	540.9	-7.1	-1.3
UK	1327.2	1361.3	34.1	2.6
EU 27	11866	11867	1.0	0.01

2.2.3 Transport sector

The EU 27 gross final energy consumption in transport sector reported for 2010 was 3.3% lower than the planned NREAP value with 12685 PJ (303 Mtoe) against the NREAPs value of 13124 PJ (313.5 Mtoe). Its share in gross final energy consumption changed by 1 percentage point from the planned share, from 26.5% to 25.3%. Figure 72 and Table 55 report the fulfilment of this target in each MS of EU 27 in transport sector.

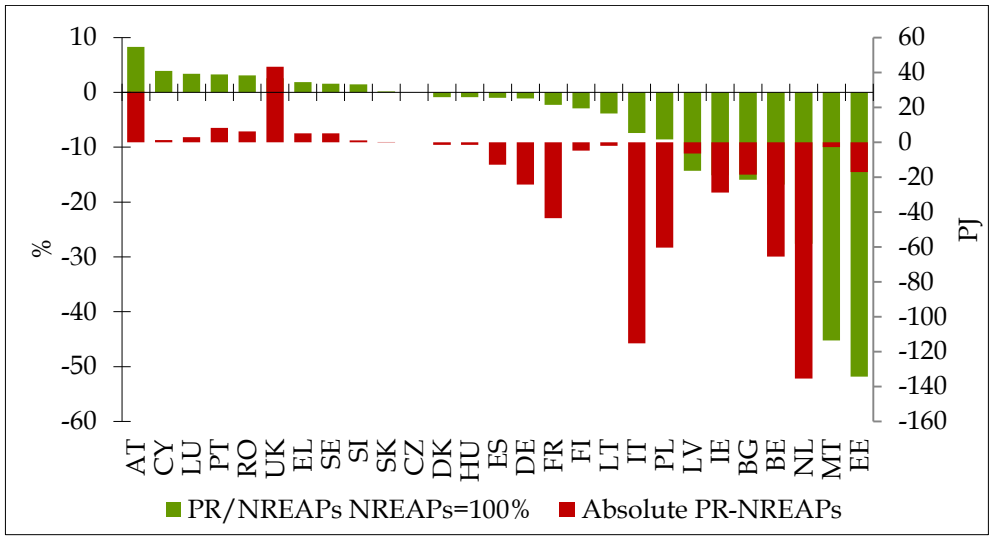

Figure 72[76]. EU 27 MS deviations from NREAPs in GFEC-T, 2010

[76] MS are ranked according to their relative deviation from 2010 NREAPs plans

In transport sector only 10 MS reached or exceeded their 2010 NREAPs planned consumptions. The highest absolute exceedance was reported by United Kingdom with +43PJ (1 Mtoe) followed by Austria with +29 PJ (+0.7 Mtoe) and Portugal with +8.2 PJ (+0.2 Mtoe). The highest negative difference between actual consumption and NREAP value was in the Netherlands with 135.3 PJ (3.2 Mtoe), Italy (115.2 PJ or 2.75 Mtoe) and Belgium (65.5 PJ or 1.6 Mtoe).

In relative terms Austria reported the highest exceedance from the NREAPs value with +8.3%, followed by Cyprus with +3.9%, Luxemburg with +3.4%, Portugal +3.2% and Romania +3.1%. The highest negative difference was reported in Estonia with -51.8% together with Malta (-45.3%), Netherland (-27.6%), Belgium (-16.8%) and Bulgaria (-15.9%)

Germany had the highest contribution in gross final energy consumtion in transport sector with 2167.7 PJ (51.8 Mtoe) together with France with 1869.9 PJ (44.7 Mtoe), United Kingdom with 1738.2 PJ (41.5 Mtoe), Italy with 1436.2 PJ (34.3 Mtoe) and Spain with 1279.6 PJ (30.6 Mtoe).

Table 55. GFEC-T in EU 27 and deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	**PJ**	**PJ**	**%**
BE	389.5	324.1	-65.5	-16.8
BG	116.2	97.7	-18.5	-15.9
CZ	255.8	255.8	0	0
DK	175.5	173.9	-1.6	-0.9
DE	2192.0	2167.7	-24.3	-1.1
E	33.0	15.9	-17.1	-51.8
IE	191.1	162.2	-28.8	-15.1
EL	273.3	278.4	5.1	1.9
ES	1292.5	1279.6	-13.0	-1.0
FR	1913.4	1869.9	-43.5	-2.3
IT	1551.4	1436.2	-115.2	-7.4
CY	30.1	31.3	1.2	3.9
LV	45.9	39.3	-6.6	-14.3
LIT	55.8	53.6	-2.2	-3.9
LU	87.3	90.3	3.0	3.4
HU	170.9	169.4	-1.5	-0.9
MT	6.4	3.5	-2.9	-45.3
NL	489.8	354.5	-135.3	-27.6
AT	349.0	377.9	28.9	8.3
PL	703.4	642.9	-60.5	-8.6
PT	252.9	261.1	8.2	3.2
RO	197.8	204.0	6.2	3.1
SI	72.6	73.7	1.1	1.5
SK	93.0	93.2	0.2	0.2
FI	168.7	163.8	-4.9	-2.9
SE	321.8	326.9	5.1	1.6
UK	1695.0	1738.2	43.2	2.5
EU 27	13124.4	12685.1	-439.3	-3.3

2.2 Total Renewable Energy (RES)
a. Total RES share

The planned overall RES share in EU 27 gross final energy consumption for year 2010 stated by NREAPs was 11.5%. According to Progress Reports this share was exceeded already in 2009 when the RES share reached 11.9%.

Overall RES share in EU 27 in year 2009, 2010 and the RES minimum trajectory for 2011/2012 are presented in Figure 73. In 2010 the overall RES share amounted to 12.6%, exceeding the NREAP target by 1.1 percentage points (+9.9% in relative terms).

Figures 74, 75 and Table 56 present the comparison for overall RES share between 2010 NREAPs targets in each MS and Progress Reports and RES minimum trajectory for 2011/2012[77]. According to Progress Reports overall RES share in 2010 was found to be below the NREAPs planned targets in Malta by 0.9 percentage points (-50%), Cyprus with 1.3 percentage points (-20 %), Ireland with 1.1 percentage points (-16.7%), The Netherlands with 0.5 percentage points (-11.9%), Austria with 0.3 percentage points (-1%), Latvia with 0.2 percentage points (-0.6%), Poland with 0.1 percentage points (-0.8%) and Denmark with 0.1 percentage points (-0.5%).

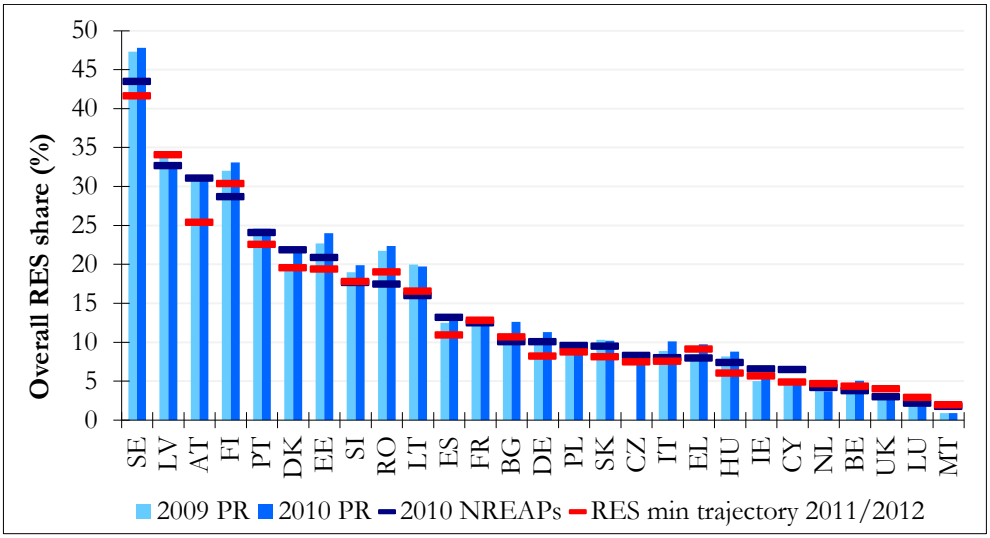

Figure 73.[78] EU 27 MS overall RES share in 2009, 2010 and RES min trajectory 2011/2012

Ireland, Latvia and Malta didn't reach both their planned targets for 2010 and RES minimum trajectory for 2011/2012. Meanwhile Denmark and Austria didn't reach their 2010 planned target for overall RES share but exceeded their RES minimum trajectory for 2011/2012 due to the fact that they set it lower than their planned target for 2010.

Except Ireland, Greece, France, Cyprus, Malta, the Netherlands and United Kingdom, all other MS have reached their RES minimum trajectory for 2011/2012 targets since in 2009. It is nevertheless worth noticing that half of MS have set their RES minimum trajectory for 2011/2012 lower than their 2010 planned targets.

[77] RES minimum trajectory is calculated upon formula presented in Annex B of the Directive 2009/28/EC
[78] MS are ranked according to their overall RES share in 2009

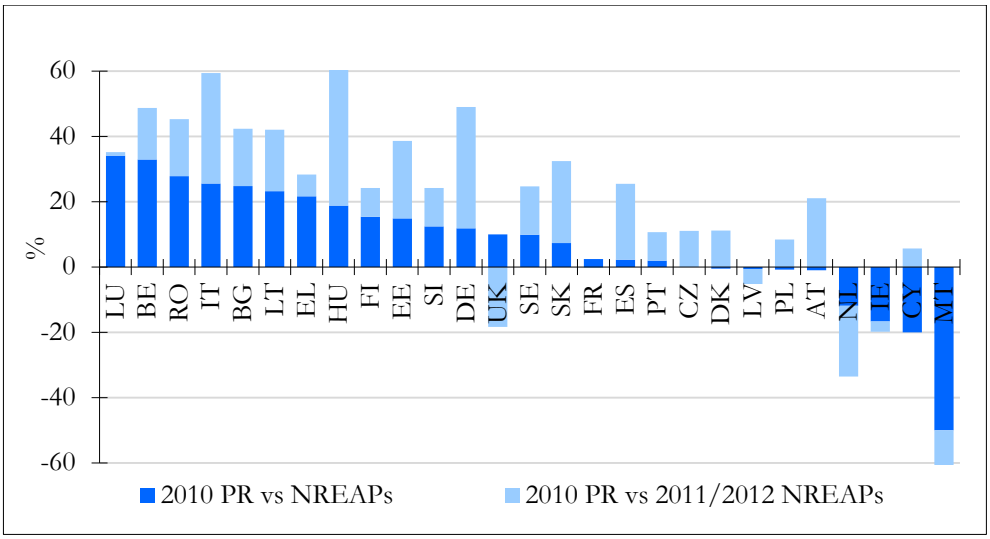

Figure 74[79]. EU 27 MS relative deviations from NREAPs of 2010 overall RES share and RES minimum target 2011/2012

19 MS had in 2010 an overall RES share higher than the planned target. The highest relative exceedance from 2010 planned target was reported by Luxemburg with 34.1% (+0.75 percentage points) followed by Belgium with 32.9% (+1.25 percentage points), Romania with 27.9% (+4.86 percentage points), Italy with 25.6% (+2.06 percentage points) and Bulgaria with 24.8% (+2.5 percentage points).

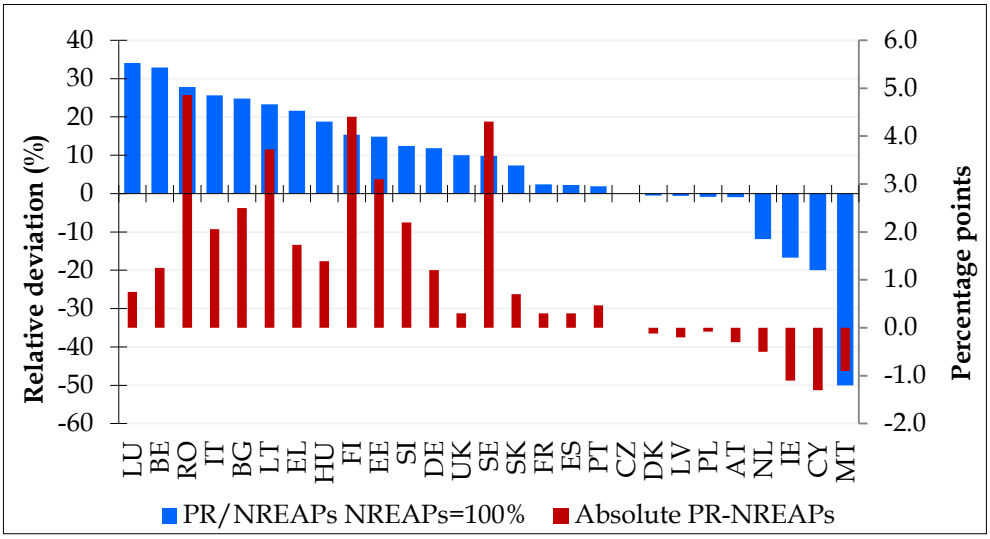

Figure 75[78]. EU 27 total RES shares deviations from NREAPs, 2010

Table 56. Total RES share in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	PR	NREAPs RES min	Deviation PR-NREAPs		Deviation PR-RES min	
	%	%	%	% points	%	% points	%
BE	3.8	5.1	4.4	1.3	32.9	0.7	15.8
BG	10.1	12.6	10.7	2.5	24.8	1.9	17.5

[79] MS are ranked according to their relative deviation from 2010 NREAPs plans

CZ	8.8	8.3[80]	7.5	-0.5	-5.7	0.8	11
DK	21.9	21.8	19.6	-0.1	-0.5	2.2	11.1
DE	10.1	11.3	8.2	1.2	11.9	3.1	37.1
EE	20.9	24.0	19.4	3.1	14.8	4.6	23.7
IE	6.6	5.5	5.7	-1.1	-16.7	-0.2	-3.2
EL	8.0	9.7	9.1	1.7	21.6	0.6	6.7
ES	13.2	13.5	11.0	0.3	2.3	2.5	23.2
FR	12.5	12.8	12.8	0.3	2.4	0.0	-0.3
IT	8.1	10.1	7.6	2.1	25.6	2.6	33.7
CY	6.5	5.2	4.9	-1.3	-20.0	0.3	5.7
LV	32.7	32.5	34.1	-0.2	-0.6	-1.6	-4.6
LT	16.0	19.7	16.6	3.7	23.3	3.1	18.8
LU	2.2	3.0	2.9	0.8	34.1	0.0	1.0
HU	7.4	8.8	6.0	1.4	18.8	2.8	45.5
MT	1.8	0.9	2.0	-0.9	-50.0	-1.1	-55.0
NL	4.2	3.7	4.7	-0.5	-11.9	-1.0	-21.6
AT	31.1	30.8	25.4	-0.3	-1.0	5.4	21.1
PL	9.6	9.5	8.8	-0.1	-0.8	0.7	8.4
PT	24.1	24.6	22.6	0.5	2.0	2.0	8.7
RO	17.5	22.4	19.0	4.9	27.8	3.3	17.4
SI	17.7	19.9	17.8	2.2	12.4	2.1	11.8
SK	9.5	10.2	8.2	0.7	7.4	2.0	25.0
FI	28.7	33.1	30.4	4.4	15.3	2.7	8.9
SE	43.5	47.8	41.6	4.3	9.9	6.2	14.8
UK	3.0	3.3	4.0	0.3	10.0	-0.7	-18.3
EU 27	11.5	12.6	10.7	1.1	9.9	1.9	17.6

b. Total RES installed capacity

The total installed capacity in RES electricity in EU 27 was 241.1 GW and did not reach by 2.0% (5.0 GW) the planned value of 246.1 GW reported in the NREAPs.

Figure 76 and Table 57 report the deviations, absolute and relative, of each MS in EU 27 from the 2010 NREAPs targets.

13 MS exceeded their 2010 targets in renewable electricity installed capacity. The highest absolute exceedances in RES electricity installed capacity were found in Germany (1756 MW above the target) together with Sweden (1637 MW above the target), Belgium (897 MW above the target), Denmark (292 MW above the target) and Finland (225 MW above the target).

[80] Czech Republic reported in its Progress Report an overall RES share for 2010 equal to 8.3% which nevertheless needs to be confirmed.

Slovenia reached almost its 2010 planned value on total RES installing capacity with 1135 MW compared to 1137 MW. So did also Cyprus with 97 MW instead of 94 MW that had planned in its NREAP.

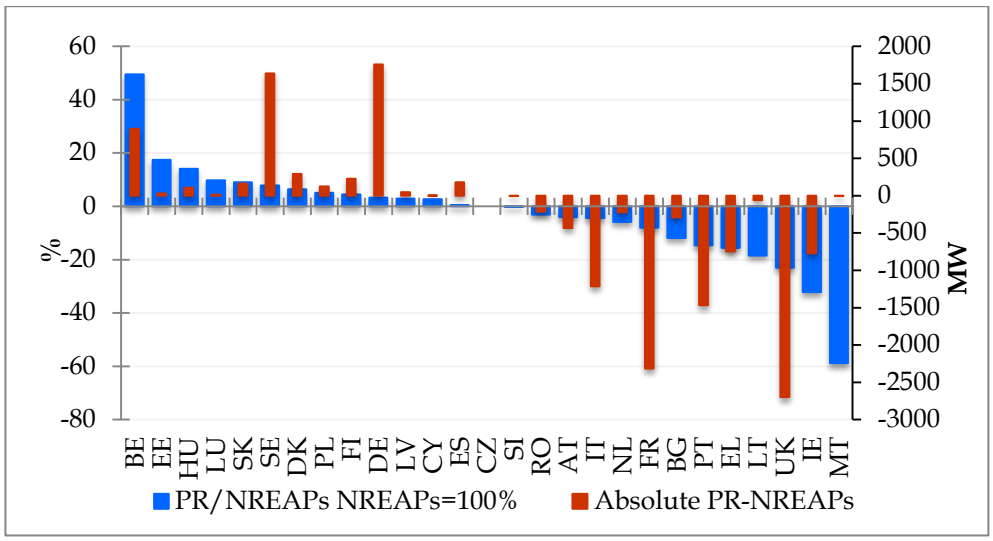

Figure 76[81]. EU 27 MS total RES installed capacity deviations from NREAPs, 2010

Malta reached to install in 2010 almost half of the renewable capacity that had planned in its NREAP having so the highest relative decrease with 58.9%. The total RES installed capacity in United Kingdom was about 77% of the planned target for this year reaching only 9.2 GW.

The total RES installed capacity for Finland almost reached the planned value since in 2009 and due to the increase in biomass installed capacity it exceeded with 225 MW the planned 2010 target.

France had the second highest absolute value of missing capacity (2316 MW below the target) in total RES installed capacity followed by Portugal (1469 MW below the target), Italy (1214 MW below the target) and Ireland (772 MW below the target).

Belgium, Estonia, Hungary, Luxemburg and Slovakia had the five highest relative exceedances from their targets in year 2010 with respectively 49.4%, 17.4%, 14.1%, 9.73% and 9%.

By 2010 Germany had the highest RES installed capapcity with 55.6 GW followed by Spain with 39.4 GW, France with 26.5 GW, Italy with 26.3 GW and Sweden with 22.5 GW.

Table 57. RES capacity in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	1813	2710	897	49.4
BG	2460	2169	-291	-11.8
CZ	3106	3106	0	0
DK	4614	4906	292	6.3
DE	53834	55590	1756	3.3
EE	154.2	181	27	17.4
IE	2399	1627	-772	-32.2

[81] MS are ranked according to their relative deviation from 2010 NREAPs plans

EL	4808	4060	-748	-15.6
ES	39214	39391	177	0.5
FR	28785	26469	-2316	-8.0
IT	27557	26343	-1214	-4.4
CY	94	97	3	2.7
LV	1577	1622	45	2.9
LT	341	278	-63	-18.4
LU	113	124	11	9.7
HU	755	862	107	14.1
MT	4	2	-2	-58.9
NL	3790	3567	-223	-5.9
AT	10547	10112	-435	-4.1
PL	2433	2556	123	5.1
PT	10022	8553	-1469	-14.7
RO	6987	6771	-216	-3.1
SI	1137	1135	-2	-0.2
SK	1805	1967	162	9.0
FI	5020	5245	225	4.5
SE	20868.3	22505	1637	7.8
UK	11900	9204	-2696	-23
EU 27	246137	241150	-4988	-2.0

c. Total RES consumption[82]

Total RES consumption exceeded by 8.3% the 2010 planned NREAPs values, reaching 6294.9 PJ (150.3 Mtoe) against the 2010 target of 5811.8 PJ (138.8 Mtoe).

Figure 77 and Table 58 report the fulfilment of this target by each MS in EU 27.

Only 5 MS were below their 2010 planned total RES consumption while the other ones reached or exceeded their 2010 planned RES consumption.

The highest negative absolute deviation has been reported in Ireland (8.1 PJ below the plan) while the highest relative missing RES consumption took place in Malta (53.7% below the plan).

Germany had the highest absolute exceedance from 2010 NREAPs with 104.5 PJ above the target) followed by Italy (+88 PJ), Sweden (+66.7 PJ), Finland (+58.7 PJ) and Romania (+41.1 PJ).

Luxemburg had the highest relative exceedance with 35.8% above the plan together with Belgium (+29.8%), Bulgaria (+25.8%), Lithuania (+25.1%) and Slovenia (+24.3%).

[82] According to Article 5(1) the contribution of total RES transport consumption in total RES consumption include all sources (bioethanol, biodiesel, hydrogen, renewable electricity and others)

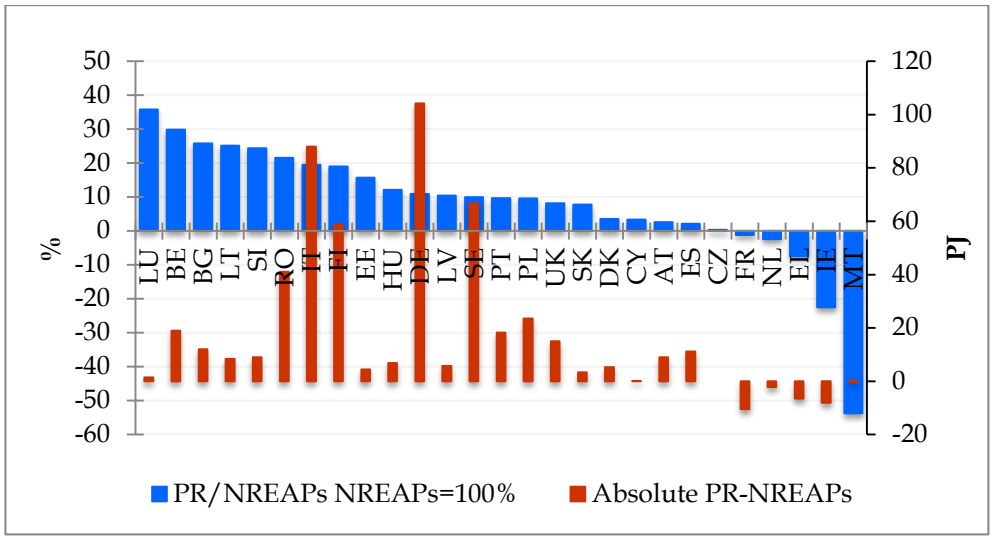

Figure 77.[83], EU 27 MS total RES consumption deviations from NREAPs, 2010

The highest RES consumption in 2010 took place in Germany with 1059 PJ (25.3 Mtoe) together with France (891 PJ or 21.3 Mtoe), Sweden (735.1 PJ or 17.6 Mtoe), Spain (546.7 PJ or 13.1 Mtoe) and Italy (539.6 PJ or 12.9 Mtoe).

Table 58. RES consumption in EU 27,Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	PJ	PJ	%
BE	63.7	82.6	19.0	29.8
BG	46.4	58.3	12.0	25.8
CZ	108.2	108.2	0	0
DK	149.7	155.0	5.3	3.5
DE	954.9	1059.1	104.1	10.9
EE	27.8	32.2	4.4	15.7
IE	36.0	27.9	-8.1	-22.5
EL	88.7	82.2	-6.6	-7.4
ES	535.7	546.7	11.1	2.1
FR	901.5	891.0	-10.5	-1.2
IT	451.6	539.6	88.0	19.5
CY	4.2	4.3	0.1	3.3
LV	55.4	61.1	5.7	10.4
LT	33.4	41.7	8.4	25.1
LU	3.8	5.2	1.4	35.8
HU	56.2	63.0	6.8	12.1
MT	0.3	0.2	-0.2	-53.7
NL	89.6	87.5	-2.2	-2.4
AT	340.1	349.1	8.9	2.6
PL	245.9	269.5	23.5	9.6

[83] MS are ranked according to their relative deviation from 2010 NREAPs target

PT	188.3	206.5	18.2	9.7
RO	190.5	231.5	41.1	21.6
SI	36.8	45.7	9.0	24.3
SK	42.4	45.7	3.3	7.8
FI	309.4	368.1	58.7	19.0
SE	668.4	735.1	66.7	10.0
UK	182.9	197.9	14.9	8.2
EU 27	5811.8	6294.9	483.1	8.3

d. Total RES generation[84]

Total RES generated exceeded by 8.5% the 2010 the planned NREAPs values, reaching 6248.3 PJ (149.2 Mtoe) against the 2010 target of 5757.5 PJ (137.5 Mtoe).

Figure 78 and Table 59 report the fulfilment of this target by each MS in EU 27.

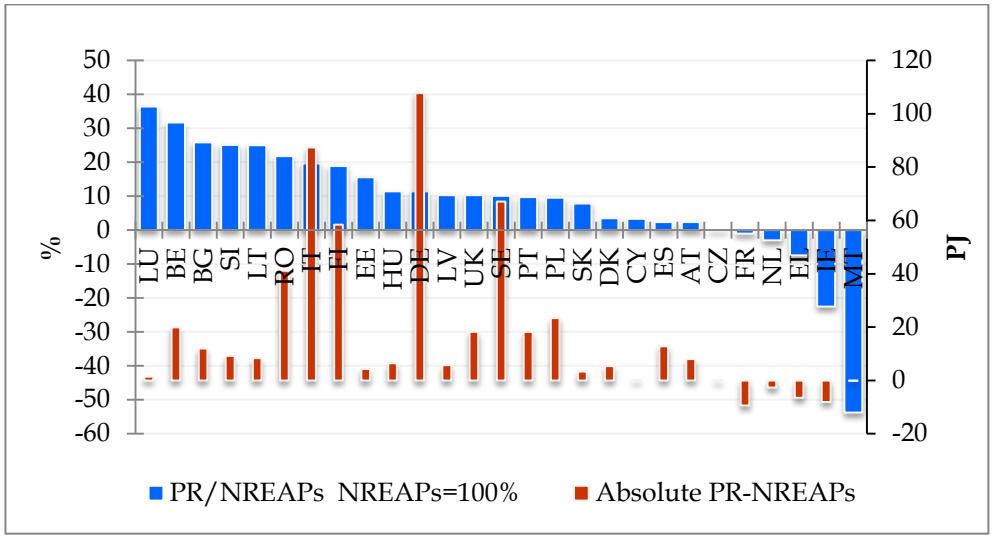

Figure 78.[85], EU 27 MS total RES generation deviations from NREAPs, 2010

Almost all MS exceeded their total RES generation except France (9.3 PJ below the target), Ireland (8.1 PJ below the target), Greece (6.6 PJ below the target), Netherlands (2.7 PJ below the target) and Malta (0.2 PJ below the target).

Germany had the highest absolute exceedance from 2010 NREAPs target with 107.7 PJ (11.4% above the target) followed by Italy (+87.4 PJ or +19.7%), Sweden (+67.1 PJ or +10.1%), Finland (+58.4 PJ or +18.9%) and Romania (+41.2 PJ or +21.8%).

Luxemburg had the highest relative exceedance with 36.5% (1.4 PJ above the target) together with Belgium (+31.7% or +19.9PJ), Bulgaria (+25.9% or +12 PJ), Slovenia (+25.1% or 9.2 PJ) and Lithuania (+25.0% or +8.3 PJ).

[84] According to Article 5.1 of Directive 2009/28/EC the contribution of total RES transport in total RES generation include only once the contribution of renewable sources (bioethanol, biodiesel and others).
[85] MS are ranked according to their relative deviation from 2010 NREAPs target

Table 59. RES generation in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	62.7	82.5	19.9	31.7
BG	46.2	58.2	12.0	25.9
CZ	107.9	107.9	0.0	0.0
DK	149.2	154.6	5.3	3.6
DE	944.5	1052.3	106.5	11.3
EE	27.8	32.2	4.4	15.6
IE	36.0	27.9	-8.1	-22.6
EL	88.6	82.1	-6.6	-7.4
ES	531.7	544.5	12.9	2.4
FR	893.9	884.5	-9.3	-1.0
IT	444.5	531.9	87.4	19.7
CY	4.2	4.3	0.1	3.3
LV	55.3	61.0	5.7	10.3
LT	33.3	41.7	8.3	25.0
LU	3.7	5.1	1.4	36.5
HU	56.0	62.4	6.4	11.5
MT	0.3	0.2	-0.2	-53.7
NL	89.1	86.4	-2.7	-3.0
AT	333.0	340.9	8.0	2.4
PL	245.3	268.7	23.4	9.5
PT	187.5	205.7	18.2	9.7
RO	189.0	230.1	41.2	21.8
SI	36.6	45.8	9.2	25.2
SK	42.1	45.4	3.3	7.9
FI	309.0	367.4	58.8	19.1
SE	662.2	729.2	67.0	10.1
UK	177.2	195.5	18.3	10.3
EU 27	5757.5	6248.3	490.8	8.5

2.2.1 RES Heating/Cooling

a. RES-H/C share

According to NREAPs, planned RES share in heating/cooling sector amounted to 12.5% and EU 27 exceeded it since 2009 with 1.2 percentage points. The RES share in this sector increased furthermore in year 2010 reaching the value of 14.4%.

Figure 79, 80 and Table 60 present the deviations, absolute and relative, of RES share in heating/cooling sector in each MS of EU 27.

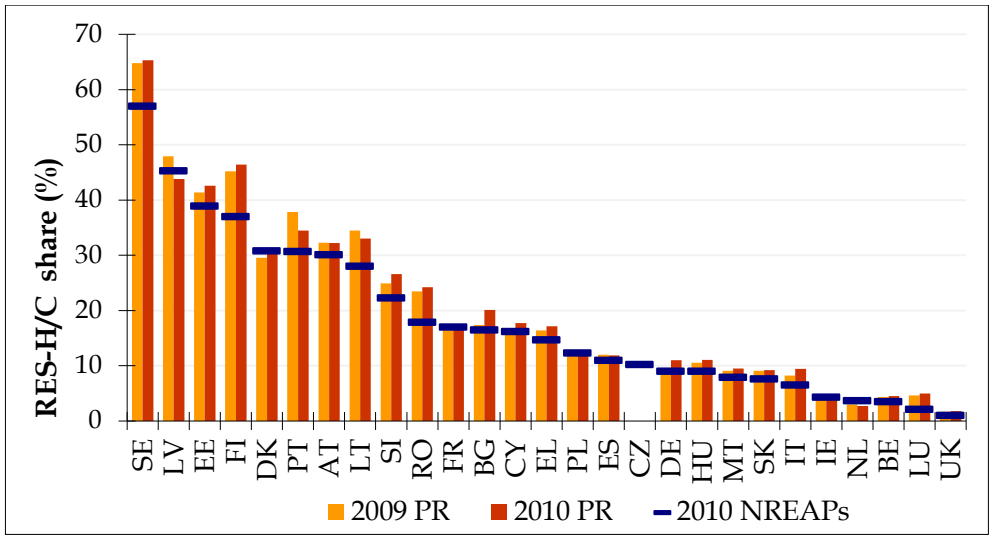

Figure 79[86]. EU 27 MS RES-H/C share in 2009, 2010 (PR & NREAPs)

22 MS in EU 27 reached or exceeded their 2010 NREAPs planned value in RES H/C share since 2009 while only 4 MS (Denmark, Latvia, Netherland and Poland) failed to meet their 2010 NREAPs RES H/C share targets. Latvia was above the 2010 target in 2009 but it failed in 2010 because its share dropped from 47.9% to 43.8%.

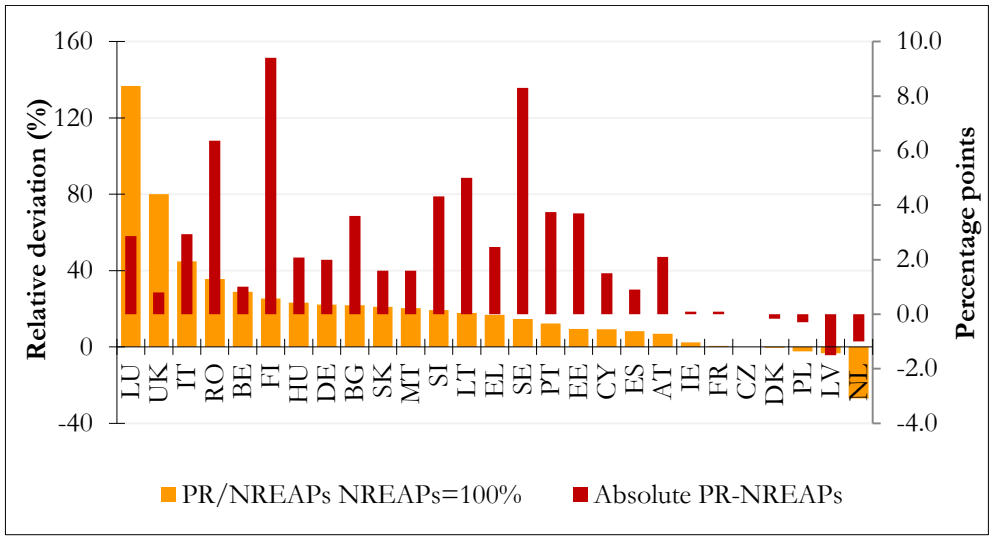

Figure 80[87]. EU 27 MS RES-H/C share deviations from NREAPs of, 2010

In relative terms, Luxemburg (136% above the target) together with United Kingdom (80%), Italy (44.9%), Romania (35.6%) and Belgium (28.9%) are the leading countries in the group that exceeded the 2010 target.

Netherland had the highest negative relative deviation in RES share with 27% below the target while Latvia had the highest absolute negative absolute deviation with 1.5 percentage points.

Finland had the highest absolute exceedance of RES share in heating/cooling sector in year 2010 with 9.4 percentage points above the target (+25.4%) together with Sweden with 8.3 percentage

[86] MS are ranked according to their RES-H/C share in 2009
[87] MS are ranked according to their relative deviation from 2010 NREAPs plans

points (+14.6%), Romania with 6.4 percentage points (+35.6%), Lithuania with 5 percentage points (+17.9%) and Slovenia with 4.3 percentage points (+19.4%).

Table 60. RES H/C share in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	2010 NREAPs	2009 PR	2010 PR	2010 Deviation PR-NREAPs	
	%	%	%	% points	%
BE	3.5	4.4	4.5	1.0	28.9
BG	16.5	17.4	20.1	3.6	21.8
CZ	10.9	0.0	10.9	0.0	0
DK	30.8	29.6	30.6	-0.2	-0.5
DE	9.0	9.6	11.0	2.0	22.2
EE	38.9	41.4	42.6	3.7	9.5
IE	4.3	4.3	4.4	0.1	2.3
EL	14.7	16.4	17.2	2.5	16.8
ES	11.0	12.0	11.9	0.9	8.2
FR	17.0	16.4	17.1	0.1	0.6
IT	6.5	8.2	9.5	2.9	44.9
CY	16.2	15.6	17.7	1.5	9.3
LV	45.3	47.9	43.8	-1.5	-3.3
LT	28.0	34.5	33.0	5.0	17.9
LU	2.1	4.6	5.0	2.9	136.7
HU	9.0	10.5	11.1	2.1	23.1
MT	7.9	9.1	9.5	1.6	20.3
NL	3.7	3.0	2.7	-1.0	-27.0
AT	30.1	32.3	32.2	2.1	7.0
PL	12.3	11.9	12.0	-0.3	-2.4
PT	30.7	37.9	34.5	3.8	12.2
RO	17.9	23.5	24.2	**6.4**	35.6
SI	22.3	24.9	26.6	**4.3**	19.4
SK	7.6	9.1	9.2	1.6	21.1
FI	37.0	45.2	46.4	**9.4**	25.4
SE	57.0	64.8	65.3	**8.3**	14.6
UK	1.0	1.7	1.8	0.8	80.0
EU 27	12.5	13.7	14.4	1.9	15.2

b. Contribution of RES in heating/cooling sector

Renewable energy contribution in heating/cooling sector reported for year 2010 was 18.5% larger (+528.2 PJ or 12.6 Mtoe) than the planned NREAPs value of 2851.6 PJ (68.1 Mtoe) for the same year. The share of renewable energy in total RES for this sector reached 54% compared to the planned value of 50%.

Figure 51 and Table 61 report the absolute and relative deviations of RES in heating/cooling sector from the each MS of EU 27 NREAPs targets.

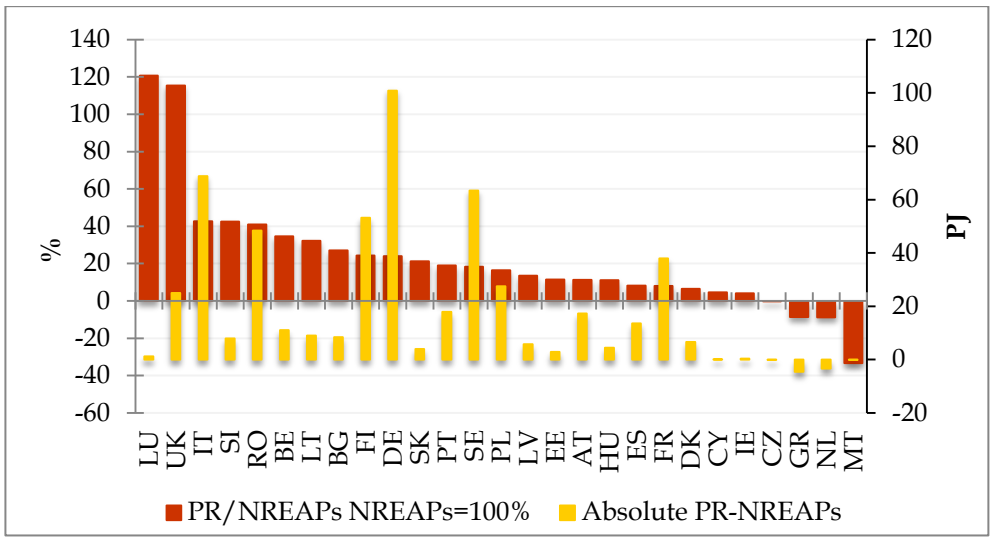

Figure 81.[88] EU 27 MS RES H/C contribution deviations from NREAPs, 2010

Only three MS didn't reach their 2010 planned renewable energy contribution in heating/cooling sector: Malta with 0.1 PJ less than planned value (-33.3%), The Netherlands with 3.3 PJ less than planned value (-8.7%) and Greece with 4.6 PJ less than the planned value (-8.6%).

The highest absolute exceedance was reported by Germany with 101 PJ (+24%), followed by Italy with 69 PJ (+42.7%), Sweden with 63.4 PJ (+18.4%), Romania with 48.4 PJ (+41%) and France with 37.8 PJ (+8.1%).

The highest relative exceedances were found in Luxemburg with 120.8% (+1.3 PJ) and United Kingdom with 115.4% (+25 PJ).

Germany was the leading MS in RES-H/C in 2010 with 520.9 PJ (12.4 Mtoe) followed by France with 503.5 PJ (12 Mtoe), Sweden with 408 PJ (9.7 Mtoe), Finland with 271 PJ (6.5 Mtoe) and Italy with 230 PJ (5.5 Mtoe).

Table 61. RES-H/C in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	PJ	PJ	%
BE	32.1	43.2	11.1	34.7
BG	31.0	39.4	8.4	27.1
CZ	79.2	79.2	0.0	0.0
DK	103.2	109.9	6.7	6.5
DE	420.0	520.9	100.9	24.0
EE	25.6	28.6	2.9	11.4
IE	9.2	9.6	0.4	4.1
EL	53.1	48.6	-4.6	-8.6
ES	164.7	178.3	13.6	8.3

[88] MS are ranked according to their relative deviation from 2010 NREAPs targets

FR	465.7	503.5	37.9	8.1
IT	161.2	230.1	68.9	42.7
CY	3.3	3.4	0.2	4.6
LV	42.7	48.5	5.8	13.5
LT	27.9	36.9	9.0	32.3
LU	1.1	2.4	1.3	120.8
HU	39.7	44.2	4.4	11.2
MT	0.1	0.1	-0.1	-33.3
NL	37.9	34.6	-3.3	-8.7
AT	153.1	170.4	17.3	11.3
PL	166.6	194.1	27.5	16.5
PT	93.8	111.7	17.9	19.1
RO	118.0	166.4	48.4	41.0
SI	18.6	26.5	7.9	42.5
SK	18.9	22.9	4.0	21.2
FI	218.1	271.3	53.2	24.4
SE	344.9	408.3	63.4	18.4
UK	21.7	46.7	25.0	115.4
EU 27	2851.6	3379.8	528.2	18.5

2.2.2 RES Electricity

a. RES-E share

According to Progress Reports the 2010 EU 27 RES share in gross final energy consumption in electricity sector reached 19.7% exceeding with 0.1 percentage points (+0.5%) the NREAPs planned value for this year. RES share in electricity sector in 2009 and 2010 in each EU 27 MS is presented in Figure 82. Figures 83 and Table 62 report the fulfilment of this target in absolute and relative terms by each MS of EU 27.

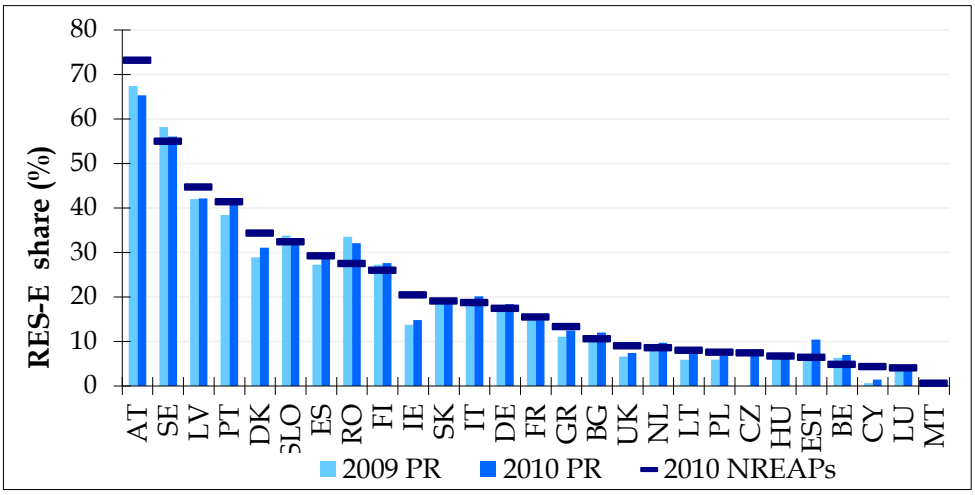

Figure 82[89]. EU 27 MS RES-E share in 2009, 2010 (PR & NREAPs)

[89] MS are ranked according to their RES –E share in 2009

11 MS were above the 2010 NREAPs planned value for RES electricity share since in 2009: Belgium, Bulgaria, Germany, Luxemburg, Hungary, Netherland, Romania, Slovenia, Finland and Sweden. Nevertheless, in Luxemburg and Slovenia the RES electricity share dropped in 2010 making not possible the achievement of the planned values.

In 2010 eleven MS exceeded their NREAPs target for RES electricity share: Estonia, Belgium, Romania, Bulgaria, the Netherlands, Czech Republic, Italy, Finland, Hungary, Germany and Sweden.

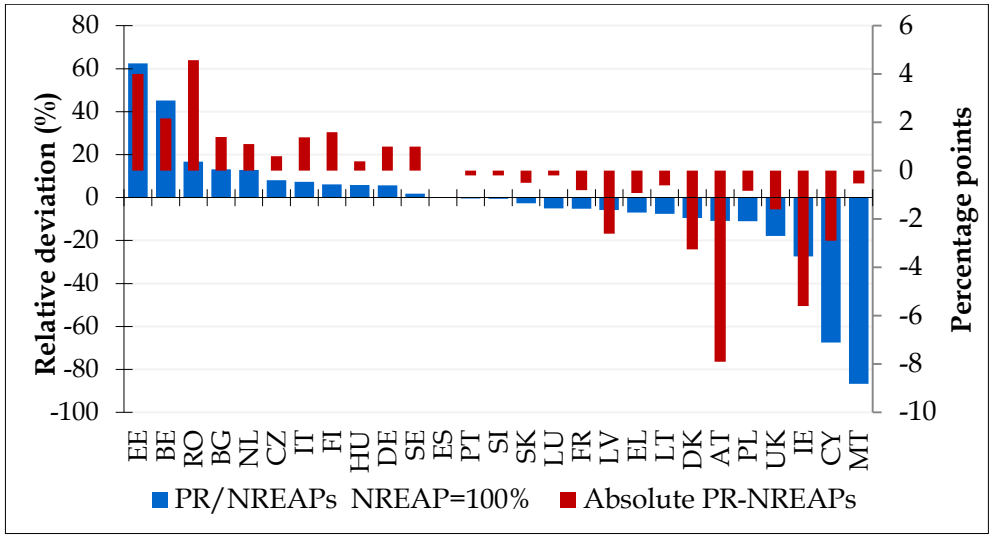

Figure 83[90]. EU 27 MS RES-E share deviations from NREAPs, 2010

The highest relative exceedances were reported by Estonia with 62.5% (+4 percentage points), Belgium with 45.2% (+2.17 percentage points), Romania with 16.7% (+4.58 percentage points), Bulgaria with 13.2% (+1.4 percentage points) and the Netherlands with 12.8% (+1.1 percentage points).

Spain was the only MS that reported the same RES share for 2010 in this sector as it was planned in the NREAPs.

The highest negative relative distance in reaching the target RES electricity share happened in Malta with 86.7% (0.5 percentage points less) and Cyprus with 67.4% (2.9 percentage points less) while Luxemburg, Portugal, Slovenia, Slovakia, Latvia and France had a very slightly missing value from their planned targets by less than 6%.

Table 62. RES-E share in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	2009 PR	2010 PR	2010 Deviation PR-NREAPs	
	%	%	%	% points	%
BE	4.8	6.3	7.0	2.2	45.2
BG	10.6	11.4	12.0	1.4	13.2
CZ[91]	7.5	7.4	8.0	0.5	6.7
DK	34.3	28.9	31.0	-3.3	-9.5
DE	17.4	17.4	18.4	1.0	5.7

[90] MS are ranked according to their relative deviation from 2010 NREAPs plans
[91] Czech Republic reported in its Progress Reports the RES-E share for 2009 and 2010

EE	6.4	6.1	10.4	4.0	62.5
IE	20.4	13.7	14.8	-5.6	-27.5
EL	13.3	11.0	12.4	-0.9	-6.9
ES	29.2	27.2	29.2	0.0	0.0
FR	15.5	15.0	14.7	-0.8	-5.2
IT	18.7	18.8	20.1	1.4	7.4
CY	4.3	0.6	1.4	-2.9	-67.4
LV	44.7	42.0	42.1	-2.6	-5.8
LT	8.0	5.9	7.4	-0.6	-7.5
LU	4.0	4.1	3.8	-0.2	-5.0
HU	6.7	7.0	7.1	0.4	5.8
MT	0.6	0.0	0.1	-0.5	-86.7
NL	8.6	9.1	9.7	1.1	12.8
AT	73.2	67.4	65.3	-7.9	-10.8
PL	7.5	5.9	6.7	-0.8	-11.0
PT	41.4	38.4	41.2	-0.2	-0.5
RO	27.5	33.5	32.1	4.6	16.7
SI	32.4	33.8	32.2	-0.2	-0.6
SK	19.1	18.9	18.6	-0.5	-2.6
FI	26.0	27.2	27.6	1.6	6.2
SE	55.0	58.2	56.0	1.0	1.8
UK	9.0	6.6	7.4	-1.6	-17.8
EU 27	19.6	19.1	19.7	0.1	0.5

b. Contribution of RES in electricity sector

According to Progress Reports the contribution of renewable energy to the electricity sector reached in 2010 the amount of 2310.5 PJ (641.7 TWh or 55.2 Mtoe) missing by 0.8% the planned 2010 NREAPs value of 2330 PJ (647.1 TWh or 55.6 Mtoe). The share in total RES also did not reach the planned 40% stopping at 37%.

Figure 84 and Table 63 report the deviations, absolute and relative, for each MS of EU 27 in the fulfilments of these plans.

14 MS were able to reach or exceed the NREAPs plans regarding the total renewable electricity contribution in year 2010: Belgium, Bulgaria, Germany, Estonia, Spain, Cyprus, Latvia, Luxemburg, Hungary, the Netherlands, Romania, Slovenia, Finland and Sweden.

Germany had the highest absolute exceedance in total electricity generation from renewables in year 2010 (25.8 PJ above the target) together with Finland (+8.9 PJ), Belgium (+8.2 PJ), Bulgaria (+4.5 PJ) and Netherlands (+3.9 PJ).

The highest negative absolute difference was reported by France (37.4 PJ below the target) together with Austria (14.6 PJ below), United Kingdom (13.1 PJ below), Ireland (6.7 PJ below) and Greece (2.9 PJ below).

In relative terms Estonia had the highest exceedance in renewable electricity consumption (+67.1%) together with Belgium (+48.7%) and Bulgaria (+32.4%). Malta had the highest negative relative deviation (-72.1%) together with Ireland (-31.7%) and France (-11.9%).

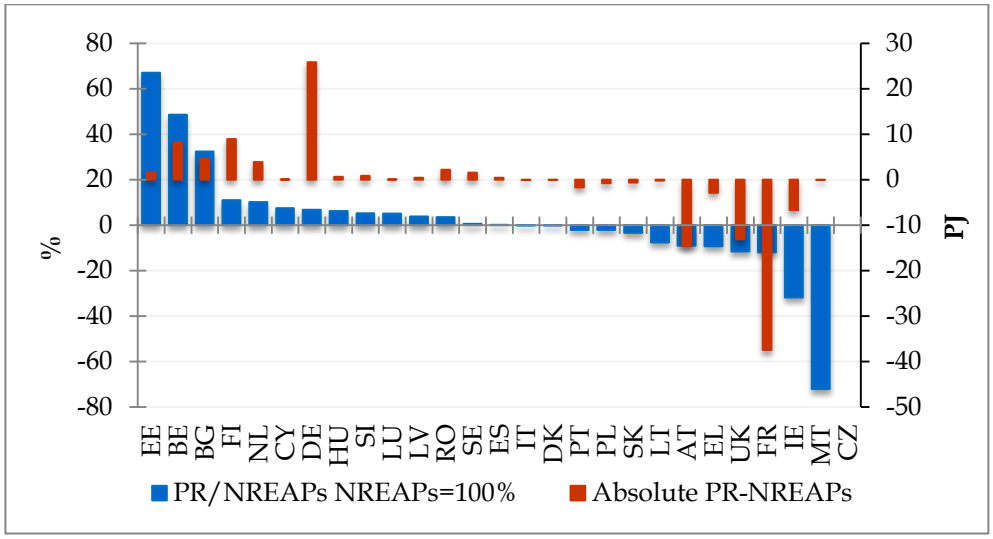

Figure 84[92]. EU 27 MS RES-E contribution deviations from NREAPs, 2010

Leading MS in renewable energy contribution in electricity sector in 2010 were Germany with 403.7 PJ (112.1 TWh), Spain with 307 PJ (85.3 TWh), Sweden with 302.9 PJ (84.1 TWh), France with 277 PJ (77 TWh) and Italy with 240 PJ (66.8 TWh).

Table 63. RES-E in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	PJ	PJ	%
BE	16.8	25.0	8.2	48.7
BG	13.8	18.3	4.5	32.4
CZ	18.9	18.9	0.0	0
DK	44.7	44.6	-0.1	-0.2
DE	377.9	403.7	25.8	6.8
EE	2.2	3.6	1.5	67.1
IE	21.1	14.4	-6.7	-31.7
EL	31.0	28.1	-2.9	-9.3
ES	306.5	307.0	0.5	0.1
FR	314.5	277.1	-37.4	-11.9
IT	240.5	240.4	-0.10	-0.04
CY	0.2	0.3	0.02	7.4
LV	10.9	11.4	0.4	3.9
LT	3.2	2.9	-0.2	-7.6

[92] MS are ranked according to their relative deviation from 2010 NREAPs targets

LU	0.9	1.0	0.05	5.1
HU	10.2	10.9	0.6	6.3
MT	0.0	0.0	-0.02	-72.1
NL	38.3	42.2	3.9	10.1
AT	163.4	148.8	-14.6	-8.9
PL	38.2	37.4	-0.8	-2.1
PT	81.9	80.2	-1.7	-2.1
RO	61.5	63.7	2.2	3.5
SI	16.2	17.1	0.8	5.2
SK	19.7	19.1	-0.7	-3.4
FI	81.6	90.5	8.9	10.9
SE	301.3	302.9	1.5	0.5
UK	113.8	100.7	-13.1	-11.5
EU 27	2330	2310.5	-19.5	-0.8

2.2.3 RES Transport

a. RES-T share

EU 27 missed by 0.1 percentage points its 2010 planned target in renewable energy share in transport sector reaching only 4.8% instead of the planned one of 4.9%. RES share in transport sector in 2009 and 2010 according both Progress Reports and NREAPs are presented in Figure 85. Figure 86 and Table 64 report the fulfilment of this target in each MS of EU 27.

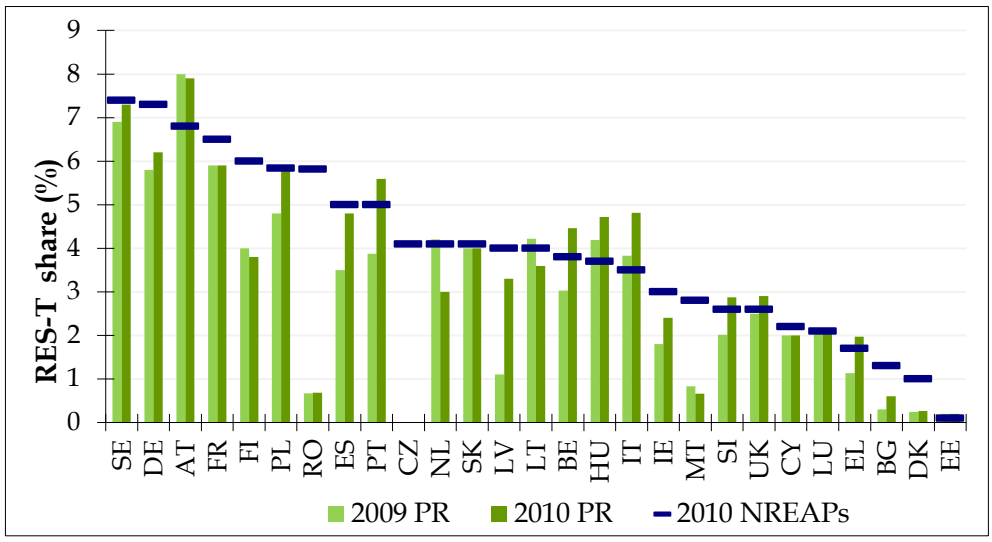

Figure 85[93]. EU 27 MS RES-T share in 2009, 2010 (PR & NREAPs)

Only 10 MS exceeded their 2010 targets on RES transport share: Belgium, Estonia, Greece, Italy, Hungary, Austria, Poland, Portugal, Slovenia and United Kingdom. 7 MS exceeded their 2010 target in RES transport share since in 2009: Estonia, Italy, Latvia, Luxemburg, Hungary, Netherlands and Austria. Latvia, Luxemburg and Netherlands due to the drop of their RES transport share in 2010 weren't able to meet their targets in this year.

[93] MS are ranked according to their RES-T share in 2009

Estonia doubled its RES transport share since in 2009 and maintained the same share even in 2010 and had the highest relative exceedance with 100% (+0.1 percentage points).

The highest absolute exccedance in RES share in transport sector was reported by Italy with 1.3 percentage points (+37.4%) together with Austria with 1.1 percentage points (+16.2%) and Hungary with 1 percentage points (+27.6%).

Romania (88.3% below the target) and Denmark (74% below the target) didn't report on biofuels due to the fact that these didn't fulfil the sustainability criteria set out in Article 17(2) to (6) of the RES Directive. For this reason their contribution for RES transport refers only to renewable electricity and failed to reach what they had planned in their NREAPs.

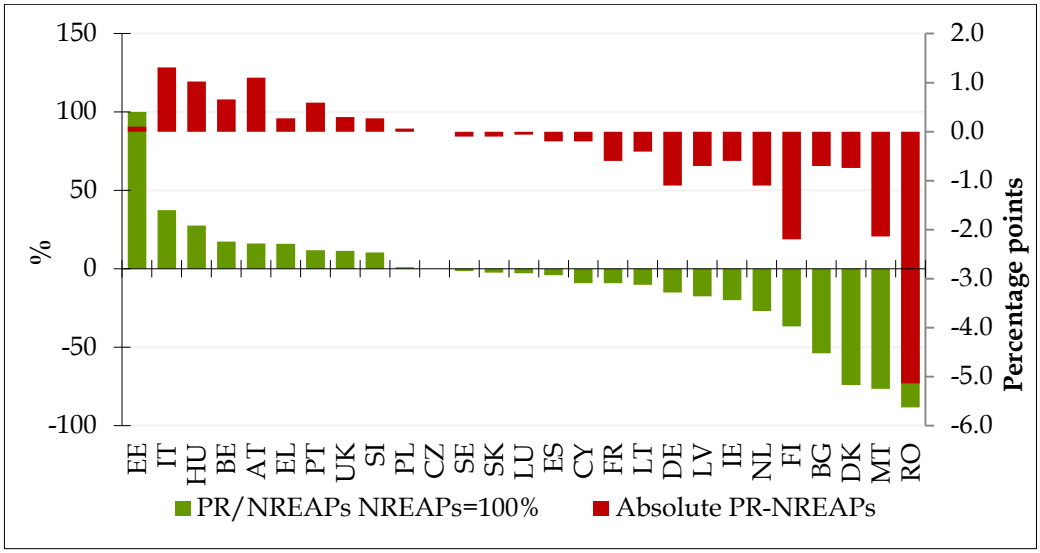

Figure 86.[94] EU 27 MS RES-T share deviations from NREAPs, 2010

Malta reached in 2010 a RES share in transport sector equal to ¼ of its NREAP planned value, 0.7% instead of 2.8%, having the second highest relative negative difference with 76.4%. Bulgaria was the fourth MS that had a negative difference in its RES share in transport sector with 53.8% (0.7 percentage points below the planned value).

Table 64. RES-T share in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	2009 PR	2010 PR	2010 Deviation PR-NREAPs	
	%	%	%	% points	%
BE	3.8	3.0	4.5	0.7	17.4
BG	1.3	0.3	0.6	-0.7	-53.8
CZ	3.9	n.a	3.9	0.0	0.0
DK	1.0	0.2	0.3	-0.7	-74.0
DE	7.3	5.8	6.2	-1.1	-15.1
EE	0.1	0.2	0.2	0.1	100.0
IE	3.0	1.8	2.4	-0.6	-20.0
EL	1.7	1.1	2.0	0.3	15.9
ES	5.0	3.5	4.8	-0.2	-4.0

[94] MS are ranked according to their relative deviation from 2010 NREAPs targets

FR	6.5	5.9	5.9	-0.6	-9.2
IT	3.5	3.8	4.8	1.3	37.4
CY	2.2	2.0	2.0	-0.2	-9.1
LV	4.0	1.1	3.3	-0.7	-17.5
LT	4.0	4.2	3.6	-0.4	-10.3
LU	2.1	2.2	2.0	-0.1	-2.9
HU	3.7	4.2	4.7	1.0	27.6
MT	2.8	0.8	0.7	-2.1	-76.4
NL	4.1	4.2	3.0	-1.1	-26.8
AT	6.8	8.0	7.9	1.1	16.2
PL	5.8	4.8	5.9	0.1	1.0
PT	5.0	3.9	5.6	0.6	11.8
RO	5.8	0.7	0.7	-5.1	-88.3
SI	2.6	2.0	2.9	0.3	10.4
SK	4.1	4.0	4.0	-0.1	-2.4
FI	6.0	4.0	3.8	-2.2	-36.7
SE	7.4	6.9	7.3	-0.1	-1.4
UK	2.6	2.5	2.9	0.3	11.5
EU 27	4.9	4.2	4.8	-0.1	-3.3

b. RES-T with double counting

EU 27 missed the 2010 plan in energy consumption in transport sector by 4.1% reaching the amount of 604.6 PJ (14.4 Mtoe) compared to 630.2 PJ (15 Mtoe). The share in total RES consumption decreased from planned 11% to 10%. With multiple counting the RES in transport sector reached 628.8 PJ (15 Mtoe) missing by 3% (20.3 PJ) the planned amount at NREAPs for 2010. Figure 87 and Table 65 present the absolute and relative deviations from 2010 targets in each MS of EU 27 in RES consumption in transport sector.

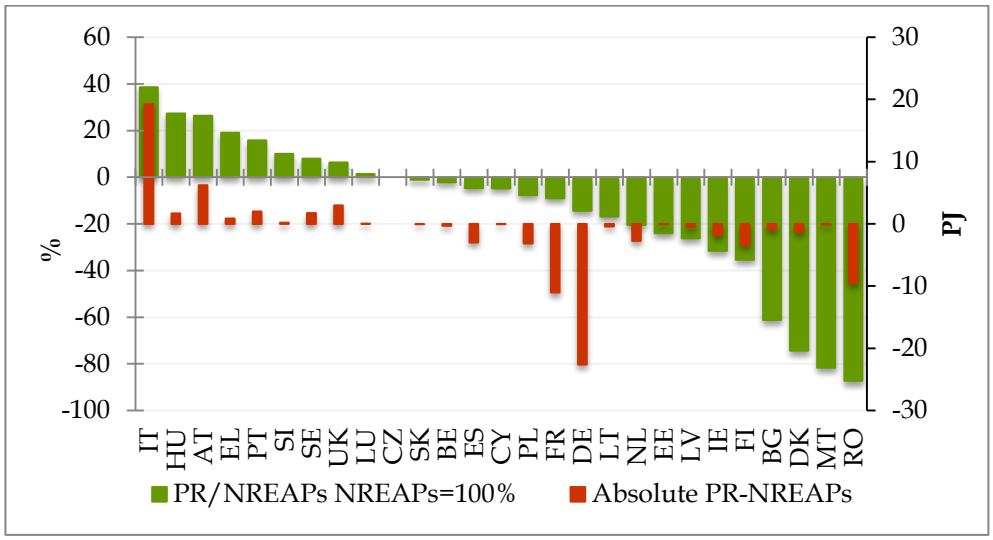

Figure 87.[95] EU 27 MS RES-T consumption deviations from NREAPs, 2010

[95] MS are ranked according to their relative deviation from 2010 NREAPs targets

According to Progress Reports, in 2010 9 MS consumed in transport sector more renewable energy than planned: Greece, Italy, Luxemburg, Hungary, Austria, Portugal, Slovenia[96], Sweden and United Kingdom. The other MS didn't reach their the RE consumption they had planned in their NREAPs.

Italy had the highest absolute and relative exceedance in RES consumption in transport sector with 19.3 PJ above the plan (+38.7%). Hungary (+27.3%), Austria (+26.4%), Slovenia (+26.3%) and Greece (+19.1%) are part of the group with highest relative exceedances from the planned targets.

Germany consumed in 2010 less renewable energy in transport sector missing by 22.6 PJ (-0.5 Mtoe) (-14.4%) the NREAP value. France also had a negative difference in its renewable energy consumption in transport sector in year 2010 compared with what had planned being almost 11 PJ below the planned value (-9.1%).

Romania had the highest relative negative difference in RES consumption in this sector being 87.3 % below the planned NREAP value. Malta had the second highest relative negative difference with 81.5%, followed by Denmark with 74.3%, Bulgaria with 61.1% and Finland with 35.3%.

Germany had the highest RES consumption in transport sector in 2010 with 134.4 PJ (3.2 Mtoe) followed by France with 110.3 PJ (2.6 Mtoe), Italy with 69 PJ (1.6 Mtoe), Spain with 61.4 PJ (1.5 Mtoe) and United Kingdom with 50.4 PJ (1.2 Mtoe).

Table 65. RES-T consumption in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	PJ	PJ	%
BE	14.8	14.5	-0.3	-2.2
BG	1.5	0.6	-0.9	-61.1
CZ	10	10	0.0	
DK	1.8	0.5	-1.3	-74.3
DE	157.0	134.4	-22.6	-14.4
EE	0.0	0.0	0.0	-24.0
IE	5.7	3.9	-1.8	-31.1
EL	4.6	5.5	0.9	19.1
ES	64.4	61.4	-3.0	-4.6
FR	121.3	110.3	-11.0	-9.1
IT	49.8	69.1	19.3	38.7
CY	0.7	0.6	0.0	-6.5
LV	1.8	1.3	-0.5	-26.2
LT	2.3	1.9	-0.4	-16.4
LU	1.8	1.8	0.0	1.4
HU	6.3	8.0	1.7	27.3
MT	0.1	0.0	-0.1	-81.7
NL	13.4	10.6	-2.7	-20.4

[96] Slovenia reported only the total consumtion or contribution in transport sector without dividing it into subcategories.

AT	23.6	29.9	6.2	26.4
PL	41.1	37.9	-3.1	-7.6
PT	12.6	14.6	2.0	15.8
RO	11.5	1.4	-10.1	-88.0
SI	1.7	2.1	0.4	26.3
SK	3.8	3.7	0.0	-1.1
FI	9.2	6.2	-3.0	-32.4
SE	22.1	23.9	1.8	8.0
UK	47.4	50.4	3.0	6.4
EU 27	630.2	604.6	-25.6	-4.1

c. RES-T with single counting

According to Progress Reports in EU 27 the total RES contribution in transport sector with single counting reached only 558 PJ (13.3 Mtoe) to be compared with the planned 575.9 PJ (13.8 Mtoe). The share in total RES was 1 percentage point less than planned, (10% instead of 9%).

Figure 88 and Table 66 present the absolute and relative deviations from 2010 targets in each MS of EU 27 in renewable energy contribution with single counting in transport sector.

Denmark, Romania and Estonia were the only MS that didn't report renewable energy contribution in transport sector due to the fact that their biofuels didn't fulfil the sustainability criteria as defined by Article 5 of the Directive. For this reason their relative deviations from the 2010 NREAPs was 100%.

9 MS, Belgium, Greece, Italy, Hungary, Austria, Portugal, Slovenia, Sweden and United Kingdom, increased their RES contribution in this sector more than planned in their NREAPs for year 2010. Cyprus, Luxemburg and Slovakia maintained almost the same RES contribution while the rest of MS report a RES contribution lower than their planned values.

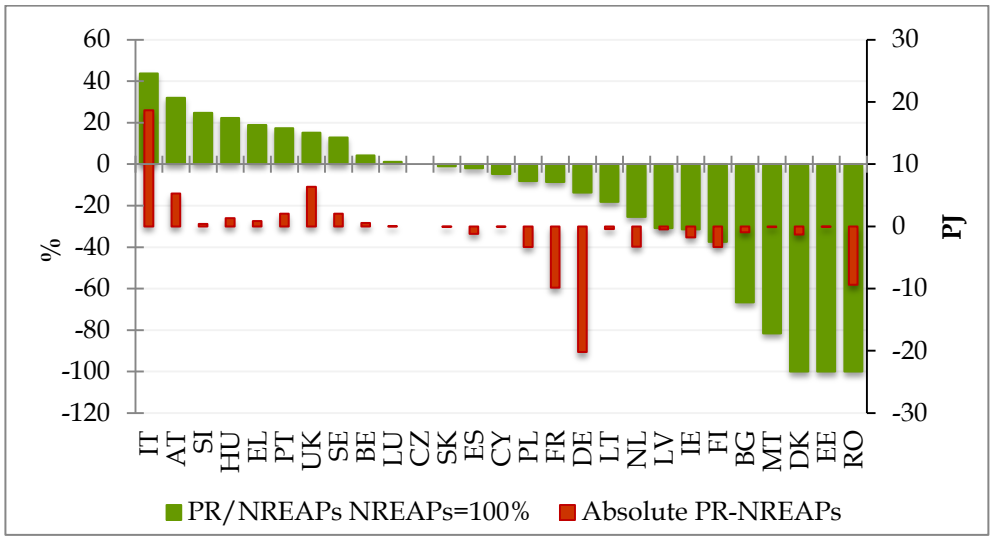

Figure 88.[97] EU 27 MS RES-T with single counting deviations from NREAPs, 2010

[97] MS are ranked according to their relative deviation from 2010 NREAPs targets

Italy had the highest absolute (+18.7 PJ) and relative exceedance (+43.7%) in renewable energy contribution in this sector compared to the planned target for year 2010. Austria, Slovenia, Hungary and Greece joined Italy with respectively 32.1%, 24.7%, 22.2% and 19%.

The highest absolute negative difference in renewable energy contribution in this sector compared to 2010 plans was reported by Germany with 20.2 PJ (0.48 Mtoe below the planned target). France followed Germany with 9.8 PJ below the planned value in renewable energy contribution in year 2010 in transport sector.
In absolute terms, Germany had the highest RES contribution in transport sector with 127.6 PJ (3 Mtoe) together with France (103.8 PJ or 2.5 Mtoe), Italy (61.4 PJ or 1.5 Mtoe), Spain (59.2 PJ or 1.4 Mtoe) and United Kingdom (48.1 PJ or 1.1 Mtoe).

Table 66. RES-T contribution in EU 27, Absolute and Relative Deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	PJ	PJ	%
BE	13.8	14.4	0.6	4.2
BG	1.4	0.5	-0.9	-66.7
CZ	9.8	9.8	0.0	0.0
DK	1.3	0.0	-1.3	-100.0
DE	147.8	127.6	-20.2	-13.7
EE	0.0	0.0	0.0	-100.0
IE	5.6	3.9	-1.8	-31.5
EL	4.5	5.4	0.9	19.0
ES	60.4	59.2	-1.2	-2.0
FR	113.7	103.8	-9.8	-8.7
IT	42.7	61.4	18.7	43.7
CY	0.7	0.6	0.0	-4.7
LV	1.6	1.1	-0.5	-30.8
LT	2.3	1.9	-0.4	-18.2
LU	1.7	1.8	0.0	1.2
HU	6.0	7.4	1.3	22.2
MT	0.1	0.0	-0.1	-81.5
NL	12.9	9.6	-3.3	-25.4
AT	16.5	21.7	5.3	32.1
PL	40.4	37.1	-3.3	-8.2
PT	11.8	13.8	2.0	17.3
RO	9.4	0.0	-9.4	-100.0
SI	1.7	2.1	0.4	24.7
SK	3.4	3.4	0.0	-1.1
FI	8.8	5.5	-3.3	-37.4
SE	16.0	18.0	2.1	12.9
UK	41.7	48.1	6.4	15.3
EU 27	575.9	558	-18	-3.1

d. RES-T with multiple counting

RES contribution in transport with multiple counting reached in 2010 628.8 PJ (15018.7 ktoe) missing by 3.1% the planned value of 649.1 PJ (15503.7 ktoe). Nevertheless the RES share in GFEC in this sector reached 4.96% exceeding by 0.01 percentage points the planned share (4.95 %).

Figure 89 and Table 67 present the absolute and relative deviations from 2010 targets in each MS of EU 27 in renewable energy contribution in transport sector.

12 MS, Ireland, Greece, Italy, Austria, Estonia, Portugal, Poland, Hungary, Slovenia, Sweden, United Kingdom and Luxemburg had in 2010 a RES contribution with multiple counting in transport sector higher than their planned values reported at NREAPs.

Italy had the highest exceedance from the 2010 plan in renewable energy with multiple counting in transport sector with +16.5 PJ (+393 ktoe) together with Austria with +6.2 PJ (+149 ktoe), Poland with +5.7 PJ (+137 ktoe), United Kingdom with +3 PJ (+72.5 ktoe) and Sweden with +2.2 PJ (+53 ktoe).

The highest relative exceedances in renewable energy with multiple counting from 2010 planned values were reported by Ireland with 35.2 % followed by Greece (+31.5%), Italy (+30.3%), Austria (+26.4%) and Estonia with 22.5%.

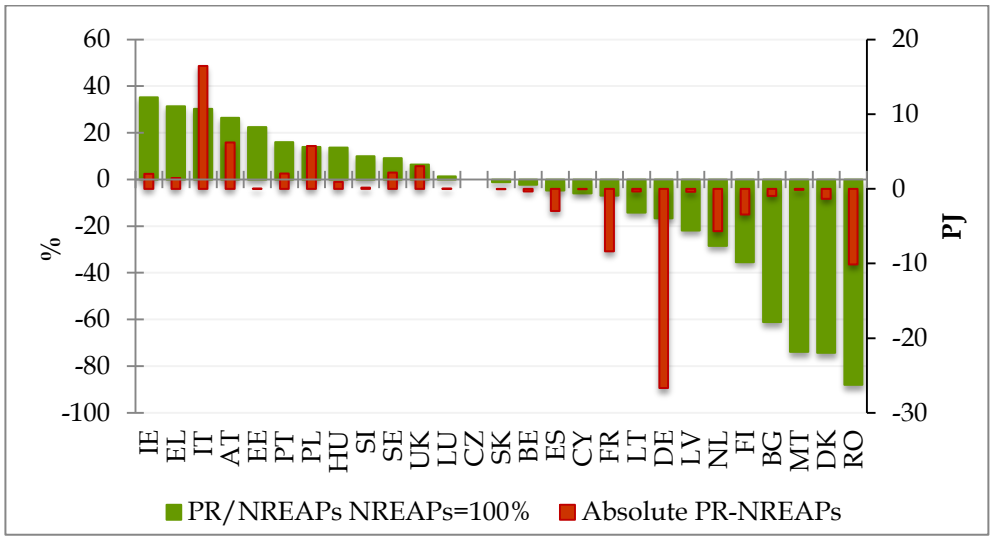

Figure 89[98]. EU 27 MS RES-T with multiple counting deviations from NREAPs, 2010

Germany had the highest absolute negative difference in renewable energy with multiple counting with 26.7 PJ below the planned value. The second absolute negative difference from the 2010 plan was found in Romania (10.1 PJ below the plan) which had even the highest relative negative difference (-88%). France was the third MS with a negative deviation from 2010 NREAP value in multiple counting with 8.4 PJ (-6.9%).

Germany (134.4 PJ or 3210 ktoe), France (113 PJ or 2698 ktoe), Italy (70.7 PJ or 1688 ktoe), Spain (61.6 PJ or 1462 ktoe), United Kingdom (50.4 PJ or 1204 ktoe) and Poland (46.8 PJ or 1118 ktoe) were the leading MS in renewable energy with multiple counting in transport sector in year 2010 with a contribution equal to 75.8%

[98] MS are ranked according to their relative deviation from 2010 NREAPs plans

Table 67. RES-T with multiple counting deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	14.8	14.5	-0.3	-2.2
BG	1.5	0.6	-0.9	-61.1
CZ	10.0	10.0	0.0	0.0
DK	1.8	0.5	-1.3	-74.3
DE	161.1	134.4	-26.7	-16.6
EE	0.04	0.05	0.01	22.5
IE	5.7	7.7	2.0	35.2
EL	4.6	6.1	1.5	31.5
ES	64.6	61.6	-3.0	-4.6
FR	121.3	113.0	-8.4	-6.9
IT	54.2	70.7	16.5	30.3
CY	0.7	0.6	0.0	-5.9
LV	1.8	1.4	-0.4	-21.8
LT	2.3	2.0	-0.3	-14.1
LU	1.8	1.8	0.0	1.4
HU	7.0	8.0	1.0	13.7
MT	0.2	0.0	-0.1	-73.9
NL	19.9	14.2	-5.7	-28.4
AT	23.6	29.9	6.2	26.4
PL	41.1	46.8	5.7	14.0
PT	12.8	14.8	2.1	16.1
RO	11.5	1.4	-10.1	-88.0
SI	1.9	2.1	0.2	10.1
SK	3.8	3.7	0.0	-1.1
FI	9.6	6.2	-3.4	-35.3
SE	24.0	26.2	2.2	9.2
UK	47.4	50.4	3.0	6.4
EU 27	649.1	628.8	-20.3	-3.1

2.3 Renewable Energy Sources

2.3.1 Hydropower

The 2010 NREAPs target in hydropower installed capacity in EU 27 was 111 GW. The hydropower installed capacity in EU 27 according to Progress Reports was 9% below the planned capacity (-10 GW).

Figure 90 and Table 68 report the detailed changes (absolute and relative) in hydropower installed capacity in EU 27.

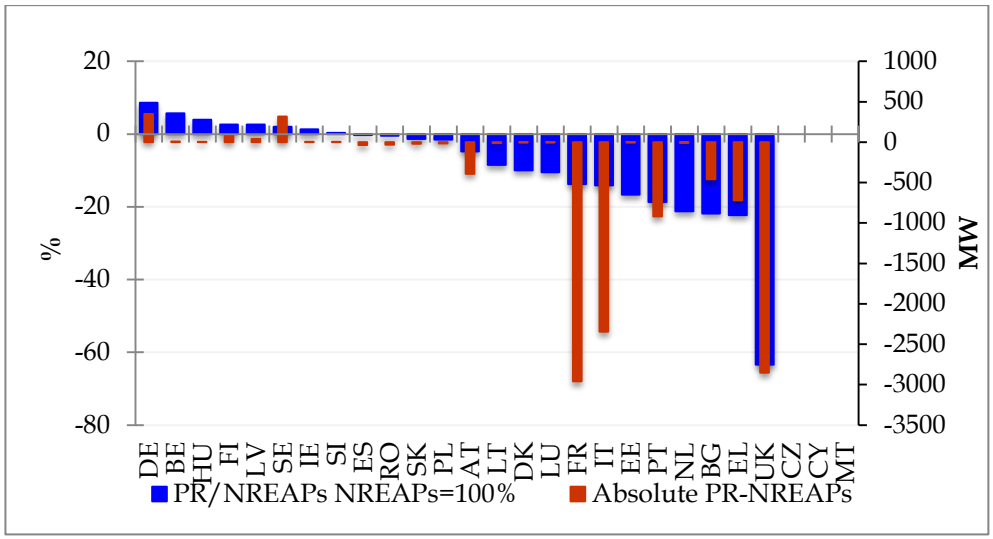

Figure 90.[99] EU 27 MS hydropower installed capacity deviations from NREAPs, 2010

Only 8 Member States were above their planned level of hydropower installed capacity for 2010: Germany with +348 MW, Sweden with +317 MW, Finland with +80 MW, Latvia with +40 MW, Belgium with +6 MW, Ireland, Slovenia and Hungary with less than +3MW.

All other Member States missed their planned capacity in hydropower technology. The highest absolute negative difference was reported by United Kingdom (2.8 GW below the target), France (3 GW below), Italy (2.3 GW below) and Portugal (0.9 GW below). United Kingdom had also the highest relative negative deviation with 63.4% followed by Greece (-22.3%), Bulgaria (-21.8%) and Netherland (-21.3%).

France was the leading MS in 2010 with 18.5 GW hydropower installed capacity followed by Sweden with 16.6 GW, Italy with 14.2 GW, France with 13.1 GW and Austria with 7.8 GW.

Table 68.EU 27 MS hydropower capacity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	112	119	6	5.7
BG	2115	1653	-462	-21.8
CZ	1048	1048	0	0
DK	10	9	-1	-10.0
DE	4052	4400	348	8.6
EE	7.2	6	-1	-16.7
IE	234	237	3	1.3
EL	3237	2516	-721	-22.3
ES	13226	13188	-38	-0.3
FR	21421	18464	-2957	-13.8
IT	16580	14234	-2346	-14.1
CY	0	0	0	
LV	1536	1576	40	2.6
LT	127	116	-11	-8.5

[99] MS are ranked according to their relative deviation from 2010 NREAPs targets

LU	38	34	-4	-10.5
HU	51	53	2	3.9
MT	0	0	0	
NL	47	37	-10	-21.3
AT	8234	7843	-391	-4.7
PL	952	937	-15	-1.6
PT	4934	4013	-921	-18.7
RO	6413	6382	-31	-0.5
SI	1071	1074	3	0.3
SK	1622	1600	-22	-1.4
FI	3060	3140	80	2.6
SE	16307	16624	317	1.9
UK[100]	4500	1649	-2851	-63.4
EU 27	110934	100952	-9983	-9.0

The 2010 NREAPs target in electricity generation from hydropower in EU 27 was 1223 PJ (339.8 TWh) but in this year this technology reached only 1201 PJ (333.7 TWh) dropping with 1.8% (21.9 PJ or 6.1 TWh). The share in total renewable electricity production decreased slightly from 53% to 52%.

Figure 91 and Table 69 report the detailed changes (absolute and relative) in hydropower electricity generated in EU 27 in 2010.

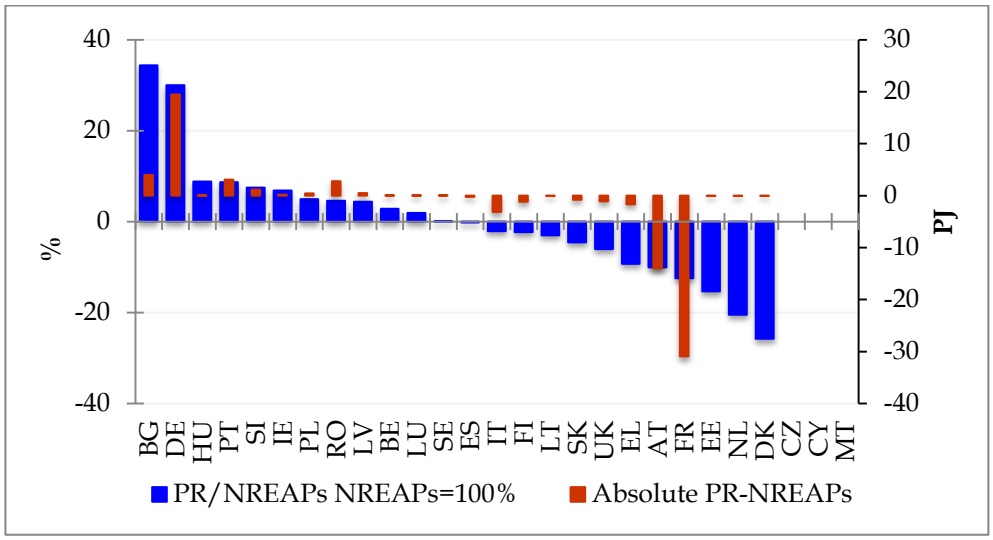

Figure 91.[101] EU 27 MS hydropower electricity generation deviations from NREAPs, 2010

Half of Member States almost reached or were above their projected level of hydropower electricity generation for 2010: Germany with 19.4 PJ (5.4 TWh) having also the second highest relative exceedance (+30%), Bulgaria with 4 PJ (1.1 TWh) and the highest relative exceedance (+34.3%), Portugal with 3 PJ (0.84 TWh) and relative exceedance +8.6% and Romania with 2.7 PJ (0.76 TWh) and +4.6% of relative exceedance.

[100] Table 10a of United Kingdom NREAP is compiled not in accordance with the Template. Due to this fact the hydropower capacity reported from UK in its NREAP includes only three sucategories : < 20 MW, > 20 MW and pumped storage. Two first subcategories are included in the comparison analysis for the achievement of 2010 target.

[101] MS are ranked according to their relative deviation from 2010 NREAPs targets

The other half of Member States were below their projected levels of hydro electricity generation for 2010. France had the highest absolute decrease in electricity generation from this technology with 30.9 PJ (8.6 TWh) and -12.5% of relative deviation. Austria follows with 14 PJ (3.9 TWh) below the target and a relative deviation of -10.1%. Italy was the third MS who didn't reach what planned being 3.2 PJ (0.9 TWh) followed by Greece who reached only 16.3 PJ (4.5 TWh) instead of its 18 PJ (4.9 TWh) planned electricity generation. Denmark, Netherland and Estonia had three highest relative decreases in electricity generation from hydropower even that in absolute values these decreases were very small due to low electricity that these MS generated from this technology.

Table 69. EU 27 MS hydropower electricity deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	PJ	PJ	%
BE	1.30	1.34	0.0	2.8
BG	11.6	15.6	4.0	34.3
CZ	7.8	7.8	0.0	0.0
DK	0.1	0.1	-0.03	-25.8
DE	64.8	84.2	19.4	30.0
EE	0.1	0.1	0.0	-15.4
IE	2.5	2.7	0.2	6.8
EL	18.0	16.3	-1.7	-9.3
ES	113.8	113.6	-0.2	-0.2
FR	248.5	217.5	-30.9	-12.5
IT	151.7	148.5	-3.2	-2.1
CY	0.0	0.0	0.0	
LV	10.5	10.9	0.5	4.4
LT	1.6	1.5	0.0	-3.0
LU	0.4	0.4	0.0	1.9
HU	0.7	0.8	0.1	8.8
MT	0.0	0.0	0.0	
NL	0.5	0.4	-0.1	-20.5
AT	138.8	124.7	-14.0	-10.1
PL	8.2	8.6	0.4	4.9
PT	35.1	38.1	3.0	8.6
RO	59.6	62.4	2.7	4.6
SI	15.1	16.2	1.1	7.5
SK	17.4	16.6	-0.8	-4.6
FI	51.2	50.0	-1.2	-2.4
SE	245.8	245.9	0.0	0.0
UK	18.4	17.2	-1.1	-6.1
EU 27	1223.3	1201.4	-21.9	-1.8

2.3.2 Geothermal

Energy generated from geothermal technology in 2010 reached 42.2 PJ, missing by 16.1% the NREAPs palnned value, 50.3 PJ.

Figure 92 and Table 70 report the detailed changes (absolute and relative) in geothermal energy generated in EU 27 in 2010.

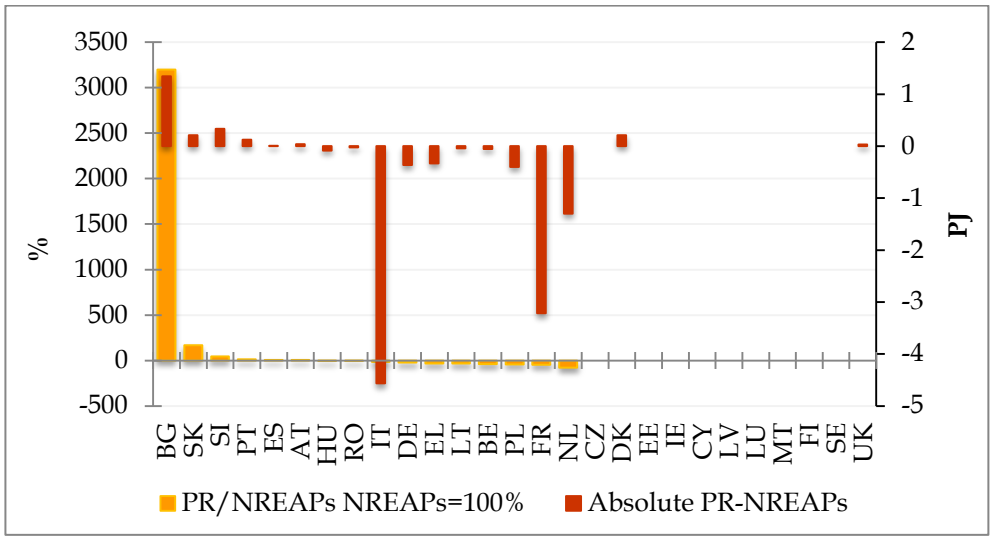

Figure 92[102]. EU 27 MS geothermal energy generated deviations from NREAPs, 2010

In 2010 six MS generated from geothermal technology more energy than in their NREAPs while ten MS produced less energy than these plans. Eleven MS, Czech Republic, Denmark, Estonia, Ireland, Cyprus, Latvia, Luxembourg, Malta, Finland, Sweden and United Kingdom, hadn't planned to introduce geothermal technology in 2010. Despite of their plans Denmark and United Kingdom introduced in heating/cooling sector geothermal technology in 2010.

Bulgaria had both the highest absolute and relative exceedance from planned value in energy generated from geothermal by 1.34 PJ and 3200%. Slovakia had the second highest relative exceedance by 166.7% (0.22 PJ above) together with Slovenia by 44.4% (0.33 PJ above).

The Netherlands missed the planned value of energy from geothermal with 79.5% (1.3 PJ below) followed by France with 45.7% (3.2 PJ below) and Poland with 41.7% (0.4 PJ below). Italy was the leading country in geothermal energy generated in 2010, nevertheless it didn't reach the planned value by 15.3 % (4.6 PJ below).

Table 70. EU 27 MS geothermal energy generated deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	0.13	0.08	-0.1	-40.6
BG	0.04	1.38	1.3	3200.0
CZ	0.00	0.00	0.0	
DK	0.00	0.21	0.2	
DE	1.52	1.15	-0.4	-24.1
EST	0.00	0.00	0.0	
IE	0.00	0.00	0.0	
GR	1.00	0.67	-0.3	-33.3
ES	0.16	0.17	0.0	5.3
FR	7.04	3.82	-3.2	-45.7

[102] MS are ranked according to their relative deviation from 2010 NREAPs targets

IT	29.74	25.18	-4.6	-15.3
CY	0.00	0.00	0.0	
LV	0.00	0.00	0.0	
LT	0.13	0.08	0.0	-33.3
LU	0.00	0.00	0.0	
HU	4.23	4.14	-0.1	-2.0
MT	0.00	0.00	0.0	
NL	1.63	0.33	-1.3	-79.5
AT	0.80	0.84	0.0	4.8
PL	0.96	0.56	-0.4	-41.7
PT	1.01	1.13	0.1	12.2
RO	1.05	1.02	0.0	-2.6
SLO	0.75	1.09	0.3	44.4
SK	0.13	0.33	0.2	166.7
FI	0.00	0.00	0.0	
SE	0.00	0.00	0.0	
UK	0.00	0.03	0.0	
EU 27	50.3	42.2	-8.1	-16.1

2.3.2.1 Geothermal electricity

In 2010 the geothermal installed capacity in EU 27 reached 823 MW exceeding by 0.9% the 2010 NREAPs target of 816 MW. Figure 93 and Table 71 report the detailed changes (absolute and relative) in geothermal electricity installed capacity in EU 27 in 2010.

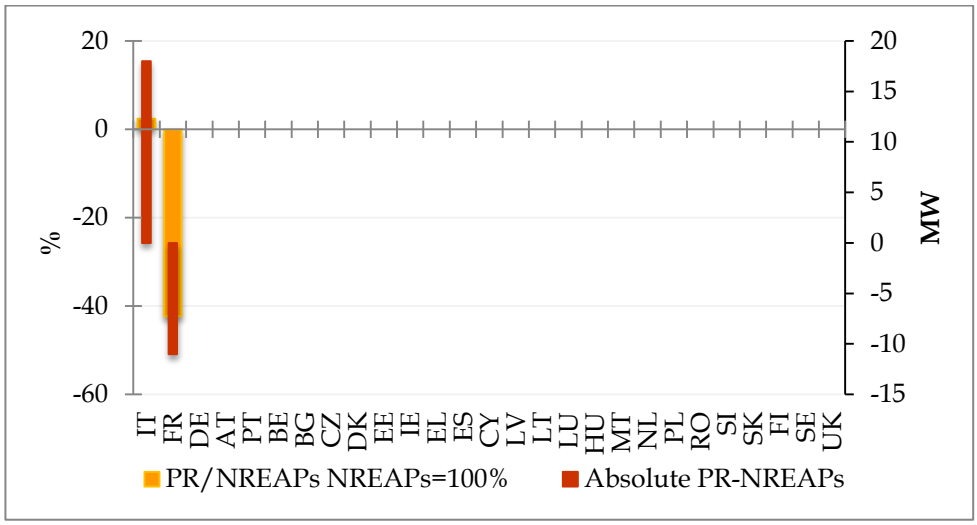

Figure 93.[103] EU 27 MS geothermal installed capacity deviations from NREAPs, 2010

Italy was the only MS that exceeded the 2010 target with +18 MW (+2.4%). For France the geothermal installed capacity was 11 MW (-42.3%) below the target while Germany, Austria and Portugal reported the same value as they have planned in NREAPs.

[103] MS are ranked according to their relative deviation from 2010 NREAPs targets

Table 71. EU 27 MS geothermal electricity capacity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	0	0	0	
BG	0	0	0	
CZ	0	0		
DK	0	0	0	
DE	10	10	0	0.0
EE	0	0	0	
IE	0	0	0	
EL	0	0	0	
ES	0	0	0	
FR	26	15	-11	-42.3
IT	754	772	18	2.4
CY	0	0	0	
LV	0	0	0	
LT	0	0	0	
LU	0	0	0	
HU	0	0	0	
MT	0	0	0	
NL	0	0	0	
AT	1	1	0	0.0
PL	0	0	0	
PT	25	25	0	0.0
RO	0	0	0	
SI	0	0	0	
SK	0	0	0	
FI	0	0	0	
SE	0	0	0	
UK	0	0	0	
EU 27	816	823	7	0.9

In 2010 the electricity generated from geothermal technology reached only 20.2 PJ (5.6 TWh) instead of 21.5 PJ (6 TWh) being below with 6% (1.3 PJ or 358 GWh). Figure 94 and Table 72 report the detailed changes (absolute and relative) in hydropower installed capacity in EU 27.

Compared to the expected electricity production from geothermal sources, Portugal was above the expected level by 2.9 PJ or 34 GWh (+20.9%), Germany was above by 0.3 PJ or 3 GWh (+11.1%). Italy was below the target by 22 PJ or 256 GWh (-4.5%) together with France that reached only 15 GWh which is ten times lower than the target 153 GWh (-90.2%) and Austria who reached the half of what had planned (-50%).

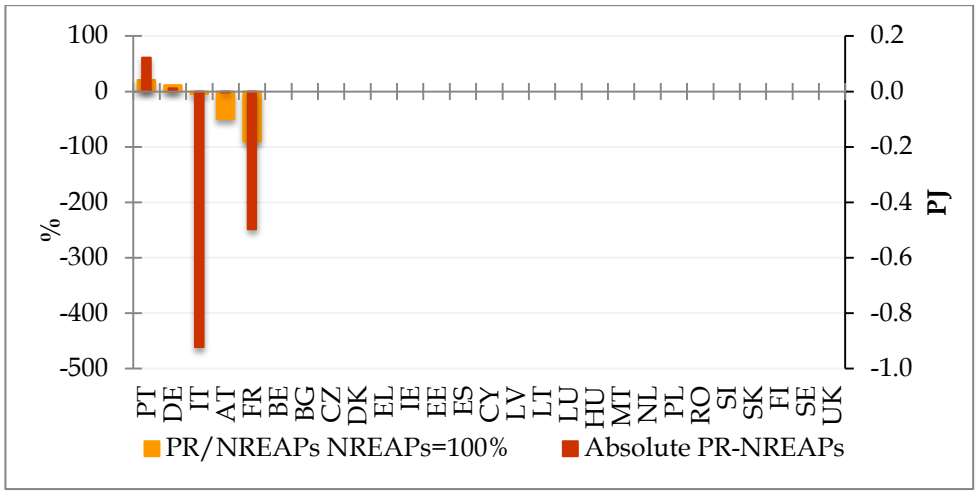

Figure 94.[104] EU 27 MS geothermal electricity generation deviations from NREAPs, 2010

Table 72. EU 27 MS geothermal electricity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	0.00	0.00	0.0	
BG	0.0	0.0	0.0	
CZ	0.0	0.0	0.0	0
DK	0.0	0.0	0.0	
DE	0.1	0.1	0.0	11.1
EE	0.0	0.0	0.0	
IE	0.0	0.0	0.0	
EL	0.0	0.0	0.0	
ES	0.0	0.0	0.0	
FR	0.6	0.1	-0.5	-90.2
IT	20.3	19.4	-0.9	-4.5
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	0.0	0.0	0.0	
AT	0.0	0.0	0.0	-50.0
PL	0.0	0.0	0.0	
PT	0.6	0.7	0.1	20.9
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	
SE	0.0	0.0	0.0	
UK	0.0	0.0	0.0	
EU 27	21.5	20.2	-1.3	-6.0

[104] MS are ranked according to their relative deviation from 2010 NREAPs targets

2.3.2.2 Geothermal heating/cooling

In 2010 the energy generated from geothermal technology in heating/cooling missed to reach the planned NREAPs value with 23.6% (6.8 PJ or 162.5 ktoe below).

Figure 95 and Table 73 report the detailed changes (absolute and relative) in hydropower installed capacity in EU 27.

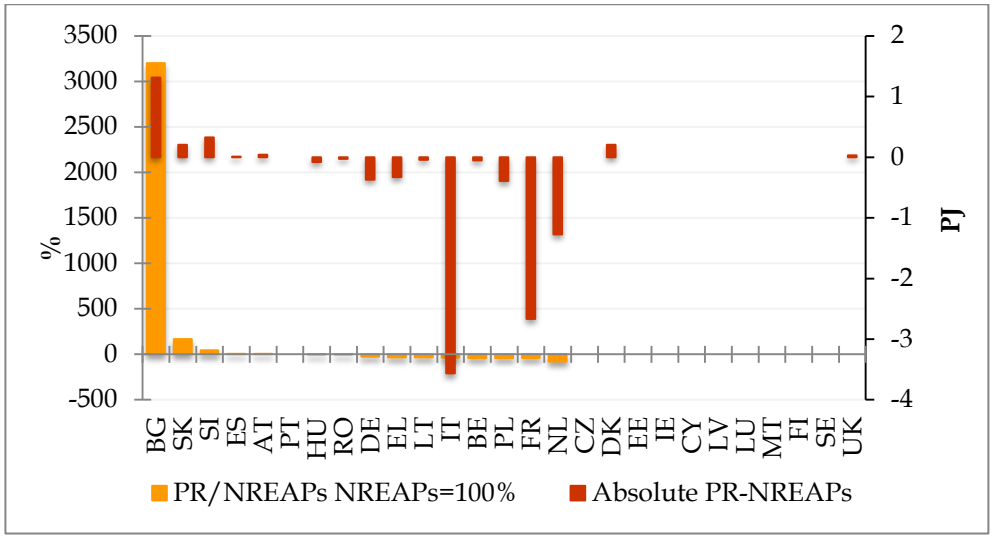

Figure 95.[105] EU 27 MS geothermal H/C deviations from NREAPs, 2010

Compared to the expected heat production from geothermal sources, Bulgaria was 33 times above the expected level, reaching 1.38 PJ (33 ktoe) instead of 0.04PJ (1 ktoe). Together with Slovenia (0.3 PJ or 8 ktoe above the target), Denmark with 0.2 PJ (5 ktoe), Slovakia with 0.2 PJ (5 ktoe) and Spain with 0.01 PJ (0.2 ktoe) it remain in the MS group that exceeded their planned levels.

10 MS didn't reach their 2010 plans: Italy was below the planned value by 3.64 PJ (87 ktoe) followed by France with 2.72 PJ (65 ktoe), The Netherlands with 1.3 PJ (31 ktoe), Poland with 0.4 PJ (10 ktoe) and Germany with 0.4 PJ (9 ktoe).

Table 73. EU 27 MS geothermal thermal deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	0.13	0.08	-0.05	-40.6
BG	0.04	1.38	1.34	3200.0
CZ	0.00	0.00	0.00	
DK	0.00	0.21	0.21	
DE	1.42	1.05	-0.38	-26.5
EE	0.00	0.00	0.00	
IE	0.00	0.00	0.00	
EL	1.00	0.67	-0.33	-33.3
ES	0.16	0.17	0.01	5.3
FR	6.49	3.77	-2.72	-41.9
IT	9.46	5.82	-3.64	-38.5

[105] MS are ranked according to their relative deviation from 2010 NREAPs targets

CY	0.00	0.00	0.00	
LV	0.00	0.00	0.00	
LT	0.13	0.08	-0.04	-33.3
LU	0.00	0.00	0.00	
HU	4.23	4.14	-0.08	-2.0
MT	0.00	0.00	0.00	
NL	1.63	0.33	-1.30	-79.5
AT	0.80	0.84	0.04	5.3
PL	0.96	0.56	-0.40	-41.7
PT	0.42	0.42	0.00	0.0
RO	1.05	1.02	-0.03	-2.6
SI	0.75	1.09	0.33	44.4
SK	0.13	0.33	0.21	166.7
FI	0.00	0.00	0.00	
SE	0.00	0.00	0.00	
UK	0.00	0.03	0.03	
EU 27	28.81	22.00	-6.81	-23.6

2.3.3 Marine

Marine technology didn't reach in 2010 the planned capacity by 2.4 MW (-1%). Compared to the expected installed capacity, UK was above the target with 2.6 MW while Portugal in contrary to NREAP didn't report any installed capacity in this technology. France reported the same marine capacity that had planned in the NREAPs.

Figure 96 and Table 74 report the detailed absolute and relative changes from NREAPs in marine installed capacity for year 2010.

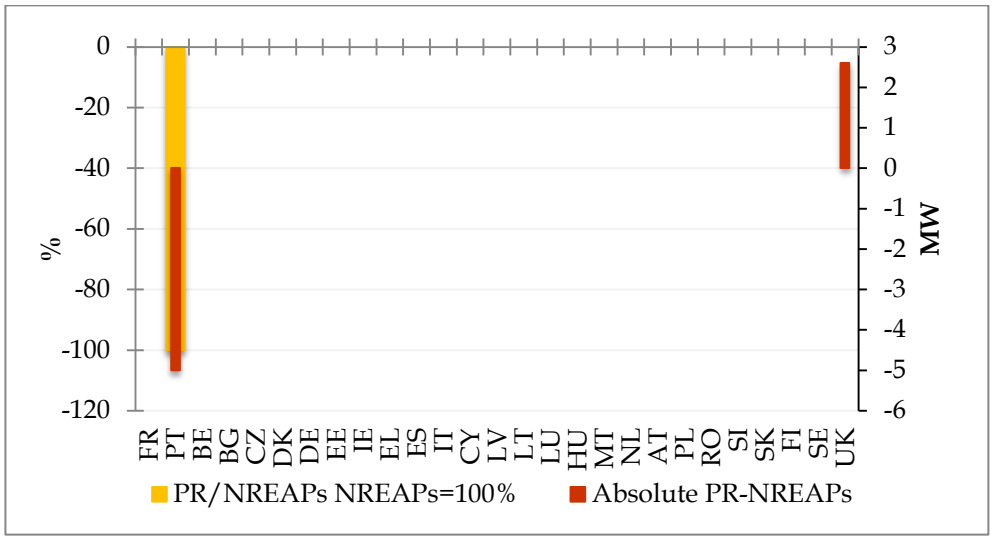

Figure 96[106]. EU 27 MS marine installed capacity deviations from NREAPs, 2010

[106] MS are ranked according to their relative deviation from 2010 NREAPs targets

Table 74. EU 27 MS marine capacity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	0	0	0	
BG	0	0	0	
CZ	0	0		
DK	0	0	0	
DE	0	0	0	
EE	0	0	0	
IE	0	0	0	
EL	0	0	0	
ES	0	0	0	
FR	240	240	0	0.0
IT	0	0	0	
CY	0	0	0	
LV	0	0	0	
LT	0	0	0	
LU	0	0	0	
HU	0	0	0	
MT	0	0	0	
NL	0	0	0	
AT	0	0	0	
PL	0	0	0	
PT	5	0	-5	-100.0
RO	0	0	0	
SI	0	0	0	
SK	0	0	0	
FI	0	0	0	
SE	0	0	0	
UK	0	2.6	2.6	
EU 27	245	242.6	-2.4	-1.0

2010 marine energy generation in EU 27 missed its target with 0.1 PJ (23 GWh) or 4.6%. Referring to Member States the United Kingdom was above the expected level by 2 GWh, while France was below by 24 GWh and Portugal was below the projected level by 1 GWh.

The absolute and relative deviations from the marine electricity production projected in the NREAPs and the Member States Progress Reports for 2010 are shown in Figure 97 and Table 75.

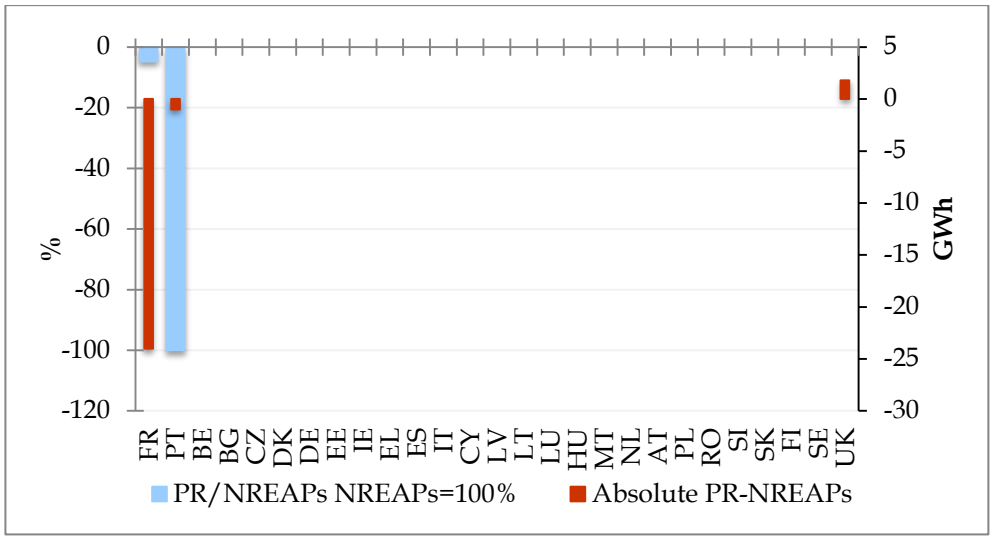

Figure 97[107]. EU 27 deviations from 2010 NREAPs in marine electricity generation

Table 75. EU 27 MS marine energy deviations from NREAPs, 2010

	NREAPs		Progress		Deviation PR-NREAPs		
	GWh	PJ	GWh	PJ	GWh	PJ	%
BE	0	0.0	0	0.00	0	0.0	
BG	0	0.0	0	0.0	0	0.0	
CZ	0	0.0	0	0.0		0.0	
DK	0	0.0	0	0.0	0	0.0	
DE	0	0.0	0	0.0	0	0.0	
EE	0	0.0	0	0.0	0	0.0	
IE	0	0.0	0	0.0	0	0.0	
EL	0	0.0	0	0.0	0	0.0	
ES	0	0.0	0	0.0	0	0.0	
FR	500	1.8	476	1.7	-24	-0.1	-4.8
IT	0	0.0	0	0.0	0	0.0	
CY	0	0.0	0	0.0	0	0.0	
LV	0	0.0	0	0.0	0	0.0	
LT	0	0.0	0	0.0	0	0.0	
LU	0	0.0	0	0.0	0	0.0	
HU	0	0.0	0	0.0	0	0.0	
MT	0	0.0	0	0.0	0	0.0	
NL	0	0.0	0	0.0	0	0.0	
AT	0	0.0	0	0.0	0	0.0	
PL	0	0.0	0	0.0	0	0.0	
PT	1	0.0	0	0.0	-1	0.0	-100.0
RO	0	0.0	0	0.0	0	0.0	
SI	0	0.0	0	0.0	0	0.0	
SK	0	0.0	0	0.0	0	0.0	
FI	0	0.0	0	0.0	0	0.0	
SE	0	0.0	0	0.0	0	0.0	
UK	0	0.0	1.8	0.0	2	0.0	
EU 27	501	1.8	477.8	1.7	-23	-0.1	-4.6

[107] MS are ranked according to their relative deviation from 2010 NREAPs targets

2.3.4 Solar

Contribution of solar technology in 2010 amounted to 146.2 PJ exceeding the NREAPs planned target by 9.8 PJ representing 7.2% of that target.

Figure 98 and Table 76 report the detailed absolute and relative changes from NREAPs in solar contribution for year 2010.

Half of MS were found to be above their 2010 NREAPs plans on solar energy contribution to total RES. United Kingdom had the highest relative exceedance from the plan with +140% followed by Sweden with +76%.

For 2010 five MS, Ireland, Latvia, Lithuania, Romania and Finland haven't planned contribution to total RES from solar technology. Only Romania and Finland, despite their plans, produced in 2010 electricity from solar technology even that in very low levels.

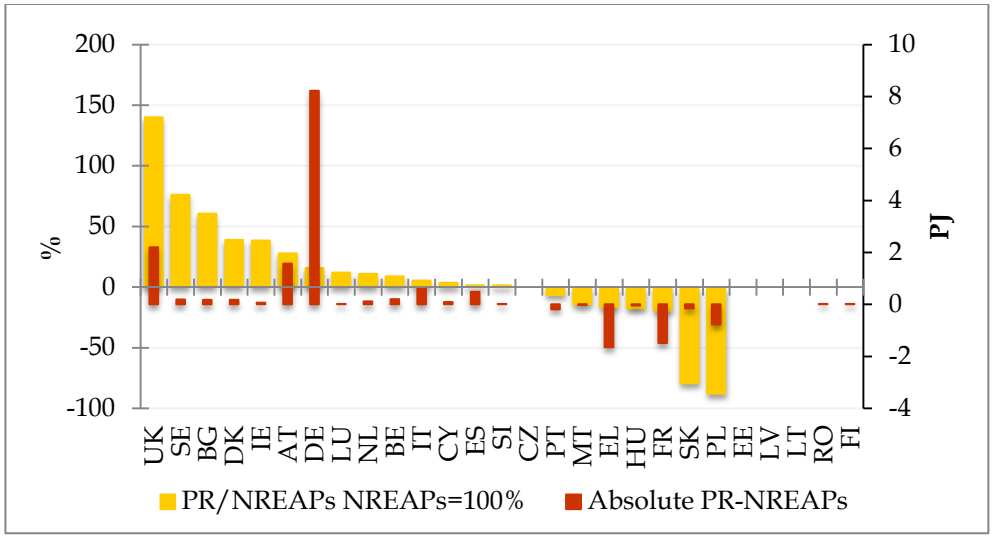

Figure 98[108]. EU 27 MS solar energy deviations from NREAPs, 2010

Germany had in 2010 the highest absolute exceedance from NREAP planned value by 8.2 PJ followed by United Kingdom with 2.2 PJ and Austria with 1.6 PJ.

Greece had planned to generate 9.9 PJ energy from solar technology in 2010 but it reached only 8.3 PJ being 16.7% below the planned value. France had in 2010 the second highest absolute negative deviation from its NREAP with 1.5 PJ (-19.5%).

Table 76. EU 27 MS solar energy deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	2.3	2.5	0.2	8.7
BG	0.3	0.5	0.2	60.6
CZ	2.6	2.6	0.0	0.0
DK	0.5	0.6	0.2	38.9

[108] MS are ranked according to their relative deviation from 2010 NREAPs targets

DE	52.6	60.8	8.2	15.6
EE	0.0	0.0	0.0	
IE	0.2	0.2	0.1	38.5
EL	9.9	8.3	-1.7	-16.7
ES	32.8	33.2	0.5	1.5
FR	7.7	6.2	-1.5	-19.5
IT	11.8	12.5	0.6	5.3
CY	2.5	2.6	0.1	3.4
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.1	0.1	0.0	11.8
HU	0.3	0.2	0.0	-17.6
MT	0.1	0.1	0.0	-14.2
NL	1.1	1.2	0.1	11.0
AT	5.6	7.2	1.6	27.8
PL	0.9	0.1	-0.8	-87.9
PT	2.9	2.7	-0.2	-6.4
RO	0.0	0.0	0.0	
SI	0.3	0.3	0.0	1.4
SK	0.2	0.0	-0.2	-79.3
FI	0.0	0.0	0.0	
SE	0.3	0.5	0.2	76.0
UK	1.6	3.8	2.2	140.0
EU 27	136.4	146.2	9.8	7.2

2.3.4.1 Solar electricity

The expected solar installed capacity for 2010 in the EU 27 was 25989 MW. The EU 27 exceeded this target by 3738 MW, representing 14.4% of that target, the installed solar capacity in the EU 27 reaching 29727 MW in 2010.

Figure 99 and Table 77 report the detailed absolute and relative changes from NREAPs in solar electricity installed capacity for year 2010.

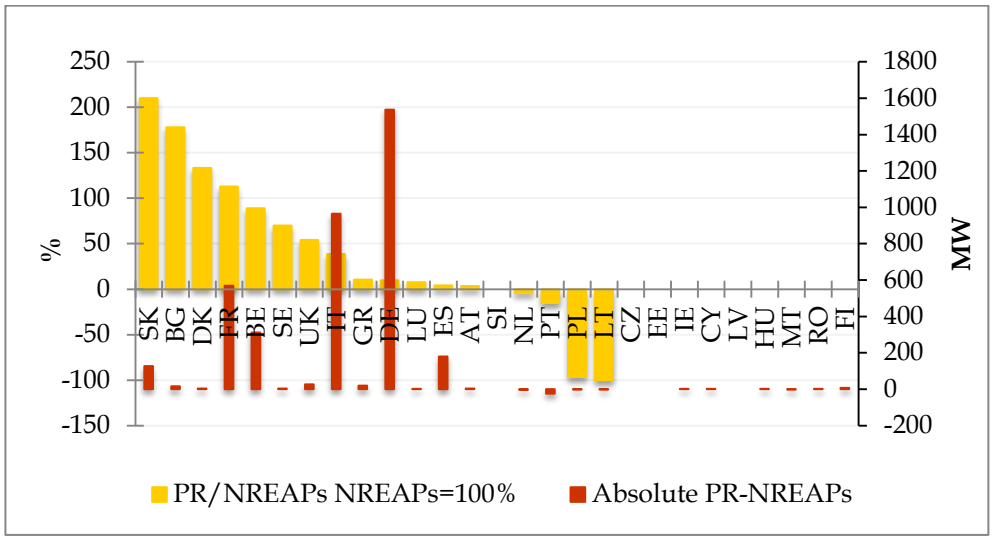

Figure 99[109]. EU 27 MS solar installed capacity deviations from NREAPs, 2010

In 2010, a large number of Member Stated had an installed solar plant capacity well above the projected level for 2010: Germany with 1536 MW (9.7%), Italy with 965 MW (38.5%), France with 568 MW (112.7%), Belgium with 311 MW (88.8%), Spain with 179 MW (4.1%).

Few Member States were below their estimated levels: The Netherlands with 4 MW (-4.3%), Malta with 2 MW (-58.8%) and Lithuania with 1 MW (-100%).

Table 77. EU 27 MS solar electricity capacity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	350	661	311	88.8
BG	9	25	16	177.8
CZ	1727	1727	0	0
DK	3	7	4	133.3
DE	15784	17320	1536	9.7
EE	0	0	0	
IE	0	1	1	
EL	184	203	19	10.3
ES	4419	4598	179	4.1
FR	504	1072	568	112.7
IT	2505	3470	965	38.5
CY	6	7	1	
LV	0	0	0	
LT	1	0	-1	-100.0
LU	27	29	2	7.4
HU	0	2	2	
MT	4	2	-2	
NL	92	88	-4	-4.3
AT	90	93	3	3.3
PL	1	0	-1	-96.7
PT	156	132	-24	-15.4
RO	0	0	0	
SI	12	12	0	0.0
SK	60	186	126	210.0
FI	0	7	7	
SE	5.3	9	4	69.8
UK	50	77	27	54.0
EU 27	25989	29727	3738	14.4

The expected solar electricity generation for 2010 in the EU 27 was 74.7 PJ. The EU 27 exceeded this target by 8.9 PJ, representing 11.9% of that target, the solar electricity generation in the EU 27 reaching 83.5 PJ in 2010. Figure 100 and Table 78 report the detailed absolute and relative changes from NREAPs in solar electricity generated for year 2010.

[109] MS are ranked according to their relative deviation from 2010 NREAPs targets

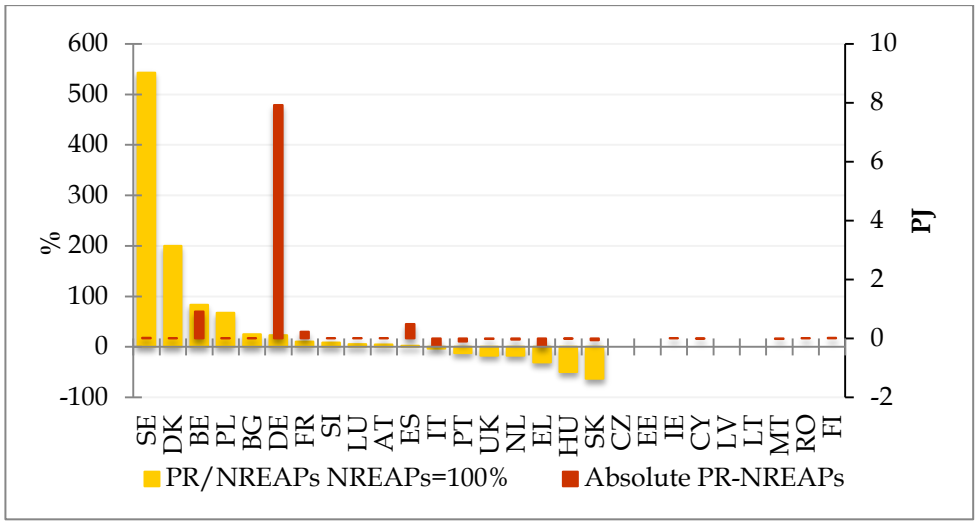

Figure 100[110]. EU 27 MS solar electricity generation deviations from NREAPs, 2010

Compared to the expected solar electricity production, several MS were above the expected level: Germany with 7.9 PJ (23.2%), Belgium with 0.9 PJ (83.4%), Spain with 0.5 PJ (1.9%) and France with 0.2 PJ (10.3%). Other MS were below their projected levels for 2010: Greece with 0.3 PJ (31.0%), Italy with 0.3 PJ (3.5%), Portugal with 0.1 PJ (12.6%) and Slovakia by 0.1 PJ (63.3%).

Table 78. EU 27 MS solar electricity generation deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	1.1	2.0	0.9	83.4
BG	0.0	0.1	0.0	25.0
CZ	2.2	2.2	0.0	0.0
DK	0.0	0.0	0.0	200.0
DE	34.2	42.1	7.9	23.2
EE	0.0	0.0	0.0	
IE	0.0	0.0	0.0	
EL	0.9	0.6	-0.3	-31.0
ES	25.1	25.6	0.5	1.9
FR	2.2	2.4	0.2	10.3
IT	7.1	6.9	-0.3	-3.5
CY	0.0	0.0	0.0	-1.1
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.1	0.1	0.0	5.0
HU	0.0	0.0	0.0	-50.0
MT	0.0	0.0	0.0	-72.1
NL	0.3	0.2	0.0	-17.8
AT	0.3	0.3	0.0	4.7
PL	0.0	0.0	0.0	67.2
PT	0.8	0.7	-0.1	-12.6
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	8.3

[110] MS are ranked according to their relative deviation from 2010 NREAPs targets

SK	0.1	0.0	-0.1	-63.3
FI	0.0	0.0	0.0	
SE	0.0	0.0	0.0	542.9
UK	0.1	0.1	0.0	-17.5
EU 27	74.7	83.5	8.9	11.9

2.3.4.2 Solar heating/cooling

The expected use of solar heating and cooling for 2010 in the EU 27 was 61.7 PJ. The EU 27 exceeded this target by 1.0 PJ, representing 1.6% of that target, the solar heating generation in the EU 27 reaching 62.7 PJ in 2010.

Figure 101 and Table 79 report the detailed absolute and relative changes from NREAPs in solar heating/cooling generated for year 2010.

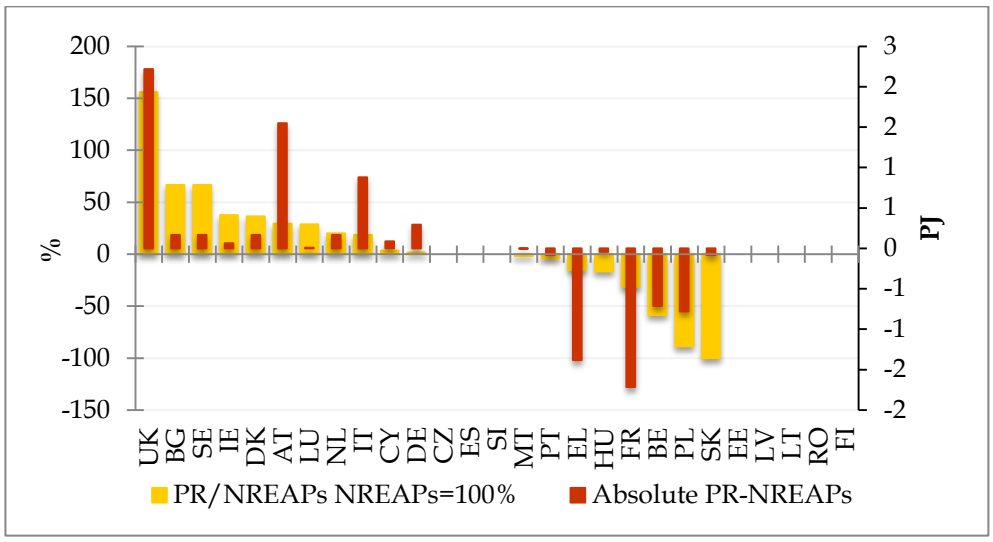

Figure 101[111]. EU 27 MS solar heating/cooling deviations from NREAPs, 2010

Compared to the expected heating and cooling production, several MS were above the expected level: UK with 2.2 PJ (+155.9%), Austria with 1.6 PJ (+29.1%), Italy with 0.9 PJ (18.6%), Germany with 0.3 PJ (+1.6%) and Bulgaria with 0.2 PJ (+66.7%).

Other MS were below their projected levels for 2010: France with 1.7 PJ (-31.5%), Greece with 1.4 PJ (15.3%), Poland with 0.8 PJ (-88.6%), Belgium with 0.7 PJ (-58.6%) and Portugal with 0.1 PJ (-4.0%).

Table 79. EU 27 MS solar heating/cooling deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	1.2	0.5	-0.7	-58.6
BG	0.3	0.4	0.2	66.7
CZ	0.4	0.4	0.0	0.0
DK	0.5	0.6	0.2	36.4
DE	18.4	18.7	0.3	1.6

[111] MS are ranked according to their relative deviation from 2010 NREAPs targets

EE	0.0	0.0	0.0	
IE	0.2	0.2	0.1	37.5
EL	9.0	7.7	-1.4	-15.3
ES	7.7	7.7	0.0	0.0
FR	5.4	3.7	-1.7	-31.5
IT	4.7	5.6	0.9	18.6
CY	2.5	2.6	0.1	3.5
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	28.6
HU	0.3	0.2	0.0	-16.7
MT	0.1	0.1	0.0	-2.0
NL	0.8	1.0	0.2	20.0
AT	5.3	6.9	1.5	29.1
PL	0.9	0.1	-0.8	-88.6
PT	2.1	2.0	-0.1	-4.0
RO	0.0	0.0	0.0	
SI	0.2	0.2	0.0	0.0
SK	0.1	0.0	-0.1	-100.0
FI	0.0	0.0	0.0	
SE	0.3	0.4	0.2	66.7
UK	1.4	3.6	2.2	155.9
EU 27	61.7	62.7	1.0	1.6

2.3.5 Wind

The expected wind installed capacity for 2010 in the EU 27 was 85472 MW. The EU 27 was below this target by 1155 MW, representing 1.4% of that target, the installed wind capacity in the EU 27 reaching 84317 MW in 2010.

Figure 102 and Table 80 report the detailed absolute and relative changes from NREAPs in wind power capacity for year 2010.

In 2010, a large number of Member Stated had an installed wind plant capacity well above the projected level for 2010: France with 187 MW (3.4%), Belgium with 186 MW (25.4%), Bulgaria with 152 MW (45.2%), Sweden with 145 MW (7.7%) and Poland with 80 MW (7.3%) above the projected installed capacity.

Several Member States were below their estimated levels for 2010: Ireland with 699 MW (-33.5%), Germany with 466 MW (-1.7%), Portugal with 460 MW (-10.8%), Romania with 171 MW (-30.6%), the UK with 52 MW (-1.0%), etc.

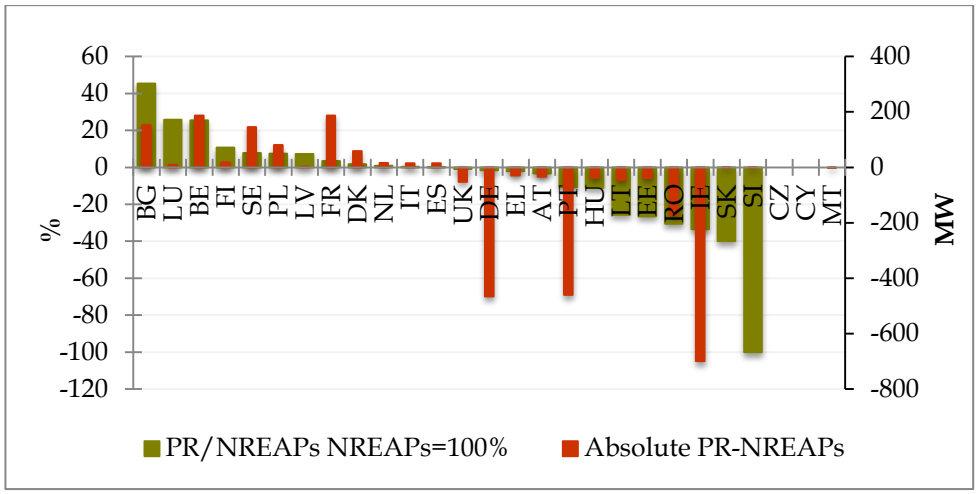

Figure 102[112]. EU 27 MS wind power capacity deviations from NREAPs, 2010

Table 80. EU 27 MS wind power capacity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	733	920	186	25.4
BG	336	488	152	45.2
CZ	213	213	0	0.0
DK	3584	3,642	58	1.6
DE	27676	27,210	-466	-1.7
EE	147	108	-39	-26.5
IE	2088	1,389	-699	-33.5
EL	1327	1,298	-29	-2.2
ES	20744	20,759	15	0.1
FR	5542	5,729	187	3.4
IT	5800	5,814	14	0.2
CY	82	82	0	0.0
LV	28	30	2	7.1
LT	179	133	-46	-25.7
LU	35	44	9	25.7
HU	330	293	-37	-11.2
MT	0	0	0	-100.0
NL	2221	2,237	16	0.7
AT	1011	977	-34	-3.4
PL	1100	1,180	80	7.3
PT	4256	3,796	-460	-10.8
RO	560	389	-171	-30.6
SI	2	0	-2	-100.0
SK	5	3	-2	-40.0
FI	170	188	18	10.6
SE	1873	2,018	145	7.7
UK	5430	5378	-52	-1.0
EU 27	85472	84317	-1155	-1.4

[112] MS are ranked according to their relative deviation from 2010 NREAPs targets

The expected wind power generation for 2010 in the EU 27 was 596.9 PJ. The EU 27 wind electricity production was below this target by 38.6 PJ, representing 6.5% of that target, the wind electricity generation in the EU 27 reaching 558.3 PJ in 2010.

Figure 103 and Table 81 report the detailed absolute and relative changes from NREAPs in wind electricity generated for year 2010.

Compared to the expected wind electricity production, several Member States were above their target for wind power generation: Belgium with 599 GWh or 2.2 PJ (60.5%), Spain with 395 GWh or 1.4 PJ (0.9%), Italy with 389 GWh or 1.4 PJ (4.6%), Bulgaria with 117 GWh or 0.4 PJ (19.3%) and the Netherlands with 32 GWh or 0.1 PJ (0.7%).

More Member States were below the 2010 target: UK with 2911 GWh or 10.5 PJ (-20.6%), Portugal with 1819 GWh or 6.5 PJ (17.8%), Ireland with 1589 GWh or 5.7 PJ (-33.0%), Germany with 1568 GWh or 5.6 PJ (-3.5%), France with 1139 GWh or 4.1 PJ (-9.8%), etc.

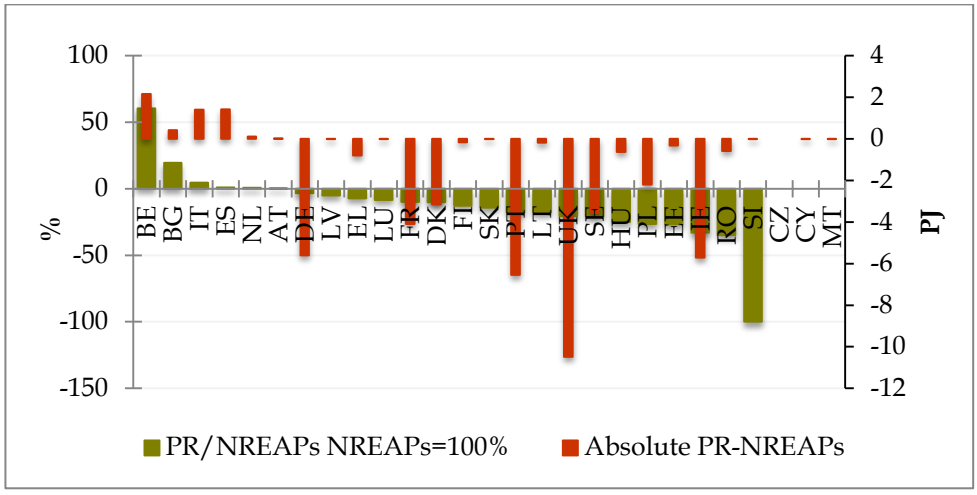

Figure 103[113]. EU 27 MS wind power generation deviations from NREAPs, 2010

Table 81. EU 27 MS wind power generation deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	3.6	5.7	2.2	60.5
BG	2.2	2.6	0.4	19.3
CZ	1.2	1.2	0.0	0.0
DK	31.0	27.8	-3.2	-10.2
DE	160.8	155.2	-5.6	-3.5
EE	1.2	0.9	-0.3	-26.7
IE	17.3	11.6	-5.7	-33.0
EL	11.3	10.5	-0.8	-7.2
ES	152.4	153.8	1.4	0.9
FR	41.9	37.8	-4.1	-9.8
IT	30.2	31.6	1.4	4.6
CY	0.1	0.1	0.0	-0.1
LV	0.2	0.2	0.0	-5.2

[113] MS are ranked according to their relative deviation from 2010 NREAPs targets

LT	1.1	0.9	-0.2	-17.8
LU	0.2	0.2	0.0	-8.3
HU	2.5	1.9	-0.6	-25.1
MT	0.0	0.0	0.0	-100.0
NL	16.1	16.2	0.1	0.7
AT	7.3	7.3	0.0	0.0
PL	8.3	6.1	-2.2	-26.4
PT	36.8	30.2	-6.5	-17.8
RO	1.7	1.1	-0.6	-35.0
SI	0.0	0.0	0.0	-100.0
SK	0.0	0.0	0.0	-14.3
FI	1.3	1.1	-0.2	-12.8
SE	17.3	13.7	-3.6	-20.7
UK	50.9	40.5	-10.5	-20.6
EU 27	596.9	558.3	-38.6	-6.5

a. Onshore Wind

Onshore wind installed capacity in 2010 amounted to 81466 MW missing by 1.5% (1276 MW) the planned capacity for this year, 82742 MW.

Figure 104 and Table 82 report the detailed absolute and relative changes from NREAPs in onshore wind installed capacity for year 2010.

11 MS, Finland, France, Bulgaria, Poland, Sweden, Belgium, the Netherlands, Spain, Italy, Luxemburg and Latvia exceeded their plans regarding onshore wind capacity. Finland was the only MS that hadn't planned to have onshore wind installation up to 2010. Nevertheless it reported an onshore wind capacity equal to 188 MW for 2010.

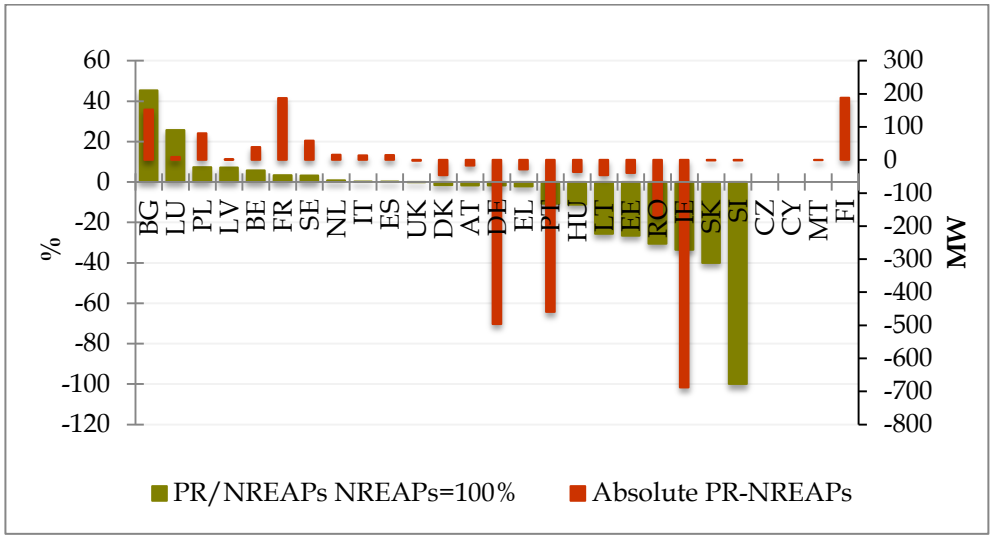

Figure 104[114]. EU 27 MS onshore wind installed capacity deviations from NREAPs, 2010

Cyprus was the only MS that reported in 2010 the same onshore wind capacity as planned in the NREAP. France (+187 MW above the plan) and Bulgaria (+152 MW above the plan) had the

[114] MS are ranked according to their relative deviation from 2010 NREAPs targets

highest absolute exceedances in onshore wind installed capacity for 2010 from their plans reported at respective NREAPs. Ireland had the highest absolute deviation with 688 MW below the plan followed by Germany with 496 MW below the plan, Portugal with 460 MW below the plan and Romania with 171 MW below the plan. The highest relative exceedance was reported by Bulgaria with 45.2% and the highest relative decrease was reported by Slovenia with 100%.

Table 82. EU 27 MS onshore wind installed capacity deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	MW	MW	MW	%
BE	684	723	39	5.7
BG	336	488	152	45.2
CZ	243	243	0	0
DK	2,923	2877	-46	-1.6
DE	27526	27030	-496	-1.8
EE	147	108	-39	-26.5
IE	2052	1364	-688	-33.5
EL	1327	1298	-29	-2.2
ES	20744	20759	15	0.1
FR	5542	5729	187	3.4
IT	5800	5814	14	0.2
CY	82	82	0	0
LV	28	30	2	7.1
LT	179	133	-46	-25.7
LU	35	44	9	25.7
HU	330	293	-37	-11.2
MT	0	0	0	0
NL	1993	2009	16	0.8
AT	1011	994	-17	-1.7
PL	1100	1180	80	7.3
PT	4256	3796	-460	-10.8
RO	560	389	-171	-30.6
SI	2	0	-2	-100.0
SK	5	3	-2	-40.0
FI	0	188	188	
SE	1797	1855	58	3.2
UK	4040	4037	-3	-0.1
EU 27	82742	81466	-1276	-1.5

Electricity generated from onshore wind in EU 27 during year 2010 reached the amount of 536.9 PJ (149.1 TWh) missing with 4.9 % the planned energy 564.8 PJ (156.9 TWh).

Figure 105 and Table 83 report the detailed absolute and relative changes from NREAPs in onshore wind electricity generated for year 2010.

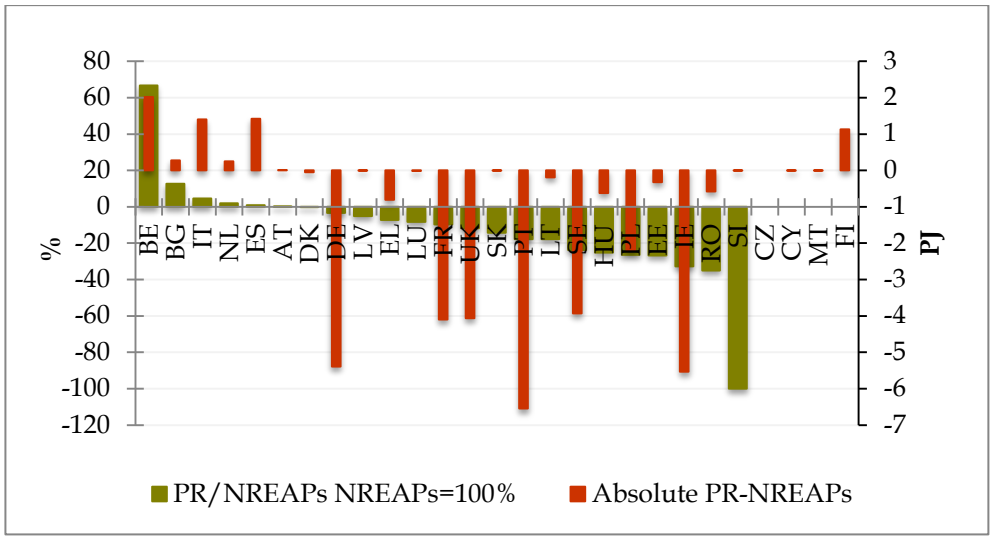

Figure 105[115]. EU 27 MS wind onshore electricity deviations from NREAPs, 2010

Only 6 MS, Belgium, Spain, Italy, Finland, Bulgaria and the Netherlands generated more electricity from onshore wind compared with what their had planned for 2010.

Cyprus generated in 2010 the same electricity from onshore wind plants as planned. Finland reported in 2010 electricity generation from onshore wind even that it hadn't planned at its NREAPs. The highest absolute and relative exceedances from the plans was found in Belgium with 2.2 PJ (+560 GWh) and 66.7%. Spain and Italy had the second and third exceedances from their action plans in electricity generated from onshore wind with respectively 1.42 PJ (395 GWh) and 1.4 PJ (389 GWh). Portugal, Ireland and Germany were three MS with highest absolute decreases from their plans in electricity generation from onshore wind with respectively 6.5 PJ (1.82 TWh), 5.5 PJ (1.54 TWh) and 5.4 PJ (1.5 TWh).

Table 83. EU 27 MS onshore wind electricity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	3.02	5.04	2.0	66.7
BG	2.2	2.5	0.3	12.6
CZ	1.6	1.6	0.0	
DK	22.0	22.0	-0.1	-0.2
DE	159.8	154.4	-5.4	-3.4
EE	1.2	0.9	-0.3	-26.7
IE	16.9	11.4	-5.5	-32.7
EL	11.3	10.5	-0.8	-7.2
ES	152.4	153.8	1.4	0.9
FR	41.9	37.8	-4.1	-9.8
IT	30.2	31.6	1.4	4.6
CY	0.1	0.1	0.0	
LV	0.2	0.2	0.0	-5.2
LT	1.1	0.9	-0.2	-17.8
LU	0.2	0.2	0.0	-8.3
HU	2.5	1.9	-0.6	-25.1

[115] MS are ranked according to their relative deviation from 2010 NREAPs targets

MT	0.0	0.0	0.0	
NL	13.2	13.5	0.3	1.9
AT	7.3	7.3	0.0	0.0
PL	8.3	6.1	-2.2	-26.4
PT	36.8	30.2	-6.5	-17.8
RO	1.7	1.1	-0.6	-35.0
SI	0.0	0.0	0.0	-100.0
SK	0.0	0.0	0.0	-14.3
FI	0.0	1.1	1.1	
SE	16.5	12.6	-3.9	-23.8
UK	34.3	30.2	-4.1	-11.8
EU 27	564.8	536.9	-27.9	-4.9

b. Offshore Wind

The installed capacity of offshore wind in 2010 amounted to 2899 MW, which is 309 MW or 11.9% above the expected installed plant capacity of 2590 MW.
Figure 106 and Table 84 report the detailed absolute and relative changes from NREAPs in offshore wind installed capacity for year 2010.

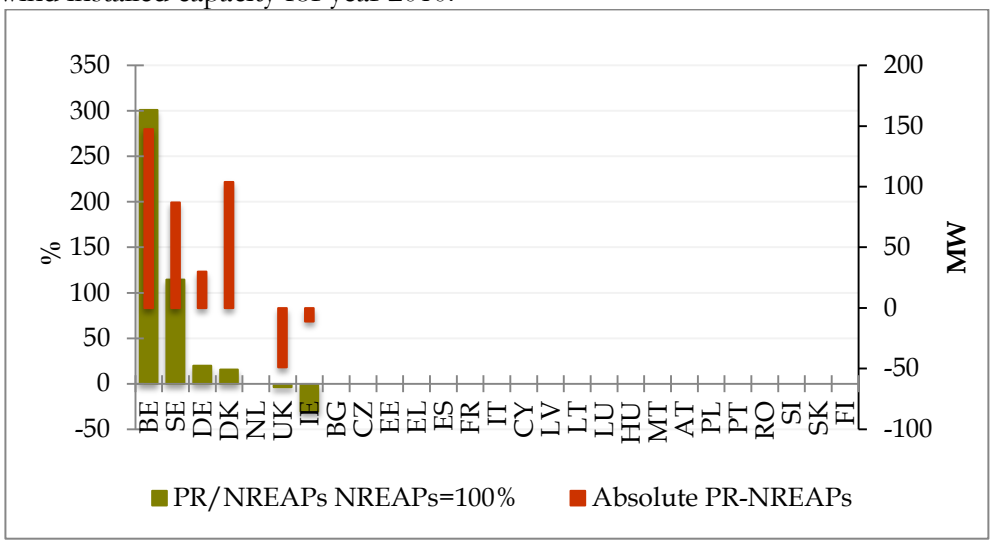

Figure 106[116]. EU 27 MS offshore wind capacity deviation from NREAPs, 2010

The offshore wind installed power capacity share in total renewable power capacity in the EU27 reached 1.2% in 2010, compared to an expected share of 1.0% for 2010. The share of offshore wind capacity in wind capacity has increased to 3.6% in 2010, below the expected share of 3.1% for 2010.

In 2010, several Member Stated had an installed offshore wind capacity above the projected level for 2010: Belgium with 148 MW, Denmark with 104 MW, Sweden with 87 MW and Germany with 30 MW. Two Member States were below their estimated levels for 2010: UK with 49 MW and Ireland with 11 MW.

[116] MS are ranked according to their relative deviation from 2010 NREAPs targets

Table 84. EU 27 MS offshore wind capacity deviation from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	49	197	148	301.0
BG	0	0	0	
CZ	0	0		
DK	661	765	104	15.7
DE	150	180	30	20.0
EE	0	0	0	
IE	36	25	-11	-30.6
EL	0	0	0	
ES	0	0	0	
FR	0	0	0	
IT	0	0	0	
CY	0	0	0	
LV	0	0	0	
LT	0	0	0	
LU	0	0	0	
HU	0	0	0	
MT	0	0	0	
NL	228	228	0	0.0
AT	0	0	0	
PL	0	0	0	
PT	0	0	0	
RO	0	0	0	
SI	0	0	0	
SK	0	0	0	
FI	0	0	0	
SE	76	163	87	114.5
UK	1390	1341	-49	-3.5
EU 27	2590	2898.5	309	11.9

Offshore wind electricity generation reached 6046 GWh (21.8 PJ) in 2010, which is 218 GWh (9.4 PJ) or 30.2% below the expected level of 8664 GWh (31.2 PJ) in 2010. The share of offshore wind electricity in total renewable electricity generation has increased from 0.4% in 2005 to 1.0% in 2010, below the expected share of 1.3% for 2010.

Figure 107 and Table 85 report the detailed absolute and relative changes from NREAPs in offshore wind electricity generation for year 2010.

The share of offshore wind electricity in total renewable electricity generation has increased from 0.4% in 2005 to 1.0% in 2010, below the expected share of 1.3% for 2010. The share of offshore wind electricity in total wind electricity produced increased from 2.9% in 2005 to 4.1% in 2010 and this is expected to increase to 38.8% until 2020.

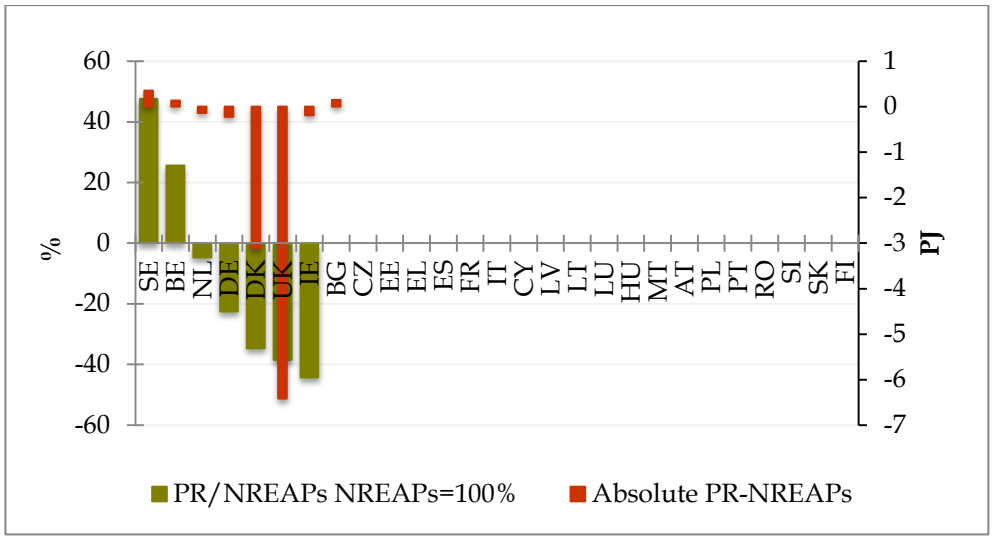

Figure 107[117]. EU 27 MS offshore wind electricity generation deviations from NREAPs, 2010

Compared to the expected offshore wind electricity production, three Member States were above their target for wind power generation: Sweden with 242 GWh or 0.4 PJ (47.6%), Bulgaria with 41 GWh (0.1 PJ) and Belgium with 39 GWh or 0.1 PJ (25.6%).

Several Member States were below the 2010 target: UK with 1783 GWh or 6.4 PJ (-38.5%), Denmark with 863 GWh or 3.1 PJ (-34.7%), Germany with 61 GWh or 0.2 PJ (-34.7%), Ireland with 0.2 PJ or -44.3% and the Netherlands with 38 GWh or 0.1 PJ (-4.7%).

Table 85. EU 27 MS offshore wind electricity generation deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	PJ	PJ	%
BE	0.5	0.7	0.1	25.6
BG	0.0	0.1	0.1	
CZ	0.0	0.0	0.0	
DK	8.9	5.8	-3.1	-34.7
DE	1.0	0.8	-0.2	-22.5
EE	0.0	0.0	0.0	
IE	0.4	0.2	-0.2	-44.3
EL	0.0	0.0	0.0	
ES	0.0	0.0	0.0	
FR	0.0	0.0	0.0	
IT	0.0	0.0	0.0	
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	2.9	2.8	-0.1	-4.7
AT	0.0	0.0	0.0	
PL	0.0	0.0	0.0	

[117] MS are ranked according to their relative deviation from 2010 NREAPs targets

PT	0.0	0.0	0.0	
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	
SE	0.7	1.1	0.4	47.6
UK	16.7	10.2	-6.4	-38.5
EU 27	31.2	21.8	-9.4	-30.2

2.3.6 Heat pumps

The expected heat production using heat pumps in 2010 in the EU 27 was 168.0 PJ. The EU 27 exceeded this target by 14.7 PJ, representing 8.7% of the target and the heat generation from heat pumps in the EU 27 reached 182.6 PJ in 2010.

Figure 108 and Table 86 report the detailed absolute and relative changes from NREAPs in heat generation from heat pumps for year 2010.

Compared to the expected heat production from heat pumps, several Member States were above their planned levels: Sweden with 18.6 PJ (+127.2%), France with 5.1 PJ (+13.8%), Greece with 2.2 PJ (+305.9%), Austria with 1.0 PJ (+24.0%) and Belgium with 0.3 PJ (+15.5%).

Several Member States were below the 2010 target: UK with 5.2 PJ (-67.2%), Italy with 3.2 PJ (-6.1%), Denmark with 1.7 PJ (-19.9%), the Netherlands with 1.5 PJ (-26.5%) and Germany with 0.4 PJ (-1.9%).

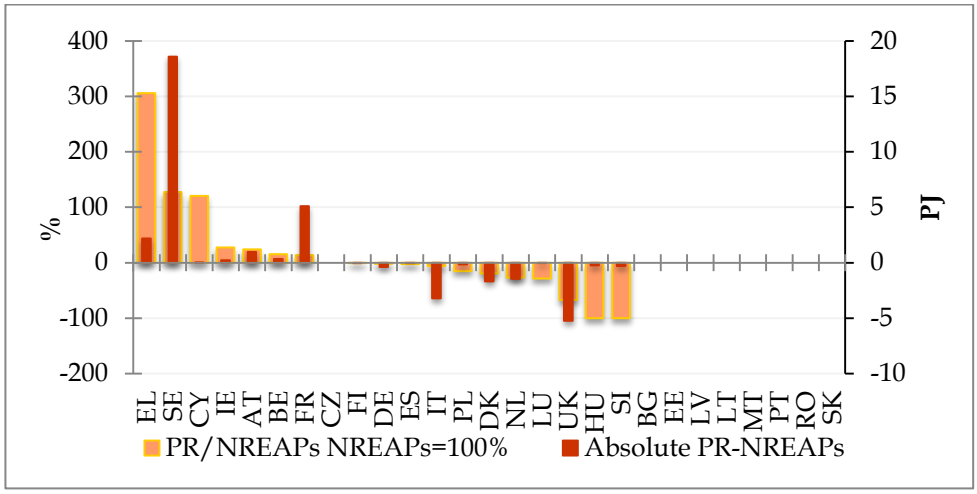

Figure 108[118]. EU 27 MS heat generation from heat pump deviations from NREAPs, 2010

Table 86. EU 27 MS heat generation from heat pump deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	2.2	2.5	0.3	15.5
BG	0.0	0.0	0.0	
CZ	1.9	1.9		
DK	8.8	7.1	-1.7	-19.0
DE	19.5	19.1	-0.4	-1.9

[118] MS are ranked according to their relative deviation from 2010 NREAPs targets

EE	0.0	0.0	0.0	
IE	0.8	1.0	0.2	27.8
EL	0.7	2.9	2.2	305.9
ES	0.7	0.7	0.0	-2.3
FR	37.1	42.2	5.1	13.8
IT	53.3	50.0	-3.2	-6.1
CY	0.0	0.0	0.0	120.6
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.1	0.0	0.0	-28.6
HU	0.3	0.0	-0.3	-100.0
MT	0.0	0.0	0.0	
NL	5.5	4.1	-1.5	-26.5
AT	4.0	5.0	1.0	24.0
PL	1.0	0.9	-0.2	-15.2
PT	0.0	0.0	0.0	
RO	0.0	0.0	0.0	
SI	0.3	0.0	-0.3	-100.0
SK	0.0	0.0	0.0	
FI	9.6	9.6	0.0	-0.4
SE	14.6	33.2	18.6	127.2
UK	7.8	2.6	-5.2	-67.2
EU 27	168.0	182.6	14.7	8.7

2.3.7 Bioenergy

According to NREAPs, bioenergy (bioheat, bioelectricity and biofuels) in EU 27 was planned to reach 3581 PJ (85.5 Mtoe) in 2010. Actually bioenergy in 2010 amounted to 4115.4 PJ (98.3 Mtoe) presenting 14.9% of the planned value.
Figure 109 and Table 87 report the detailed absolute and relative changes from NREAPs in bioenergy for year 2010.

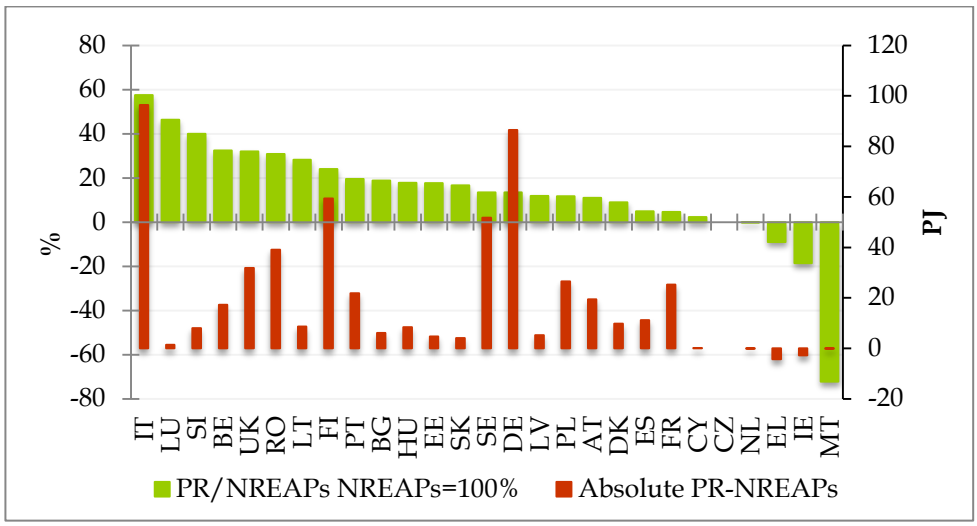

Figure 109[119] EU 27 MS bioenergy deviations from NREAPs, 2010

[119] MS are ranked according to their relative deviation from 2010 NREAPs targets

Only four MS, Ireland, Greece, Malta and The Netherlands, missed their plans on bioenergy for year 2010. Italy had both the highest absolute and relative exceedances in bioenergy for year 2010 with 57.5% and 96.4 PJ above NREAP planned value. Luxembourg had the second highest relative exceedance with 46.3% (1.4 PJ above the plan) followed by Belgium with 32.4% (17.2 PJ above the plan) and United Kingdom with 32% (31.8 PJ above the plan). Germany had the second highest absolute exceedance in bioenergy for 2010 with 86.4 PJ above the planned value (+13.4%) followed by Finland with 59.4 PJ above the plan (+24%), Sweden with 51.8 PJ above the plan (+13.5%) and Romania with 39.1 PJ above the plan (+30.9%).

The highest negative relative deviation from NREAPs was found in Malta by 72.2% (0.1 PJ below the plan) followed by Ireland with 18.6% (2.8 PJ below the plan), Greece with 9% (4.3 PJ below the plan) and The Netherland with 0.1% (0.1 PJ below the plan).

Table 87. EU 27 MS bioenergy deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	53.2	70.4	17.2	32.4
BG	32.1	38.2	6.0	18.8
CZ	94.5	94.5	0.0	0.0
DK	108.9	118.7	9.8	9.0
DE	645.3	731.7	86.4	13.4
EE	26.5	31.2	4.7	17.7
IE	15.2	12.4	-2.8	-18.6
EL	47.8	43.5	-4.3	-9.0
ES	231.8	243.0	11.2	4.8
FR	550.0	575.2	25.3	4.6
IT	167.6	264.0	96.4	57.5
CY	1.5	1.6	0.0	2.3
LV	44.6	49.9	5.3	11.8
LT	30.6	39.2	8.6	28.2
LU	3.0	4.3	1.4	46.3
HU	47.1	55.4	8.4	17.8
MT	0.2	0.0	-0.1	-72.2
NL	64.3	64.2	-0.1	-0.1
AT	176.4	195.8	19.4	11.0
PL	225.9	252.4	26.5	11.7
PT	111.6	133.5	21.9	19.6
RO	126.6	165.7	39.1	30.9
SI	20.1	28.2	8.0	39.9
SK	24.3	28.4	4.1	16.7
FI	247.3	306.6	59.4	24.0
SE	384.2	436.0	51.8	13.5
UK	99.6	131.4	31.8	32.0
EU 27	3580.1	4115.4	535.3	15.0

2.3.7.1 Biomass

a. Biomass electricity

The expected biomass electricity installed capacity for 2010 in the EU 27 was 22681 MW. The EU 27 exceeded this target by 2408 MW representing 10.6% of the target. The installed biomass electricity capacity in the EU 27 reached 25088 MW in 2010.

Figure 110 and Table 88 report the detailed absolute and relative changes from NREAPs in biomass electricity capacity for year 2010.

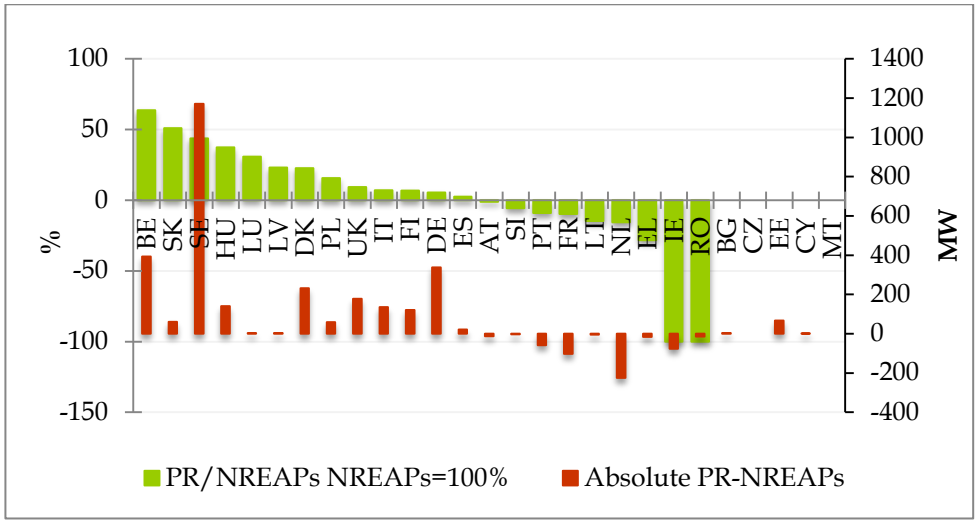

Figure 110[120]. EU 27 MS biomass capacity deviations from NREAPs, 2010

In 2010, a large number of Member Stated had an installed biomass plant capacity above the projected level for 2010: Sweden with 1171 MW (+43.6%), Belgium with 393 MW (+63.6%), Germany with 338 MW (+5.4%), Denmark with 231 MW (+22.7%), UK with 177 MW (+9.2%), etc.

Bulgaria and Estonia hadn't planned to introduce biomass capacity in electricity production for year 2010. In contrary they reported for this year on biomass electricity capacity respectively 3 MW and 67 MW.

Ireland and Romania despite of their plans on biomass electricity capacity in 2010 didn't include biomass in electricity production for this year having a relative deviation equal to -100%.

Table 88. EU 27 MS biomass capacity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	618	1011	393	63.6
BG	0	3	3	
CZ	118	118	0	0
DK	1017	1248	231	22.7
DE	6312	6650	338	5.4
EE	0	67	67	
IE	77	0	-77	-100.0

[120] MS are ranked according to their relative deviation from 2010 NREAPs targets

GR	60	43	-17	-28.3
ES	825	846	21	2.5
FR	1052	949	-103	-9.8
IT	1918	2053	135	7.0
CY	6	8	2	
LV	13	16	3	23.1
LT	34	29	-5	-14.7
LU	13	17	4	30.8
HU	374	514	140	37.3
MT	0	0	0	
NL	1430	1205	-225	-15.7
AT	1211	1198	-13	-1.1
PL	380	439	59	15.5
PT	646	587	-59	-9.1
RO	14	0	-14	-100.0
SI	52	49	-3	-5.8
SK	118	178	60	50.8
FI	1790	1910	120	6.7
SE	2683	3854	1171	43.6
UK	1920	2097	177	9.2
EU 27	22681	25088	2408	10.6

Several Member States were below their estimated levels for 2010: The Netherlands with 225 MW (-15.7%), France with 103 MW (-9.8%), Ireland with 77 MW (-100%), Greece with 17 MW (-28.3%), Romania with 14 MW (-100%), etc.

The expected biomass electricity production for 2010 in the EU 27 was 411.4 PJ. The EU 27 exceeded this target by 33.5 PJ, representing 8.2% of the target. The installed biomass electricity generation in the EU 27 reached 444.9 PJ in 2010.

Figure 111 and Table 89 report the detailed absolute and relative changes from NREAPs in biomass electricity generated for year 2010.

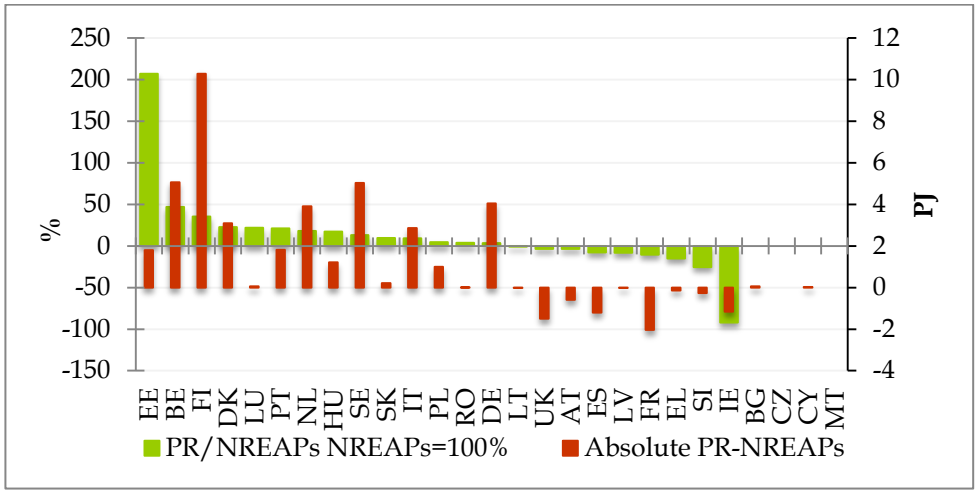

Figure 111[121]. EU 27 MS biomass electricity generation deviations from NREAPs, 2010

[121] MS are ranked according to their relative deviation from 2010 NREAPs targets

Compared to the expected biomass electricity production, several Member States were above their target for biomass power generation: Finland with 2858 GWh or 10.3 PJ (+35.3%), Belgium with 1407 GWh or 5.1 PJ (+46.8%), Sweden with 1398 GWh or 5.0 PJ (+13.2%), Germany with 1123 GWh or 4.0 PJ (+3.4%), the Netherlands with 1084 GWh or 3.9 PJ (+18.1%), etc.

Several Member States were below the 2010 target: France with 565 GWh or 2.0 PJ (-10.4%), UK with 416 GWh of 1.5 PJ (-3.4%), Spain with 334 GWh or 1.2 PJ (-7.9%), Ireland with 321 GWh or 1.2 PJ (-92.2%), Slovenia with 76 GWh or 0.3 PJ (-25.5%), etc.

Table 89. EU 27 MS biomass electricity generation deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	10.8	15.9	5.1	46.8
BG	0.0	0.1	0.1	
CZ	7.7	7.7	0.0	0.0
DK	13.6	16.7	3.1	22.8
DE	118.0	122.0	4.0	3.4
EE	0.9	2.7	1.8	207.1
IE	1.3	0.1	-1.2	-92.2
EL	0.9	0.8	-0.1	-15.0
ES	15.2	14.0	-1.2	-7.9
FR	19.6	17.6	-2.0	-10.4
IT	31.1	34.0	2.9	9.2
CY	0.1	0.1	0.0	
LV	0.3	0.2	0.0	-8.3
LT	0.5	0.5	0.0	-0.7
LU	0.2	0.3	0.1	21.7
HU	7.0	8.2	1.2	17.2
MT	0.0	0.0	0.0	
NL	21.5	25.4	3.9	18.1
AT	17.0	16.4	-0.6	-3.5
PL	21.7	22.7	1.0	4.6
PT	8.6	10.5	1.8	21.0
RO	0.2	0.3	0.0	3.7
SI	1.1	0.8	-0.3	-25.5
SK	2.2	2.4	0.2	9.5
FI	29.1	39.4	10.3	35.3
SE	38.3	43.3	5.0	13.2
UK	44.4	42.9	-1.5	-3.4
EU 27	411.4	444.9	33.5	8.2

b. Biomass heating/cooling

The expected biomass heating and cooling generation for 2010 in the EU 27 was 2593.6 PJ. The EU 27 exceeded this target by 518.9 PJ representing +20.0% of the target, biomass heating and cooling reaching 3112.5 PJ in 2010. Figure 112 and Table 90 report the detailed absolute and relative changes from NREAPs in biomass heating/cooling generated for year 2010.

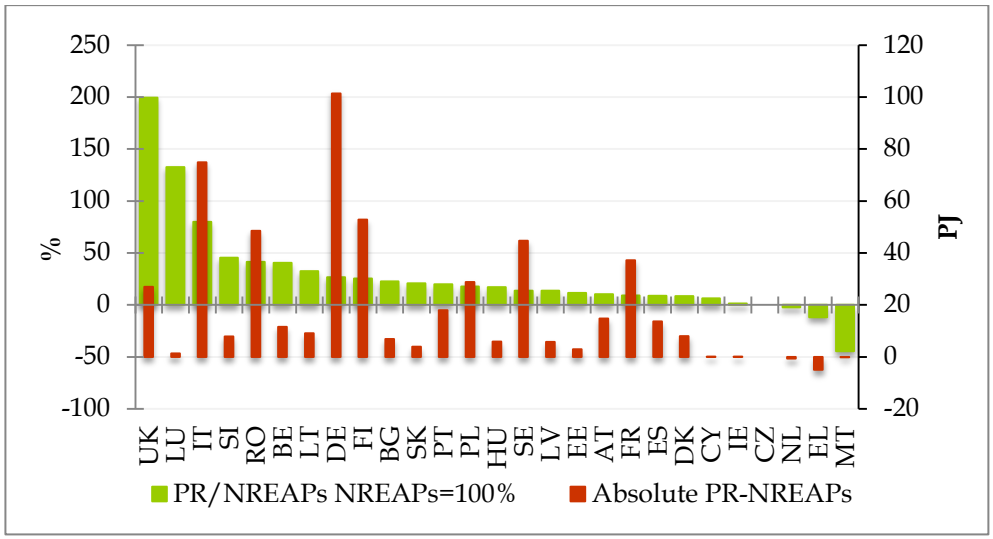

Figure 112[122]. EU 27 MS biomass heating/cooling generation deviations from NREAPs, 2010

Compared to the expected biomass heat production, most of the MS were above their proposed targets for 2010. Germany was above the expected level with 101.4 PJ or 2421 ktoe (+26.6%), Italy with 74.9 PJ or 1789 ktoe (+79.9%), Finland with 52.8 PJ or 1261 ktoe (25.3%), Romania with 48.4 PJ or 1157 ktoe (+41.4%), Sweden with 44.7 PJ or 1067 ktoe (+13.5%), etc. Two Member States were below the 2010 target: Greece with 5.0 PJ or 120 ktoe (-11.9%) and The Netherlands with 0.7 PJ or 17 ktoe (-2.4%).

Table 90. EU 27 MS biomass heating/cooling generation deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	28.6	40.1	11.6	40.5
BG	30.7	37.6	6.9	22.5
CZ	77.1	77.1	0.0	0.0
DK	94.0	102.0	8.0	8.5
DE	380.7	482.0	101.4	26.6
EE	25.6	28.6	2.9	11.4
IE	8.3	8.4	0.1	1.3
EL	42.4	37.3	-5.0	-11.9
ES	156.1	169.7	13.6	8.7
FR	416.7	453.8	37.1	8.9
IT	93.7	168.6	74.9	79.9
CY	0.8	0.8	0.0	6.2
LV	42.7	48.5	5.8	13.5
LT	27.8	36.8	9.0	32.6
LU	1.0	2.3	1.3	132.5
HU	34.0	39.8	5.8	17.1
MT	0.0	0.0	0.0	-44.6
NL	29.9	29.2	-0.7	-2.4
AT	143.0	157.7	14.7	10.3
PL	163.7	192.6	28.8	17.6

[122] MS are ranked according to their relative deviation from 2010 NREAPs targets

PT	91.2	109.2	18.0	19.7
RO	117.0	165.4	48.4	41.4
SI	17.4	25.2	7.9	45.3
SK	18.7	22.6	3.9	20.8
FI	208.9	261.7	52.8	25.3
SE	330.0	374.7	44.7	13.5
UK	13.5	40.5	27.0	199.4
EU 27	2593.6	3112.5	518.9	20.0

2.3.7.1.1 Solid biomass

a. Solid biomass electricity

Solid biomass power installed capacity was estimated at 10566 MW in 2005. This increased to 19158 MW in 2010, 4737 MW or 32.8% above the expected installed plant capacity of 14421 MW. In 2010, a large number of Member Stated had an installed solid biomass plant capacity above the projected level for 2010: Finland with 1910 MW, UK with 1517 MW (+261.6%), Sweden with 1190 MW (+45.1%), Portugal with 289 MW (+105.9%), Belgium with 228 MW (+45.8%), etc.
Figure 113 and Table 91 report the detailed absolute and relative changes from NREAPs in solid biomass capacity in electricity for year 2010.

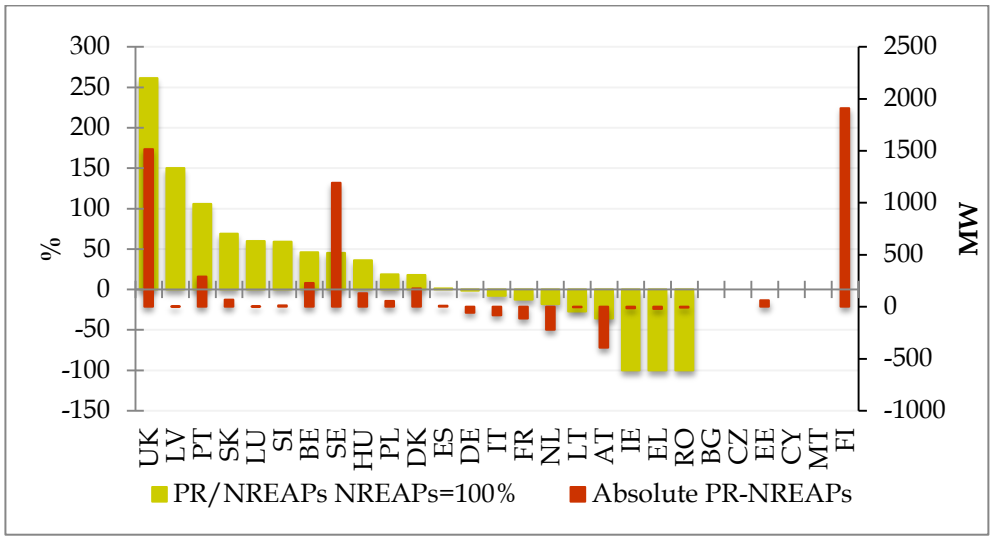

Figure 113[123]. EU 27 MS solid biomass electricity capacity deviations from NREAPs, 2010

Several Member States were below their estimated levels for 2010: Austria with 395 MW (-35.9%), the Netherlands with 222 MW (-18.3%), France with 114 MW (-12.8%), Italy with 82 MW (-8.0%) and Germany with 57 MW (-1.5%).

Table 91. EU 27 MS solid biomass electricity capacity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	498	727	228	45.8
BG	0	0	0	
CZ	0	0	0	
DK	991	1168	177	17.9

[123] MS are ranked according to their relative deviation from 2010 NREAPs targets

DE	3707	3650	-57	-1.5
EE	0	63	63	
IE	15	0	-15	-100.0
EL	20	0	-20	-100.0
ES	648	657	9	1.4
FR	888	774	-114	-12.8
IT	1026	944	-82	-8.0
CY	0	0	0	
LV	2	5	3	150.0
LT	22	16	-6	-27.3
LU	5	8	3	60.0
HU	360	490	130	36.0
MT	0	0	0	
NL	1214	992	-222	-18.3
AT	1099	704	-395	-35.9
PL	300	356	56	18.7
PT	273	562	289	105.9
RO	10	0	-10	-100.0
SI	22	35	13	59.1
SK	100	169	69	69.0
FI	0	1910	1910	
SE	2641	3832	1191	45.1
UK	580	2097	1517	261.6
EU 27	14421	19158	4737	32.8

Solid biomass power generation increased to 92773 GWh (334 PJ) in 2010, representing 14.5% of the total renewable electricity generation being 57.8 PJ or 20.9% above the expected level of 76704 GWh (276.1 PJ) in 2010.

Figure 114 and Table 92 report the detailed absolute and relative changes from NREAPs in solid biomass electricity generated for year 2010.

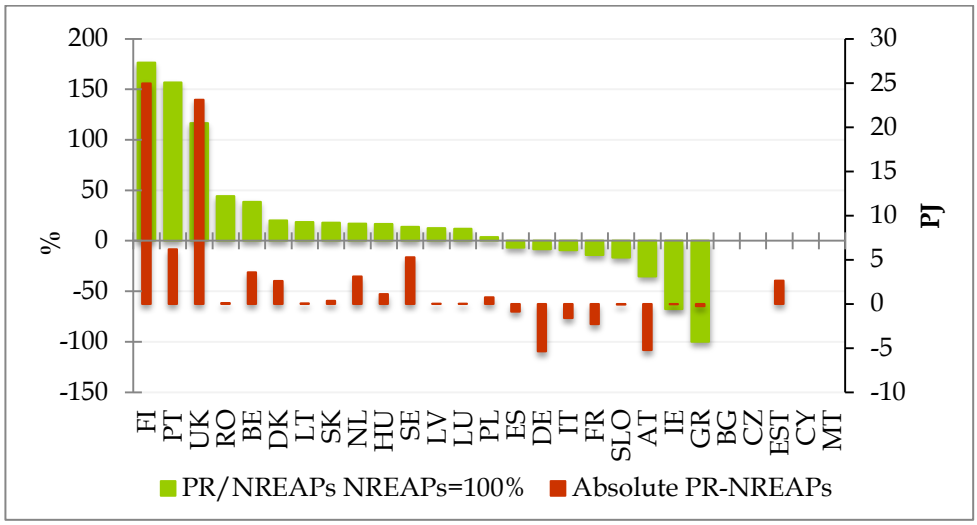

Figure 114[124]. EU 27 MS solid biomass electricity generation deviations from NREAPs, 2010

[124] MS are ranked according to their relative deviation from 2010 NREAPs targets

Compared to the expected biomass electricity production, several Member States were above their target for biomass power generation: Finland with 6929 GWh or 24.9 PJ (+176.3%), UK with 6414 GWh or 23.1 PJ (+116.6%), Portugal with 1712 GWh or 6.2 PJ (+156.8%), Sweden with 1463 GWh or 5.3 PJ (+13.9%), Belgium with 996 GWh or 3.6 PJ (+38.6%), the Netherlands with 858 GWh or 3.1 PJ (+16.8%), etc.

Several Member States were below the 2010 target: Germany with 1498 GWh or 5.4 PJ (-8.6%), Austria with 1457 GWh or 5.2 PJ (-35.3%), France with 643 GWh or 2.3 PJ (-14.3%), Italy with 450 GWh or 1.6 PJ (-9.5%) and Spain with 242 GWh or 0.9 PJ (-6.9%). The deviations from the solid biomass electricity production projected in the NREAPs and the Member States Progress Reports for 2010 are shown in Figure 2.

Table 92. EU 27 MS solid biomass electricity generation deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	9.29	12.87	3.6	38.6
BG	0.0	0.0	0.0	
CZ	5.4	5.4	0.0	
DK	12.9	15.5	2.6	20.2
DE	63.0	57.6	-5.4	-8.6
EE	0.0	2.6	2.6	
IE	0.1	0.0	-0.1	-67.9
EL	0.3	0.0	-0.3	-100.0
ES	12.5	11.7	-0.9	-6.9
FR	16.2	13.9	-2.3	-14.3
IT	17.1	15.5	-1.6	-9.5
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	12.5
LT	0.4	0.4	0.1	18.4
LU	0.1	0.1	0.0	12.0
HU	6.7	7.8	1.1	16.5
MT	0.0	0.0	0.0	
NL	18.4	21.5	3.1	16.8
AT	14.9	9.6	-5.2	-35.3
PL	20.5	21.3	0.7	3.6
PT	3.9	10.1	6.2	156.8
RO	0.2	0.2	0.1	44.2
SI	0.5	0.5	-0.1	-16.7
SK	1.9	2.3	0.3	17.8
FI	14.1	39.1	24.9	176.3
SE	37.8	43.1	5.3	13.9
UK	19.8	42.9	23.1	116.6
EU 27	276.1	334.0	57.8	20.9

b. Solid biomass heating/cooling

The heat generation from solid biomass reached 2898.6 PJ (69231 ktoe), which is 521.4 PJ (12453 ktoe) or 21.9% above the expected level of 2377.2 PJ (56778.1 ktoe) in 2010.

Figure 115 and Table 93 report the detailed absolute and relative changes from NREAPs in solid biomass heat production for year 2010.

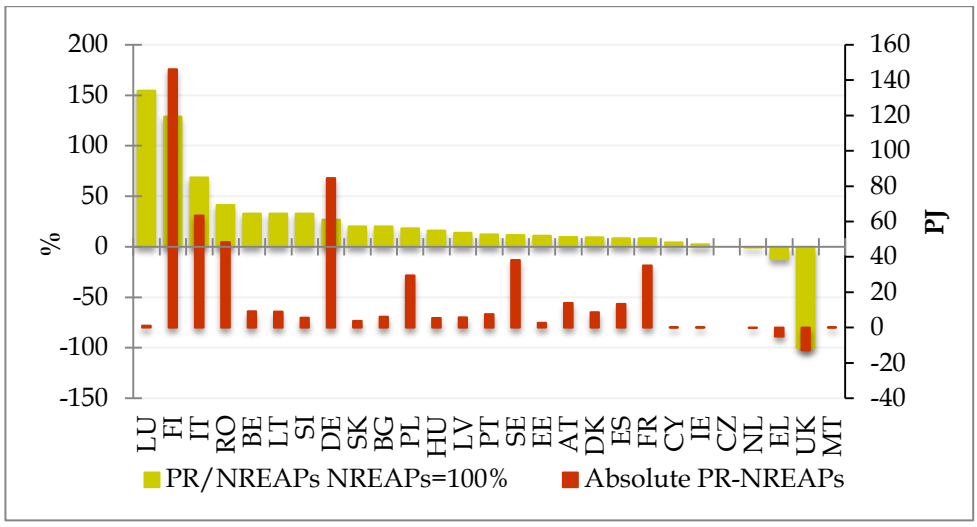

Figure 115[125]. EU 27 MS solid biomass heating/cooling deviations from NREAPs, 2010

The share of solid biomass reached 85.8% of the total renewable heat generation in 2010, in comparison with the expected share of 83.4%. Compared to the expected heat production from solid biomass, most of the Member States were above their expected level for 2010: Finland with 146.2 PJ or 3493 ktoe (+128.9%), Germany with 84.6 PJ or 2021 ktoe (+26.9%), Italy with 63.4 PJ or 1515 ktoe (+68.7%), Romania with 48.4 PJ or 1157 ktoe (+41.4%), Sweden with 38.2 PJ or 913 ktoe (+11.7%), etc.

A few Member States were below the target: UK with 12.8 PJ or 305 ktoe (-100%), Greece with 5.1 PJ or 122 ktoe (-12.1%) and the Netherlands with 0.2 PJ or 4 ktoe (-0.7%).

Table 93. EU 27 MS solid biomass heating/cooling deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	PJ	PJ	%
BE	28.0	37.3	9.3	33.1
BG	30.7	37.0	6.2	20.3
CZ	74.6	74.6	0.0	0.0
DK	91.2	99.9	8.8	9.6
DE	314.7	399.3	84.6	26.9
EE	25.6	28.5	2.8	11.1
IE	7.9	8.1	0.2	2.7
EL	42.4	37.3	-5.1	-12.1
ES	154.7	168.1	13.4	8.7
FR	413.2	448.4	35.2	8.5
IT	92.4	155.8	63.4	68.7
CY	0.7	0.7	0.0	4.5
LV	42.4	48.3	5.9	13.8
LT	27.5	36.6	9.1	33.0
LU	0.8	2.0	1.2	154.8

[125] MS are ranked according to their relative deviation from 2010 NREAPs targets

HU	34.0	39.4	5.4	16.0
MT	0.0	0.0	0.0	
NL	24.0	23.8	-0.2	-0.7
AT	142.4	156.3	14.0	9.8
PL	161.0	190.7	29.7	18.4
PT	63.4	71.1	7.7	12.2
RO	116.9	165.4	48.4	41.4
SI	17.4	23.1	5.7	33.0
SK	18.5	22.3	3.8	20.3
FI	113.5	259.7	146.2	128.9
SE	326.6	364.8	38.2	11.7
UK	12.8	0.0	-12.8	-100.0
EU 27	2377.2	2898.6	521.4	21.9

2.3.7.1.2 Biogas

a. Biogas electricity

Biogas power installed capacity increased in 2010 to 4558 MW, 872 MW or 16.1% below the expected installed plant capacity of 5431 MW. The share of installed biogas power plant capacity in the total renewable power capacity reached to 1.9% in 2010, below the projected share of 2.2% for 2010.

Figure 116 and Table 94 report the detailed absolute and relative changes from NREAPs in biogas electricity capacity for year 2010.

In 2010, a large number of Member Stated had an installed biogas plant capacity above the projected level for 2010: Germany with 362 MW (+15.3%), Austria with 74 MW (+76.3%), Italy with 55 MW (+12.1%), Denmark with 54 MW (+207.7%) and Belgium with 18 MW (+17.0%).

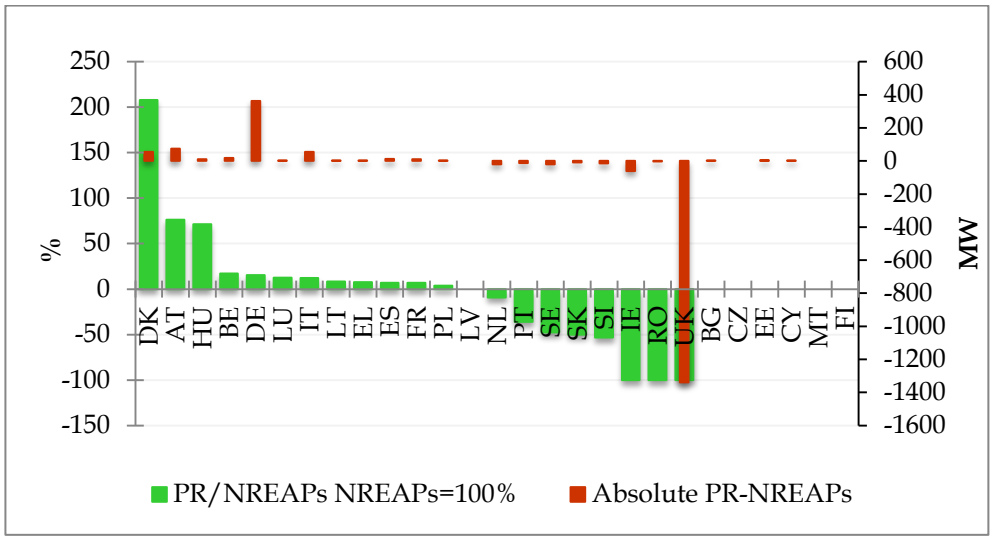

Figure 116[126]. EU 27 MS biogas installed capacity deviations from NREAPs, 2010

[126] MS are ranked according to their relative deviation from 2010 NREAPs targets

Several Member States were below their estimated levels for 2010: The UK with 1340 MW (-100%), Ireland with 62 MW (-100%), Sweden with 20 MW (-47.6%), the Netherlands with 20 MW (-9.3%) and Slovenia with 16 MW (-53.3%).

Table 94. EU 27 MS biogas installed capacity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	106	124	18	17.0
BG	0	3	3	
CZ	118	118		
DK	26	80	54	207.7
DE	2368	2730	362	15.3
EE	0	4	4	
IE	62	0	-62	-100.0
EL	40	43	3	7.5
ES	177	189	12	6.8
FR	164	175	11	6.7
IT	453	508	55	12.1
CY	6	8	2	
LV	11	11	0	0.0
LT	12	13	1	8.3
LU	8	9	1	12.5
HU	14	24	10	71.4
MT	0	0	0	
NL	216	196	-20	-9.3
AT	97	171	74	76.3
PL	80	83	3	3.6
PT	39	25	-14	-35.9
RO	4	0	-4	-100.0
SI	30	14	-16	-53.3
SK	18	9	-9	-50.0
FI	0	0	0	
SE	42	22	-20	-47.6
UK	1340	0	-1340	-100.0
EU 27	5431	4558	-872	-16.1

The electricity generation from biogas in 2010 amounted to 24453 GWh (88.0 PJ) which is 4232 GWh (15.2 PJ) and 14.8% below the expected level of 28685 GWh (103.3 PJ) in 2010. The share of biogas electricity in total renewable electricity generation has increased to 3.8% in 2010 but still below the expected share of 4.4% for 2010.

Figure 117 and Table 95 report the detailed absolute and relative changes from NREAPs in biogas electricity generation for year 2010.

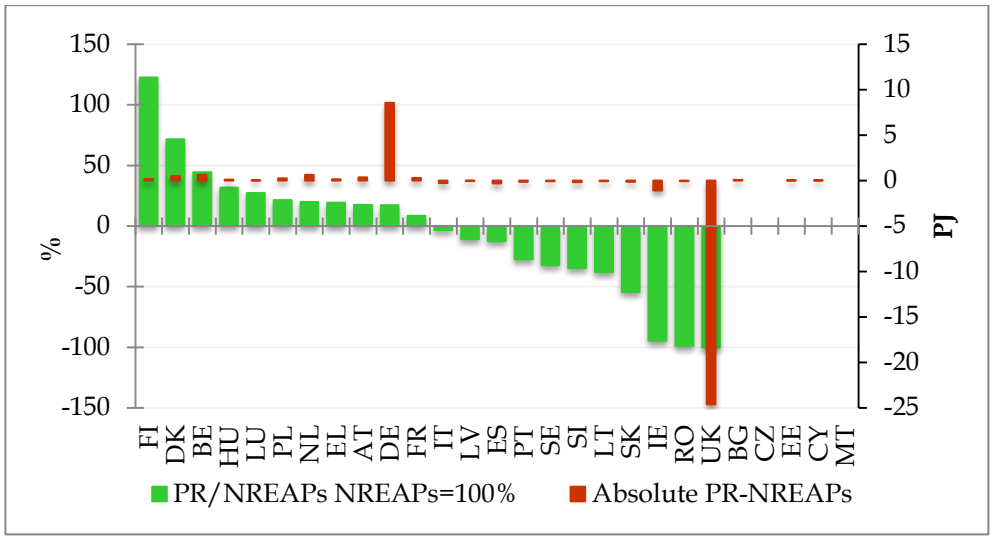

Figure 117[127]. EU 27 MS biogas electricity deviations from NREAPs, 2010

Compared to the expected biogas electricity production, several Member States were above their target for power generation: Germany with 2371 GWh or 8.5 PJ (+17.1%), Belgium with 175 GWh or 0.6 PJ (+44.5%), the Netherlands with 172 GWh or 0.6 PJ (+19.7%), Denmark with 139 GWh or 0.5 PJ (+71.6%) and Austria with 96 GWh or 0.3 PJ (+17.4%).
Several Member States were below the 2010 target, including: UK with 6830 GWh or 24.6 PJ (-100%), Ireland with 302 GWh or 1.1 PJ (-94.4%), Spain with 92 GWh or 0.3 PJ (-12.3%), Italy with 75 GWh or 0.3 PJ (-3.5%), Slovenia with 51 GWh or 0.2 PJ (-34.5%), etc.

Table 95. EU 27 MS biogas electricity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	1.42	2.05	0.6	44.5
BG	0.0	0.1	0.1	
CZ	2.3	2.3	0.0	
DK	0.7	1.2	0.5	71.6
DE	49.8	58.3	8.5	17.1
EE	0.0	0.0	0.0	
IE	1.2	0.1	-1.1	-94.4
EL	0.7	0.8	0.1	19.3
ES	2.7	2.4	-0.3	-12.3
FR	3.4	3.6	0.3	8.3
IT	7.7	7.4	-0.3	-3.5
CY	0.1	0.1	0.0	
LV	0.2	0.2	0.0	-10.9
LT	0.2	0.1	-0.1	-38.0
LU	0.2	0.2	0.0	27.3
HU	0.3	0.4	0.1	31.8
MT	0.0	0.0	0.0	
NL	3.1	3.8	0.6	19.7

[127] MS are ranked according to their relative deviation from 2010 NREAPs targets

AT	2.0	2.3	0.3	17.4
PL	1.2	1.4	0.3	21.5
PT	0.5	0.4	-0.1	-27.5
RO	0.1	0.0	-0.1	-98.7
SI	0.5	0.3	-0.2	-34.5
SK	0.3	0.1	-0.1	-54.3
FI	0.1	0.3	0.2	122.5
SE	0.2	0.1	-0.1	-32.1
UK	24.6	0.0	-24.6	-100.0
EU 27	103.3	88.0	-15.2	-14.8

b. Biogas heating/cooling

The heating/cooling from biogas increased to 83.2 PJ (1988 ktoe) in 2010, which is 21.1 PJ (504 ktoe) or 34% above the expected level of 62.1 PJ (1484 ktoe) in 2010 . The share of biogas heat in total renewable heat generation increased from 1.1% in 2010 to 2.5% in 2010, which is above the expected share of 2.2% in total renewable heating/cooling.

Figure 118 and Table 96 report the detailed absolute and relative changes from NREAPs in biogas electricity generation for year 2010.

Many Member States were above the projected levels for the biogas heat production: Germany with 16.0 PJ or 381 ktoe (+41.8%), Sweden with 2.7 PJ or 66 ktoe (+374.3%), France with 1.9 PJ or 46 ktoe (+55.4%), Portugal with 0.9 PJ or 22 ktoe (+220.0%), Belgium with 0.7 PJ or 17 ktoe (+194.4%), etc.

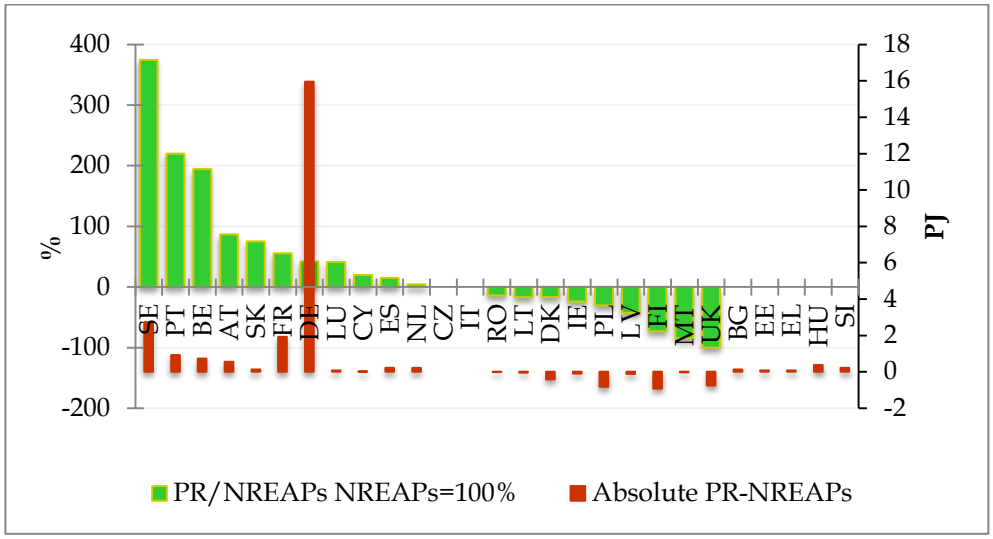

Figure 118[128]. EU 27 MS biogas heat production deviations from NREAPs, 2010

Few Member States were below the 2010 target: Finland with 0.9 PJ or 22 ktoe (-73.3%), Poland with 0.8 PJ or 20 ktoe (-30.3%), UK with 0.8 PJ or 18 ktoe (-100%), Denmark with 0.4 PJ or 10 ktoe (-16.9%) and Latvia with 0.1 PJ or 3 ktoe (-42.9%).

[128] MS are ranked according to their relative deviation from 2010 NREAPs targets

Table 96. EU 27 MS biogas heat production deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	0.4	1.1	0.7	194.4
BG	0.0	0.1	0.1	
CZ	2.5	2.5	0.0	0.0
DK	2.5	2.1	-0.4	-16.9
DE	38.2	54.1	16.0	41.8
EE	0.0	0.1	0.1	
IE	0.4	0.3	-0.1	-24.0
EL	0.0	0.1	0.1	
ES	1.4	1.6	0.2	14.7
FR	3.5	5.4	1.9	55.4
IT	1.1	1.1	0.0	0.0
CY	0.1	0.1	0.0	19.5
LV	0.3	0.2	-0.1	-42.9
LT	0.3	0.2	0.0	-16.7
LU	0.2	0.3	0.1	41.3
HU	0.0	0.4	0.4	
MT	0.0	0.0	0.0	-85.1
NL	4.6	4.9	0.2	4.5
AT	0.6	1.2	0.5	86.7
PL	2.7	1.9	-0.8	-30.3
PT	0.4	1.3	0.9	220.0
RO	0.0	0.0	0.0	-14.0
SI	0.0	0.2	0.2	
SK	0.2	0.3	0.1	75.0
FI	1.3	0.3	-0.9	-73.3
SE	0.7	3.5	2.7	374.3
UK	0.8	0.0	-0.8	-100.0
EU 27	62.1	83.2	21.1	34.0

2.3.7.1.3 Bioliquids

a. Bioliquids for electricity

Bioliquids power installed capacity increased in 2010 to 1382 MW, 344 MW or 33.1% above the expected installed plant capacity of 1039 MW. The share of installed bioliquids power plant capacity in the total renewable power capacity reached to 0.6% in 2010, above the projected share of 0.4% for 2010.

Figure 119 and Table 97 report the detailed absolute and relative changes from NREAPs in bioliquids electricity capacity for the year 2010.

In 2010, a few Member States had an installed bioliquids plant capacity above the projected level for 2010: Austria with 309 MW (+2060%), Belgium with 147 MW (+1077.9%), Italy with 162 MW (+36.9%), Germany with 43 MW (+18.1%) and the Netherlands with 17 MW. The installed capacity in Portugal remained zero, in comparison with an expected capacity of 334 MW for 2010.

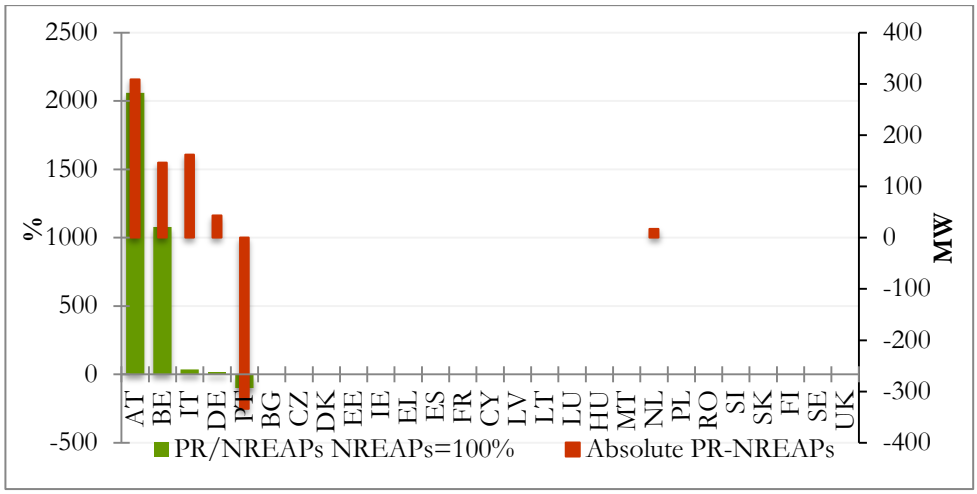

Figure 119[129]. EU 27 MS bioliquids installed capacity deviations from NREAPs, 2010

Table 97. EU 27 MS bioliquids installed capacity deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
BE	14	160	147	1077.9
BG	0	0	0	
CZ	0	0	0	
DK	0	0	0	
DE	237	280	43	18.1
EE	0	0	0	
IE	0	0	0	
EL	0	0	0	
ES	0	0	0	
FR	0	0	0	
IT	439	601	162	36.9
CY	0	0	0	
LV	0	0	0	
LT	0	0	0	
LU	0	0	0	
HU	0	0	0	
MT	0	0	0	
NL	0	17	17	
AT	15	324	309	2060.0
PL	0	0	0	
PT	334	0	-334	-100.0
RO	0	0	0	
SI	0	0	0	
SK	0	0	0	
FI	0	0	0	
SE	0	0	0	
UK	0	0	0	
EU 27	1039	1382	344	33.1

[129] MS are ranked according to their relative deviation from 2010 NREAPs targets

The electricity generation from bioliquids in 2010 amounted to 6351 GWh (22.9 PJ) which is 2282 GWh (8.2 PJ) and 26.4% below the expected level of 8633 GWh (31.1 PJ) in 2010. The share of bioliquids electricity in total renewable electricity generation has increased to 1.0% in 2010, but below the expected share of 1.3% for 2010.

Figure 120 and Table 98 report the detailed absolute and relative changes from NREAPs in bioliquids electricity generation for year 2010.

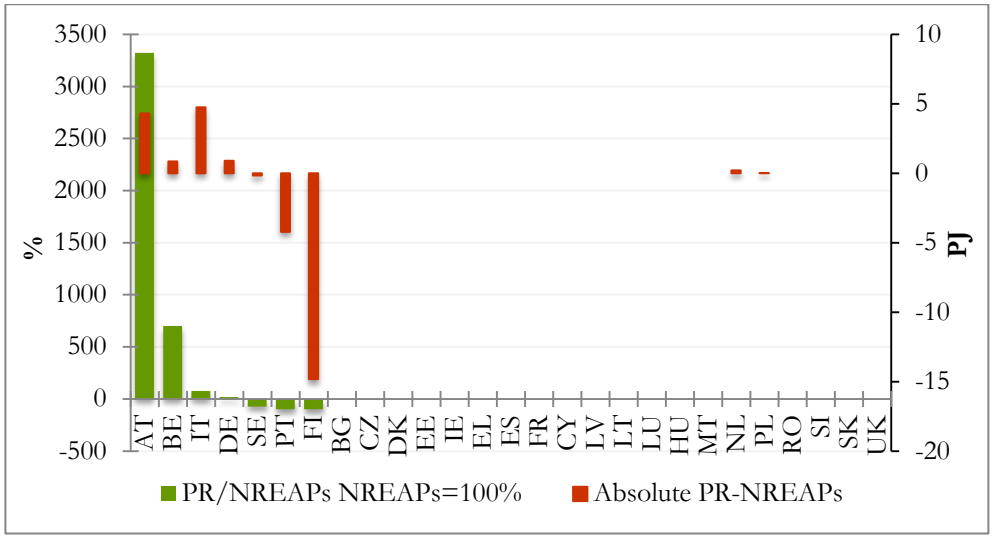

Figure 120[130]. EU 27 MS bioliquids electricity deviations from NREAPs, 2010

Compared to the expected bioliquids electricity production, several Member States were above their target for power generation: Italy with 1320 GWh or 4.8 PJ (+75.1%), Austria with 1196 GWh or 4.3 PJ (+3322.5%), Germany with 250 GWh or 0.9 PJ (+19.7%), Belgium with 236 GWh or 0.8 PJ (+700%) and the Netherlands with 54 GWh or 0.2 PJ.

Several Member States were below the 2010 target: Finland with 4120 GWh or 14.8 PJ (-100%), Portugal with 1170 GWh or 4.2 PJ (-100%) and Seweden with 48 GWh or 0.2 PJ (-73.8%).

Table 98. EU 27 MS bioliquids electricity deviations from NREAPs, 2010.

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	0.1	1.0	0.8	700.0
BG	0.0	0.0	0.0	
CZ	0.0	0.0	0.0	
DK	0.0	0.0	0.0	
DE	5.2	6.1	0.9	17.2
EE	0.0	0.0	0.0	
IE	0.0	0.0	0.0	
EL	0.0	0.0	0.0	
ES	0.0	0.0	0.0	
FR	0.0	0.0	0.0	
IT	6.3	11.1	4.8	75.1
CY	0.0	0.0	0.0	

[130] MS are ranked according to their relative deviation from 2010 NREAPs targets

LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	0.0	0.2	0.2	
AT	0.1	4.4	4.3	3322.2
PL	0.0	0.0	0.0	
PT	4.2	0.0	-4.2	-100.0
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	14.8	0.0	-14.8	-100.0
SE	0.2	0.1	-0.2	-73.8
UK	0.0	0.0	0.0	
EU 27	31.1	22.9	-8.2	-26.4

b. Bioliquids heating/cooling

The heating/cooling from bioliquids increased to 30.2 PJ (2154 ktoe) in 2010, which is 63.7 PJ (1521 ktoe) or 41.4% below the expected level of 153.8 PJ (3674 ktoe) in 2010. The share of bioliquids heat in total renewable heat generation increased from 2.2% in 2005 to 2.7% in 2010, which is below the expected share of 5.4% in total renewable heating/cooling.
Figure 121 and Table 99 report the detailed absolute and relative changes from NREAPs in bioliquids electricity generation for year 2010.

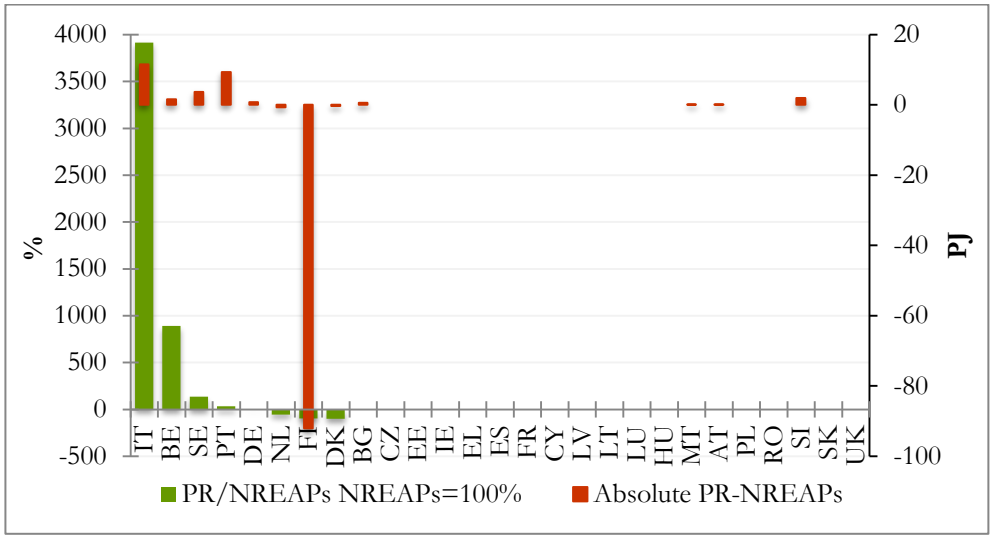

Figure 121[131]. EU 27 MS bioliquids heat production deviations from NREAPs, 2010

Several Member States were above the projected levels for the biogas heat production: Italy with 11.5 PJ or 274 ktoe (+3914.3%), Portugal with 9.3 PJ or 223 ktoe (+34.0%), Sweden with 3.7 PJ or 88 ktoe (+890.5%), Slovenia with 1.9 PJ of 46 ktoe, Belgium with 1.6 PJ or 37 ktoe (+890.5%), etc.

[131] MS are ranked according to their relative deviation from 2010 NREAPs targets

Few Member States were below the 2010 target: Finland with 92.1 PJ or 2200 ktoe (-98.2%), the Netherlands with 0.7 PJ or 17 ktoe (-54.8%) and Denmark with 0.3 PJ or 8 ktoe (-100%).

Table 99. EU 27 MS bioliquids heat production deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	0.2	1.7	1.6	890.5
BG	0.0	0.5	0.5	
CZ	0.0	0.0	0.0	
DK	0.3	0.0	-0.3	-100.0
DE	27.8	28.6	0.8	2.9
EE	0.0	0.0	0.0	
IE	0.0	0.0	0.0	
EL	0.0	0.0	0.0	
ES	0.0	0.0	0.0	
FR	0.0	0.0	0.0	
IT	0.3	11.8	11.5	3914.3
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	1.3	0.6	-0.7	-54.8
AT	0.0	0.2	0.2	
PL	0.0	0.0	0.0	
PT	27.4	36.8	9.3	34.0
RO	0.0	0.0	0.0	
SI	0.0	1.9	1.9	
SK	0.0	0.0	0.0	
FI	93.8	1.7	-92.1	-98.2
SE	2.7	6.4	3.7	135.4
UK	0.0	0.0	0.0	
EU 27	153.8	90.2	-63.7	-41.4

2.3.7.1.4 Biomass use in households

The use of biomass in households in 2010 reached the amount of 1604 PJ (38311 ktoe) which is 338.2 PJ (8078 ktoe) or 26.7% above the projected level for the biomass use in households in this year.

Figure 122 and Table 100 report the detailed absolute and relative changes from NREAPs in biogas electricity generation for year 2010.

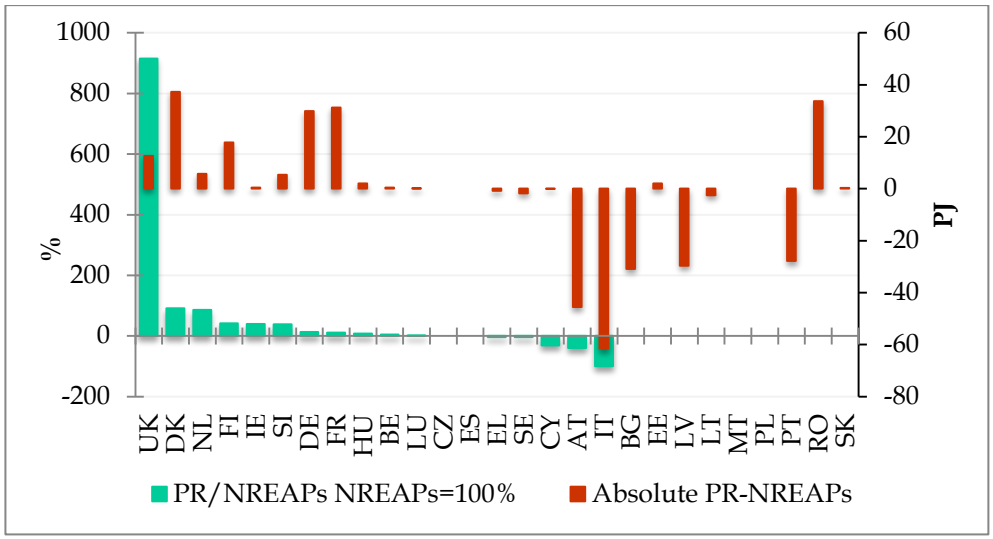

Figure 122[132]. EU 27 MS biomass use in households deviations from NREAPs, 2010

Biomass use in households had a share of the biomass heat of 48.5% in 2005, which increased to 51.6% in 2010, above the expected share of 48.8% for 2010 and this share is expected to further decrease to 39.2% in 2020. The share of biomass use in households in total renewable heat generation has increased from 48.0% in 2005 to 47.5% in 2010, above the expected share of 48.8% in 2010 and it is expected to further decrease to 31.7% in total renewable heat until 2020.

Compared to the expected biomass use in households, several Member States were above their expected level for 2010: Poland with 112.7 PJ (2693), Italy with 70.9 PJ or 1693 ktoe (+115.1%), Denmark with 37.3 PJ or 891 ktoe (+91.3%) Romania with 33.7 PJ or 806 ktoe (+29.6%), France with 31.2 PJ or 746 ktoe (+10.9%), etc.

A few Member States were below the target: Austria with 45.6 PJ or 1088 ktoe (-39.3%) , Sweden with 1.8 PJ or 43 ktoe (-3.9%), Bulgaria with 1.1 PJ or 26 ktoe (-3.5%), Greece with 0.8 PJ or 20 ktoe (-3.3%), Cyprus with 0.1 PJ or 2.2 ktoe (-30.9%).

Table 100. EU 27 MS biomass use in households deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	10.0	10.4	0.4	4.2
BG	30.8	29.7	-1.1	
CZ	48.5	48.5	0.0	0.0
DK	40.9	78.2	37.3	91.3
DE	231.9	261.7	29.9	12.9
EE	15.6	17.7	2.1	
IE	1.0	1.3	0.4	39.1
EL	25.7	24.9	-0.8	-3.3
ES	86.0	86.0	0.0	0.0
FR	286.2	317.4	31.2	10.9
IT	61.6	132.5	70.9	115.1
CY	0.3	0.2	-0.1	-30.9
LV	29.6	30.8	1.1	

[132] MS are ranked according to their relative deviation from 2010 NREAPs targets

LT	2.5	24.7	22.2	
LU	0.8	0.8	0.0	0.5
HU	25.5	27.5	2.0	7.9
MT	0.0	0.0	0.0	
NL	6.7	12.4	5.7	85.5
AT	115.9	70.4	-45.6	-39.3
PL	0.0	112.7	112.7	
PT	27.8	29.6	1.8	
RO	113.9	147.6	33.7	
SI	13.9	19.3	5.4	38.9
SK	1.5	1.8	0.3	
FI	42.3	60.0	17.8	42.0
SE	45.6	43.8	-1.8	-3.9
UK	1.4	14.0	12.6	915.2
EU 27	1265.8	1604.0	338.2	26.7

2.3.7.2 Biofuels

Biofuel use in transport has increased to 558 PJ (13326 ktoe) in 2010 being below with 18 PJ (429 ktoe) or 3.1% the expected contribution of biofuels use in transport of 575.9 PJ (13756 ktoe) in 2010.
Figure 123 and Table 101 report the detailed absolute and relative changes from NREAPs in biofuels used in transport for year 2010.

The contribution of biofuels to the gross final energy consumption in transport (calculation according to RES Directive) has increased from 1.0% in 2010 to 4.7% in 2010, which is above the NREAPs expected contribution of biofuels of 4.5%.
Compared to the expected biofuels use in transport, several Member States were above their target for 2010: Italy with 18.6 PJ or 445 ktoe (+43.6%, UK with 6.4 PJ or 152 ktoe *+15.3%), Austria with 5.3 PJ or 126 ktoe (32.1%), Sweden with 2.1 PJ or 50 ktoe (+3.2%) and Portugal with 2.0 PJ or 49 ktoe (+17.3%).

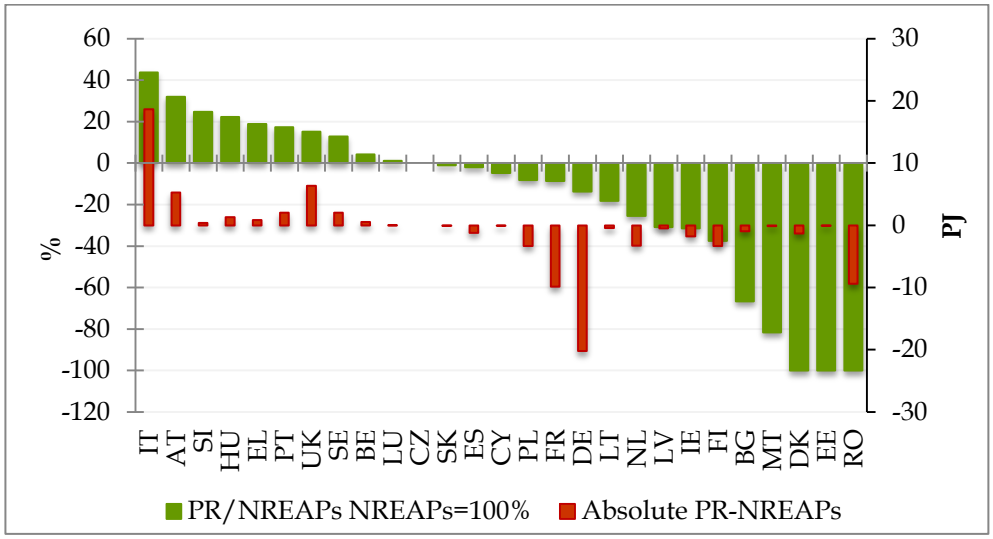

Figure 123[133]. EU 27 MS biofuel deviations from NREAPs, 2010

[133] MS are ranked according to their relative deviation from 2010 NREAPs targets

Several Member States were below the 2010 target: Germany with 19.0 PJ or 453 ktoe (-13.7%), France with 9.8 PJ or 235 ktoe (-8.7%), Finland with 3.7 PJ or 86 ktoe (-40.2%), Poland with 3.3 PJ or 79 ktoe (-8.2%) and the Netherlands with 3.3 PJ or 78 ktoe (-25.4%).

Table 101. EU 27 MS biofuel deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	13.8	14.4	0.6	4.2
BG	1.4	0.5	-0.9	-66.7
CZ	9.8	9.8	0.0	0.0
DK	1.3	0.0	-1.3	-100.0
DE	147.8	127.6	-20.2	-13.7
EE	0.0	0.0	0.0	-100.0
IE	5.6	3.9	-1.8	-31.8
EL	4.5	5.4	0.9	19.0
ES	60.4	59.2	-1.2	-2.0
FR	113.7	103.8	-9.8	-8.7
IT	42.7	61.4	18.7	43.7
CY	0.7	0.6	0.0	-4.7
LV	1.6	1.1	-0.5	-30.8
LT	2.3	1.9	-0.4	-18.2
LU	1.7	1.8	0.0	1.2
HU	6.0	7.4	1.3	22.2
MT	0.1	0.0	-0.1	-81.5
NL	12.9	9.6	-3.3	-25.4
AT	16.5	21.7	5.3	32.1
PL	40.4	37.1	-3.3	-8.2
PT	11.8	13.8	2.0	17.3
RO	9.4	0.0	-9.4	-100.0
SI	1.7	2.1	0.4	-100.0
SK	3.4	3.4	0.0	-1.1
FI	8.8	5.5	-3.3	-37.4
SE	16.0	18.0	2.1	12.9
UK	41.7	48.1	6.4	15.3
EU 27	575.9	558.0	-18.0	-3.1

2.3.7.2.1 Bioethanol/bio-ETBE

The use of bioethanol/bio-ETBE in transport has increased to 114.5 PJ (2735 ktoe) in 2010. This is 5.9 PJ (140 ktoe) or 4.9% below the expected contribution of bioethanol use in transport of 120.4 PJ (2875 ktoe) in 2010.

Figure 124 and Table 102 report the detailed absolute and relative changes from NREAPs in bioethanol used in transport for year 2010.

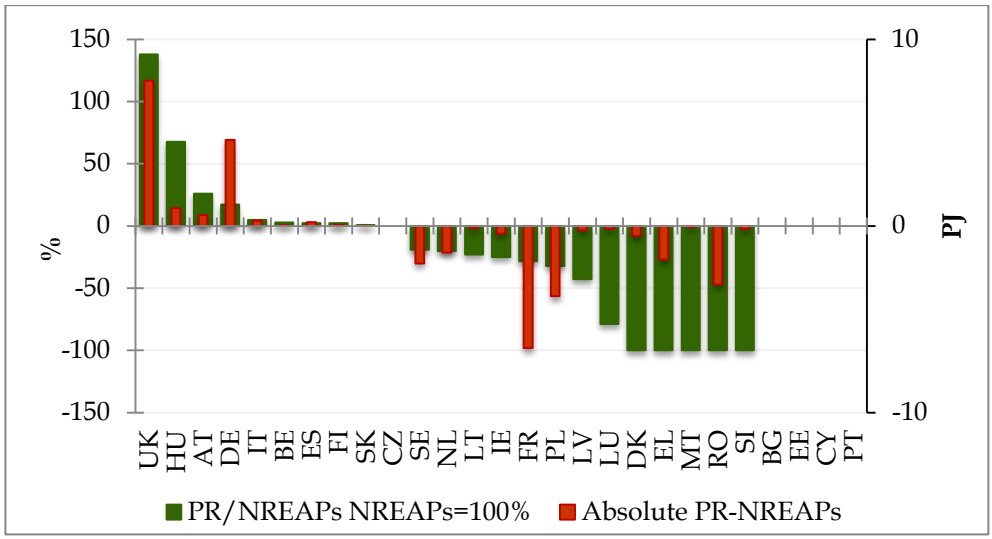

Figure 124[134]. EU 27 MS bioethanol/bio-ETBE deviations from NREAPs, 2010

Compared to the expected bioethanol use in transport, several Member States were above their target for 2010: UK with 7.8 PJ or 186 ktoe (+137.8%), Germany with 4.6 PJ or 110 ktoe (+17.2), Romania with 1.5 PJ or 36 ktoe (+47.9%), Hungary with 1.0 PJ or 23 ktoe (+67.6%), Austria with 0.6 PJ or 14 ktoe (+25.9%), etc.

Several Member States were below the 2010 target: France with 6.5 PJ or 156 ktoe (-28.4%), Poland with 3.8 PJ or 90 ktoe (-32.3%), Sweden with 2.0 PJ 48 ktoe (-19.1%), Greece with 1.8 PJ or 43 ktoe (-100%), the Netherlands with 1.4 PJ or 34 ktoe (-20.2%), etc.

Table 102. EU 27 MS bioethanol/bio-ETBE deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	1.6	1.6	0.0	2.7
BG	0.0	0.0	0.0	
CZ	2.5	2.5	0.0	0.0
DK	0.5	0.0	-0.5	-100.0
DE	26.8	31.4	4.6	17.2
EE	0.0	0.0	0.0	
IE	1.7	1.3	-0.4	-25.0
EL	1.8	0.0	-1.8	-100.0
ES	9.5	9.7	0.2	2.2
FR	23.0	16.5	-6.5	-28.4
IT	6.2	6.5	0.3	4.7
CY	0.0	0.0	0.0	
LV	0.6	0.3	-0.3	-42.9
LT	0.5	0.4	-0.1	-23.1
LU	0.2	0.0	-0.2	-78.7
HU	1.4	2.4	1.0	67.6
MT	0.1	0.0	-0.1	-100.0
NL	7.0	5.6	-1.4	-20.2
AT	2.3	2.8	0.6	25.9

[134] MS are ranked according to their relative deviation from 2010 NREAPs targets

PL	11.7	7.9	-3.8	-32.3
PT	0.0	0.0	0.0	
RO	3.1	0.0	-3.1	-100.0
SI	0.2	0.0	-0.2	-100.0
SK	0.6	0.6	0.0	0.7
FI	2.9	3.0	0.1	2.1
SE	10.5	8.5	-2.0	-19.1
UK	5.7	13.4	7.8	137.8
EU 27	120.4	114.5	-5.9	-4.9

2.3.7.2.2 Biodiesel

Biodiesel use in transport has increased to 433.5 PJ (10354 ktoe) in 2010. This is below the expected contribution of biodiesel use in transport of 445.9 PJ (10651 ktoe) in 2010, which is 12.4 PJ (297 ktoe) or 2.8% below the 2010 target.
Figure 125 and Table 103 report the detailed absolute and relative changes from NREAPs in biodiesel used in transport for year 2010.

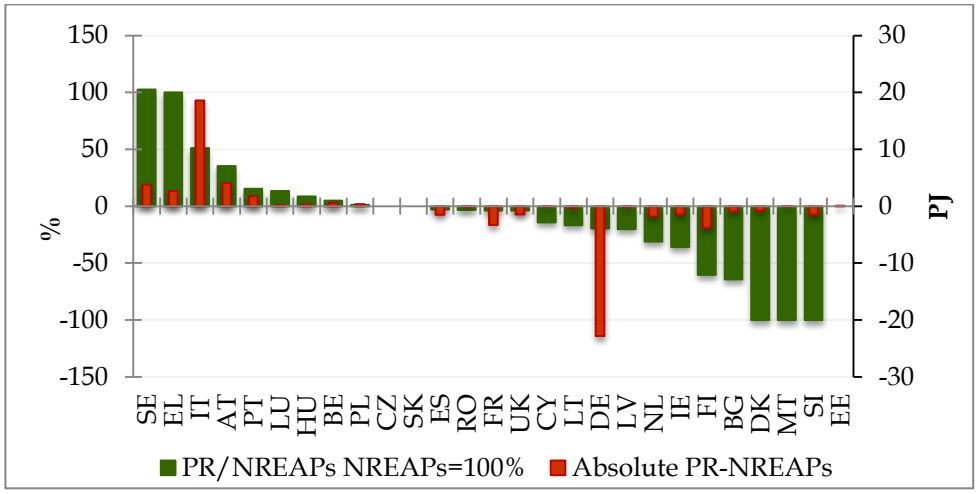

Figure 125[135]. EU 27 MS biodiesel use deviations from NREAPs, 2010

Compared to the expected biodiesel use in transport, several Member States were above their target for 2010: Italy with 18.5 PJ or 443 ktoe (+51.0%), Austria with 4.1 PJ or 98 ktoe (+35.5%), Sweden with 3.7 PJ or 89 ktoe (+100.0%), Greece with 2.7 PJ or 64 ktoe (+100%) and Portugal with 1.9 PJ or 45 ktoe (+16.0).
Several Member States were below the 2010 target: Germany with 22.9 PJ or 516 ktoe (-19.6%), Finland with 3.8 PJ or 90 ktoe (-60.0%), France with 3.3 PJ or 79 ktoe (3.6%), the Netherlands with 1.8PJ or 44ktoe (-31.7%), Slovenia with 1.5PJ of 37ktoe (-100%), etc.

Table 103. EU 27 MS biodiesel use deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	12.2	12.8	0.5	4.4
BG	1.4	0.5	-0.9	
CZ	7.2	7.2	0.0	0.0

[135] MS are ranked according to their relative deviation from 2010 NREAPs targets

DK	0.8	0.0	-0.8	-100.0
DE	115.6	94.0	-21.6	-18.7
EE	0.0	0.0	0.0	
IE	3.9	2.5	-1.4	-36.2
EL	2.7	5.4	2.7	100.0
ES	51.0	49.5	-1.4	-2.8
FR	90.6	87.3	-3.3	-3.6
IT	36.3	54.9	18.5	51.0
CY	0.7	0.6	0.0	
LV	1.0	0.8	-0.3	-24.0
LT	1.8	1.5	-0.3	-16.7
LU	1.5	1.7	0.2	11.4
HU	4.6	5.0	0.4	8.2
MT	0.1	0.0	0.0	-55.3
NL	5.8	4.0	-1.8	-31.7
AT	11.6	15.7	4.1	35.5
PL	28.8	29.2	0.5	1.6
PT	11.8	13.6	1.9	
RO	6.2	0.0	-6.2	-100.0
SI	1.5	0.0	-1.5	-100.0
SK	2.8	2.8	0.0	-1.5
FI	6.3	2.5	-3.8	-60.0
SE	3.7	7.5	3.7	100.0
UK	36.0	34.6	-1.4	-3.9
EU 27	445.9	433.5	-12.4	-2.8

2.3.7.2.3 Other biofuels

The use of other biofuels (biogas, vegetable oils, etc.) decreased to 7.8 PJ (187 ktoe) in 2010 that is below the expected contribution of biodiesel use in transport of 8.8 PJ (211 ktoe) in this year. The share of other biofuels (biogas, vegetable oils, etc.) in the biofuels used in transport represented 1.4% of the biofuels used in 2010, in comparison with 1.5% NREAPs expected share for 2010.

Figure 126 and Table 104 report the detailed absolute and relative changes from NREAPs in other biofuels used in transport for year 2010.

Compared to the expected use of other biofuels (biogas, vegetable oils, etc.) in transport, several Member States were above their target for 2010: Austria with 0.6 PJ or 14 ktoe (+22.2%), Sweden with 0.4 PJ or 9 ktoe (+22.5%), Portugal with 0.2 PJ (4 ktoe) and Ireland with 0.05 PJ or 1 ktoe (+122.2%).

Two Member States were below the 2010 target: Germany with 2.0 PJ or 47 ktoe (-46.1%) and Italy with 0.2 PJ or 5 ktoe (-100%).

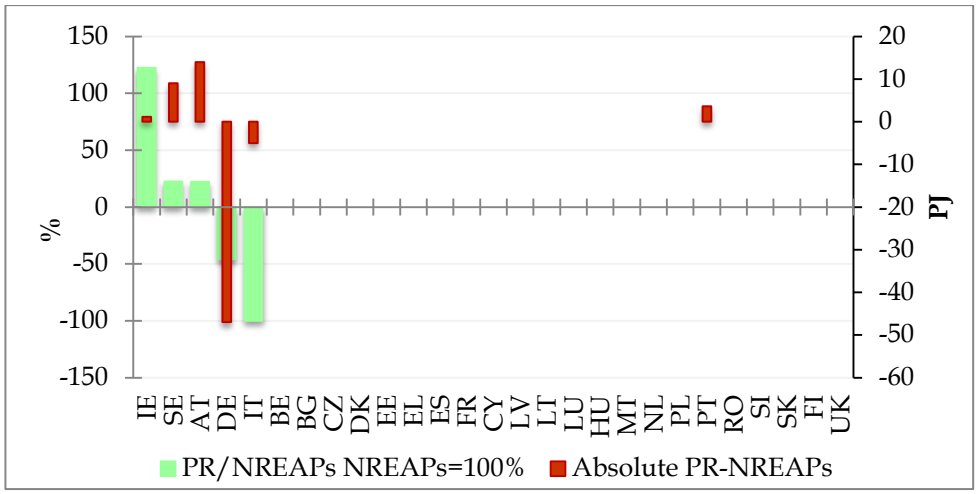

Figure 126[136]. EU 27 MS other biofuels use deviations from NREAPs, 2010

Table 104. EU 27 MS other biofuels use deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	0.0	0.0	0.0	
BG	0.0	0.0	0.0	
CZ	0.0	0.0	0.0	
DK	0.0	0.0	0.0	
DE	4.3	2.3	-2.0	-46.1
EE	0.0	0.0	0.0	
IE	0.0	0.1	0.0	122.2
EL	0.0	0.0	0.0	
ES	0.0	0.0	0.0	
FR	0.0	0.0	0.0	
IT	0.2	0.0	-0.2	-100.0
CY	0.0	0.0	0.0	
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.0	0.0	0.0	
MT	0.0	0.0	0.0	
NL	0.0	0.0	0.0	
AT	2.6	3.2	0.6	22.2
PL	0.0	0.0	0.0	
PT	0.0	0.2	0.2	
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	
SE	1.7	2.1	0.4	22.5
UK	0.0	0.0	0.0	
EU 27	8.8	7.8	-1.0	-11.5

[136] MS are ranked according to their relative deviation from 2010 NREAPs targets

2.3.9.4 Biofuels Article 21.2

The use of biofuels produced from wastes, residues, non-food cellulosic material, and ligno-cellulosic material, or so called art 21.2, as defined in the Renewable Energy Directive 2009/28/EC increased to 23.8 PJ (567.5 ktoe) in 2010. This is 6.2 PJ (148 ktoe) or 35.3% above the expected contribution of 17.6 PJ (419.4 ktoe) in 2010.

Figure 127 and Table 105 report the detailed absolute and relative changes from NREAPs in biofuels article 21.2 used in transport for year 2010.

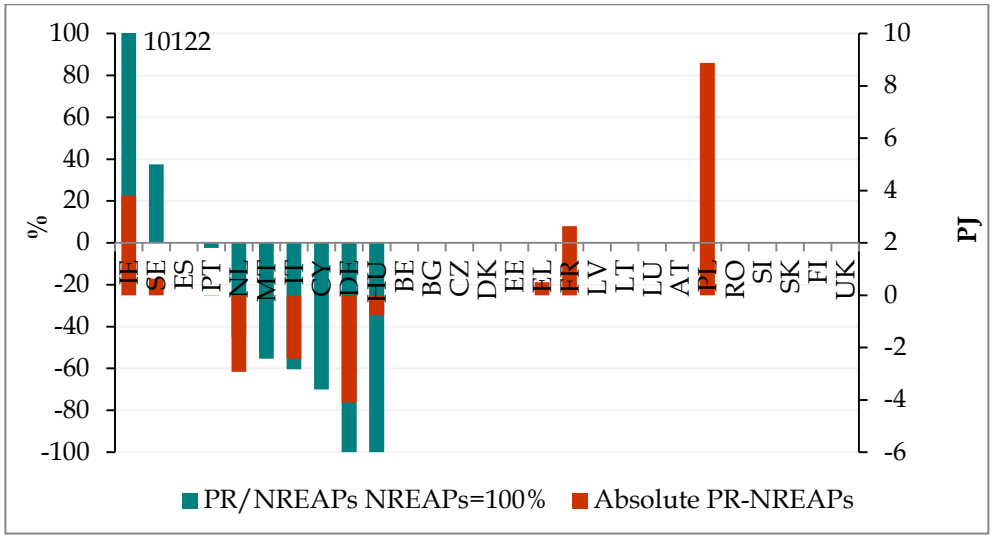

Figure 127[137]. EU 27 MS biofuels art 21.2 use in transport deviations from NREAPs, 2010

Compared to the expected use of art 21.2 in transport, several Member States were above their target for 2010: Poland with 8.9 PJ (212 ktoe), Romania with 4.9 PJ (117 ktoe), Ireland with 3.8 PJ (91 ktoe), France with 2.6 PJ (63 ktoe) and Sweden with 0.6 PJ (15 ktoe).

Several Member States were below the 2010 target, including: Germany with 4.1 PJ or 98 ktoe (-100%), The Netherlands with 2.9 PJ or 70 ktoe (-44.9%), Italy with 2.4 PJ or 58 ktoe (-60.4%), Hungary with 0.8 PJ or 18 ktoe (-100%).

Table 105. EU 27 MS biofuels art 21.2 use in transport deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	0.0	0.0	0.0	
BG	0.0	0.0	0.0	
CZ	0.0	0.0	0.0	
DK	0.0	0.0	0.0	
DE	4.1	0.0	-4.1	-100.0
EE	0.0	0.0	0.0	
IE	0.0	3.9	3.8	10122.2
EL	0.0	0.5	0.5	
ES	0.2	0.2	0.0	0.0
FR	0.0	2.6	2.6	

[137] MS are ranked according to their relative deviation from 2010 NREAPs targets

IT	4.0	1.6	-2.4	-60.4
CY	0.0	0.0	0.0	-70.0
LV	0.0	0.0	0.0	
LT	0.0	0.0	0.0	
LU	0.0	0.0	0.0	
HU	0.8	0.0	-0.8	-100.0
MT	0.1	0.0	0.0	-55.3
NL	6.5	3.6	-2.9	-44.9
AT	0.0	0.0	0.0	
PL	0.0	8.9	8.9	
PT	0.2	0.2	0.0	-2.5
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	0.0	0.0	0.0	
SE	1.7	2.3	0.6	37.5
UK	0.0	0.0	0.0	
EU 27	17.6	23.8	6.2	35.3

2.3.9.5 Biofuels from import

The use of biofuels from import in the transport sector has increased to 184.8 PJ (4414 ktoe) in 2010. This is only 1.8 PJ (43 ktoe) or 1% below the expected contribution of biofuels from import to be uses in transport of 186.6 PJ (4457 ktoe) in 2010.

Figure 128 and Table 106 report the detailed absolute and relative changes from NREAPs in biofuels from import used in transport for year 2010.

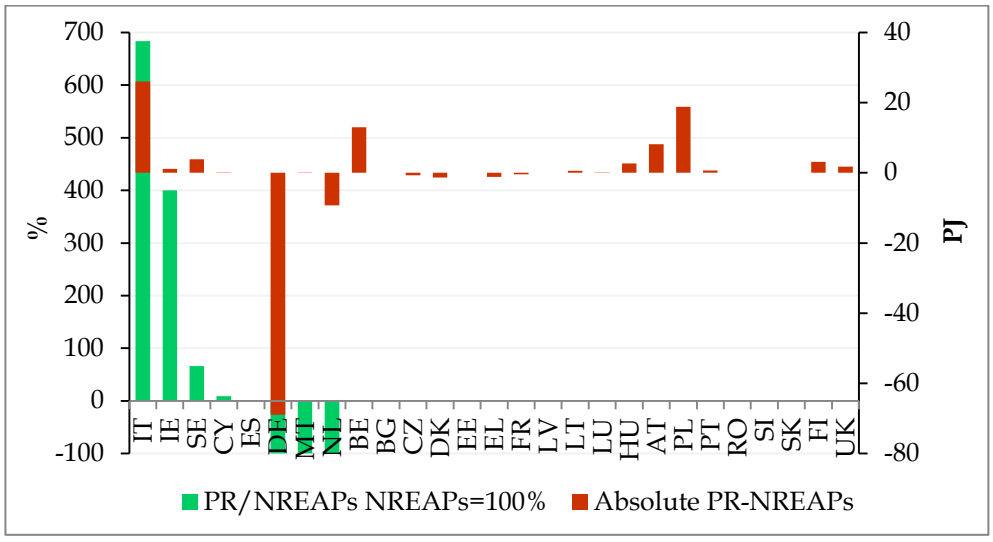

Figure 128[138]. EU 27 MS biofuels from import in transport deviations from NREAPs, 2010

Compared to the expected import of biofuels to be used in transport, several Member States were above their expected level of import for 2010: Italy with 26.0 PJ or 622 ktoe (+683.5%), Poland

[138] MS are ranked according to their relative deviation from 2010 NREAPs plans

with 18.8 PJ or (449 ktoe), Belgium with 13.0 PJ (312 ktoe), Austria with 8.1 PJ or 194 ktoe (+116.2%), Sweden with 3.9 PJ or 92 ktoe (+66.0%), etc.

Several Member States were below the expected import of biofuels in 2010: Germany with 69.0 PJ or 1648 ktoe (-100%), the Netherlands with 9.3 PJ or 221 ktoe (-100%), Denmark with 1.3 PJ or 31 ktoe (-100%), Greece with 1.2 PJ or 28 ktoe (-65.1%) and France with 0.4 PJ or ktoe (-2.4%).

Table 106. EU 27 MS biofuels from import in transport deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
BE	0.0	13.0	13.0	
BG	0.0	0.0	0.0	
CZ	0.7	0.0	-0.7	
DK	1.3	0.0	-1.3	
DE	69.0	0.0	-69.0	-100.0
EE	0.0	0.0	0.0	
IE	0.3	1.5	1.2	400.0
EL	1.8	0.6	-1.2	
ES	32.4	32.4	0.0	0.0
FR	15.6	15.2	-0.4	
IT	3.8	29.9	26.0	683.5
CY	0.4	0.4	0.0	8.7
LV	0.0	0.0	0.0	
LT	0.0	0.6	0.6	
LU	1.7	1.8	0.0	
HU	0.0	2.7	2.7	
MT	0.1	0.0	-0.1	-100.0
NL	9.3	0.0	-9.3	-100.0
AT	7.0	15.1	8.1	
PL	0.0	18.8	18.8	
PT	0.0	0.7	0.7	
RO	0.0	0.0	0.0	
SI	0.0	0.0	0.0	
SK	0.0	0.0	0.0	
FI	0.0	3.1	3.1	
SE	5.9	9.7	3.9	66.0
UK	37.5	39.2	1.7	
EU 27	186.6	184.8	-1.8	-1.0

ANNEX I

RES in Progress Reports / Eurostat/ Eurobserv'ER (2009-2010)

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Introduction

Data on RES, shares and technologies from Progress Reports-NREAPs/ Eurostat/ Eurobserv'ER covering period 2009-2010 are presented here. Data from these three sources include total RES generation, total RES share in gross final energy consumption, installed capacities and energy generated from hydropower, wind, solar (PV), geothermal, heat pumps, biomass and biofuels. Accuracy between these datatset is evaluated according to EurObserv'ER methodology:

- For electricity production: below a discrepancy of 5 % (for capacity installed and electricity generated), accuracy will be considered high;
- For heat and primary energy production: below a discrepancy of 10 % (for capacity installed and/or energy generated), accuracy will be considered high.

Eurostat

European Commission Decision 2012/504/EU clarify and reinforced the role and responsibilities of Eurostat. Eurostat statistics present aggregated data on renewable energy development in Europe using as primary source the MS National Statistical Offices covered by Regulation (EC) 1099/2008 on energy statistics. It provides statistics at European level that enable comparisons between countries and regions. Eurostat methodology in the calculation of some indicators is presented below:

- The share of renewable energy in gross final energy consumption is identified as a key indicator for measuring progress under the Europe 2020 strategy for smart, sustainable and inclusive growth. This indicator may be considered as an estimate for the purpose of monitoring Directive 2009/28/EC on the promotion of the use of energy from renewable sources – however, the statistical system for some renewable energy technologies is not yet fully developed to meet the requirements of this Directive; for example, the treatment of energy from heat pumps;
- Eurostat reports on electricity installed capacity and generation from each renewable technology[139];
- Eurostat has adapted the calculation method defined in the Directive to differentiate the capacity and output of pure hydropower plants and those that only use pumped-storage. Therefore only the renewable electricity output from "pure" and mixed hydropower plants is taken into consideration;
- Electricity from renewable energy sources is defined as the ratio between electricity produced from renewable energy sources and gross national electricity consumption;
- Electricity produced from renewable energy sources comprises electricity generation from hydropower plants (excluding pumping), as well as electricity generated from biomass/wastes, wind, solar and geothermal installations;
- The share of renewable energies in the energy consumed by the transport sector is calculated on the basis of energy statistics, according to the methodology described in Directive 2009/28/EC;
- The contribution of all biofuels is currently included within the calculation for this indicator and the data are not restricted to biofuels complying with the sustainability criteria.

[139] Eurostat 44/2012, the Methodological Notes emphasized that long series for hydro energy normalization are not available for EU 27 (staring year 1990).

Eurobserv'ER

The 'EurObserv'ER, a European project co-funded by the Inteligent Energy Europe (IEE) Programme, measures the progress of RES, in each Member State of the EU, on the basis of economical and energetic indicators regularly published in the press (Journal des Énergies Renouvelables, Journal de l'Éolien et du Journal du Photovoltaïque) providing an overview of the latest renewable energy market statistics even before official data are available.

Eurobserv'ER monitors and analyses the development of renewable energy sectors in Europe (wind power, photovoltaics, solar thermal, geothermal, small hydro, biogas, bio fuels, solid biomass, and ground source heat pumps) and publishes technology-specific reports, the so-called barometers. EurObserv'ER also generates indicators on energy, technology and economy. EurObserv'ER methodology for some indicators is presented below:

- EurObserv'ER methodology is being adapted to reflect the requirements of the Directive 2009/28/EC in order to permit EurObserv'ER barometers to be used to track the trajectory of each Member State towards its binding 2020 target, and the corresponding progress of each technology;
- EurObserv'ER report on three sectors, electricity, heat/cooling and transport but not all technologies are covered;
- Gross final energy consumption from renewable sources is directly derived from EurObserv'ER data collection;
- Gross final energy consumption is estimated using a model based on an estimate of gross domestic energy consumption obtained from the monthly data sent by each MS to Eurostat;
- EurObserv'ER has adopted the Eurostat methodology in the calculation of capacities and outputs from "pure" and mixed hydropower plants;
- EurObserv'ER reported only data on small hydropower, installed capacity and energy generation;
- Geothermal and hydrothermal energy captured by heat pumps is reported by EurObser'ER according to the Eurostat methodology.

1. Total renewable energy

This section presents a comparison of the developments in the renewable energy at the level of Member States. This was based on data from the Progress reports and the data collected from Eurostat, covering the period 2009-2010. EurObserv'ER provided no data on this indicator. This reveals some differences between data reported in Progress Reports in comparison with Eurostat, which can be significant, above 30% in some cases. At EU level, the data from Progress Reports was 11.2% and 10.6% below the data available from in Eurostat for 2009 and 2010, respectively.

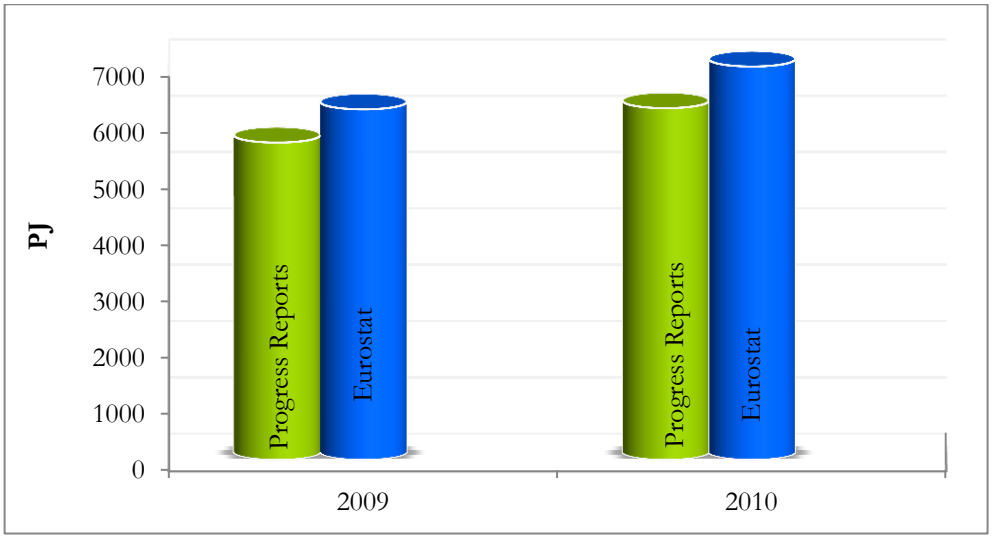

Figure 1. Total RES generated in EU 27, PR-Eurostat, 2009-2010

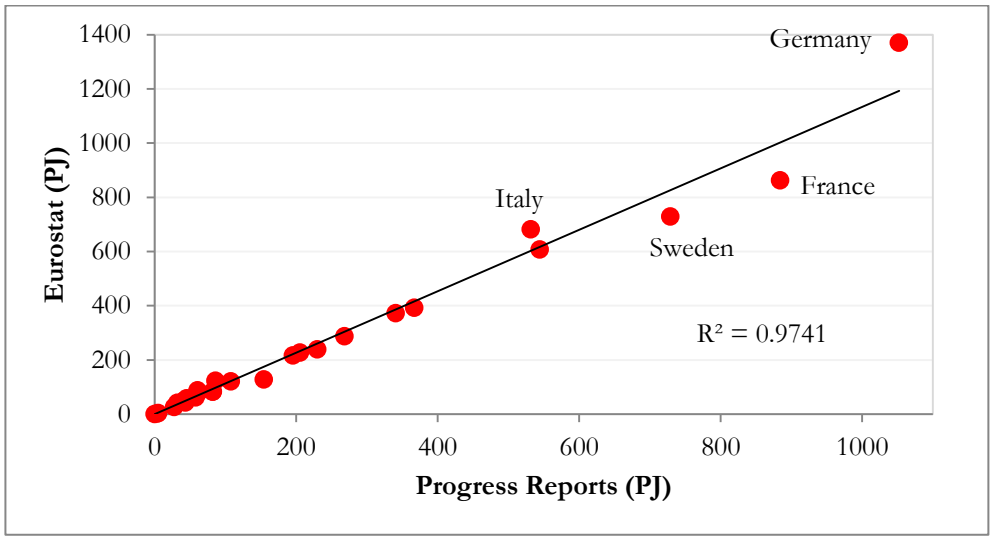

Figure 2. Total RES generated in EU 27 MS, PR-Eurostat, 2010

In comparison with Eurostat, one-fourth of MS have reported in Progress Reports a larger renewable energy generated in 2010. According to Progress Reports renewable energy generated in Denmark was 26.4 PJ (+20.6%) larger than what was reported from Eurostat. According to Eurostat in 2010 Germany generated 318.7 PJ (+23.2%) more renewable energy than what was reported in Progress Reports.

Table 1. Total RES generated in EU 27 MS, PR-Eurostat, 2009-2010

	Progress Reports (PJ)		Eurostat (PJ)		Discrepancy PR-Eurostat	
	2009	2010	2009	2010	2010 (PJ)	2010 (%)
BE	65.3	82.5	69.5	83.3	-0.7	-1.0
BG	44.9	58.2	48	62.6	-4.3	-7.0
CZ	n.a	107.9[140]	108.6	121.4	-13.5	-11.1
DK	133.6	154.6	115.6	128.2	26.4	20.6
DE	907.8	1052.3	1163	1371	-318.7	-23.2
EE	28.9	32.2	36.2	41.4	-9.2	-22.2
IE	25.4	27.9	26.4	26.2	1.7	6.5
EL	75.3	82.1	75.9	83.1	-1.1	-1.2
ES	491.6	544.5	513	607.2	-62.7	-10.3
FR	816.7	884.5	790.6	863	21.5	2.5
IT	456.1	531.9	615.1	682.7	-150.8	-22.1
CY	4	4.3	3.2	3.4	0.9	26.5
LV	60.9	61	87.5	88	-27.0	-30.7
LT	41.4	41.7	49	49.6	-7.9	-15.9
LU	4.7	5.1	3.6	3.9	1.2	30.8
HU	57	62.4	77.5	80.5	-18.1	-22.5
MT	0.2	0.2	0	0.2	0.0	0.0
NL	88.1	86.4	116.4	123.3	-36.9	-29.9
AT	324.2	340.9	352.5	373.1	-32.1	-8.6
PL	235.1	268.7	252.5	287	-18.4	-6.4
PT	188	205.7	201	227.7	-22.0	-9.7
RO	220.1	230.1	220.9	239	-8.8	-3.7
SI	42.5	45.7	41.4	43.1	0.6	6.0
SK	43.6	45.4	51.2	58.8	-13.4	-22.8
FI	330.6	367.4	332.3	392.3	-24.9	-6.3
SE	672.2	729.2	662.3	728.8	0.4	0.1
UK	171.2	195.5	212.1	217.1	-21.6	-9.9
EU 27	5529	6246.1	6225.2	6985.7	-739.6	-10.6

2. Overall RES share

Comparison analysis of overall RES share in gross final energy consumption at the level of Member States is conducted based on data from the Progress Reports, Eurostat[141] and EurObserv'ER. Analysis covers period 2009-2010. Differences between RES share reported in Progress Reports in comparison with Eurostat were found. In some cases these differences can be significant, up to 1.7 percentage points.

At EU level, data from Progress reports was 0.2 and 0.5 percentage points above the data available from in Eurostat for 2009 and 2010, respectively. Compared to EurObserv'ER, the RES share from Progress reports was 0.4 and 0.1 percentage points above the data for 2009 and 2010, respectively.

[140] According to CZ updated NREAP
[141] Source: Eurostat table t2020_31

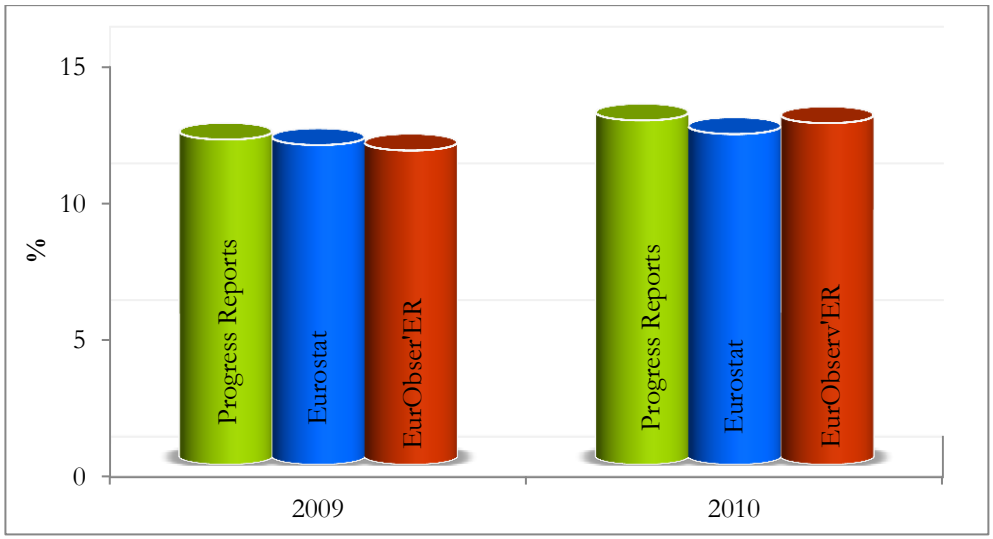

Figure 3. Overall RES share in GFEC in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

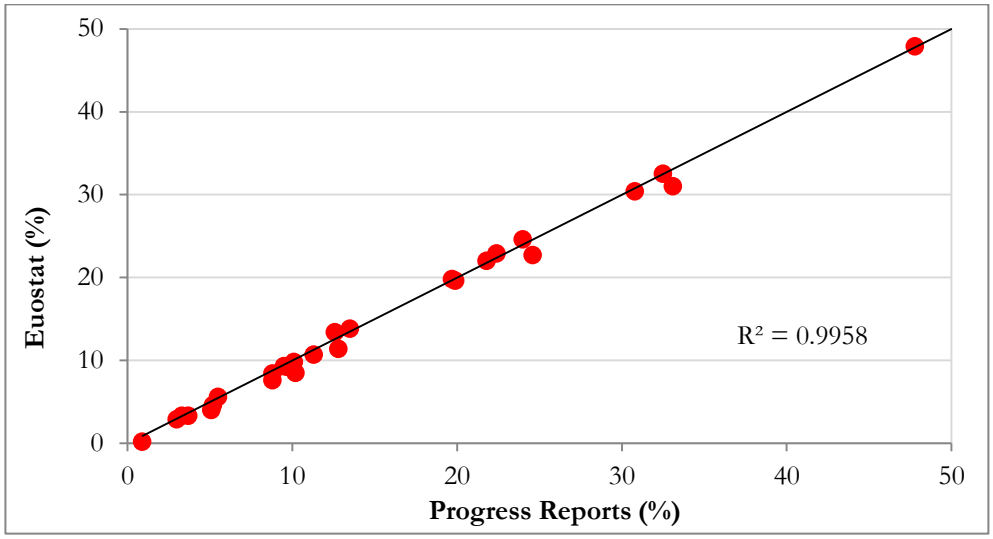

Figure 4. Comparison of overall RES share in EU 27 MS, PR- Eurostat, 2010

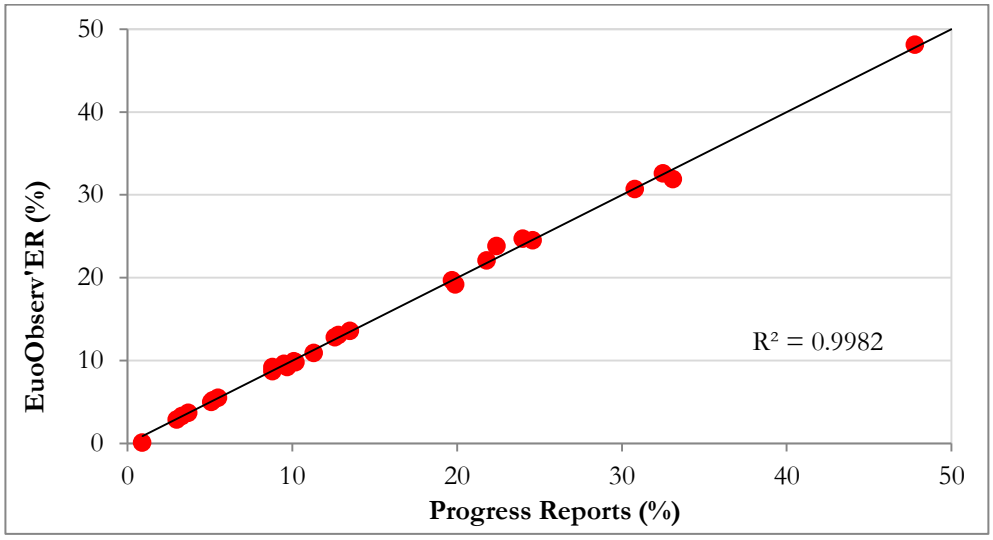

Figure 5. Comparison of overall RES share in EU 27 MS, PR -EurObserv'ER, 2010

Table 2. Overall RES share in GFEC, PR-Eurostat-EurObserv'ER, absolute discrepancies, 2009-2010

	Progress Reports		**Eurostat**		**EurObserv'ER**		**Discrepancies (% points)**			
	(%)		**(%)**		**(%)**		PR- Eurostat		PR- EurObserv'ER	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	4.5	5.1	4.5	4	4.7	5	0.0	1.1	-0.2	0.1
BG	11	12.6	11.9	13.4	11.6	12.8	-0.9	-0.8	-0.6	-0.2
CZ	n.a	8.8	8.5	8.4	8.5	9.2		0.4		-0.4
DK	19.9	21.8	20.2	22	19.2	22.1	-0.3	-0.2	0.7	-0.3
DE	10.2	11.3	9.5	10.7	9.3	10.9	0.7	0.6	0.9	0.4
EE	22.7	24	23	24.6	23.4	24.7	-0.3	-0.6	-0.7	-0.7
IE	5	5.5	5.1	5.6	5.1	5.5	-0.1	-0.1	-0.1	0.0
EL	8.4	9.7	8.1	9.2	8	9.2	0.3	0.5	0.4	0.5
ES	12.5	13.5	12.8	13.8	12.9	13.6	-0.3	-0.3	-0.4	-0.1
FR	12.4	12.8	12.3	11.4	11.7	13.1	0.1	1.4	0.7	-0.3
IT	8.9	10.1	8.9	9.8	7.7	9.9	0.0	0.3	1.2	0.2
CY	4.8	5.2	4.6	4.6	4.9	5.2	0.2	0.6	-0.1	0.0
LV	34.3	32.5	34.3	32.5	35.5	32.6	0.0	0.0	-1.2	-0.1
LT	20	19.7	20	19.8	20.8	19.7	0.0	-0.1	-0.8	0.0
LU	2.9	3	2.8	2.9	2.6	2.9	0.1	0.1	0.3	0.1
HU	8.2	8.8	8.1	7.6	8.5	8.7	0.1	1.2	-0.3	0.1
MT	0.9	0.9	0.2	0.2	0.2	0.1	0.7	0.7	0.7	0.8
NL	4.1	3.7	4.1	3.3	4	3.7	0.0	0.4	0.1	0.0
AT	30.9	30.8	31	30.4	30.2	30.7	-0.1	0.4	0.7	0.1
PL	8.9	9.5	8.9	9.3	9	9.6	0.0	0.2	-0.1	-0.1
PT	24.6	24.6	24.6	22.7	24.7	24.5	0.0	1.9	-0.1	0.1
RO	21.8	22.4	22.4	22.9	22.9	23.8	-0.6	-0.5	-1.1	-1.4
SI	19	19.9	18.9	19.6	19.7	19.2	0.1	0.3	-0.7	0.7
SK	10.3	10.2	10.4	8.5	10.7	9.8	-0.1	1.7	-0.4	0.4
FI	32	33.1	31.1	31	30.7	31.9	0.9	2.1	1.3	1.2
SE	47.3	47.8	48.1	47.9	47.7	48.1	-0.8	-0.1	-0.4	-0.3
UK	3	3.3	2.9	3.3	3	3.3	0.1	0.0	0.0	0.0
EU 27	11.9	12.6	11.7	12.1	11.5	12.5	0.2	0.5	0.4	0.1

2. Renewable electricity

This section presents a comparison of the renewable electricity development at the level of Member States between Progress Reports and data collected from Eurostat, covering period 2009-2010.

Analysis reveals some discrepancies between the contribution of renewable resources to electricity consumption reported in Progress Reports and in Eurostat, which can be significant, up to 7.2 percentage points in 2009 and 6.4% in 2010.

At the EU level, the data from Progress reports was 0.8% % above the data available from in Eurostat for 2009 and 0.2% below the data for 2010, respectively.

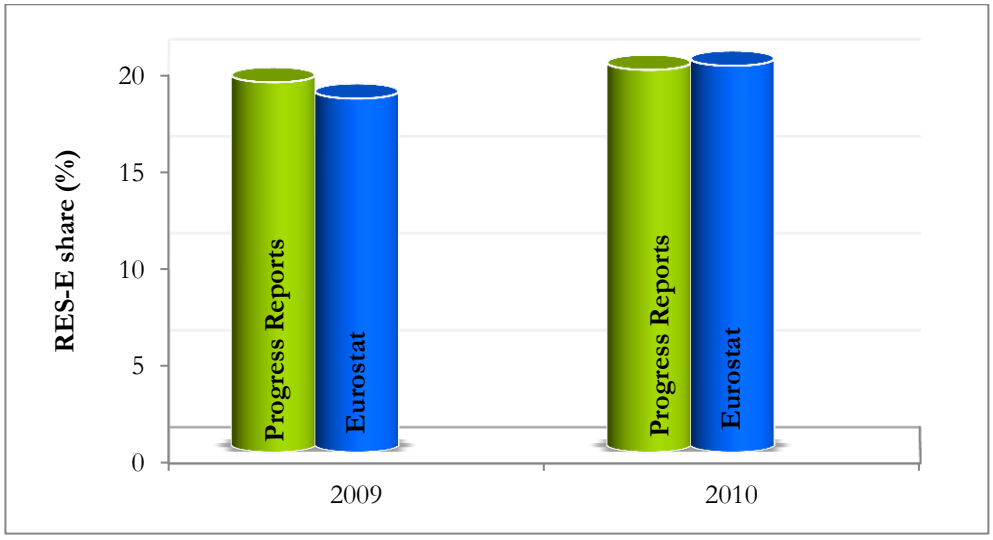

Figure 6. RES-E share in EU 27, PR –Eurostat, 2009-2010

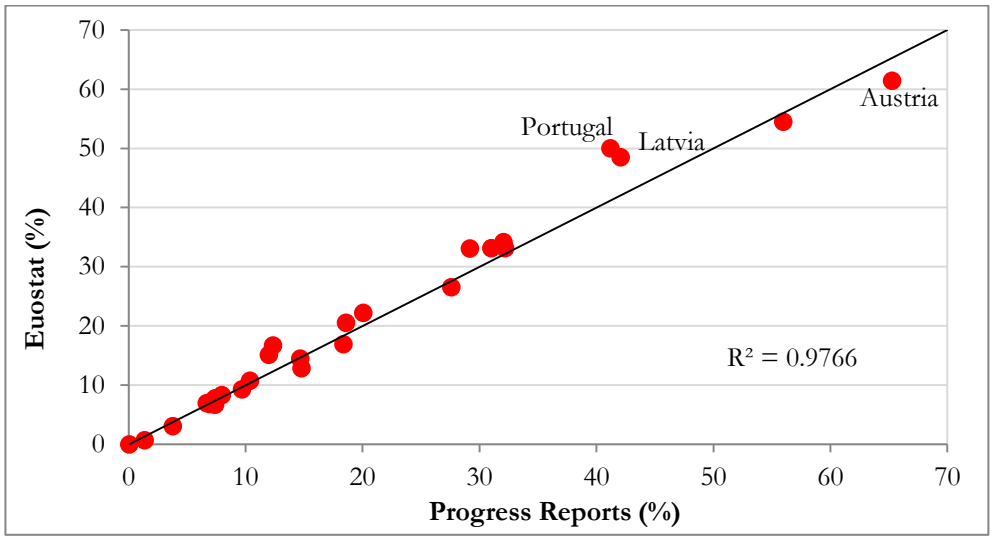

Figure 7. Comparison of RES-E share in EU 27 MS, PR-Eurostat, 2010

Table 3. RES-E share in GFEC, PR-Eurostat, absolute discrepancies, 2009-2010

	Progress Reports (%)		Eurostat (%)		Discrepancies PR-Eurostat (% points)	
	2009	2010	2009	2010	2009	2010
BE	6.3	7.0	6.1	6.8	0.3	0.2
BG	11.4	12.0	9.8	15.2	1.6	-3.2
CZ	7.4	8.0	6.8	8.3	0.6	-0.3
DK	28.9	31.0	27.5	33.1	1.4	-2.1
DE	17.4	18.4	16.2	16.9	1.2	1.5
EE	6.1	10.4	6.1	10.8	0.0	-0.4
IE	13.7	14.8	14.1	12.8	-0.4	2.0
EL	11.0	12.4	12.5	16.7	-1.4	-4.3
ES	27.2	29.2	25.8	33.1	1.4	-3.9
FR	15.0	14.7	13.6	14.5	1.4	0.3
IT	18.8	20.1	20.5	22.2	-1.7	-2.1
CY	0.6	1.4	0.1	0.7	0.5	0.7
LV	42.0	42.1	49.2	48.5	-7.2	-6.4
LT	5.9	7.4	5.5	7.8	0.4	-0.4
LU	4.1	3.8	3.7	3.1	0.4	0.7
HU	7.0	7.1	7.0	7.1	0.0	0.0
MT	0.0	0.1	0.0	0.0	0.0	0.1
NL	9.1	9.7	9.2	9.3	-0.1	0.4
AT	67.4	65.3	67.7	61.4	-0.3	3.9
PL	5.9	6.7	5.8	7.0	0.1	-0.3
PT	38.4	41.2	33.3	50.0	5.1	-8.8
RO	33.5	32.1	27.9	34.2	5.6	-2.1
SI	33.8	32.2	36.8	33.1	-3.0	-0.9
SK	18.9	18.6	17.9	20.5	1.0	-1.9
FI	27.2	27.6	25.8	26.5	1.4	1.1
SE	58.2	56.0	56.4	54.5	1.8	1.5
UK	6.6	7.4	6.6	6.7	0.0	0.7
EU 27	19.1	19.7	18.3	19.9	0.8	-0.2

3. Renewable energy sources

3.1 Hydropower

a. Hydropower installed capacity

This section presents a comparison of the developments in the hydropower installed capacity (without pumping storage) at the level of Member States. This was based on data from the Progress reports and the data collected from Eurostat, covering the period 2009-2010. EurObserv'ER provided data only on small hydropower installed capacity in EU 27.

Analysis reveals some differences between data reported in Progress Reports in comparison with Eurostat, which can be significant, above 24% in some cases. At the EU level, the data from Progress Reports was 2.7% and 2.0% below the Eurostat data available for 2009 and 2010, respectively.

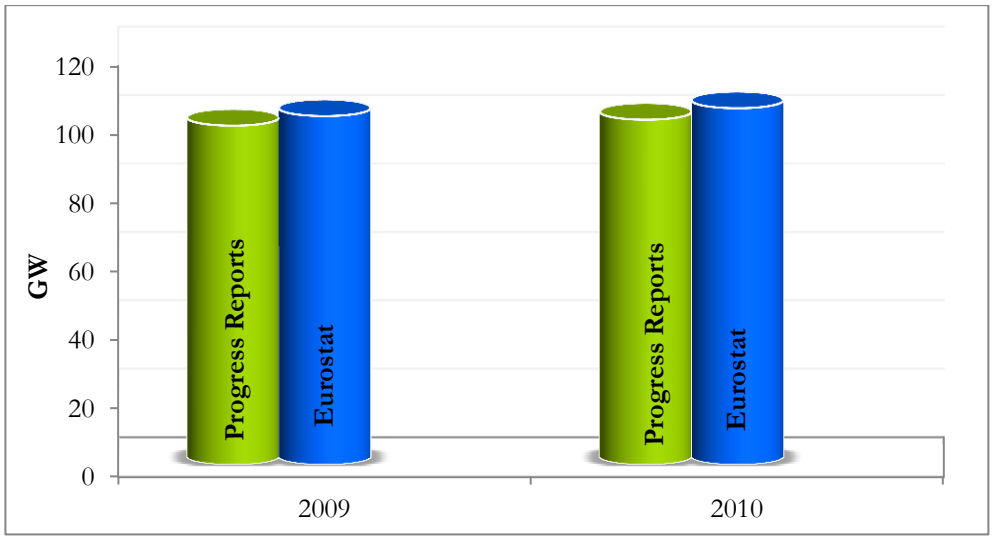

Figure 8. Hydropower installed capacity in EU 27, PR-Eurostat, 2009-2010

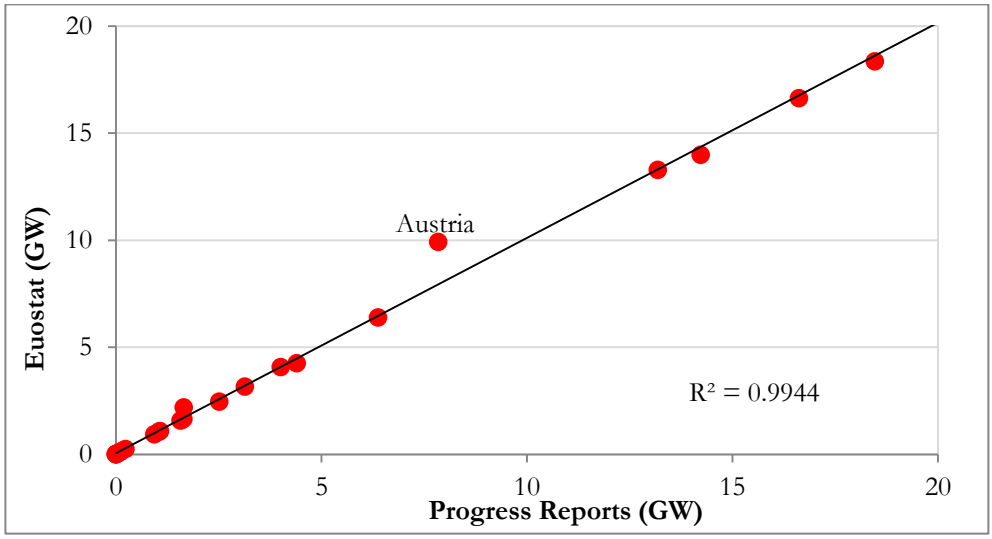

Figure 9. Comparison of hydropower installed capacity in EU 27, PR –Eurostat, 2010

Table 4. Hydropower installed capacity, PR-Eurostat, 2009-2010 (MW)

	Progress Reports		Eurostat		PR vs Eurostat (%)	
	2009	**2010**	**2009**	**2010**	**2009**	**2010**
BE	119	119	110	118	8.2	0.8
BG	1621	1653	2137	2184	-24.1	-24.3
CZ	n.a	1047[142]	1037	1049	n.a	-0.2
DK	9	9	9	9	0.0	0.0
DE	4150	4400	3974	4244	4.4	3.7
EE	7	6	7	6	0.0	0.0
IE	234	237	238	238	-1.7	-0.4
EL	2502	2516	2447	2447	2.2	2.8
ES	13158	13188	13069	13275	0.7	-0.7
FR	18464	18464	18199	18347	1.5	0.6
IT	14080	14234	13827	13976	1.8	1.8
CY	0	0	0	0		
LV	1536	1576	1536	1576	0.0	0.0

[142] According to CZ updated NREAP

LT	116	116	116	116	0.0	0.0
LU	34	34	34	34	0.0	0.0
HU	53	53	53	53	0.0	0.0
MT	0	0	0	0	0	0
NL	37	37	37	37	0.0	0.0
AT	7828	7843	9883	9909	-20.8	-20.8
PL	945	937	932	936	1.4	0.1
PT	3991	4013	4051	4064	-1.5	-1.3
RO	6358	6382	6358	6382	0.0	0.0
SI	1070	1074	1070	1074	0.0	0.0
SK	1597	1600	1571	1600	1.7	0.0
FI	3120	3140	3145	3155	-0.8	-0.5
SE	16544	16624	16544	16624	0.0	0.0
UK	1645	1649	1638	1641	0.4	0.5
EU 27	99218	100951	102022	103094	-2.7	-2.0

b. Hydro electricity generation

This section presents a comparison of the developments in the hydropower production (without pumping storage) at the level of Member States. This was based on data from the Progress reports and the data collected from Eurostat, covering the period 2009-2010. EurObserv'ER provided no data on this indicator.

Analysis reveals some differences between data reported in Progress Reports in comparison with Eurostat, which can be significant, above 24% in some cases. At the EU level, the data from Progress Reports was 8.2% and 0.8% below the Eurostat data available for 2009 and 2010, respectively.

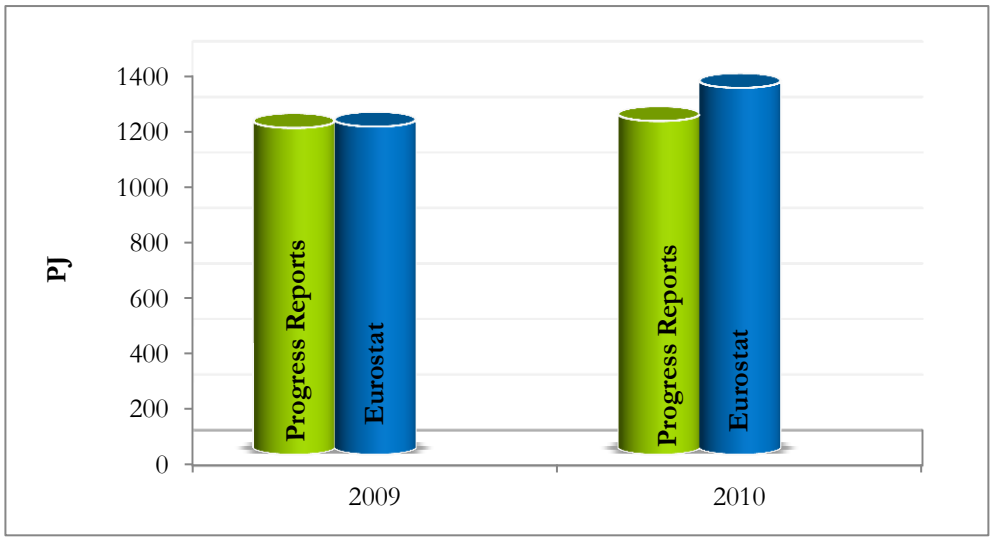

Figure 10. Hydropower electricity generated in EU 27, PR-Eurostat, 2009-2010

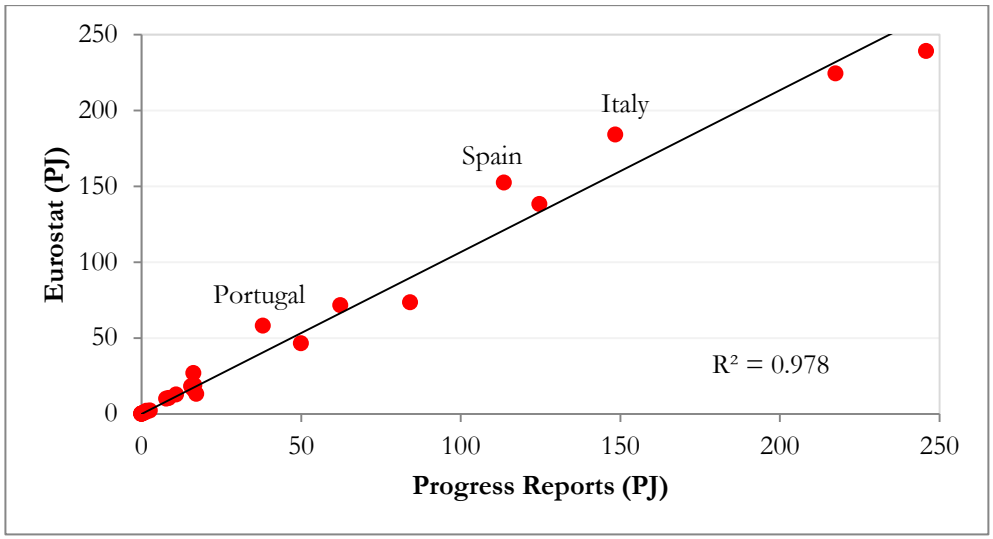

Figure 11. Comparison of hydro electricity generation in EU 27, PR-Eurostat, 2010

Table 5. Hydropower electricity generation PR-Eurostat, relative discrepancies, 2009-2010

	Progress Reports (PJ)		Eurostat (PJ)		PR vs Eurostat (%)	
	2009	**2010**	**2009**	**2010**	**2009**	**2010**
BE	1.3	1.3	1.2	1.1	13.4	19.4
BG	10.6	15.6	12.5	18.2	-14.8	-14.4
CZ	0.0	7.8	8.7	10.0		-22.3
DK	0.1	0.1	0.1	0.1	21.1	9.5
DE	80.3	84.2	67.2	73.5	19.5	14.6
EE	0.1	0.1	0.1	0.1	-21.9	-18.5
IE	2.7	2.7	3.2	2.2	-16.9	25.0
EL	15.4	16.3	19.3	26.9	-20.2	-39.3
ES	109.4	113.6	95.1	152.3	15.1	-25.4
FR	220.1	217.5	205.9	224.4	6.9	-3.0
IT	144.7	148.5	176.9	184.0	-18.2	-19.3
CY	0.0	0.0	0.0	0.0		
LV	10.5	10.9	12.4	12.7	-15.3	-13.8
LT	1.5	1.5	1.5	1.9	-1.2	-22.4
LU	0.4	0.4	0.4	0.4	0.0	0.0
HU	0.8	0.8	0.8	0.7	-7.0	12.2
MT	0.0	0.0	0.0	0.0		
NL	0.4	0.4	0.4	0.4	2.0	-3.8
AT	124.8	124.7	147.2	138.2	-15.2	-9.7
PL	8.5	8.6	8.6	10.5	-0.8	-18.1
PT	36.5	38.1	29.8	58.1	22.2	-34.5
RO	61.4	62.4	55.9	71.6	9.8	-12.9
SI	17.0	16.2	17.0	16.2	0.0	0.0
SK	16.6	16.6	15.7	18.9	5.3	-12.2
FI	50.0	50.0	45.7	46.5	9.5	7.4
SE	246.0	245.9	237.1	239.0	3.8	2.9
UK	17.7	17.2	18.9	13.1	-6.3	31.4
EU 27	1176.7	1201.4	1181.6	1321.1	-0.4	-9.1

3.2 Wind power
a. Wind installed capacity

This section presents a comparison of the developments in the wind installed capacity at the level of Member States. This was based on data from the Progress reports and the data collected from Eurostatand EurObserv'ER, covering the period 2009-2010.

Analysis reveals some differences between data reported in Progress Reports in comparison with Eurostat, which can be significant, in some cases (France, UK) and in comparison with EurObserv'ER (Bulgaria, Romania, Slovakia).

At the EU level, the data from Progress Reports was 3.8% and 2.48% above the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 0.2% and 0.5% below the EuObserv'ER data available for 2009 and 2010, respectively.

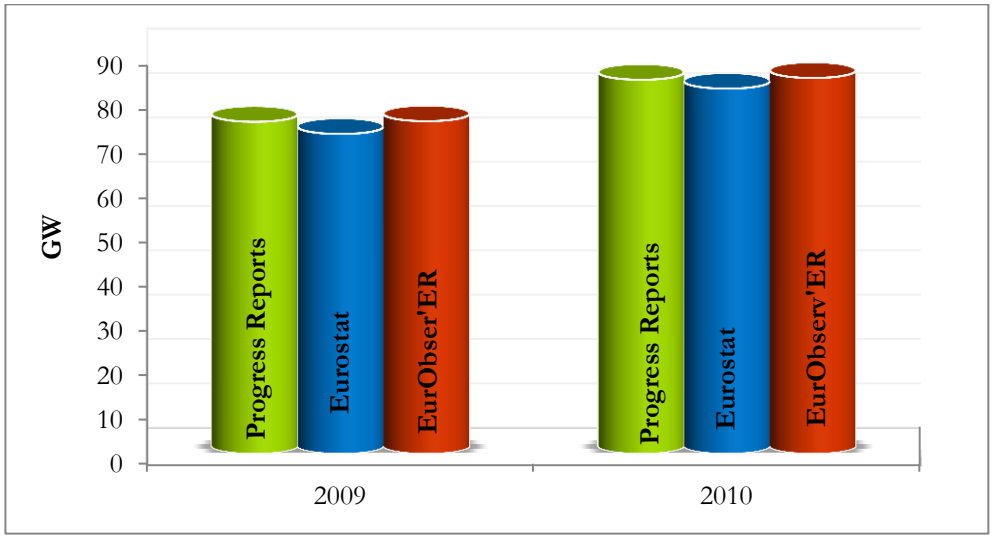

Figure 12. Wind installed capacity in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

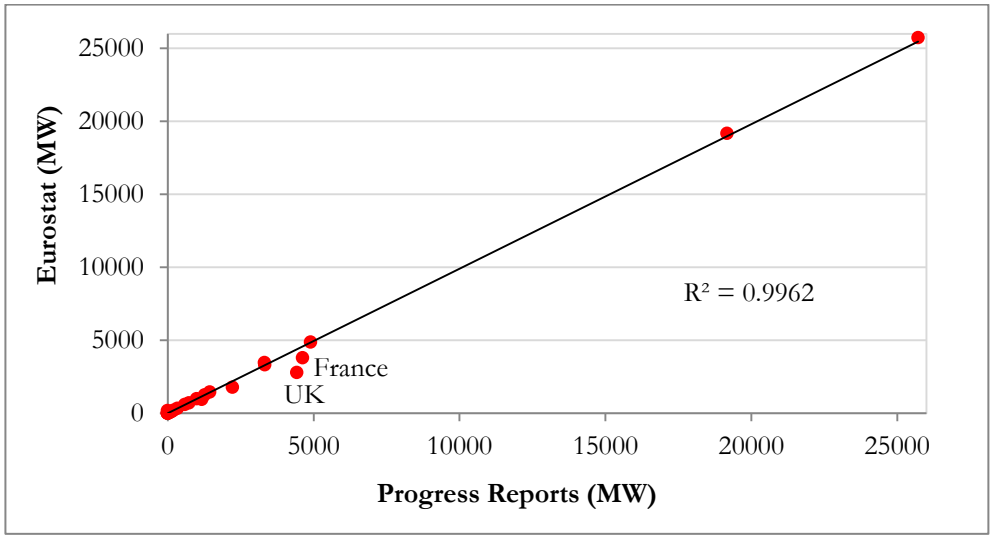

Figure 13. Comparison of wind power capacity in EU 27 MS, PR-Eurostat, 2010

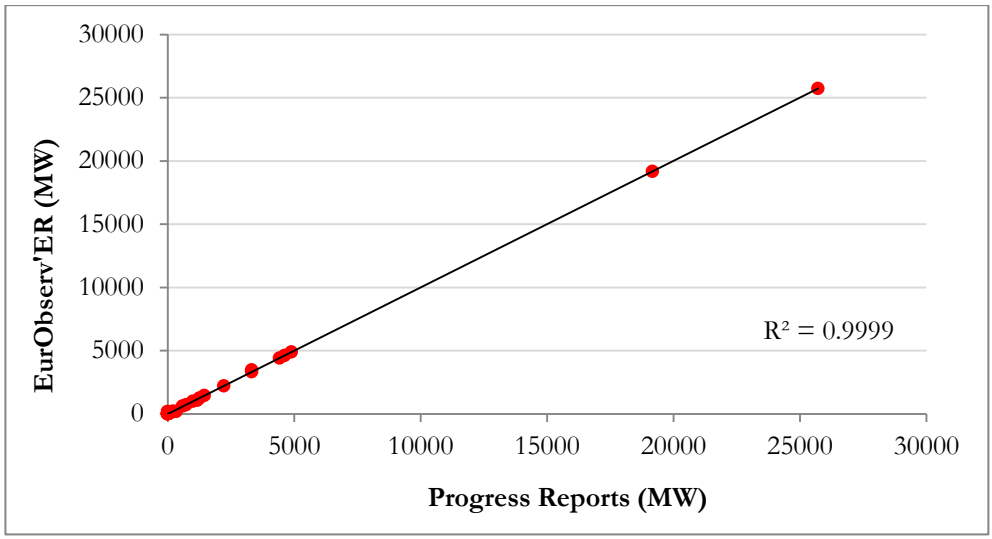

Figure 14. Comparison of wind power capacity in EU 27, PR-EurObserv'ER, 2010

Table 6. Wind installed capacity, PR-Eurostat-EurObserv'ER, relative discrepancies,2009-2010

	Progress Reports		**Eurostat**		**EurObserv'ER**		**Discrepancies**			
	MW		MW		MW		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	586	920	600	904	608	912	-2.3	1.8	-3.6	0.9
BG	333	488	333	488	177	488	0.0	0.0	88.1	0.0
CZ			193	213	193	215				
DK	3322	3642	3482	3802	3482	3802	-4.6	-4.2	-4.6	-4.2
DE	25720	27210	25746	27157	25719	27191	-0.1	0.2	0.0	0.1
EE	104	108	103	107	104	108	1.0	0.9	0.0	0.0
IE	1264	1389	1264	1389	1260	1412	0.0	0.0	0.3	-1.6
EL	1171	1298	950	1298	1087	1298	23.3	0.0	7.7	0.0
ES	19176	20759	19176	20693	19176	20693	0.0	0.3	0.0	0.3
FR	4621	5729	3806	5413	4621	5976	21.4	5.8	0.0	-4.1
IT	4898	5814	4877	5790	4898	5814	0.4	0.4	0.0	0.0
CY	0	82	0	82	0	82		0.0		0.0
LV	29	30	26	28	28	31	11.5	7.1	3.6	-3.2
LT	98	133	98	133	98	133	0.0	0.0	0.0	0.0
LU	43	44	43	44	43	43	0.0	0.0	-0.7	1.6
HU	203	293	203	293	203	293	0.0	0.0	0.0	0.0
MT	0	0	0	0	0	0				
NL	2222	2237	1778	1790	2222	2237	25.0	25.0	0.0	0.0
AT	994	977	994	981	995	981	0.0	-0.4	-0.1	-0.4
PL	725	1180	709	1108	724	1180	2.2	6.5	0.1	0.0
PT	3326	3796	3326	3796	3326	3865	0.0	0.0	0.0	-1.8
RO	15	389	13	382	18	388	11.9	1.8	-19.2	0.3
SI	0	0	0	0	0	0				
SK	3	3	0	0	5	3			-40.0	-3.2
FI	147	188	147	197	147	197	0.0	-4.6	0.0	-4.6
SE	1448	2018	1448	2019	1448	2019	0.0	0.0	0.0	0.0
UK	4424	5378	2801	4226	4424	5378	57.9	27.3	0.0	0.0
EU 27	74872	84347	72116	82333	75007	84743	3.8	2.4	-0.2	-0.5

b. Wind electricity generation

This section presents a comparison of the contribution of wind electricity at the level of Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals some differences compared to the data on wind electricity between data reported in Progress Reports in comparison with Eurostat (Bulgaria, Latvia, Lithuania, Germany, Ireland) .

At the EU level, the data from Progress Reports was 2.4% and 3.9% above the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 2.4% and 3.8% above the EurObserv'ER data available for 2009 and 2010, respectively.

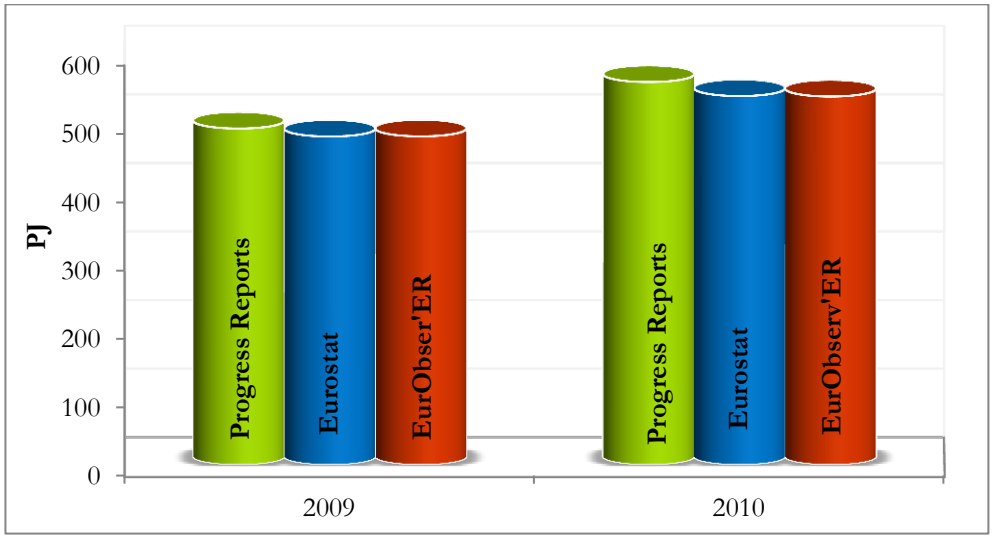

Figure 15. Wind electricity generation in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

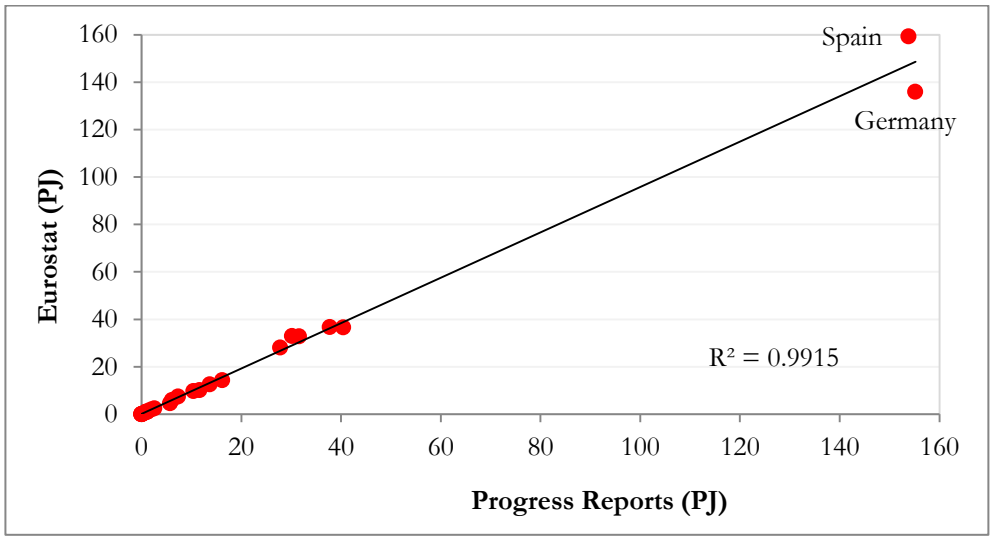

Figure 16. Comparison of wind power generation in EU 27 MS, PR-Eurostat, 2010

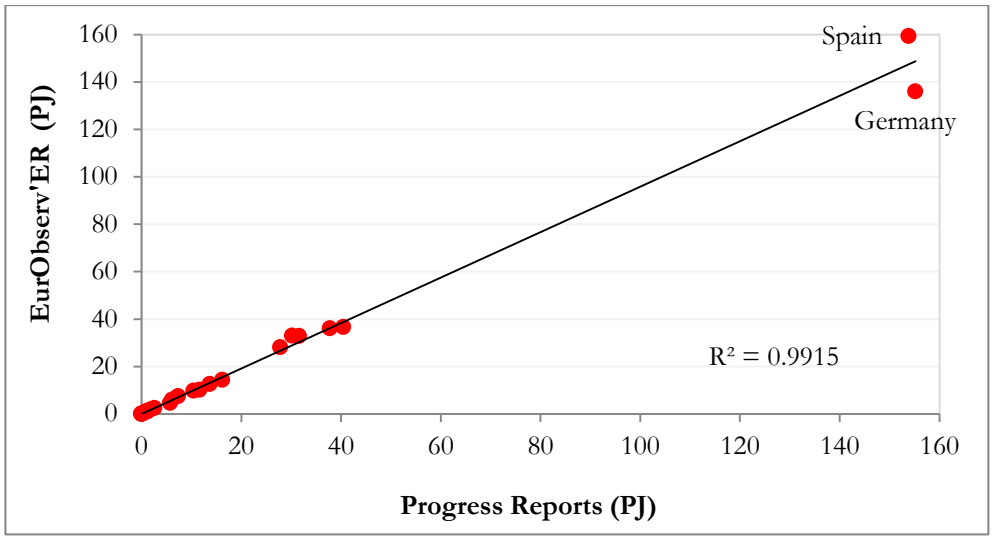

Figure 17. Comparison of wind power generation in EU 27 MS, PR-EurObserv'ER, 2010

Table 7. Wind electricity generation PR-Eurostat-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		**Eurostat**		**Eurobserver**		**Discrepancies**			
	PJ		PJ		PJ		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	3.9	5.7	3.6	4.7	3.6	4.7	9.7	23.0	9.3	22.9
BG	1.5	2.6	0.9	2.5	0.7	2.5	73.8	6.0	106.0	6.0
CZ	0.0	1.2	1.0	1.2	1.1	1.2		2.4		2.1
DK	25.3	27.8	24.2	28.1	24.1	28.1	4.6	-1.0	4.9	-1.0
DE	148.5	155.2	139.1	136.1	139.0	136.1	6.7	14.1	6.8	14.1
EE	0.7	0.9	0.7	1.0	0.7	1.0	4.6	-10.8	2.0	-10.5
IE	10.6	11.6	10.6	10.1	10.8	10.1	-0.6	14.7	-2.1	14.7
EL	9.6	10.5	9.2	9.8	9.0	9.8	5.0	7.0	6.8	7.0
ES	137.9	153.8	137.2	159.4	137.2	159.4	0.5	-3.5	0.5	-3.5
FR	29.1	37.8	28.5	36.8	28.8	36.1	2.2	2.8	1.1	4.7
IT	24.6	31.6	23.6	32.9	23.4	32.9	4.4	-3.7	5.1	-3.7
CY	0.0	0.1	0.0	0.1	0.0	0.1		1.2		1.2
LV	0.2	0.2	0.2	0.2	0.4	0.2	8.0	12.2	-46.0	12.2
LT	0.6	0.9	0.6	0.8	0.7	0.8	10.1	8.9	-13.0	8.9
LU	0.2	0.2	0.2	0.2	0.4	0.2	0.0	0.0	-37.0	0.0
HU	1.2	1.9	1.2	1.9	0.7	1.9	2.1	-3.0	69.0	-3.0
MT	0.0	0.0	0.0	0.0	0.0	0.0				
NL	16.1	16.2	16.5	14.4	16.6	14.4	-2.2	12.7	-2.6	12.7
AT	7.3	7.3	7.1	7.4	7.2	7.4	2.9	-1.4	1.2	-1.4
PL	4.2	6.1	3.9	6.0	4.0	6.0	8.1	2.2	5.8	2.2
PT	25.2	30.2	27.3	33.1	27.4	33.1	-7.6	-8.6	-7.9	-8.6
RO	0.0	1.1	0.0	1.1	0.0	1.1	8.4	-2.3		-2.3
SI	0.0	0.0	0.0	0.0	0.0	0.0				
SK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0
FI	1.0	1.1	1.0	1.1	1.1	1.1	0.7	6.8	-7.0	6.8
SE	9.2	13.7	8.9	12.6	9.0	12.6	2.4	8.5	1.8	8.5
UK	33.6	40.5	33.5	36.7	33.5	36.7	0.3	10.4	0.4	10.4
EU 27	490.6	558.3	478.9	537.9	479.2	537.2	2.4	3.8	2.4	3.9

3.3 Solar photovoltaic energy
a. Solar photovoltaic capacity

This section presents a comparison of the developments in the solar photovoltaic installed capacity at the level of Member States. This was based on data from the Progress reports and the data collected from Eurostatand EurObserv'ER, covering the period 2009-2010.

Analysis reveals some important differences between data reported in Progress Reports in comparison with Eurostat, which can be significant, in some cases (Belgium, Austria, Slovakia, etc.) and in comparison with EurObserv'ER (Belgium, Bulgaria, Slovenia, Finland, etc.).

At the EU level, the data from Progress Reports was 2.8% and 6.3% below the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 4.2% and 8.2% below the EurObserv'ER data for 2009 and 2010, respectively.

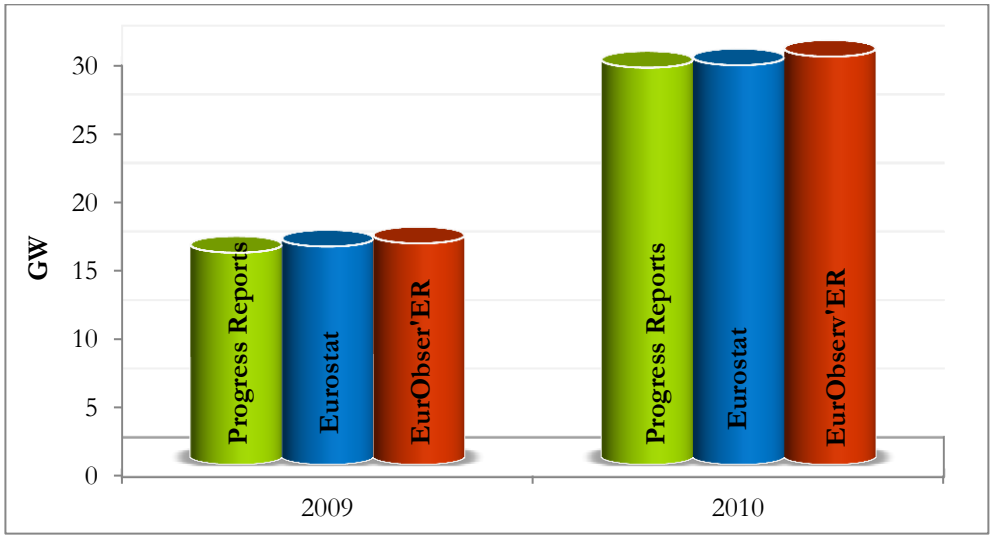

Figure 18. PV installed capacity in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

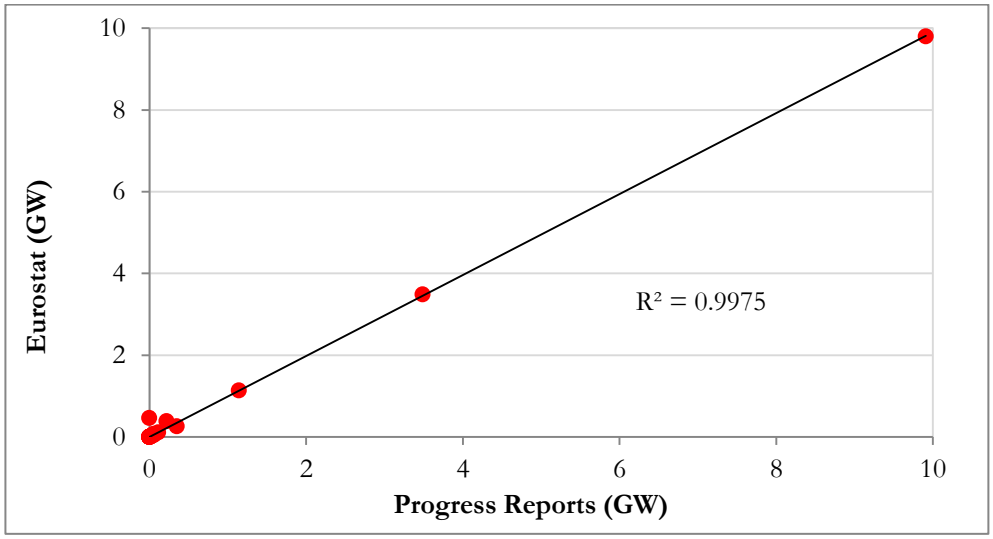

Figure 19. Comparison of PV installed capacity in EU 27, MS, PR- Eurostat, 2010

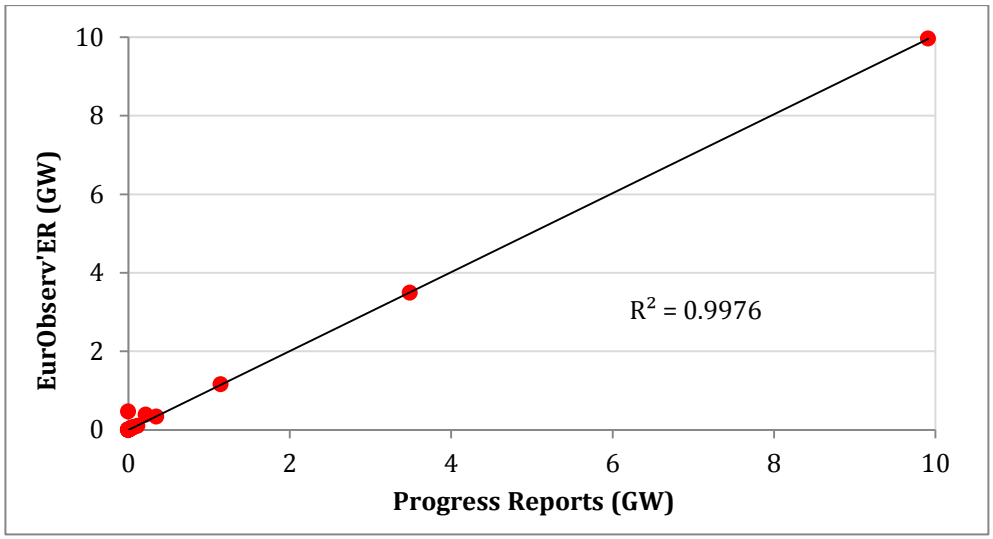

Figure 20. Comparison of PV installed capacity in EU 27MS, PR- EurObserv'ER,2010

Table 8. PV installed capacity in EU 27, PR-Eurostat-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		**Eurostat**		**Eurobserver**		**Discrepancies**			
	MW		MW		MW		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	218.4	661.0	386.0	904.0	386.1	904.1	-43.4	-26.9	-43.4	-26.9
BG	2.0	25.0	2.0	25.0	5.7	32.3	0.0	0.0	-64.9	-22.6
CZ			465.0	1727.0	463.3	1959.1				
DK	5.0	7.0	5.0	7.0	4.6	7.1	0.0	0.0	8.7	-1.4
DE	9910.0	17320.0	9800.0	17320.0	9959.0	17370.0	1.1	0.0	-0.5	-0.3
EE	0.0	0.0	0.0	0.0	0.1	0.1			-100.0	-100.0
IE	0.6	1.0	0.0	0.0	0.6	0.7			1.7	42.9
EL	53.0	203.0	46.0	202.0	55.0	205.4	15.2	0.5	-3.6	-1.2
ES	3488.0	3916.0	3488.0	3921.0	3488.0	3943.3	0.0	-0.1	0.0	-0.7
FR	348.0	1072.0	263.0	1030.0	335.2	1192.8	32.3	4.1	3.8	-10.1
IT	1144.0	3470.0	1142.0	3470.0	1157.4	3483.5	0.2	0.0	-1.2	-0.4
CY	3.4	7.0	4.0	7.0	3.3	6.2	-16.3	0.0	1.5	12.9
LV	0.0	0.0	0.0	0.0		0.0				
LT	0.0	0.0	0.0	0.0	0.1	0.1			-100.0	-100.0
LU	26.0	29.0	26.0	29.0	26.4	29.5	0.0	0.0	-1.5	-1.7
HU	1.0	2.0	1.0	2.0	0.7	1.8	0.0	0.0	42.9	11.1
MT	1.5	2.0	n.a	n.a	1.5	3.8			2.0	-47.4
NL	68.0	88.0	68.0	88.0	67.0	88.0	0.0	0.0	1.5	0.0
AT	51.0	93.0	71.0	154.0	52.6	95.5	-28.2	-39.6	-3.0	-2.6
PL	0.0	0.0	0.0	0.0	1.4	1.8			-99.9	-100.0
PT	115.0	132.0	115.0	134.0	102.2	126.0	0.0	-1.5	12.5	4.8
RO	0.1	0.0	0.0	0.0	0.6	1.9			-91.7	-100.0
SI	4.0	12.0	4.0	12.0	9.0	45.5	0.0	0.0	-55.6	-73.6
SK	0.0	186.0	0.0	19.0	0.2	174.2		878.9	-100.0	6.8
FI	6.0	7.0	6.0	7.0	7.6	9.6	0.0	0.0	-21.1	-27.1
SE	9.0	9.0	9.0	11.0	8.7	11.4	0.0	-18.2	3.4	-21.1
UK	27.0	77.0	27.0	77.0	26.5	79.0	0.0	0.0	1.9	-2.5
EU 27	15480.9	27319.0	15928.0	29146.0	16162.8	29772.7	-2.8	-6.3	-4.2	-8.2

b. Solar photovoltaic electricity

This section presents a comparison of the contribution of solar photovoltaic electricity at the level of Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals some differences compared to the data on solar photovoltaic electricity between data reported in Progress Reports in comparison with Eurostat and EurObserv'ER (France, Portugal, Slovakia).

At the EU level, the data from Progress Reports was 0.06% and 0.2% below the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 0.3% and 0.01% below the EurObserv'ER data available for 2009 and 2010, respectively.

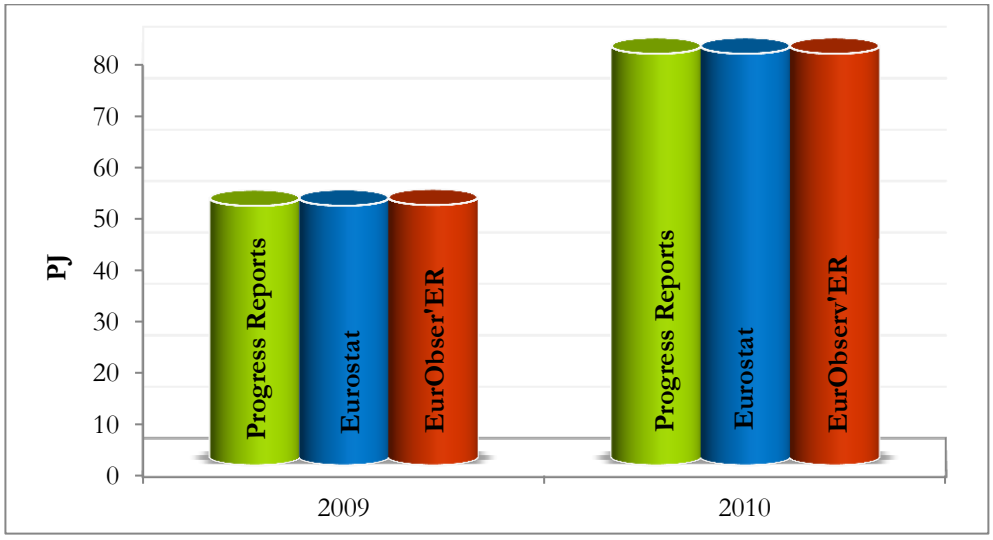

Figure 21. PV electricity in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

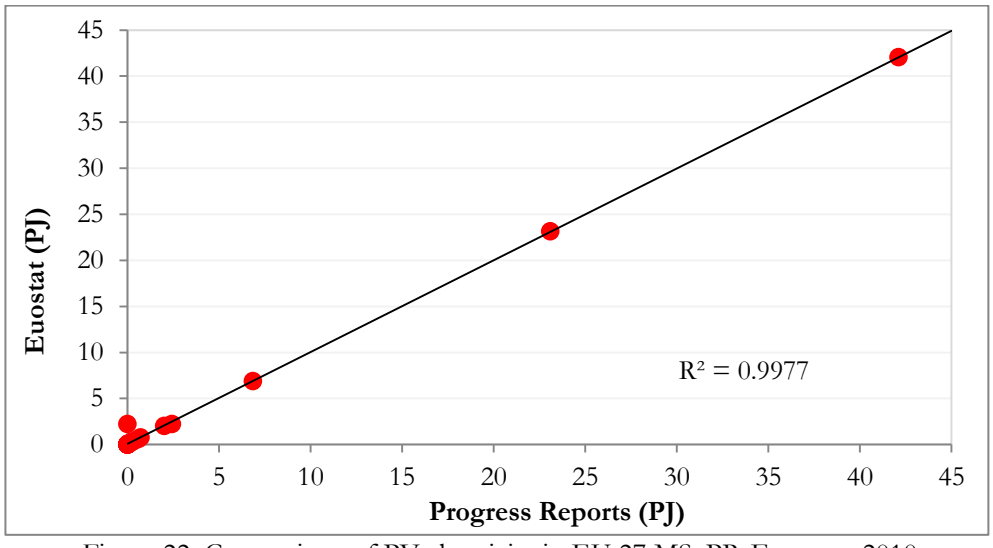

Figure 22. Comparison of PV electricity in EU 27 MS, PR-Eurostat, 2010

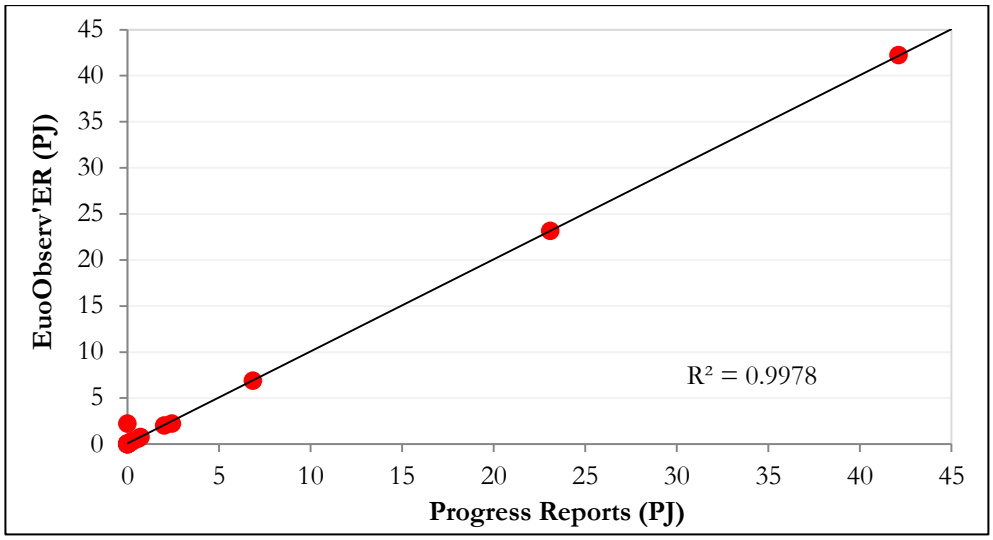

Figure 23. Comparison of PV electricity in EU 27, PR- EurObserv'ER, 2010

Table 9. PV electricity in EU 27 MS, PR-Eurostat-EurObserv'ER, relative discrepancies,2009-2010

	Progress Reports		Eurostat		Eurobserver		Discrepancies			
	PJ		PJ		PJ		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	0.61	2.01	0.60	2.02	0.6	2.02	2.0	-0.4	2.0	-0.5
BG	0.01	0.05	0.01	0.05	0.01	0.05	0.0	0.0	-9.1	0.0
CZ	0.00	2.22	0.32	2.22	0.32	2.22		0.0		0.0
DK	0.01	0.02	0.01	0.02	0.01	0.02	0.0	0.0	8.1	0.0
DE	23.76	42.12	23.68	42.06	23.68	42.22	0.3	0.1	0.3	-0.2
EE	0.00	0.00	0	0	0	0				
IE	0.00	0.00	0	0	0	0			5.0	12.5
EL	0.19	0.60	0.18	0.57	0.18	0.57	8.0	5.7	8.0	5.7
ES	21.46	23.09	21.46	23.13	21.46	23.13	0.0	-0.2	0.0	-0.2
FR	0.79	2.43	0.63	2.23	0.79	2.23	26.4	9.0	0.0	9.0
IT	2.43	6.86	2.43	6.86	2.44	6.86	0.0	0.0	-0.1	0.0
CY	0.01	0.02	0.01	0.02	0.01	0.03	-4.3	6.5	32.1	-8.7
LV	0.00	0.00	0	0	0	0				
LT	0.00	0.00	0	0	0	0				
LU	0.07	0.08	0.07	0.08	0.07	0.08	0.0	0.0	-1.5	0.0
HU	0.00	0.00	0	0	0	0	0.0	0.0	25.0	0.0
MT	0.00	0.01	0	0	0	0.02			-51.8	-69.6
NL	0.17	0.22	0.17	0.22	0.17	0.22	0.0	0.0	0.0	0.0
AT	0.18	0.32	0.18	0.32	0.13	0.32	0.0	0.0	40.0	0.0
PL	0.00	0.01	0	0	0	0.01			10.7	-1.6
PT	0.58	0.72	0.58	0.77	0.58	0.77	0.0	-6.1	0.0	-6.1
RO	0.00	0.00	0	0	0	0			-99.6	-98.0
SI	0.01	0.05	0.01	0.05	0.02	0.05	0.0	0.0	-4.8	0.0
SK	0.00	0.04	0	0.06	0	0.06		-35.3		-35.3
FI	0.01	0.02	0.01	0.02	0.01	0.02	0.0	0.0	-2.4	0.0
SE	0.03	0.03	0.03	0.03	0.03	0.03	0.0	0.0	0.0	0.0
UK	0.07	0.12	0.07	0.12	0.07	0.12	0.0	0.0	0.0	-0.6
EU 27	50.42	81.04	50.45	80.85	50.58	81.05	-0.06	0.2	-0.3	-0.01

3.4 Geothermal energy
a. Geothermal power capacity

This section presents a comparison of the geothermal power capacity in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals some differences between the geothermal installed capacities reported in Progress Reports in comparison with Eurostat, which can be significant in the few MS which had some geothermal power capacity.

At the EU level, the data from Progress reports was 7.8% and 7.3% above the data available from in Eurostat for 2009 and 2010, respectively. Compared to EurObserv'ER, the RES share from Progress reports was 12.3% and 12.2% below the 2009 and 2010 data, respectively.

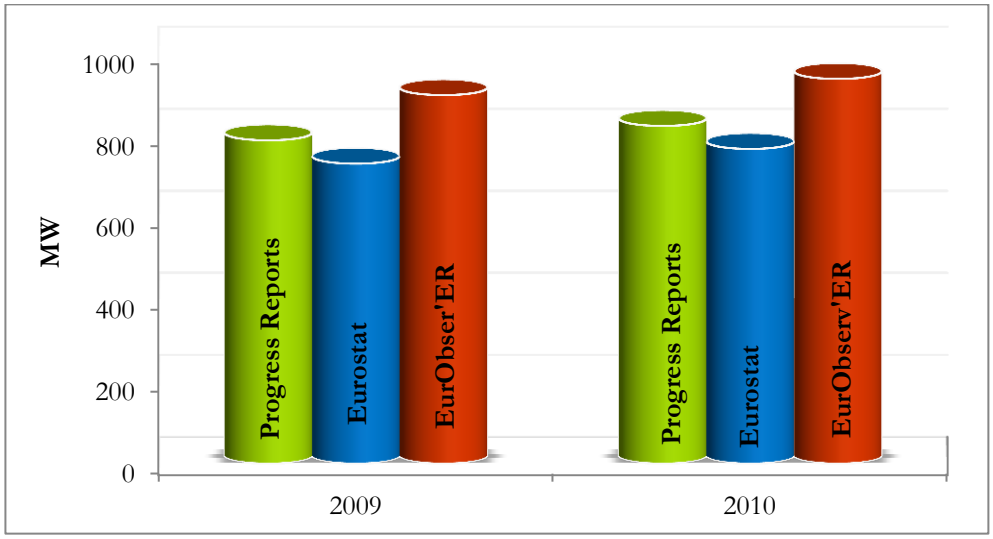

Figure 24. Geothermal installed capacity in EU 27, PR- Eurostat-EurObserv'ER,2009-2010

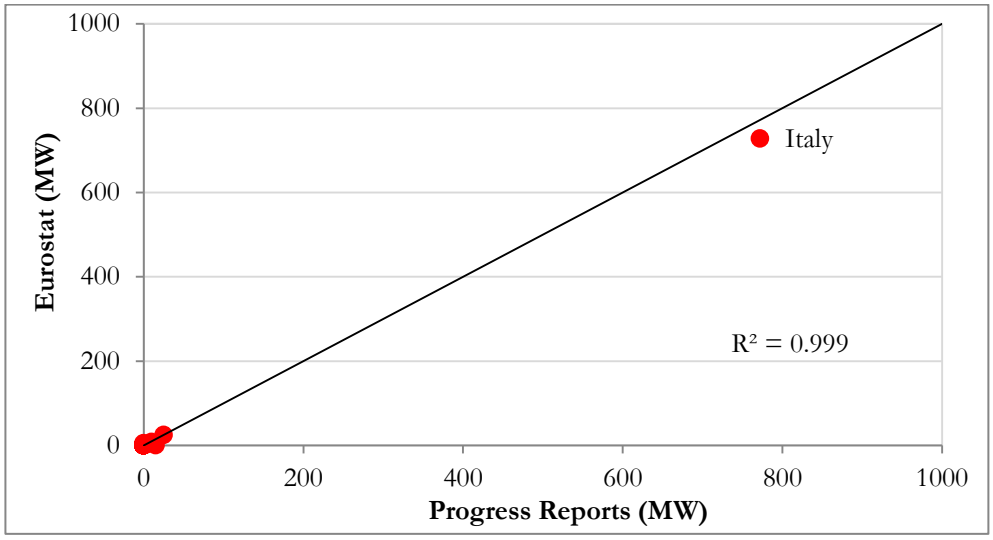

Figure 25. Comparison of geothermal power capacity in EU 27 MS, PR-Eurostat, 2010

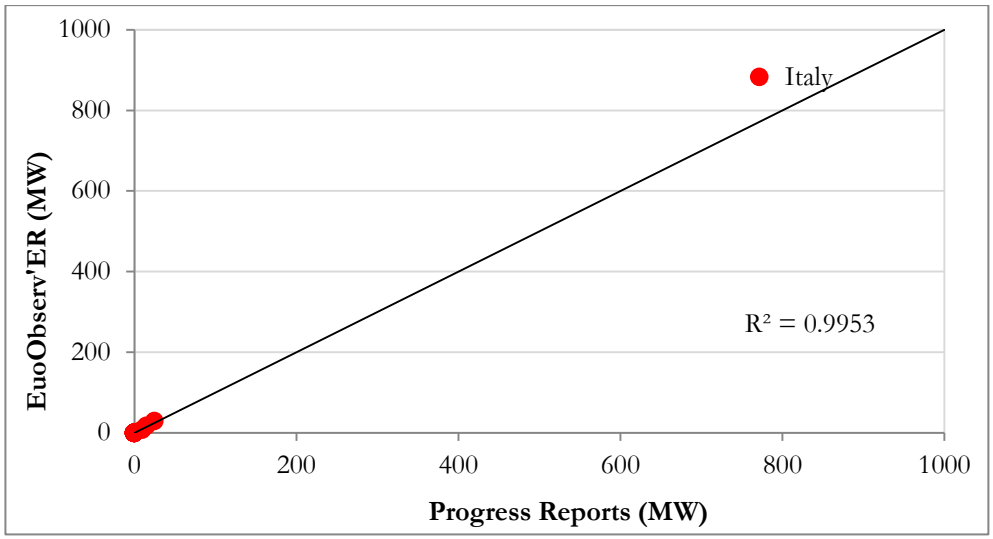

Figure 26. Comparison of geothermal power capacity in EU 27 MS, PR-EurOvserv'ER, 2010

Table 10. Geothermal capacity in EU 27 MS, PR-Eurostat-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		Eurostat		EurObserv'ER		Discrepancies			
	MW		MW		MW		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	0	0	0	0	0	0				
BG	0	0	0	0	0	0				
CZ	0	0	0	0	0	0				
DK	0	0	0	0	0	0				
DE	10	10	7	8	8	8	42.9	25.0	33.3	33.3
EE	0	0	0	0	0	0				
IE	0	0	0	0	0	0				
EL	0	0	0	0	0	0				
ES	0	0	0	0	0	0				
FR	15	15	0	0	17	17			-12.8	-12.8
IT	737	772	695	728	843	883	6.0	6.0	-12.6	-12.5
CY	0	0	3	5	0	0	-100.0	-100.0		
LV	0	0	0	0	0	0				
LT	0	0	0	0	0	0				
LU	0	0	0	0	0	0				
HU	0	0	0	0	0	0				
MT	0	0			0	0				
NL	0	0	0	0	0	0				
AT	1	1	1	1	1	1	0.0	0.0	-28.6	-28.6
PL	0	0	0	0	0	0				
PT	25	25	25	25	29	29	0.0	0.0	-13.8	-13.8
RO	0	0	0	0	0	0				
SI	0	0	0	0	0	0				
SK	0	0	0	0	0	0				
FI	0	0	0	0	0	0				
SE	0	0	0	0	0	0				
UK	0	0	0	0	0	0				
EU 27	788	823	731	767	898.1	937.6	7.8	7.3	-12.3	-12.2

b. Geothermal electricity generation

This section presents a comparison of the production of electricity from geothermal energy sources at the level of Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals some smaller differences compared to the data on geothermal electricity between data reported in Progress Reports in comparison with Eurostat. The differences between the data from Progress Reports and Eurostat are smaller than the differences between Progress Reports and EurObserv'ER.

At the EU level, the data from Progress Reports was 0.9% and 0.4% above the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 0.4% and 3.1% above the EurObserv'ER data available for 2009 and 2010, respectively.

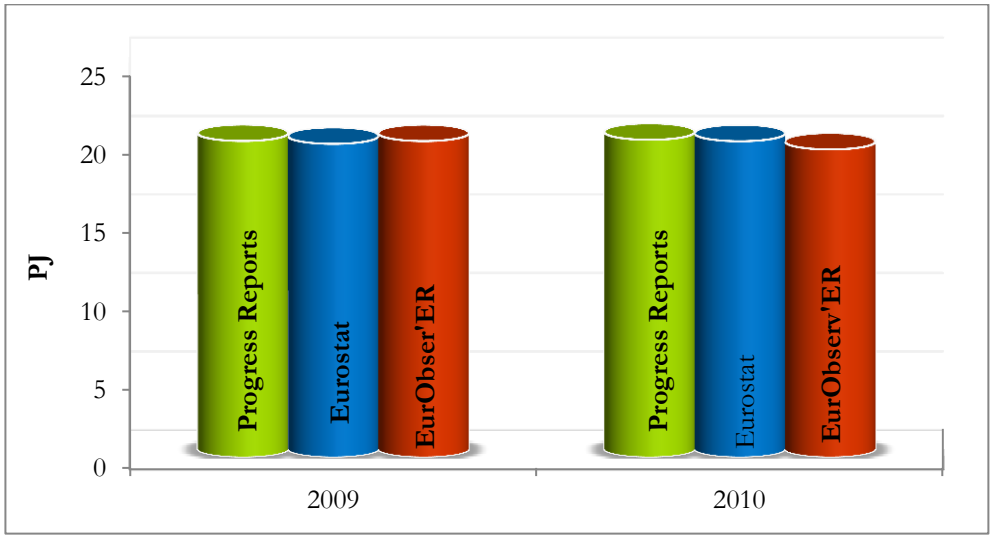

Figure 27. Geothermal electricity generation in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

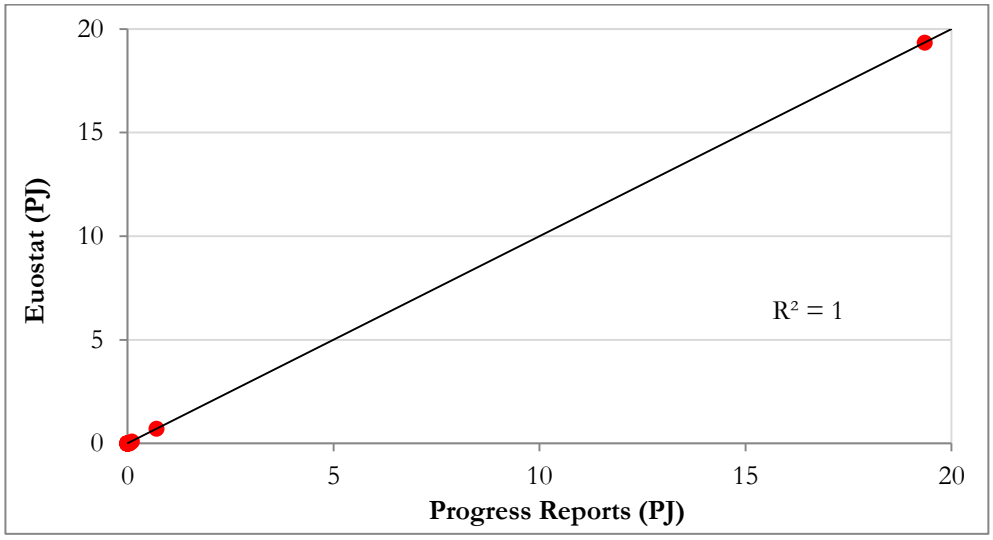

Figure 28. Comparison of geothermal electricity generation in EU 27, PR-Eurostat, 2010

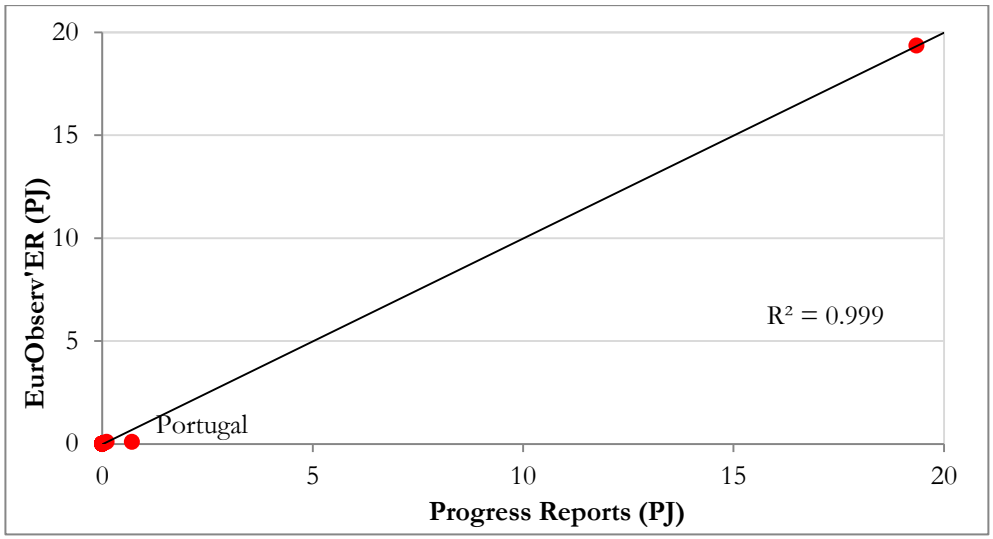

Figure 29. Comparison of geothermal electricity generation in EU 27, PR-EurOvserv'ER, 2010

Table 11. Geothermal electricity in EU 27, PR-Eurostat-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		Eurostat		Eurobserver		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	0.0	0.0	0.0	0.0	0.0	0.0				
BG	0.0	0.0	0.0	0.0	0.0	0.0				
CZ	0.0	0.0	0.0	0.0	0.0	0.0				
DK	0.0	0.0	0.0	0.0	0.0	0.0				
DE	0.1	0.1	0.1	0.1	0.1	0.1	-14.0	29.0	6.4	8.3
EE	0.0	0.0	0.0	0.0	0.0	0.0				
IE	0.0	0.0	0.0	0.0	0.0	0.0				
EL	0.0	0.0	0.0	0.0	0.0	0.0				
ES	0.0	0.0	0.0	0.0	0.2	0.0				
FR	0.2	0.1	0.0	0.0	0.0	0.1				0.0
IT	19.2	19.4	19.2	19.3	19.2	19.4	0.1	0.1	0.0	0.0
CY	0.0	0.0	0.0	0.0	0.0	0.0				
LV	0.0	0.0	0.0	0.0	0.0	0.0				
LT	0.0	0.0	0.0	0.0	0.0	0.0				
LU	0.0	0.0	0.0	0.0	0.0	0.0				
HU	0.0	0.0	0.0	0.0	0.0	0.0				
MT	0.0	0.0	0.0	0.0	0.0	0.0				
NL	0.0	0.0	0.0	0.0	0.0	0.0				
AT	0.0	0.0	0.0	0.0	0.0	0.0			0.0	-28.6
PL	0.0	0.0	0.0	0.0	0.0	0.0				
PT	0.7	0.7	0.7	0.7	0.7	0.1	-1.1	-0.4	0.0	611.1
RO	0.0	0.0	0.0	0.0	0.0	0.0				
SI	0.0	0.0	0.0	0.0	0.0	0.0				
SK	0.0	0.0	0.0	0.0	0.0	0.0				
FI	0.0	0.0	0.0	0.0	0.0	0.0				
SE	0.0	0.0	0.0	0.0	0.0	0.0				
UK	0.0	0.0	0.0	0.0	0.0	0.0				
EU 27	20.2	20.2	20.0	20.1	20.1	19.6	0.9	0.4	0.4	3.1

c. Geothermal heat

This section presents a comparison of the heat use from geothermal sources at the level of Member States. This was based on data from the Progress reports and the data collected from EurObserv'ER, covering the period 2009-2010. No data was available from Eurostat on the use of geothermal heat in the EU.

Analysis reveals some smaller differences compared to the data on geothermal heat between data reported in Progress Reports in comparison with EurObserv'ER.

At the EUlevel, the data from Progress Reports was 11.4% and 13.7% below the EurObserv'ER data available for 2009 and 2010, respectively.

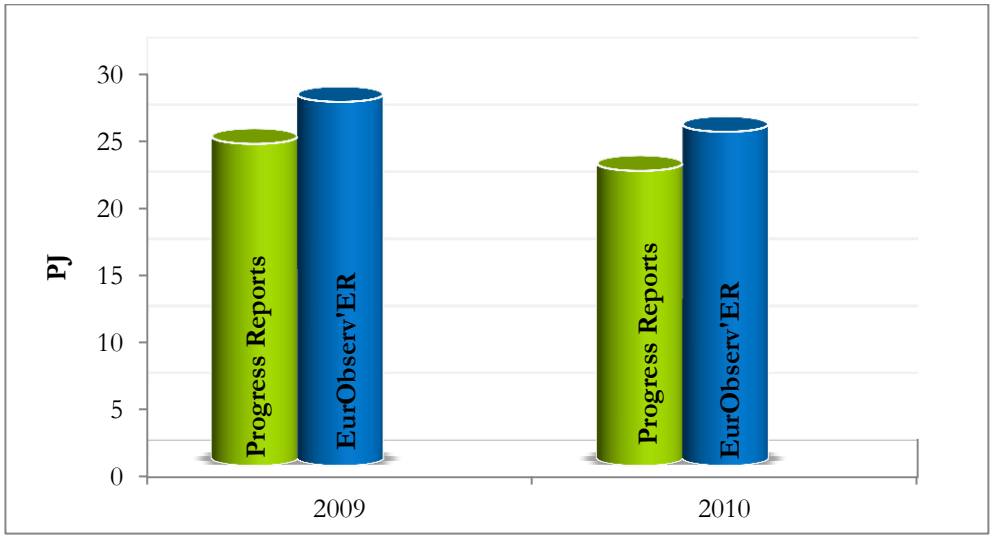

Figure 30. Geothermal heat use in EU 27, PR-EurObserv'ER, 2009-2010

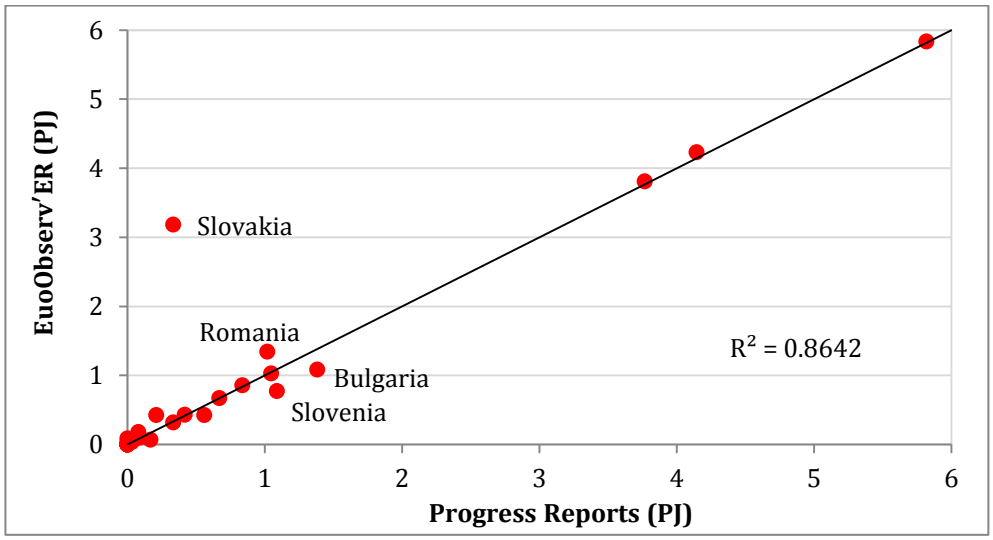

Figure 31. Comparison of geothermal heat use in EU 27, PR- EurOvserv'ER, 2010

Table 12. Geothermal heat use in EU 27, PR-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		Eurobserver		Discrepancies	
	PJ		PJ		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010
BE	0.1	0.1	0.1	0.2	0	-50
BG	1.4	1.4	1.1	1.1	27.3	27.3
CZ		0.0	0.1	0.1	-100.0	-100.0
DK	0.3	0.2	0.2	0.4	50.0	-50.0
DE	1.0	1.0	1.0	1.0	0.0	0.0
EE	0.0	0.0	0.0	0.0		
IE	0.0	0.0	0.0	0.0		
EL	0.7	0.7	0.7	0.7	0.0	0.0
ES	0.2	0.2	0.2	0.1	0.0	100.0
FR	3.7	3.7	3.7	3.8	0.0	-2.6
IT	8.9	5.7	8.9	5.8	0.0	-1.7
CY	0.0	0.0	0.0	0.0		
LV	0.0	0.0	0.0	0.0		
LT	0.1	0.1	0.1	0.1	0.0	0.0
LU	0.0	0.0	0.0	0.0		
HU	4.0	4.1	4.0	4.2	0.0	-2.4
MT	0.0	0.0	0.0	0.0		
NL	0.1	0.3	0.1	0.3	0.0	0.0
AT	0.8	0.8	0.8	0.9	0.0	-11.1
PL	0.6	0.5	0.5	0.4	20.0	25.0
PT	0.4	0.4	0.4	0.4	0.0	0.0
RO	1.1	1.0	1.2	1.3	-8.3	-23.1
SI	0.3	1.1	0.8	0.8	-62.5	37.5
SK	0.4	0.3	3.1	3.2	-87.1	-90.6
FI	0.0	0.0	0.0	0.0		
SE	0.0	0.0	0.0	0.0		
UK	0.0	0.0	0.0	0.0		
EU 27	24.0	21.5	27.1	24.9	-11.4	-13.7

3.5 Heat pumps

This section presents a comparison of the use from ground source heat pumps at the level of Member States. This was based on data from the Progress reports (geothermal and hydrothermal) and the data collected from EurObserv'ER, covering the period 2009-2010.

Analysis reveals significant differences for some Member States on heat pumps between data reported in Progress Reports in comparison with data reported from EurObserv'ER.

At the EU level, the data from Progress Reports was 9.5% and 8.9% below the EurObserv'ER data available for 2009 and 2010, respectively.

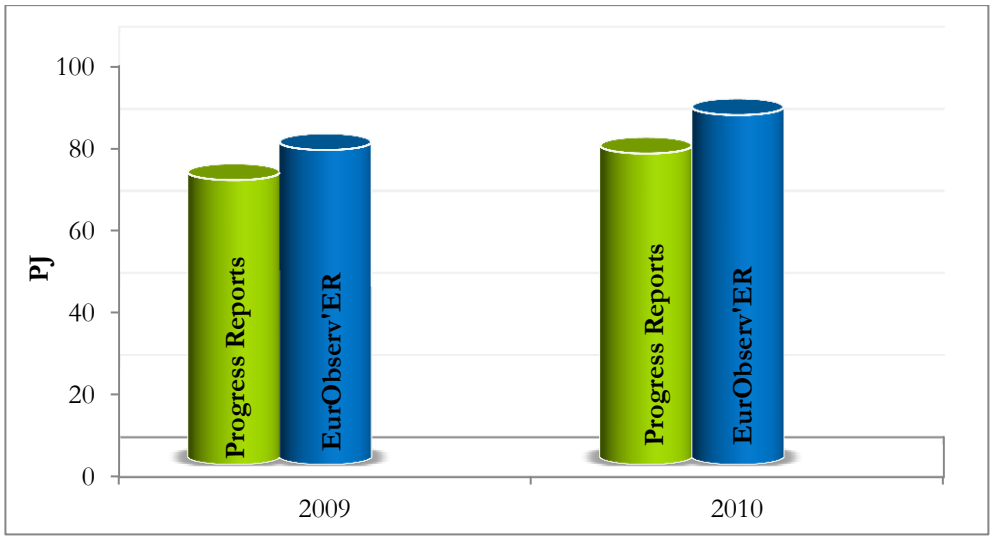

Figure 32. Heat use from ground source heat pumps in EU 27, PR-EurObserv'ER, 2009-2010

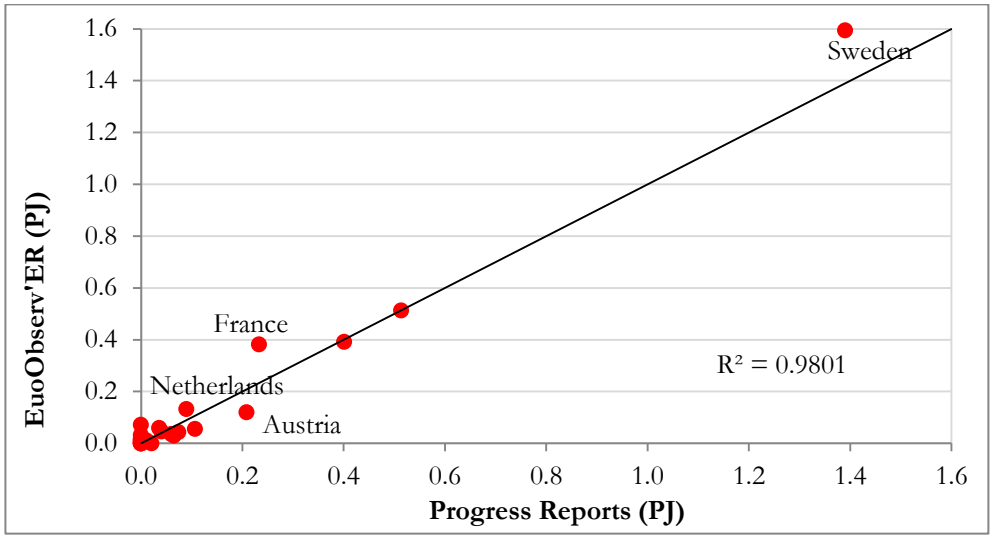

Figure 33. Comparison of heat use from ground source heat pumps in EU 27, PR- EurOvserv'ER, 2010

Table 13. Heat from ground source heat pumps EU 27,PR-EurObserv'ER, relative discrepancies,2009-2010

	Progress Reports		Eurobserver		Discrepancies	
	PJ		PJ		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010
BE	0.5	1.4	0.8	0.9	-40.3	59.1
BG	0.0	0.0	0.3	0.3	-100.0	-100.0
CZ	0.0	1.8	0.9	1.0	-100.0	75.8
DK	0.0	0.0	1.7	1.7	-100.0	-100.0
DE	11.1	12.3	12.3	12.2	-9.5	0.6
EE	0.0	0.0	0.7	0.8	-100.0	-100.0
IE	0.9	1.0	1.1	1.1	-16.3	-12.5
EL	0.2	0.3	0.3	0.3	-30.2	-16.3
ES	0.4	0.5	0.0	0.0		
FR	4.6	5.6	8.4	9.1	-44.7	-38.8
IT	1.4	1.5	1.0	0.7	42.4	121.3
CY	0.0	0.0	0.0	0.0		

LV	0.0	0.0	0.0	0.0		
LT	0.0	0.0	0.3	0.3	-100.0	-100.0
LU	0.0	0.0	0.0	0.0		
HU	0.0	0.0	0.1	0.1	-100.0	-100.0
MT	0.0	0.0	0.0	0.0		
NL	1.8	2.1	2.7	3.1	-33.3	-31.1
AT	4.8	5.0	2.9	2.9	65.5	72.4
PL	0.7	0.9	1.1	1.4	-32.2	-39.0
PT	0.0	0.0	0.0	0.0		
RO	0.0	0.0	0.0	0.0		
SI	0.0	0.0	0.3	0.4	-100.0	-100.0
SK	0.0	0.0	0.2	0.2	-100.0	-100.0
FI	8.4	9.6	8.1	9.3	3.7	3.2
SE	33.2	33.2	32.9	38.1	0.9	-12.9
UK	1.2	2.6	1.0	1.3	20.0	100.0
EU 27	69.4	77.7	76.7	85.3	-9.5	-8.9

3.6 Biomass

a. Biomass capacity

This section presents a comparison of the biomass capacity in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat, covering the period 2009-2010. EurObserv'ER dd not provide data on the biomass installed capacity.

Analysis reveals significant differences in biomass capacity for some Member States as Austria, France, Czech Republic, Poland, the Netherlands reported in Progress Reports in comparison with Eurostat.

At the EU level, the aggregated data from Progress Reports showed an installed capacity of 22.8 GW in 2009[143] and 25.0 GW in 2010. In comparison, Eurostat data showed an installed capacity of 25.8 GW in 2009 and 28.7 GW in 2010. Thus, the data from Progress reports was 11.5% and 12.5% below the data available in Eurostat for 2009 and 2010, respectively.

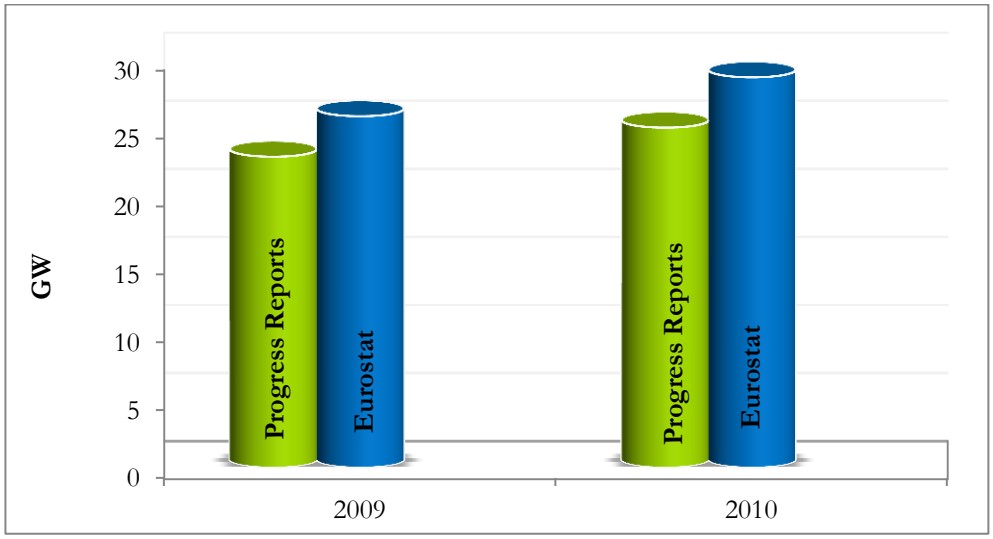

Figure 34. Biomass installed capacity in EU 27, PR-Eurostat, 2009-2010

[143] Czech Republic didn't report any data in its Progress reports. Updated CZ NREAP data for year 2010 are included in this analysis

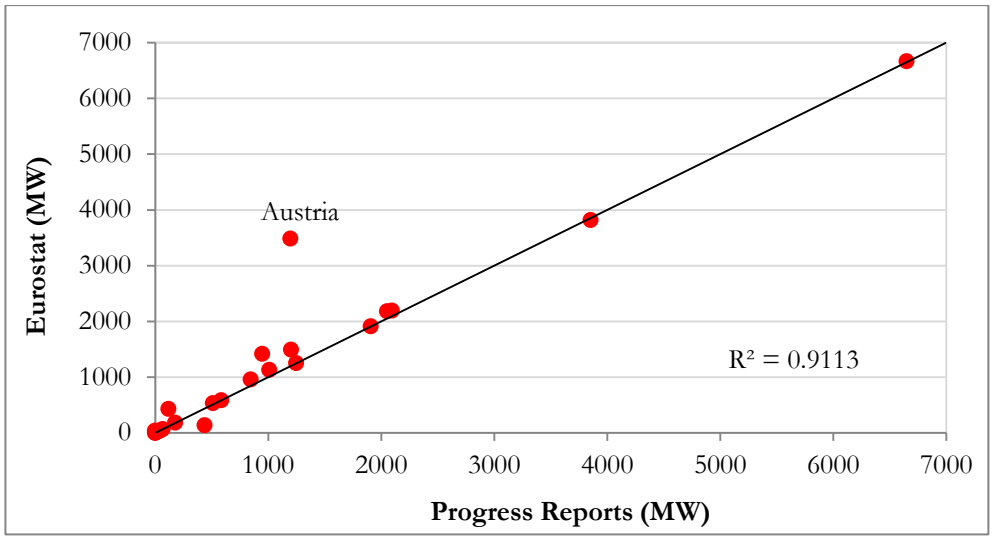

Figure 35. Comparison of biomass installed capacity in EU 27, PR-Eurostat, 2010

Table 14. Biomass installed capacity in EU 27, PR-Eurostat, relative discrepancies, 2009-2010

	Progress Reports		Eurostat		Discrepancies	
	MW		MW		PR vs Eurostat (%)	
	2009	2010	2009	2010	2009	2010
BE	901	1011	1,016	1,130	-11.3	-10.6
BG	3	3	3	4	0.0	-25.0
CZ		118	353	432		-266
DK	1094	1248	1,094	1,248	0.0	0.0
DE	6070	6650	6,000	6,664	1.2	-0.2
EE	37	67	37	67	0.0	0.0
IE	0	0	35	36	-100.0	-100.0
EL	41	43	40	41	2.5	4.9
ES	774	846	868	960	-10.8	-11.9
FR	914	949	1,273	1,417	-28.2	-33.0
IT	1728	2053	1,871	2,183	-7.6	-6.0
CY	4	8	8	8	-46.9	-1.3
LV	10	16	10	16	0.0	0.0
LT	24	29	24	29	0.0	0.0
LU	17	17	17	28	0.0	-39.3
HU	509	514	530	535	-4.0	-4.0
MT	0	0	0	0		
NL	1028	1205	1,300	1,489	-20.9	-19.1
AT	1150	1198	2,952	3,485	-61.0	-65.6
PL	323	439	110	134	194.0	227.7
PT	442	587	439	584	0.7	0.5
RO	0	0	0	20		-100.0
SI	52	49	50	47	4.0	4.3
SK	164	178	170	183	-3.5	-2.7
FI	1807	1910	1,807	1,910	0.0	0.0
SE	3813	3854	3,813	3,818	0.0	0.9
UK	1932	2097	1,988	2,193	-2.8	-4.4
EU 27	22837	25088	25808	28661	-11.5	-12.5

b. Biomass electricity generation

This section presents a comparison of the biomass electricity generation in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat, covering the period 2009-2010. EurObserv'ER did not provide data on the biomass electricity generation.

Analysis reveals some differences between biomass electricity generation reported in Progress Reports in comparison with Eurostat, which can be significant for some Member States.

At the EU level, the differences between the aggregated data from Progress Reports and Eurostat data are lower. Thus, the data from Progress Reports was 2.0% and 1.7% above the data available from in Eurostat for 2009 and 2010, respectively.

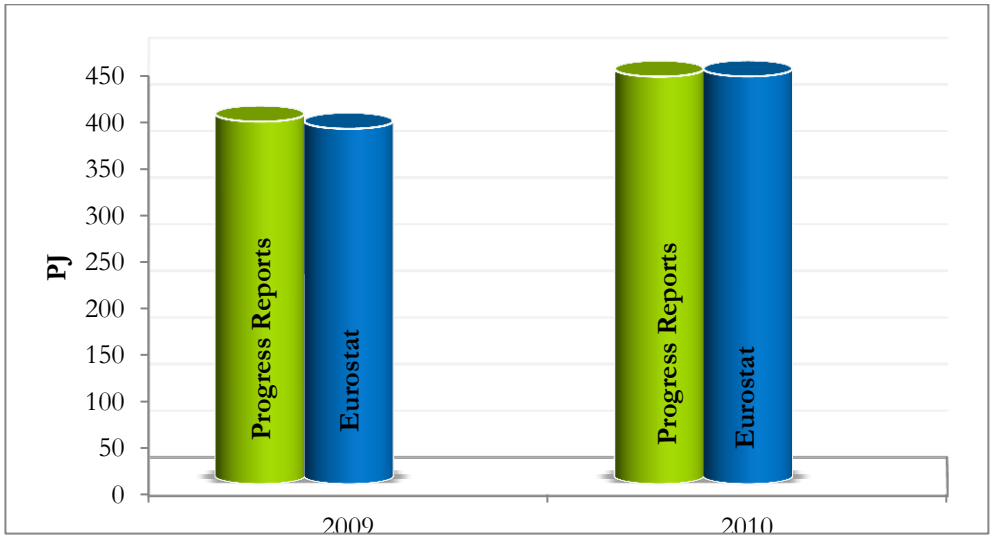

Figure 36. Biomass electricity generation in EU 27, PR-Eurostat, 2009-2010

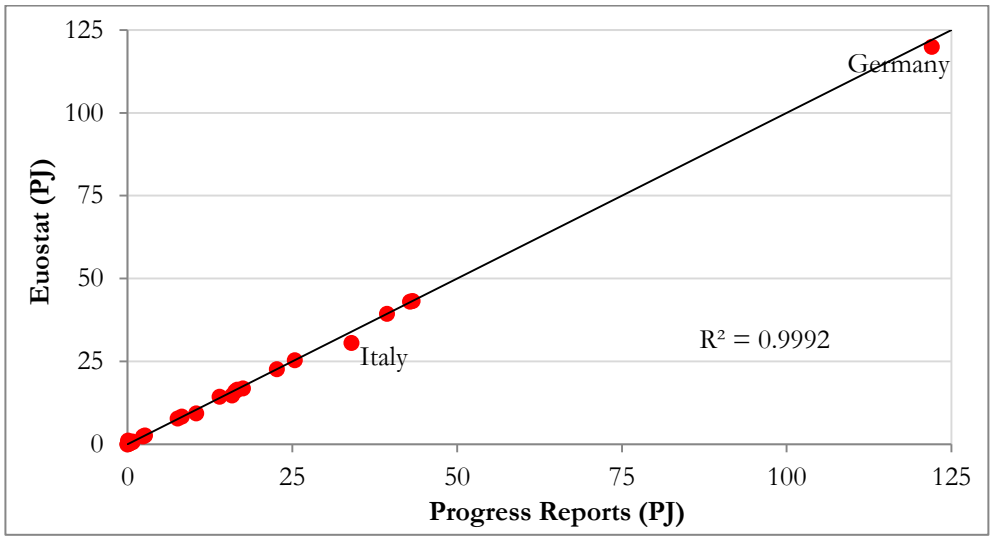

Figure 37. Comparison of biomass electricity generation in EU 27, PR-Eurostat, 2010

Table 15. Biomass electricity generation EU 27 MS, PR-Eurostat, relative discrepancies,2009-2010

	Progress Reports		Eurostat		Discrepancies	
	PJ		PJ		PR - Eurostat (%)	
	2009	2010	2009	2010	2009	2010
BE	14.8	15.9	13.9	14.8	6.0	7.5
BG	0.0	0.1	0.0	0.1	-65.6	-54.1
CZ		7.7	6.7	7.8		-1.3
DK	12.1	16.7	11.9	16.5	1.5	1.1
DE	109.1	122.0	106.8	119.9	2.1	1.8
EE	1.1	2.7	1.1	2.7	-0.3	-0.6
IE	0.1	0.1	0.9	1.2	-91.0	-91.7
EL	0.8	0.8	0.8	0.7	-1.3	16.1
ES	12.6	14.0	12.6	14.4	0.0	-2.7
FR	16.3	17.6	14.9	16.9	9.6	3.8
IT	27.2	34.0	25.8	30.6	5.3	11.2
CY	0.1	0.1	0.1	0.1	14.0	0.7
LV	0.2	0.2	0.2	0.2	5.3	13.5
LT	0.4	0.5	0.3	0.5	9.6	5.3
LU	0.3	0.3	0.3	0.3	-4.2	20.4
HU	8.4	8.2	8.4	8.3	0.4	-1.0
MT	0.0	0.0	0.0	0.0		
NL	22.1	25.4	22.1	25.3	0.0	0.3
AT	15.7	16.4	15.4	16.0	2.4	2.5
PL	18.8	22.7	18.8	22.7	-0.2	0.0
PT	8.6	10.5	7.5	9.4	14.5	11.5
RO	0.0	0.3	0.0	0.4	-55.2	-33.6
SI	0.7	0.8	0.7	0.8	3.7	0.5
SK	1.9	2.4	1.9	2.3	0.4	2.6
FI	38.6	39.4	31.4	39.4	22.9	0.1
SE	41.1	43.3	40.3	43.2	2.0	0.1
UK	38.1	42.9	38.6	43.1	-1.1	-0.4
EU 27	389.0	444.9	381.3	437.5	2.0	1.7

3.6.1 Solid biomass

a. Solid biomass capacity

This section presents a comparison of the solid biomass plant capacity in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat, covering the period 2009-2010. EurObserv'ER dd not provide data on the solid biomass capacity.

Analysis reveals some significant differences between biomass electricity generation reported in Progress Reports in comparison with Eurostat, which can be significant for some Member States (Austria, UK or France). In the Progress report of the UK, all biomass electricity is reported as being produced from solid biomass, without contribution from biogas or bioliquids.

At the EU level, the aggregated data from Progress reports showed an installed capacity of 18.0 GW in 2009 and 19.2 GW in 2010. In comparison, Eurostat data showed an installed capacity of 19.8 GW in 2009 and 21.5 GW in 2010. Thus, the data from Progress reports was 9.1% and 10.9% below the data available from in Eurostat for 2009 and 2010, respectively.

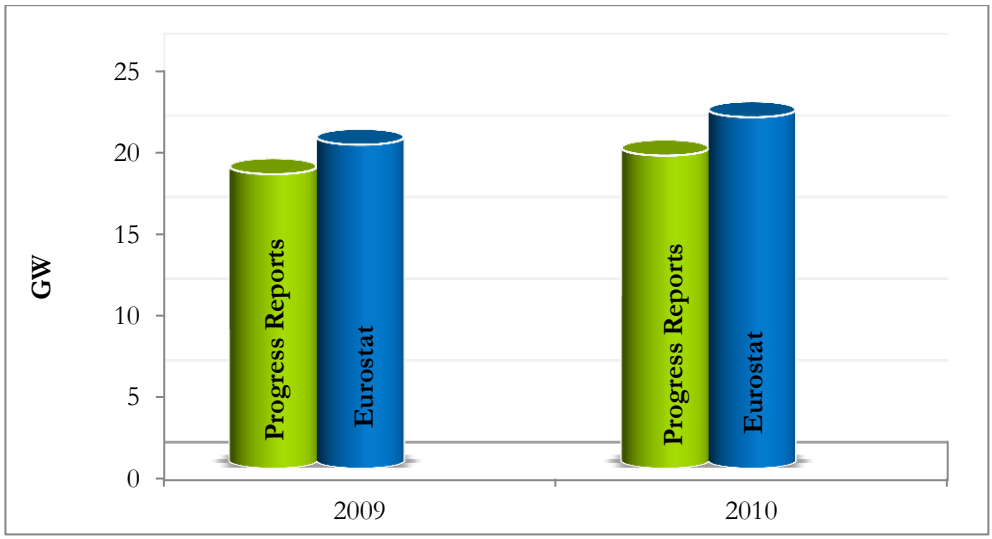

Figure 38. Solid biomass installed capacity in EU 27, PR-Eurostat, 2009-2010

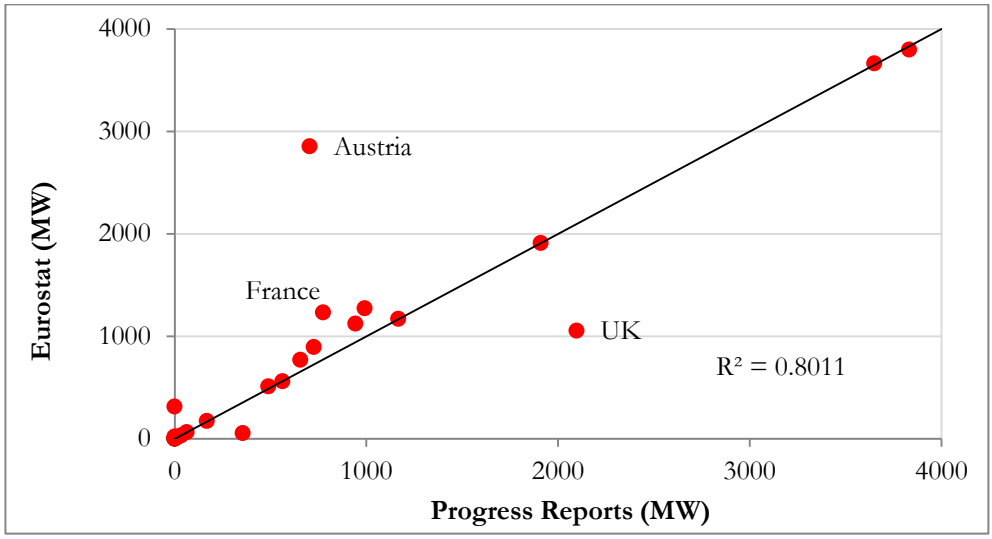

Figure 39. Comparison of solid biomass capacity in EU 27, PR-Eurostat, 2010

Table 16. Solid biomass installed capacity in EU 27, PR-Eurostat, relative discrepancies,2009-2010

	Progress Reports		Eurostat		Discrepancies	
	MW		MW		PR-Eurostat (%)	
	2009	2010	2009	2010	2009	2010
BE	638	727	772	893	-17.4	-18.6
BG	0	0	0	0		
CZ			257	314		
DK	1017	1168	1017	1168	0.0	0.0
DE	3590	3650	3502	3664	2.5	-0.4
EE	35	63	35	63	0.0	0.0
IE	0	0	5	5	-100.0	-100.0
EL	0	0	0	0		
ES	597	657	691	768	-13.6	-14.5
FR	753	774	1114	1233	-32.4	-37.2
IT	964	944	1141	1122	-15.5	-15.9
CY	0	0	0	0		
LV	2	5	2	5	0.0	0.0
LT	16	16	16	16	0.0	0.0

LU	8	8	8	19	0.0	-57.9
HU	485	490	506	511	-4.2	-4.2
MT	0	0	0	0		
NL	825	992	1097	1272	-24.8	-22.0
AT	684	704	2473	2853	-72.3	-75.3
PL	252	356	42	53	501.2	572.1
PT	422	562	419	559	0.7	0.5
RO	0	0	0	19		
SI	40	35	38	33	5.3	6.1
SK	160	169	166	174	-3.6	-2.9
FI	1807	1910	1807	1910	0.0	0.0
SE	3796	3832	3796	3796	0.0	0.9
UK	1932	2097	916	1055	110.9	98.8
EU 27	18023	19158	19820	21505	-9.1	-10.9

b. Solid biomass electricity generation

This section presents a comparison of the solid biomass electricity generation in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals some significant differences between solid biomass electricity generation reported in Progress Reports in comparison with Eurostat and EurObserv'ER, which can be significant for some Member States (UK, Austria, Germany).

At the EU level, the data from Progress Reports was 8.4% and 6.7% above the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 8.0% and 5.2% above the EurObserv'ER data available for 2009 and 2010, respectively.

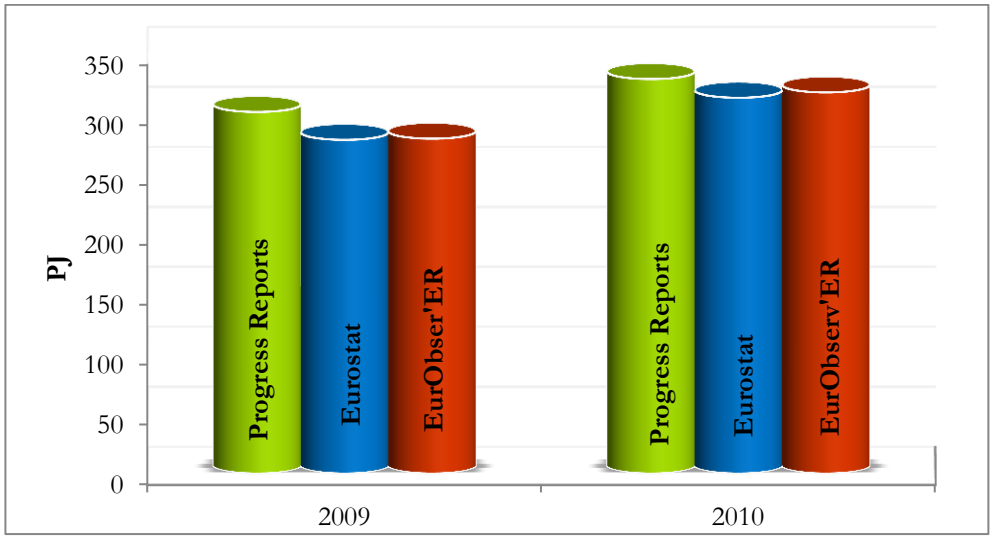

Figure 40. Solid biomass electricity generation in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

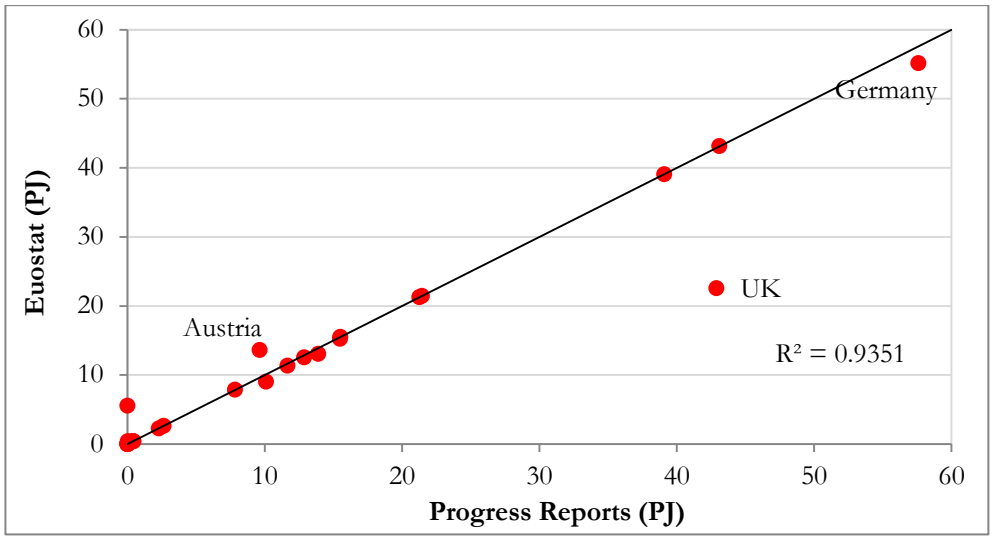

Figure 41. Comparison of solid biomass electricity generation in EU 27, PR-Eurostat, 2010

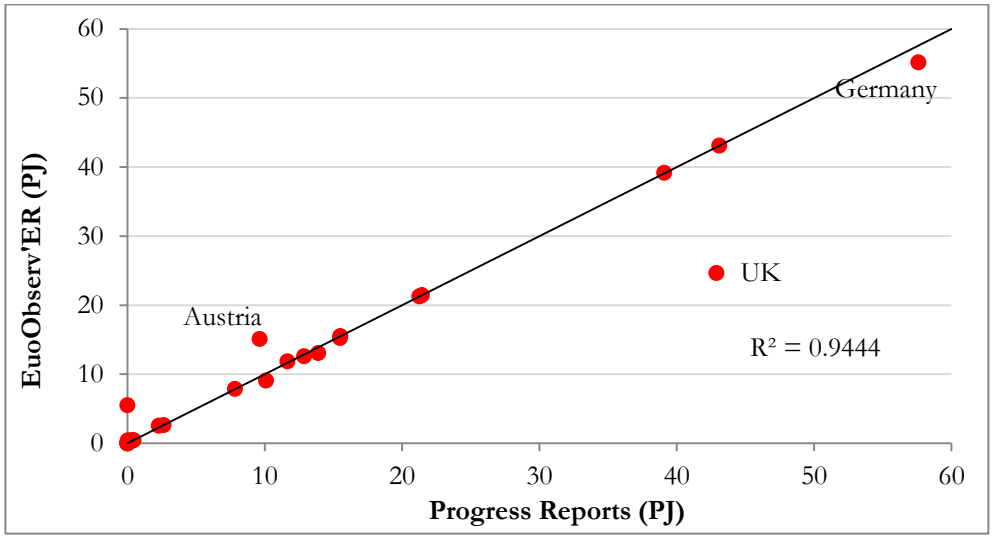

Figure 42. Comparison of solid biomass electricity generation in EU 27, PR- EurObserv'ER, 2010

Table 17. Solid biomass electricity in EU 27, PR-Eurostat-EurObserv'ER, relative discrepancies,2009-2010

	Progress Reports		Eurostat		Eurobserver		Discrepancies			
	PJ		PJ		PJ		PR - Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	11.8	12.87	11.3	12.6	11.4	12.6	4.5	2.5	3.0	2.3
BG	0.0	0.0	0.0	0.1	0.0	0.1	-100.0	-100.0	-100.0	-100.0
CZ		5.4	5.1	5.5	5.1	5.5		-1.8		-1.8
DK	10.9	15.5	10.6	15.2	10.9	15.2	2.6	1.6	0.0	1.7
DE	56.5	57.6	54.1	55.1	54.2	55.1	4.4	4.5	4.3	4.5
EE	1.1	2.6	1.1	2.6	1.1	2.6	1.2	-0.4	0.0	0.0
IE	0.0	0.0	0.2	0.4	0.2	0.4	-89.7	-92.3	-90.6	-91.9
EL	0.0	0.0	0.0	0.0	0.0	0.0				
ES	10.6	11.7	10.7	11.3	10.6	11.8	-0.3	2.8	0.0	-1.5
FR	13.2	13.9	11.7	13.1	11.6	13.1	12.2	6.5	13.7	6.4
IT	16.0	15.5	16.0	15.5	16.0	15.5	-0.2	0.1	0.0	0.0
CY	0.0	0.0	0.0	0.0	0.0	0.0				
LV	0.0	0.0	0.0	0.0	0.0	0.0		-22.6	0.0	0.0

LT	0.3	0.4	0.3	0.4	0.3	0.4	6.9	-0.3	0.0	0.0
LU	0.1	0.1	0.1	0.1	0.1	0.1	7.5	20.4	0.0	0.0
HU	8.1	7.8	8.0	7.9	7.7	7.8	0.3	-0.3	4.5	0.0
MT	0.0	0.0	0.0	0.0	0.0	0.0				
NL	18.4	21.5	18.5	21.4	18.4	21.5	-0.4	0.1	0.0	0.0
AT	9.4	9.6	13.1	13.6	14.5	15.1	-28.4	-29.3	-35.4	-36.2
PL	17.7	21.3	17.7	21.3	17.7	21.3	-0.1	0.0	-0.1	0.0
PT	8.3	10.1	7.2	9.0	7.2	9.1	15.0	11.6	14.9	11.5
RO	0.0	0.2	0.0	0.4	0.0	0.4	-57.4	-33.9	-54.9	-37.1
SI	0.4	0.5	0.4	0.4	0.4	0.4	6.6	7.5	3.3	2.5
SK	1.9	2.3	1.8	2.3	1.9	2.5	0.6	1.3	0.0	-9.7
FI	38.5	39.1	31.3	39.1	31.3	39.1	23.0	0.1	23.0	-0.1
SE	40.0	43.1	40.2	43.1	40.1	43.1	-0.4	0.0	-0.4	0.0
UK	38.1	42.9	18.5	22.6	18.2	24.7	105.7	90.1	110.0	73.9
EU 27	301.2	334.0	278.0	313.1	279.0	317.5	8.3	6.7	8.0	5.2

c. Solid biomass heating

This section presents a comparison of the solid biomass heating in the EU Member States. This was based on data from the Progress reports and the data collected from EurObserv'ER, covering the period 2009-2010. No data was available from Eurostat on the solid biomass heating in the EU.

Analysis reveals some significant differences between solid biomass heat reported in Progress Reports in comparison with EurObserv'ER, which can be significant for some Member States (Austria, France, Germany, Portugal).

At the EU level, the data from Progress Reports was just 0.08% and 0.2% below the EurObserv'ER data available for 2009 and 2010, respectively.

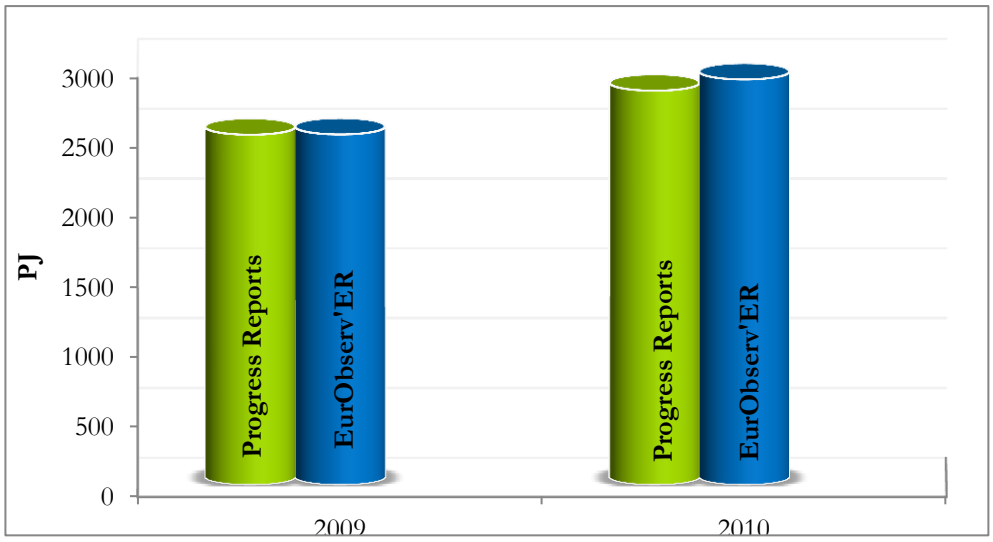

Figure 43. Solid biomass heating in EU 27, PR-EurObserv'ER, 2009-2010

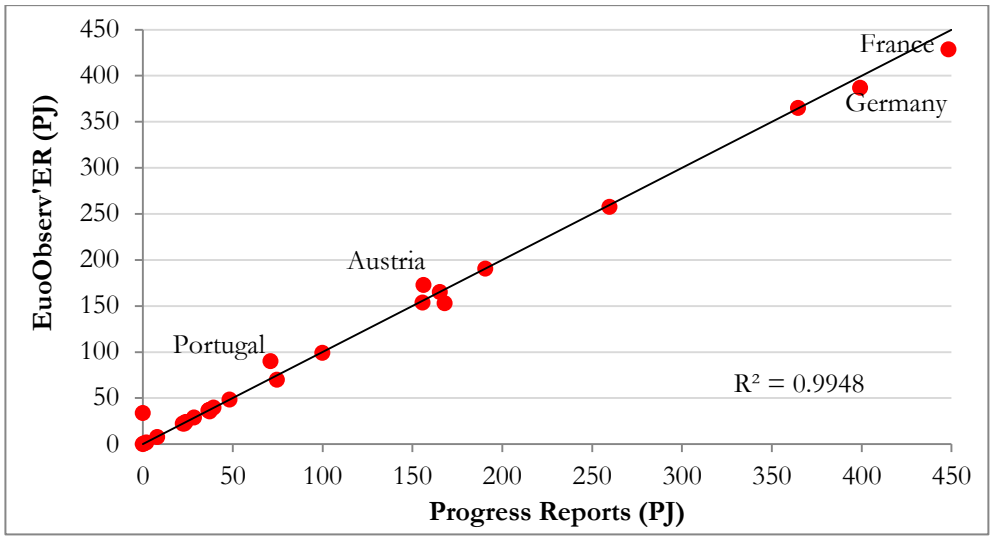

Figure 44. Comparison of solid biomass heating in EU 27, PR-EurObserv'ER, 2010

Table 18. Solid biomass heating in EU 27, PR-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		Eurobserver		Discrepancies	
	PJ		PJ		PR - EurObservER (%)	
	2009	2010	2009	2010	2009	2010
BE	31.6	37.3	31.6	36.9	0.0	0.9
BG	31.1	37.0	30.8	36.8	1.0	0.3
CZ		74.6	62.9	69.7		6.7
DK	86.9	99.9	68.7	98.8	26.4	1.1
DE	341.6	399.3	294.0	386.9	16.2	3.2
EE	26.9	28.5	26.9	28.7	0.0	-0.9
IE	7.5	8.1	6.9	7.5	8.5	7.2
EL	35.3	37.3	33.4	35.5	5.8	5.1
ES	157.0	168.1	157.0	152.9	0.0	9.9
FR	402.1	448.4	377.6	428.5	6.5	4.7
IT	115.7	155.8	107.1	153.4	8.0	1.6
CY	0.7	0.7	0.5	0.5	36.4	54.9
LV	49.7	48.3	49.7	48.3	0.0	0.0
LT	36.4	36.6	36.4	36.5	0.0	0.2
LU	1.7	2.0	1.4	1.7	17.4	19.8
HU	35.0	39.4	38.9	39.4	-9.9	0.0
MT	0.0	0.0	0.0	0.0		
NL	23.7	23.8	18.6	23.8	27.0	0.0
AT	141.8	156.3	141.8	172.8	0.0	-9.5
PL	172.6	190.7	172.5	190.5	0.0	0.1
PT	69.4	71.1	106.4	90.1	-34.8	-21.0
RO	157.5	165.4	157.2	165.0	0.2	0.2
SI	21.4	23.1	21.3	22.0	0.6	4.9
SK	21.4	22.3	20.7	22.0	3.4	1.3
FI	225.5	259.7	221.2	257.6	2.0	0.8
SE	316.4	364.8	297.6	364.8	6.3	0.0
UK	0.0	0.0	29.6	33.7	-100.0	-100.0
EU 27	2508.9	2898.6	2510.9	2904.5	-0.08	-0.2

3.6.2 Biogas
a. Biogas capacity

This section presents a comparison of the biogas installed capacity in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010. No data was available from EurObserv'ER on the biogas capacity for all MS.

Analysis reveals some significant differences between biogas installed capacity reported in Progress Reports in comparison with Eurostat, which can be significant for some Member States (UK, Austria).

At the EU level, the data from Progress Reports was 29.0% and 25.7% above the Eurostat data available for 2009 and 2010, respectively.

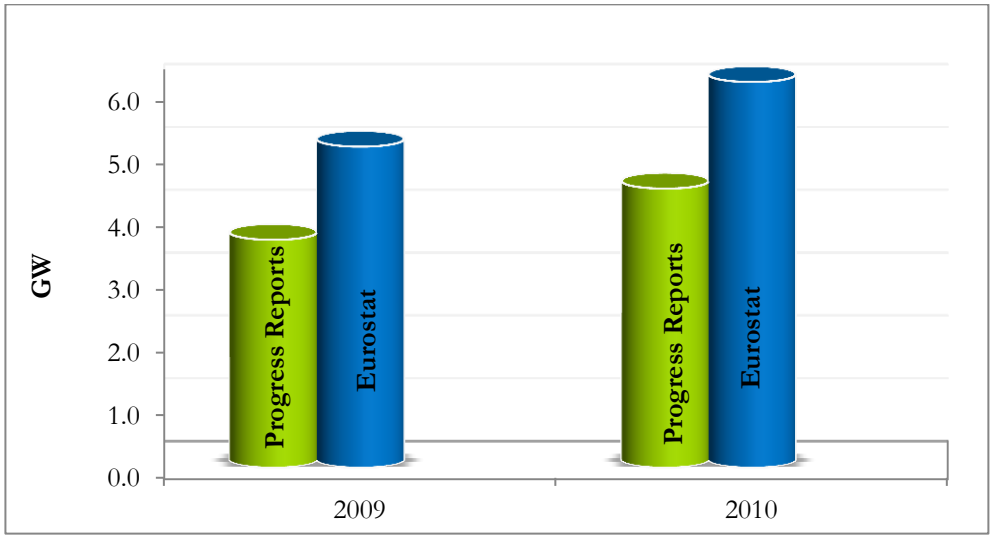

Figure 45. Biogas installed capacity in EU 27, PR-Eurostat, 2009-2010

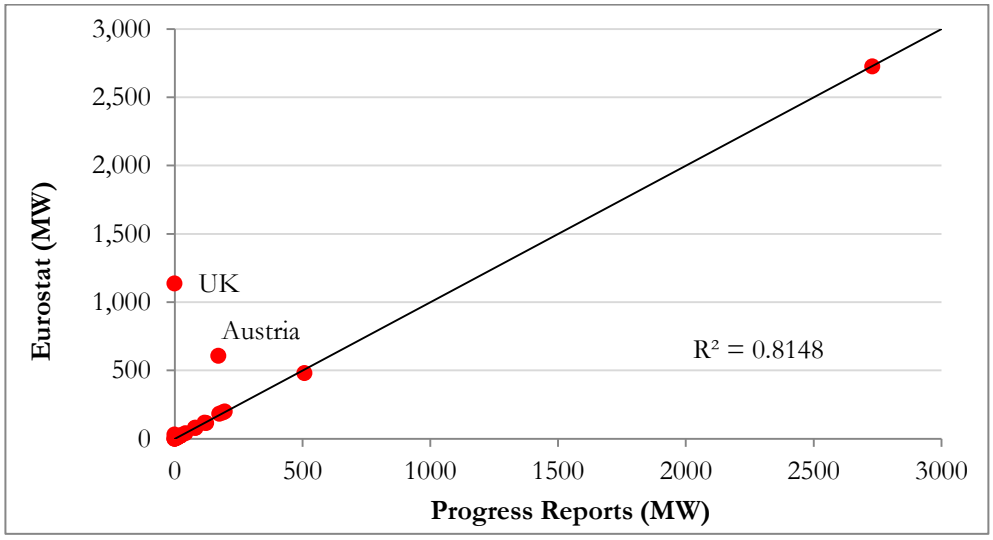

Figure 46. Comparison of biogas installed capacity in EU 27, PR-Eurostat, 2010

Table 19. Biogas installed capacity in EU 27, PR-Eurostat, relative discrepancies 2009-2010

	Progress Reports		Eurostat		Discrepancies	
	MW		MW		PR - Eurostat (%)	
	2009	2010	2009	2010	2009	2010
BE	112	124	105	115	6.5	7.5
BG	3	3	3	4	0.0	-25.0
CZ		118	96	118		
DK	77	80	77	80	0.0	0.0
DE	2150	2730	2169	2725	-0.9	0.2
EE	2	4	2	4	0.0	0.0
IE	0	0	30	31	-100.0	-100.0
EL	41	43	40	41	2.5	4.9
ES	177	189	177	192	0.0	-1.6
FR	161	175	159	184	1.3	-4.9
IT	378	508	359	480	5.3	5.8
CY	4	8	8	8	-46.9	-1.3
LV	8	11	8	11	0.0	0.0
LT	8	13	8	13	0.0	0.0
LU	9	9	9	9	0.0	0.0
HU	24	24	24	24	0.0	0.0
MT	0	0				
NL	186	196	186	200	0.0	-2.0
AT	161	171	454	607	-64.5	-71.8
PL	71	83	68	81	4.2	2.3
PT	20	25	20	25	0.0	0.0
RO	0	0	0	1		-100.0
SI	12	14	12	14	0.0	0.0
SK	4	9	4	9	0.0	0.0
FI	0	0	0	0		
SE	17	22	17	22	0.0	0.0
UK	0	0	1072	1138	-100.0	-100.0
EU 27	3625	4558	5107	6136	-29.0	-25.7

b. Biogas electricity generation

This section presents a comparison of the biogas electricity generation in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals some significant differences between biogas electricity generation reported in Progress Reports in comparison with Eurostat and EurObserv'ER, which can be significant for some Member States (UK, Ireland).

At the EU level, the data from Progress Reports was 24.1% and 19.4% above the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 24.6% and 20.0% above the EurObserv'ER data available for 2009 and 2010, respectively.

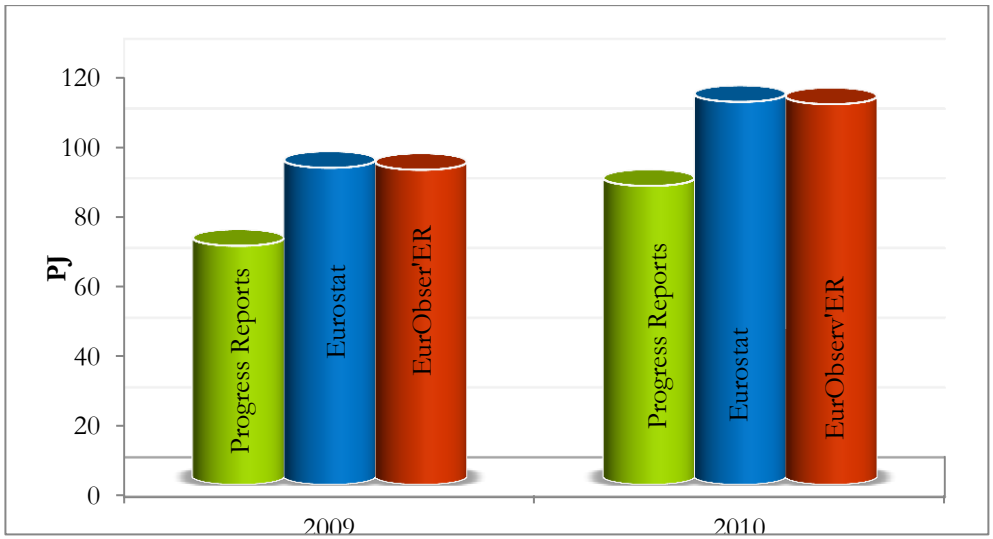

Figure 47. Biogas electricity generation in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

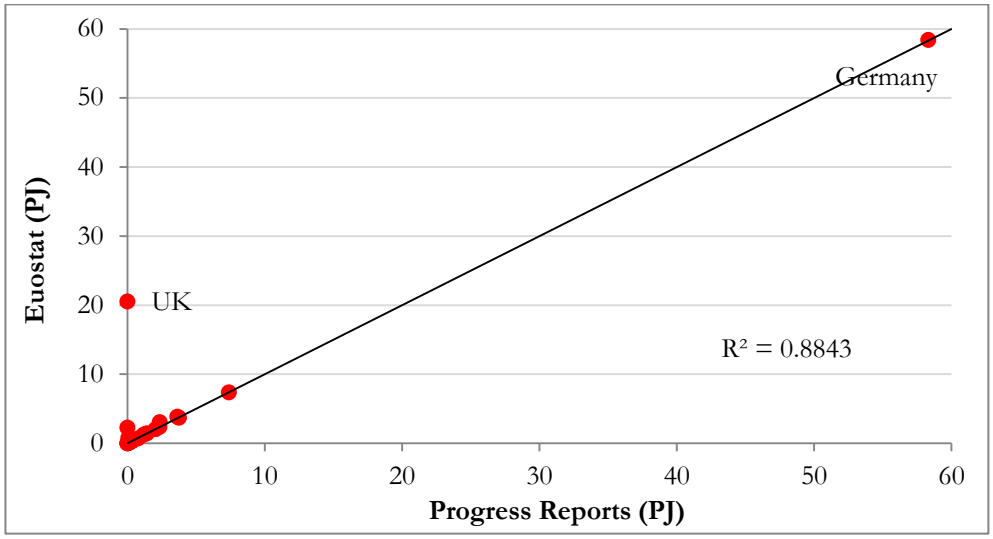

Figure 48. Comparison of biogas electricity generation in EU 27, PR-Eurostat, 2010

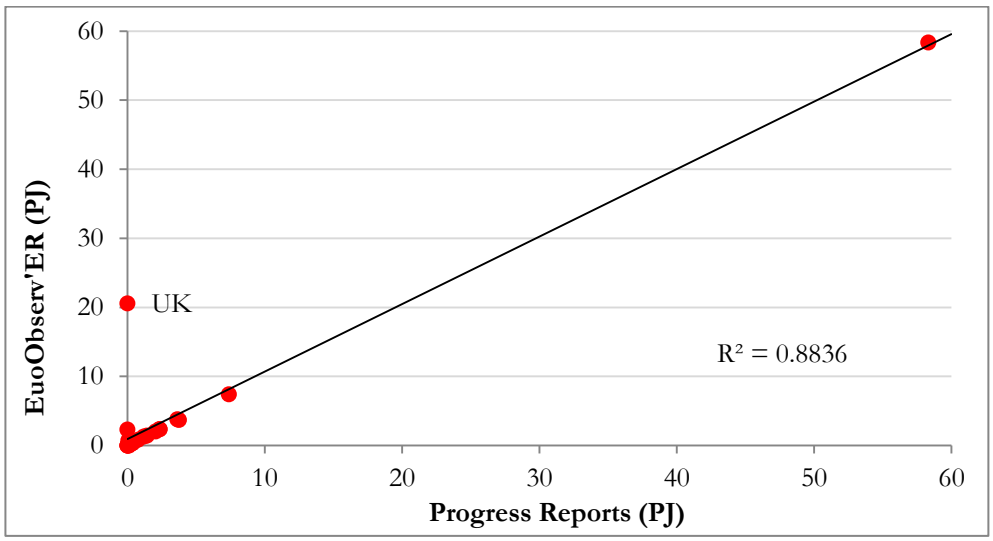

Figure 49. Comparison of biogas electricity generation in EU 27, PR-EurObserv'ER, 2010

Table 20. Biogas electricity in EU 27, PR-Eurostat-EurObserv'ER, relative discrepancies,2009-2010

	Progress Reports		Eurostat		Eurobserver		Discrepancies			
	PJ		PJ		PJ		PR - Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	1.7	2.05	1.7	2.0	1.6	2.0	-2.8	0.4	1.9	1.8
BG	0.0	0.1	0.0	0.0	0.0	0.0				37.6
CZ		2.3	1.6	2.3	1.6	2.3				
DK	1.2	1.2	1.2	1.3	1.3	1.3	0.1	-5.7	-8.3	-4.6
DE	45.4	58.3	45.2	58.3	45.2	58.4	0.3	0.0	0.4	-0.1
EE	0.0	0.0	0.0	0.0	0.0	0.0	4.5	-2.0	-39.8	-14.0
IE	0.1	0.1	0.7	0.7	0.7	0.8	-91.4	-91.3	-91.4	-91.4
EL	0.8	0.8	0.8	0.8	0.8	0.7	-2.6	-2.7	-1.3	16.1
ES	1.9	2.4	1.9	2.4	1.9	3.1	0.0	0.0	1.3	-23.1
FR	3.2	3.6	3.0	3.8	3.2	3.9	4.6	-3.8	0.1	-5.3
IT	6.0	7.4	6.0	7.4	6.3	7.4	0.0	0.0	-4.6	0.3
CY	0.1	0.1	0.0	0.0	0.1	0.1			14.0	0.7
LV	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.5	-3.3	22.5
LT	0.1	0.1	0.1	0.1	0.0	0.1	1.4	0.0	29.0	33.3
LU	0.2	0.2	0.2	0.2	0.2	0.2	-0.6	0.2	-8.9	20.4
HU	0.3	0.4	0.3	0.3	0.3	0.5	0.0	16.7	3.2	-12.5
MT	0.0	0.0	0.0	0.0	0.0	0.0				
NL	3.4	3.8	3.3	3.7	3.3	3.7	2.1	1.6	1.7	2.0
AT	2.2	2.3	2.2	2.3	2.2	2.3	0.2	0.2	-0.9	-0.4
PL	1.1	1.4	1.1	1.4	1.2	1.4	0.0	0.0	-2.0	0.7
PT	0.3	0.4	0.3	0.4	0.3	0.3	0.0	-1.0	2.0	7.5
RO	0.0	0.0	0.0	0.0	0.0	0.0	-75.3	-75.5		
SI	0.2	0.3	0.2	0.4	0.3	0.4	0.3	-0.4	-1.1	-7.3
SK	0.1	0.1	0.1	0.1	0.1	0.1	0.0	45.5	-5.4	37.6
FI	0.1	0.3	0.1	0.3	0.1	0.3	1.3	-0.2	-8.3	9.3
SE	0.1	0.1	0.1	0.1	0.1	0.1	0.0	-1.1	-2.6	3.2
UK	0.0	0.0	20.0	20.6	20.0	20.5	-100.0	-100.0	-100.0	-100.0
EU 27	68.6	88.0	90.4	109.2	90.9	109.9	-24.1	-19.4	-24.6	-20.0

3.7 Biofuel use in transport

This section presents a comparison of the biofuel use in transport in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals some significant differences between the biofuel use in transport reported in Progress Reports in comparison with Eurostat and EurObserv'ER, for some Member States (France, Germany, Poland).

At the EU level, the data from Progress Reports was 2.9% and 0.2% below the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 5.4% and 2.1% below the EurObserv'ER data available for 2009 and 2010, respectively.

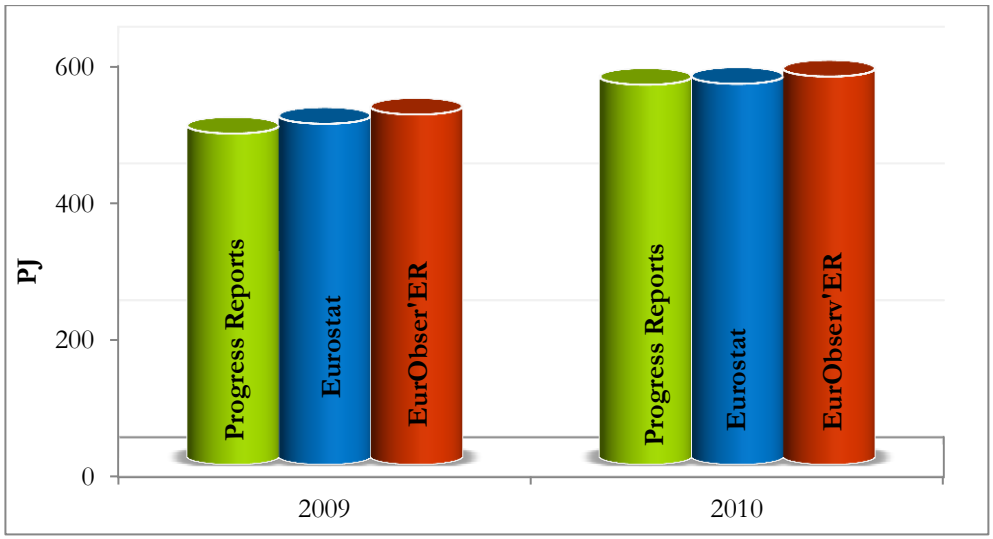

Figure 50. Biofuel use in transport in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

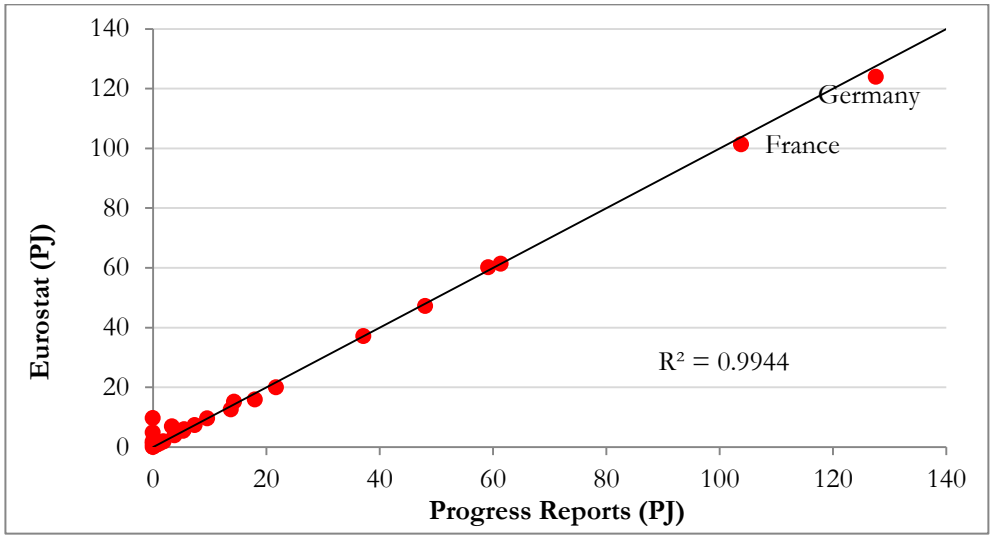

Figure 51. Comparison of biofuel use in transport in EU 27, PR-Eurostat, 2010

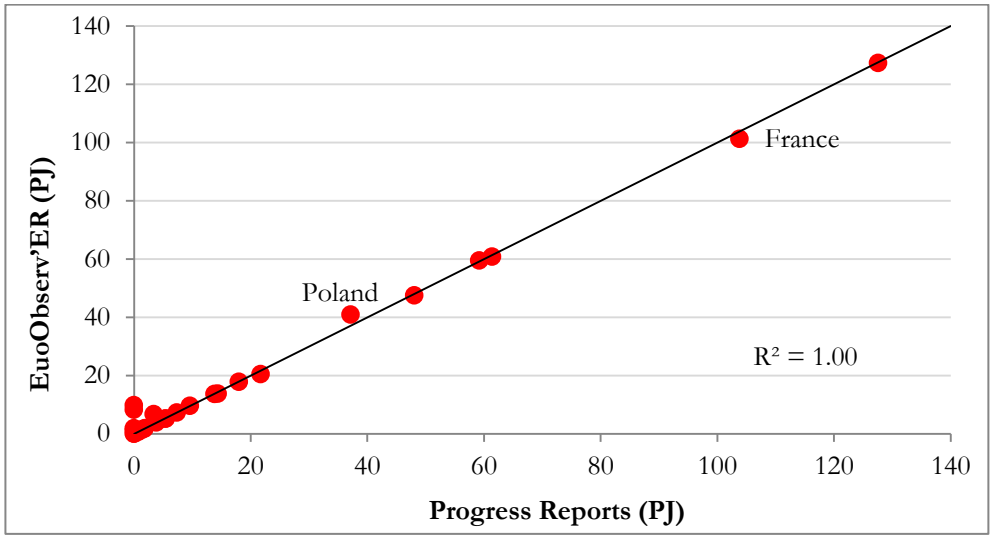

Figure 52. Comparison of biofuel use in transport in EU 27, PR-EurOvserv'ER, 2010

Table 21. Biofuel use in transport in EU 27, PR-Eurostat-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		Eurostat		EurObserv'ER		Discrepancies			
	PJ		PJ		PJ		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	9.5	14.4	12.0	15.2	13.7	13.7	-20.9	-5.3	-31.0	4.6
BG	0.2	0.5	0.2	0.5	0.2	0.7	0.0	-15.4	-31.1	-30.8
CZ		9.8	8.2	9.7	7.2	9.8		1.0		0.0
DK	0.0	0.0	0.4	1.1	0.4	1.1	-100.0	-100.0	-100.0	-100.0
DE	118.1	127.6	112.9	123.9	121.2	127.3	4.6	3.0	-2.5	0.3
EE	0.0	0.0	0.0	0.0	0.0	0.0				
IE	3.2	3.9	3.3	3.9	3.2	3.9	-1.3	-1.1	-0.6	-0.8
EL	3.3	5.4	3.3	5.4	3.2	5.2	0.0	0.0	2.6	2.7
ES	44.2	59.2	44.9	60.1	44.4	59.5	-1.6	-1.5	-0.4	-0.4
FR	103.1	103.8	103.2	101.3	102.6	101.2	-0.1	2.5	0.5	2.6
IT	49.4	61.4	49.4	61.4	49.0	60.8	0.0	0.0	0.9	0.9
CY	0.6	0.6	0.6	0.6	0.6	0.6	-0.9	-0.3	-1.0	0.1
LV	0.2	1.1	0.2	1.1	0.2	1.1	25.0	0.0	6.6	-0.4
LT	2.2	1.9	2.2	1.9	2.2	1.9	0.0	0.0	0.4	-0.3
LU	1.8	1.8	1.7	1.7	1.7	1.7	2.4	2.4	3.3	3.0
HU	7.1	7.4	7.1	7.3	7.1	7.3	0.0	0.6	0.3	1.1
MT	0.0	0.0	0.0	0.0	0.0	0.0				
NL	15.6	9.6	15.6	9.6	15.6	9.6	0.0	0.0	0.2	0.1
AT	22.3	21.7	20.3	20.0	21.1	20.5	9.7	8.6	5.4	6.0
PL	27.8	37.1	27.5	37.1	30.1	40.9	1.1	0.1	-7.9	-9.2
PT	9.7	13.8	9.2	12.6	9.4	13.6	4.8	9.9	2.4	1.3
RO	0.0	0.0	6.8	4.8	7.7	8.3	-100.0	-100.0	-100.0	-100.0
SI	1.5	2.1	1.3	1.9	1.2	1.9	15.4	10.5	25.0	10.5
SK	2.9	3.4	7.0	6.9	6.8	6.7	-58.7	-50.5	-57.4	-49.4
FI	5.5	5.5	6.1	5.9	5.6	5.2	-9.3	-7.4	-1.1	5.6
SE	16.6	18.0	15.1	15.9	16.5	17.8	9.7	13.2	0.7	1.2
UK	41.4	48.1	40.6	47.2	41.2	47.5	2.0	1.9	0.6	1.2
EU 27	484.5	555.8	499.0	557.1	512.3	567.8	-2.9	-0.2	-5.4	-2.1

3.7.1 Bioethanol use in transport

This section presents a comparison of the use of bioethanol in transport in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals some significant differences between the use of bioethanol in transport reported in Progress Reports in comparison with Eurostat and EurObserv'ER, for some Member States (especially Denmark, Romania, Slovenia, which did not reported biofuels in their Progress Reports as complying with sustainability criteria, but also others – Belgium, Slovakia, Finland).

At the EU level, the data from Progress Reports was 4.2% and 5.6% below the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 4.9% and 5.6% below the EurObserv'ER data available for 2009 and 2010, respectively.

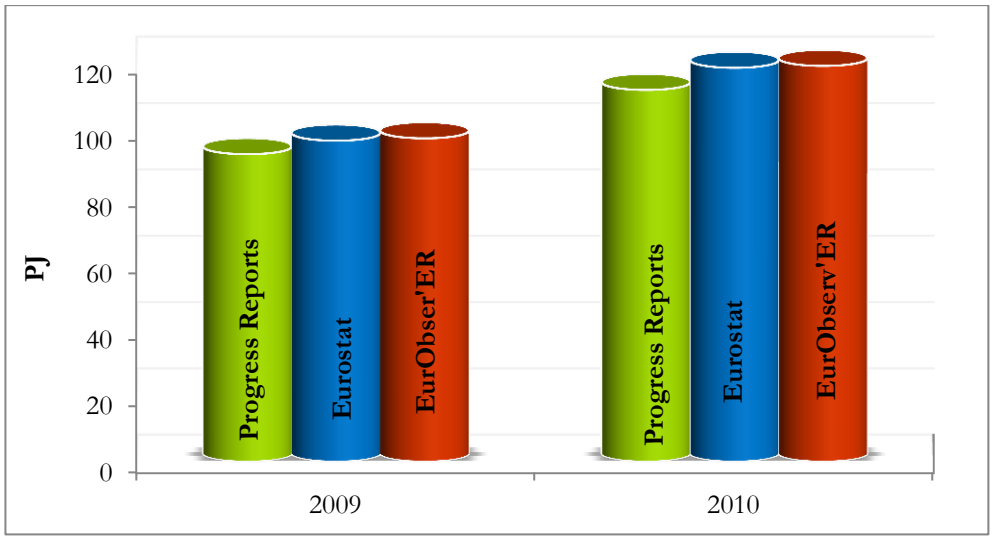

Figure 53. Bioethanol use in transport in EU 27, PR- Eurostat-EurObserv'ER, 2009-2010

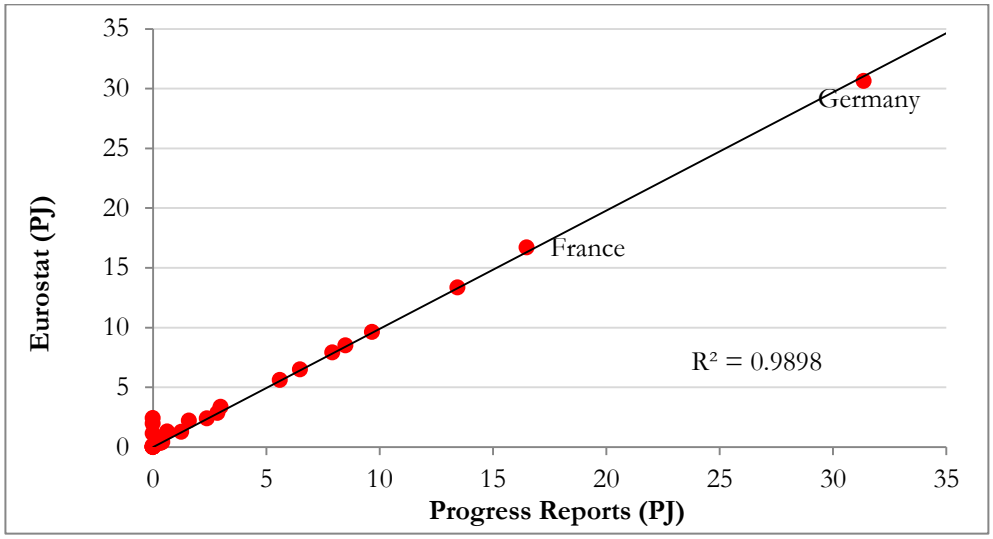

Figure 54. Comparison of bioethanol use in transport in EU 27, PR-Eurostat, 2010

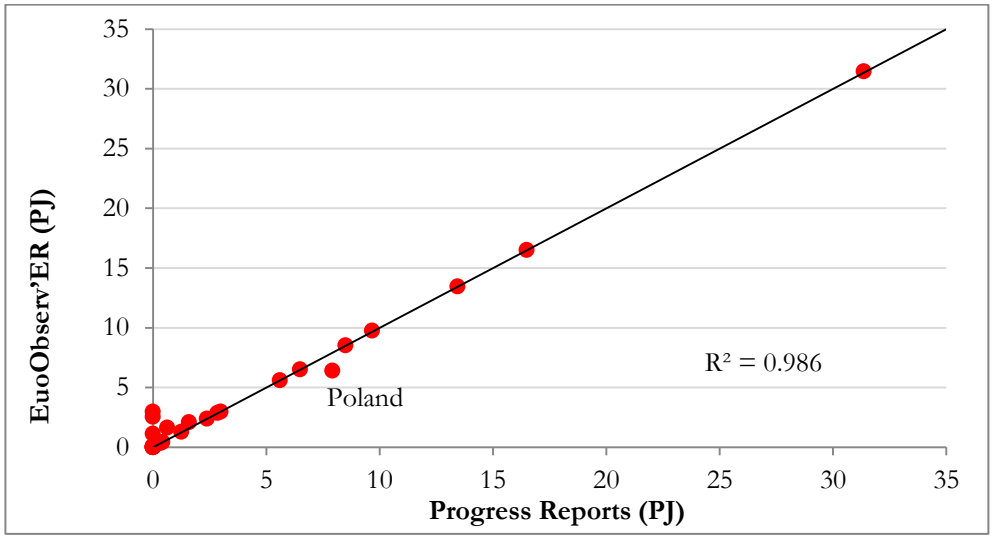

Figure 55. Comparison of bioethanol use in transport in EU 27, PR-EurOvserv'ER, 2010

Table 22. Bioethanol in EU 27, PR-Eurostat-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		Eurostat		EurObserv'ER		Discrepancies			
	PJ		PJ		PJ		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	1.3	1.6	2.0	2.2	1.8	2.1	-34.5	-27.9	-27.3	-24.1
BG	0.0	0.0	0.0	0.0	0.0	0.0				
CZ		2.5	2.5	2.4	2.0	2.6		4.2		-0.04
DK	0.0	0.0	0.2	1.1	0.3	1.1	-100.0	-100.0	-100.0	-100.0
DE	24.0	31.4	23.6	30.6	24.4	31.5	1.8	2.3	-1.3	-0.3
EE	0.0	0.0	0.0	0.0	0.0	0.0				
IE	1.0	1.3	1.0	1.3	1.0	1.3	0.0	0.0	-1.0	-2.4
EL	0.0	0.0	0.0	0.0	0.0	0.0				
ES	6.3	9.7	6.3	9.6	6.4	9.8	0.0	0.4	-0.9	-1.0
FR	17.0	16.5	17.0	16.7	17.2	16.5	0.2	-1.3	-1.1	-0.1
IT	4.9	6.5	4.9	6.5	4.9	6.5	0.0	0.0	-0.9	-0.6
CY	0.0	0.0	0.0	0.0	0.0	0.0				
LV	0.1	0.3	0.1	0.3	0.0	0.4	0.0	0.0	167.9	-5.0
LT	0.6	0.4	0.6	0.4	0.6	0.4	0.0	0.0	-0.6	-4.0
LU	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.1	38.9
HU	1.9	2.4	1.9	2.4	2.0	2.4	0.0	0.0	-2.1	-0.7
MT	0.0	0.0	0.0	0.0	0.0	0.0				
NL	5.8	5.6	5.8	5.6	5.8	5.6	0.0	0.0	0.5	-0.1
AT	2.6	2.8	2.6	2.8	2.7	2.9	0.0	0.0	-2.3	-0.7
PL	8.2	7.9	7.9	7.9	6.3	6.4	3.7	0.0	30.0	23.1
PT	0.0	0.0	0.0	0.0	0.0	0.0				
RO	0.0	0.0	0.1	2.0	2.2	3.0	-100.0	-100.0	-100.0	-100.0
SI	0.0	0.0	0.1	0.1	0.1	0.1	-100.0	-100.0	-100.0	-100.0
SK	0.6	0.6	1.4	1.3	1.7	1.6	-57.4	-51.3	-63.7	-61.6
FI	3.2	3.0	3.6	3.3	3.2	3.0	-13.4	-10.6	-0.2	0.0
SE	8.3	8.5	8.3	8.5	8.3	8.5	0.0	0.0	-0.1	-0.5
UK	6.8	13.4	6.8	13.4	6.7	13.5	0.6	0.6	1.6	-0.1
EU 27	92.6	114.5	96.7	118.7	97.4	119.2	-4.2	-3.5	-4.9	-3.9

3.7.2 Biodiesel use in transport

This section presents a comparison of the use of biodiesel in transport in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals some significant differences between the use of biodiesel in transport reported in Progress Reports in comparison with Eurostat and EurObserv'ER, for some Member States (especially Denmark, Romania, Slovenia, which did not reported biofuels in their Progress Reports as complying with sustainability criteria, but also others – Bulgaria, Slovakia, Poland).

At the EU level, the data from Progress Reports was only 0.08% and 4.2% above the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 5.7% and 2.0% below the EurObserv'ER data available for 2009 and 2010, respectively.

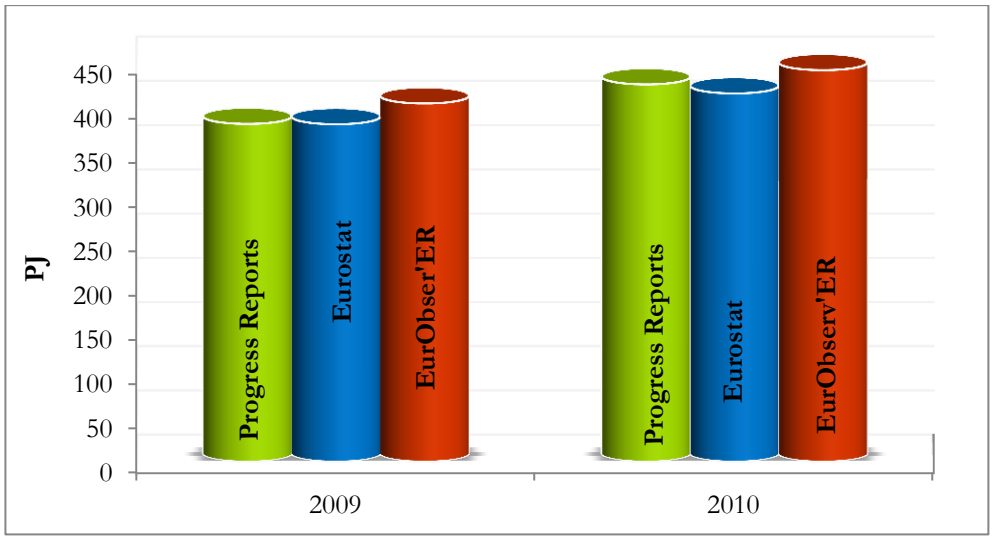

Figure 56. Biodiesel use in transport in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

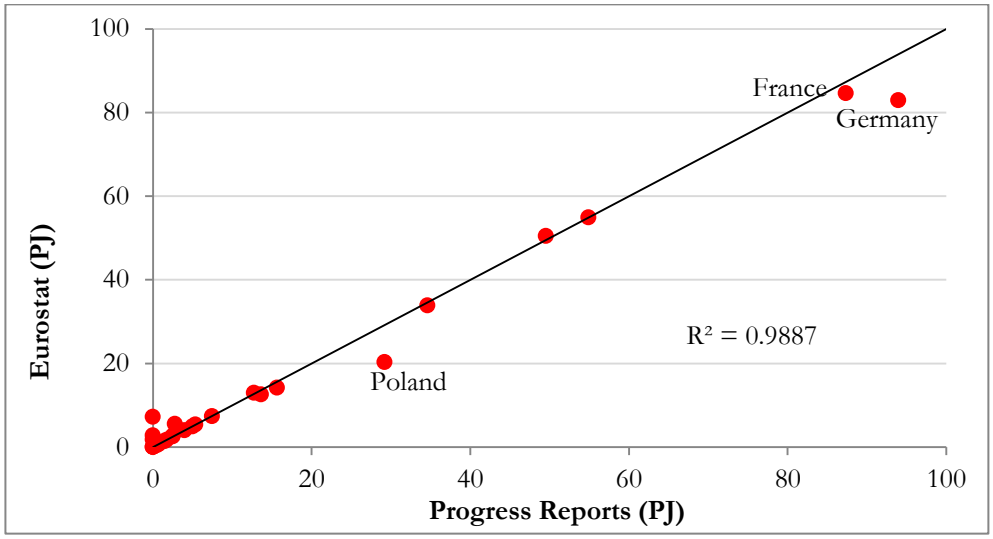

Figure 57. Comparison of biodiesel use in transport in EU 27, PR-Eurostat, 2010

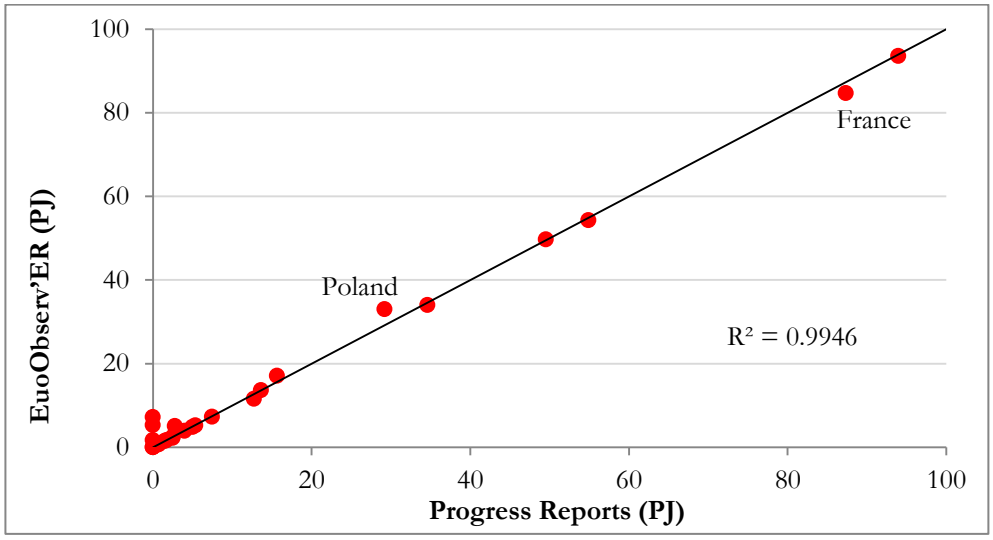

Figure 58. Comparison of biodiesel use in transport in EU 27, PR-EurOvserv'ER, 2010

Table 23. Biodiesel in EU 27, PR-Eurostat-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		Eurostat		Eurobserver		Discrepancies			
	PJ		PJ		PJ		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	8.2	12.8	10.0	12.9	12.0	11.6	-17.9	-1.4	-31.6	9.8
BG	0.2	0.5	0.1	0.4	0.2	0.7	33.3	10.0	-31.1	-30.8
CZ		7.2	5.7	7.2	5.2	7.2				
DK	0.0	0.0	0.2	0.0	0.1	0.0	-100.0		-100.0	-100.0
DE	90.3	94.0	81.3	82.9	93.1	93.6	11.1	13.3	-3.0	0.4
EE	0.0	0.0	0.0	0.0	0.0	0.0				
IE	2.2	2.5	2.2	2.6	2.2	2.5	0.0	-1.6	0.2	0.5
EL	3.3	5.4	3.3	5.4	3.2	5.2	0.0	0.0	2.6	2.7
ES	37.9	49.5	38.6	50.5	38.0	49.7	-1.7	-1.9	-0.3	-0.3
FR	86.1	87.3	86.3	84.7	85.5	84.7	-0.2	3.2	0.8	3.1
IT	44.5	54.9	44.5	54.9	44.0	54.3	0.0	0.0	1.1	1.0
CY	0.6	0.6	0.6	0.6	0.6	0.6	-0.9	-0.3	-1.0	0.1
LV	0.1	0.8	0.1	0.8	0.1	0.8	0.0	0.0	-44.0	1.6
LT	1.6	1.5	1.6	1.4	1.6	1.5	0.0	2.9	0.8	0.8
LU	1.7	1.7	1.7	1.7	1.7	1.7	2.5	2.5	2.7	2.4
HU	5.1	5.0	5.1	4.9	5.1	4.9	0.0	0.8	1.2	2.0
MT	0.0	0.0	0.0	0.0	0.0	0.0				
NL	9.8	4.0	9.8	4.0	9.8	4.0	0.0	0.0	0.0	0.4
AT	14.9	15.7	13.3	14.2	13.5	17.1	11.6	10.3	10.4	-8.4
PL	19.6	29.2	16.2	20.3	23.8	33.0	20.9	43.6	-17.8	-11.6
PT	9.5	13.6	9.2	12.6	9.4	13.6	2.7	8.7	0.4	0.2
RO	0.0	0.0	1.6	2.8	5.5	5.3	-100.0	-100.0	-100.0	-100.0
SI	0.0	0.0	1.2	1.8	1.2	1.7	-100.0	-100.0	-100.0	-100.0
SK	2.3	2.8	5.6	5.6	5.1	5.1	-59.0	-50.4	-55.3	-45.5
FI	2.4	2.5	2.5	2.6	2.4	2.2	-4.7	-4.8	-2.2	13.4
SE	6.8	7.5	6.8	7.4	6.7	7.3	0.0	0.6	1.3	1.7
UK	34.6	34.6	33.8	33.9	34.5	34.0	2.2	2.2	0.4	1.7
EU 27	381.6	433.5	381.3	416.1	404.7	442.3	0.08	4.2	-5.7	-2.0

3.7.3 Other biofuels use in transport

This section presents a comparison of the use of other biofuels in transport in the EU Member States. This was based on data from the Progress reports and the data collected from Eurostat and EurObserv'ER, covering the period 2009-2010.

Analysis reveals significant differences between the use of other biofuels in transport between Eurostat, one one side and Progress Reports and EurObserv'ER, on the other side, but also for some Member States (Austria, Germany, Poland, Sweden).

At the EU level, the data from Progress Reports was 50.9% and 65.2% below the Eurostat data available for 2009 and 2010, respectively. The data from Progress Reports was 0.9% and 24.6% below the EurObserv'ER data available for 2009 and 2010, respectively.

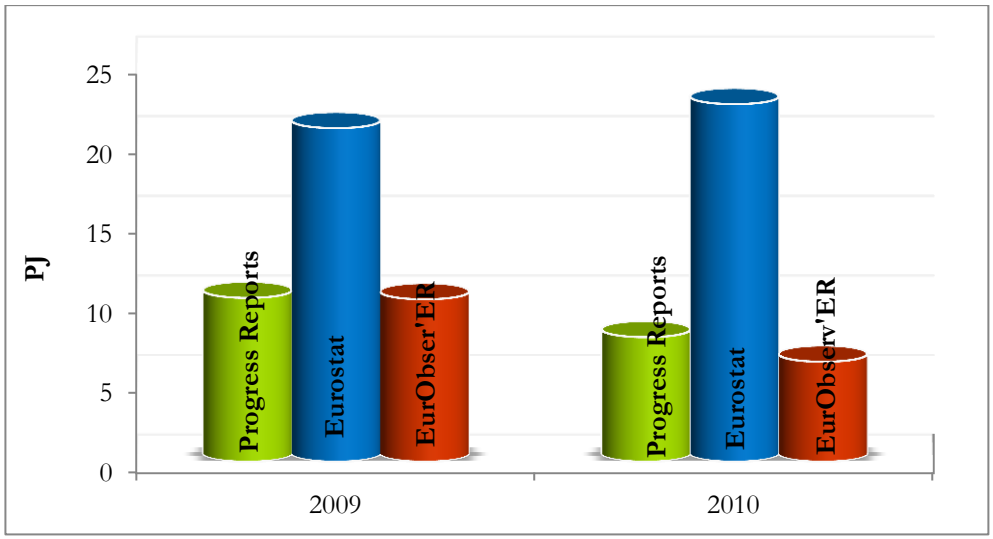

Figure 59. The use of other biofuels in transport in EU 27, PR-Eurostat-EurObserv'ER, 2009-2010

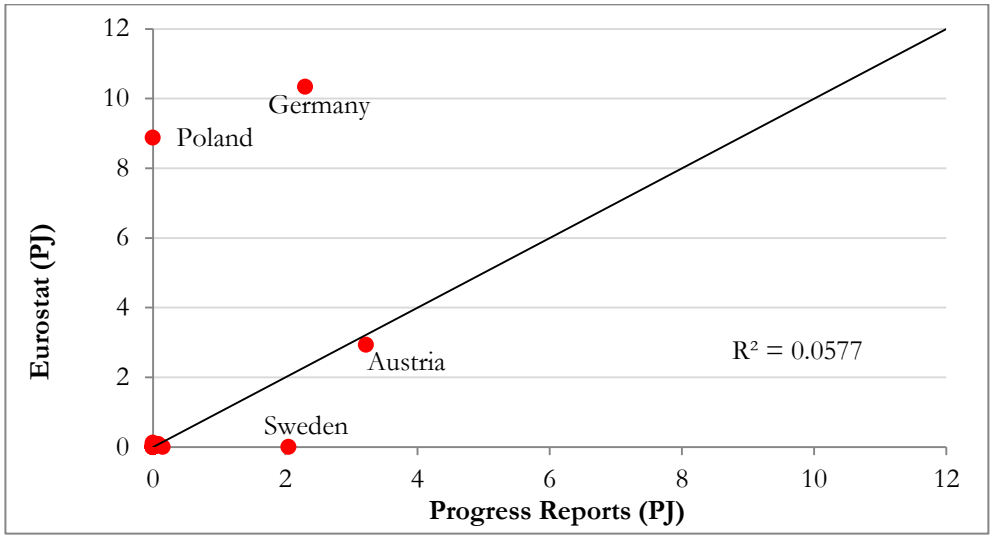

Figure 60. Comparison of other biofuels use in EU 27, PR-Eurostat, 2010

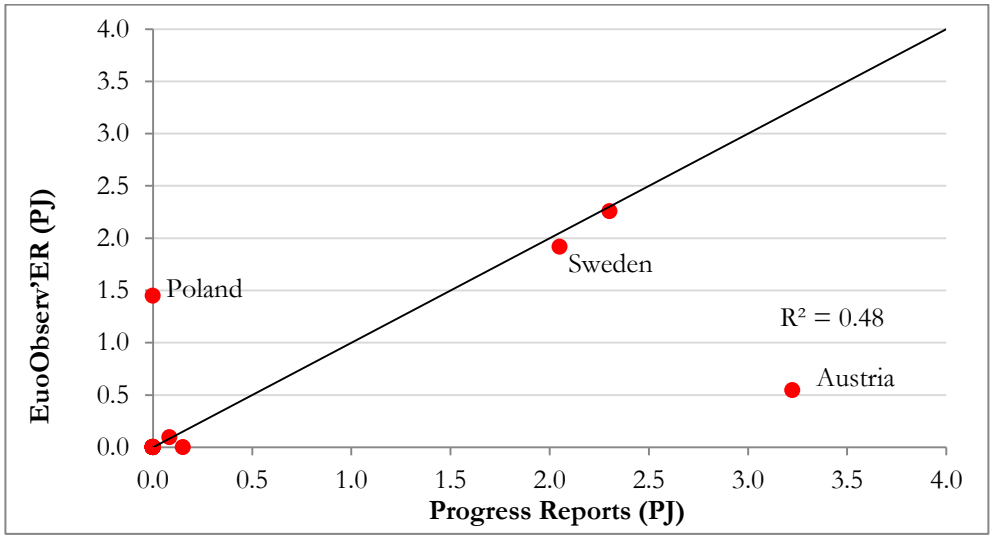

Figure 61. Comparison of other biofuels use in EU 27, PR-EurOvserv'ER, 2010

Table 24. Other biofuels used in EU 27, PR-Eurostat-EurObserv'ER, relative discrepancies, 2009-2010

	Progress Reports		Eurostat		Eurobserver		Discrepancies			
	PJ		PJ		PJ		PR-Eurostat (%)		PR-EurObserv'ER (%)	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
BE	0.0	0.0	0.0	0.0	0.0	0.0				
BG	0.0	0.0	0.0	0.1	0.0	0.0		-100.0		
CZ		0.0	0.0	0.0	0.0	0.0				
DK	0.0	0.0	0.0	0.0	0.0	0.0				
DE	3.8	2.3	8.1	10.3	3.7	2.3	-53.4	-77.7	1.8	2.0
EE	0.0	0.0	0.0	0.0	0.0	0.0				
IE	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	-24.4	-14.1
EL	0.0	0.0	0.0	0.0	0.0	0.0				
ES	0.0	0.0	0.0	0.0	0.0	0.0				
FR	0.0	0.0	0.0	0.0	0.0	0.0				
IT	0.0	0.0	0.0	0.0	0.0	0.0				
CY	0.0	0.0	0.0	0.0	0.0	0.0				
LV	0.0	0.0	0.0	0.0	0.0	0.0				
LT	0.0	0.0	0.0	0.0	0.0	0.0				
LU	0.0	0.0	0.0	0.0	0.0	0.0	-100.0			
HU	0.0	0.0	0.0	0.0	0.0	0.0				
MT	0.0	0.0	0.0	0.0	0.0	0.0				
NL	0.0	0.0	0.0	0.0	0.0	0.0				
AT	4.8	3.2	4.3	2.9	5.0	0.5	10.7	10.0	-3.7	491.2
PL	0.0	0.0	3.3	8.9	0.0	1.5	-100.0	-100.0	#DIV/0!	-100.0
PT	0.2	0.2	0.0	0.0	0.0	0.0				
RO	0.0	0.0	5.1	0.1	0.0	0.0	-100.0	-100.0		
SI	0.0	0.0	0.0	0.0	0.0	0.0				
SK	0.0	0.0	0.0	0.0	0.0	0.0				
FI	0.0	0.0	0.0	0.0	0.0	0.0			-100.0	-100.0
SE	1.5	2.1	0.0	0.0	1.5	1.9			2.1	7.0
UK	0.0	0.0	0.0	0.0	0.0	0.0				
EU 27	10.3	7.8	20.9	22.4	10.2	6.3	-50.9	-65.2	0.9	24.6

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ANNEX II
SUMMARY TABLES OF RENEWABLE ENERGY DEVELOPMENT IN EU 27

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Table 1. Gross Final Energy Consumption in EU 27, (2009-2010)

	2009	2010	Additional 2010		2009	2010
	PJ	PJ	PJ	%	(GJ/Capita)	(GJ/Capita)
GFEC H/C	21196.5	22976.0	1779.5	8.4	42.4	45.9
GFEC-E	11153.8	11614.7	460.8	4.1	22.3	23.2
GFEC-T	12473.6	12429.3	-44	-1.1	25.0	24.8
GFEC	46771	48943	2172	4.6	93.6	97.7

Table 2. RES contribution in Gross Final Energy Consumption in EU 27, (2009-2010)

	2009	2010	Additional 2010		2009	2010
	PJ	PJ	PJ	%	(GJ/Capita)	(GJ/Capita)
RES-H/C	2914	3301	386	13.3	5.8	6.6
RES-E	2129	2292	162.4	7.6	4.3	4.6
RES-T	486.0	548.2	62.2	12.8	1.0	1.1
RES-T double counting	529	594.6	65.5	12.4	1.1	1.2
RES-T multiple counting	543.5	618.8	75.2	13.8	1.1	1.2
Total RES	5529	6140	611	11.0	11.1	12.3

Table 3. EU 27 RES share in Gross Final Energy Consumption, (2009-2010)

	2009	2010	Increase/Decrease	
	%	%	% points	%
RES H/C	13.7	14.4	0.6	4.5
RES-E	19.1	19.7	0.6	3.4
RES-T	4.2	4.8	0.5	12.8
RES-T(for 10% target)	4.36	4.96	0.6	13.8
Total RES	11.9	12.6	0.7	6.1

Table 4. RES installed capacity in EU 27, (2009-2010)

	2009	2010	Additional 2010	
	MW	MW	MW	%
Hydropower	99218	99904	686	0.7
Geothermal	788	823	35	4.4
Solar	15763	28000	12237	77.6
Marine	242.5	242.6	0.1	0.04
Wind	74872	84104	9233	12.3
Onshore	72861.1	81222.9	8362	11.5
Offshore	2001	2899	898	44.9
Biomass	22837	24970	2133	9.3
Solid biomass	18,023	19,158	1135	6.3
Biogas	3625	4440	815	22.5
Bioliquids	1188	1382	194	16.4
Total	213720	238044	24323	11.4

Table 5. Renewable Energy Technologies Development in EU 27, (2009-2010)

	2009	2010	Additional 2010	
	PJ	PJ	PJ	%
Hydropower	1177	1194	16.9	1.4
Geothermal	44.2	42.2	-2.0	-4.5
Geothermal -E	20.2	20.2	0.08	0.4
Geothermal – H/C	24.0	22.0	-2.0	-8.4
Solar	104.1	143.6	39.7	38.2
Solar electricity	50.8	81.3	30.5	60.1
Solar thermal	53.2	62.3	9.2	17.2
Marine	1.61	1.72	0.11	6.5
Wind	490.6	557.1	66.5	13.6
Onshore	474.9	535.3	60.4	12.7
Offshore	14.7	21.8	7.0	47.8
Heat pumps	159.7	180.9	21.2	13.3
Biomass -E	389.0	437.2	48.2	12.4
Solid biomass	301.2	328.6	27.4	9.1
Biogas	68.6	85.7	17.2	25.0
Bioliquids	19.2	22.9	3.7	19.1
Biomass H/C	2677.4	3035.4	358.1	13.4
Solid biomass	2508.9	2824.0	315.1	12.6
Biogas	60.6	80.8	20.2	33.3
Bioliquids	72.0	90.2	18.1	25.2
Biofuels	486.0	548.2	62.2	12.8
Bioethanol/bio-ETBE	92.6	112.0	19.4	20.9
Biodiesel	381.6	426.3	44.6	11.7
Other	10.3	7.8	-2.5	-24.0
Total	5529	6140	611	11.0

Table 6. Gross Final Energy Consumption in EU 27 and deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
GFEC-H/C	22807	23699	893	3.9
GFEC-E	11866	11867	1.0	0.01
GFEC-T	13124.4	12685.1	-439.3	-3.3
GFEC	49609.2	50175.5	566.3	1.1

Table 7. RES contribution in GFEC in EU 27 and deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	PJ	PJ	PJ	%
RES-H/C	2851.6	3379.8	528.2	18.5
RES-E	2330	2310.5	-19.5	-0.8
RES-T	575.9	558	-18	-3.1
RES-T double counting	630.2	604.6	-25.6	-4.1
RES-T multiple counting	649.1	628.8	-20.3	-3.1
Total RES	5757.5	6248.3	490	8.5

Table 8. RES share in GFEC in EU 27 and deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	%	%	% points	%
RES-H/C	12.5	14.4	1.9	15.2
RES-E	19.6	19.7	0.1	0.5
RES-T	4.9	4.8	-0.1	-3.3
RES-T (for 10% target)	4.95	4.96	0.01	0.2
Total RES	11.5	12.6	1.1	9.9

Table 9. RES installed capacity in EU 27 and deviations from NREAPs, 2010

	NREAPs	Progress Reports	Deviation PR-NREAPs	
	MW	MW	MW	%
Hydropower	110934	100952	-9983	-9.0
Geothermal	816	823	7	0.9
Solar	25989	29727	3738	14.4
Marine	245	242.6	-2.4	-1.0
Wind	85472	84317	-1155	-1.4
Onshore	82742	81466	-1276	-1.5
Offshore	2590	2898.5	309	11.9
Biomass	22681	25088	2408	10.6
Solid biomass	14421	19158	4737	32.8
Biogas	5431	4558	-872	-16.1
Bioliquids	1039	1382	344	33.1
Total	246137	241150	-4988	-2.0

Table 10. Renewable Energy Technologies in EU 27 and deviations from NREAPs, 2010

	NREAPs	**Progress Reports**	**Deviation PR-NREAPs**	
	PJ	PJ	PJ	%
Hydropower	1223.3	1201.4	-21.9	-1.8
Geothermal	50.3	42.2	-8.1	-16.1
Geothermal -E	21.5	20.2	-1.3	-6.0
Geothermal – H/C	28.21	21.54	-6.8	-23.6
Solar	136.4	146.2	9.8	7.2
Solar electricity	74.7	83.5	8.9	11.9
Solar thermal	61.7	62.7	1.0	1.6
Marine	1.8	1.7	-0.1	-4.6
Wind	596.9	558.7	-38.6	-6.5
Onshore	564.8	536.9	-27.9	-4.9
Offshore	31.2	21.8	-9.4	-30.2
Heat pumps	168.0	182.6	14.7	8.7
Biomass -E	411.4	444.9	33.5	8.2
Solid biomass	276.1	334.0	57.8	20.9
Biogas	103.3	88.0	-15.2	-14.8
Bioliquids	31.1	22.9	-8.2	-26.4
Biomass H/C	2593.6	3112.5	518.9	20.0
Solid biomass	2377.2	2898.6	521.4	21.9
Biogas	62.1	83.2	21.1	34.0
Bioliquids	153.8	90.2	-63.7	-41.4
Biofuels	575.9	558.0	-18.0	-3.1
Bioethanol/bio-ETBE	120.4	114.5	-5.9	-4.9
Biodiesel	445.9	433.5	-12.4	-2.8
Other	8.8	7.8	-1.0	-11.5
Total	5757.5	6248.3	490	8.5

Glossary

Aerothermal energy - means energy stored in the form of heat in the ambient air;

Bioenergy – means the conversion of biomass resources such as agricultural and forest residues, organic municipal waste and energy crops into useful energy carriers including heat, electricity and transport fuels;

Bioethanol – means the ethanol (alcohol) that is produced chemically from ethylene, or biologically from fermentation of various sugars from carbohydrates found in agricultural crops and cellulosic residues from crops or wood;

Biodiesel – means the liquid biofuel suitable as a diesel fuel substitute or diesel fuel additive. Biodiesel fuels are typically made from oils such as soybeans, rapeseed or sunflowers; or from animal tallow. Biodiesel can also be made from hydrocarbons derived from agricultural products such as rice hulls.

Biofuel - means liquid or gaseous fuel for transport produced from biomass;

Bioliquid – means liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass;

Biomass - means the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste;

Concentrated Solar Power – means the technology which produces electricity by concentrating solar energy in a single focal point. This concentrated energy is then used to heat up a fluid, produce steam and activate turbines that produce electricity;

Geothermal energy - means energy stored in the form of heat beneath the surface of solid earth;

Gross Final Energy Consumption - means the energy commodities delivered for energy purposes to industry, transport, households, services including public services, agriculture, forestry and fisheries, including the consumption of electricity and heat by the energy branch for electricity and heat production and including losses of electricity and heat in distribution and transmission;

Hydrothermal energy - means energy stored in the form of heat in surface water;

Marine energy - means the energy carried by ocean waves, tides, salinity, and ocean temperature differences. This energy can be harnessed to generate electricity to power homes, transport and industries;

NREAPs – According to Article 4 of Directive 2009/28/EC the national renewable energy action plans shall set out Member States' national targets for the share of energy from renewable sources consumed in transport, electricity and heating and cooling in 2020, taking into account the effects of other policy measures relating to energy efficiency on final consumption of energy, and adequate measures to be taken to achieve those national overall targets, including cooperation between local, regional and national authorities, planned statistical transfers or joint projects, national policies to develop existing biomass resources and mobilise new biomass resources for different uses, and the measures to be taken to fulfil the requirements of Articles 13 to 19.

Renewable Energy - means energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases;

Solar energy – means the radiant energy of the sun, which can be converted into other forms of energy, such as heat or electricity

Solar photovoltaic – means the field of technology and research related to the application of solar cells that convert sunlight directly into electricity.

Wind energy – means the kinetic energy present in wind motion that can be converted to mechanical energy for driving pumps, mills and electric power generators.

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Abstract

The present report is an analysis of the state of the art in the development of renewable energy by each technology and Member State for years 2009 and 2010. The report presents a comparative analysis with expected achievements and indicative interim trajectory provided by National Renewable Energy Action Plans and Progress Reports for year 2010.

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