



KEEP-ON-TRACK! PROJECT

ANALYSIS OF DEVIATIONS AND BARRIERS 2013

03.06.2013

Contract N: IEE/11/842

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EXECUTIVE SUMMARY

The Analysis of Deviations and Barriers Report provides a detailed European overview on deviations of EU Member States from their indicative trajectory (chapter I) as well as on barriers to RES deployment (chapter II). Furthermore, the third chapter of this publication also provides more insights on the national deviations and barriers identified in each of the 11 EU Member States represented in the Keep on Track! consortium.

European Overview of Deviations

Of 27 Member States, 16 were on track regarding the RES trajectories defined in the NREAPs. Regarding the interim targets defined in the RES Directive, 21 Member States have met the 2011/2012 milestone already; only 5 still need to make additional efforts. This is not surprising, given the relatively low ambition level of the interim targets in the early years. Trajectories will become steeper just before 2020.

- In the RES-E sector, 14 Member States overachieved on their 2011 target, 13 underachieved, and growth rates for 16 Member States would be sufficient to achieve 2020 targets if they could be maintained. With the recent deterioration of support schemes in many Member States, however, this is unlikely.
- In the RES-H sector, 23 Member States were above their 2011 targets, similar to the previous year. Four Member States underachieved. However, only 8 Member States had growth rates from 2010-2011 that would be sufficient to reach 2020 targets if they were to be maintained.
- The RES-T sector has seen less progress than the former two, with only 9 Member States on or above their NREAP 2011 target, and 18 below. Only 10 Member States had growth rates from 2010-2011 that would be sufficient to reach 2020 targets if they were to be maintained.

The following map (figure 1) gives an overview of EU Member States' target achievement in 2011, regarding both their NREAP 2011 target, as well as the 2011/2012 interim target defined in the RES Directive. The interim targets defined in the Directive have a rather low level of ambition in the early years, and many countries thus defined their own NREAP 2011 targets to be higher. Member States which achieved both their 2011/2012 interim target and their NREAP target in 2011 are shown in green in the map. Member States which achieved the 2011/2012 interim target but not the (higher) NREAP target are shown in yellow. One Member State, the UK, neither achieved the 2011/2012 interim target nor the NREAP target in 2011 and is therefore shown in red. However, as the interim target is an average of 2011 and 2012, the UK may still achieve it in the next year. National 2012 share estimations to verify this were not available at the time of writing. The arrows give indications for each Member State on whether they are on a good track to achieve their 2020 target. The indication is based on qualitative judgments by the national renewable energy associations and eclareon, as well as on a quantitative assessment by Fraunhofer ISI based on whether the growth rate in the RES share between 2010 and 2011 would be sufficient to achieve 2020 planned deployment.

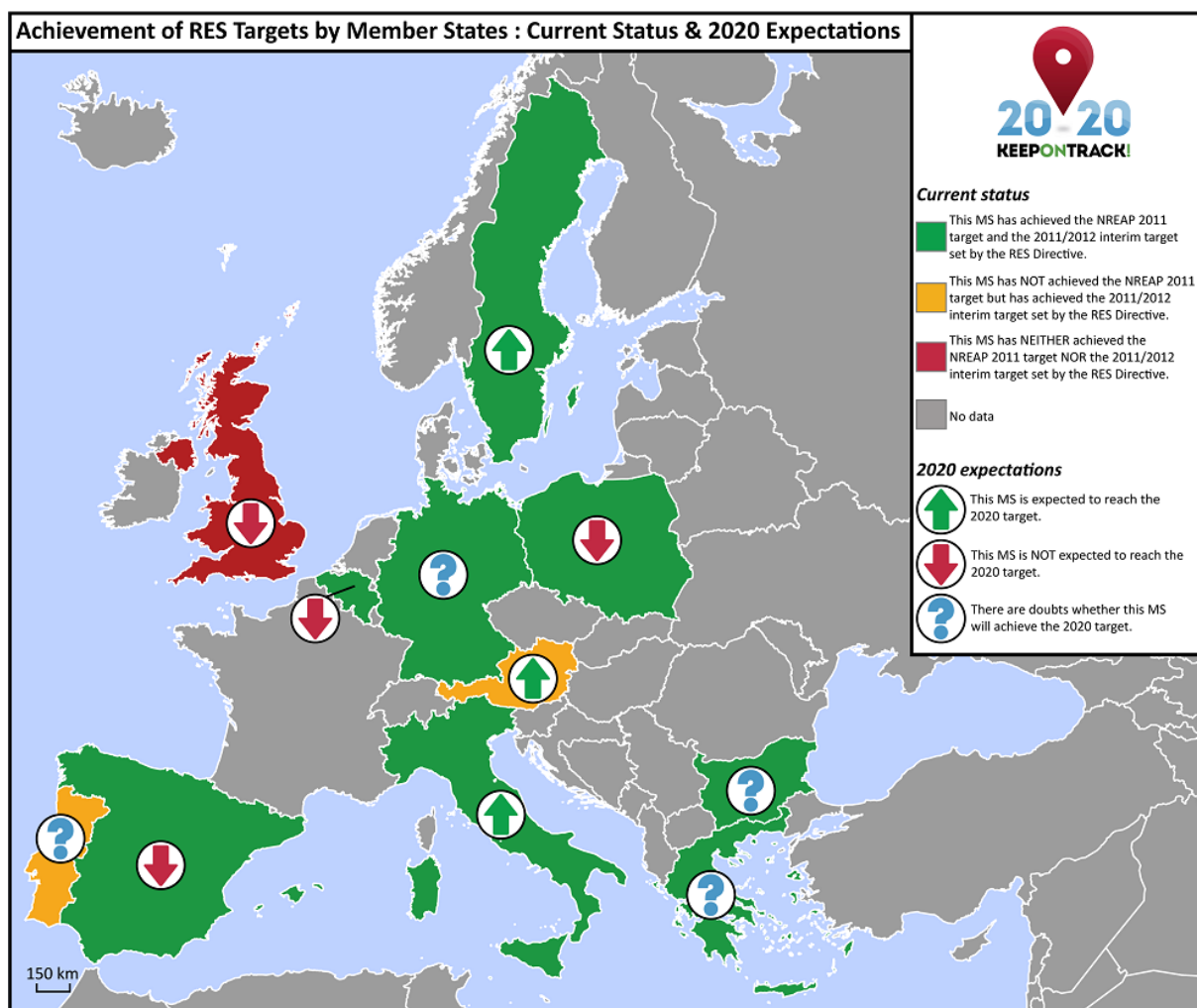


Figure 1: Achievement of RES targets by member states: current status & 2020 explanations¹.

European Overview of Barriers

The Keep-on-Track! Project analyses the barriers hindering the development of renewable energy sources, across all three energy sectors in the European Union. The first year of this 3 year project focuses on the 11 Member States represented by national renewable energy associations as partners of the project consortium. The year 1 report mainly provides a status quo overview on the barrier situation as perceived by national stakeholders. To this end, a bottom up approach was chosen, allowing for the broadest barrier identification possible at national level. Year 2 and 3 of the project shall then see a development analysis as well as an in-depth examination of the barrier impact at national and European level.

¹ In Annex I of Directive 2009/28/EC, the binding trajectory towards 2020 targets is defined through biannual interim targets. The interim targets consist in a percentage deployment towards the 2020 target starting from 2005 levels: 20% has to be reached by 2011/2012, 30% by 2013/2014; 45% by 2015/2016, and 65% by 2017/2018



In a second step of the year 1 research, identified barriers were classified under global categories enabling a comparison of information across Member States. As a consequence of the chosen approach it should be underlined that the non-identification of a barrier in a certain country does not necessarily stand for its non-existence. In fact, other national barriers may have been perceived as more important or more urgent and were therefore prioritised.

In addition, it is to underline that the identification of a high number of barriers in a specific Member State does not necessarily correlate with the degree of severity of the overall renewable situation. The identification of a high number of barriers might namely be the result of high barrier awareness in certain countries, favoured by high transparency or a high level of information availability. Moreover, the number of barriers might also depend on the development stage of a certain technology; a high number of barriers would therefore be the outcome of technology maturity.

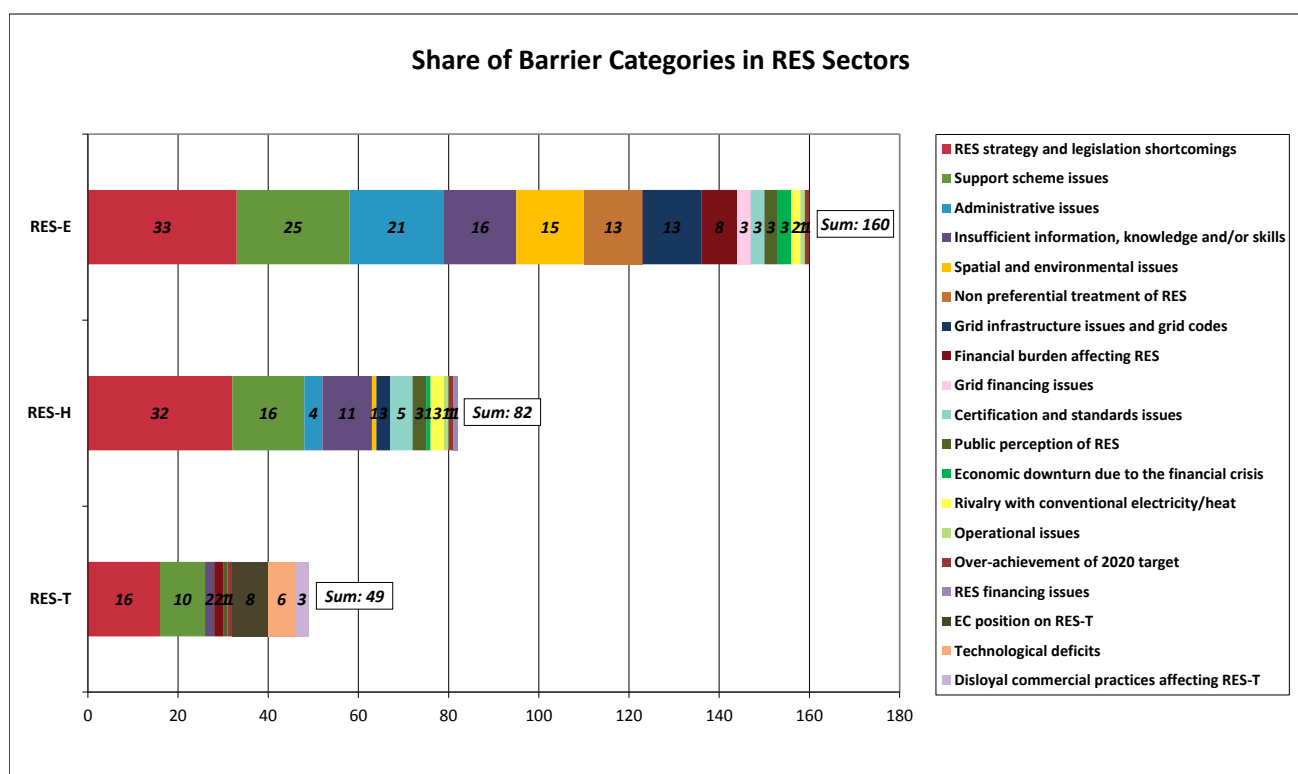


Figure 39: Share of Barrier Categories in RES Sectors. Source: eclareon based on own research and on information from the 11 national renewable energy associations which partner the Keep on track! Project

In total, 280 single barriers have been reported over all sectors and Member States, among which 160 barriers for RES-E only, 82 for the RES-H and 49 for RES-T.

The most dominant category common to all sectors is the issue of “RES strategy and legislation shortcomings”, gathering in total 81 out of 280 barriers over all sectors. This category refers among others to barriers resulting



from a lack of long-term vision of decision makers, unclear legislative frameworks or a lack of harmonised positions of decision makers.

The second most dominant category, being “Support Scheme Issues“, is also common to all three sectors, in terms of number of barriers as well as number of affected Member States. Here barriers relate to the uncertainty and instability of support scheme mechanisms as well as to the insufficient level of incentives. As far as the transport sector is concerned, the majority of barriers reported refer to biofuels. Yet issues such as the lack of targeted mechanisms for e-vehicles have also been flagged.

The third category common to all three sectors concerns the issue of “Insufficient information, knowledge and/or skills“. This category mainly relates to barriers dealing with the insufficient information, knowledge and skills of the professional sector and of decision makers as regards RES. For example, numerous barriers refer to the lack of technical expertise of installers and experts as well as to the insufficient information and studies available on RES. Another important source of barriers is the insufficient knowledge of the responsible authorities on RES, leading among others to issues related to local spatial development plans, especially in the RES-E sector.

Another common barrier deals with “Administrative issues“. Interesting enough is the fact that a quite important amount of barriers classified under this category were identified both in the RES-E and in the RES-H sector, but no barrier was reported for the RES-T sector. As mentioned above, this could be explained by the fact that in most of the 11 Member States analysed, the RES-T sector is less developed or is subject to a minor degree of barrier awareness than the RES-E and RES-H sectors. As a consequence, fewer barriers could be identified for RES-T at this stage of the project.

In addition to the above outlined common categories, it is important to highlight that a large set of identified categories remain sector specific and have to be addressed accordingly. In this regard, a significant example is illustrated by the RES-T sector, for which two important categories were identified which do not appear in the RES-E and the RES-H sectors. Several barriers namely refer to the issue of “Technological issues“, hindering both the development of e-vehicles (e-battery issues) and of biofuels (incompatibility of old engines with the use of biofuels). The second important category solely affecting RES-T regards the position of the European Commission towards RES-T. Here barriers mainly refer to the uncertain position of the EC regarding biofuels (especially concerning the cap on the amount of crop-based biofuels, the ILUC coefficients, and discussions about double and quadruple counting of biofuels).

On the basis of the barriers reported during the first year of the Keep on Track! Project, the category referring to the “Non-preferential treatment of RES“ appears to be specific to the RES-E sector. The main barriers belonging to this category mainly result from discriminatory practice towards certain RES-E technologies as well as from a failing support of decision makers (high focus of the government on costs and the strong influence of the conventional energy lobby).





I. EUROPEAN OVERVIEW OF DEVIATIONS

A. METHODOLOGY AND DATA SOURCES

The trajectories planned for each RES technology until 2020 are publicly available in the National Renewable Energy Action Plans (NREAPs) submitted to the European Commission by every Member State in 2010.

The following assumptions were made to handle gaps and inconsistencies in the NREAP data:

- Wind data: in the NREAPs, Member States were asked to give data for wind on- and offshore, and an overall figure for wind. Some Member States only provided the overall figure (Belgium, Finland). In the case of Finland, it was assumed that the Member State was exactly on track in offshore wind, and the remaining planned generation was assumed to be onshore wind. For Belgium, direct communication with the administration led to a breakdown into subcategories based on national figures.
- Biomass data: similarly to wind, if a Member States did not provide values for the sub-categories solid biomass, biogas, and bioliquids in their NREAP (Estonia), it is assumed that the Member State is exactly on track in biogas and bioliquids. The remaining planned generation is assumed to be solid biomass
- Hydropower: for Member States who did not report on hydro subcategories (Belgium, Bulgaria, Ireland, the Netherlands, and the UK), the same approach as for wind and biomass was used.

Member States were requested to submit the first of six biannual Progress Reports to the Commission by December 31st, 2011, - with data covering the years 2009/2010 - to monitor compliance with their planned trajectories and measures. The next round of Progress Reports is not due before the end of 2013. Therefore, to assess the progress made by 2011, this report relies on data published by EUROSTAT in early 2013. This is complemented by additional data sources such as EurObserv'ER, official national statistics, and data provided by national Renewable Energy Industry Associations. In addition to energy balances, EUROSTAT now also provides RES overall shares and sector shares calculated according to the methodology stipulated in Directive 2009/28/EC. These shares were used in the RES overall and RES sector analysis.

The following assumptions were made to handle data gaps and inconsistencies:

- EUROSTAT only provides overall wind figures. To allocate electricity production to either onshore or offshore, this analysis relies on offshore wind capacity data by EurObserv'ER.
- EUROSTAT provides capacity data for different sizes of hydro installations, but only an overall hydro figure for generation. Generation was allocated to size categories using capacity data and assumptions on full-load hours.



- RES shares are calculated and published by EUROSTAT according to the methodology stipulated in Directive 2009/28/EC, taking into account additional information from the Member States which is not publicly available. This report relies on EUROSTAT-calculated shares for all Member States for which this was published by April 29th, 2013. In this version, Eurostat uses estimates for Hungary and Belgium regarding data for heat pumps, mixed hydro, and biofuels compliant to sustainability criteria. The Eurostat estimates for Hungary were used in this report, while own estimates for Belgium were applied.

Data provided in the Overview by Member States:

- Absolute production figures provided on sector level for 2005, 2020, and 2011 refer to target-relevant production. This includes multiple counting of compliant bioliquids and RES-E in road transport. In case of the transport sector, the figure refers to consumption. Since bioliquids are an easily traded good, the amount produced nationally is not relevant.
- Growth rates on the Member State page refer to growth in shares, not absolute figures.



B. OVERVIEW OVER HISTORIC DEVELOPMENT

Electricity production from 'new' RES-E technologies in the EU-27 from 1995-2011

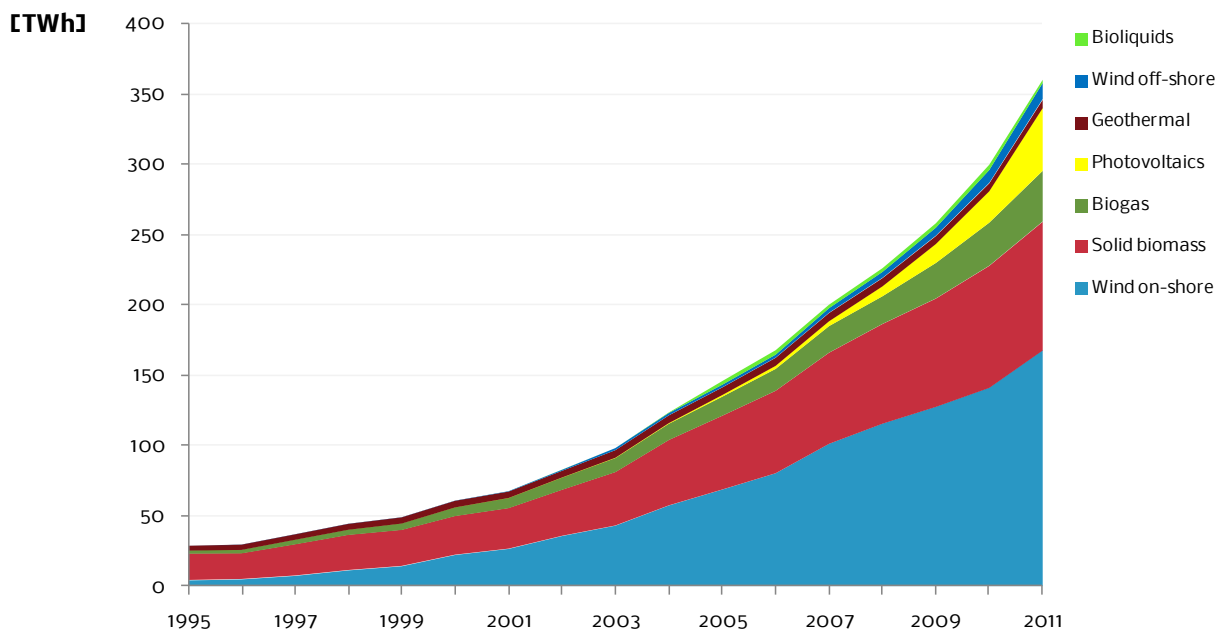


Figure 2: Electricity production from 'new' RES-E technologies in the EU-27 from 1995-2011. Wind and hydro not normalised. Source: Fraunhofer ISI based on Eurostat and other sources.

Figure 2 focuses on 'new' RES-E technologies, which have grown rapidly in recent years to complement the established hydropower. Large hydro remains the single most important RES-E technology, with 266 TWh produced in 2011 in the EU-27. Small and medium hydro contribute another 39.9 TWh. However, figure 2 shows that in sum, the 'new' RES technologies have caught up, with a production of 361 TWh in 2011. Almost half of this, 168 TWh, was onshore wind. Roughly 92 TWh were contributed by solid biomass, 36 TWh by biogas, and 45 TWh by PV. 4 shows the corresponding installed capacities for selected technologies, in this case also for hydro.



RES-E capacities installed in the EU-27

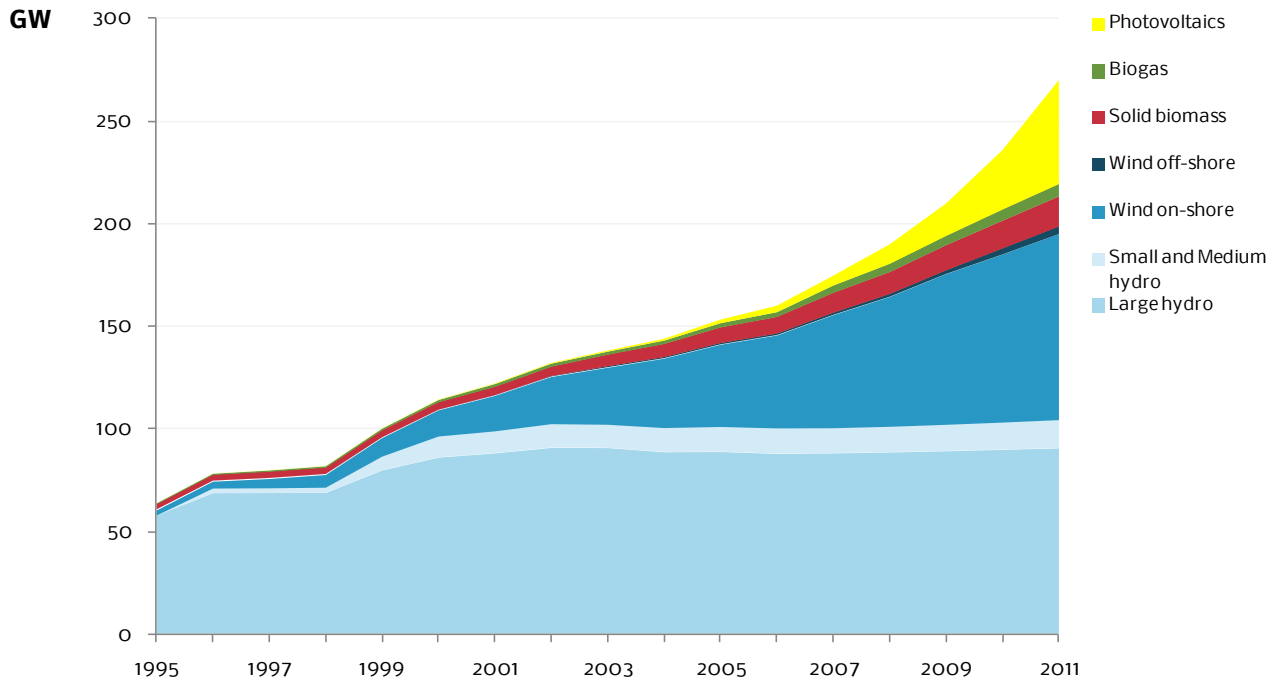


Figure 3: RES-E capacities installed in the EU-27

Heat production from main RES-H technologies in the EU-27 from 1995-2011

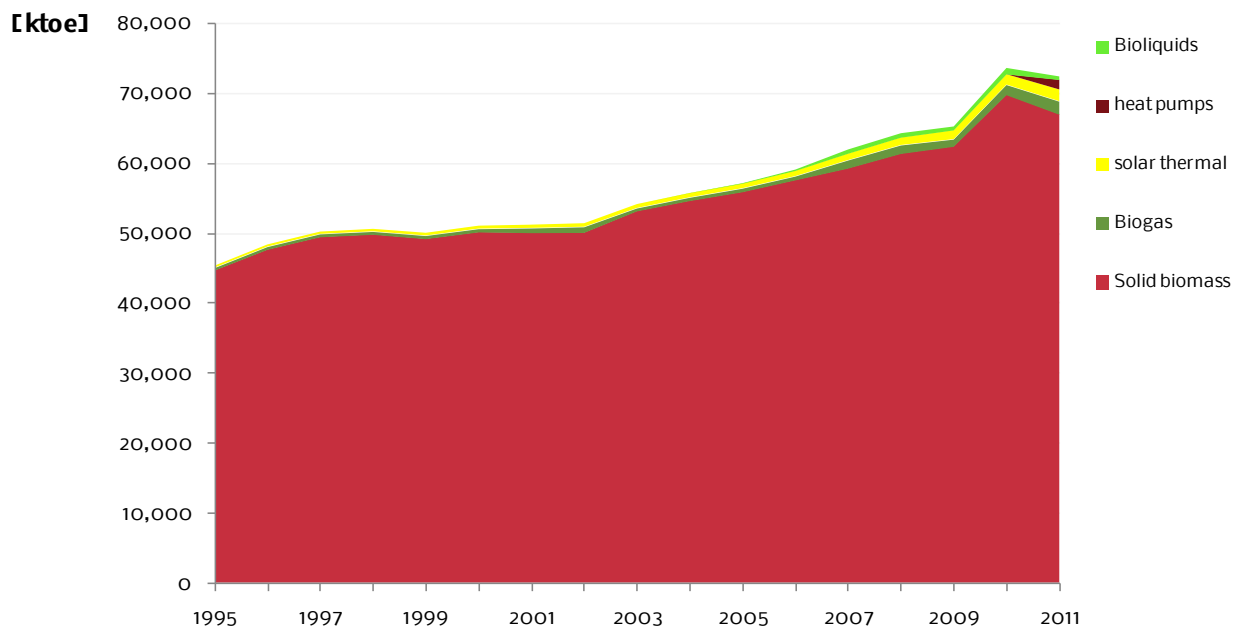


Figure 4: Heat production from main RES-H technologies in the EU-27 from 1995-2011 (heat pump data 2011 estimated for BE, CY, DK, ES, FI, EL, HU, MT, SE, and SK). Source: Fraunhofer ISI based on Eurostat and other sources.



In 2011, total heat production from the five main RES-H technologies was 77.036 ktoe. It showed a slight decline from 2010 to 2011 due to the largest contributor, solid biomass, decreasing by 2,499 ktoe to 67,327 ktoe. This development can be explained by the exceptionally mild winter in 2011, causing a low demand for solid biomass heating. Renewable energy from heat pumps and solar thermal facilities continued their steady growth, accounting for 5,342 ktoe and 1.686 ktoe in 2011, respectively, while biogas heat production stood at 1867 ktoe.

Biofuel consumption in the EU-27 from 1995-2011

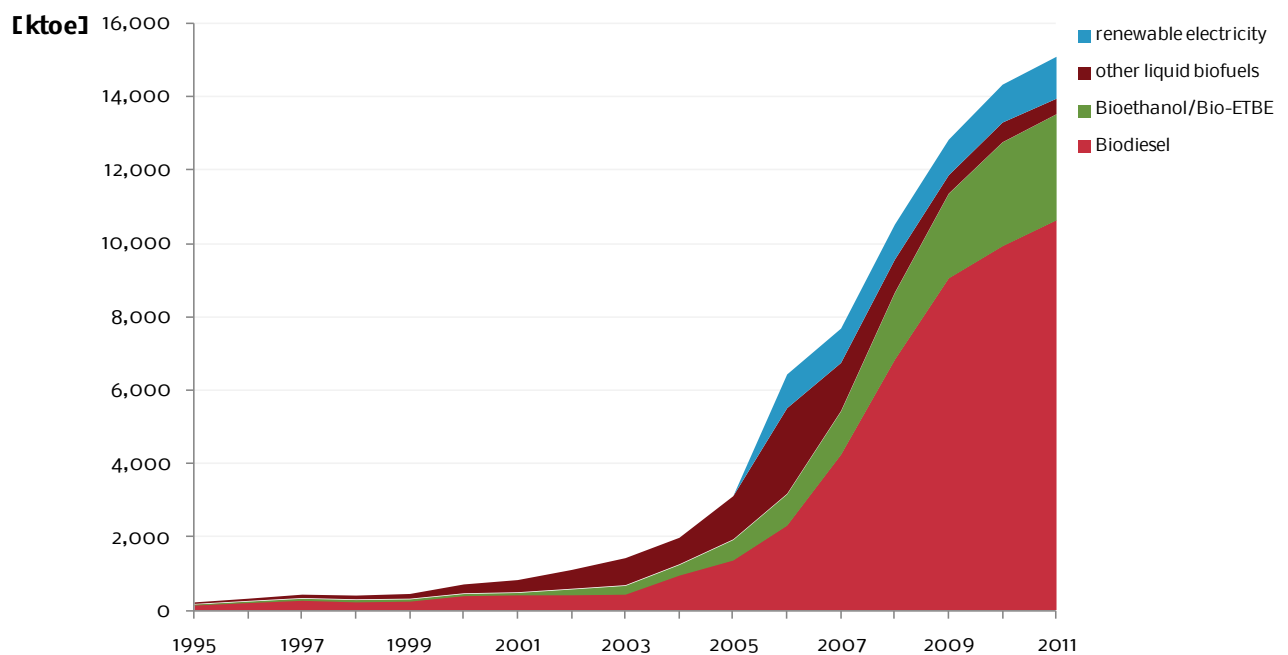


Figure 5: Biofuel consumption in the EU-27 from 1995-2011. Source: Fraunhofer ISI based on Eurostat and other sources.

Biofuel consumption in transport has shown impressive growth rates in the last few years, but growth has slowed down recently. The most important driver has been biodiesel, with 10,644 ktoe in 2011. Bioethanol/bio-ETBE contributed 2,892 ktoe, and other biofuels another 422 ktoe. The 1347 ktoe of renewable electricity in transport are mostly owed to non-road transport modes. The consumption of electricity in road transport and of hydrogen is so far close to zero.



C. OVERALL RES PROCESS

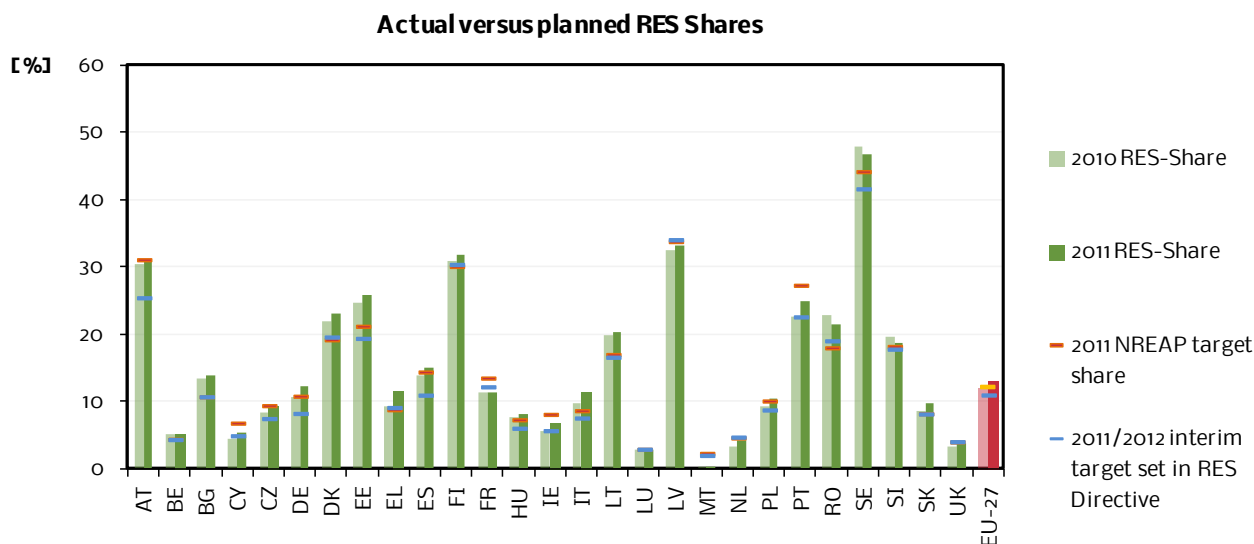


Figure 6: Actual overall RES Share in 2010 and 2011 vs. 2011/2012 interim target of RES Directive and 2011 NREAP target (%) Shares are estimated by Eurostat for Hungary, and estimated by Fraunhofer for Belgium. Final figures will confirm whether Belgium is on track². Source: Fraunhofer ISI based on Eurostat and other sources.

Two different target values are shown in Figure : The 2011 targets set by Member States themselves in their NREAPs, and the interim targets defined in the RES Directive for 2011/2012³.

The NREAP targets are exceeded by 16 Member States (compared to 20 Member States in 2010), and failed by 11.

However, 21 Member States are still on track regarding their 2011/2012 interim target. Only the UK, the Netherlands, Malta, Latvia, Luxembourg, and France have not met theirs yet, but may still be able to catch up until 2012. This good result is not surprising, given that the interim targets are less ambitious in the early years, but the trajectory will become steeper as it gets closer to 2020.

² At the time of writing, only preliminary shares data from Eurostat was available for Belgium, resulting in a share of 4.1%, which would mean that Belgium achieves neither its 2011 NREAP target nor its 2011/2012 interim target. This is due to the fact that, for lack of information, Eurostat assumed zero compliant biofuels in the transport sector. Fraunhofer assumes all 348 ktoe of liquid transport biofuels to be compliant to sustainability criteria. Combined with higher values for PV and wind electricity production, this results in a share of 5.26%. The true RES share is within this range and must be confirmed by final data.

³ In Annex I of Directive 2009/28/EC, the binding trajectory towards 2020 targets is defined through biannual interim targets. The interim targets consist in a percentage deployment towards the 2020 target starting from 2005 levels: 20% has to be reached by 2011/2012, 30% by 2013/2014; 45% by 2015/2016, and 65% by 2017/2018



RES Growth Rate 2010-2011 versus Average Annual Growth Rates Required

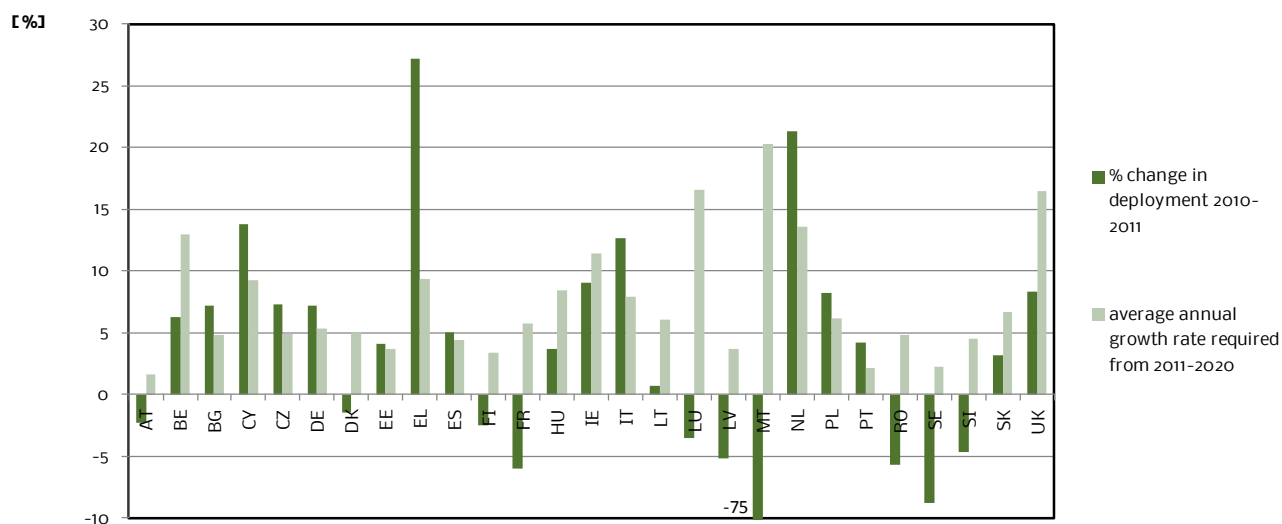


Figure 7: RES growth rate achieved in 2010-2011 and average annual growth rate required from 2011-2020 to achieve the 2020 target. Source: Fraunhofer ISI based on Eurostat and other sources.

This figure, as well as the corresponding figures in the following chapters on RES-E, RES-H&C and RES-T, is based on absolute figures, not shares. They therefore show the growth in real production, independent of fluctuations in overall/sectoral energy demand.

For RES overall, 11 Member States have a higher growth rate than would be necessary on average to achieve the envisioned 2020 production. They can be considered well on track if they manage to maintain this. Of the remaining 16 Member States, 7 need to increase growth rates, while another 10 even need to reverse the negative growth trend observed between 2010 and 2011.



Actual and planned RES shares 2011						
Member State	Actual RES-Share 2010	Actual RES-Share 2011	RES-Share 2011 NREAP	2011/2012 interim target set in RES Directive	% Deviation actual against NREAP share 2011	% Deviation actual against target share 2011/2012
Austria	30.37	30.93	31.10	25.44	-0.54	21.59
Belgium	5.17	5.26	4.40	4.36	19.62	20.71
Bulgaria	13.45	13.83	10.72	10.72	29.04	29.04
Cyprus	4.55	5.42	6.80	4.92	-20.25	10.23
Czech Rep.	8.37	9.35	9.40	7.48	-0.50	25.04
Denmark	22.04	23.11	19.20	19.60	20.37	17.91
Estonia	24.60	25.92	21.20	19.40	22.28	33.63
Finland	30.96	31.75	30.10	30.40	5.48	4.44
France	11.35	11.47	13.50	12.20	-15.07	-6.02
Germany	10.73	12.30	10.80	8.24	13.91	49.30
Greece	9.19	11.57	8.80	9.12	31.44	26.83
Hungary	7.62	8.11	7.30	6.04	11.07	34.24
Ireland	5.64	6.69	8.10	5.68	-17.42	17.76
Italy	9.83	11.47	8.65	7.56	32.64	51.77
Latvia	32.50	33.14	33.80	34.08	-1.96	-2.77
Lithuania	19.83	20.31	17.00	16.60	19.49	22.37
Luxembourg	2.90	2.85	2.90	2.92	-1.59	-2.26
Malta	0.22	0.38	2.30	2.00	-83.54	-81.07
Netherlands	3.30	4.33	4.60	4.72	-5.87	-8.27
Poland	9.35	10.39	10.09	8.76	3.02	18.66
Portugal	22.66	24.86	27.30	22.60	-8.96	9.98
Romania	22.87	21.41	18.00	19.04	18.95	12.45
Slovakia	8.52	9.73	8.20	8.16	18.62	19.21
Slovenia	19.62	18.80	18.20	17.80	3.31	5.63
Spain	13.83	15.07	14.40	10.96	4.63	37.46
Sweden	47.87	46.78	44.20	41.64	5.83	12.34
UK	3.26	3.84	4.00	4.04	-4.01	-4.96
EU-27	12.09	12.98	12.18	10.98	6.59	18.20

Table 1: Actual and planned RES shares 2011



Deviation of actual 2011 RES Shares from NREAP 2011 target share

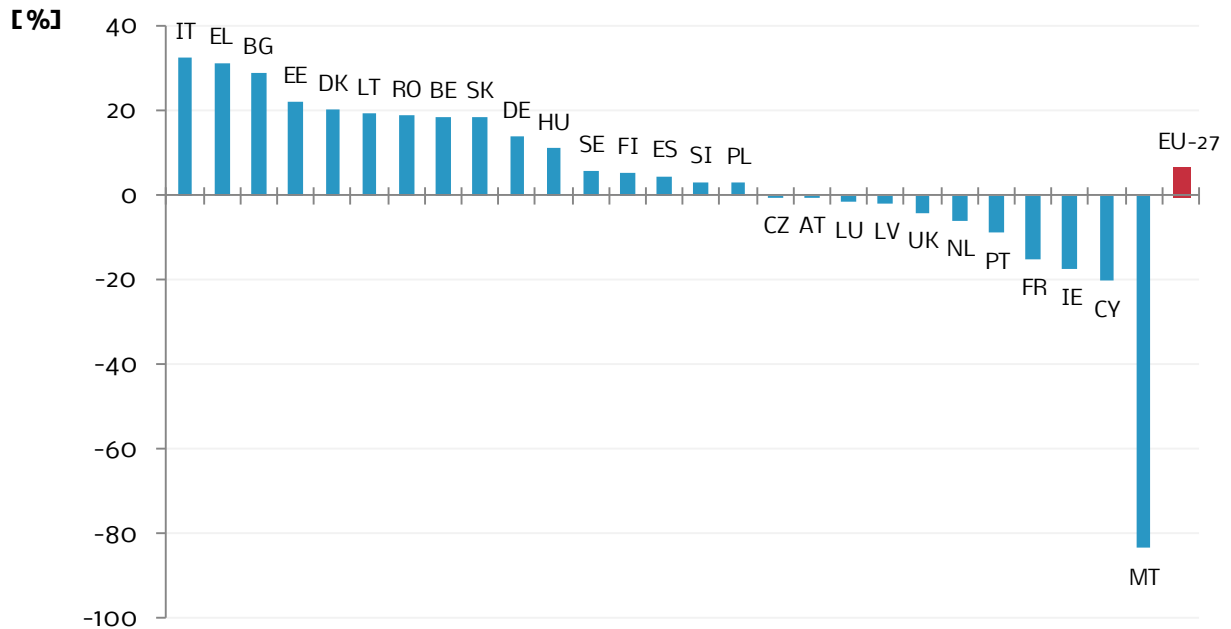


Figure 8: Deviation of actual 2011 RES Shares from NREAP 2011 target share. Source: Fraunhofer ISI based on Eurostat and other sources.

In contrast to the previous figure, Figure 8 is based on shares in the case of overall RES and RES sectors. For individual technologies, absolute figures are used.

For RES overall, 16 Member States are on or above track regarding their RES share, while 11 stay below the NREAP target planned for 2011.



D. RES-E

This chapter provides information on the main RES-E technologies onshore and offshore wind, PV, solid biomass, biogas, large, medium, and small hydro, bioliquids, geothermal electricity, CSP, and tide, wave, and ocean energy. To assess compliance with the NREAP trajectories, wind and hydro production data were normalised in accordance with the methodology specified in Directive 2009/28/EC.

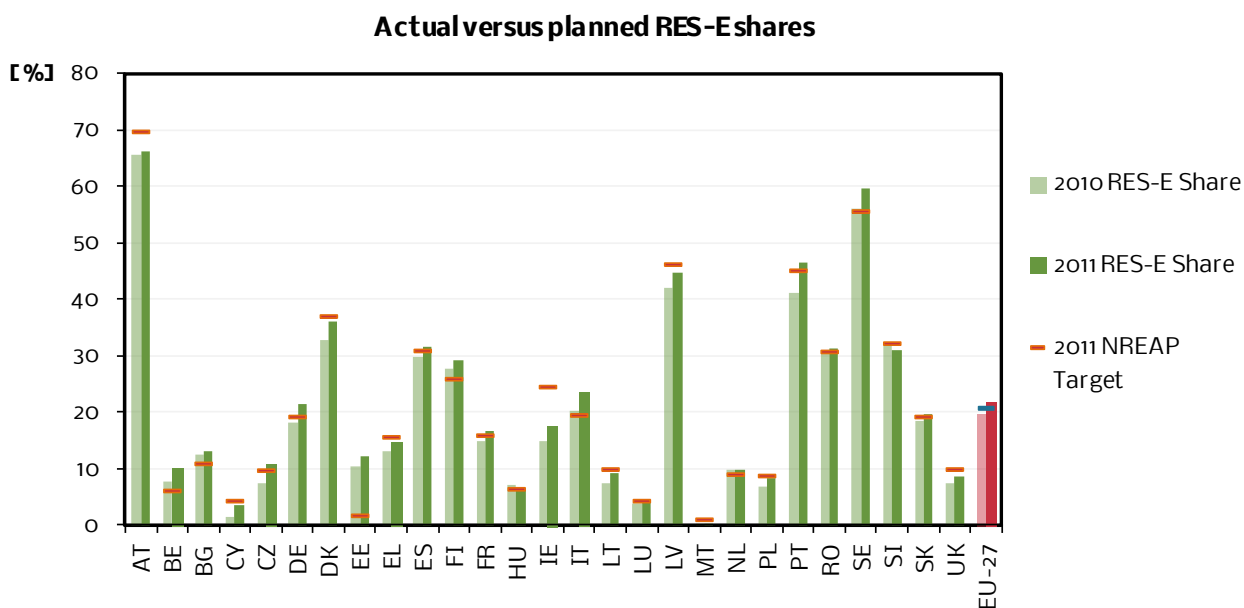


Figure 9: RES-E shares vs. NREAP target shares. Shares are estimated by Eurostat for Hungary, and estimated by Fraunhofer for Belgium. Source: Fraunhofer ISI based on Eurostat and other sources.

Fourteen Member States overachieved their 2011 target shares, and 13 underachieved. The result is thus slightly better than in the previous year, where 12 Member States had exceeded their targets and 15 had missed them.



RES-E Growth Rate 2010-2011 versus Average Annual Growth Rates Required

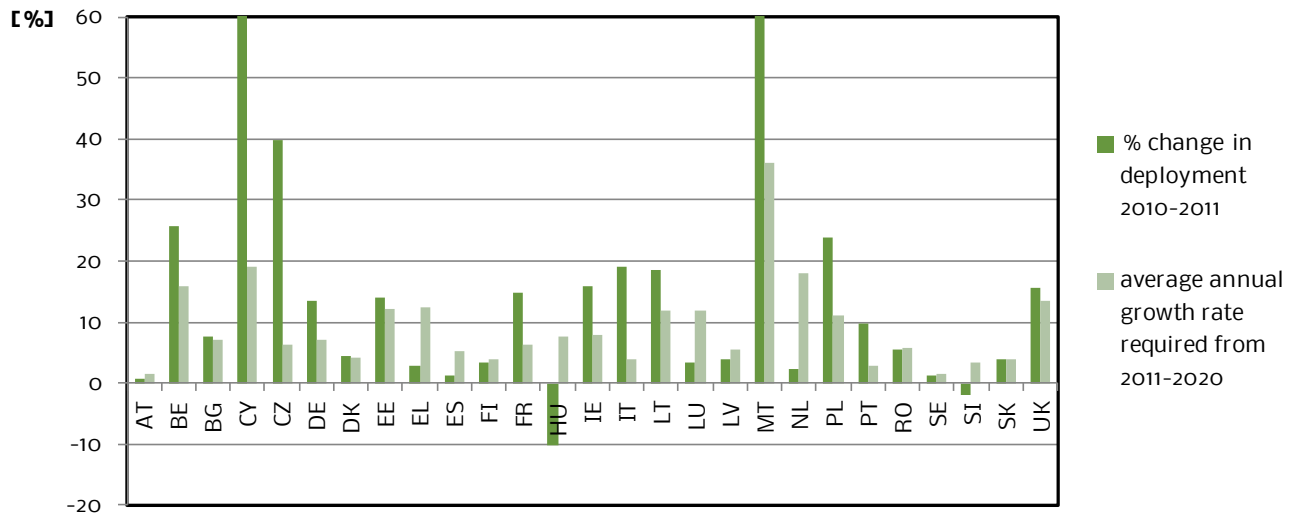


Figure 10: RES-E growth rate achieved in 2010-2011 and average annual growth rate required from 2011-2020 to achieve the 2020 target. Source: Fraunhofer ISI based on Eurostat and other sources.

Figure 10 shows that among the three sectors, RES-E looked most positive in 2011, with 16 Member States having had growth rates exceeding the necessary average growth rate to achieve 2020 planned production. Cyprus had a growth rate of 106% and Malta had 71%. They were thus catching up, albeit still below trajectory in 2011. Nine Member States needed to accelerate growth, and 2 even needed to reverse a negative growth trend.



Growth of electricity production from main RES-E technologies from 2010-2011								
Member State	RES-E [%]	Offshore wind [%]	Onshore wind [%]	Solid biomass [%]	Biogas [%]	PV [%]	Small/medium hydro [%]	Large hydro [%]
Austria	0.69	-	0.98	2.64	-3.39	95.51	2.92	-2.02
Belgium	25.64	27.92	30.12	12.93	-6.71	93.74	-2.26	-3.79
Bulgaria	7.71	-	31.91	94.74	18.75	573.33	-2.15	2.35
Cyprus	106.30	-	156.34	-	48.57	100.00	-	-
Czech	39.90	-	8.77	16.31	46.07	254.22	-0.53	-0.28
Denmark	4.47	11.91	7.73	-5.02	-2.83	-	-0.03	-
Estonia	13.88	-	41.26	4.93	50.00	-	-10.70	-
Finland	1.12	-1.46	28.71	2.01	49.44	0.00	-1.37	-0.64
France	3.44	-	17.07	9.07	10.95	234.04	-2.36	-1.54
Germany	13.36	36.32	4.66	6.38	19.87	65.65	7.48	12.09
Greece	14.80	-	29.12	-	8.95	286.08	28.37	0.42
Hungary	-10.31	-	22.81	-24.46	80.51	-	-0.47	4.64
Ireland	15.95	0.00	21.28	22.52	-1.94	-	-2.65	-0.27
Italy	19.18	-100.00	15.91	9.82	65.19	466.42	5.81	0.54
Latvia	3.96	-	14.21	44.44	85.96	-	2.11	2.11
Lithuania	18.62	-	52.17	4.31	19.35	-	1.30	1.30
Luxembourg	3.37	-	-3.42	35.71	1.82	-	-0.25	-
Malta	71.11	-	-	-	-	-	-	-
Netherlands	2.25	-1.48	4.90	0.86	0.78	100.00	-	-1.52
Poland	23.96	-	70.05	21.07	13.57	-	2.09	0.03
Portugal	9.72	-	13.56	9.86	58.42	16.76	1.93	12.25
Romania	5.56	-	334.15	71.82	800.00	-	-0.42	-0.67
Slovakia	3.93	-	0.74	12.42	232.35	4150.00	5.99	-1.50
Slovenia	-1.95	-	-	4.17	30.93	100.00	-1.78	-2.80
Spain	2.91	-	3.33	14.94	3.18	15.00	0.59	0.33
Sweden	1.31	-9.71	55.83	-3.97	-8.33	22.22	1.42	0.06
UK	15.68	67.65	10.77	15.36	0.40	663.64	9.19	3.70
EU-27	8.01	36.56	10.71	5.48	17.70	98.76	2.96	0.48

Table 2: Growth of electricity production from main RES-E technologies from 2010-2011. Based on normalised wind and hydro data.



Deviation of actual 2011 RES-E Shares from NREAP 2011 target share

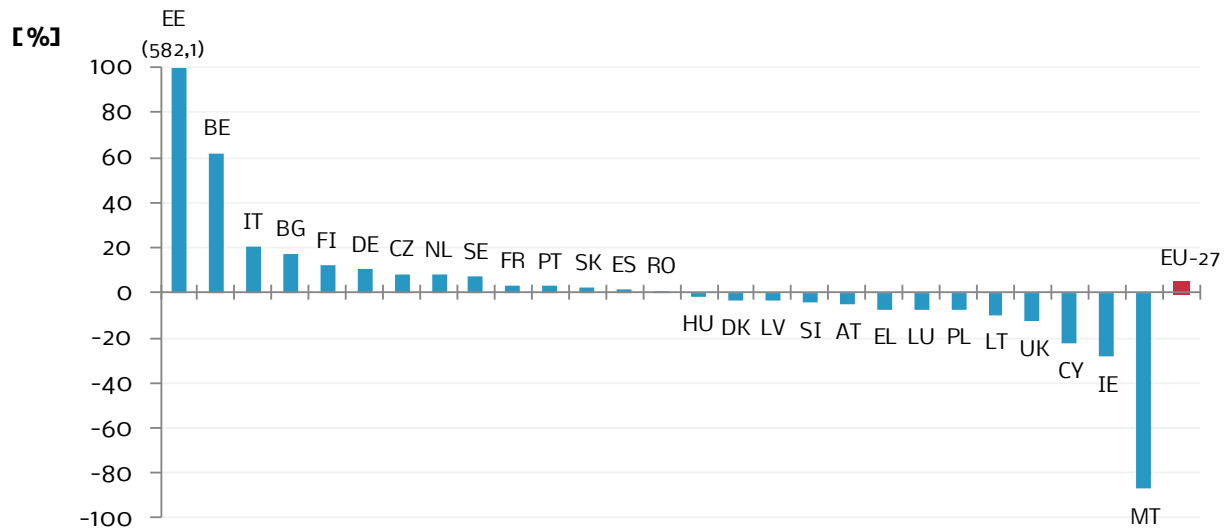


Figure 11: Deviation of actual 2011 RES-E Shares from NREAP 2011 target share. Source: Fraunhofer ISI based on Eurostat and other sources.

The most significant overachievement is displayed by Estonia with 582% of the NREAP target.



Electricity production from main RES-E technologies in 2011								
Member State	RES-E [GWh]	Offshore wind* [GWh]	Onshore wind* [GWh]	Solid biomass [GWh]	Biogas [GWh]	PV [GWh]	Small/medium hydro* [GWh]	Large hydro* [GWh]
Austria	46,475	0	2,061	3,886	627	174	4,579	34,537
Belgium	9,191	762	1,828	3,947	528	1,736	200	172
Bulgaria	5,079	0	801	37	19	101	497	3,537
Cyprus	167	0	105	0	52	10	0	0
Czech Rep.	7,402	0	374	1,776	929	2,182	620	1,517
Denmark	13,037	2,838	6,006	4,015	343	0	22	0
Estonia	1,148	0	347	766	15	0	20	0
Finland	25,484	90	314	11,086	133	5	1,365	12,315
France	82,375	0	12,389	3,955	1,196	2,041	7,082	53,615
Germany	125,385	758	44,977	16,294	19,425	19,340	9,523	14,292
Greece	9,256	0	3,520	0	207	610	368	4,146
Hungary	2,715	0	641	1,646	213	0	55	161
Ireland	4,941	76	3,773	136	202	0	130	619
Italy ⁴	80,407	0	10,161	4,731	3,393	10,796	8,717	35,172
Latvia	3,280	0	64	13	106	0	51	3,046
Lithuania	987	0	404	121	37	0	95	330
Luxembourg	261	0	64	38	56	0	103	0
Malta	0	0	0	0	0	0	-	0
Netherlands	11,880	708	4,011	6,011	1,036	8	0	100
Poland	12,893	0	2,904	7,149	452	0	676	1,695
Portugal	25,531	1	9,654	2,763	160	202	957	10,527
Romania	18,711	0	1,302	189	9	1	1,033	16,140
Slovakia	5,422	0	5	706	113	85	275	4,183
Slovenia	4,450	0	0	125	127	2	614	3,575
Spain	89,342	0	44,661	3,640	875	7,360	4,293	25,229
Sweden	85,258	503	5,024	11,501	33	11	3,935	65,024
UK	32,353	6,285	8,528	7,238	5,735	252	831	4,291
EU-27	703,430	11,840	163,919	91,769	36,021	44,916	46,042	294,223

Table 3: Electricity production from main RES-E technologies in 2011. *wind and hydro production normalised according to the methodology specified in Directive 2009/28/EC.

⁴ GSE, the institution responsible for Italian RES support schemes, has published an alternative figure of 82,961 GWh RES-E production, and slightly different normalized hydro figures: 34,012 GWh for large hydro, and around 10,000 GWh for small/medium hydro.



The following paragraphs provide details on individual RES-E technologies:

1. OFFSHORE WIND

Only six Member States had explicitly planned any offshore wind electricity production in 2011. Of those, Sweden is the only Member States which overachieved its planned production, with 502 GWh instead of 237 GWh planned. Denmark, the UK, the Netherlands, Germany, and Ireland were all behind plan. The delays in deployment were in part due to problems of connecting large offshore wind farms to the grid, a process which, for instance in Germany, is progressing much slower than planned. In addition, assumptions on planned offshore wind figures were taken for Belgium and Finland, as their NREAPs provided only overall wind figures (see footnote in onshore section).

The UK is by far the largest producer with 6,285 GWh, followed by Denmark with 2,838 GWh.

Deviation of actual 2011 offshore wind electricity production from NREAP 2011 target



Figure 12: Deviation of actual 2011 offshore wind electricity production from NREAP 2011 target. Production figures are normalised according to the procedure specified in Directive 2009/28/EC. Source: Fraunhofer ISI based on Eurostat and other sources.

⁵ In this table, as well as in the following technology-specific paragraphs, a distinction is made between large and small/medium hydro. The normalised production figures must be considered approximations, as so far Eurostat provides no systematic information on how much of each size category is pure hydro and how much is mixed hydro. This may lead to an error in the normalisation calculation for some countries (only on technology-specific level, much less so on target calculation level). As Eurostat is planning to provide mixed hydro data in the future, this problem is expected to persist only for this year.



2. ONSHORE WIND

Among 'new' RES technologies, onshore wind makes the biggest contribution to renewable electricity in the EU, with 168 TWh produced in 2011 - leading to a normalised value of around 164 TWh.

Trajectory achievement is based on normalised production figures. Only Belgium, Bulgaria, the Netherlands, Italy and Portugal are above their NREAP target for 2011, the majority of Member States is behind plan. The largest producers by far are Germany and Spain with 44,977 GWh and 44,661 GWh, respectively. France follows with 12,424 GWh.

According to Belgian RES association EDORA, the Belgian NREAP overall wind target for 2020 is not in line with the different regional political commitments. Regional commitments add up to a higher annual production of about 6,640 GWh in 2020 for onshore wind and 6,600 GWh in 2020 for offshore wind. The Belgian NREAP foresees 10,474 GWh of overall wind electricity production in 2020, providing no distinction between onshore and offshore production. However, it seems that the regionally planned offshore wind capacities of 2,000 MW by 2020 have been considered in the NREAP.

No data is available for Malta.

Deviation of actual 2011 onshore wind electricity production from NREAP 2011 target

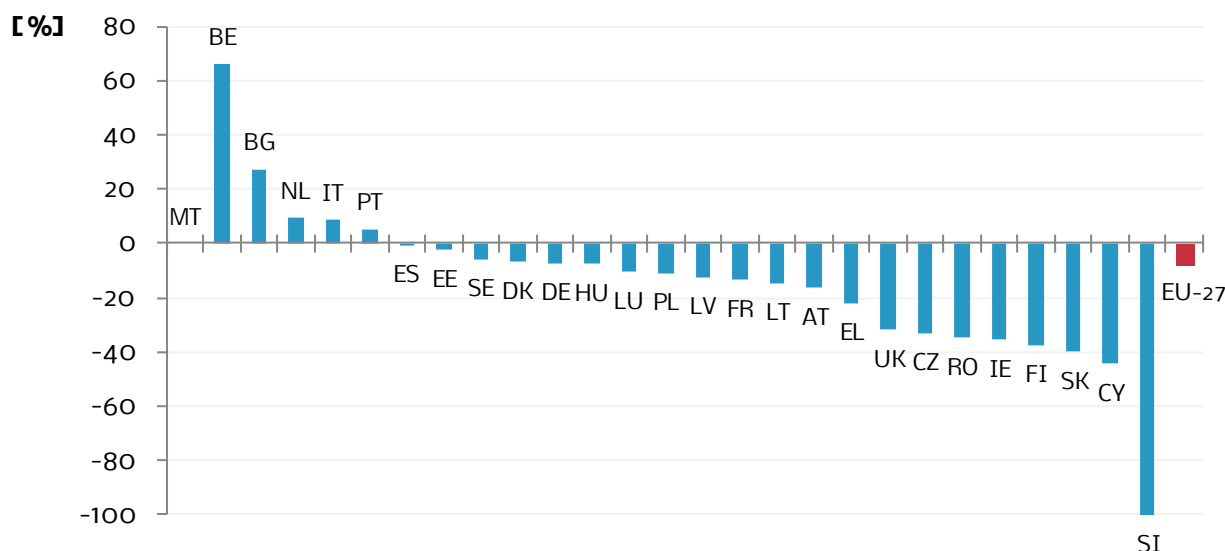


Figure 13: Deviation of actual 2011 onshore wind electricity production from NREAP 2011 target⁶. Production figures are normalised according to the procedure specified in Directive 2009/28/EC. Source: Fraunhofer ISI based on Eurostat and other sources.

⁶ Actual production: EUROSTAT generation figures for onshore wind in Belgium were inconsistent with capacity figures. Belgian national figures were used in this analysis instead. Planned production: The Belgian and Finnish NREAPs only provide trajectories for overall wind. For Belgium, assumptions



3. PV

PV has experienced rapid deployment in the last years, by far surpassing expectations in some Member States. Even Finland, one of 4 Member States which had not planned any PV deployment until 2020, reports 5 GWh in 2011. Sweden, too, had planned a negligible amount of 1.4 GWh in 2011, but shows an actual production of 11 GWh. Belgium and Italy had also planned much more modest development, leading to an overachievement of their 2020 PV targets already in 2011. The largest producers are Germany with 19,340 GWh, Italy with 10,796 GWh, and Spain with 7,360 GWh.

No data is available for Malta.

Deviation of actual 2011 PV electricity production from NREAP 2011 target

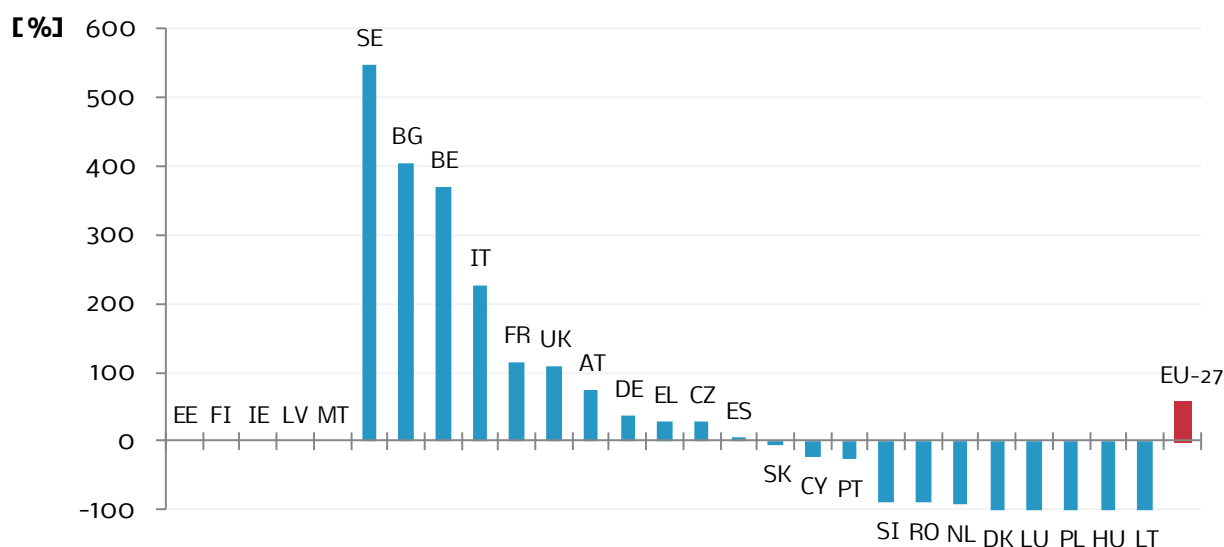


Figure 14: Deviation of actual 2011 PV electricity production from NREAP 2011 target⁷. Source: Fraunhofer ISI based on Eurostat and other sources.

on the breakdown into onshore and offshore are based on direct communication with Belgian administration. For Finland, planned offshore production is assumed to be actual offshore production (exactly on track). The remainder of planned production is assumed to be onshore.

⁷ EUROSTAT generation figures for PV in Belgium are extremely low with 4 GWh for 2011, and inconsistent with capacity figures. Belgian national figures were used in this analysis instead. For the UK, PV production data is reported as zero by Eurostat, which is not in line with installed capacities. UK national data was used for this analysis.



4. SOLID BIOMASS

Solid biomass is the second biggest 'new' RES technology contributing to renewable electricity generation in the EU, with almost 92 TWh produced in 2011.

Half of all Member States are above their planned 2011 target. Estonia provided only an overall biomass figure in its NREAP, but no subcategories. The country is therefore assumed to be exactly on track for biogas, with the remainder of planned biomass assumed to be solid biomass. No data is available for Malta.

The biggest producers are Germany with 16,294 GWh, Finland with 11,086 GWh, and Sweden with 11,501 GWh.

Deviation of actual 2011 solid biomass electricity production from NREAP 2011 target

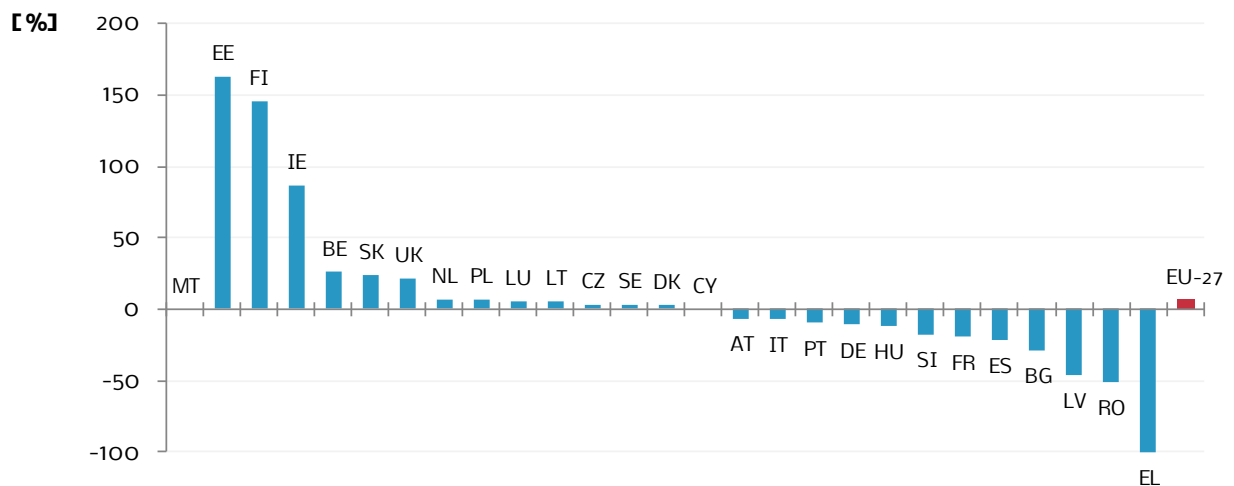


Figure 15: Deviation of actual 2011 solid biomass electricity production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.



5. BIOGAS

Biogas includes landfill, sewage, and agricultural gas. Half of all Member States overachieve on their planned electricity production from biogas for 2011. Estonia provided no specific biogas figure and is assumed to be exactly on track (see above section on solid biomass). Bulgaria reports a rather small production of 19 GWh, which is nevertheless about six times higher than the planned figure. The biggest producer by far is Germany with 19,425 GWh, followed by the UK with 5,735 GWh and Italy with 3,393 GWh.

No data is available for Malta.

Deviation of actual 2011 biogas electricity production from NREAP 2011 target

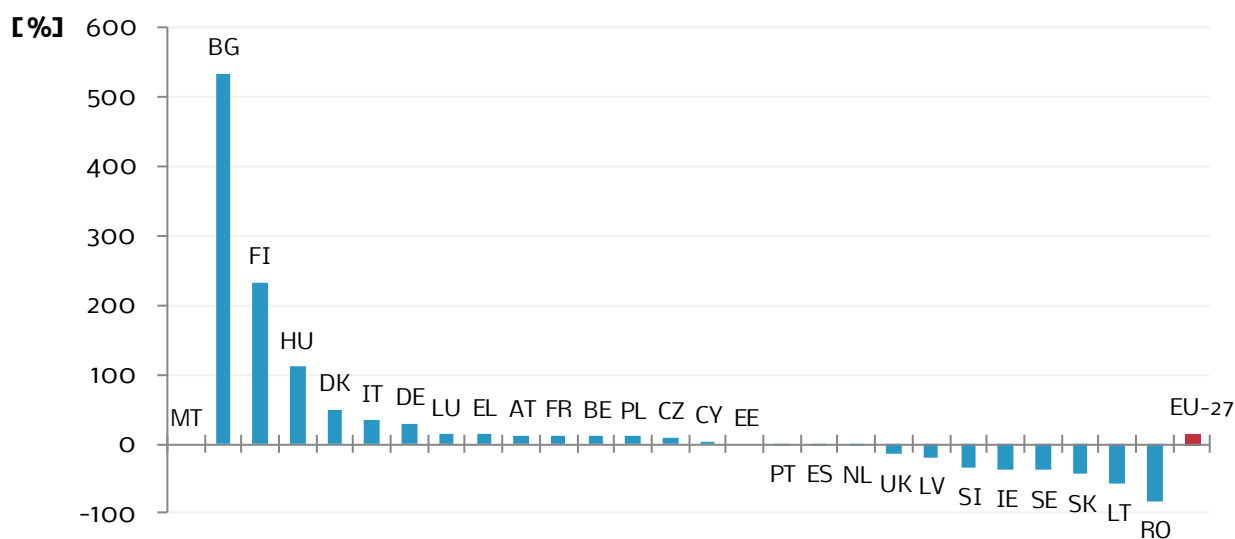


Figure 16: Deviation of actual 2011 biogas electricity production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.



6. BIOLIQUIDS

Only six Member States had planned electricity production from bioliquids in 2011. Of these, only Belgium overachieves its planned production. With 82 GWh, it is also the third largest producer, following Germany with 617 GWh. The largest producer, Italy, is below trajectory according to Eurostat, which reports 1,663 GWh in 2010 and 1,662 GWh in 2011. However, the Italian RES association APER reports 3,078 GWh in 2010 and 2,697 GWh in 2011, which would mean that Italy would have overachieved its 2011 plan. According to APER, the significant decrease in production of liquid biofuels between 2010 and 2011 is due to an increase in prices of raw materials.

Deviation of actual 2011 bioliquids electricity production from NREAP 2011 target



Figure 17: Deviation of actual 2011 bioliquids electricity production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.



7. SMALL AND MEDIUM HYDRO

This category includes all hydro power installations with a capacity of less than 10 MW. Eight Member States overachieved their planned 2011 production, while 12 Member States underachieved. Bulgaria, Ireland, the UK, and Belgium only provided overall hydro figures in their NREAPs, but no data for subcategories. They are therefore assumed to be exactly on track in small/medium hydro, and the remainder of planned hydro generation is assumed to be large hydro.

The largest producers are Germany with 9,523 GWh, Italy with 8,709 GWh, and France with 6,638 GWh. Cyprus and the Netherlands had not planned any small hydro in 2011, and had zero deployment. No data is available for Malta.

Deviation of actual 2011 small and medium hydro electricity production from NREAP 2011 target

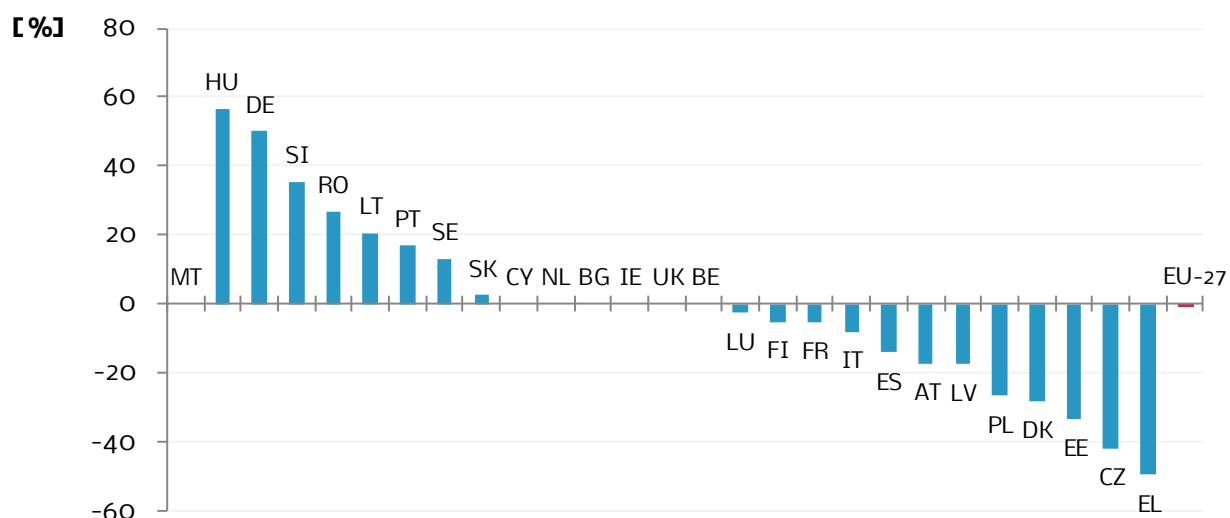


Figure 18: Deviation of actual 2011 small and medium hydro electricity production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.



8. LARGE HYDRO

This category includes all hydro power installations with a capacity greater than 10 MW. Cyprus, Denmark, Estonia, and Luxembourg had neither planned nor deployed any large hydro in 2011. Eleven Member States overachieved on their trajectory for 2011, while eleven stayed below their planned production figure. The largest producers are Sweden with 65,023 GWh, France with 50,910 GWh, and Italy with 35,140 GWh.

No data for Malta was available.

Deviation of actual 2011 large hydro electricity production from NREAP 2011 target

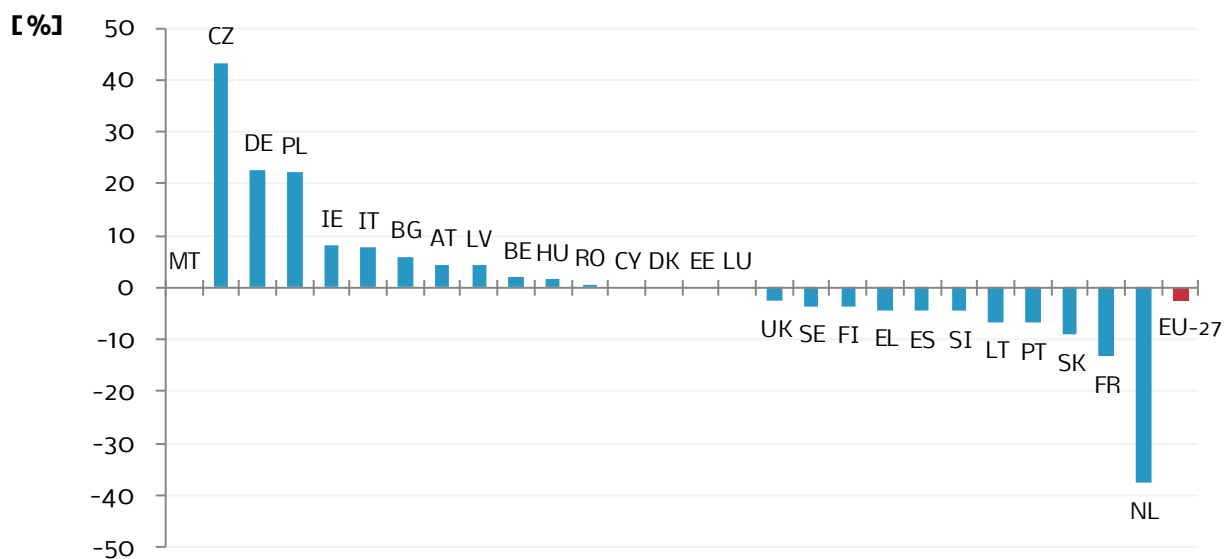


Figure 19: Deviation of actual 2011 large hydro electricity production from NREAP 2011 target⁸. Source: Fraunhofer ISI based on Eurostat and other sources.

⁸ EUROSTAT production figures for hydro in Bulgaria seem very high, but suddenly drop from 5057 GWh in 2010 to 2917 GWh in 2011. This may be due to pumped hydro still being mistakenly included in the older production figures (according to the Bulgarian RES Association APEE).



9. GEOTHERMAL

Only Italy, France, Austria and Germany had plans to produce geothermal electricity in 2011. Italy is by far the greatest producer with 5,654 GWh of actual production in 2011, followed by Portugal with 2010 GWh.

Deviation of actual 2011 geothermal electricity production from NREAP 2011 target

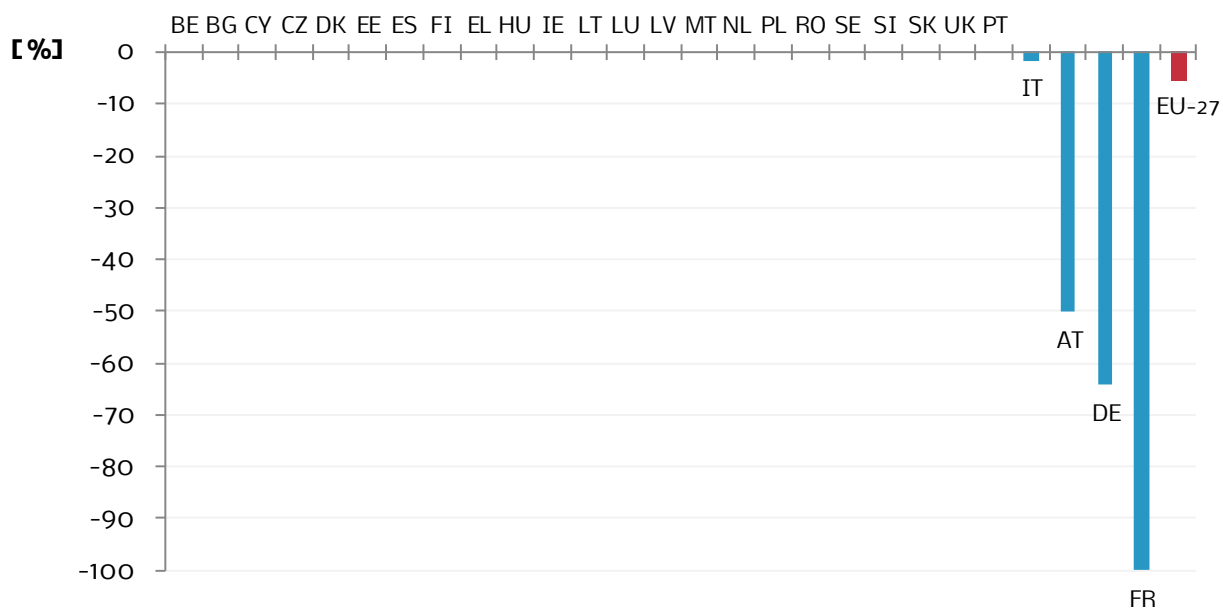


Figure 20: Deviation of actual 2011 geothermal electricity production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.



10. CONCENTRATED SOLAR POWER (CSP)

Only Spain and Italy had planned any electricity production from CSP in 2011, and only Spain reports any production, with 1,294 GWh still only about half of what had been planned⁹.

Deviation of actual 2011 CSP electricity production from NREAP 2011 target



Figure 21: Deviation of actual 2011 CSP electricity production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.

⁹ ESTELA reports alternative data for Spain: 1,779 GWh in 2011 and even 3,433 GWh in 2012. They further remark that some CSP electricity is also being produced in Italy. Due to the plant not having completed the procedure to receive incentives, however, the electricity generated does not show up in the statistics. The Italian RES industry association APER reports that in Italy 17kW were installed and produced an estimated 50 MWh in 2011.



11. TIDE, WAVE, AND OCEAN ENERGY

Only France had planned any electricity production from tide, wave, and ocean energy. While France, where the world's first tidal power station is located, realised 534 GWh in 2011, the UK reports 3 GWh, even though it had not planned any in the NREAP.

Deviation of actual 2011 tide, wave, and ocean electricity production from NREAP 2011 target

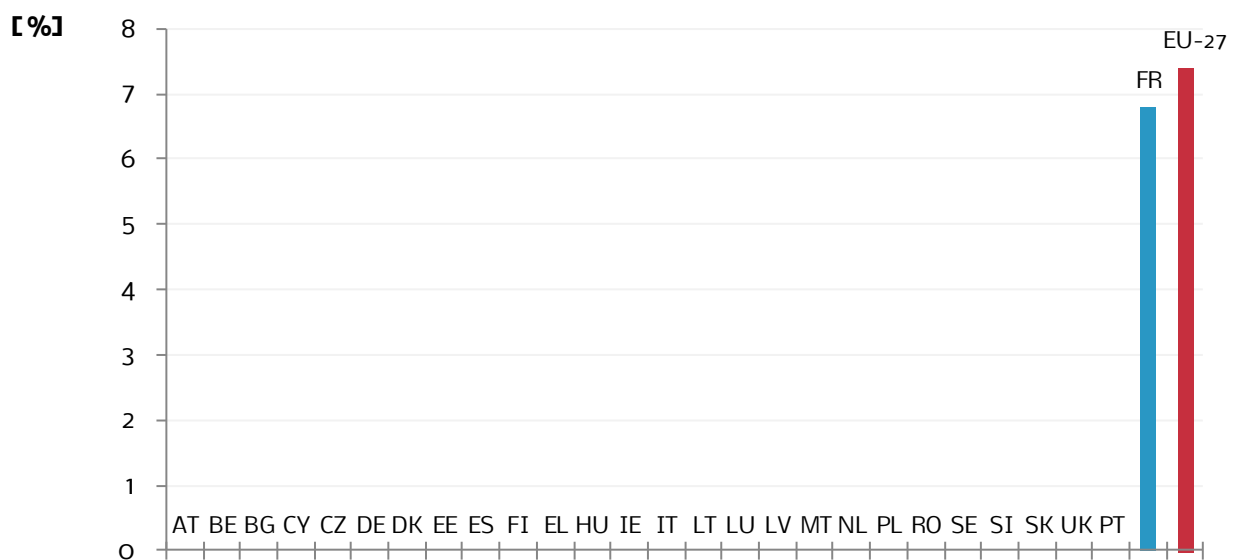


Figure 22: Deviation of actual 2011 tide, wave, and ocean electricity production from NREAP 2011 target ¹⁰. Source: Fraunhofer ISI based on Eurostat and other sources.

¹⁰ For the UK, tide/wave/ocean production data is reported as zero by Eurostat, however, there are capacities installed. UK national data was used here instead.



E. RES-H

This chapter provides information on the RES-H technologies solar-thermal, solid biomass, biogas, heat pumps, bioliquids, and geothermal heat.

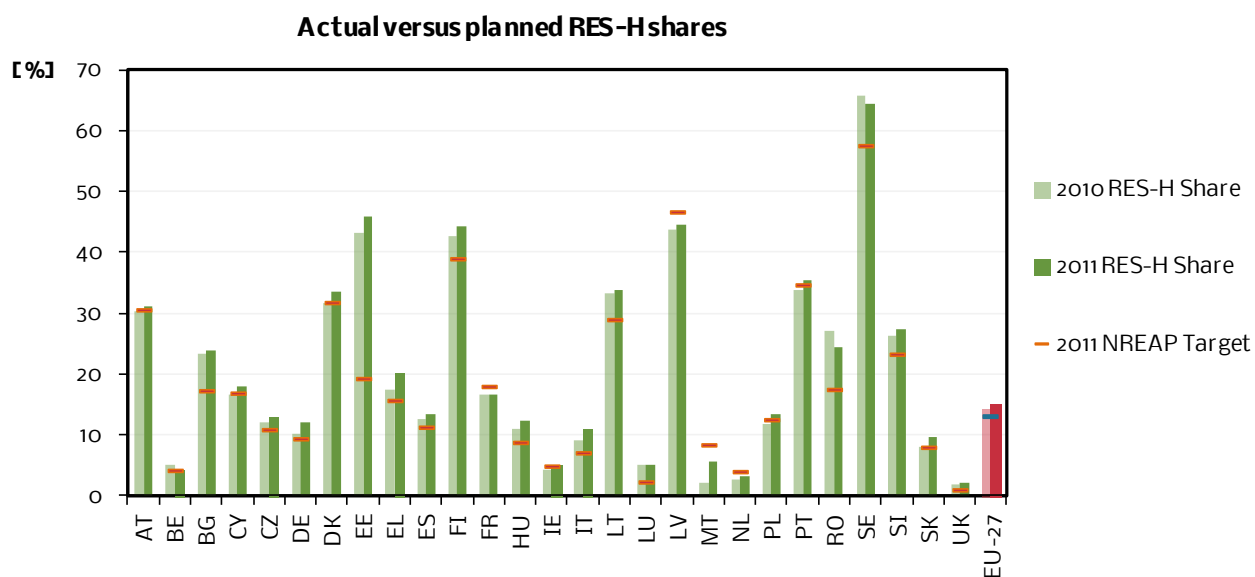


Figure 23: RES-H shares vs. NREAP target shares. Shares are estimated by Eurostat for Hungary, and estimated by Fraunhofer for Belgium¹¹. Source: Fraunhofer ISI based on Eurostat and other sources.

In the RES-H sector, 21 Member States had been above track already in 2010. As a consequence, 23 Member States were above their planned shares in 2011, and only 4 Member States underachieved.

¹¹ Please note that the NREAP 2011 target for the UK does not consider the renewable heat from biomass and biogas CHP, which are included in the actual 2011 RES Share



RES-H Growth Rate 2010-2011 versus Average Annual Growth Rates Required

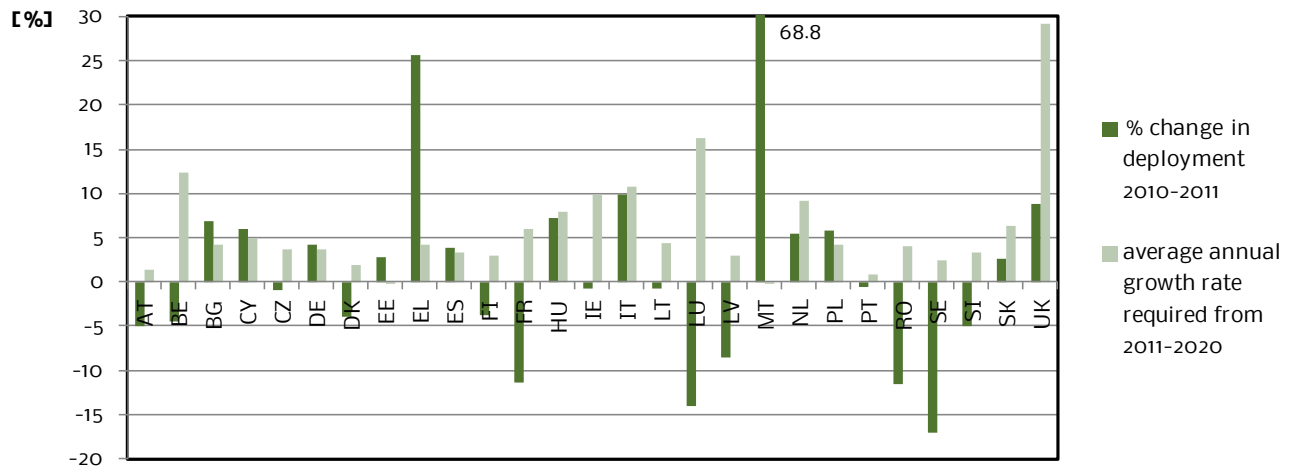


Figure 24: RES-H growth rate achieved in 2010-2011 and average annual growth rate required from 2011-2020 to achieve the 2020 target. Source: Fraunhofer ISI based on Eurostat and other sources.

Only 8 Member States had growth rates that would be sufficient to achieve 2020 production. Fourteen Member States even had negative growth rates, which may be due to the mild winter of 2011 reducing overall heat demand.



Growth of heat production from main RES-H technologies from 2010-2011					
Member State	RES-H [%]	Solar thermal [%]	Solid biomass [%]	Biogas [%]	Heat pumps* [%]
Austria	-4.97%	2.48%	-5.58%	-17.86%	15.74%
Belgium	-2.95%	16.67%	-3.26%	28.57%	17.54%
Bulgaria	6.91%	40.00%	6.80%	0.00%	-
Cyprus	6.02%	3.28%	5.56%	66.67%	-
Czech Republic	-0.93%	22.22%	-2.79%	30.00%	24.39%
Denmark	-3.88%	26.67%	-5.02%	0.00%	8.98%
Estonia	2.85%	-	-3.62%	-50.00%	-
Finland	-3.79%	0.00%	-3.77%	8.00%	-
France	-11.42%	12.28%	-12.29%	14.29%	-7.66%
Germany	4.23%	24.16%	1.83%	48.38%	13.12%
Greece	25.68%	0.00%	21.50%	650.00%	-
Hungary	7.22%	20.00%	7.22%	25.00%	-
Ireland	-0.84%	14.29%	-1.61%	0.00%	0.94%
Italy	9.86%	4.48%	9.94%	32.00%	11.81%
Latvia	-8.64%	-	-9.11%	100.00%	-
Lithuania	-0.80%	-	-0.69%	-25.00%	-
Luxembourg	-13.99%	0.00%	-14.58%	-14.29%	9.02%
Malta	68.76%	-100.00%	0.00%	-	-
Netherlands	5.50%	4.17%	7.37%	-2.73%	18.86%
Poland	5.78%	25.00%	5.64%	17.39%	6.48%
Portugal	-0.62%	17.24%	-0.09%	-	-
Romania	-11.62%	-	-11.97%	500.00%	-
Slovakia	2.57%	25.00%	0.00%	214.29%	-
Slovenia	-5.05%	12.50%	-6.83%	14.29%	-
Spain	3.76%	11.41%	3.34%	5.66%	-
Sweden	-17.00%	10.00%	-17.69%	-49.40%	-1.00%
UK	8.73%	25.29%	5.82%	12.31%	52.66%
EU-27	-2.81%	13.23%	-4.00%	28.32%	6.94%

Table 4: Growth of heat production from main RES-H technologies from 2010-2011. *heat pump data 2011 estimated by Eurostat for Hungary and by Fraunhofer for Belgium



Figure 25: Deviation of actual 2011 RES-H Shares from NREAP 2011 target shares. Source: Fraunhofer ISI based on Eurostat and other sources.

Only 4 Member States stayed below their NREAP trajectory. Positive deviations of above 100% were achieved by Estonia, the UK, and Luxembourg



Heat production from main RES-H technologies in 2011					
Member State	RES-H [ktoe]	Solar thermal [ktoe]	Solid biomass [ktoe]	Biogas [ktoe]	Heat pumps* [ktoe]
Austria	4,148	165	3,806	23	97
Belgium	944	14	860	45	16
Bulgaria	990	14	942	1	0
Cyprus	88	63	19	5	0
Czech Republic	1,780	11	1,638	78	53
Denmark	2,531	19	2,269	46	193
Estonia	712	0	665	1	46
Finland	6,043	1	5,978	27	0
France	10,481	64	9,081	128	1,125
Germany	12,526	555	9,497	1,055	515
Greece	1,354	183	1,051	15	79
Hungary	1,129	6	1,010	10	0
Ireland	217	8	183	9	17
Italy	5,774	140	4,091	33	1,337
Latvia	1,057	0	1,048	8	0
Lithuania	872	0	867	3	0
Luxembourg	49	1	41	6	1
Malta	1	0	1	0	0
Netherlands	868	25	612	107	115
Poland	4,905	10	4,813	54	15
Portugal	2,231	68	2,149	0	0
Romania	3,505	0	3,470	12	0
Slovakia	559	5	529	22	0
Slovenia	545	9	491	8	0
Spain	4,079	205	3,801	56	0
Sweden	8,198	11	7,172	42	909
UK	1,160	109	945	73	32
EU-27	76,746	1,686	67,029	1,867	4,550

Table 5: Heat production from main RES-H technologies in 2011. *heat pump data 2011 estimated by Eurostat for Hungary and by Fraunhofer for Belgium



1. SOLAR-THERMAL

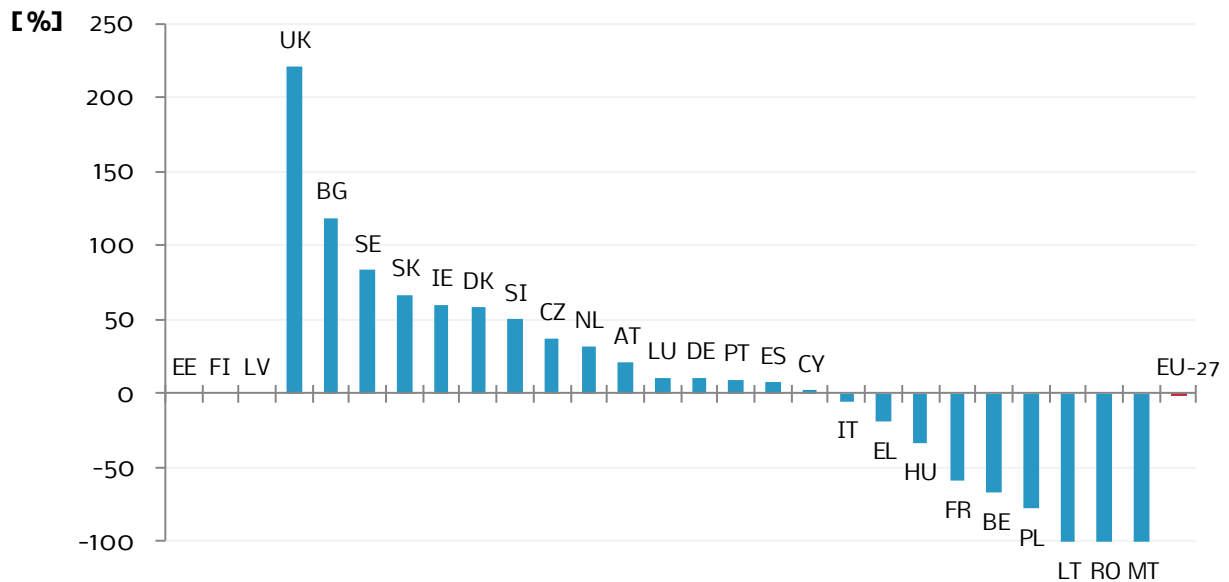


Figure 26: Deviation of actual 2011 solar thermal heat production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.

Germany was by far the biggest producer in 2011 with 555 ktoe (of 1,686 ktoe in total), followed by Spain and Greece with 205 ktoe and 183 ktoe, respectively. While most Member States aimed for a production below 50 ktoe in 2011, Austria, Germany, Spain and Cyprus are positive examples for a target completion with more than 50 ktoe production while having set continuously increasing NREAP target levels.

The UK shows the highest positive deviation with a total production of 109 ktoe in 2011. Growth by over 275 % since 2005 indicates that the constant NREAP target level of 34 ktoe (referring to a 29 ktoe baseline) was set rather low. In Italy there was even higher growth of nearly 420 % since 2005 (27 ktoe baseline) arriving at 140 ktoe in 2011. Due to an ambitious trajectory, however, the NREAP target level for 2011 was missed by 5.4 %.

In Malta, Romania and Lithuania, there was no production at all reported for 2011 although there have been ambitions to produce from 1 to 3 ktoe. Although production in Poland, Belgium, France, Hungary and Greece experienced steady growth in the last years, the hitherto efforts are not sufficient to meet with the NREAP trajectory targets.



2. SOLID BIOMASS

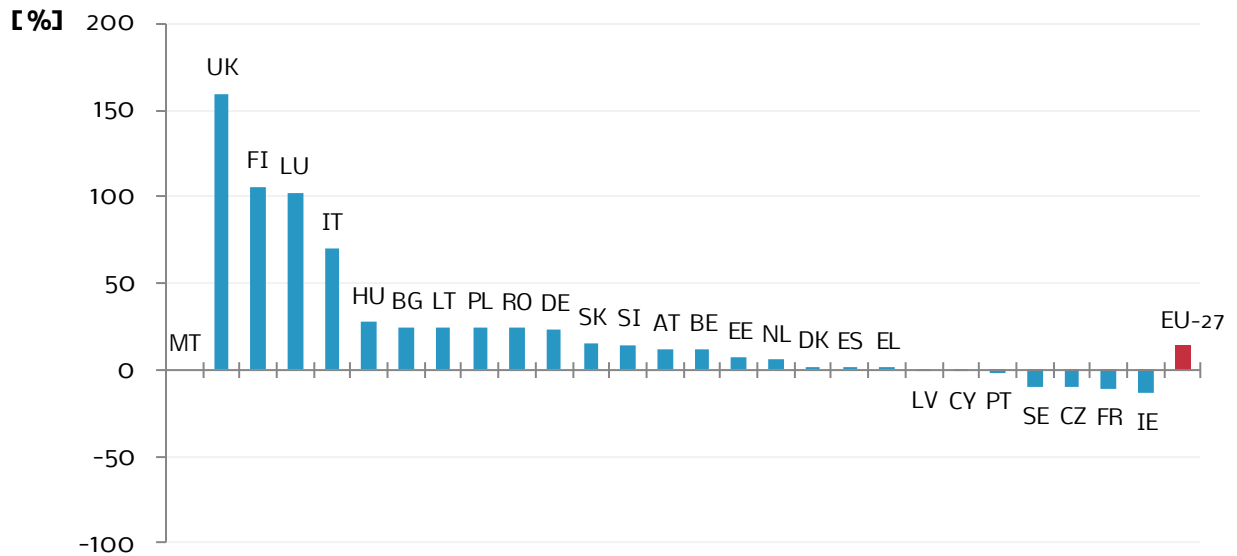


Figure 27: Deviation of actual 2011 solid biomass heat production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.

In total, the 2011 target was overachieved by 15 %. Only seven Member States stayed below their planned production. The biggest producers in 2011 were Germany and France with 9,497 ktoe and 9,081 ktoe, respectively. The UK shows the highest positive deviation with 945 ktoe produced against 365 ktoe planned. Malta had planned no solid biomass heat for 2011, but produced 1 ktoe.



3. BIOGAS

With an overall production of 1682 ktoe, biogas heat production in the EU-27 had a target deviation of + 11 %. The largest producer was Germany with 1,055 ktoe, followed by France with 128 ktoe and the Netherlands with 107 ktoe.

The highest positive deviation was reached in Romania, although production is at a low level with 12 ktoe in 2011. Germany has mastered its initial difficulties of 2010 with an augmentation by nearly 50 % from 2010 to 2011, and is now on track.

Among the Member States not meeting their 2011 NREAP target, some have seen their biogas production stagnating from 2010 to 2011. In Portugal and Malta, there was no production at all reported for 2011 although the 2011 NREAP targets were 14 ktoe and 1.96 ktoe, respectively.

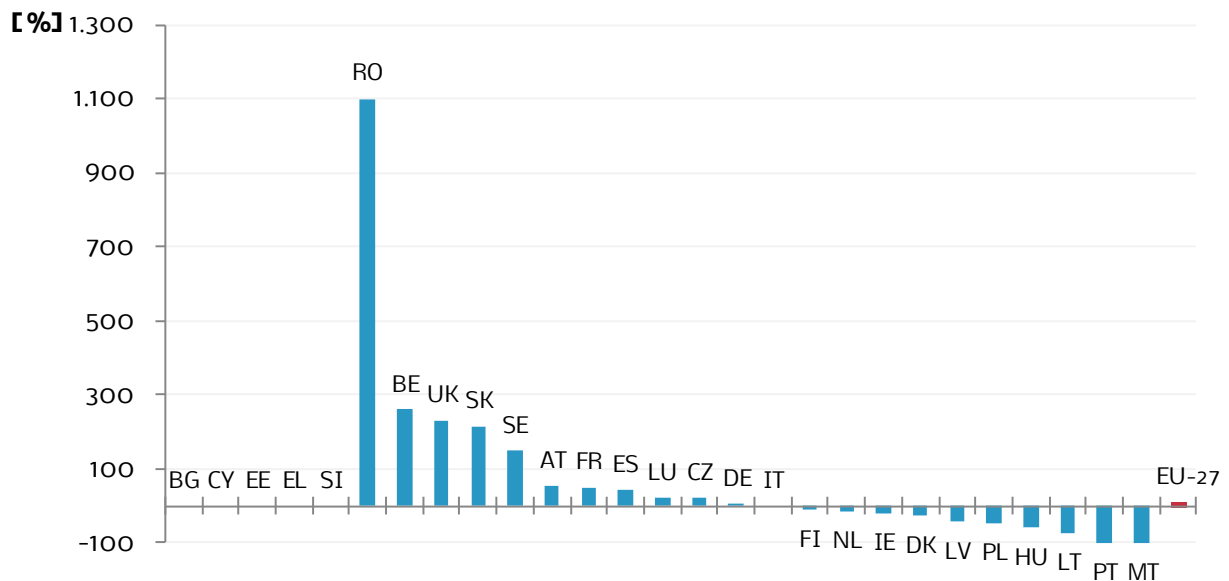


Figure 28: Deviation of actual 2011 biogas heat production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.



4. BIOLIQUIDS



Figure 29: Deviation of actual 2011 bioliquids heat production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.

Overall production of heat from bioliquids almost halved from the previous year, arriving at 521 ktoe in 2011, at least in part due to increased prices for raw materials. For Europe overall, the target is missed by 86.5 %. While there are only seven Member States which had intended bioliquids heat production in 2011 according to their NREAPs, only Italy and Belgium achieve a positive deviation, both with low production of 33 ktoe and 7 ktoe, respectively. Sweden is approximately on track despite a fall in production by nearly 60 %, accounting for 64 ktoe in 2011. Germany, Finland and Portugal reveal a huge lack between their 2011 NREAP targets and their actual production figures of 330 ktoe, 2,333 ktoe and 724 ktoe, respectively. Although it was not intended according to the NREAP targets, Austria, Latvia and the Netherlands did produce heat from bioliquids in 2011 (36 ktoe, 1 ktoe and 1 ktoe).



5. HEAT PUMPS

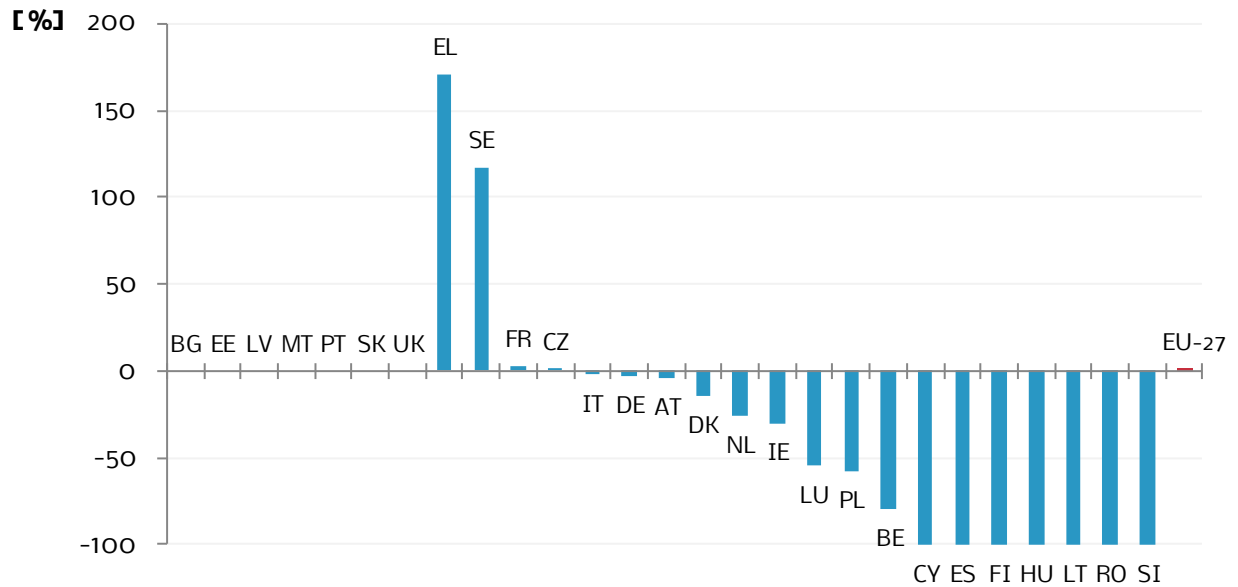


Figure 30: Deviation of actual 2011 production of renewable energy from heat pumps from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.

The data available from Eurostat includes geothermal, hydrothermal, and aerothermal heat pumps. A distinction between these sub-technologies is not available at this point. Data for Hungary was estimated by Eurostat, data for Belgium was estimated by Fraunhofer.

Sweden, with 909 ktoe in 2011, exceeds its plan by far. Most renewable energy from heat pumps was produced in Italy (1337 ktoe) and France (1125 ktoe).



6. GEOTHERMAL

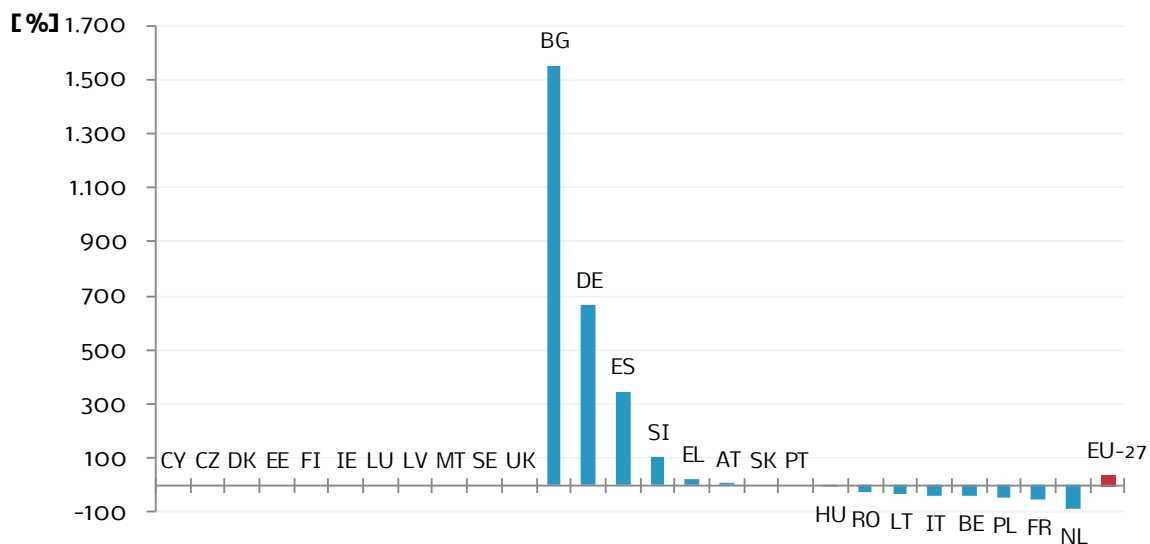


Figure 31: Deviation of actual 2011 geothermal heat production from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.

Looking at the EU as a whole, there has been an overachievement of the NREAP NREAP target 2011 by 39 %. 11 Member States did report zero geothermal heat production which is consistent with their NREAP target level for 2011. Germany produces more than half of total geothermal heat production in the EU with 566 ktoe and continues to overachieve its NREAP target levels. Despite a high positive deviation, geothermal heat production in Bulgaria and Spain is stagnating in the last years. Looking at the Member States with a negative deviation, only Italy and France can be named as countries with a deviation of more than 5 % while producing more than 80 ktoe (140 ktoe and 83 ktoe, respectively). In both countries, production decreased since 2009.



F. RES-T

This chapter provides information on the main RES-T technologies bioethanol/bio-ETBE, biodiesel, electricity in transport, other biofuels, and hydrogen.

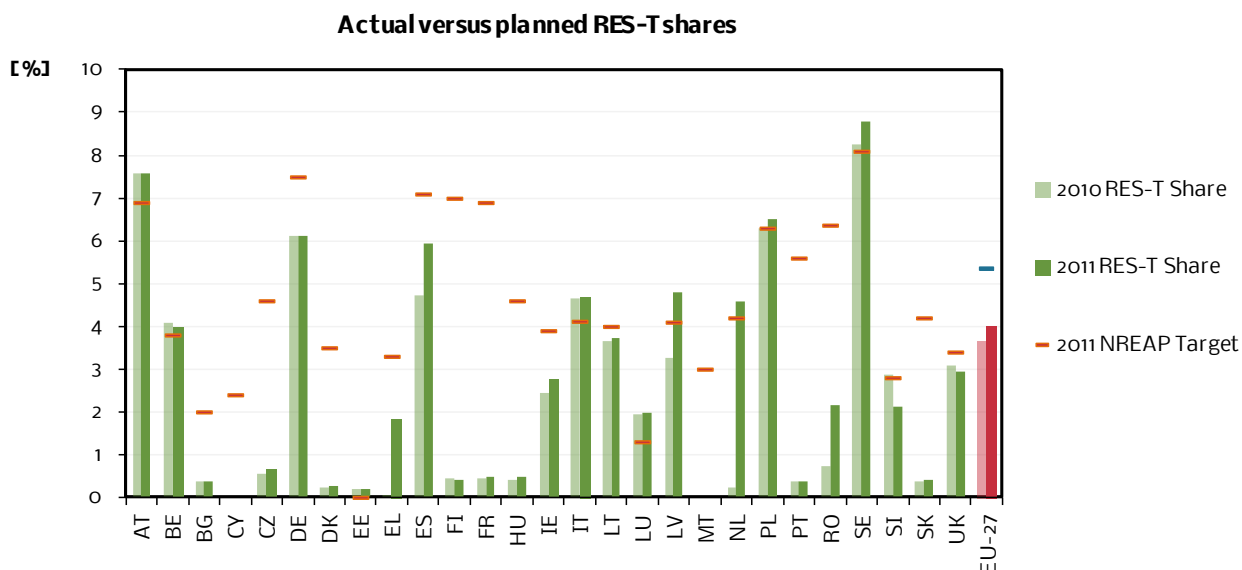


Figure 32: RES-T shares vs. NREAP target shares. Shares are estimated by Eurostat for Hungary, and estimated by Fraunhofer for Belgium. Source: Fraunhofer ISI based on Eurostat and other sources.

The RES-T sector has seen less progress than the former two, with only 9 Member States on or above their NREAP 2011 target, and 18 below. The situation has therefore slightly deteriorated since the previous year, where 11 Member States had exceeded their target, one had been just on track, and 15 had missed their targets.



RES-T Growth Rate 2010-2011 versus Average Annual Growth Rates Required

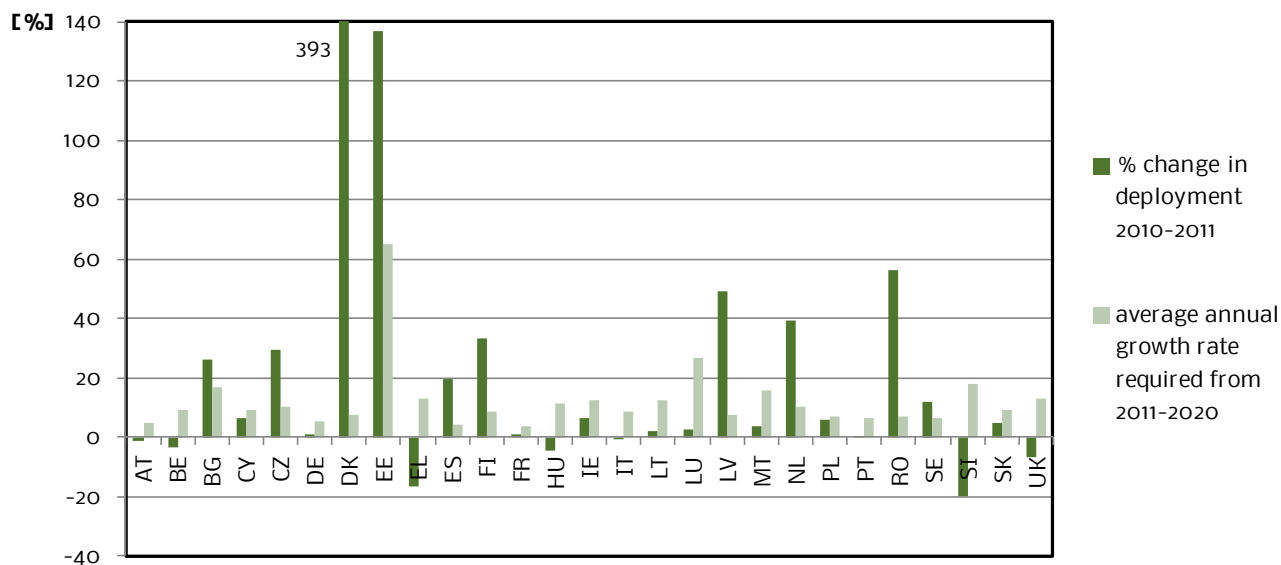


Figure 33: RES-T growth rate achieved in 2010-2011 and average annual growth rate required from 2011-2020 to achieve the 2020 target. Source: Fraunhofer ISI based on Eurostat and other sources.

Ten Member States had growth rates sufficient to achieve the NREAP 2020 targets. Of the remaining Member States, 10 need to accelerate growth, and 7 Member States even need to reverse negative growth rates.



Growth of biofuels consumption from 2010-2011						
Member State	RES-T [%]	Of which: compliant [%]	Bioethanol/ bio-ETBE [%]	Biodiesel [%]	Renewable electricity [%]	Other biofuels [%]
Austria	-1.27	-0.02	-2.94	-1.18	-5.46	11.43
Belgium	-3.41	-	-9.43	-2.91	21.71	-
Bulgaria	25.98	-	-	70.00	7.08	-100.00
Cyprus	6.67	-	-	6.67	-	-
Czech Republic	29.72	-	5.17	38.15	26.21	-
Denmark	295.28	-	81.48	-	5.83	-
Estonia	137.19	-	-	-	137.19	-
Finland	33.52	-	10.00	73.02	-1.28	-
France	0.85	-	-0.75	0.94	3.82	-
Germany	0.85	0.00	5.33	3.84	22.30	-53.44
Greece	-16.62	-	-	-17.19	27.30	-
Hungary	-4.65	-	-15.79	-0.85	32.22	-
Ireland	6.54	0.05	3.33	11.48	24.11	-100.00
Italy	-0.18	-0.04	-7.10	-0.76	11.83	-
Latvia	49.11	0.54	0.00	78.95	8.29	-
Lithuania	2.28	0.01	0.00	2.94	3.80	-
Luxembourg	2.54	0.07	300.00	-5.00	14.62	-
Malta	3.77	-	-	-	-	-
Netherlands	39.58	140763.29	11.19	81.05	26.85	-
Poland	5.67	0.05	-5.29	10.29	31.70	3.30
Portugal	0.70	0.02	-	1.00	-5.71	-
Romania	56.33	-	0.00	105.97	14.74	400.00
Slovakia	4.79	-	3.23	5.26	3.00	-
Slovenia	-19.74	-0.24	33.33	-26.19	5.16	-
Spain	19.66	0.20	-2.17	24.05	15.47	-
Sweden	12.04	0.10	-0.49	22.03	19.06	-
UK	-6.87	-0.07	3.45	-11.62	22.12	-
EU-27	5.31	0.08	2.05	7.10	10.77	-21.27

Table 6: Growth of biofuels consumption from 2010-2011. Compliant biofuel data estimated for BE, DK, FI, EL, HU, MT, SE, and SK

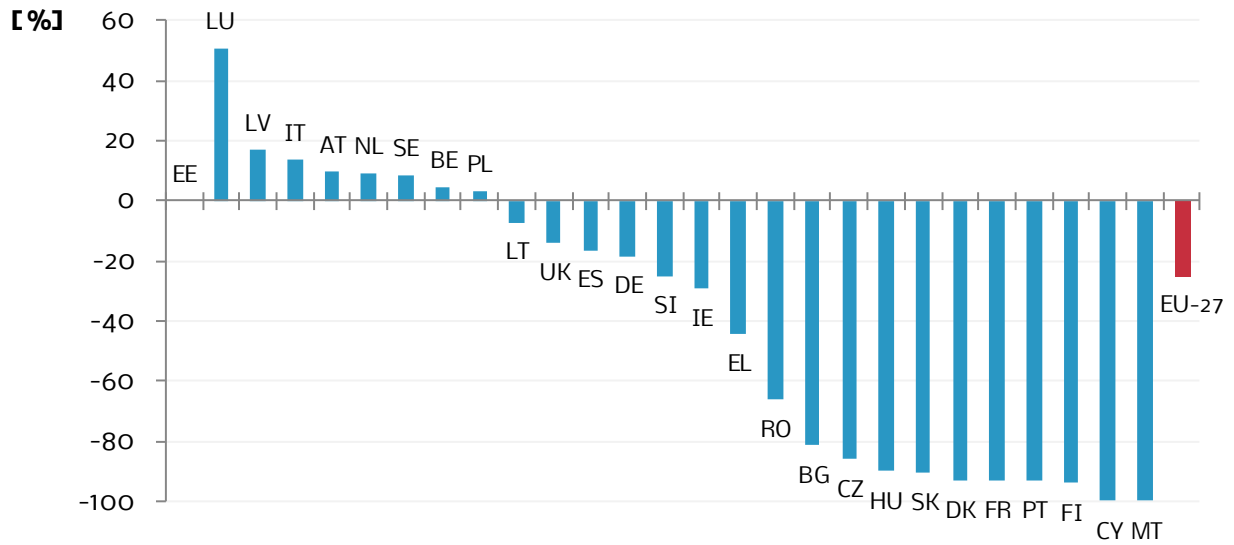


Figure 34: Deviation of actual 2011 RES-T Shares from NREAP 2011 target share. Source: Fraunhofer ISI based on Eurostat and other sources.

Not only do 18 Member States stay below their planned 2011 values, but 7 of them even had negative deviations of 50% or more. Estonia had planned a share of zero, but had an actual share of 0.18%.



Biofuel consumption for main RES-T technologies in 2011						
Member State	RES-T [ktoe]	Of which: compliant	Bioethanol/bio-ETBE [ktoe]	Biodiesel [ktoe]	Renewable electricity [ktoe]	Other biofuels [ktoe]
Austria	661	400	66	335	182	78
Belgium	356	0	48	300	8	0
Bulgaria	21	0	0	17	4	0
Cyprus	16	0	0	16	0	0
Czech Rep.	312	0	61	239	12	0
Denmark	143	0	49	84	10	0
Estonia	0	0	0	0	0	0
Finland	214	0	88	109	17	0
France	2598	0	396	2041	161	0
Germany	3183	2941	771	2057	240	115
Greece	108	103	0	106	2	0
Hungary	172	0	48	117	7	0
Ireland	100	98	31	68	1	0
Italy	1616	1401	144	1301	171	0
Latvia	47	42	8	34	5	0
Lithuania	45	45	10	35	0	0
Luxembourg	42	44	4	38	0	0
Malta	6	0	-	-	-	-
Netherlands	334	321	149	172	13	0
Poland	951	934	179	536	17	219
Portugal	316	4	0	303	13	0
Romania	233	63	47	138	38	10
Slovakia	181	0	32	140	9	0
Slovenia	40	35	4	31	5	0
Spain	1797	1691	225	1496	76	0
Sweden	550	475	202	216	132	0
UK	1068	1063	330	715	23	0
EU-27	15103	9659	2892	10644	1145	422

Table 7: Biofuel consumption for main RES-T technologies in 2011. Compliant biofuel data¹² estimated for BE, DK, FI, EL, HU, MT, SE, and SK

¹² Among biofuels, only those compliant with sustainability criteria count towards the target and are used in above target calculations. The implementation of sustainability standards and the respective reporting is still in a transition phase. Eurostat does not yet systematically provide the data. In this table, compliant biofuel data had to be estimated for 8 countries. Other biofuel categories include compliant and non-compliant biofuels. Nevertheless, the following fuel-specific paragraphs provide details on these mixed-source fuels, assuming that Member States are working on compliance for their whole biofuel supply. As both compliance rates and reporting is expected to improve, this problem will only appear in this year's report.



1. BIOETHANOL/BIO-ETBE



Figure 35: Deviation of actual 2011 bioethanol/bio-ETBE consumption from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.

Only seven Member States (over)achieve their NREAP 2011 target, while another four had not planned to use any bioethanol in transport in 2011. The biggest consumer is Germany with 771 ktoe, followed by France with 396 ktoe, and the UK with 330 ktoe.



2. BIODIESEL

All Member States planned biodiesel consumption in 2011, and all except Malta and Estonia report some consumption. Ten Member States are above their planned 2011 target. The biggest consumers are Germany with 2,057 ktoe, France with 2,041 ktoe, and Spain with 1,496 ktoe.

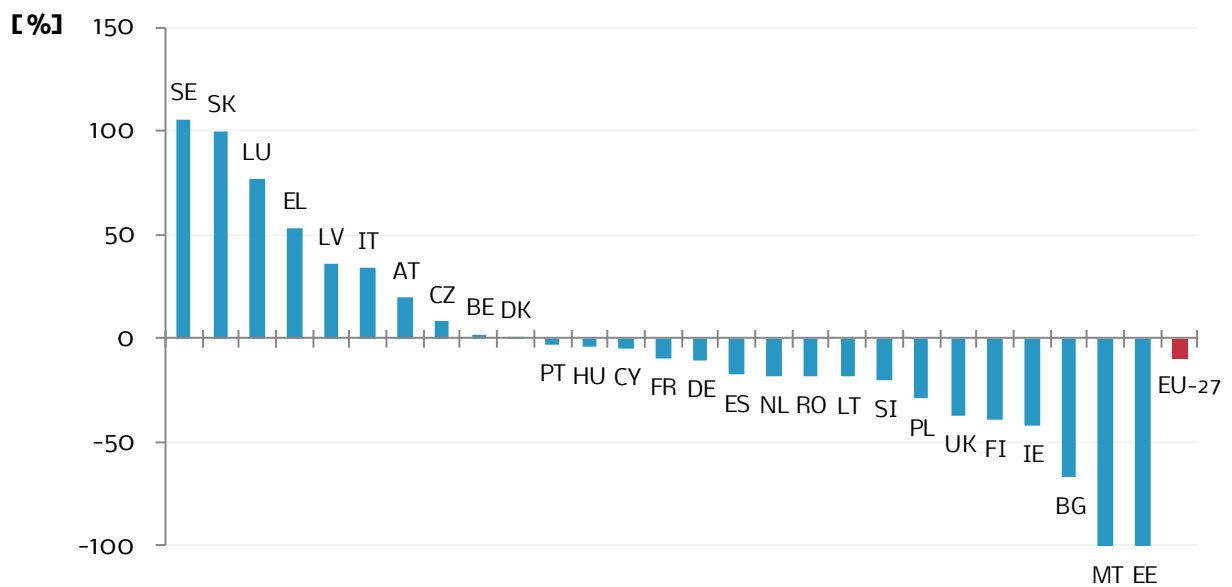


Figure 36: Deviation of actual 2011 biodiesel consumption from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.



3. ELECTRICITY IN TRANSPORT

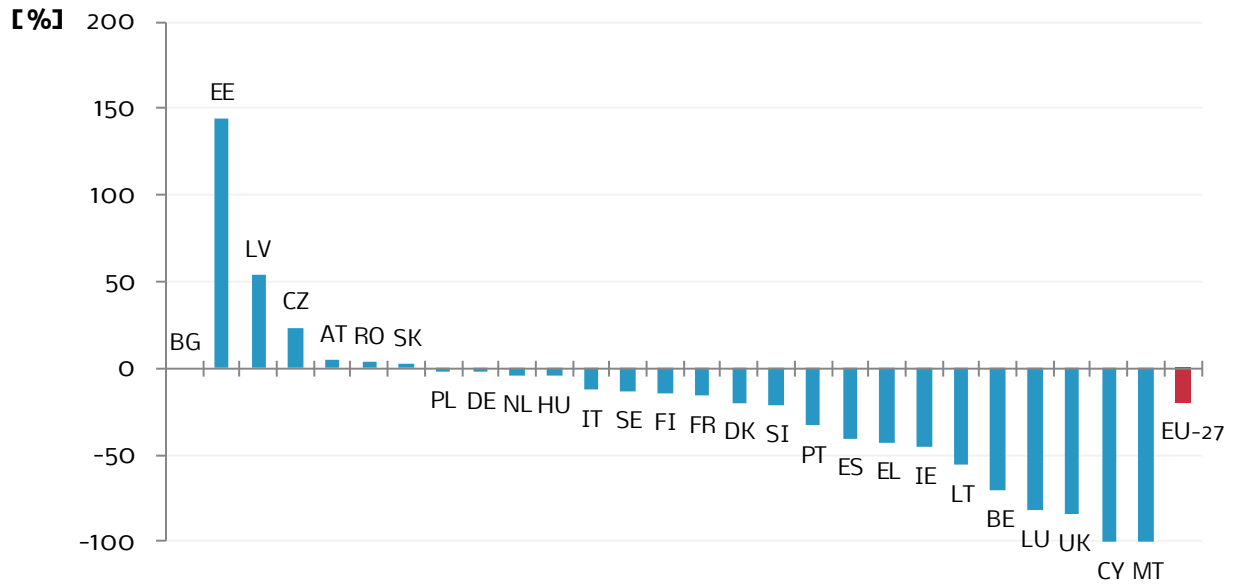


Figure 37: Deviation of actual 2011 renewable electricity consumption from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.

Seven Member States are above their NREAP 2011 target, including Bulgaria which had originally not planned any RES-E consumption in transport. The largest consumers are Germany with 239 ktoe, Austria with 182 ktoe, and Italy with 171 ktoe. Bulgaria reported 3.52 ktoe, but had planned none. Most Member States report zero or close to zero electricity consumption in road transport. Almost all electricity is used in non-road transport modes.



4. OTHER BIOFUELS

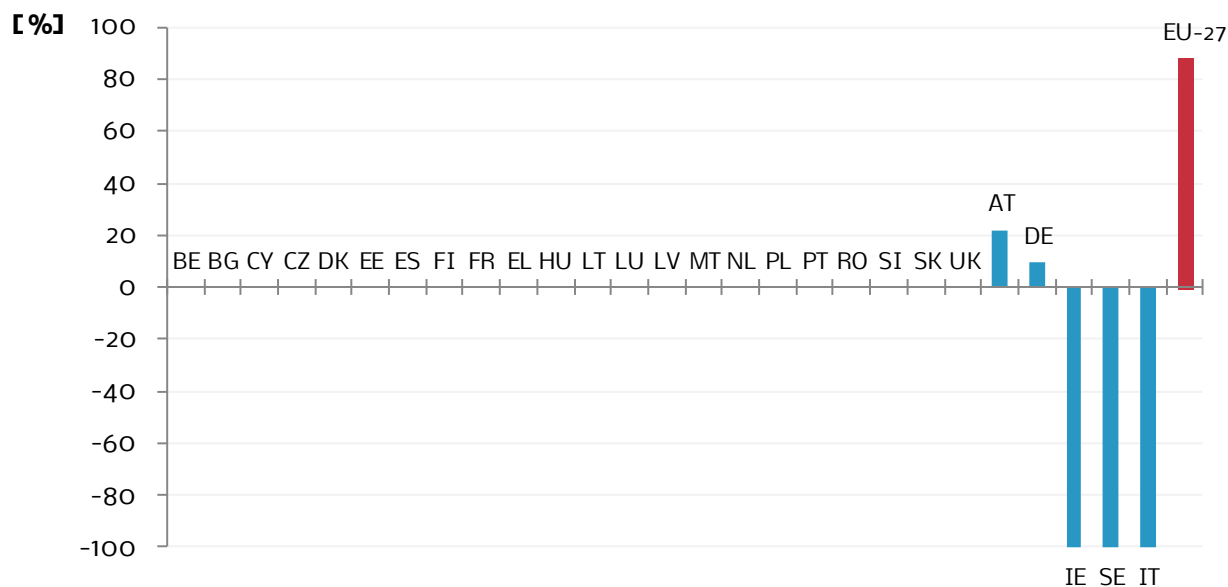


Figure 38: Deviation of actual 2011 other biofuels consumption from NREAP 2011 target. Source: Fraunhofer ISI based on Eurostat and other sources.

Only five Member States had planned any consumption of other biofuels in 2011, and rather small amounts. While Italy, Ireland and Sweden report zero consumption, the two remaining consumers are Germany with 115 ktoe and Austria with 78 ktoe. The EU-27 overall still overachieve the target by 88%. This is due to Poland and Romania having planned zero consumption but reporting an actual consumption of 219 ktoe and 10 ktoe, respectively.

5. HYDROGEN

No Member States reports any hydrogen consumption in transport in 2011, and none had been planned. Romania is the only Member States which foresees any hydrogen consumption, aiming for 2.4 ktoe in 2020.



II. EUROPEAN OVERVIEW OF BARRIERS

A. METHODOLOGY

Along with the analysis of the EU member states' trajectory towards their 2020 targets and the formulation of recommendations thereupon, one of the objectives of the Keep-on-Track! Project is to identify the existing barriers hindering the deployment of RES in the electricity, heating and transport sector. These barriers can be of political, administrative, financial or operational nature.

Geographical scope

During the first year of the project, 11 countries were analysed with the support of the 11 national renewable energy associations which partner the project. The second year of the project will see the analysis of the EU-27 Member States; the third year will then also address Croatia, as the 28th Member State to the European Union, joining on 1 July 2013.

The research of year 1 took a bottom-up approach to allow for the broadest barrier identification at national level possible. Therefore, the year 1 research is mainly dedicated to identify the status quo in Member States. Building on these identified results, the research of year 2 and 3 shall then specifically address the development of barriers and their impact on technologies and processes. The year 1 research resulted in the identification of 280 single barriers, which can be divided as follows:¹³

Barriers by RES-sector

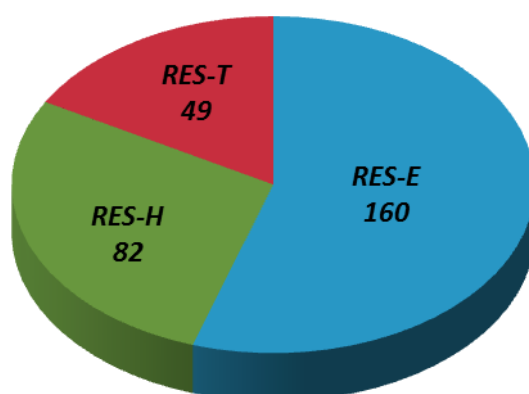


Figure 40: Barriers by RES-sector. Source: eclareon based on own research and on information from the 11 national renewable energy associations which partner the Keep on track! Project

¹³ Please note that the sum of barriers of the 3 sectors (291) differs from the total amount of identified barriers (280), as some barriers can affect more than one sector and are therefore counted more than once.



European overview

The report does not deliver a detailed description and analysis of the single barriers in each Member State. To this end, please read the 11 country reports, which analyse barriers detected on a national level.

The present report provides a European overview of the global categories of barriers identified in the 11 EU Member States: indeed, for the sake of clarity and comparability from a European perspective, the single national barriers were then grouped further, allowing for a more comprehensive presentation of identified issues at European level. Moreover, this report provides a European sectoral overview of the identified categories of barriers, focussing on the electricity, the heating and the transport sector. Examples of barriers classified in the different categories are included and detailed in the rest of the report.

1. Quantitative analysis

Each sector section of the report is introduced by an overview table, presenting all identified global categories of each sector and the number of single barriers detected under each category. The 280 single national barriers identified were classified into 15 global categories for RES-E, 13 global categories for RES-H and 9 global categories for RES-T. Each barrier was classified into one single category, according to the most dominant aspect of the barrier. However, barriers being often complex, they may also contain aspects of other categories. As a consequence, it may occur that for a certain category, a country is coloured in blue (meaning that no main barriers were reported) whereas some barriers identified in this country still contain components corresponding to this category. This is particularly the case for categories which are in close relation with one another, such as “RES strategy and legislation shortcomings” and “Support Scheme Issues”.

As far as possible, cross-categories relevant to all three sectors were defined in order to enable a cross-sectoral perspective of the barriers. However, several individual barriers and thus their corresponding categories remain sector-specific. In order to provide an in-depth analysis of the barriers on a European level, it was decided to focus on the most important categories of each sector. These include the global categories comprising the greatest number of individual barriers.

2. Qualitative analysis

Within each section, a second set of tables provides a geographic overview of the barriers in the 11 Member States concerned and outlines technology relevance of the category. In fact, barriers identified in individual Member States could be of relevance only for selected technologies, or for all renewable sources in general. The distinction however provides a more differentiated and a more accurate picture.

The qualitative analysis of the barriers consists of defining the spread and severity for each barrier:



The severity level of the barrier represents the degree to which the individual barrier hinders the development of a single individual renewable energy installation. The spread of the barrier represents the estimated share of renewable energy installations which are affected by the barrier. Combined together, the severity and spread aspects reflect the impact scope of the barrier. The spread and severity levels were evaluated on a scale of 1-5 by each of the 11 national renewable energy associations partnered to the project, according to their expertise in the field of renewable energies in their respective countries (1 being sporadic/not severe and 5 being widely spread/severe). In this respect it should be underlined that the spread and severity data are the result of a subjective assessment and shall therefore be considered as such throughout the report. A coefficient of spread and severity was established by calculating the average of both values to outline on the impact of a given barrier on a specific renewable technology.

It should also be underlined that the non-identification of a barrier in a certain country does not necessarily stand for its non-existence. In fact, other national barriers may have been perceived as more important or more urgent and were therefore prioritised.

In addition, the identification of a high number of barriers in a specific Member State does not necessarily reflect the degree of severity of the national renewable situation. The identification of a high number of barriers might namely be the result of high barrier awareness in certain countries, favoured by high transparency or a high level of information availability.

The qualitative analysis is on the one hand reflected in the 11 national reports, taking a **national** perspective on the barrier identification.

The qualitative information was also used for the **European** overview tables, outlining the barriers of selected renewable technologies.

Please note that due to the impossibility of the Greek association to provide information on the existing barriers for the RES-H and RES-T sectors, the current report does not contain information on both sectors.



B. RES-E

The following section presents a barrier analysis for RES-E in the 11 Member States considered. In the first part, a general overview of the identified global categories and their distribution across technologies is provided.

In the second part, the most important categories are displayed in greater detail. The analysis comprises a geographical map visualising the occurrence of barriers in the 11 Member States along with the corresponding technologies affected. In addition, a description of the barriers falling under the category is provided.

The third section takes a technology-specific perspective of the barriers on the basis of geographical maps indicating the average level of spread and severity of the concerned barriers. Information is provided for the 3 most affected technologies, being namely biomass/biogas, solar and wind.

In summary, a total of 15 categories have been defined for RES-E, covering 160 barriers.

The first graph below presents an overview of all global categories for the RES-E sector identified in the 11 Member States analysed during year 1 of the Keep-on-Track! Project. The most important category in terms of number of barriers relates to “RES strategy and legislation shortcomings” with 33 barriers, whereas the smallest category gathers only a single barrier.

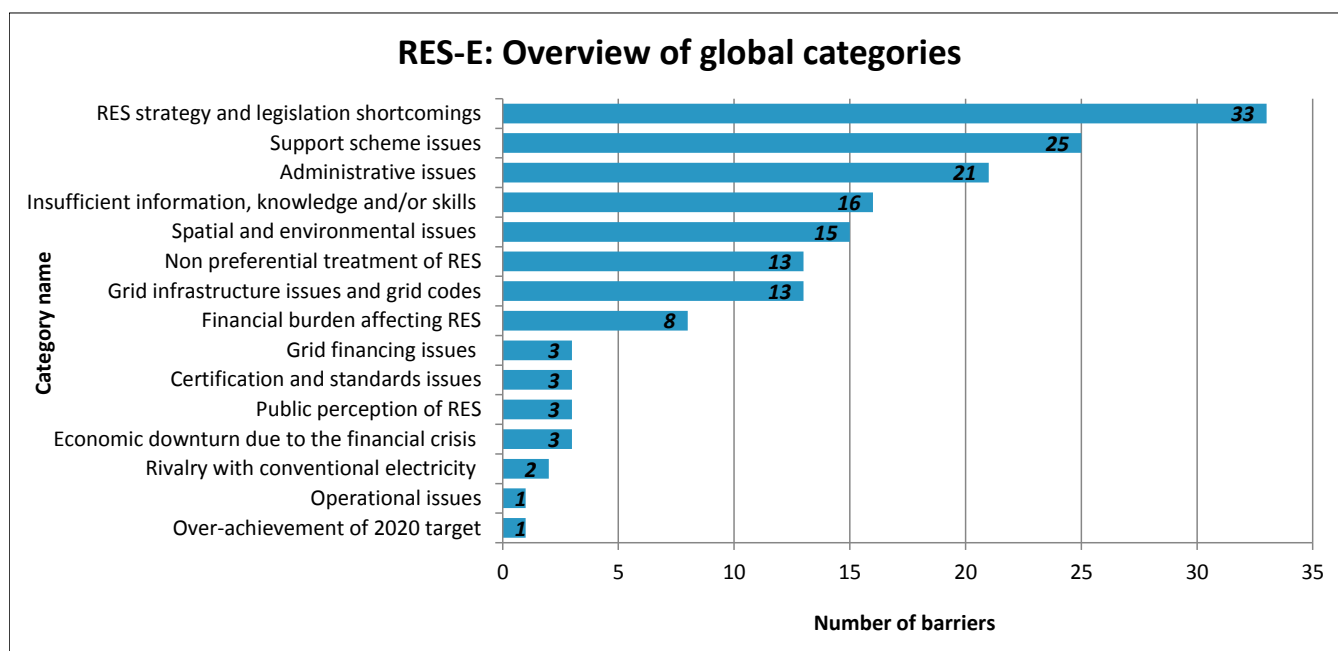


Figure 41: Overview on the categories of barriers identified for the RES-E sector. Source: eclareon based on own research and on information from the 11 national renewable energy associations which partner the Keep on track! Project



The second graph displays the distribution of RES-E technologies by category. As mentioned in the methodology section, only the most important categories were considered for a further analysis. On the one hand, the graph describes the number of barriers affecting all renewable technologies equally (in red) and, on the other hand, the number of barriers exclusively affecting single technologies is illustrated.

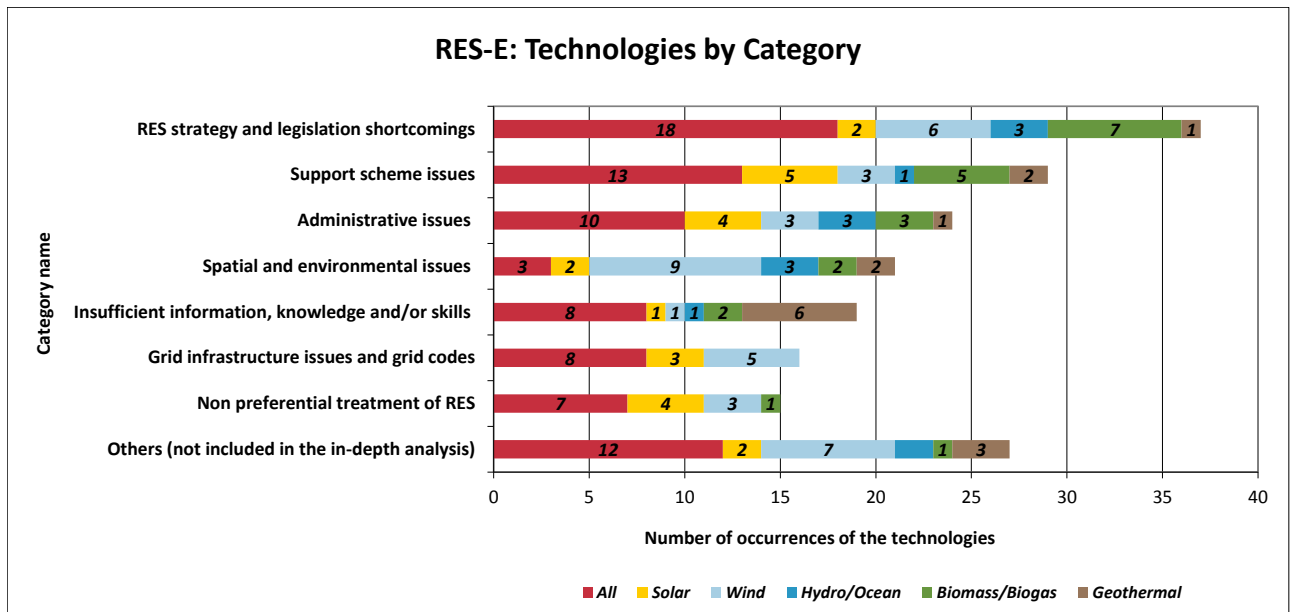
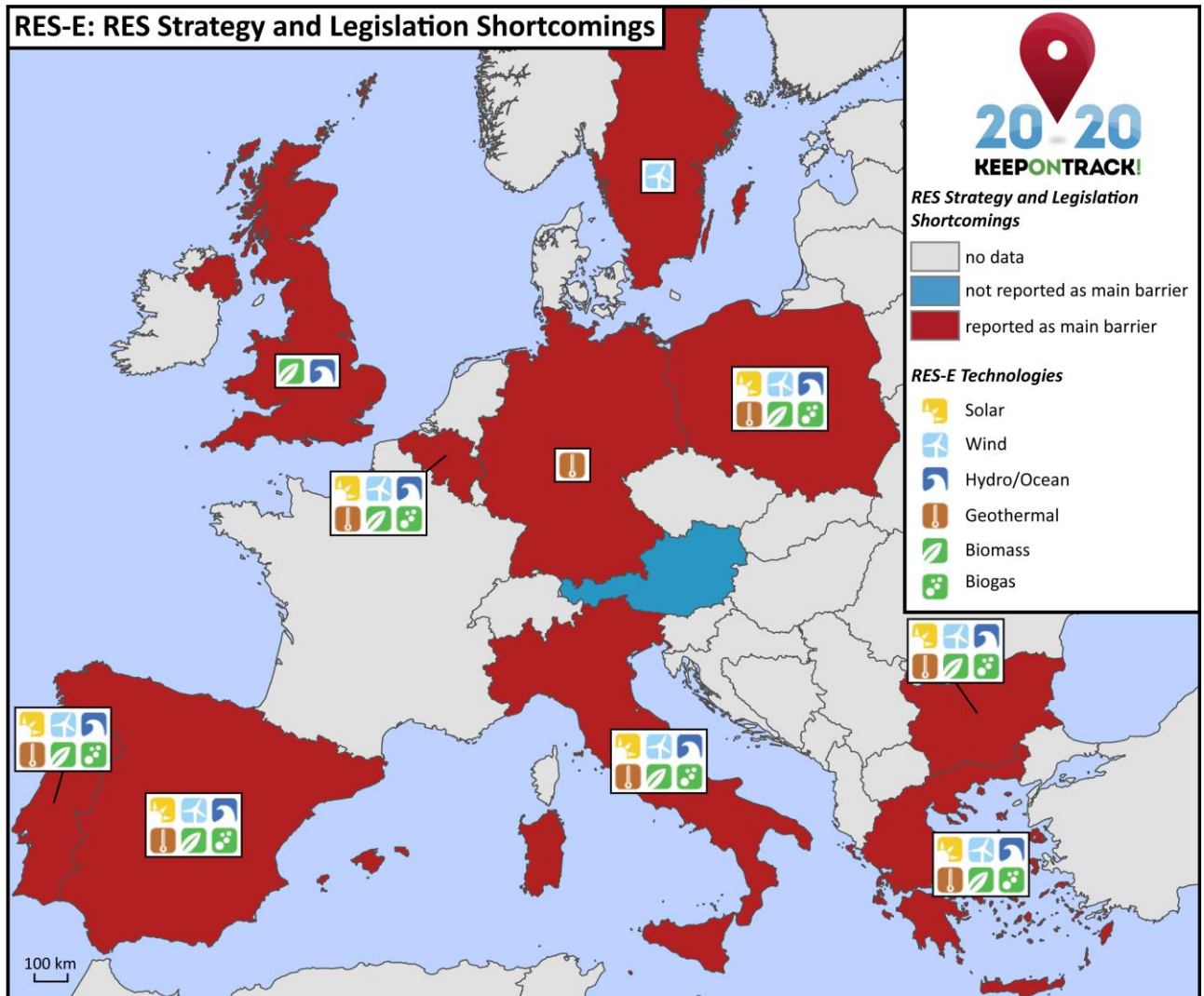


Figure 42: Overview of technologies' occurrence for the most important categories of the RES-E sector. Source: eclareon based on own research and on information from the 11 national renewable energy associations which partner the Keep on track! Project

1. RES STRATEGY AND LEGISLATION SHORTCOMINGS



Barriers falling into the category of “RES strategy and legislation shortcomings” result primarily from two main issues:

- Firstly they are due to a **lack of long-term vision from decision makers with regards to the national energy strategy**, characterised by political indecision about the future of RES, the uncertain implementation of regulations for RES or the adoption of a moratorium for new power allocation affecting mostly RES.
- The second set of issues is mainly rooted in an **unclear legislative framework for RES**. Here, the scarce definition of the distribution of costs between developers and public entities (e.g. regarding grid costs and the financing of environmental equipment) as well as the lack of clarity in terms of RES taxation is worthy of mention. In addition, several barriers also point out the deficits of the legislative framework regarding grid connection and expansion rules (i.e. the unclear definition of the competent authorities



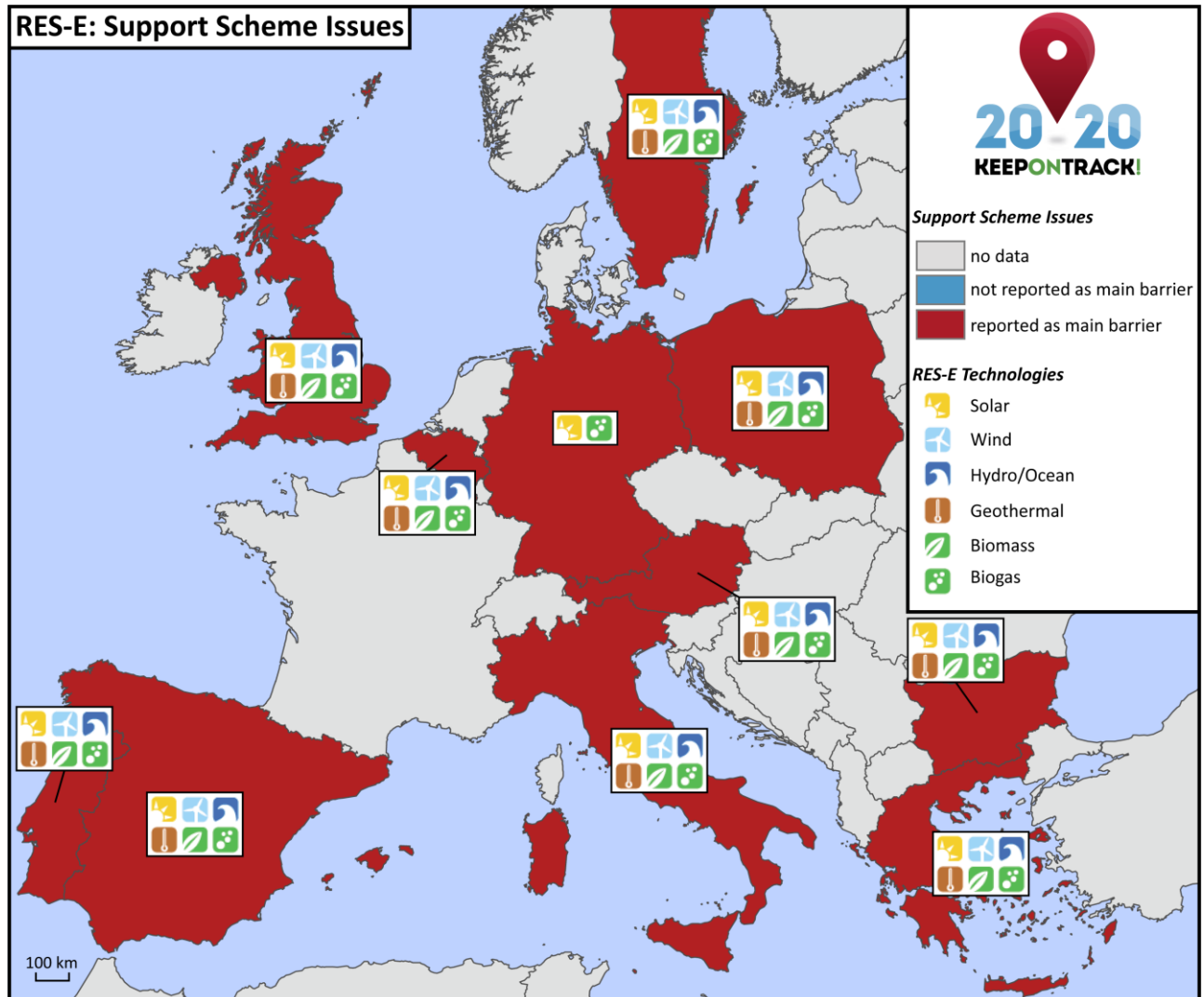
for grid reinforcement or the unclear definition of shallow and deep costs for TSOs and DSOs). Finally, barriers also refer to the insufficient implementation of the RES directive in certain national legislations.

In 10 of the 11 Member States concerned, barriers falling under the global category of “RES strategy and legislative issues” have been reported. Furthermore, “RES strategy and legislative issues” is the most affected global category of RES-E, with 33 single national barriers.

Regarding the affected technologies, while 7 Member States reported that the barriers within this category are impacting on all technologies, in 3 other Member States, the barriers are only affecting a single technology or a smaller group of technologies. Barriers from this category are only impacting on wind installations in Sweden; while for Germany, barriers under this category are predominantly reported for geothermal installations.

Only for Austria, there are no barriers reported under the global category of “RES strategy and legislation shortcomings”.

2. SUPPORT SCHEME ISSUES



Barriers referring to “Support Scheme Issues” are characterized by two core issues:

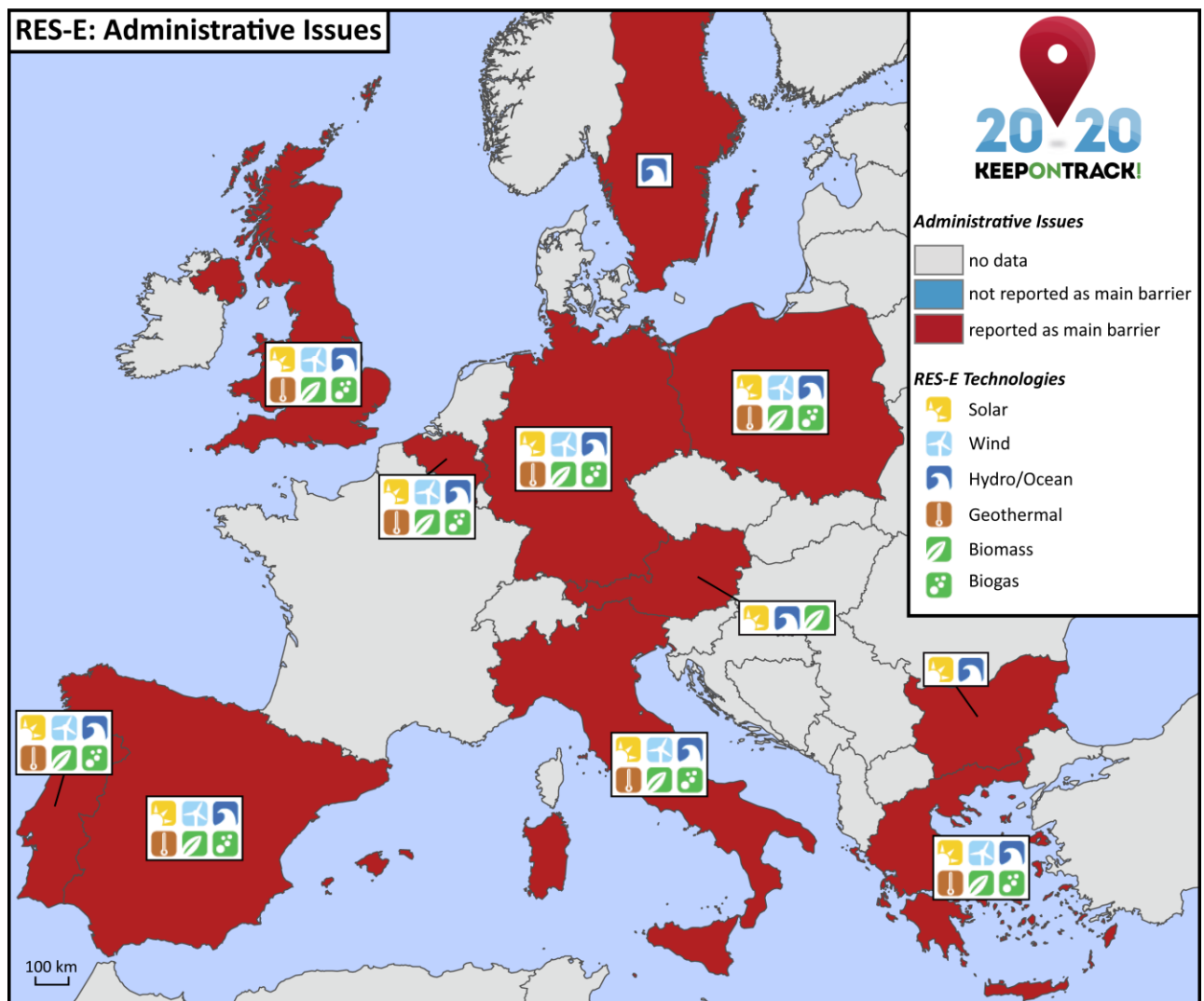
- On the one hand, barriers are raised by the **uncertainty and the instability of the support mechanisms** creating market insecurity and scaring off investors. As a matter of fact, stop and go policies, retroactive cuts of subsidy or regular legislative changes of the Feed-in Tariff (FIT) system constitute important barriers to the development of renewable energy in the electricity sector. Moreover, several barriers are linked to the FIT, which is deemed non-adapted to the increase of production costs and not balanced across the renewables industry.
- On the other hand, barriers refer to the **insufficient level of support mechanisms**, characterised by restricted yearly volumes of subsidy for RES-projects, the cessation of certain tax exemptions after 2015 and disproportionate reductions of the FIT rates, resulting in low profitability of RES-E investments.



All 11 Member States report barriers in the category of “Support Scheme Issues”. Regarding the number of single identified barriers which were grouped under this category, “Support Scheme Issues” forms the second largest group of single barriers with 25 reported issues.

It was only for Germany that barriers under this category were reported for specific technologies, specifically solar and biogas. For the other 10 Member States analysed, barriers under this global category were reported for all renewable technologies.

3. ADMINISTRATIVE ISSUES





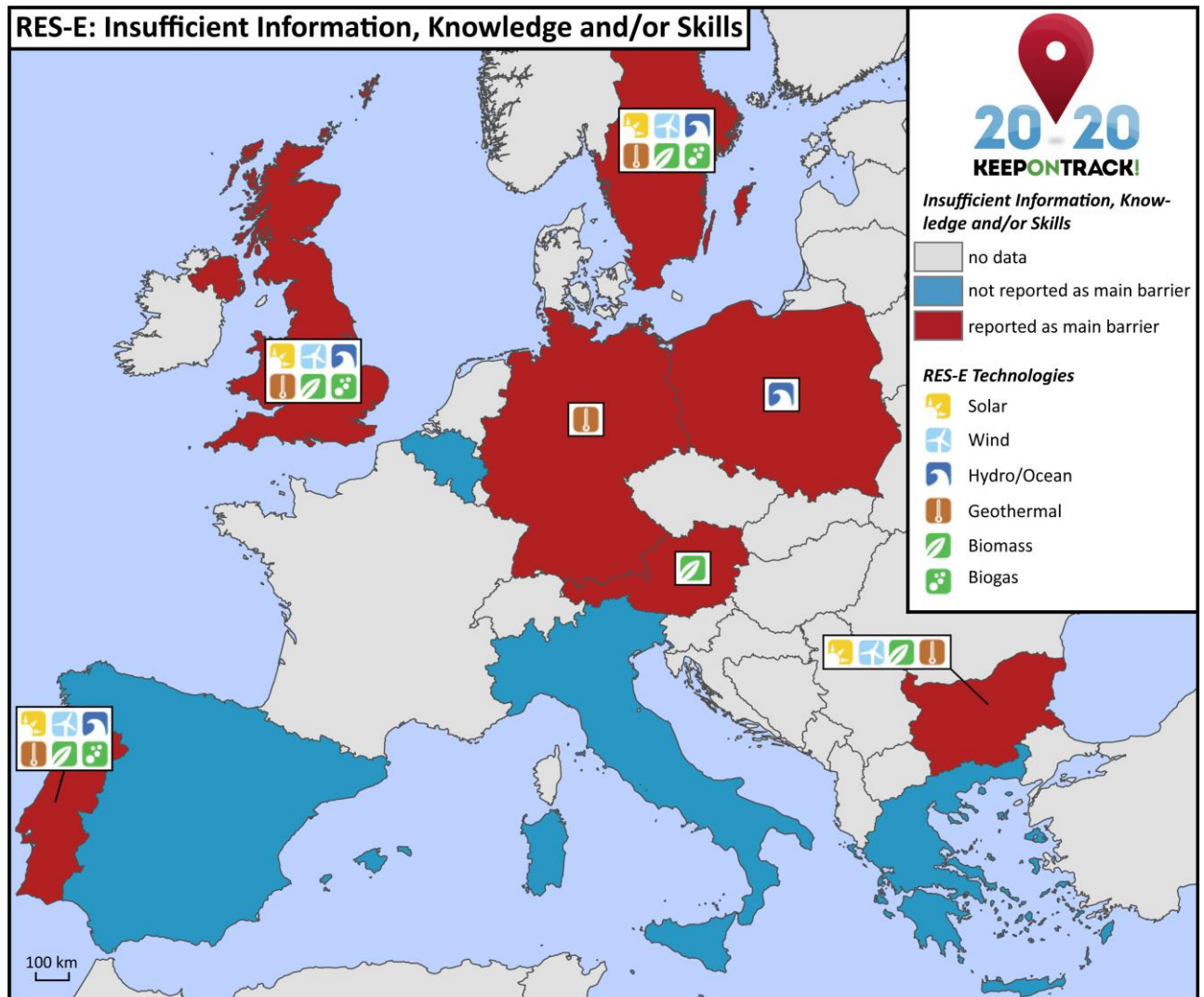
This category includes all barriers related to administrative frameworks:

- On the one hand, the barriers regard the **complexity, tardiness and inflexibility of administrative procedures** for the granting of permits, environmental impact assessments or the issuance of grid connection requirements. Moreover, authorization processes are deemed to be uncertain and expensive.
- On the other hand, administrative issues can result from the existence of competing regulations and conflicting jurisdictions, leading to a **lack of harmonization and coordination between the competent authorities** mostly affecting permit procedures, environmental requirements and safety provisions.

All 11 Member States reported barriers under the global category of “Administrative Issues”. This category is gathering 21 national single barriers, thereby representing the most reported category.

Most Member States reported that all technologies are affected by administrative issues. Only 3 Member States reported technology-specific barriers under this global category, (Sweden (hydro), Austria (solar, hydro, biomass) and Bulgaria (solar, hydro)).

4. INSUFFICIENT INFORMATION, KNOWLEDGE AND/OR SKILLS



This category mainly relates to barriers dealing with the insufficient information, knowledge and skills of the professional sector and of decision makers as regards RES.

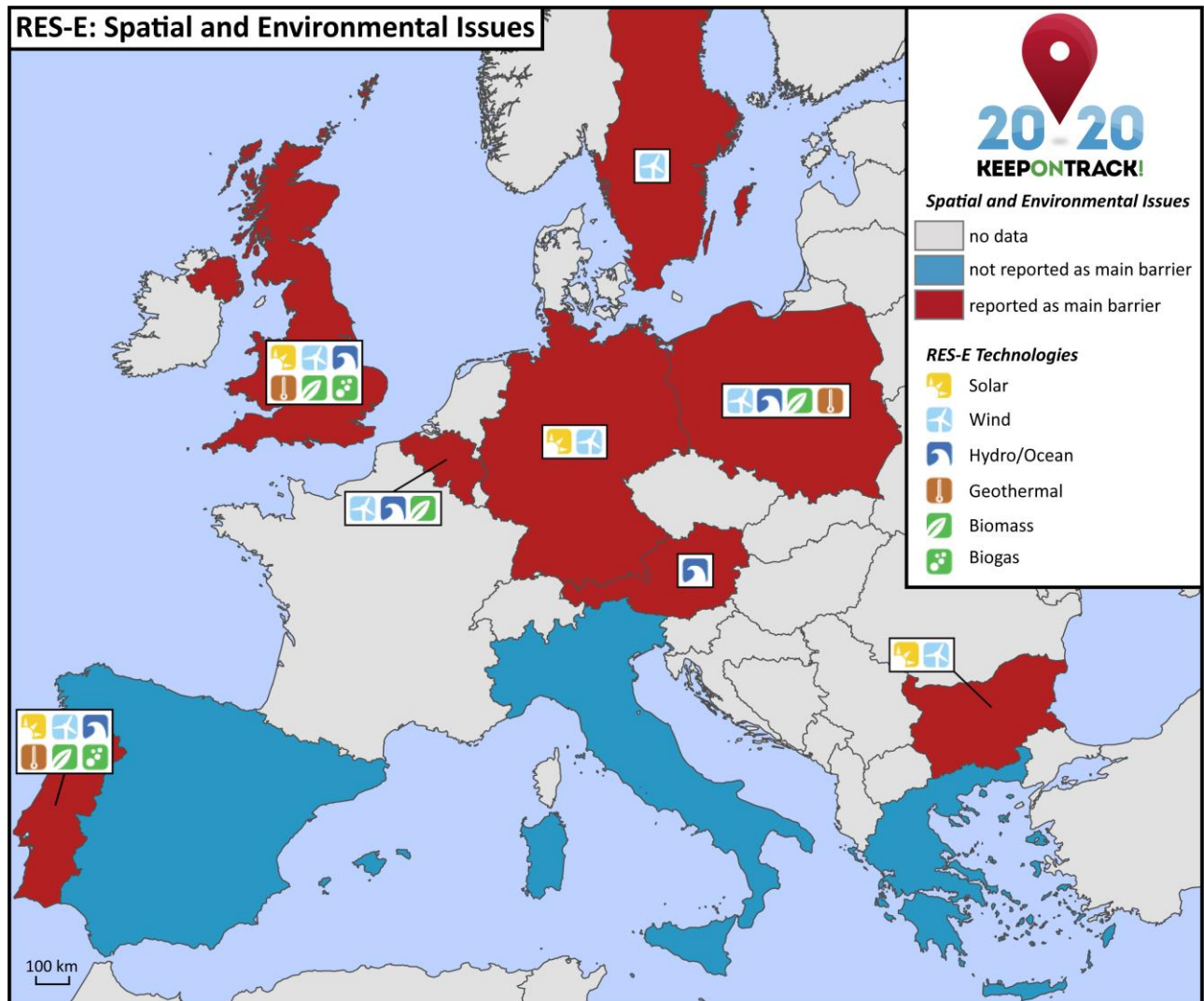
- First of all, this is due to a **lack of available information and studies on RES-E**, affecting the assessment of costs and benefits as well as the assessment of the existing potential of RES-E technologies. The lack of information also hinders the identification of the most appropriate sites for the development of RES projects.
- Furthermore, numerous barriers result from the **lack of expertise of installers**, leading to bad experiences of RES producers and consequently to a bad image of RES. The bad image of RES together with the insufficient knowledge of installers also brings about financing issues of RES projects. Moreover, some barriers point out the lack of information network to exchange know-how, thereby aggravating the lack of expertise of installers.



- Another important issue is the **lack of understanding of the responsible authorities**, often caused by their lack of expertise as regards RES technologies.
- Last but not least, several barriers are raised by the **lack of transparent communication of grid operators**: some grid operators do not comply with their obligation to provide information on their current connection capacity and developers have no direct access to the results of technical studies.

7 out of 11 Member States flagged barriers under the global category of insufficient information, know-how and/or skills. Furthermore, 16 single barriers are reported under this global category. For 4 Member States, namely Belgium, Italy, Greece and Spain, no barriers were reported, which would fall under the category. To this end, it is again to highlight that the non-identification of a barrier in a certain country does not necessarily stand for its non-existence. In fact, other national barriers may have been perceived as more important or more urgent and were therefore prioritised.

5. SPATIAL AND ENVIRONMENTAL ISSUES



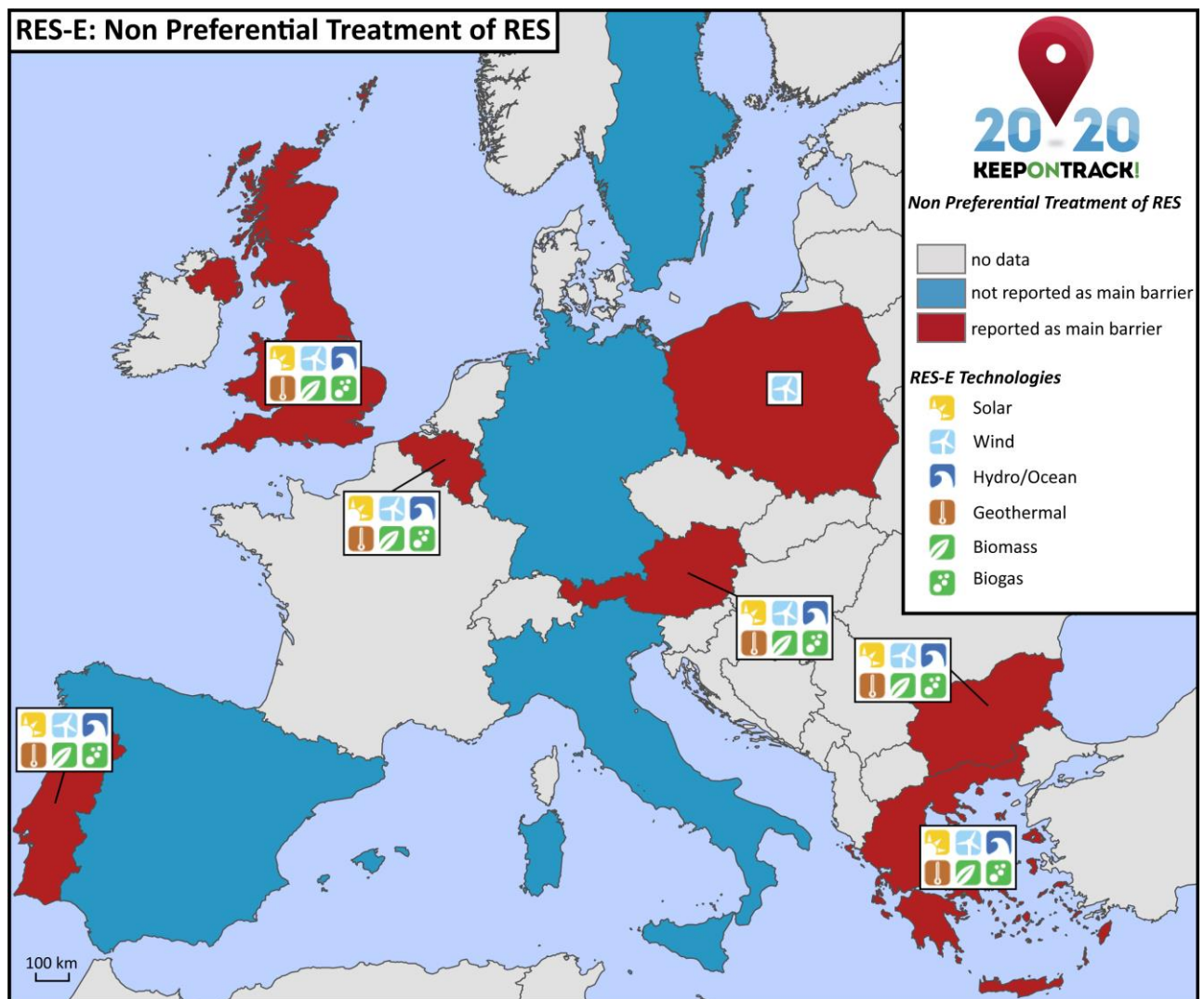
- The category of “Spatial and environmental issues” is characterised by three core problems. First, numerous barriers result from **issues related to local spatial development plans**. The lack of spatial planning could lead to a lack of anticipation in grid reinforcement in order to connect future decentralized RES production units. In some cases, the lack of spatial development plans therefore hampers the development of RES projects. In others, barriers are rather due to the incompatibility of RES-projects with the spatial plans or with existing land-use management instruments. Barriers can also be caused by refusal of planning consent from local authorities as well as by ungrounded bans for certain territories.
- A second set of barriers refers to the **conflict between RES installations and environmental protection**, as a result of stringent or unclear environmental requirements hindering the development of



RES projects. Thirdly, the installation of wind energy turbines can be strongly hampered by **military, radar and airport restrictions**.

Barriers under this category are reported for 8 of the 11 Member States analysed. The global category of “Spatial and environmental issues” covers 15 single barriers. For this category only two Member States report barriers, which affect all technologies. The other 6 Member States are reporting technology specific barriers, affecting only a limited range of renewable technologies.

6. NON-PREFERENTIAL TREATMENT OF RES



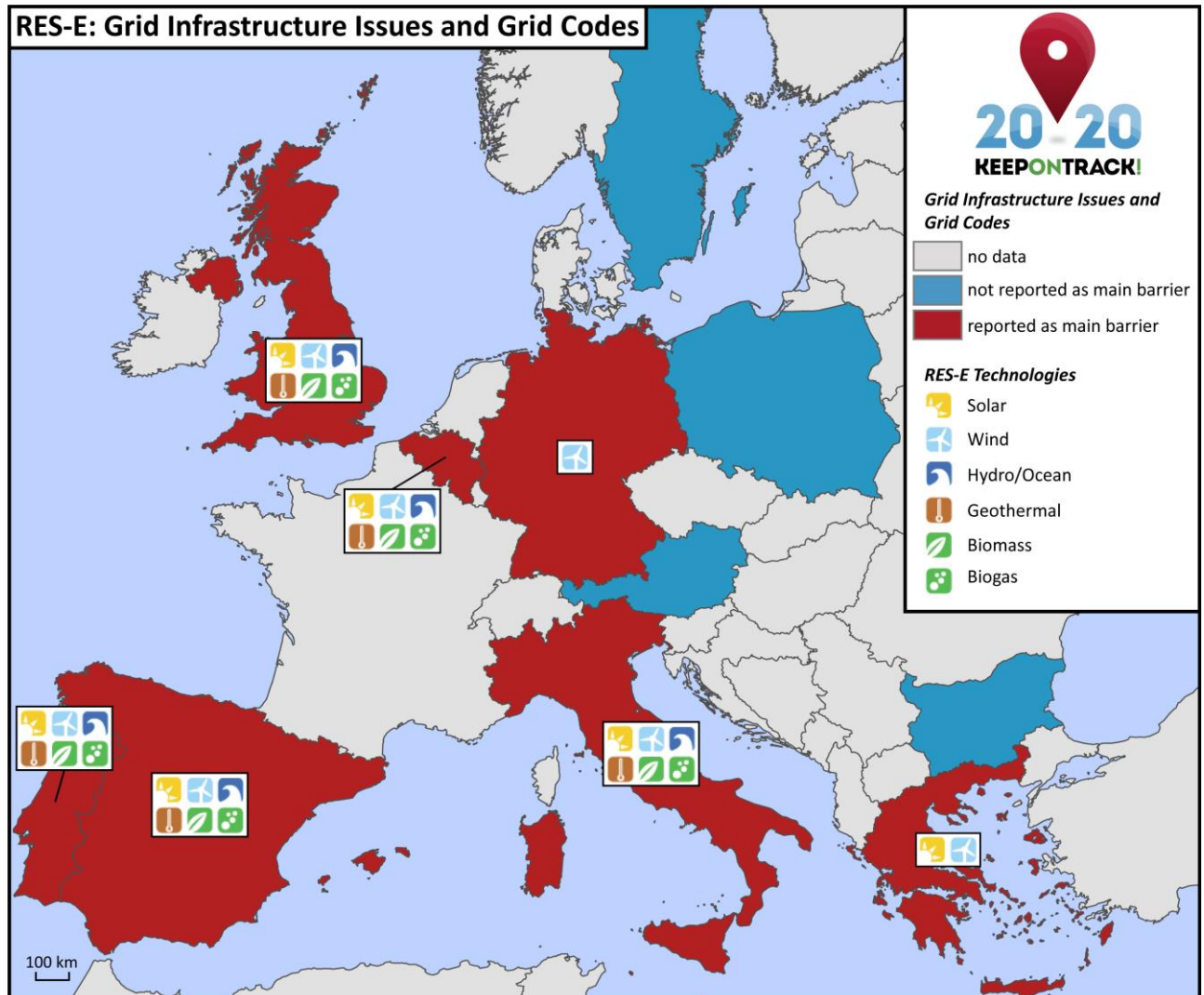


The main issues behind the barriers belonging to the category of “Non-preferential treatment of RES” are related to the discriminative handling of RES and to the failing decision makers’ support. The **discrimination of RES producers** is characterised among others by the reduction of the annual cap for microgeneration installations and by the introduction of a levy on the guaranteed gross revenues of operating RES projects. As far as the electricity grid is concerned, discrimination is illustrated by the implementation of grid access and grid service fees for RES installations, the priority curtailing of RES installations connected to the grid, the limited access to the grid, as well as the lack of priority access to the grid for RES installations. The other main issue is the **lack of decision makers’ support** in certain countries, resulting from the high focus of the government on costs and the strong influence of the conventional energy lobby.

For the category “Non-preferential treatment of RES”, 7 out of 11 Member States have reported barriers. In total, 13 single barriers have been identified related to the non-preferential treatment of renewable installations.

Out of the 7 affected Member States, for which barriers have been reported, 5 have flagged issues which affect all renewable technologies. Only Poland reports wind specific barriers under this category. Still, as with other categories, it is important to underline that the non-identification of a barrier in a certain country does not necessarily stand for its non-existence.

7. GRID INFRASTRUCTURE ISSUES AND GRID CODES



The category of “Grid infrastructure issues and grid codes” includes barriers resulting mainly from **grid capacity issues**, such as insufficient grid connection and interconnection capacity, the lack of grid infrastructure development or the curtailment of RES installations. Furthermore, barriers refer to over-capacity and over-voltage issues as well as to the insufficient adjustment of the grid to distributed electricity generation in certain countries, hindering the grid connection of RES installations. **Problematic grid connection requirements** are characterised by uncertain grid connection criteria, severe technical requirements of grid codes and differing technical practices of DSOs. Barriers related to grid infrastructure issues also refer to speculation practices and the problem of virtual saturation, which complicate the access of RES installations to the grid. Finally, the **lack of coordination between grid development and RES-E integration** also hampers in certain countries.

7 of the 11 analysed Member States highlighted barriers under the global category of “Grid infrastructure issues and grid codes”. 13 single barriers were reported and grouped under this category.

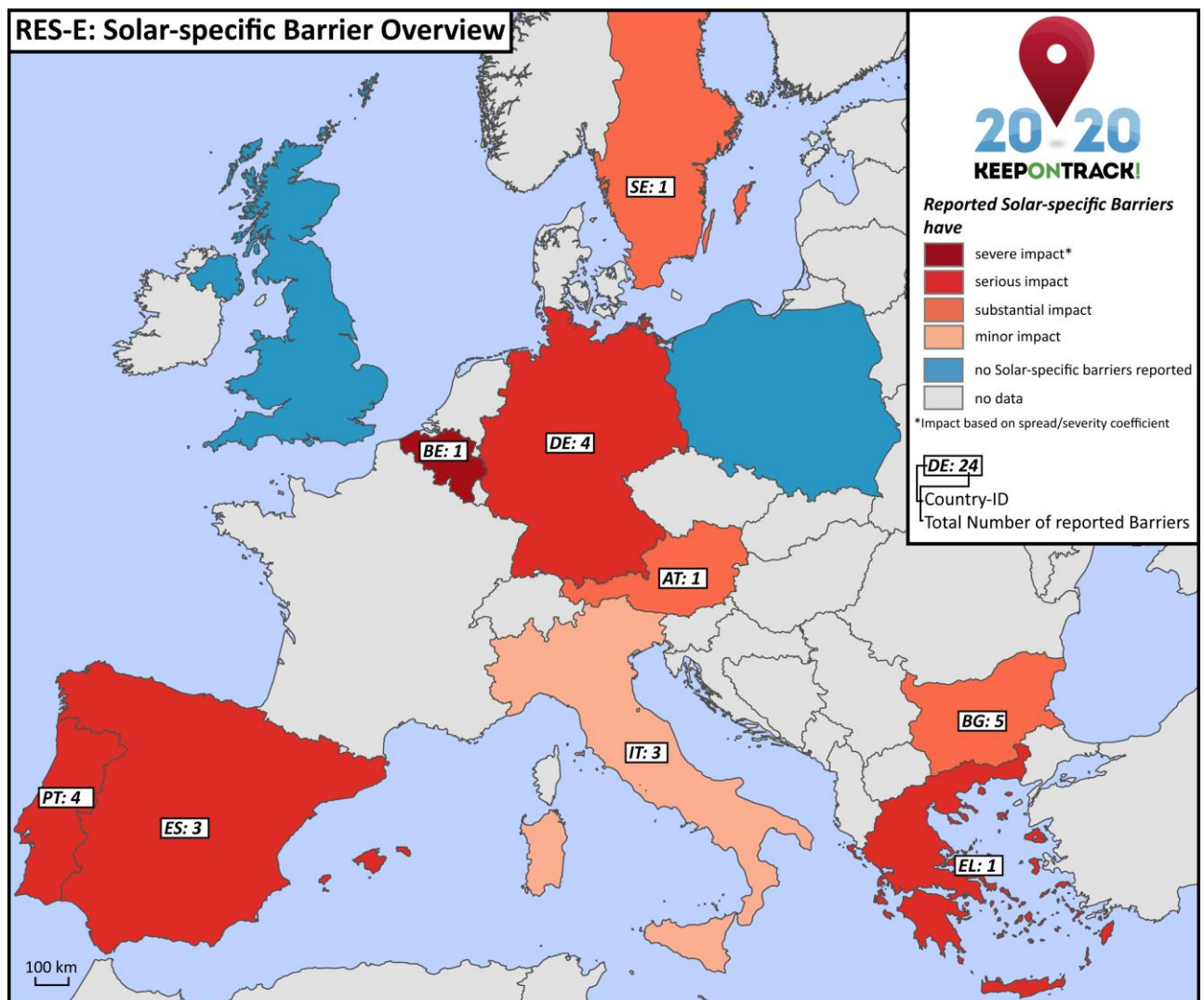


While Germany, especially flags wind related barriers under this global category, Greece reports technology specific barriers for solar and wind energy. The remaining 5 Member States which pointed out barriers report barriers related to all renewable technologies.

C. TECHNOLOGY SPECIFIC ANALYSIS OF RES-E

This section analyses the spread and severity of barriers for a specific technology and in the EU.¹⁴ For the electricity sector, the three most affected renewable technologies in terms of number of barriers were chosen for a deeper analysis. Please note that these results are purely based on barriers reported **solely** for specific technologies and where stated as 'no barriers reported' does not necessarily mean that barriers for these specific technologies do not exist. Instead they could be impacted by overarching barriers affecting all renewable energy technologies in general. For the electricity sector, the three most affected renewable technologies in terms of number of barriers were chosen for a deeper analysis.

1. SOLAR-SPECIFIC BARRIER OVERVIEW



¹⁴ Please refer to the methodology regarding the definition of the spread and severity values

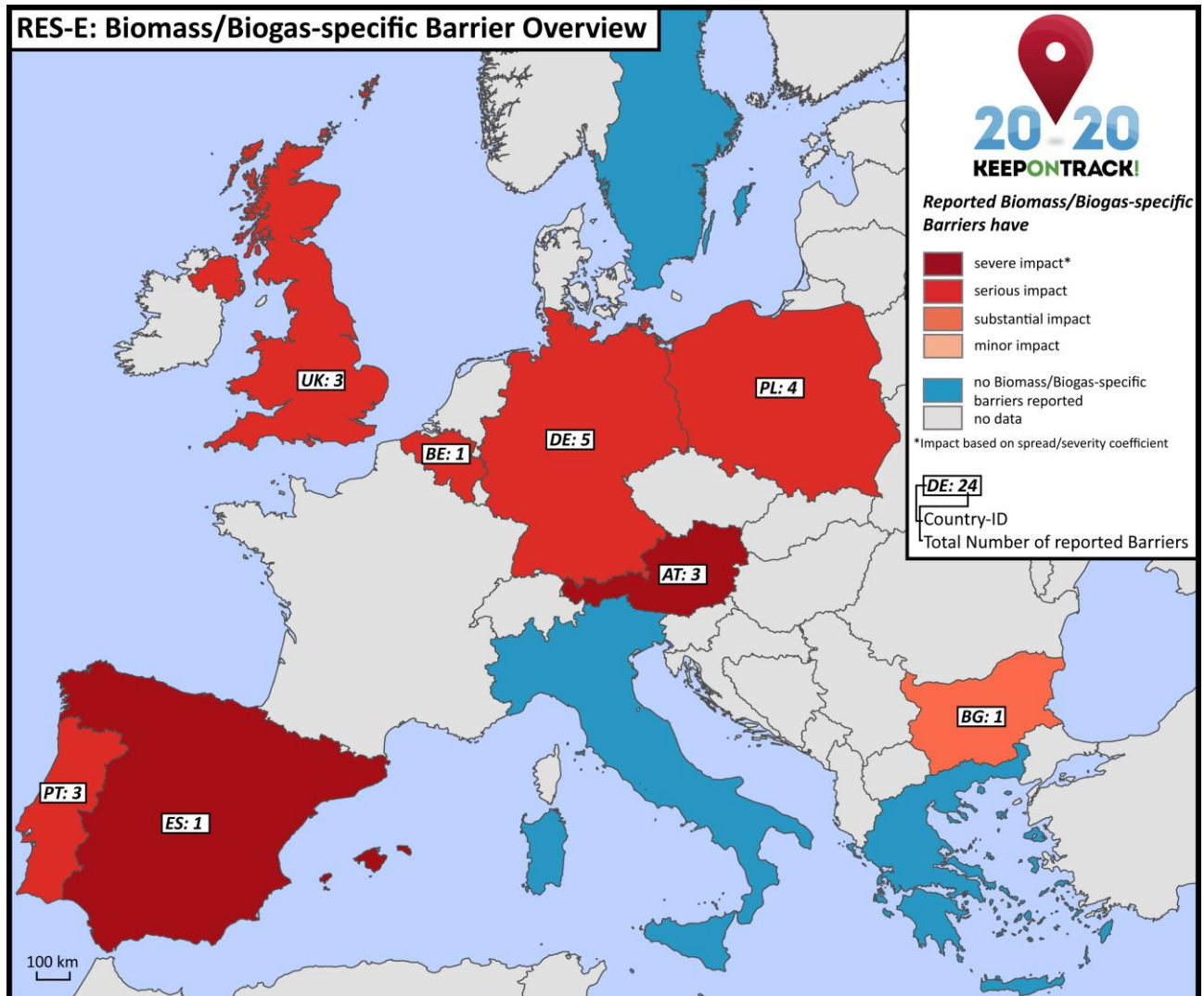


All Member States, beside UK and Poland, are reporting solar specific barriers. Belgium is the only country which flagged a severe impact of its barriers on the development of solar installations, due to the uncertainty of the support mechanism. For Spain, Portugal, Germany and Greece, a serious impact of barriers has been identified. Among the barriers responsible for this assessment, the most serious issues regard retroactive cuts of the support scheme as well as missing support schemes from 2013 onwards in Spain, the introduction of a micro generation cap in Portugal, the disproportionate reduction of the feed-in tariff in Germany, as well as the insufficient interconnections in Greece to accommodate new installations.

For Sweden, Austria and Bulgaria, barriers have been reported impacting the RES-E sector to a substantial degree. To this end a negative campaigning on RES has been identified in Bulgaria and Sweden flagged the disproportionate costs for small-scale producers as a barrier for solar development.

Finally, Italy is facing virtual saturation and speculation, which is deemed to affect the development of solar installations to a minor degree.

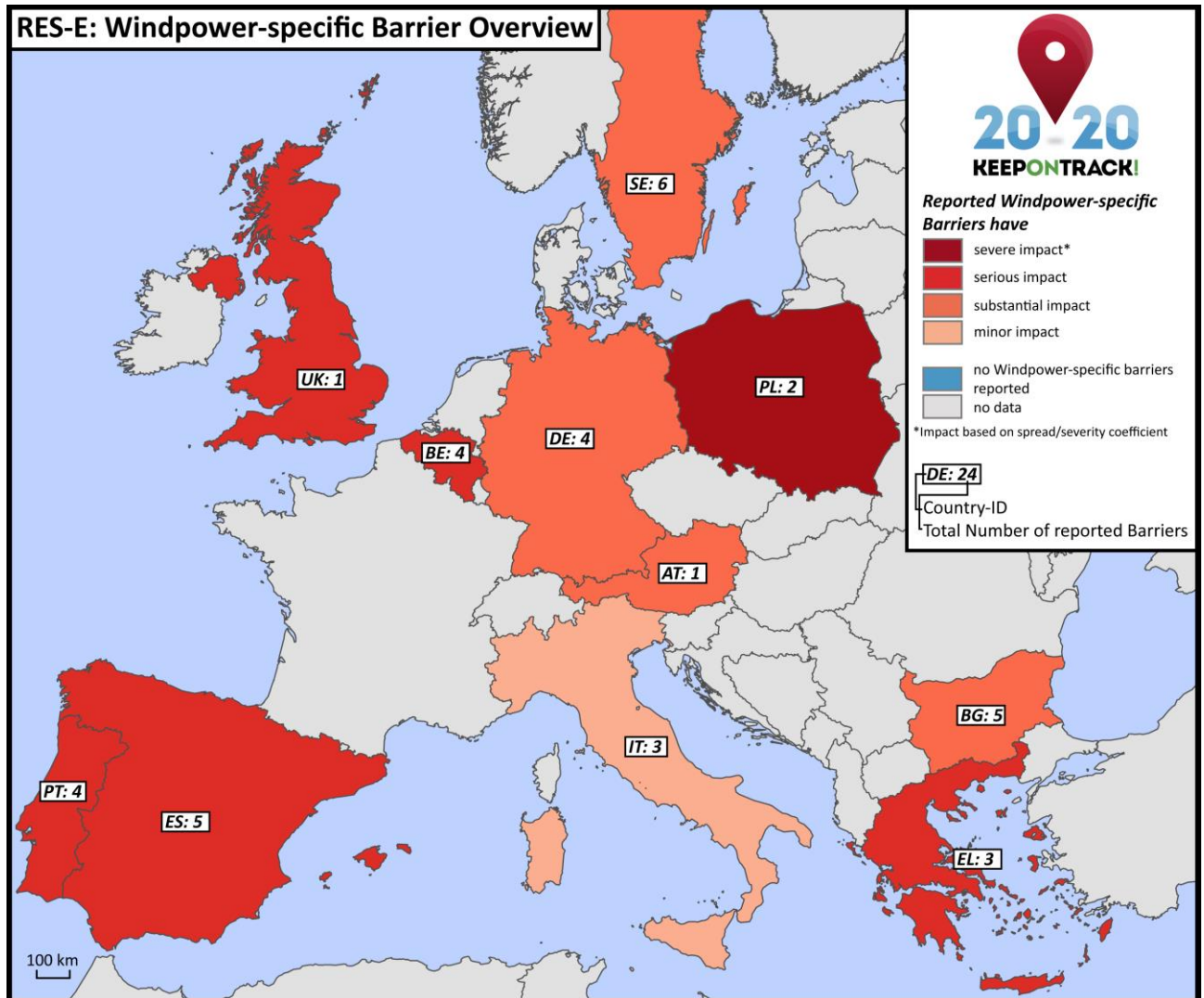
2. BIOMASS/BIOGAS-SPECIFIC BARRIER OVERVIEW



Regarding biomass and biogas, for 3 out of the 11 considered Member States (Sweden, Italy and Greece) no main barriers were reported throughout the research. However, Spain and Austria were identified as facing barriers with a severe impact on the biomass/biogas development. Spain outlined in this context among others the missing biomass/biogas market in the country, while pointed to the insufficient access for renewables to the gas grid.

Moreover, for 5 Member States (Belgium, Germany, UK, Portugal and Poland) a serious impact of barriers has been detected. As far as Germany is concerned a missing reaction of the support scheme to increasing production costs was highlighted, whereas Belgium deals with environment constraints specifically affecting biomass and biogas. In the UK, the implementation of sustainability regulation affects the development of the biomass sector, whereas Portugal faces difficulties related to biomass availability. Lastly, Bulgaria is the only Member State considered, reporting a barrier which has a minor impact on the development of biomass/biogas in the country.

3. WINDPOWER-SPECIFIC BARRIER OVERVIEW



Peculiar to the wind sector, all 11 Member States analysed during the year 1 research facing wind specific barriers. A potential explanation could be that the wind sector has progressed further and thus has experienced more barriers overall. Poland is the only considered Member State which is “severely” impacted by wind power-specific barriers, mainly due to myths about the development and functioning of renewable energy sources.

A second group, consisting of Belgium, UK, Greece, Portugal and Spain, are confronted with barriers affecting the wind sector to a serious degree. In this context, Spain reports retroactive cuts of subsidies whereas Portugal emphasizes a lack of definition regarding grid access, connection procedures as well as respective cost sharing rules. The wind sector in Greece faces barriers regarding the insufficient interconnection networks to accommodate new installed capacity. As far as Belgium and UK are concerned, the striking issue for both countries is the aeronautical and military restrictions for wind installations, especially caused by radar vicinity.



Furthermore, 5 Member States are substantially affected by barriers in the wind sector, namely Germany, Sweden, Austria and Bulgaria.

Finally Italy is the only country reporting minor barriers to the development of wind power.



D. RES-H

This section provides the barrier analysis for the heating sector. The first graph below shows the 13 categories defined on the basis of the 82 barriers detected in the 10 Member States¹⁵ (please refer to the methodology regarding Greece). For the heat sector, the most dominant category is by far the one on “RES strategy and legislation shortcomings”, with a total of 32 single barriers. Noticeably, 5 of the categories identified only gather one single barrier. As mentioned in the methodology, the number of barriers identified does not necessarily reflect the degree of severity of the overall renewable situation in the different Member States. The identification of barriers might namely depend on the barrier awareness in the respective countries, favoured by high transparency or a high level of information availability. Moreover, the number of barriers might also depend on the development stage of a certain technology; a low number of barriers would therefore be the outcome of technology immaturity.

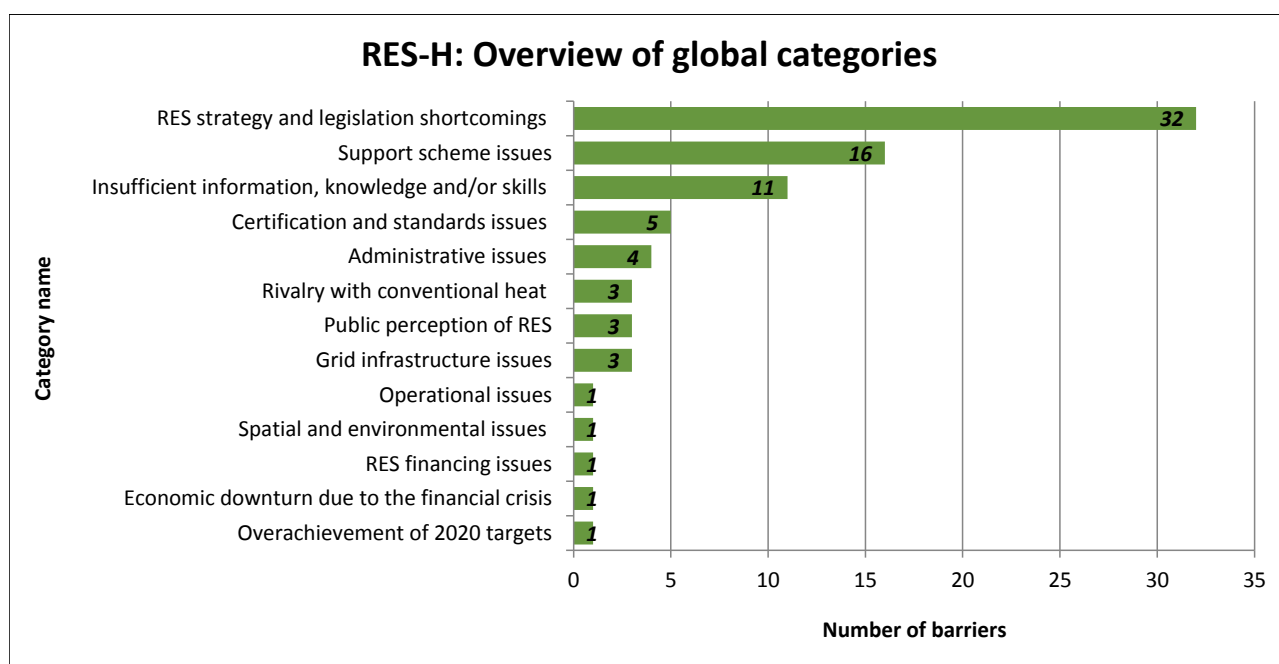


Figure 41: Overview on the categories of barriers identified for the RES-H sector. Source: eclareon based on own research and on information from the 11 national renewable energy associations which partner the Keep on track! Project

The second graph below displays the distribution of the technologies among the most important categories, differentiating on the one hand the barriers which affect all technologies (in red) and on the other hand those which are technology-specific.

¹⁵ Please refer to the methodology regarding Greece

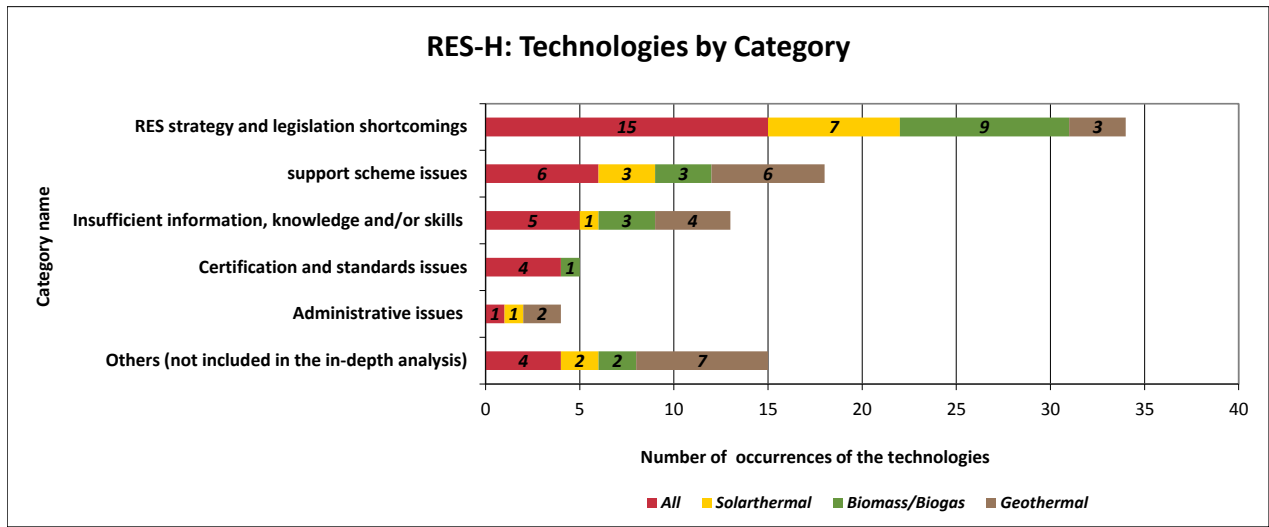
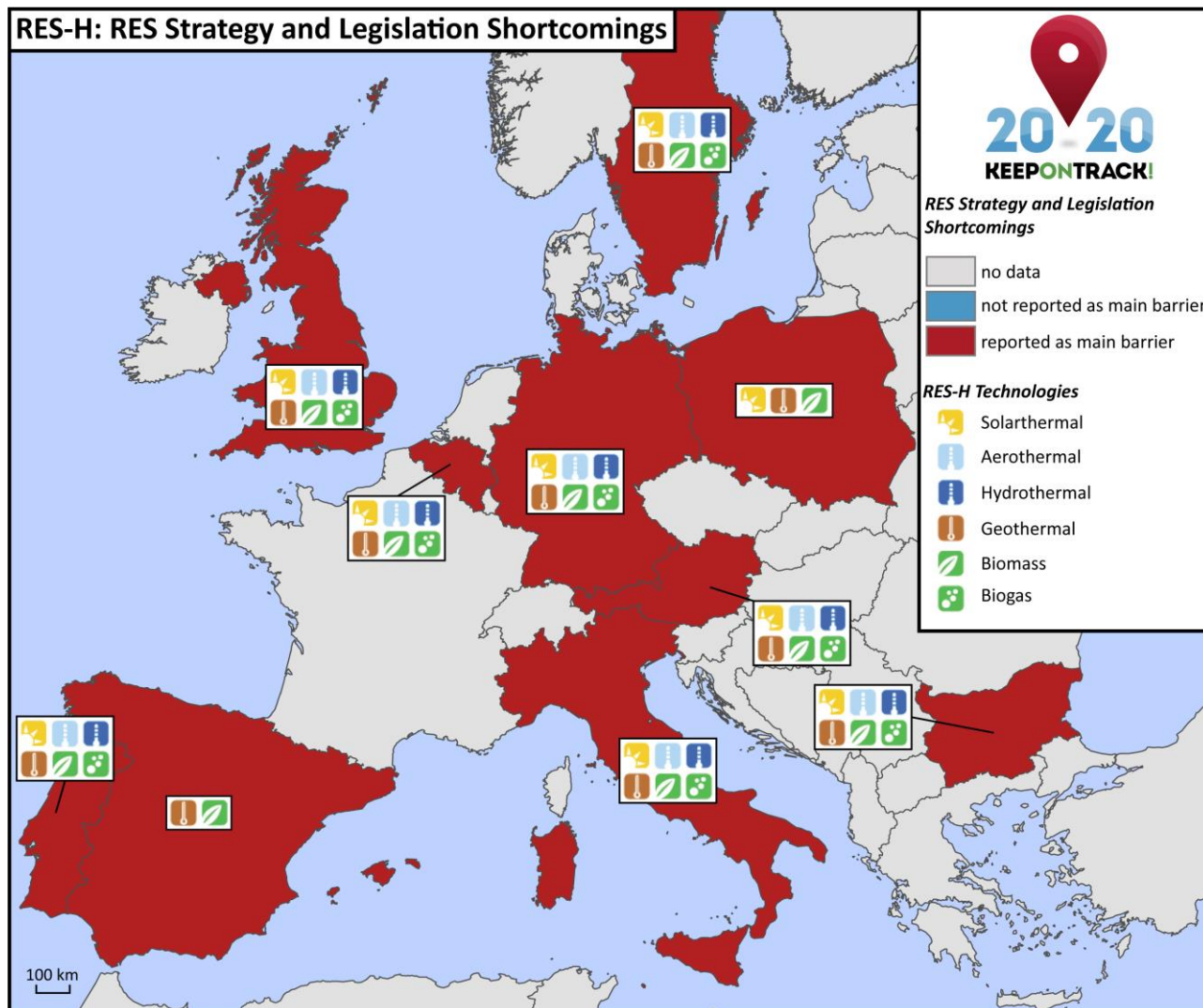


Figure 42: Overview of technologies' occurrence for the most important categories of the RES-H sector. Source: eclareon based on own research and on information from the 11 national renewable energy associations which partner the Keep on track! Project

1. RES STRATEGY AND LEGISLATION SHORTCOMINGS



- Numerous barriers identified for the heating sector are due to a **lack of well-defined strategy and coherent legislation**. As a matter of fact, a long-term strategy supporting the sustainable development of national RES for heating purposes is failing in certain countries, thereby affecting national industrial production, especially in the biomass sector. The absence of support mechanisms, such as the lack of tax benefits for the purchase of RES-H equipment, further underlines the shortcomings of RES-H strategies. Moreover, barriers can result from the different applications or interpretations of the existing RES-legislation, as well as from a too strong focus of the energy strategy on the electricity market at the expense of the heating sector.
- Another important issue hindering the deployment of RES-H technologies lies in the **lack of harmonised position of decision makers on biomass**, due to the effects of fine dust pollution in particular or to the negative image of biomass in general.

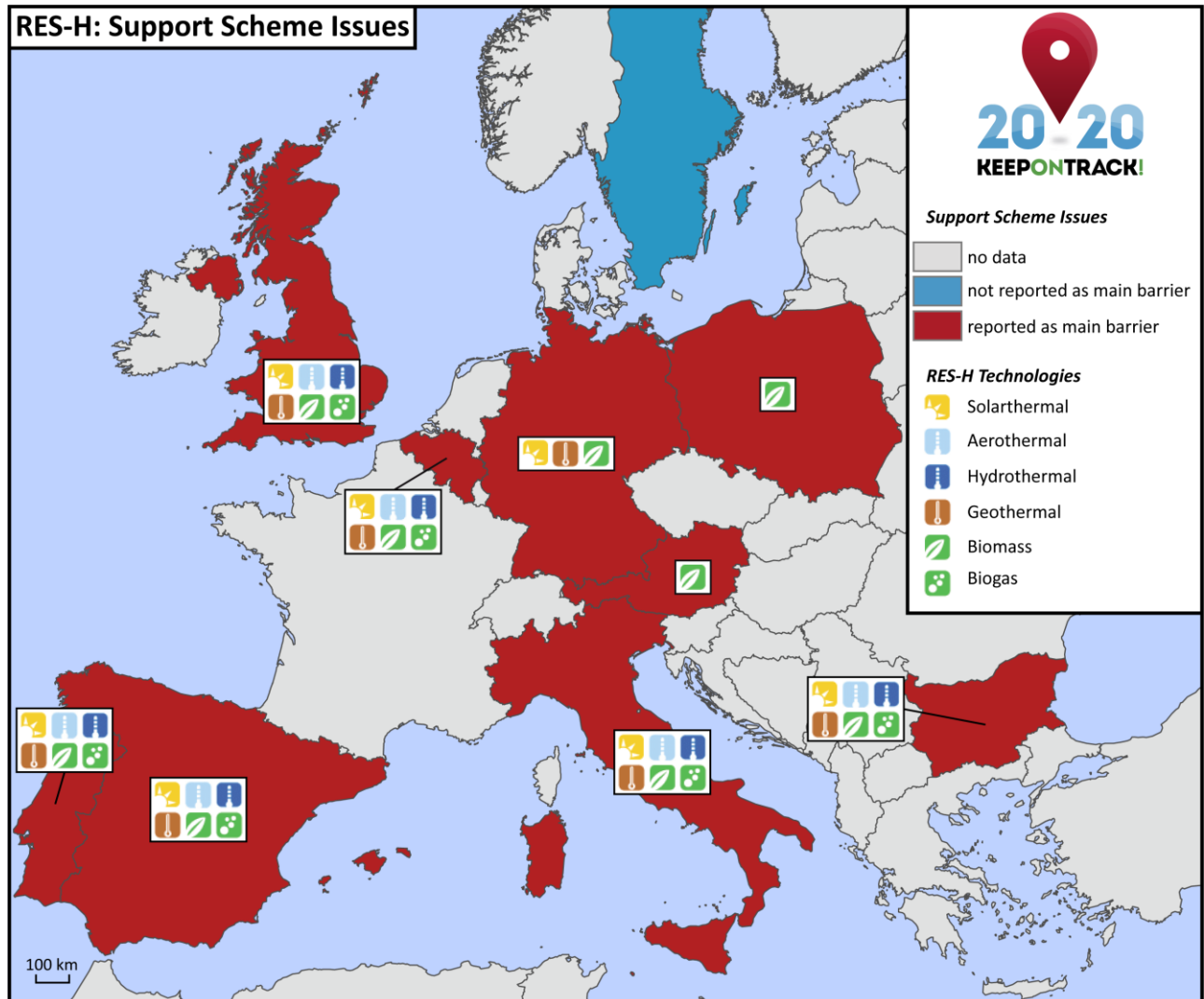


- Finally, barriers refer to a **focus of policy instruments on newly constructed buildings**. The negligence of existing buildings is illustrated by the lack of mandatory use of RES-H, the lack of efficiency criteria for existing heating systems as well as lack of financial incentives to encourage the use of roof areas for RES-H production.

As shown in the graph above displaying the overall categories of the RES-H sector, the “RES strategy and legislation shortcomings” category is the most important one with a total of 32 barriers identified. All 10 Member States analysed during the first year of the project have reported national barriers related to “RES strategy and legislation shortcomings”.

As far as technologies are concerned, the barriers reported affect all RES-H technologies in the majority of countries. In Poland however, it is highlighted that the barriers specifically affect solar thermal, geothermal and biomass technologies, whereas in Spain, the detected barriers especially affect biomass and geothermal technologies.

2. SUPPORT SCHEME ISSUES



Barriers referring to “Support Scheme Issues” result from several core issues.

- On the one hand, barriers are raised by the **uncertainty and the instability of the support mechanisms** creating market insecurity and scaring off investors. As a matter of fact, stop and go policies, the uncertain future of the certificate system supporting co-generation as well as the lack of minimum price of certificates constitute important barriers to the development of renewable energy in the heating sector.
- On the other hand, many barriers refer to the **insufficient level of support mechanisms**, characterised by the lack of tax incentives and fiscal benefits for RES-H installations, unequal incentive schemes across the renewables industry as well as the insufficient adaptation of the support to the increasing production costs, resulting in high investment costs and long payback periods.

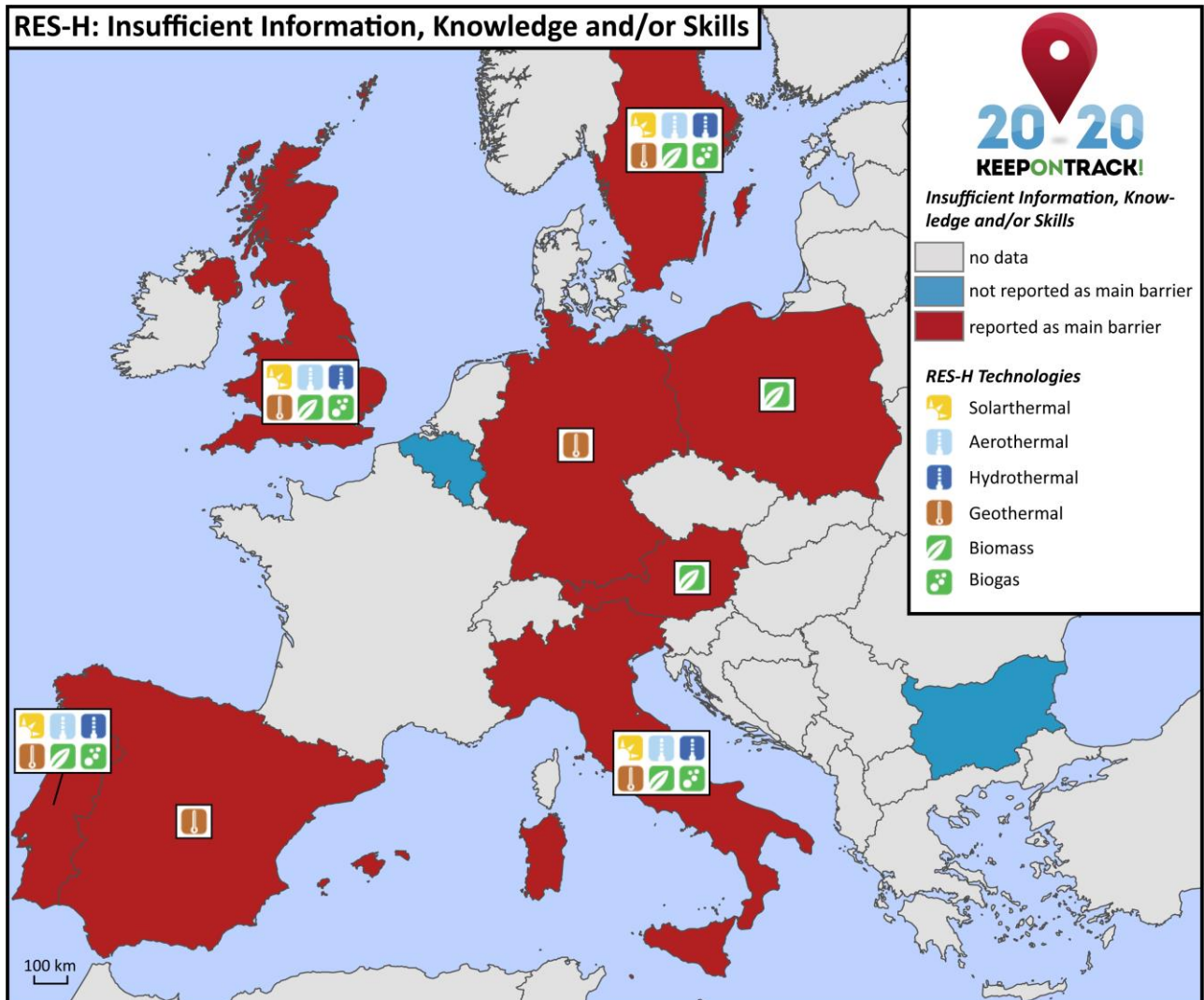


- Moreover, countries point out the **conflict between RES-H technologies and other energy efficiency measures**, especially resulting from the insufficient support of RES-H installations such as solar thermal heating systems.
- Last but not least, the allocation of green certificates for electricity combined to the lack of RES-H support in certain countries leads to the **conflicting use of biomass for electricity at the expense of heat production**.

The global category of “Support Scheme Issues“ is with a total of 16 barriers the second most important one in terms of numbers of barriers. This category is also important in terms of countries it appears to affect, since 9 out of 10 countries have reported barriers related to “Support Scheme Issues“. In fact, Sweden is the only country which has not perceived any barriers in this regard.

From a technology perspective, the barriers reported affect all RES-H technologies in the majority of countries, whereas in Germany the barriers specifically affect solar thermal, geothermal and biomass technologies. Finally, in Poland and in Austria, the barriers identified solely affect the biomass sector.

3. INSUFFICIENT INFORMATION, KNOWLEDGE AND/OR SKILLS



- Numerous barriers under this category refer to a **lack of understanding of the responsible authorities**, illustrated on the one hand by the high focus of the government on costs to the detriment of more expensive RES-H technologies and on the other hand by the insufficient knowledge of solutions related to renewable heat, also regarding technical expertise.
- Another main issue, mainly related to the one described above, is the **insufficient information policy**, leading to lacking public awareness, bad market perception and resistance to wide implementation of RES-H technologies.
- Furthermore, several barriers are caused by the **lack of updated information about RES-H**, characterised by the lack of available statistics on existing RES-H installations as well as by insufficient information on the use and potential of certain RES-H technologies, such as geothermal energy.

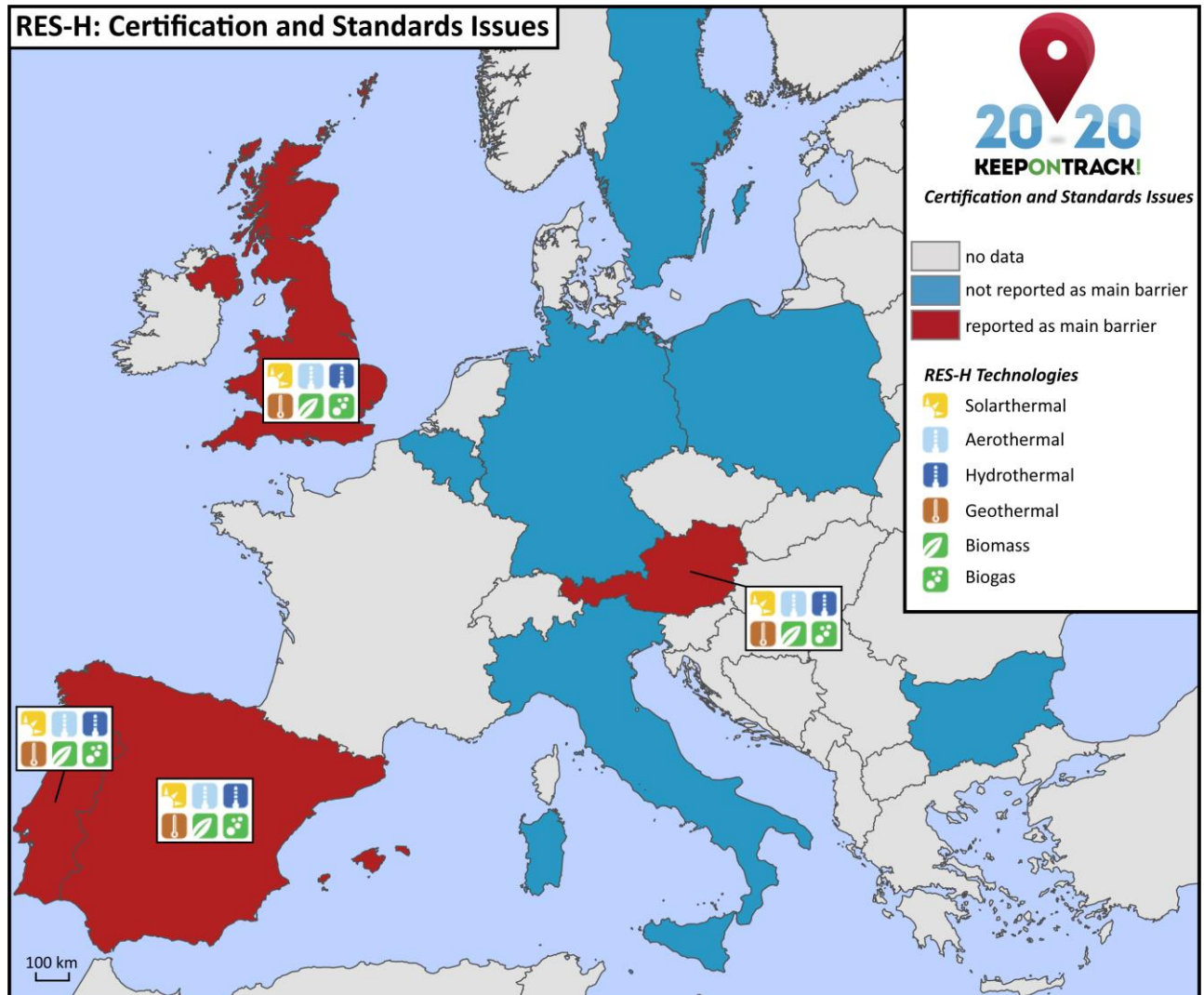


- Last but not least, the **lack of technical expertise of installers** results from the insufficient qualification of operators as well as from the lack of certification schemes for installers.

A total of 11 barriers have been detected in the global category of “Insufficient information, knowledge and/or skills”. Apart from Belgium and Bulgaria, all countries analysed during the first year of the project have reported barriers belonging to this category.

Barriers detected in Portugal, Sweden and Italy hinder the development of all RES-H technologies. In Germany and in Spain, it is specified that the barriers have an impact on the geothermal technologies, whereas in Poland and in Austria, it is solely the biomass technologies which are concerned by the detected barriers.

4. CERTIFICATION AND STANDARD ISSUES

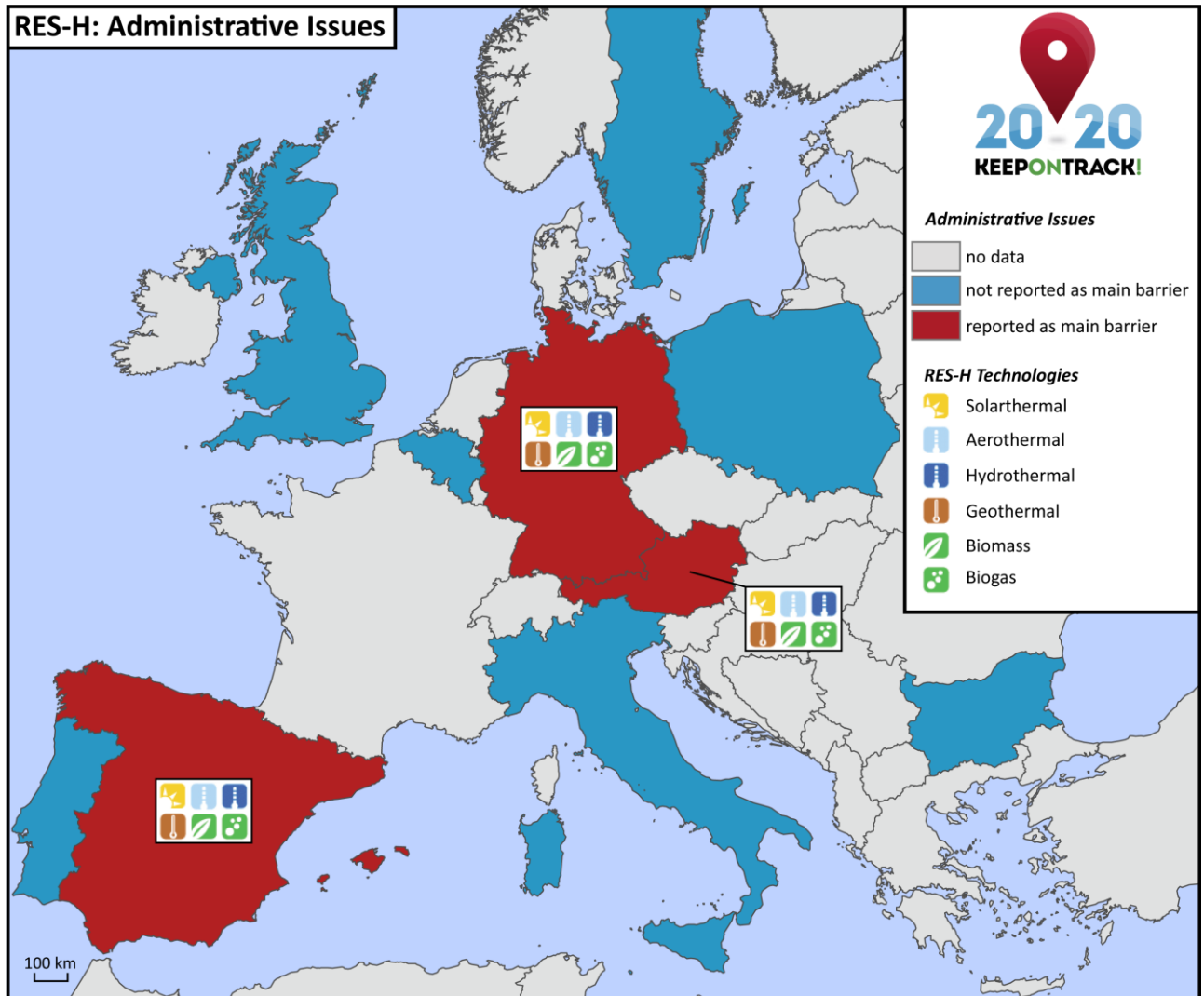


The barriers related to “Certification and standard issues” in the RES-H sector are raised by several core issues.

- Firstly, there is an **insufficient compliance with minimum standards**, resulting from a lack of control and affecting the quality of RES-H installations and favouring black-market.
- Secondly, existing barriers are linked to the **lack of mandatory certification** and mandatory control systems.
- Finally, certain **certification schemes are deemed too expensive and complex**.

The “Certification and standard issues” category is, with a total of 5 barriers, the fourth most important one in terms of numbers of barriers detected. However one can notice that the majority of countries analysed during year 1 did not report the existence of main barriers due to certification and standard issues. In the countries affected, namely Austria, Portugal, Spain and UK, the barriers hamper the development of all RES-H technologies.

5. ADMINISTRATIVE ISSUES



This category includes barriers resulting from **complicated, lengthy and inconsistent administrative procedures** for RES-H installations. As a matter of fact, deadlines are not adapted to certain RES-H technologies. Moreover, barriers refer to a lack of harmonised guidelines in planning guidelines and call for proposals as well as to a **lack of harmonization and coordination between the different authorities** such as with regards to technical provisions for buildings.

Only 4 of the 82 barriers identified in the RES-H sector belong to the category of “Administrative Issues”. These were reported in a minority of 3 countries out of 10, namely Austria, Germany and Spain. Again, the non-identification of barriers in certain countries does not necessarily stand for their non-existence. Other national barriers may have been perceived as more important or more urgent and were therefore prioritised. Moreover, each barrier was classified into one single category, according to the most dominant aspect of the barrier. However, barriers being often complex, they may also contain aspects of other categories. As a consequence, it



may occur that a country is coloured in blue in a certain category, whereas some barriers may contain components still corresponding to this category. Therefore, the fact that a country is marked blue should not be systematically interpreted positively, but rather analysed warily.

All countries which have reported barriers state that these barriers affect the development of all RES-H technologies.



E. RES-T

This section presents the barrier analysis for the transport sector. The first graph below displays the 8 categories defined on the basis of the 49 barriers detected in the 10 Member States¹⁶. Similar to the electricity and the heating sector, the most dominant category is the one on “RES strategy and legislation shortcomings”, with a total of 16 single barriers. As mentioned in the methodology, the number of barriers identified does not necessarily reflect the degree of severity of the overall renewable situation in the different Member States. The identification of barriers might namely depend on the barrier awareness in the respective countries, favoured by high transparency or a high level of information availability. Moreover, the number of barriers might also depend on the development stage of a certain technology; a low number of barriers would therefore be the outcome of technology immaturity. This is particularly the case for the RES-T sector.

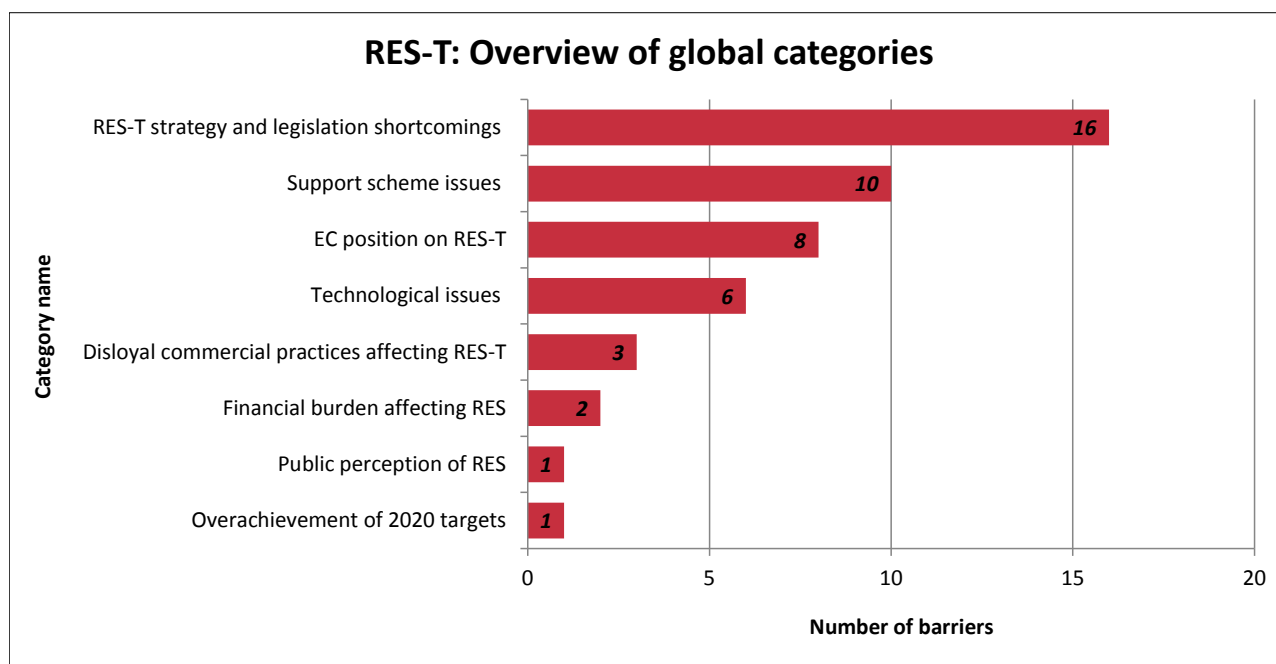


Figure 43: Overview of the categories of barriers identified for the RES-T sector. Source: eclareon based on own research and on information from the 11 national renewable energy associations which partner the Keep on track! Project

As illustrated by the following graph outlining on the distribution of the several RES-T technologies by category, barriers of this sector are predominantly affecting biofuels. On the contrary, only few barriers have been reported for electric mobility or hydrogen technologies.

¹⁶ Please refer to the methodology regarding Greece

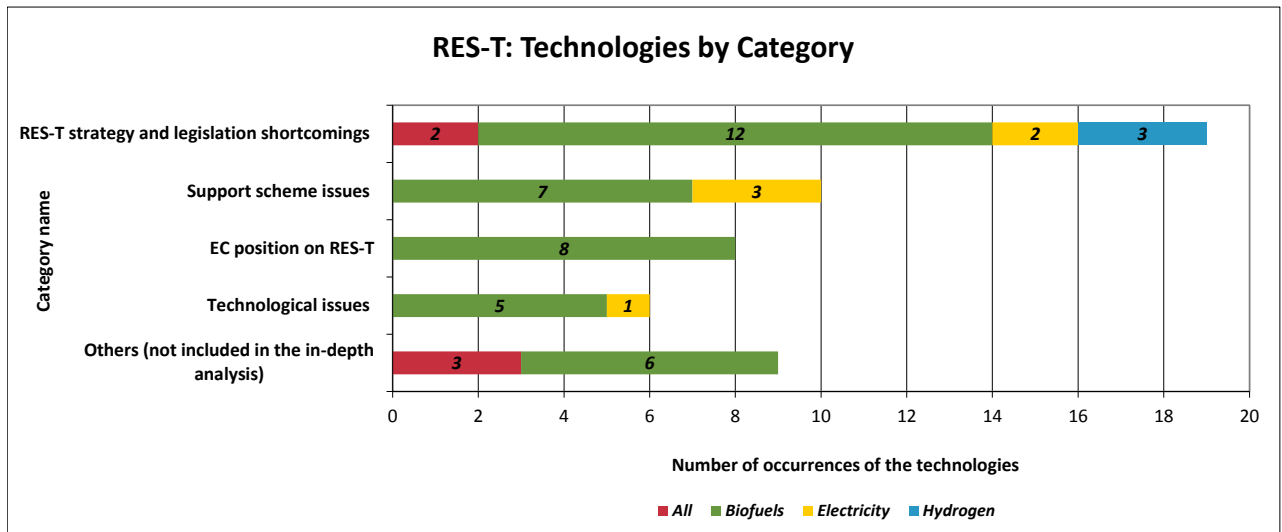
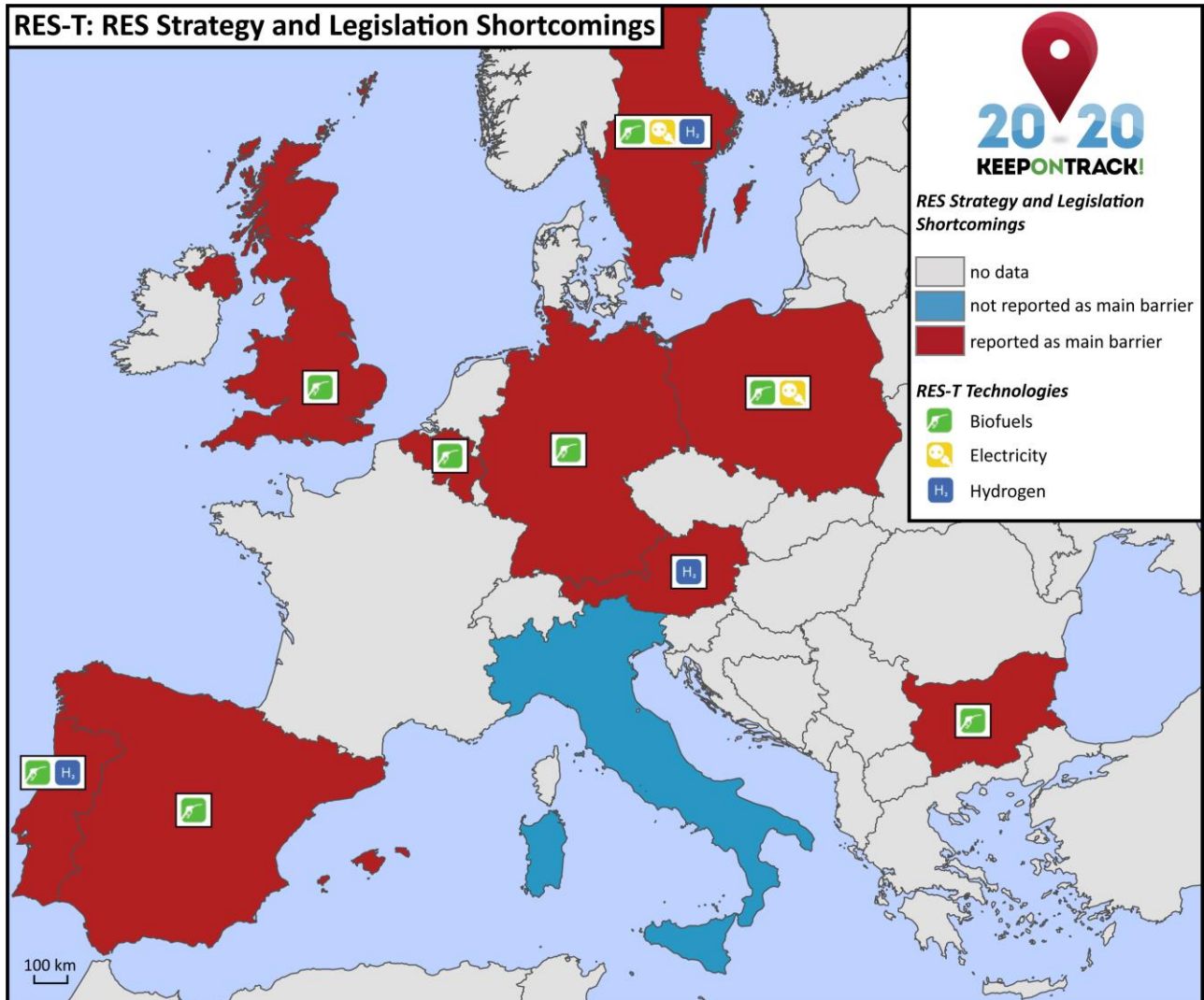


Figure 44: Overview of technologies' occurrence for the most important categories of the RES-T sector. Source: eclareon based on own research and on information from the 11 national renewable energy associations which partner the Keep on track! Project

6. RES STRATEGY AND LEGISLATION SHORTCOMINGS

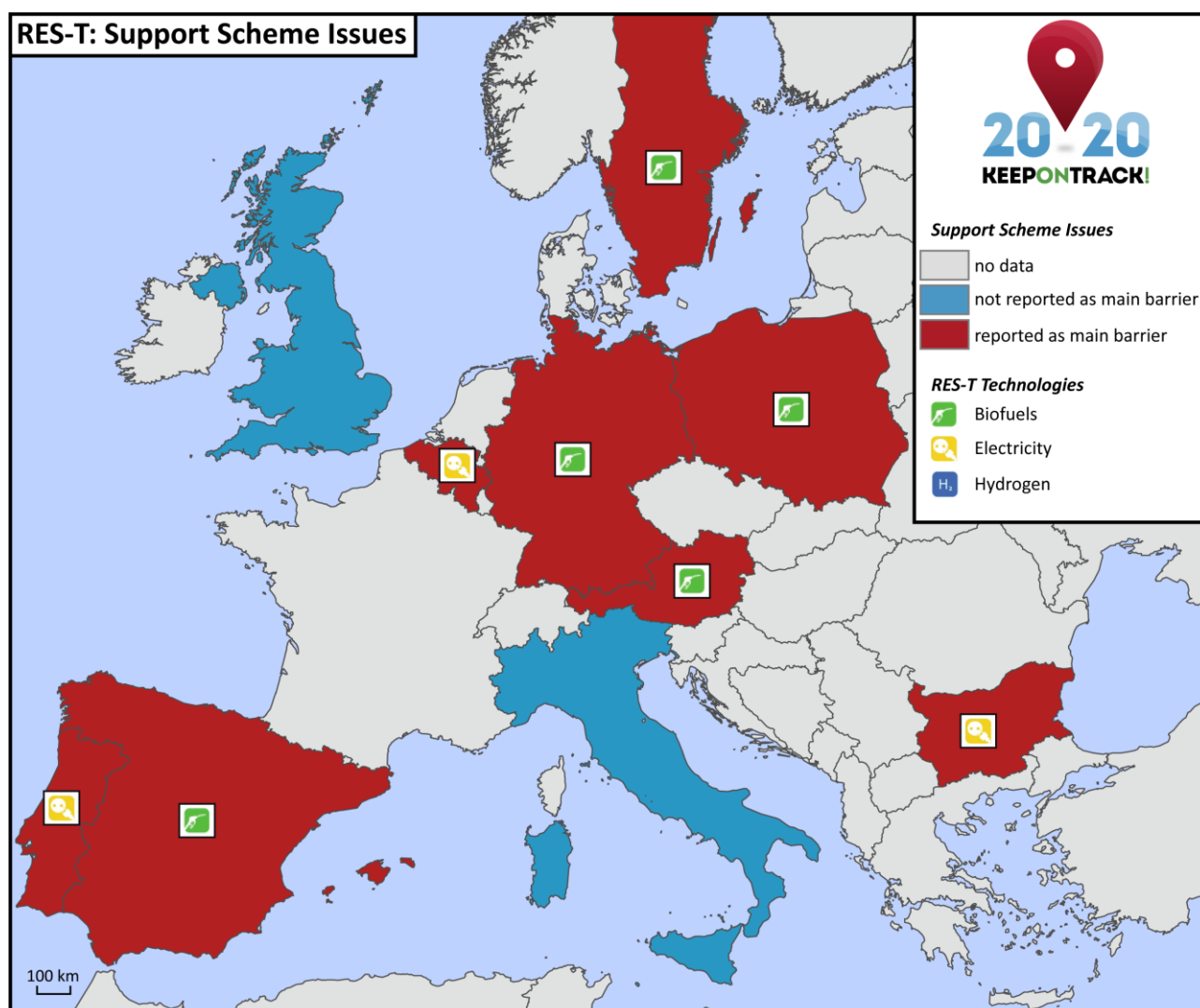


- Many barriers result from a **lack of political priority and long-term vision for RES-T**, characterised in some countries by insufficient goals for market development or by the absence of policy instruments after 2013. Barriers are also raised by the lack of binding action plan to implement electro-mobility. As far as biofuels are concerned, barriers refer to the scarce evolution of legislations for biofuels and to the reluctance of some governments to introduce E10 as well as regulations for the mandatory blending of biofuels.
- Further important issues result from **severe constraints for the blending of biofuels**, such as the “protection grade petrol” for bioethanol or the limited permitted amount of biofuels in fuels.
- Finally, the existence of a **maximum selling price for biodiesel** in certain countries leads to limited profit margins for biofuels producers.

Similar to the electricity and the heating sector, the category of “RES strategy and legislation shortcomings” is the most important one of the transport sector both in terms of numbers of barriers as well as of number of countries affected. More precisely, 16 barriers out of 49 were reported in all countries analysed in year 1, except in Italy.

As far as technologies are concerned, only Sweden reports that the barriers affect all RES-T technologies. In general, one can notice that the most affected RES-T technology in the countries analysed is biofuels. In the majority of countries, the barriers identified solely hinder the development of biofuels technologies. Regarding hydrogen technologies, Portugal and Austria signal the existence of specific barriers. As far as electro-mobility is concerned, only Sweden and Poland reported barriers hindering the development of electric vehicles.

7. SUPPORT SCHEME ISSUES





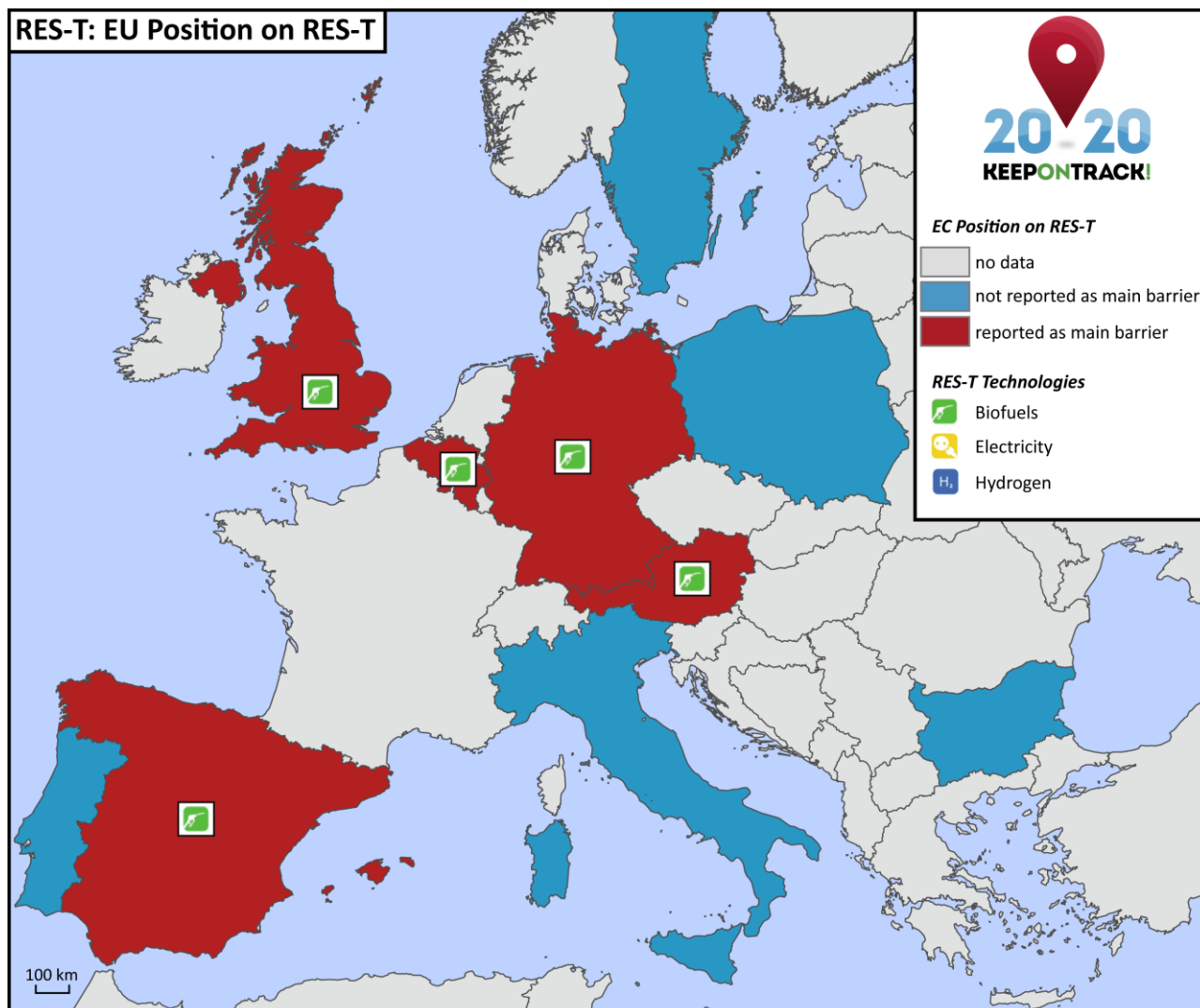
Barriers related to “Support Scheme Issues” result from issues mainly regarding biofuels and electric vehicles.

- On the one hand, **biofuels suffer from insufficient financial incentives**, characterised by the lack of tax exemptions for biofuels, the absence of financial compensation for the conversion of diesel engines to vegetable oil, or the lack of targeted incentives for biofuels with higher blends. Moreover, the lack of competitiveness of vegetable oil compared with diesel hampers the development of biofuels, whereas fossil fuels keep being subsidized to an excessive degree. In certain countries, the lacking implementation of legislation e.g. regarding incentives on the double counting of biofuels further illustrates the incentive issue for biofuels.
- On the other hand, barriers referring to “Support Scheme Issues” are also raised due to a **lack of targeted support mechanism for electric vehicles**, leading to the withdrawal of support for electro-mobility in certain countries.

The category of “Support Scheme Issues” ranks second in terms of number of barriers, with a total of 10 barriers identified in 8 of the 10 countries analysed during the first year of the project. Only UK and Italy did not report any barriers belonging to this category. Again, the non-identification of barriers in certain countries does not necessarily stand for their non-existence. Other national barriers may have been perceived as more important or more urgent and were therefore prioritised. Moreover, each barrier was classified into one single category, according to the most dominant aspect of the barrier. However, barriers being often complex, they may also contain aspects of other categories. As a consequence, it may occur that a country is coloured in blue in a certain category, whereas some barriers may contain components still corresponding to this category. Therefore, the fact that a country is marked blue should not be systematically interpreted positively, but rather analysed warily.

In the majority of countries, the barriers reported in the transport sector affect specifically the development of biofuels technologies, whereas in Belgium, in Bulgaria and in Portugal, it is only the electricity technologies which suffer from the existence of barriers.

8. EUROPEAN COMMISSION POSITION ON RES-T



The majority of barriers falling into this global category mainly relate to the **uncertain position of the EC regarding biofuels**, thus hampering investments in the biofuels technologies. This is mainly a reflexion of the proposed reduction of the cap on the amount of crop-based biofuels to 5% instead of 10%, the surcharge for biofuel crops through Indirect Land -Use Change (ILUC) coefficient or the discussions about double and quadruple counting of biofuels highly jeopardize the market security. The lack of waivers regarding petrol vapour pressure as well as the possible stopping of the tax exception for biofuels at European level also contribute to threaten investments in the biofuels sector. The other main issue behind several of the reported barriers is the **lack of harmonization of regulations for RES-T at European level**. In fact, the existence of different standards for biofuels affects the level playing field of national biofuels producers.

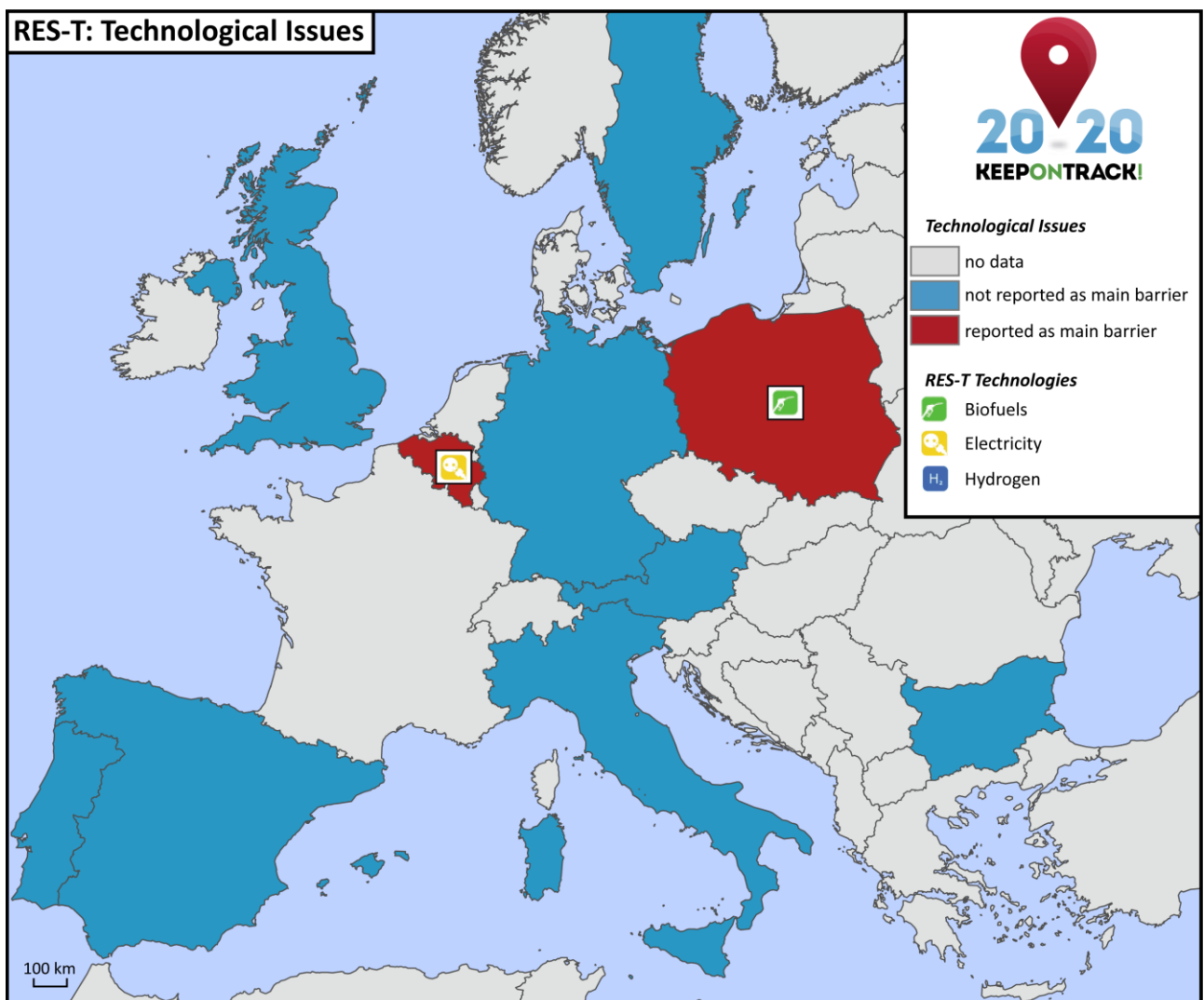
The category “European Commission position of RES-T” is, with a total of 8 barriers, the third most important one of the RES-T sector in terms of number of barriers. As far as the number of countries affected is concerned, half of



the countries analysed during year 1 have detected barriers related to the position of the European Commission. The non-identification of barriers in certain countries does not necessarily stand for their non-existence. Other national barriers may have been perceived as more important or more urgent and were therefore prioritised. Therefore, the fact that a country is marked green should not be systematically interpreted positively, but rather analysed warily.

As described in the paragraph above, the barriers predominantly refer to biofuels technologies.

9. TECHNOLOGICAL ISSUES





Barriers related to “Technological issues” mainly result from **technological bottlenecks hindering the development of electric vehicles**. As a matter of fact, the issues of the limited battery life of current electric vehicles, the lack of standardization of e-batteries as well as the incompatibility of old engines with the use of biofuels hinder the development of electric mobility in numerous countries.

A total of 6 barriers were identified in Belgium and in Poland relating to the issue of “Technological issues”. Again, the non-identification of barriers in certain countries does not necessarily stand for their non-existence. Other national barriers may have been perceived as more important or more urgent and were therefore prioritised. Moreover, each barrier was classified into one single category, according to the most dominant aspect of the barrier. However, barriers being often complex, they may also contain aspects of other categories. As a consequence, it may occur that a country is coloured in blue in a certain category, whereas some barriers may contain components still corresponding to this category. Therefore, the fact that a country is marked blue should not be systematically interpreted positively, but rather analysed warily.

Therefore, the fact that a country is marked green should not be systematically interpreted positively, but rather analysed warily.

In Belgium, the barriers affect the e-mobility technologies, whereas in Poland, biofuels suffer from the existence of several barriers.



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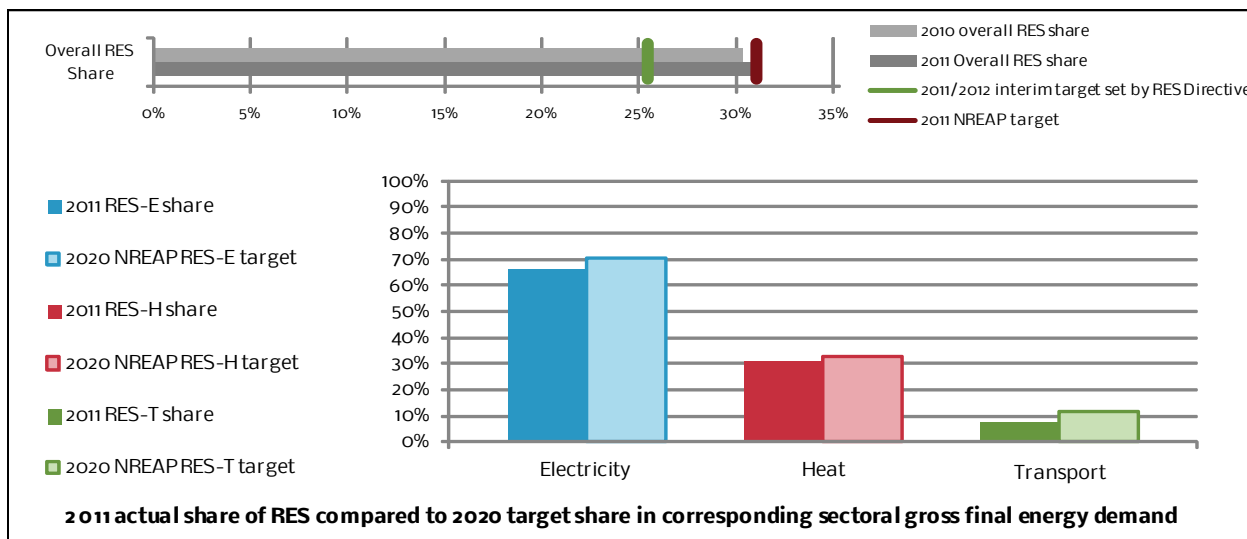
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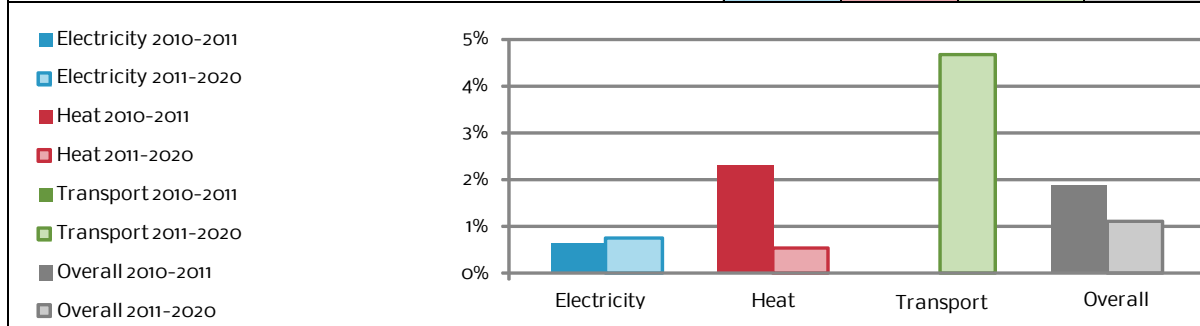
A. AUSTRIA

1. NATIONAL DEVIATIONS REPORT



2011 actual share of RES compared to 2020 target share in corresponding sectoral gross final energy demand

	Electricity	Heat	Transport	Total
2011 actual share of RES in sectoral gross final energy demand	66.1%	31.1%	7.6%	30.9%
2011 NREAP target	69.8%	30.6%	6.9%	31.1%
2011/2012 interim target set by RES Directive	-	-	-	25.4%
2020 NREAP target	70.6%	32.6%	11.4%	34.2%
Percentage of sector consumption in total final energy consumption in 2011	22%	48%	30%	100%
2011 Production [ktoe]	3,997	4,147	583	8,728
2010 Production [ktoe]	3,967	4,361	600	8,928
2005 Production [ktoe]	3,491	3,193	0	6,684
2020 NREAP target production [ktoe]	4,503	4,179	856	9,266
Deviation [%] of actual from planned share in 2011	-5.33%	1.56%	9.61%	-0.54%



RES growth rates achieved from 2010 to 2011 compared to RES growth rates required from 2011 to 2020 by sector

- Austria has achieved the interim target 2011/2012, but is slightly behind in the NREAP 2011 target due to a negative deviation in the electricity sector share.
- Compared to the prior 6-year average, growth was slower between 2010 and 2011. The transport sector even experienced negative growth.



2. NATIONAL BARRIERS REPORT

The Austrian RES-E Sector

Due to its favourable natural conditions, Austria's electricity generation mix is historically dominated by hydro power. Therefore, Austria started with a very high share of RES-E, which was 62% in 2005 and reached 69% in 2010, according to the National Renewable Energy Action Plan¹⁷, of which 58.5 % was generated by hydro power plants. Hence, Austria can be considered as the European leader on RES contribution to gross electricity consumption.

With the adoption of the first Green Electricity Act in 2003, the Austrian Government intended to bring new renewable energy technologies such as wind, solar or biomass closer to the market. The lucrative feed-in tariff attracted many investors and led to a swift development of these technologies in Austria (Schneider, Umweltbundesamt).

In 2006 however, the Government reacted on the rapid increase of installed renewable capacities and revised the Green Electricity Act. Additionally, the feed-in tariffs were considerably lowered, which led to a sharp decrease of new installations.

In 2011, an amendment of the Green Electricity Act was passed which introduced a revised feed-in tariff system. A central element of the new legislation was the increase of the annual support cap, i.e. support is being granted only as long as funds are still available. After the new law was adopted, the tailback of renewable energy projects could subsequently be reduced and new projects financially supported. Currently, the tariffs are high enough to enable a sustainable development of the RES-E sector.

Regarding the different technologies, there is still potential for wind and PV. The use of biogenic material has less promising prospects (e.g., due to competition between energetic and material use of biomass), and the further development of hydro is notably hampered by the Water Framework Directive (Schneider, Umweltbundesamt).

Support scheme

In Austria, electricity from renewable sources is supported mainly through a feed-in tariff, which is set out in the Green Electricity Act¹⁸ and the regulations related thereto. The operators of renewable energy plants are entitled against the government purchasing agency, the Clearing and Settlement Agency¹⁹, to the conclusion of a contract on the purchase of the electricity they produce as long as funds are available (RES LEGAL Europe database).

The feed-in tariffs for the different renewable technologies are stipulated annually through a resolution of the Federal Minister of Economy, Family and Youth²⁰. The tariffs are granted for 13 or 15 years, depending on

¹⁷ http://ec.europa.eu/energy/renewables/transparency_platform/doc/dir_2009_0028_action_plan_austria.zip

¹⁸ Ökostromgesetz (ÖSG)

¹⁹ OeMAG - Abwicklungsstelle für Ökostrom AG (www.oem-ag.at)

²⁰ Bundesminister für Wirtschaft, Familie und Jugend (www.bmwfj.gv.at)



technology. After the feed-in tariff has expired, most installations can sell their electricity under a purchase obligation at market prices minus balancing costs for another 12 years (RES Integration - Country Report Austria).

Barriers to RES-E

Stop-and-go support policy

While the applied feed-in tariffs and other incentives for renewable energy projects can be generally considered as favourable for the development of PV, wind and other renewable energy technologies, the unclear funding situation due to the annual support cap can lead to considerable latencies. This stop & go support policy could therefore scare off possible investors (Schneider, Umweltbundesamt).

The new subsidy-structure for PV (a mixture of invest-subsidy and feed in tariff) is expected to cause unnecessary bureaucracy. For a positive administration decision too many public authorities have to be contacted, whereas projects cannot be started until the disbursement of subsidies is granted. Therefore, the implementation of PV projects could be delayed.

Annual support limits for electricity from renewable energy sources may compromise the trust of RES investors. Since demand exceeds supply, representatives of the PV association argued that the development of the market had been slowed down by this regulation (Liebl, PV Austria).

Grid loss fees discriminate large domestic RE producers

In Austria, operators of plants with capacities exceeding 5 MW have to pay a so called grid loss fee²¹, which before was distributed amongst all consumers. The payment of this fee means a significant burden mainly for producers of renewable electricity with the production capacities already up and running, as the profitability of electricity production is strongly dependent on the feed-in tariffs and has been calculated without taking those additional fees into account (RES Integration - Country Report Austria, 2011). According to the Federal Environment Agency, this applies especially to large wind power plants (Schneider, Umweltbundesamt).

The grid loss fees were introduced to transfer net grid costs to the plant operators. Since these costs were not foreseen during the implementation of the projects, they can lead to considerable financing issues and clearly constitute a discrimination of large domestic renewable energy producers on the Austrian energy trading market. In 2013, the grid loss fee rose by 52 % compared to 2012 and even by 84 % compared to 2011. The reallocation of these charges from consumers to plant operators contravenes the Austrian federal constitution (Moidl, IG Windkraft).

Presumably, this barrier could soon be mitigated as the passage of a new regulation for 2013 is on the way which could lower the grid costs for RE producers. At this point however, it is still too early to make an assessment on how this conflict will be managed (Moidl, IG Windkraft).

²¹ Netzverlustentgelt



Problems with the implementation of Water Framework Directive

The implementation of the EU-water framework is causing some difficulties for the development of hydropower in Austria and especially for the revitalisation of existing power plants and hydro-power potentials. These difficulties are caused by the conflict between renewable energy and environmental protection which lead to high investment costs for the technical expertise in the approval process as well as highly bureaucratic requirements to fulfil the demanded environmental standards. Consequently, this results in a reduced trust of the investors in the approval processes and to project delays due to the changing framework conditions (Prechtl, Kleinwasserkraft Österreich).



The Austrian RES-H Sector

Regarding the use of renewable energy in the heating sector, Austria has a favourable starting position. The Austrian heat supply is composed of four comparable fractions which each have shares of about 20-25 %; namely these are oil, gas (mostly used in urban regions), biomass (rural regions) and district heating (a mix of industrial waste heat, CHP, waste incineration and agricultural biomass plants) (Schneider, Umweltbundesamt).

In Austria, district heating networks are managed at local level by the individual heat supply companies. In contrast to other countries with a considerable share of district heating, there is no federal regulation providing a legal framework for the connection of RES-H plants to the heating grid (RES LEGAL Europe database).

The long-term strategy of Austria is to constantly reduce its heat demand. This is mainly being realised in the housing sector. With regard to newly constructed buildings, this strategy has produced quite positive results due to the strict criteria for housing construction. However, the main problem lies in the poorly constructed housing stock, especially multi-family houses from the postwar years and single family houses. These houses reach only very low thermal energy efficiency rates. Therefore, it is the principal task to gradually increase the thermal refurbishment quota (Schneider, Umweltbundesamt).

With regard to the different technologies, there is still a huge potential for the use of solar thermal installations for hot water supply. As the need for hot water supply is high even during the summer season, solar thermal installations could be used to a much larger extent. Until now, conventional energy sources still have a large share, even though they are inefficient and more expensive than building-integrated solar thermal installations. Therefore, a harmonised commitment of all federal states of Austria could be achieved to promote the larger use of solar thermal energy systems (Karner, EEÖ).

Support scheme

The most substantial form of promoting small-scale RES heating and cooling is applied on the level of the individual federal states ("Länder"). There are special investment incentives for solar thermal installations, heat pumps, geothermics and biomass heating plants. The funding guidelines are published separately for each federal state; however, they do not differ in eligibility criteria and respective amounts (RES LEGAL Europe database).

In principle, the investment grants for measures supporting the use of energy from renewable sources in the heating and cooling sector differ according to technology. Usually, a flat rate of de minimis support is calculated. "De minimis" allows for aid up to € 200,000 to be provided from public funds over a period of three years. Another option for support is the 'standard reimbursement rate' which mostly amounts to 25 % of the environment-related investment costs and can be increased through awards (sustainability and gas-cleaning awards, etc.) to a maximum of 30 %. In some cases, the application must be made before the beginning of the project and the



environment-related investment costs must amount to a certain minimum sum (€ 10,000) (RES LEGAL Europe database).

Barriers to RES-H

Lack of incentives leads to low quota of energy-efficient refurbishments

The low energetic and thermal refurbishment quotas and the fact that the installation of renewable energy technologies is not obligatory to receive housing subsidies are responsible for the slow development of the use of renewable energy in the housing sector. This applies to all technologies but especially to bioenergy and solar thermal energy which are the most important renewable energy sources in households. These low quotas can be explained by the lacking financial incentives for building refurbishments (Karner, EEÖ).

Currently, the financial support of energy-efficient refurbishments is linked to the thermal refurbishment of buildings for which an annual budget of € 100 million is provided. The lack of a separate budget for energy-efficient refurbishments and the lacking financial incentives for the switch of heating systems in households makes it therefore impossible to reach the intended annual refurbishment quota of 3 % (Karner, EEÖ).

In general, the refurbishment of existing buildings should be promoted more effectively. At the time being, the focus is mainly on newly constructed buildings, which also seems to be connected with lobbying (Schneider, Umweltbundesamt).

Lack of efficiency criteria for existing heating systems

In Austria, there is a big stock of outdated heating systems which would require a reconstruction including the switch to renewable energy sources. However, at the time being there are no efficiency criteria for the reconstruction of existing heating systems. Therefore, the introduction of minimum efficiency criteria for renewable energy installations in households is needed (Karner, EEÖ). Currently, such criteria are being discussed in connection with the amendment of the climate protection act as well as the new energy efficiency act²² (Schneider, Umweltbundesamt).

EPCs are not connected with further measures to implement RE solutions

In pursuance of the European Directive on the energy performance of buildings, every Austrian building needs an Energy Performance Certificate (EPC). This certification however does not obligate building owners to conduct any further measures in order to improve the energy efficiency or the thermal parameters of the building. There is no technical regulation for the construction of buildings which would harmonise the different provisions of each federal state of Austria. Consequently, there is no motivation to invest in renewable energy installations even if the EPC states a high energy demand of a certain kind of building (Karner, EEÖ). According to the Federal

²² Bundes-Energieeffizienzgesetz



Environment Agency, the harmonisation of the different technical regulation is being envisaged (Schneider, Umweltbundesamt).

No more funds available for agricultural biomass plants

There are no more funds available for the support of agricultural biomass heating plants. According to the Austrian biomass association, the installation of such plants cannot be promoted before 2014. This issue is related to the federal political system of Austria: If the Austrian federal states do not agree on co-financing the incentives, also the support from federal funds will not be granted. Therefore, the construction of new biomass plants in agricultural enterprises until 2014 is highly unlikely (Paleczek, ÖBV).



The Austrian RES-T Sector

The European Biofuels Directive has been implemented into Austrian law within the scope of the 2004 Fuel Order Amendment. As the share of renewable energy sources in the Austrian transport sector is relatively high, Austria has fulfilled the EU target for biofuels for 2010 (5.75 %) with ease (Schneider, Umweltbundesamt).

In September 2012, the Austrian Government suspended the introduction of E10 biofuel and declared to postpone its introduction until the situation will be clarified on a European level. Previously, the European Commission announced to limit the production of fuels made from food crops to 5 % until 2020 (EUbusiness: "Austria says to postpone introduction of E10 biofuel")

Austria will implement the sustainability certificate for biofuels envisaged in the EU Directive into its national legislation by 1 January 2013. Currently, a sustainability system for biofuels based on this legislation is being developed by the Austrian Government (Schneider, Umweltbundesamt).

Furthermore, Austria can also be considered as forerunner with regard to the use of renewable energy in the rail sector. Currently, 97 % of the electricity used by the Austrian railway company ÖBB is generated by renewable energy sources, predominantly from hydro power plants. Additionally, ÖBB also intends to increase the share of electricity from PV through feeding it directly into the rail network (oekonews: "E-Mobilität in Kombination mit der Eisenbahn").

Support scheme

In Austria, petrol and diesel from a minimum content of 4.6 % resp. 6.6 % of biogenic material are subject to a lower mineral oil tax. Mineral oil solely from biogenic material and E85 are exempt from this tax (RES LEGAL Europe database).

To ensure that biofuels make up a defined percentage of the annual fuel sales, there is a substitution obligation in force since 2005. From 2009, the substitution target amounts to 5.75 %, measured by the total fossil petrol or diesel introduced or used in the federal territory (RES LEGAL Europe database).

Barriers to the transport sector

No action plan for e-mobility

Currently, there is no binding national action plan for the implementation of e-mobility in Austria. Representatives of the BPA stressed that switching to e-mobility and setting clear targets for 2020 would lead to a higher use of renewable energy in the transport sector. Stakeholders claimed that the main reason for this was the



lacking knowledge about the advantages of e-mobility. Additionally, the high investment costs discouraged many possible investors (Breinesberger, BPA).

According to the Federal Environment Agency however, there is a roadmap elaborated by three Austrian federal ministries for the promotion of e-mobility. In addition, the Austrian Energy Strategy foresees up to 250,000 electric vehicles until 2020 (a goal which seems quite exaggerated bearing in mind that Austria has about 8.4 m inhabitants); the implementation of concrete measures to foster e-mobility is pending (Schneider, Umweltbundesamt).

Surcharges because of ILUC coefficients

Currently, it is being discussed on the level of the European Commission to introduce a so-called ILUC coefficient representing a surcharge for biofuel crops. ILUC relates to the unintended consequence of releasing more carbon emissions due to land-use changes induced by the expansion of croplands for ethanol or biodiesel. The Commission intends to quantify these ancillary carbon emissions and introduce a surcharge for biofuel crops

The BPA argues that in consequence of this surcharge, biodiesel and vegetable oil would not meet the target values for the reduction of carbon emissions. Provided that this draft proposal will actually be introduced, these fuels could not be counted anymore as biofuel and therefore would not be able to contribute to the biofuel quota (Breinesberger, BPA).

No long term tax concessions for vegetable oil - strict and costly storage rules

A representative of the Vegetable Oil Association argued that, because of the higher costs for necessary conversions of regular diesel engines for the use of vegetable oil, it was necessary to create financial incentives allowing an equal competitive position to diesel. At the moment, investors are still discouraged by the possibility that the exemption from mineral oil tax respectively the application of a lower VAT could be abolished in the upcoming year. The price difference between vegetable oil and diesel is not sufficient to enable an economically sustainable advantage. Additionally, the high quality requirements for the purification of vegetable oil allegedly lead to rising costs which are further exacerbated by the double fuel storage costs (vegetable oil plus diesel). The storage rules for vegetable oil in Austria are the same as for diesel, since experts always consider that also diesel could be stored in the tanks (Breinesberger, BPA).

In reaction to this, a representative of the Federal Environment Authority stated that vegetable oil represented only a minor option for the generation of renewable energy for transportation purposes having limited potential for future development (Schneider, Umweltbundesamt)



Common barriers for the electricity, heating and transport sector

Federal system hampers implementation of RES targets

The decentralised political system of the Federal Republic of Austria can lead to non-transparencies and sometimes even hampers the implementation of national renewable energy targets. Furthermore, it has a negative effect on the realisation of new support schemes and leads to inefficient administrative steps and in some cases even double subsidies (Schneider, Umweltbundesamt).

There is a lack of harmonised guidelines for the installation of renewable energy plants. If there are no clear national guidelines, the quality of the RES installations could suffer which would eventually lead to a general loss of trust in the renewable energy sector. Some federal states in Austria developed their own planning guideline while others failed to do so. Currently, Austria is trying to harmonise these guidelines with own regulations (so called 15a arrangements). However, the implementation of guidelines still lies in the competency of the federal states (Karner, EEÖ).

Similar to the electricity sector, the federal political system of Austria may in some cases also constitute a barrier to the development of the renewable heating sector. As the heating legislation as well as the planning and building laws lie in the competency of the federal states, the harmonisation of the different regulations can prove difficult (Schneider, Umweltbundesamt).

Specific barriers to the development of the biomass sector

With regard to biomass, representatives of the biomass association complained about lacking legal security in some parts of the approval procedure, missing technological knowledge on the side of the authorities, the different application or interpretation of existing federal legislation and the complicated financing of projects due to the negative image of the technology (Pfeimeter, Austrian Biomass Association).

However, some of these arguments were weakened by a representative of the Federal Environment Agency (Umweltbundesamt). While the combustion of biomass in newly constructed plants is unequivocally supported by Austrian decision makers, the use of outdated installations or the firing of unsuitable combustibles may lead to issues regarding fine dust pollution. (Schneider, Umweltbundesamt).

The construction rates of new biomass stoves are fluctuating and are highly depending on the respective prices for mineral oil or firewood and subsidies. Additionally, the mineral oil industry effectively promotes the switch to more efficient heating stoves which eventually leads to a lock-in to a fossil technology (Schneider, Umweltbundesamt).



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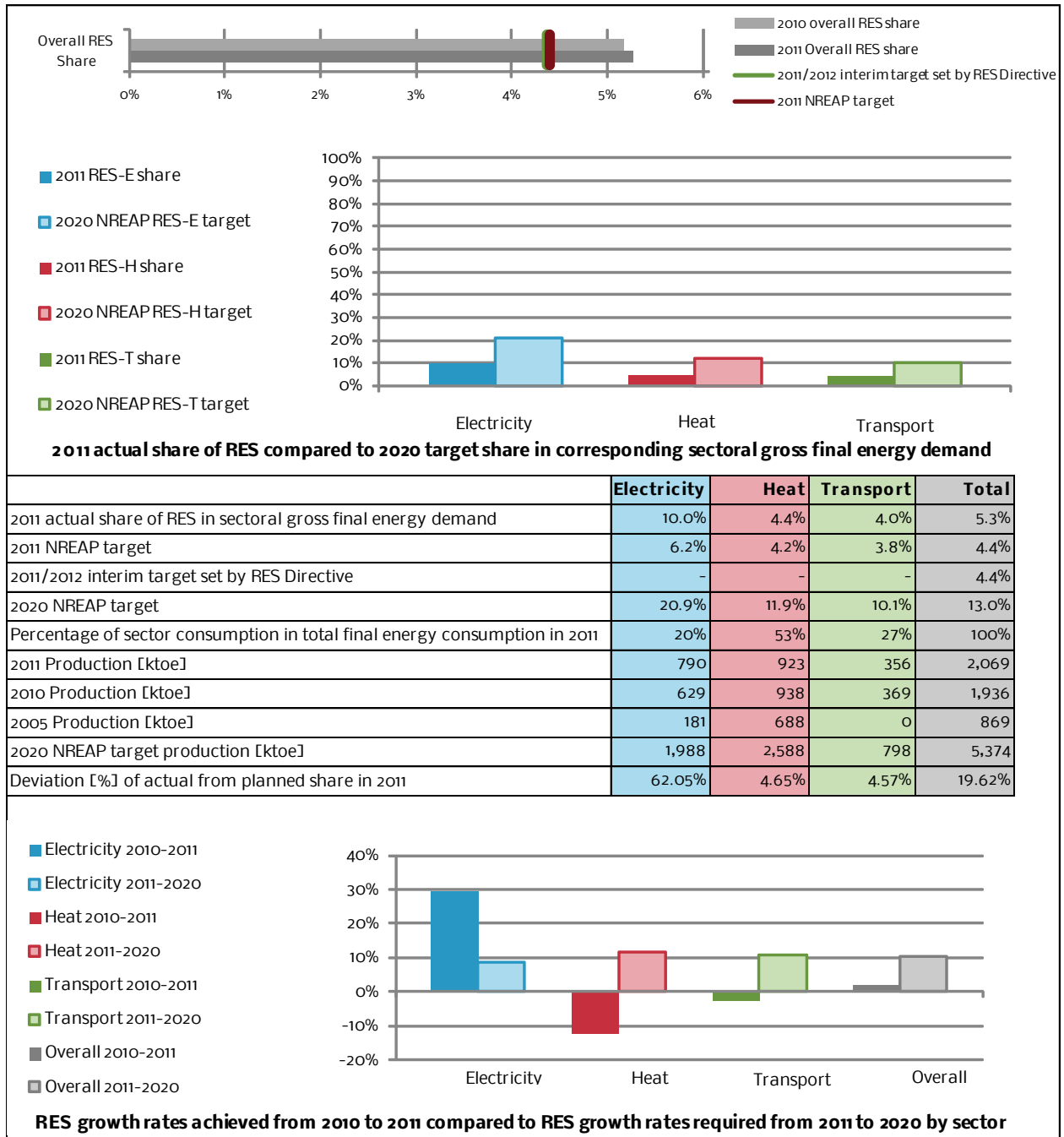
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B. BELGIUM

1. NATIONAL DEVIATIONS REPORT



- Belgium has met both the 2011/2012 interim target and the 2011NREAP target, due to estimates available at the time of writing. Final data will have to confirm this, see footnote x in the EU overview chapter.
- Only in the electricity sector production grew at a constant level compared to the prior 6-year average growth rate. In the other sectors, overall production decreased slightly from 2010 to 2011.
- With the 2010-2011 growth rate, the overall target will not be achieved. In 2011, only the growth rate in the electricity sector would be high enough for this purpose.



2. NATIONAL BARRIERS REPORT

The Belgian RES-E Sector

Support scheme

In Belgium, electricity from renewable sources is promoted mainly through a quota system based on the trade of certificates. Besides offshore wind power that is governed by national regulations, the promotion of renewable energy is a regional competence. Accordingly, every region (Wallonia, Flanders, Brussels Capital) has its own standards of support for renewable energy, based on a national framework. Generally, electricity suppliers are obliged to present green certificates to prove that a certain proportion (quota) of the electricity supplied to their final consumers in Belgium was generated from renewable sources. This quota differs according to the region.

Accounting for the different policy frameworks, the following support schemes are in place in the different regions for the production of electricity from renewable energy sources²³:

Brussels-Capital Region: system of green certificates; regional support schemes such as energy subsidies, investment assistance for companies and net-metering

Flanders: quota system; an ecological premium; net-metering scheme

Wallonia: system of green certificates; regional support schemes such as energy subsidies, investment assistance for companies or for public bodies and net-metering

When identifying particular barriers in the electricity sector for Belgium as a whole, one clearly needs to bear in mind the different policies pursued in the regions. Nevertheless, this report aims to give a general overview of Belgium's progress in attaining the 2020 obligations.

Barriers to RES-E

Uncertainty of the support mechanism

The current support system is under revision without certainty on the future project support and with possible retroactive effect for existing production plants. This concerns the onshore wind support systems in Flanders and Wallonia and the offshore wind support system. Some decisions have already been taken regarding the targets (future quotas in Wallonia) or the general direction of the system (in Flanders). For offshore wind, the producers, investors and big consumers have proposed a compromise agreement to the government linked to the evolution of the electricity price. Due to the green certificate overstock, the certificate price collapsed during these last months, reaching their guaranteed price in Wallonia. This has a significant impact on the profitability of the current electricity production and could simply block any future development in some sub-sectors (e.g. biomass). In addition, the sub-sector support mechanism is still under discussion among the competent authorities,

²³ RES LEGAL Europe 2012



creating a dramatic uncertainty for the future development. In Wallonia, the government has not found any agreement yet on the number of green certificates delivered per technology. As a consequence of this systematic delay in political decision making, some investments are completely blocked jeopardising the realisation of projects for which a permit has already been delivered (Al Bitar, Edora²⁴).

The Flemish support scheme has been reviewed in June 2012 affecting all technologies, however, to different degrees. The implementation agreement determining the banding factor has not yet been decided, creating a lot of market insecurity and financial insecurity for project developers. In terms of onshore wind, project developers try to get grid access until the end of December 2012 at the latest in order not to be affected by lower support levels from 1 January 2013 onwards. Additionally, biomass suffers from financial insecurity and insufficient support. The PV sector is heavily affected, especially due to the suspension of support for big PV plants. Generally, low support tariffs weaken the PV market development as a whole. Generally, all technologies are concerned, triggering project blocking and endangering (future) projects on the ground of lower profitability and financial viability (Duerinck, VITO; Bode, ODE).

Lack of coordination in long-term planning of RES

Lack of coordination between decision-making levels

The **lack of coordination between decision-making levels** could lead to conflicting decisions impairing the good development of the subsector (e.g. deletion of fiscal federal tax deduction without compensation on regional level for PV). Municipality vision is also partly different than the regional. This especially concerns onshore wind projects (and to a minor share biomass projects) that are supported at regional level and opposed at local level due to the negative visual impact for citizens. Furthermore, municipalities sometimes refuse to deliver a road permit (“permis de voirie”), which is needed to temporarily modify the road in order to allow the installation and material transport. Municipalities can also decide to impose a RES-production tax, thus, reducing project profitability (Al Bitar, Edora). Regarding environmental and construction permission, one can outline contradictory policies and motivations by regions and municipalities that trigger market insecurity, project delays and even project abortion (Bode, ODE). This lack of coordination between the different authorities in Belgium is illustrated by the **complicated and uncertain permit procedures and regulation**. In general for Flanders, the Region is in charge of issuing environmental permits currently aiming to speed up administrative processes and acknowledge the benefits of RES. Two different permits (environment and construction permits) are required and depend on different competent authorities. For instance, a construction permit can be refused on an environmental basis even though an environmental permit has been already delivered (Al Bitar, Edora). Moreover, at a lower administrative level (municipality), contradictory policies or motivations are observed which particularly affect the process of granting construction permits. Although municipalities are in charge of granting

²⁴ The feedback of Mr. Al Bitar throughout the report is mainly based on the results of interviews carried out with 35 industries active in the Belgian renewable energy sector.



construction permits, they generally lack a certain degree of expertise in this matter (Duerinck, VITO). As a result, project developers have to deal with unclear and contradictory decision making. The lack of coordination and contradicting policies lead to juridical uncertainties in appeals procedures from municipalities to the Council of State and create a negative image of RES that also result in lower social acceptance. Such complicated systems considerably slow down RES development. A one-stop-shop system is not in place in Flanders yet.

In Wallonia however, a one-stop-shop system is implemented and makes the process much simpler. Nevertheless, the majority of wind energy developers considers juridical uncertainty as the most prominent barrier to onshore wind development, mainly as a consequence of uncertain permit procedures and regulations. As a matter of fact, discussions on a fundamental review of the wind energy strategy (new regulation, new permit delivering method, new criteria, new spatial planning) impair the investment climate and endanger wind energy projects currently in the pipeline. In addition, current rules for wind development are not clear and objective enough. This leads several advisory administrations or bodies to decide on their own rules, making the decision making process unpredictable and based on a case by case decision for developers (e.g. for environment criteria). For biomass in Wallonia, a lack of clarity in the administrative framework (e.g. regarding the environment measures) leads to incoherence in the required measures and increases the unpredictability. Regarding hydro projects and possibly wind energy projects in the future, the application of the SEA directive on certain plans and programs cause important delays in the implementation of a series of concessions already given. Finally, permits delivered for wind energy projects in Wallonia are currently nearly systematically challenged at the Council of State level. Many permits are consequently broken and aborted (Al Bitar, Edora).

Lack of coherence between the different administrations for environmental requirements

The environmental constraints imposed on wind energy, biomass or hydro projects are unclear, excessive, based on a worst case scenario and are open to interpretation. This has an impact on the security of investments as it is difficult to anticipate the environmental measures to be implemented on the basis of the EIE results. Moreover, there are no harmonised environmental requirements: more environmental measures could be asked for a project in one province although less environmental measures are required for a similar project with a higher impact for the environment in another province. Besides, some mitigation measures can be imposed late in the permit process, which can considerably reduce the productivity of the project and its profitability. In some case, the financial viability of the project is even endangered. The spread of these constraints is dramatically increasing due to the simple application of the precautionary principle. There is also a lack of clarity regarding the financing of environmental equipment leading to discussions on the repartition of costs between the developer and the public administration (if necessary supported by EU funding). This leads to longer delays in the realisation of small hydro plants or even to project failures if the costs to be borne by the developer are too high (Al Bitar, Edora).

Competing public interest regarding the interference of onshore wind installations with military restrictions



A considerable proportion of appropriate wind development sites are under military restrictions due to training areas, radar vicinity or airport zones. Most of these restrictions concern exclusion zones although other restrictions would limit the height of the turbine and could therefore affect the profitability of the project. According to experts, the majority of these exclusion zones is (nearly) not used by the Defence Ministry and could potentially be released. For installations in the area of military radars, the Defence Ministry is not applying the Eurocontrol guidelines. No clear decision making process has namely been established yet in order to perform the relevant detailed assessment. Furthermore, the Air Traffic Control (ATC) has developed other exclusion zones in the vicinity of civil radars and civil airports. Although applying the Eurocontrol guidelines, the Belgian ATC seems more stringent leading to the nearly total exclusion of wind turbine installations in one Belgian region (Brussels). Due to a densely populated country and the presence of many other installation constraints for wind energy, the aeronautical constraints for wind energy dramatically undermine the development of Belgian onshore wind and could complicate the determination of new offshore zones for wind development (AI Bitar, Edora).

Lack of decision maker support and long term policy

Renewable energy technologies are frequently perceived by policy makers at all levels as cost-inducing technologies instead of as technologies that have numerous positive externalities in terms of the environment and a significant socio-economic impact. Frequently, local incidences are extrapolated as a negative example of RES in general, definitely affecting the general acceptance and image of the RES branch. Some policy makers simply rely on Not In My Back Yard (NIMBY) messages from anti-RES local groups in order to give them an increased impact. In addition, there is often a **lack of business understanding and technology understanding** at both ministries and administration levels leading administrations and ministries to take detrimental or excessive measures. This affects especially the biomass plant development (AI Bitar, Edora).

Insufficient measures to favour social acceptance

Although some opinion polls show that RES projects are massively supported by local communities, anti-RES (especially anti-wind energy) groups are more and more vocal and organised disseminating negative information and stimulating a NIMBY attitude. These organisations work with juridical experts and succeed in systematically sending delivered permits to appeal procedures. The lack of juridical certainty in the current regulation allows these appeal procedures to block or abort numerous projects (AI Bitar, Edora).

Insufficient grid connection capacity

A plethora of factors undermine the installation of renewable energy plants on grounds of **insufficient grid connection capacity with regional variance**. Insufficient grid connection capacity can prevent the project performance in general (*e.g. future offshore wind development in order to comply with the 2020 political target could not be performed without a major and already decided grid reinforcement - STEVIN*) and increases project costs to a level that is



affecting the projects profitability as well as the whole realisation of a project (Al Bitar, Edora). Grid reinforcement is urgently needed for the further development of decentralised production plants. Although priority access to the grid is encouraged by the renewable energy directive, numerous projects cannot be connected at acceptable costs. This is due to existing overcapacities at some connection points resulting from a lack of willingness to invest in grid reinforcement activities on the side of the TSO and a lack of spatial planning on the side of the regions. Particularly, the latter is needed for TSOs in order to plan their investments into the grid in order to adapt the electricity grid on time. The current procedure for connection capacity booking without permits is regarded as detrimental for little developers or new comers (Al Bitar, Edora). In addition, one needs to stress that the modalities of the connection contracts are sometimes vague and uncertain. Furthermore, grid reinforcement is hampered by a lack of regulation as regards cooperation between the regional and federal level as well as regarding environmental criteria. In particular, higher cooperation between competent authorities would enhance investment security of grid enforcement activities (Al Bitar, Edora).



The Belgian RES-H Sector

Support scheme

Similar to the promotion of renewable electricity, the promotion of RES-H is foremost a regional competence. Accounting for the different policy frameworks, the following support schemes are in place in the different regions for the production of heat from renewable energy sources²⁵:

Brussels-Capital Region: energy subsidies; investment assistance for companies

Flanders: quota system; grid operators and municipalities are responsible for setting up premium schemes

Wallonia: energy subsidies; investment assistance for companies

Despite regional policies, the federal level promotes the use of heat production from renewable energy sources via two fiscal measures; on the one hand, income tax reduction and on the other hand tax deduction on investment costs for companies are applied. Generally, the policy framework compared to electricity is less comprehensive and profound.

When identifying particular barriers in the heating sector for Belgium as a whole, one clearly needs to bear in mind the different policies pursued in the regions. Nevertheless, this report aims to give a general overview of Belgium's progress in attaining the 2020 obligations.

Barriers to RES-H

Lack of coherent, clear and efficient support framework

The main support scheme deals with green certificates for CHP and investment supports. Moreover, there are also some other subsidies in place but more within particular sectors, such as sports infrastructure, administrative buildings or agricultural sites. In addition, some specific investment aids are based on too complex systems. This complexity creates distortions especially because these subsidies are not responding to a well defined policy. There is a willingness of the administration to better coordinate all subsidy programmes within one coherent support scheme (especially in Wallonia). However, in its current incoherent shape, the support for heat from renewable energy source does not give adequate investment security (Al Bitar, Edora).

Compared to RES electricity, a coherent and integrated strategy for RES technology development in the heating sector is lacking. The latter is also characterised by a lack of consensus of policy makers regarding the use of biomass for heat production. The debate on the use of biomass is namely fuelled by the negative impact of

²⁵ RES LEGAL Europe 2012



combustion fumes on air quality (e.g. the Bruxelles Administration does not wish to develop biomass in the residential sector) (Marenne, ICEDD). The lack of supporting policies for RES in the heating sector is above all part of a more global lack of energy strategy. As a result, **no clear mid-term targets for the heating sector** and sub-sectors have been adopted. This would be particularly important to support RES integration in the building sector (Al Bitar, Edora). From 2014 onwards, energy performance obligations are in force demanding the use of either heat/cooling and electricity from RES. However, no particular obligations for heat only are envisaged. The Flemish Action Plan “Groene Warmte” is currently under review of the European Commission due to state aid.

Also the **administrative framework remains largely unclear**. For instance, environmental criteria for bio-energies are based on a worst case scenario not suitable to the majority of cases, thus triggering excessive costs. Regarding the building sector, the calculation of RES in the Energy Performance of Buildings (EPB) is inappropriate and not in line with real life methodology (e.g. for heat pumps). Moreover, there is also a lack of understanding of the interest in renewable gas solutions (biogas & syngas) (Al Bitar, Edora).

Insufficient and not adapted heating networks for solar thermal and biomass

District heating is currently only poorly developed in Belgium and no specific policy framework is in place. Moreover, due to the high investment costs no supports could yet have been decided upon. A huge scepticism exists regarding the viability of district heating in general (Duerink, VITO). Several elements come into play to explain the latter. On the one hand, experts point out the difficulty for investors to evaluate the size of the district heating networks to invest into due to the fact that heating consumption in buildings is expected to decrease in the future as a result of better insulation and energy-saving technologies. On the other hand, experts mention the common perception of the Belgian population regarding the individual aspect of heat production, which complicates the development of district heating networks (Marenne, ICEDD).



The Belgian RES-T Sector

Support scheme

In Belgium, the promotion of renewable energy sources in the transport sector is a matter of federal competence. The main support scheme for renewable energy sources used in transport is a quota system. This scheme obliges companies importing or producing petrol, gas or diesel fuels to ensure that biofuels make up a defined percentage of the company's total annual sale of fuel. Furthermore, biofuels are supported through tax regulations (RES LEGAL Europe database).

Barriers to the transport sector

Uncertainty of the European Commission, the political stakeholders and the public opinion towards biofuels

One of the most important barriers identified is the **uncertain position of the European Commission** regarding the future of biofuels. Several EU-reports question their sustainability and their efficiency, particularly as regards their impact on carbon dioxide emissions and their use of arable lands (EU Transport GHG). As a result, the European Commission published on 17 October 2012 a proposal to limit the share of biofuels produced from food crops to maximum 5% of the total fuels production. The prescribed overall target of renewable energy in the transport sector is set to 10%.²⁶ This instable atmosphere combined with the fact that biomass faces numerous competing applications does not favour investments into biofuel technologies (Marenne, ICEDD).

Moreover, the development of biofuels **is not considered enough as a priority for political stakeholders in Belgium**. As an example, there has been no evolution of the Belgian legislation regarding biofuels since 2009. In this respect, the support of biofuels suffers from the current political and budgetary difficulties of the Belgian federal state, being the competent authority for biofuels (whereas renewable energies are a regional matter) (Jossart, ValBiom).

The uncertainty towards biofuels is also characterised by a **societal criticism linked to the negative image of biofuels**. Proponents of biofuels were not able to counterbalance media criticism against biofuels (Jossart, Valbiom). The latter is also reflected by the fact that no country of the European Union has decided to go beyond the targets set by the European renewable energy directive, whereas several member states already plan on exceeding the renewable energy targets in the electricity and heating sector (Marenne, ICEDD).

Immaturity of electric vehicles technology and lack of network infrastructure

The main barriers impeding the development of electric vehicles in Belgium lie in the existence of technological and infrastructural bottle-necks. Thereby, one of the main obstacles regards the limited battery life of electric

²⁶ http://ec.europa.eu/energy/renewables/biofuels/doc/biofuels/com_2012_0595_en.pdf



vehicles and the lack of standardisation of electric batteries (Marenne, ICEDD). In fact, electric batteries are produced by each car manufacturer for his own vehicles without harmonised standards. Therefore, the problem of battery life is more difficult to resolve. Furthermore, electric vehicle technologies are still developing and remain too expensive. Policy makers therefore abstain from launching targeted support mechanisms and incentives. As a result, no investments are made in order to adapt the electricity grid to the use of electric vehicle networks. Finally, the low battery life of electric vehicles is not necessarily compatible with today's way of living, i.e. non-urban living or the need to bridge larger distances with the car (inner-city or inter-city) (Marenne, ICEDD).



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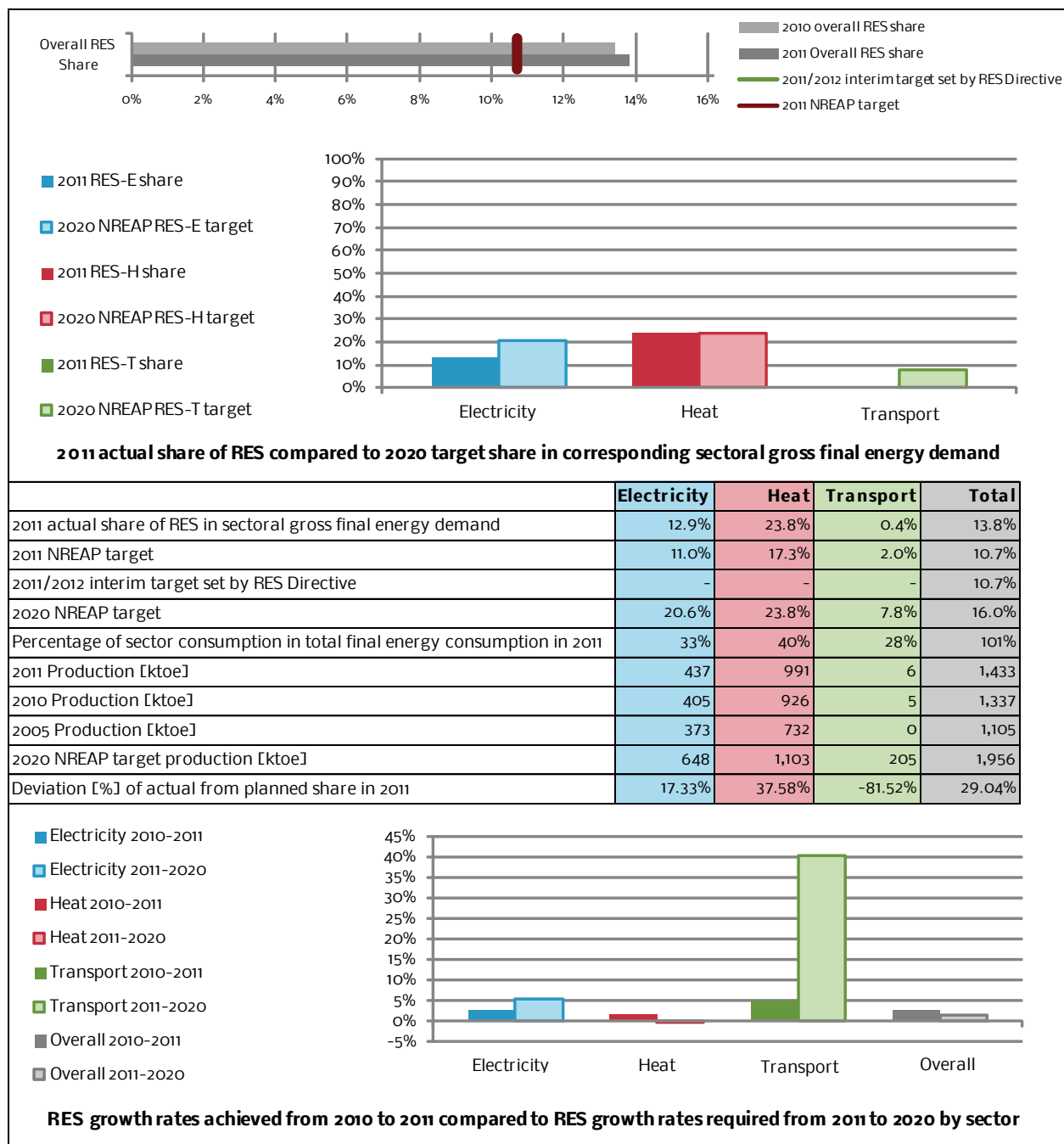
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C. BULGARIA

1. NATIONAL DEVIATIONS REPORT



- Bulgaria has complied with its 2011/2012 interim target and the 2011NREAP target, although the NREAP target for the transport sector was missed.
- Growth in the heat sector between 2010 and 2011 was slow compared to the prior 6-year average. In contrast, growth in the electricity and transport sectors accelerated.
- In total, the 2010-2011 growth rate is sufficient to achieve the 2020 target. Still, 2010-2011 growth rates in the electricity and transport sectors were too low.



2. NATIONAL BARRIERS REPORT

The Bulgarian RES-E Sector

Originally, the legal situation in Bulgaria was quite favourable for the development of a renewable energy sector - there was a profitable feed-in tariff and renewables were granted priority access to the transmission and distribution grid.

In the past, the main problems for the integration of electricity from RES in Bulgaria lied in the connection of wind and solar energy plants to the electricity grid and the lacking grid expansion needed for the further development of new RES installations. Especially because of the lucrative feed-in tariffs and the favourable legal conditions, a lot of precontracts were concluded in Bulgaria in recent years. Yet, many of these announced RES projects were in fact only of speculative nature, being mainly intended to reserve the grid capacities and subsequently sell them to foreign investors (RES Integration - National Report Bulgaria). Another reason for the large amount of precontracts was the lack of a grid development and grid investment plan. In case an investor wanted to know if there was any available grid capacity in the region of his investment interest, the only option was to apply for grid connection (Petrova, REA EU Ltd.).

Support scheme

In Bulgaria, electricity from renewable energy sources (RES) is mainly supported through a feed-in tariff. Producers of electricity from RES are contractually entitled against the grid operator to the purchase and payment of electricity at a guaranteed price (RES LEGAL Europe database).

The Renewable Energy Act (REA²⁷) is the statutory basis for the feed-in tariff, which is the main element of the Bulgarian support system. The REA also establishes an obligation to purchase and dispatch electricity from renewable sources. The amount of tariff is determined at least once a year by the regulatory authority State Energy and Water Regulatory Commission²⁸ (SEWRC).

On 14 September 2012, a retroactive grid usage fee was introduced for all RES-E plants connected to the grid since 2010, which has to be paid by RES-E plant operators to the grid operator in charge. For some technologies, this grid usage fee amounts to almost 40 % of the respective feed-in tariff (RES LEGAL Europe database).

Barriers to RES-E

Unstable and unpredictable legislative climate for renewable energy

The Bulgarian Government seems to have underestimated the rapid development of renewable energy in general and the PV sector in particular and therefore introduced several drastic changes to the support schemes and grid connection rules. The new Bulgarian Renewable Energy Act (REA) - which has been approved by parliament on 3

²⁷ Bulgarian: Закон за енергията от възобновяеми източници

²⁸ Bulgarian: Държавна комисия за енергийно и водно регулиране (ДКЕР) - www.dker.bg



May 2011 - initially intended to make certain areas of the legislation more effective. It introduced an obligatory advance payment and other measures in order to reduce the number of speculative projects. However, some of the provisions can be considered as severe barriers for the development of the Bulgarian renewable energy sector: Before the REA was passed, feed-in tariffs could be lowered annually by no more than 5 %. After this provision was abolished in May 2011, the tariff depression is no longer regulated by law and the rates can be drastically reduced every year. In pursuance of the amendment, the feed-in tariff rates were revised annually and may not be changed during the entire term of a subsidy agreement. While this posed no severe barrier for small PV systems which can be constructed and installed quite fast and therefore react quickly to legal amendments, this lack of predictability considerably worsened the situation for wind project developers, since only the Environmental Impact Assessment takes as much as one year (Petrova, REA EU Ltd.).

In addition, the SEWRC can now readjust the amount of the feed-in tariff more than once a year provided that the Regulatory Commission assumes that one of the factors setting the amount of the tariff deviated by more than 10%. Due to the lack of transparent regulation regarding the numerical basis for these input data, this regulation causes a lot of uncertainties for the producers and could eventually lead to impossibility of funding (Petrova, REA EU Ltd.).

Furthermore, the REA abolished the priority access to the grid for RES producers completely. The law envisages stopping the application of the support mechanism after the indicative target for Bulgaria is achieved. Another serious barrier is the fact that RES investors will find out the price at which they will be selling their energy only after the construction of their power generating facilities is completed (RES Integration - National Report Bulgaria). Bearing in mind that the tariffs can now be changed more than once a year and that there is no depression regulated by law, this seriously threatens the financial security of PV investors.

Together with the approval of the new law, the feed-in tariff periods have been cut for wind and photovoltaic projects, to 12 and 20 years respectively - though biomass has been favoured with a 20-year-period, up from 15. Second, a project's feed-in tariff is to be granted from the date on which its construction is completed. Investors highlighted that this new procedure bears issues as to the predictability of income flows at the time of the investment decision, taken with the collaboration of banks (RES Integration - National Report Bulgaria).

Overall, the Renewable Energy Act was directly amended three times since its initial adoption in 2011 and additional changes have been set in external laws, e.g. the Energy Act. The changes and amendments of legislation happen as often as each 6 months. Laws, ordinances and other tertiary legislation are being created, changed and amended with no assessment of the impact this might have on the interested parties, with no long term planning or even coordination between the responsible authorities. As a consequence, the newly adopted laws contradict with the old ones and investors that have received financing from institutions might lose it or declare bankruptcy (Kiriakov, APEE Bulgaria).



In September 2012, the regulatory authority SEWRC introduced a retroactive grid usage fee for any renewable energy plant connected to the grid since 2010. The fee complies with a request from the distribution grid operators EVN Bulgaria Electricity²⁹, ČEZ Bulgaria³⁰ and Energo-Pro³¹ and de facto cut the tariff rates retroactively by as much as 39 % for certain technologies:

For hydro power plants, the fee amounts to 5 % and for biomass, biogas and wind power plants it amounts to 10 % of the respective feed-in tariff. For PV installations commissioned in 2010 and 2011 the fee amounts to 20 % and for PV installations commissioned in the first half of 2012 even 39 %. If put into operation in July and August 2012, the fee equals to 5 %, and after 1 September 2012 only to 1 % of the respective feed-in tariff (RES LEGAL Europe database).

The distribution grid operators have based their request for a grid access fee on allegedly increased costs for grid management caused by the high volume of renewable energy systems that became operational this year. In fact, the high FITs for PV systems valid in the first half of this year have resulted in a boom. At least 500 MW of new PV capacity is estimated to have been connected before the tariffs were cut by up to 50% on 1 July.

Nevertheless, the grid usage fees are obviously calculated on the basis of the respective feed-in tariffs. In fact, SEWRC has already conceded that the main reason behind the fee was to alleviate the feed-in tariff payments that have to be made by the three utilities. The very high tariff rates and the apparently unexpected boom in the first half of 2012 have allegedly driven the grid operators into the red (Analyst Blog: Bulgarian PV Operators to Pay for Their Own Feed-in Tariffs).

This measure subsequently led to a massive loss of trust in Bulgaria's governing and investment climate. Currently, the European Commission is examining the legality of the grid access fee in order to identify potential breaches of EU law. Retroactive cuts within the support system have to be considered as one of the worst signals for investors in this field, since they seriously threaten their trust in the Bulgarian legislation and the future market development as well as in their investments and the predicated income from these investments (Kouroumbashev, MoP).

Discrimination and lobbying against RES producers

Not only was the grid access fee introduced just for renewable yet not for conventional power plants but the renewable energy producers are being discriminated with complicated administrative procedures that oblige even small producers (below 200kW) to obtain all necessary permits for a large power plant (Kiriakov, APEE Bulgaria).

²⁹ www.evn.bg

³⁰ www.cez.bg/en/home.html

³¹ www.energo-pro.bg



While the Government claims that the fee had to be introduced to cover expenses for grid expansion, the same argument was already used in May 2011, when the REA introduced two grid connection fees which had to be paid before the plant could be connected to the grid:

Having submitted the application for connection, the applicant shall provide a guarantee of BGN 5,000 (approx. EUR 2,500) per MW of the planned capacity to the plant operator as an advance payment for the connection cost. When entering into a preliminary agreement, the plant operator shall make another advance payment of either BGN 25,000 (approx. EUR 12,500) per MW if the capacity of his plant does not exceed 5 MW or BGN 50,000 (approx. EUR 25,000) per MW if the capacity does exceed 5 MW (RES LEGAL Europe database). Subsequently, the grid operator can choose freely where this amount shall be used for the development of the grid.

In reality however, the connection to the grid was still constructed and financed by the RES plant operators themselves and then transferred for free to the grid operators. Therefore, the introduction of the grid usage fee is not only retroactive but constitutes a double charge for a service which is not even provided by the grid operator (Petrova, REA EU Ltd.).

Beyond that, it is highly questionable if small investors will be able to afford to pay the advance payments for grid connection. Due to the economic crisis and the tense financial situation in Bulgaria, investment banks are not able to finance new projects.

Even before the priority grid access for electricity from RES was abolished, the transmission system operator faced difficulties to comply with the dispatching priority provided by law. In this regard, the TSO argues that there were only few non-variable energy sources, which could be used as balancing capacities. Stakeholders interviewed during the RES Integration project highlighted that as a consequence, a lot of wind energy plants in northeast Bulgaria have been curtailed to 50% of their installed capacities. On top of this, the RES Act from May 2011 placed renewable energy behind all other kinds of energy (RES Integration - National Report Bulgaria).

The main argument of the transmission and distribution companies for curtailing renewable energy plants is the lacking infrastructure to accommodate energy from RES. Moreover, the electricity companies highlight the fact that not much could be done regarding the lacking infrastructure since there were no allocated budgets for reconstruction and development, which, on the other hand is in the purview of the SEWRC.

There are no officially published 10-year grid development plans for the distribution grid, which leads to a vicious cycle: no plans - no funds leading to non-meeting of the deadlines for grid connection by the transmission and distribution companies, and resulting in the delayed commissioning as well as the frequent curtailment of RES plants (since they are managed more easily than conventional power plants). Even though existing regulations read that renewable energy curtailments should be compensated, this is fact only for a small number of companies (Kiriakov, APEE Bulgaria).

Moreover, the Bulgarian decision makers use the media to create a negative public image of renewable energy in general (Kiriakov, APEE Bulgaria). On several occasions, Government officials declared RES to be too expensive,



inefficient and dangerous for the stability of the electricity grid and even the environment. Similarly, the Bulgarian Government claims that the recent 30% increase of electricity prices was mainly due to the rapid development of PV power plants. But the reality is that big companies who would be able to produce cheaper green energy and subsequently lead to a lowering of energy costs, are currently discouraged from investing in Bulgaria because there is no trust in the legal system (Kiriakov, APEE Bulgaria).

The position of the Bulgarian Government can be partly explained by the upcoming parliamentary elections in summer 2013. Most probably, the situation outlined above will not change until then. Currently, the development of renewable energy sources (especially wind and PV) has been blocked; there is only a small perspective for biomass. According to the regulatory authority, there is no free grid capacity for new renewable energy projects until July 2013; the only exception being small PV installations up to 30 kW for domestic needs and biomass and hydro power plants up to 1.5 MW while wind turbines cannot be connected to the grid at all (Kouroumbashev, MoP). This suggests the assumption that the Government intends to use the negative image of RES to gain the popularity of the voters and wants to put the blame for the rising electricity prices on the RES plant operators (Petrova, REA EU Ltd.).

Another reason for the disapproving attitude of the authorities may be the strong influence of the conventional energy lobby on the decision makers. There are certain doubts of a compromised independency and influenced decision taking of the regulatory authority; some stakeholders even deem it corruption and bribing from the companies connected to the construction of the Belene nuclear power plant in Northern Bulgaria (which was cancelled in March 2012) and the Maritsa Iztok coal power plant³² in South-Central Bulgaria (Kiriakov, APEE Bulgaria; Petrova, REA EU Ltd.).

Lack of transparency and continued breaching of EU Directives

There is a lack of transparency in decision taking after the public discussions and/or hearings. Even in cases when a public discussion is held, in general statements, opinions, notes of suggestions are not taken into account. For the most part, the severity of this barrier increased significantly since 2010.

At a non-public meeting, the National Energy Company NEK³³ and the three distribution system operators Energo-Pro, ČEZ Bulgaria and EVN Bulgaria met with the regulatory authority SEWRC in order to discuss their concerns about financial liquidity (see: Retroactive grid usage fee). The current problem is that the distribution companies pay the feed-in tariffs to RES producers according to their actual electricity production, while NEK refunds the DSOs one twelfth of its own annual forecast of electricity production. This forecast however, is considerably lower than the actual production. Therefore, the distribution companies have trouble paying out the feed-in tariffs to the RES plant operators (Petrova, REA EU Ltd.).

³² <http://globalenergyobservatory.org/geoid/42177>

³³ Bulgarian: Национална електрическа компания (НЕК) - www.nek.bg



The Bulgarian Government intended to amend the Defence-Related Products and Dual-Use Items and Technologies Export Control Act³⁴ in order to allow funds allocated through the grid usage fees to be used for refunding the distribution system operators. Even though the ruling coalition did not succeed in changing the Export Control Act, it envisages including this regulation into the planned amendment of the Bulgarian Energy Act³⁵ which could be approved until the end of December 2012. This amendment would turn the hitherto temporary grid usage fees - which are so far only based on a resolution of SEWRC³⁶ - into a permanent part of the Bulgarian energy legislation (Petrova, REA EU Ltd.; Kouroumbashev, MoP).

Not only the European Commission but especially the European Bank for Reconstruction and Development (EBRD) as well as representatives from Japan, China or Korea and ambassadors from Germany and France reacted very harshly to the envisaged legal changes and threatened to withdraw their investments if the incumbent Bulgarian Government would not reconsider these actions. It is therefore questionable if the Bulgarian decision makers will actually approve the amendment of the Energy Act and risk negative impacts on the Bulgarian investment climate (Kouroumbashev, MoP).

One of the biggest problems in Bulgaria is the fact that the unbundling of the TSO provided by the second and third European Energy Package has not been transposed into national law so far. Despite the clear requirements for unbundling, the National Electric Company (NEK) and the Electricity/Transmission System Operator (ESO³⁷) are still closely linked (ESO is a daughter company of NEK). What is more, the Government intends to introduce changes to the renewable energy legislation to allow funds collected by one division of the company to be used for another division of the company (Kiriakov, APEE Bulgaria).

With the introduction of the grid usage fees, RES producers now have to “subsidise” their own feed-in tariffs, for the benefit of the utilities’ revenues. Lawyers claim this mechanism conflicts with EU Directive 2009/72/EC, which prohibits cross-subsidies between transmission, distribution and electricity supply (Analyst Blog: Bulgarian PV Operators to Pay for Their Own Feed-in Tariffs).

Effectively, there is still no liberated and working energy market in Bulgaria. Even though REA set a deadline for the distribution and transmission companies until June 2011 to adopt and enforce the Terms and Conditions for Grid Connection Contracts (low and medium voltage), the reality turned out different. Only two of the three distribution grid operators prepared their drafts of the Terms and Conditions in due time (the third one had a delay), yet even with their attempts at following of the procedure the State Energy and Water Regulatory Commission did not approve the drafts and further delayed the process. Up to this moment, there are still no approved rules (Kiriakov, APEE Bulgaria).

34 Bulgarian: Закон за експортния контрол на продукти, свързани с отбраната, и на изделия и технологии с двойна употреба

35 Bulgarian: Закон за енергетиката

36 Bulgarian: Решение № Ц-33 на Държавната комисия за енергийно и водно регулиране - Link: <http://dker.bg/files/DOWNLOAD/res-tseni-dostap-VI-proizv.pdf>

37 Bulgarian: Електроенергиен Системен Оператор (www.tso.bg)



Because of this, the abovementioned companies could not request grid access fee payments from RES producers and in the beginning of September 2012 all of the transmission and distribution companies turned to the SEWRC with a demand for imposing of provisional grid access fees for the renewable energy producers.

Quite peculiarly that happened in closed session, without public discussion with the interested parties. Two days after submitting the request-letters, SEWRC determined the new fees in a rather unlawful manner (not following the existing legislation and procedures of decision taking; not giving proper motives for the distinction between technologies). The fees are to be considered a sudden and retroactive measure that cuts off the previously guaranteed feed-in tariffs by 5-40% and forces many of the RES producers into bankruptcy (Kiriakov, APEE Bulgaria).



The Bulgarian RES-H Sector

Support scheme

In Bulgaria, the use of renewable energy for heating and cooling is promoted through a subsidy from the European Regional Development Fund, several loan schemes and through an exemption for building owners from property tax (RES LEGAL Europe database).

Barriers to RES-H

Lack of coherent legislation and indifference towards RE targets

Despite the fact that support tariffs for biomass have not been cut like the feed-in tariffs for all other renewable energy technologies in Bulgaria, there are currently only a few biomass plants in operation. According to APEE, a coherent legislation for the biomass sector is still missing (Kiriakov, APEE Bulgaria).

According to MoP Peter Kouroumbashev, the incumbent Government is not planning to introduce any legal changes which would improve the situation regarding the use of renewable energy in the heating as well as in the transport sector. If this Government will be re-elected next year, this would clearly endanger the fulfilment of the renewable energy targets for 2020 (Kouroumbashev, MoP).

Incentives for biomass lower than agricultural subsidies

The lacking development of the biomass sector can also be explained by the fact that in Bulgaria there are only a few big farmers who would be able to breed energy crop plants. These farmers however are usually not willing to change crops, since they receive additional payments from the EU which are considerably higher than the amount of the support tariff they could claim for energy crops (Petrova, REA EU Ltd.).

Avertedly inflated figures for biomass

The figures in the National Renewable Energy Action Plan³⁸ envisage mass usage of biomass which would lead to clear felling and unsustainable development of the forests (Kiriakov, APEE Bulgaria).

Difficult approval procedure for geothermal plants

On the other hand, the geothermal segment is virtually non-existent as the difficult approval procedure poses a severe barrier for investors (Biliana Petrova, REA EU Ltd.). Additionally, there is lack of statistical information about geothermal energy (Kiriakov, APEE Bulgaria).

³⁸ http://ec.europa.eu/energy/renewables/transparency_platform/doc/dir_2009_0028_action_plan_bulgaria.zip



The Bulgarian RES-T Sector

Support scheme

In Bulgaria, the main support scheme for renewable energy sources used in transport is a quota system. This scheme obliges companies importing or producing petrol or diesel to ensure that biofuels make up a defined percentage of their annual fuel sales. Furthermore, biofuels are supported through a tax regulation mechanism (RES LEGAL Europe database).

Barriers to the transport sector

Delaying of the obligatory mixing of liquid oils with biofuels

With the adoption of the REA, the obligatory mixing of liquid oils with biofuels has been delayed and must be implemented in phases, starting from 2012, in order to halt the continuously rising fuel prices. As a result, the development of the sector has been impeded and Bulgaria lags behind in achieving its target set by the EU. The figures published in the First Progress Report show that the share of renewable energy used in the transport sector amount to only 0.6%. In comparison, the target set in the National Renewable Energy Action Plan³⁹ is ten times higher, namely 6% (Kiriakov, APEE Bulgaria).

No tax exemptions for biofuels

Before joining to EU in 2007, Bulgaria treated biofuels as an excise-free product. But ever since, biofuel blends (bioethanol or biodiesel) are subject to a reduced rate of excise duty. For unleaded petrol with a share of at least 4 % of bioethanol, the reduced excise duty rate amounts to BGN 688 per 1,000 litres compared to BGN 710 per 1,000 litres for regular petrol. For gas oil with a share of at least 4 % of biodiesel, the reduced excise duty rate amounts to BGN 596 per 1,000 litres compared to BGN 630 per 1,000 litres for regular gas oil. Thus, the tax reductions only amount to BGN 22, respectively BGN 34 per 1,000 litres of fuel (RES LEGAL Europe database).

Despite the fact that the European Commission has allowed biofuels to be zero-rated, the Bulgarian authorities do not take any actions to exempt them from this tax burden. As a consequence, there is only one operational biofuel plant. For instance, ten bio-diesel and six bio-ethanol plants were operating before the implementation of the excise (Kiriakov, APEE Bulgaria).

³⁹ http://ec.europa.eu/energy/renewables/transparency_platform/doc/dir_2009_0028_action_plan_bulgaria.zip



Unclear incentives for e-mobility

The National Action Plan for Electric Mobility was adopted by the Ministry of Economy, Energy and Tourism in November 2012. As a consequence, electric vehicles shall be exempted from vignette (road tax) and municipal taxes, starting from 2013.

The National Action Plan also envisages a charging infrastructure development and a payment of BGN 5,000 (EUR 2,500) as a subsidy for every individual or legal entity who purchases an electric vehicle. However, it remains unclear when these measures will be imposed (Kiriakov, APEE Bulgaria).



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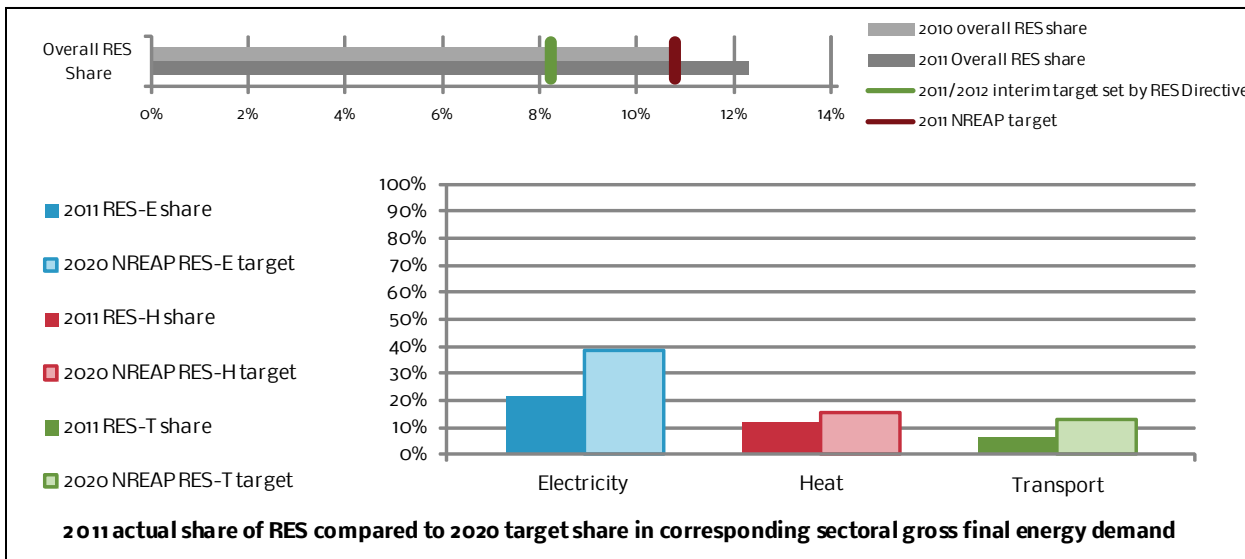
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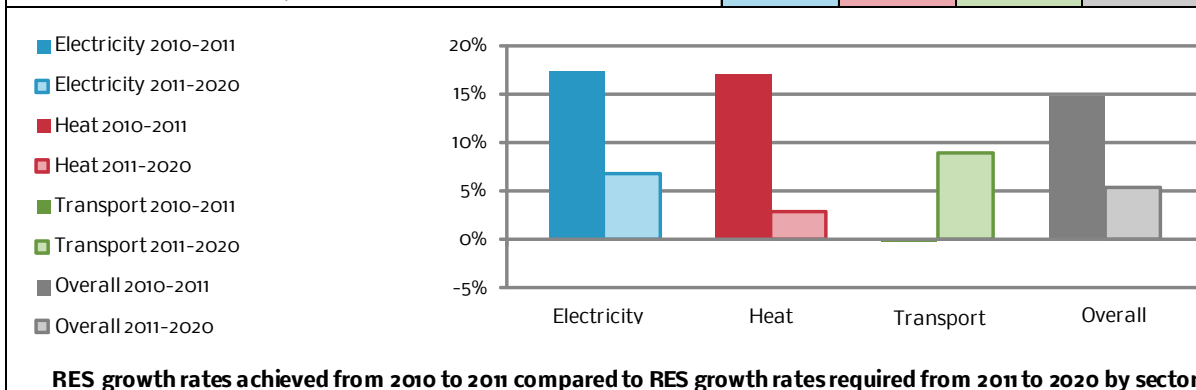


D. GERMANY

1. NATIONAL DEVIATIONS REPORT



	Electricity	Heat	Transport	Total
2011 actual share of RES in sectoral gross final energy demand	21.3%	12.0%	6.1%	12.3%
2011 NREAP target	19.3%	9.4%	7.5%	10.8%
2011/2012 interim target set by RES Directive	-	-	-	8.2%
2020 NREAP target	38.6%	15.5%	13.2%	19.6%
Percentage of sector consumption in total final energy consumption in 2011	24%	48%	29%	101%
2011 Production [ktoe]	10,955	12,319	3,180	26,455
2010 Production [ktoe]	9,462	11,572	3,144	24,178
2005 Production [ktoe]	5,293	6,794	0	12,087
2020 NREAP target production [ktoe]	18,653	14,431	6,140	38,557
Deviation [%] of actual from planned share in 2011	10.24%	27.74%	-18.64%	13.91%



- Germany has reached its 2011/2012 interim target and the NREAP 2011 target, although the NREAP target for the transport sector was slightly missed.
- 2010-2011 growth in the electricity and heat sectors increased slightly compared to average growth rates in the previous 6 years.
- The overall 2010-2011 growth rate was sufficient to achieve the 2020 target, although growth in the transport sector needs to accelerate.



2. NATIONAL BARRIERS REPORT

The German RES-E Sector

Support scheme

In Germany, electricity from renewable sources is supported through a feed-in tariff (FIT). The criteria for eligibility and the tariff levels are set out in the Act on Granting Priority to Renewable Energy Sources (Renewable Energy Sources Act - EEG). According to this act, operators of renewable energy plants are statutorily entitled against the grid operator to payments for electricity fed into the grid. The EEG also comprises the so-called market premium and the flexibility premium for plant operators who directly sell their electricity from renewable sources. Moreover, low interest loans for investments in new plants are provided by the KfW Renewable Energy Programme - Standard (RES LEGAL Europe database).

Barriers to RES-E

Public resistance to renewable energy plants

In order to analyse public acceptance for renewable energy plants in Germany, one needs to differentiate between the general public support for the support mechanism as such and the local willingness to support the erection of such plants in the neighbourhood. Regarding the general support, public debate currently focuses on the cost distribution mechanism of the support system for RES-E (EEG-Appportionment scheme). The mechanism used allows utility companies to pass the costs of the scheme on to consumers in form of a surcharge on the electricity prices. However, equal burden sharing is undermined by the current exemption regulations for energy intensive industries on grounds of competition reasons (M. v. Oppen). Current public debate focuses on the rising financial burdens for households and the risk of energy poverty for low-income households that might negatively affect public acceptance for renewable energy. Nevertheless, acceptance for the development of renewable energy is high. Currently, political stakeholders fall short of adequate communication strategies and policies.

As regards the local willingness, one can still notice the presence of the NIMBY (Not In My Back Yard) phenomenon concerning the construction of plants (particularly deep geothermal) and grid reinforcement. Regarding biogas and onshore wind plants, environmental action groups and alliances organise public protests against the erection of such plants at the regional level, which trigger project cancellations and delayed grid reinforcement (BDEW; Stubner, Agora Energiewende). As for biogas projects, public discourse focuses on the food vs. fuel dilemma, creating thus a negative image of biogas as a renewable energy source. In order to not further endanger public acceptance for renewable energy, more transparency about the costs and the infrastructure development needed is required.

Problems with financing grid reinforcement



The current policy framework does not sufficiently stimulate grid reinforcement. Particularly difficult is the long administrative authorisation process at every level, also determined by public resistance at the regional level (M. v. Oppen). Although grid operators are encouraged to expand their grid, financial incentives seem insufficient to stimulate profound grid reinforcement activities (M. v. Oppen; Loew, BEE). Taking into consideration that the amortisation of grid reinforcement investments takes approximately 40 years, the current policy framework does not provide adequate financial incentives to grid operators to undertake sufficient grid reinforcement activities. Currently, transmission system operators (TSOs) are facing too high interest rates and have to account for risk liabilities, which lead to negative investment decisions. The financial incentive for a swift reinforcement is different for different grid operators. On the one hand, the two privately-owned transmission grid operators have vast financial resources at their disposal. On the other hand, the partly state-owned transmission grid operators do not have these resources and cannot reinforce the grid accordingly. The same holds true for distribution grid operators (DSOs). Due to the vast number of DSOs, designing regulation to stimulate the financing of grid reinforcement is particularly difficult. Furthermore, the business model of the DSOs - based on collecting concession fees for the energy they transfer - is in danger, partly due to the increase in own consumption. Seeing that many grids belong to the municipalities, which can choose to invest the mentioned revenues in other areas, grid reinforcement activities are difficult to be carried out (Loew, BEE).

With regards to offshore wind plants, one needs to single out their difficulties related to grid reinforcement. Currently, problems concerning the financing of grid reinforcement activities that would ensure the transmission of electricity from the offshore wind parks located in the North to the South of Germany are heavily pronounced. The case of offshore wind reveals the urgency of concrete political actions to ensure adequate grid capacity. For PV systems, the grid connection permission process is prolonged due to the lack of adequate grid reinforcement, with the risk that the system might become cost-inefficient by the time the grid is available (Feldkamp, BSW). To date, the issue of grid reinforcement is decisive for reaching the goals of the *Energiewende*.

Problems with spatial planning, the administrative authorisation process of plants and the interference with restricted military areas

Regarding onshore wind, regulations prescribing the height of the turbine and the distance of the plant to residential areas vary from federal state to state. These regulations can even differ within the same federal state, seeing that the municipalities have planning authority on these issues and can for example decide to include a height limitation in their land-use plan (Schroth, BWE). As a result, erecting new and better wind turbines is not always possible, therefore not fully seizing the available wind potential. This barrier materialises to a larger severity in terms of repowering (Stubner, Agora Energiewende). Moreover, municipalities, by means of spatial planning, assign too few or unsuitable areas for plants or even refuse to allow their construction. This also holds to a lesser degree also for biomass plants. In the many cases, political motives (NIMBY-dilemma) prevent the optimal exploitation of the RES-E potential.



Furthermore, a considerable proportion of appropriate onshore wind development sites are under military restriction due to training areas, radar vicinity or airport zones. The sites affected by these restrictions are excluded from wind power development. Moreover, aviation safety rules prevent any changes of lighting regulation (Hinsch, juwi). So far, this issue has been marginally perceived as a barrier, since it is a very hands-on problem between the project developer and the competent military authority (Stubner, Agora Energiewende). In fact, a considerable share of plants is concerned with severe effects on the project realisation (Schroth, BWE).

Unstable support mechanism for PV installations

The amendment of the Renewable Energy Sources Act (EEG) in August 2012 overhauled the support system for PV introducing different installation categories (excluding installations >10 MW from the FiT) and a monthly degression rate. Furthermore, a cap of 52 000 MW of installed capacity is envisaged for PV. According to the PV-industry, the tariffs have been reduced too much and too fast (Feldkamp, BSW). However, the amount of newly installed capacities remains at a comparatively high level (BDEW). The exemption of large ground-mounted plants (>10 MW) is perceived by other stakeholders as less problematic for the renewable electricity sector in general (Stubner, Agora Energiewende). The introduction of a cap is expected to create reluctance among project developers to plan large-scale PV installations, especially when the installed capacity will approach the cap (Hinsch, juwi).

Remote control obligation is a financial burden for small installations

Starting in 2012, PV installations need to be equipped with remote control devices allowing for feed-in management. Different grid operators provide the necessary equipment at different costs. These costs can constitute a significant barrier for private households wanting to install a small roof-top installation likely affecting the investment decision negatively (Hinsch, juwi).

Incoherent and complex regulatory regime for biogas plants

In the case of biogas, competing competencies exist regarding safety standards as well as documentation requirements (Maciejczyk, Fachverband Biogas; BDEW). Due to a lack of coordination between the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), the Federal Ministry of Economics and Technology (BMWi) and the Federal Ministry of Labour and Social Affairs (BMAS), no coherent regulatory framework is in place. This constitutes an administrative and regulatory burden for plant owners and project developers (Maciejczyk, Fachverband Biogas). As a reaction to the dynamic market development and to some incidents such as accidents and damages in biogas plants, a strengthening of safety regulations is high on the political agenda of every ministry, but lacking sufficient inter-ministerial coordination. On the background of this lack of harmonisation at the federal level some federal states implemented and enforce ordinances with regards to plant safety themselves (e.g. Lower Saxony, Western Pomerania, North Rhine-Westphalia). Consequently, plant



owners and project developers face competing regulations, a fact clearly identified as a barrier for the development of the biogas market as a whole (Maciejczyk, Fachverband Biogas).

Furthermore, project authorisation procedures take very long due to job cuts at the competent authorities. Repowering requests are particularly concerned by delays (Maciejczyk, Fachverband Biogas). Additionally, the professional associations concerned with the topic (e.g. Landw. BG, BG Chemie, BG ETEM) do not coordinate their activities sufficiently.

The lack of coordination and the competing regulations constitute a barrier to achieving the political targets for the biogas sector. In a moderate number of cases, the profitability of a plant is at stake (Maciejczyk, Fachverband Biogas).

Insufficient and complex support system for biogas

The BEE has criticised the fact that financial support for biogas is insufficient. Increasing production costs due to rising resource prices and higher technical and regulatory standards are not adequately accounted for by tariffs, thus reducing the profitability of the plants (Rauh, Fachverband Biogas). This leads to the construction of fewer new plants and to economic problems for the existing ones. Furthermore, the tax exemption for biomethane as enshrined in the Energy Tax Act (Energiesteuerergesetz) is going to be phased out after 2015, making the processing of biogas into methane economically unattractive (Rauh, Fachverband Biogas).

Moreover, the compensation for biogas as set out in the EEG is too complex. As a result, the flexibility premium is only used by a small number of plant owners as compared to the market premium (Stubner, Agora Energiewende).

Problematic financing and a lengthy administrative authorisation process of deep geothermal plants

The development of deep geothermal plants requires a long planning process and considerable own resources. Before granting loans, banks require the drilling to be financed with own capital (Ewald & Hegele, WFG). An obstacle is also the lack of insurance companies covering exploration risks.

The administrative authorisation process is often delayed, handled differently between federal states and involves an authorisation from the water as well as the mining authority. This creates project delays and undermines the developer's planning certainty (Ewald & Hegele, WFG).

Lack of know-how exchange between project developers of deep geothermal plants

The market for geothermal plants is affected by a lack of know-how exchange between project developers. An adequate information network could help to disseminate best practice examples and prevent costly project mistakes. The lack of experience exchange is also facilitated by an incoherent regulatory framework and the different handling of mining and water matters across the federal states (Ewald & Hegele, WFG).





The German RES-H Sector

Support scheme

In Germany, heat from renewable energy sources is supported through the Market Incentive Programme (MAP)⁴⁰. Investment support for heating systems in existing buildings is provided by BAFA. Systems in new buildings are only eligible if process heat is used. The investment support is divided into basic support, bonus support and innovation support. By means of the Premium component of the KfW Renewable Energies Programme, the KfW provides long-term, low-interest loans including a repayment-free start-up period for the development and expansion of heat systems/plants. In order to be eligible for the above-mentioned support, systems need to be erected in Germany and have to be operating for at least 7 years (RES LEGAL Europe database).

Barriers to RES-H

In the context of the *Energiewende*, both media and public focus on electricity and the transformation of the power system considering the development of the renewable heating sector only to a negligible extent. But it is the heating sector which has a huge potential for financial and CO₂ savings. This policy focus is marked by a lack of policy targets and long-term vision, which prevent a stronger market development of the renewable heat sector.

Insufficient and uncertain support mechanism (MAP)

The Market Incentive Programme (MAP), formerly a model support scheme across the EU, is now considered to be an unreliable support mechanism for financing pellet heating systems and stoves (M. v. Oppen). In the summer of 2010, the programme was interrupted for a couple of months. After recommencement - including certain revisions - the number of applications recovered only slowly, alluding to the fact that consumers and installers remained hesitant and investment insecure. Furthermore, recent discussions about the continuation of the MAP in 2012 did not improve the confidence in the support mechanism; rather this “stop-and-go policy” has had a damaging effect on the development of RES-H (BDEW). Together with the uncertainty created by discussions on the proposed tax relief for retrofitting the building stock - which have been going on for months - the fear for lack of financing led to a lack of confidence and inertia among consumers and installers. Some installers simply do not recommend their clients applying for the support scheme anymore, seeing that the financing is uncertain and the application process too complex (DEPV). Moreover, final consumers are overwhelmed by the number of support programs available at federal, state and municipal level and their continuously changing content. The unreliable funding together with the intrinsic lack of trust of both installers and consumers - which are confronted with a number of alternative investment opportunities and high costs when modernising - have a negative impact on the choice for renewable heat, particularly from wood pellets (DEPV).

⁴⁰ The provisions of the MAP are laid out in the Guidelines for the support of RES-H (Richtlinien zur Förderung von Maßnahmen zur Nutzung erneuerbarer Energien im Wärmemarkt vom 11. März 2011).



Insufficient and unclear information policy

Consumers are increasingly misinformed and insecure about the best available heating system and the financial incentives in place for a particular technology. For example, a lot of decisions to exchange old and inefficient heating systems were postponed because consumers were expecting a policy introducing tax benefits for renewable heat to be passed. The policy had been advertised by the government but a final agreement could not be reached. End-user investments in heating systems are undermined by the complexity and the uncertainty of the support scheme or simply on grounds of lack of information on available heating systems. Some installers do not even recommend investing in renewable heating systems having a detrimental effect on the general acceptance of RES-H. In the case of solar thermal installations, installers and craftsmen often lack the technical expertise necessary for a successful installation (Herbell, BWP; BDEW).

Negative image of using electricity for heating

Consumers are reluctant to use electricity for heating. This is influenced by a broader, quite negative outlook on the development of electricity prices in Germany (Herbell, BWP).

Lack of effective instruments for the building sector and insufficient enforcement

Considering that the existing policy framework focuses mostly on new buildings (Renewable Energies Heat Act (EEWärmeG), Energy Conservation Regulations (EnEV)) - the MAP had only a minor effect on increasing the sales volume of renewable heating technologies in existing buildings. The EEWärmeG aims to enlarge the share of heating and cooling produced from renewable energy to 14% in 2020. Accordingly, owners of new buildings and buildings under major renovation are obliged to use a particular share of heating and cooling produced from renewable energy.⁴¹ The quota applies to buildings with a floor space > 50m² that are heated or cooled.⁴²

To date, no federal regulations exist for the mandatory use of renewable energy in existing buildings, also because of the high financial burden households would have to shoulder. In the absence of a federal regulation, Baden-Württemberg implemented own requirements. Besides merely setting the regulatory framework, municipalities fail to enforce the regulations due to a lack of financial capacity (M. v. Oppen; Knaack, BSW).

Rivalry between solar thermal and other energy efficiency measures

When deciding to renovate a building, private consumers are faced with the choice between different measures - better insulation, new windows or replacement of the heating system. The replacement of the heating system itself competes with energy efficiency investments. Due to high costs incurred by a new heating system and even more so by a solar thermal one, energy efficiency measures tend to be prioritised. Moreover, household income and socio-economic characteristics are decisive for investments and need to be better addressed by regulatory means in order to stimulate the installation of renewable energy heating systems. Even among commercial lessors

⁴¹ Art. 3 (1) EEWärmeG

⁴² Art. 4 EEWärmeG



the interest in replacing the heating system is low (tenant-landlord dilemma). Under current legislation, a new and expensive solar thermal heating system incurs costs, which cannot be passed on to the tenants. Currently, support instruments appear to be rather ineffective in substantially increasing the share of RES-H in buildings (Knaack, BSW).



The German RES-T Sector

Support scheme

The main support scheme for renewable energy sources used in transport (fuel for road transport) is a quota system. This scheme obliges companies importing or producing petrol, gas or diesel fuels to ensure that biofuels make up a defined percentage of the company's total annual sale of fuel as set out in the Biofuel Quota Act. Obligated fuel suppliers may assign this obligation to other companies. From 2015, a greenhouse gas reduction quota will replace the biofuels quota. Besides the quota, biofuels are supported through fiscal regulation. The Energy Tax Act on mineral oil products obliges companies producing, processing, holding, receiving or dispatching energy products to pay a defined amount of tax. The tax relief for biofuels varies depending on the type of biofuel. The tax relief is only granted if the produced amount of biofuel is pure and not used to fulfil the biofuels quota (RES LEGAL Europe database).

Barriers to the transport sector

The barriers in the transport sector range from issues regarding the overall support system and consumer awareness within Germany to the malfunctioning of the European single market for biofuels.

Insufficient goals for the market development of biofuels

As laid out in the Biofuel Quota Act, fuel suppliers are obliged to ensure that biofuels make up a defined percentage (6,25%) of the company's annual sales of fuel. However, this quota will be replaced by a greenhouse gas reduction quota for the whole fuel sector in 2015. As a consequence, companies will need to reduce greenhouse gas emissions by 3% annually. The quota will subsequently increase without explicitly prescribing the use of biofuels. The emission reduction target of 3% annually can be met without significantly increasing the use of biofuels (Daum, VDB). Generally, one can speak of a missing long-term vision on the role of biofuels in the German fuel market, particularly post-2020 (Stubner, Agora Energiewende).

Insufficient financial incentives for pure biofuels

The fiscal stimuli for biofuels as set out in the Energy Tax Act are insufficient to stimulate the development of a functioning market for pure biofuels. The tax relief - for biodiesel (B100) and vegetable oil - and tax exemption - for bioethanol (E85) - are granted if the produced biofuel is pure and not used to meet the biofuel quota⁴³ (RES LEGAL Europe database). However, both are going to be phased out by 1 January 2013, respectively by 2015. As a result, the interest in developing pure biofuels is reduced (Daum, VDB).

⁴³ Art. 50 EnergieStG in connection with §37a (1); (3) and (3a) BImSchG



Lack of market transparency and of an information policy for consumers

Consumers neither have sufficient information about biofuels, nor is their use transparent to them. For example, in terms of labelling fuels the non-standardisation of quantities (litre or kg) constitutes a moderate barrier concerning a predominant share of biofuels (BDEW). Moreover, the public debate about the introduction and use of E10 and the moderate levels of demand reveal public scepticism towards biofuels. Frequently, the debate on public biofuels focuses on the “food vs. fuel dilemma” due to the extensive growing of monocultures (maize), associated by the public with fuel production. Furthermore, consumer information about the technical feasibility of their vehicles to use biofuels is poor.

Dysfunctional European market for biofuels due to a lack of harmonisation of regulation

Due to a lack of transposition of the EU regulation, member states apply different standards for biofuels, such as differing sustainability criteria or non-transparent administrative and tendering procedures for the award of biofuel quantities according to the set quotas. As a result, the functioning of the European biofuels market is negatively affected (Daum, VDB). This barrier at the European level reduces the level playing field of German biofuel producers and needs to be solved at the EU-level.



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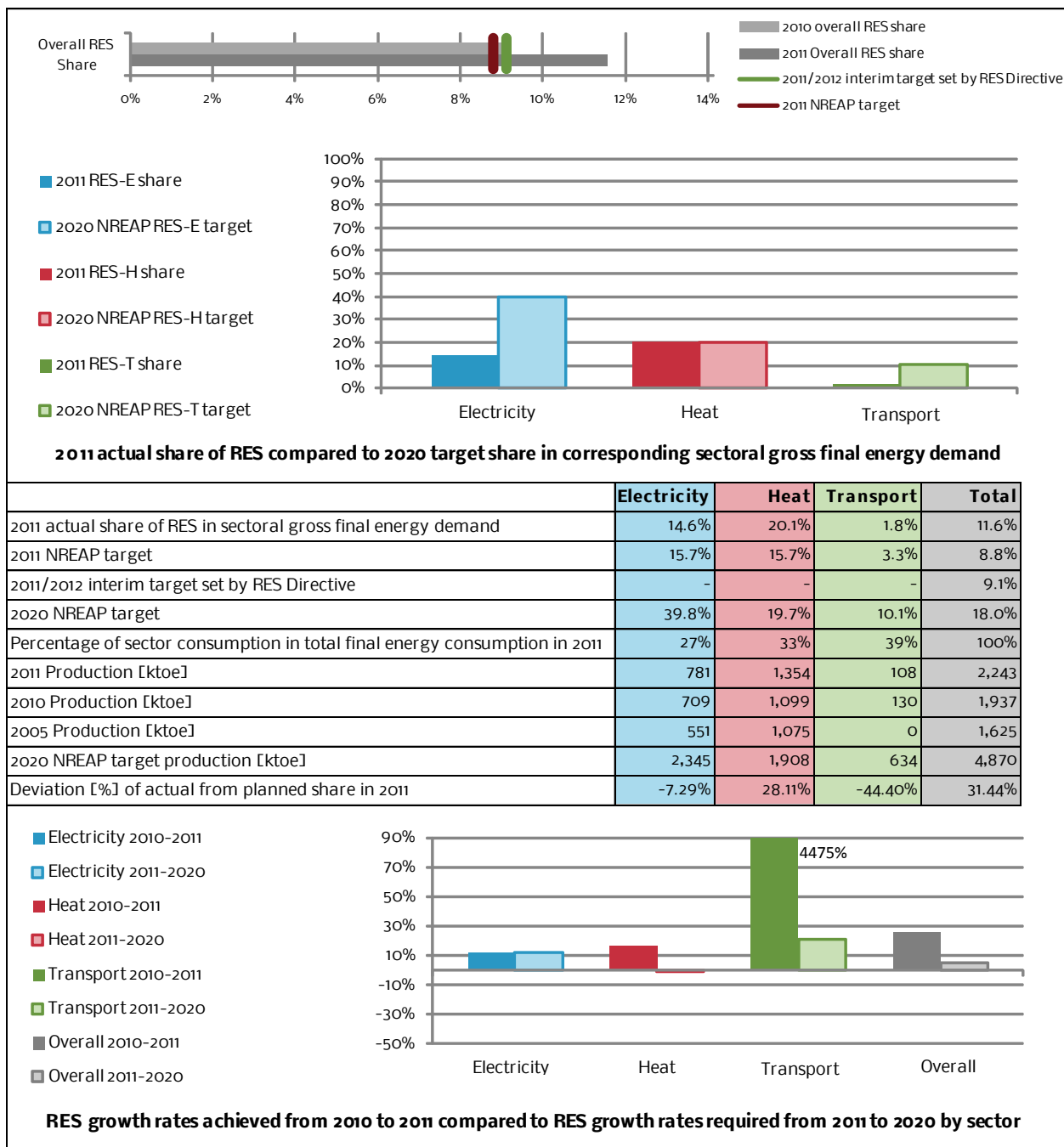
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E. GREECE

1. NATIONAL DEVIATIONS REPORT



- Greece has achieved its 2011/2012 interim target and the 2011 NREAP target due to a positive deviation in the heat sector share.
- The overall growth rate in the RES sector from 2010-2011 would be more than high enough to achieve the 2020 target if it could be maintained. This is mainly due to a strong growth trend in the heat sector. The extremely high growth rate in the transport sector may be due to data reporting inconsistencies. Growth in the electricity sector was just slightly too low.



2. NATIONAL BARRIERS REPORT

The Greek RES-E Sector

Support scheme

In Greece, electricity generation from renewable sources has been supported during the past fifteen years through various versions of a Feed-In Tariff system concept. In addition, RES-E projects have been eligible for capital subsidies and /or tax exemptions (RES LEGAL Europe, 2012⁴⁴).

Law No. 3468/2006 and its amendments set for the first time an integrated set of rules for guaranteed Feed-In Tariffs. Plant operators are contractually entitled against the Grid Operator/ Electricity Market Operator to the payment of electricity exported to the grid. The Grid Operator is obliged to enter into these contracts. The amount of Feed-In Tariff varies for each electricity generation technology. Based on a regulation issued in the Greek Government Gazette (FEK 1079/2009) the support scheme has been expanded to incentivise electricity generation from small PV installations (capacity of 10 kW or less) through a feed-in tariff, which is deducted from the consumers' electricity bill) (RES LEGAL Europe, 2012⁴⁵). During 2012, Feed-In-Tariffs for PV installations have been revised (reduced) twice, while since November 2012 a retroactive levy on the yearly turnover of all operating RES plants has been entered into force.

Apart from the Feed-In-Tariff mechanism, non-PV RES projects may come under the provisions of Law No.3098/2011 (Investment Law) and can be eligible for a subsidy and or tax exemption scheme. (RES LEGAL Europe, 2012⁴⁶).

Barriers to RES-E

Especially after the amendment of Law No. 3468/2006⁴⁷, the legal framework in Greece became more favourable for the development of the renewable energy sector- especially for PV installations. In particular, highly attractive PV Feed-In-Tariffs set the stage for the ensuing rapid development of PV installations (RES Integration, 2011)⁴⁸.

Nevertheless, the current financial crisis created a new unfavourable environment for the development of renewable energy electricity. Project financing became extremely hard to get. Subsequent revisions of Feed-In-Tariffs, mainly for PV installations, along with the inability of the Electricity Market Operator (LAGIE)⁴⁹ to remunerate the plant operators and the unstable economic environment deteriorated the prospects of further growth.

⁴⁴ <http://www.res-legal.eu/search-by-country/greece/>

⁴⁵ Ibid.

⁴⁶ Ibid.

⁴⁷ Law No.3851/2010, "Accelerating the development of Renewable Energy Sources to deal with climate change and other regulations addressing issues under the authority of the Ministry of Environment, Energy and Climate Change". Available at <http://www.ypeka.gr/LinkClick.aspx?fileticket=qtIW9oJLYs%3d&tabid=37>

⁴⁸ http://www.eclareon.eu/sites/default/files/greece_-_res_integration_national_study_nreap.pdf

⁴⁹ Greek: Λειτουργός Αγοράς Ηλεκτρικής Ενέργειας, <http://www.lagie.gr/>



Apart from that, other barriers (administrative/licensing/grid connectivity/public acceptance, etc.), which originated before the favourable amendment of Law No.3468/2006 remained and in combination with the new barriers which emerged during the financial crisis, aggravated the situation.

Unstable Financial and Economic Development

The current financial crisis constitutes the main cause for the emergence of new barriers concerning the development of the renewable electricity sector.

The barriers caused by the unstable economic financial and economic environment can be further divided into two large groups. The first one contains the effects on the viability/ sustainability of the current support mechanism for renewable electricity production. The second one has to do with the negative effects the current financial situation induces on the financing of renewable electricity projects.

The **uncertainties concerning the Feed-In-Tariff regime** in Greece is the major problem renewable electricity sector is facing. Sudden and/or retroactive revisions of the Feed-In-Tariffs surely create an insecure environment for new investments. Investors with projects under development are discouraged and may abandon their investments since such uncertainties are going to lead to the lowering of the profitability of such projects.

The dramatic impact of sudden revisions of the Feed-In-Tariff mechanism can be illustrated through the following example: if an investor had planned to build a PV installation >100 kW in 2011 and was expecting that the PV installation would be connected to the grid in August 2012, it was expected to receive a Feed-In-Tariff of € 314.27/ MWh⁵⁰. However, the Feed-In-Tariff at the beginning of 2012 for the same installation was reduced to € 271.64/ MWh⁵¹. Six months later another reduction was applied and the Feed-In-Tariff was reduced further to € 180/ MWh⁵². All in all, from the initial point of the investment until the time the PV installation was theoretically connected to the grid, the Feed-In-Tariff lost 57% of its value.

As far as the impact of retroactive changes is concerned it should be noted that with the new law No. 4093/2012 ("Approval of the Medium-Term Fiscal Strategy Framework 2013-2016 - Urgent Measures for Application of Law 4046/2012 and the Medium-Term Fiscal Strategy Framework 2013-2016") a special solidarity levy has been applied on the yearly turnover of all operating renewable electricity installations for 3 (2+1) years (25%-30% of the yearly turnover for PV installations and 10% for other renewable energy sources⁵³). This will have a devastating effect on

⁵⁰ Law No.3851/2010, "Accelerating the development of Renewable Energy Sources to deal with climate change and other regulations addressing issues under the authority of the Ministry of Environment, Energy and Climate Change". Available at <http://www.ypeka.gr/LinkClick.aspx?fileticket=qtIW9oJLYs%3d&tabid=37>

⁵¹ Greek: Αριθμ. Υ.Α.Π.Ε./Φ1/οικ.2262, "Τιμολόγηση ηλεκτρικής ενέργειας που παράγεται από φωτοβολταϊκούς σταθμούς". Available at <http://www.ypeka.gr/LinkClick.aspx?fileticket=JzS4WApZIMo%3d&tabid=555&language-el-GR>

⁵² Greek: Αριθμ. Υ.Α.Π.Ε./Φ1/2301/οικ.16933, "Τροποποίηση της απόφασης με αριθμό Υ.Α.Π.Ε./Φ1/2262/ 31.1.2012 (Β'97) σχετικά με την τιμολόγηση ηλεκτρικής ενέργειας που παράγεται από φωτοβολταϊκούς σταθμούς". Available at <http://www.ypeka.gr/LinkClick.aspx?fileticket=Ru%2btFes6Pao%3d&tabid=555&language-el-GR>

⁵³ Greek: Νόμος 4093/2012: Έγκριση Μεσοπρόθεσμου Πλαισίου Δημοσιονομικής Στρατηγικής 2013-2016 - Επείγοντα Μέτρα Εφαρμογής του ν. 4046/2012 και του Μεσοπρόθεσμου Πλαισίου Δημοσιονομικής Στρατηγικής 2013-2016. Available at <http://www.forin.gr/articles/article/7488/nomos-4093-2012-egkrish>



all RES installations but it will affect much more wind, small hydro and biomass projects, which have been operating with very low returns.

Apart from the uncertainty of the current Feed-In-Tariff mechanism, there is also **concern over the liquidity of the National Electricity Market Operator (LAGIE)**. The Electricity Market Operator (LAGIE) was established as a public entity under the provisions of Law No. 4001/2011 (known as “Energy Law”)⁵⁴.

The Electricity Market Operator (LAGIE) is responsible for clearing the daily electricity market and for paying the renewable electricity producers on a monthly basis according to their contractual Feed-In-Tariffs and the electricity they have provided to the national electrical system. This is done through a Special Account (Art.40 Law No.2773/ 1999), set up solely for that reason (RES Integration, 2011).

LAGIE presented a deficit from the time it was established and by the end of 2011 it had a deficit of € 195 million⁵⁵. Quickly it became apparent to all major stakeholders that LAGIE would be unable to remunerate the renewable electricity producers. Although the Ministry of Environment, Energy and Climate Change called a stakeholder consultation on the viability of the financing mechanism (YPIEKA, 2012), LAGIE has been paying off renewable electricity producers with a five to six months delay⁵⁶.

The Electricity Market Operator has predicted that its deficit will amount to €340 million at the end of 2012 and €500m at the end of June 2013. Fears that LAGIE would be unable to pay off the Feed-In-Tariffs to the renewable electricity producers led to imposition of the aforementioned retroactive levy on all operating RES projects.

The massive, uncontrolled and front loaded (vis-a-vis the Greek NREAP PV target for 2020) connection of PV plants to the grid has been blamed as a major cause of the instability⁵⁷. Major renewable electricity market stakeholders also point to credible studies (IOVE, NTUA, et al), which show that 60% of the Special Account finances indirectly fossil fuels in Greece. The recession-driven general lack of liquidity has also had a pronounced effect on the ability of the Market Operator to clear the electricity market transactions.

Thus, as long as these problems remain, investments in renewable energy in Greece will continue to be rendered insecure and very risky.

Apart from the aforementioned barriers, the **financing of renewable electricity projects could not be left untouched by the current economic crisis**. Financial institutions have minimized support for renewable electricity projects and especially Greek renewable electricity producers are excluded from loans by Greek and

mesoprothesmou-plaiiou-dhmosionomikhs-strathgikhs-2013-2016-epeigonta-metra-efarmo%C2%ADghs-tou-n-4046-2012-kai-tou-mesoprothesmou-plai%C2%ADsiou-dhmosionomikhs-strathgikh

⁵⁴ Greek: Νόμος 4001/2011, “Για τη λειτουργία Ενεργειακών Αγορών Ηλεκτρισμού και Φυσικού Αερίου, για Έρευνα, Παραγωγή και δίκτυα Μεταφοράς Υδρογονανθράκων και άλλες ρυθμίσεις”. Available at <http://www.ypeka.gr/LinkClick.aspx?fileticket=9rVkiH6aNzE%3D&tabid=506&language=el-GR>

⁵⁵ <http://www.greenbusiness.gr/20411/%CF%83%CF%80%CE%B5%CF%86-%CF%84%CE%BF-%CE%AD%CE%BB%CE%B5%CE%B9%CE%BC%CE%BC%CE%B1-400-%CE%B5%CE%BA%CE%B1%CF%84-%CE%B5%CF%85%CF%81%CF%8E-%CF%84%CE%BF%CF%85-%CE%BB%CE%B1%CE%B3%CE%B7%CE%B5/>

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international financial institutions. Consequently the costs for development and construction will be considerably higher.

In addition, a new draft bill by the Ministry of Environment, Energy and Climate Change foresees that investors are obliged to submit to the appropriate State Authorities expensive letters of guarantee, in order to retain a RES project connection offer and/or to issue a new one. If approved, this regulation in conjunction with the current financial situation can be expected to impede gravely any future investment in renewable electricity in Greece⁵⁸.

Frequent Changes of the Legislative Framework

Frequent changes of the legislative framework, administrative barriers and the bureaucracy involved in the grid connection process have been long standing problems for the development of renewable electricity in Greece.

Changes in the legislative framework can lead to significant delays in the development or even the cancelation of projects and will eventually bring forward the need for redesigning under a new financial and business environment.

It should be noted that this specific problem is caused mainly by the diversified political views that are applied by the Greek Political Parties and consequently by the frequent change of Minister of Environment, Energy and Climate Change. Characteristically, as it was mentioned in the previous chapter, in the past two years there have been three revisions of the Feed-In-Tariff and a number of amendments concerning the licensing procedure.

Most affected by the administrative difficulties are wind energy and small hydro. The administrative procedure for a wind power installation in Greece can take up to 5 years for example (AEON, 2010; Wind Barriers 2010). Nevertheless, it should be noted that this problem has been acknowledged by the authorities and this is why several departments within the Ministry of Environment Energy and Climate Change were merged. In accordance with the RES Spatial Planning law of 2008⁵⁹, the Ministry prioritizes renewable energy projects over other land uses and determines restricted as well as priority areas. These modifications aim to improve the complicated licensing procedure, that includes around 20 different authorities and sub-permits, whereas it used to be around 40 (REPAP 2020, 2011). However there are still some concerns over the acceleration of the licensing procedure by the relevant stakeholders.

The same can be applied to PV installations (PV Legal, 2010) as the amendment of Law No. 3468/2006 facilitated the connection process (RES Integration, 2011). Nevertheless, that facilitation created a “bottleneck” effect as the

⁵⁸ Greek: Σχέδιο νόμου «Ρυθμίσεις θεμάτων Αναανεώσιμων Πηγών Ενέργειας (Α.Π.Ε.) και άλλες διατάξεις». Available at: http://www.opengov.gr/minenv/wp-content/uploads/downloads/2012/12/Rythmiseis-thematon-ape-kai-alles-diataxeis_Draft-07_clean-me-diorthoseis.pdf

⁵⁹ Greek: Απόφαση Αριθμ. 49828, Έγκριση ειδικού πλαισίου χωροταξικού σχεδιασμού και αιεφόρου ανάπτυξης για τις ανανεώσιμες πηγές ενέργειας και της στρατηγικής Μελέτης περιβαλλοντικών επιπτώσεων αυτού. Available at <http://www.ypeka.gr/LinkClick.aspx?fileticket=zKMNsDrZKko%3D&tabid=513>



regional and national authorities did not have the capacity to evaluate such a large number of applications (RES Integration, 2011).

Apart from that, it should be underlined, that due to the fact that many national and (mainly) regional authorities are involved in the licensing process, some of them lacking not only the necessary capacity but also environmental awareness. In addition, due to the frequent changes of the legislative framework, regional and national authorities are not able to interpret the new legislation adequately⁶⁰. Consequently, licensing procedures delays and applications are not examined at all. This of course leads to the cancelation of projects and will finally bring forward the need for redesigning under a new financial and business environment.

Infrastructure Development

Another persistent obstacle for the development of renewable electricity is grid development, or more generally the **lack of infrastructure development**.

There exist many areas in the Greek territory that are currently unable to exploit mainly their wind potential. Characteristically, the Aegean islands, dispersed on the Aegean Sea, are not interconnected to the central continental grid. Apart from that, there are also other areas where grid development works are needed but they are not realised. As a consequence, those areas are characterised as congested and no further renewable energy plants can be connected to the grid (AEON, 2010). Furthermore there is the fear amongst investors that once a license is granted, no grid access will remain.

Although there is a Study for the development of Greek Transmission Grid 2010-2014 (MASM)⁶¹, which includes all the necessary grid development works until 2014 (RES Legal Europe, 2012), it is argued that the lack of infrastructure development is caused by the insufficient progress of unbundling in Greece (Law No. 4001/2011) which delayed investments in interconnections and further grid development projects. In addition due to the financial situation and the morphology of the country, it is difficult to carry out such large investments.

An example that confirms the aforementioned argument is the tender for the interconnection of a group of Aegean Islands to the continental electricity grid, a project that is also co-financed by the European Union⁶². There were at first two bids by two joint ventures. Even though one bid was firstly accepted, the tender was annulled as budgetary differences emerged and it is expected to open again at the beginning of 2013⁶³.

⁶⁰ This is why it was proposed that only a legal instance i.e. the General Secretariat for Energy of the Ministry of Energy and Climate Change should be the sole responsible for interpreting RES related legislation so as to ensure that laws are implemented uniformly (Papastamatiou, 2012).

⁶¹ Greek: Μελέτη Ανάπτυξης Συστήματος Μεταφοράς 2010-2012 (ΜΑΣΜ). Available at http://www.admie.gr/fileadmin/user_upload/Files/masm/masm_2010-2014-RAE.pdf

⁶² Greek: Διασύνδεση των Κυκλάδων με το Ηπειρωτικό Διασυνδεδεμένο Σύστημα Υψηλής Τάσης (ΥΤ). Available at <http://www.espa.gr/el/pages/ProclamationsFS.aspx?item=1829>

⁶³ Greek: Άγονος ο διαγωνισμός για τη διασύνδεσης των Κυκλάδων. Available at <http://www.capital.gr/Articles.asp?id=1669741>



Awareness Raising

Lack of knowledge on green energy and environmental awareness, diversified policy and attitude on RES which originates from the different political disciplines and local community disputes can be seen as the main causes of that barrier for the development of renewable electricity.

There are for example a significant number of appeals for the annulment of renewable electricity licenses to the State Council mainly for wind parks. As a consequence, many projects are cancelled or delayed. The negative stance of local communities should not be underestimated as in some cases it has created a long standing negative attitude towards renewable electricity. This is the case for geothermal energy in Greece. Milos, an island on the Aegean Sea, is one of few areas in Greece with a significant exploitable geothermic potential for power production. The Public Power Corporation initiated the process of installing a geothermal electricity station. However, due to careless handling and to local interest conflicts, the local community formed a very negative attitude towards geothermal energy and every time the project reinitiates the local community is opposed to it.

It should be noted that the negative attitude towards renewable energy is not only limited to the local communities but also to the public sector, namely the local and regional authorities engaged in the licensing procedure. It is important at first to convince and inform those stakeholders about the positive effects of renewable energy before engaging in awareness raising activities for the local communities.



The Greek RES-H Sector

Support scheme

RES heating and cooling sector is supported by a tax relief, a number of national programmes and the new investment law (RES LEGAL Europe, 2012⁶⁴).

Tax relief is granted for the installation of renewable boilers or the replacement of existing fossil heating boilers with renewable ones. The Programme “Exoikonomisi kat’oikon” supports measures to increase the energy performance of residential buildings through the provision of interest-free loans and subsidies for the installation of RES-E and RES-H systems and energy-saving measures. Apart from that, the new investment law (Law No. 3908/2011) supports the installation of RES- H plants (RES LEGAL Europe, 2012⁶⁵).

Although Law No. 3908/2011 (Investment Law) states explicitly that PV projects are not eligible for capital subsidies or tax relief support, such support may be provided to other RES projects, especially under the provisions of Art. 6 (General Investment Plans). Art. 6 distinguishes three types of General Investment Plans: General Entrepreneurship, Technological Development and Regional Convergence plans. RES projects are eligible if they come under one of the three categories mentioned above (RES LEGAL Europe, 2012⁶⁶).

Barriers to RES-H

Unstable Financial and Economic Development

As it was mentioned in the previous chapter, **financial institutions have minimized support for renewable projects** in Greece. Such projects have serious difficulties in securing loans from Greek and international financial institutions. This is expected to have a severe effect on the development of RES-H projects in Greece, all the more so as the specific sector is less developed in comparison to the renewable electricity one.

Unclear Support Framework

The existing support schemes for RES-H, mainly the Investment Law, lack in clarity concerning relevant eligible expenditures.

The Programme “Exoikonomo kat’ oikon” can be seen as an exception but it is limited to residential buildings and aims primarily at improving energy efficiency. In this context the poor performance concerning the exemplary role of public buildings (REPAP 2020, 2011) undermines the success of such programmes, as public authorities lack the environmental awareness to implement the obligation stated by the Law No 3661/ 2008⁶⁷.

⁶⁴ <http://www.res-legal.eu/search-by-country/greece/>

⁶⁵ Ibid.

⁶⁶ Ibid.

⁶⁷ Greek: Νόμος 3661/2008, Μέτρα για τη μείωση της ενεργειακής κατανάλωσης των κτιρίων και άλλες διατάξεις. Available at <http://www.ypeka.gr/LinkClick.aspx?fileticket=yJy1TVyRqoo%3d&tabid-338&language-el-GR>



The Greek RES-T Sector

Support scheme

Greece is using a quota system for biofuels. Law No. 3054/2002 obliges producers and distributors of petrol and diesel to blend their fuels with a certain amount ("quota") of biofuels. The mandatory quota is set by ministerial resolution and is reviewed every year (RES LEGAL Europe, 2012).

Barriers to the transport sector

Unstable Financial and Economic Development

Here again, the **limited support of financial institutions for renewable projects** and especially the exclusion of Greek investors from loans by Greek and international financial institutions is one of the main problems for the development of RES T in Greece. It is to be noted that with the exception of the development of biodiesel plants, no other aspect of the RES-T sector has been included in recent energy planning at the national level.



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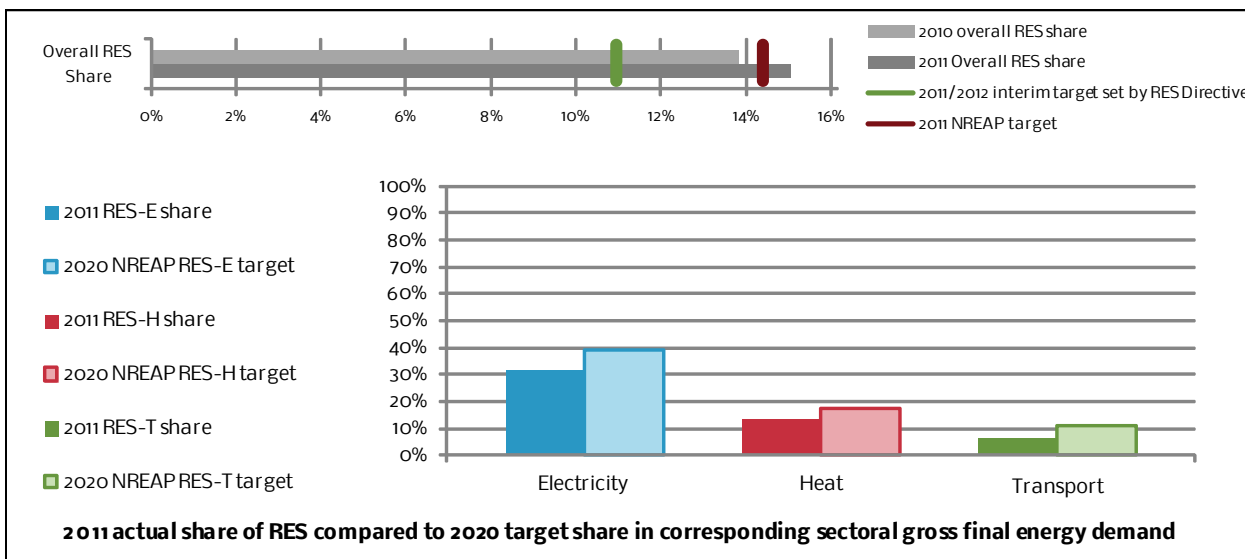
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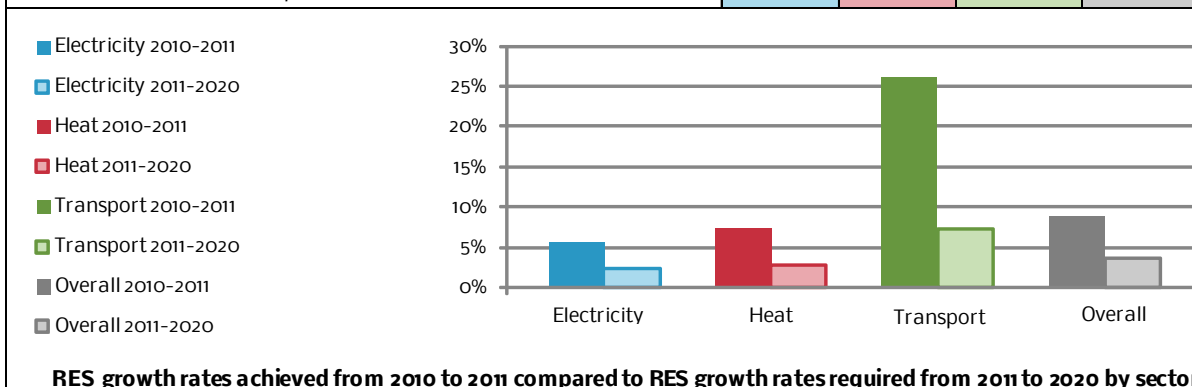


F. SPAIN

1. NATIONAL DEVIATIONS REPORT



	Electricity	Heat	Transport	Total
2011 actual share of RES in sectoral gross final energy demand	31.5%	13.5%	5.9%	15.1%
2011 NREAP target	31.0%	11.3%	7.1%	14.4%
2011/2012 interim target set by RES Directive	-	-	-	11.0%
2020 NREAP target	39.0%	17.3%	11.3%	20.8%
Percentage of sector consumption in total final energy consumption in 2011	27%	33%	40%	100%
2011 Production [ktoe]	7,674	4,053	1,767	13,493
2010 Production [ktoe]	7,422	3,904	1,477	12,804
2005 Production [ktoe]	3,634	3,533	0	7,167
2020 NREAP target production [ktoe]	12,455	5,357	3,216	20,525
Deviation [%] of actual from planned share in 2011	1.61%	19.59%	-16.33%	4.63%



- Spain has complied with its 2011/2012 interim target and the 2011 NREAP target. Spain's revised NREAP published in 2011 sets the 2020 overall target share at 20.8%, lower than the original NREAP's target of 22.7%, but still higher than the binding minimum of 20% set in the Directive.
- Compared to the prior 6-year average, growth between 2010 and 2011 slowed down in the electricity sector.
- 2010-2011 growth rates are more than twice what would be necessary to achieve the 2020 target if they were to be maintained.



2. NATIONAL BARRIERS REPORT

The Spanish RES-E Sector

Support scheme

In Spain, plant operators may choose between two options: a guaranteed feed-in tariff and a guaranteed bonus (premium) paid on top of the electricity price achieved on the wholesale market. The feed-in tariff and premium tariff are however currently suspended through Royal Decree Law (RDL) 1/2012, i.e. no new installation can access the scheme. The reason for this suspension is traced in the preamble of RDL 1/2012. Royal Decree (RD) 6/2009 established that by 2013 a part of the consumers' electricity bill (the grid access fees, "peajes the acceso") should be able to fully balance the costs incurred by the State arising from the support scheme. (RES LEGAL Europe Database)

It is deemed, however, that the present situation will not allow this goal to be reached by 2013 and there will be a **tariff deficit**. (RES LEGAL Europe Database; Bechberger, APPA) The tariff deficit is the accumulated difference between the cost of generating, distributing and supplying electricity for regulated markets (also including costs for access tariffs and other commercial costs) and the tariffs for those markets fixed by the government since 2000 (and which during 2002-2006 were not allowed to be increased by more than 2% annually - later tariff increases were also insufficient to cover the overall electricity market costs). Latest figures for the tariff deficit amount to € 30 billion, although around 6 billion € already have been amortized through the emission of bonds which have been refinanced already through corresponding surcharges/fees in the electricity tariffs paid by the final costumers. (Bechberger, APPA).

For this reason, together with the high growth of RES-E in the past years thanks to a successful RES-E promotion scheme, a strong overcapacity in the electricity market (mainly because of an uncontrolled growth of gas-fired combined cycle plants of which some 27 GW of new capacity - around a quarter of the total installed capacity in the Spanish power market, went into operation during the last 10 years, see also below) and due a decrease of electricity demand to 2006 levels thereby increasing the overcapacities existing in the Spanish electricity market., all support schemes for RES-E were suspended by RDL 1/2012 (RES LEGAL Europe Database).

Barriers to RES-E

Support scheme environment

Stakeholders reported that tariff deficit is the most severe underlying problem for RES-E in Spain. Most of the barriers mentioned in this section are a direct consequence of this problem.

On Friday 27th of January 2012, through RDL 1/2012 Spain's Council of Ministers approved a Royal Decree-Law enacting a **suspension of the incentive scheme** for all kind of renewable energy sources and waste. One stakeholder reported this decision may also be linked to political factors, namely an energy perspective that does not support RES (García Brea, Fundaciòn Energías Renovables). This decision did not affect facilities already in



operation. Officially, the reason for the elimination of this support scheme was the elimination of the tariff deficit. Stakeholders noted, however, that the share of RES-E costs in the overall costs of the Spanish electricity system only reached 12.6% in 2011, lower in comparison to other cost components of the overall electricity system costs, with a much higher percentage like energy costs with 41.3%, other regulated costs with 25.7% (like costs for the transport and distribution of electricity, extra-costs for the electricity systems of the Spanish Islands (and Northern African exclaves), costs for the concept of "interruptibility" - meaning a premium paid to conventional power producers in times when they must curtail their production due to high RES production and low demand, costs of the electricity debt, costs of the TSO (REE), of the market operator (OMEL), the energy regulator (CNE), the nuclear moratorium, etc.) or taxes with 15.9%. The suspension of RES-E support is clearly discouraging investment in the sector and will increase difficulties in achieving Spain's national target under the Europe 2020 energy and climate goals. The European Commission criticised the situation in these terms in a Communication on Spain's 2012 national reform programme (SWD(2012) 310 final). Stakeholders further reported that according to the latest sectoral estimations the RES-E moratorium has destructive employment effects, with a risk of destroying up to 36,800 jobs, besides several thousand jobs already lost as a direct consequence of former retroactive measures, mainly against existing PV installations, established since 2010. Further estimations include an economic impact of an 18 billion € of investments lost. Several law suits have been undertaken against the RES-E moratorium, arguing that the moratorium contains a clear discrimination between different energy sources and it is therefore incompatible with Directive 28/2009/EC. Unfortunately in this case the choice of a Royal Decree makes any access to jurisdiction very difficult because there is not an administrative act to appeal and, at the same time, the Spanish Supreme Court (SSC) is denying to open a preliminary ruling before the European Court of Justice. According to stakeholders, this can be considered to be a clear infringement of article 24 of the Spanish Constitution and thus several law firms will lead this issue before the SSC. (Bechberger, APPA)

In late 2010, through 3 legislative pieces, established between 19 November 2010 and 23 of December, **retroactive cuts of remuneration for PV, wind and CSP electricity** have been introduced. These include a change of the bonus-malus system for retroactive power, a reduction of remuneration period to 30 years in the case of PV, an annual limitation of production hours for wind, CSP and PV installations, a reduction of wind premiums by 35% for 2011/2012, and severe PV tariff cuts of up to 45% (as introduced by RD 1565/2010). Being retroactive, these measures caused not only a strong loss of confidence in the legal security of the Spanish RES-E promotion regime, but also resulted in numerous lawsuits at national, European and international level: affected investors claimed for respecting their legitimate expectations regarding their investments in the Spanish RES-E sector. Furthermore, the retroactive measures resulted in thousands of projects going bankrupt. Several law suits have been undertaken against the described retroactive legal package. (Bechberger, APPA)

Further in this context, it has been reported that **a net-metering scheme for RES-E self-consumption is currently missing**. (Bechberger, APPA; García Brea, Fundaciòn Energías Renovables) Stakeholders indicate that this is mainly due to a delay/hesitance of the Spanish government to finally approve a net-metering/balance



scheme for RES-E installations destined for self consumption, whose introduction is of special importance for the development of small wind energy and photovoltaic installations. The former Spanish Government presented a first draft of such a net-metering scheme in November 2011. A few days later, however, a change in Government took place and no other steps have been taken forward to implement a net-metering scheme. The lack of a timely and attractive enough net-metering scheme leaves untapped the huge potential of own consumption of clean electricity in Spain, which - due to the above-mentioned other existing barriers - is of crucial importance mainly for the continuity/survival of the Spanish PV sector. According to sector figures, an ambitious net-metering scheme in Spain could lead to nearly 1.5 GW of PV capacity until 2016, with an aggregated investment of 2.8 billion €, 10,900 direct jobs created, direct fiscal returns to the state budget of 555 million € and 122 million of € of avoided fossil fuel imports. (Bechberger, APPA)

A **lack of a specific, stable and sufficient remuneration system** has also been outlined for marine energy, small wind energy and a new incentive scheme will be needed for wind and CSP from 2013 onwards (Bechberger, APPA).

Overcapacity and grid-related issues

Experts indicated that **overcapacity** in the Spanish electricity market is an overarching barrier which has similar consequences for future RES-E installations as the ones linked to the tariff deficit. Overcapacity has existed for several years, but has clearly aggravated with the decrease in electricity consumption due to the current economic crisis and to the increase of conventional power capacity (+ 27 GW combined cycle gas plants, CCG, during the last 10 years). Whereas at the beginning CCG could be understood as a smart back-up strategy for the increasing wind capacity in Spain, apparently this investment strategy was not combined/accompanied by a realistic scenario analysis for future electricity consumption development (Bechberger, Appa; García Brea, Fundaciòn Energías Renovables). Not only was a decrease in consumption not expected, but on the contrary a high annual load factor of CCG plants of 5,000 - 6,000 operating hours was used to calculate each business case. As these plants currently only run with 1,000 - 2,000 hours per year, but their owners must pay for the ordered natural gas anyway due to the fact that the gas supply is based on "take or pay" contracts, large amounts of money are being lost. This fact has put a lot of pressure on the Spanish Government from the side of the gas industry to slow down (or even stop) the further growth of RES-E installations, as those dispose of priority access and of a purchase guarantee for their RES electricity produced. An additional problem is the fact that the Spanish Government in 2010 introduced the obligation to use domestic coal, which even aggravated the problem for the CCG plant owners. (Bechberger, APPA)

In terms of **interconnections**, Spain is an energy island. The low level of interconnection capacities between Spain and mainly France - Spain's access to the European transmission grid - are caused mainly by the strong delay to construct new lines due to financing problems or disputes between the involved national governments as well as local opposition, both based on NIMBY phenomena and nature / landscape protection issues (Bechberger, APPA) It should be pointed out that, although a goal of a 10% interconnection capacity with France was



established, such strong problems impeded its achievement (García Brevia, Fundació Energías Renovables). The missing interconnection capacities and in parallel the strong increase of wind power production capacities has led to an increasing number of curtailment of wind power. This has not only negative environmental consequences, as the curtailed electricity might be substituted by fossil energy sources, but also leads to financial losses of the wind plant owners for the reduced wind power production remuneration (which, unlike in Germany, in Spain does not lead to a financial compensation by the grid owners who prescribed the curtailment). Although after decades of delay a new transmission line (440 kV) between Bescansó in the Catalan Pyrenees and Baixas (France) is currently under construction, its coming into operation is not foreseen before the end of 2014. Once operational, it will double the existing interconnection capacity between Spain and France from 1,400 MW to 2,800 MW. (Bechberger, APPA)

At distribution level, **connection costs** have proved to be one of the main barriers, even to the point that they may discourage RES-E investments, as investors would need to pay for their connection line and for the grid reinforcement needed to transport their generated electricity (though there may be cases in which grid reinforcement costs shares are negotiated between investors and DSO, in case the reinforcement could be beneficial to the DSO independently from the new plant). From a DSO point of view, the issue of high connection costs arises mainly in areas with good natural resources but insufficient distribution grid hosting capacity or electricity demand (RES Integration). Delays in grid connection are also often associated to the **technical requirements** established by the Spanish grid codes (P.O.). The technical solutions required in Spain, though available on the market, appear to be quite country-specific and foreign investors may be unfamiliar with them. It should be recognised, though, that the high RES-E penetration and the low interconnection with the neighbouring countries, the Spanish requirements need to be quite demanding in order to guarantee security of supply. (RES Integration)

Further, the lack of **proper incentives to coordinate distribution grid development and RES-E integration** should be signalled in this context. DSOs have to periodically deliver to the National Energy Commission a forecast of all the Distributed Generation (DG) to be connected in a five-year horizon. The CNE will then consider these forecasts in its annual updates of the DSO activity remuneration, incorporating all the additional operation and management (O&M) costs that the DSO will consequently have to face. Costs related to the realisation and operation of the connection facilities will not be considered. Real Decreto Ley (RDL) 14/2010 has recently established a network usage fee of 0.5 €/MWh for all RES-E generators. However, this tariff, being equal for all generators, does not constitute an incentive to localise distributed generation in areas where the grid infrastructure would most benefit of it and where grid expansion costs could be minimised. The National Energy Commission, however, indicated that this fee would only be the first tile of a more structured support scheme, which would also include grid development and reinforcement issues. (RES Integration)

Administrative procedures and long waiting times



Administrative and permitting procedures are deemed very complex in Spain. The barrier is caused mainly by the fact that competences for the permission & connection of RES-E plants are highly dispersed between the State, regional (autonomous communities) and local/municipal level. (Bechberger, APPA) According to the Windbarriers project, grid connection lead-times are estimated at 34 weeks, with differences at regional level with lower and upper limits of 3 and 120 weeks. Most of this time is imputable to the administrative processes, and to the varying attitudes and resources put in place by the Spanish Regional Administrations. (RES Integration)

According to the EU project “PV Legal”, Spain is the country (out of 12 EU Member States monitored within the PV-Legal project) with the longest waiting periods (160 weeks on average) related to receiving a reply from all the administrations bodies involved in the permitting procedures. In the case of wind energy, up to 25 different permits may be needed from regional and national authorities. Regarding small hydro power plants, six years would be required on average to obtain the permits for construction and operation, and there are numerous requests for hydropower concessions pending for longer time, even reaching 20 years, resulting mainly from the lack of coordination between the different authorities responsible for the permit procedures. (Bechberger, APPA) The motivation of these delays is often attributed by PV developers to the difficulty of dialogue with the DSOs, the variability of norms and requirements across the country and the understaffing of DSOs that makes them unable to make up with the workload imposed by RES-E growth (PV LEGAL). In November 2011, through Royal Decree 1699/2011 of 18 November, the Spanish Government, at least simplified part of the permit procedures for small installations. Nevertheless, since only shortly after this regulation a complete RES-E moratorium was established, it is still too early to prove possible positive effects related to it. Additional measures could be a simplification of permit procedures also for bigger RES-E plants as well as a one-stop shop approach and the principle of administrative silence for all RES-E installations. (Bechberger, APPA)

Very long permit and construction periods have been outlined also for the realization of (small) hydropower projects. It takes 6-10 years in average to obtain the permits for construction and operation, and there are numerous requests for hydropower concessions pending for longer time, even reaching 20 years, resulting mainly from the lack of coordination between the different authorities responsible for the permit procedures. (Bechberger, APPA)

Fiscal aspects

On 14th of September 2012 the Spanish Government presented a draft Law on fiscal measures in the electricity sector, expected to come into force at the beginning of 2013. Amongst others, the new law foresees a new tax on the sale of electricity with a flat rate of 7% for all kind of technologies, both conventional and renewable. The tax applies not only to new installations but also to all existing ones, thereby being again a retroactive measure. Main causes for the planned fiscal law are the necessity to find new financing mechanisms for the tariff deficit by means of fiscal measures, independently of the electricity generation technology. According to stakeholders, the coming into force of the new fiscal law would lead to a clear violation of several obligations under EU law. Firstly,



it would further endanger the achievement of the binding renewable energy target imposed on Spain by Directive 2009/28/EC. Secondly, it would violate legitimate expectations of the producers of renewable energy in Spain which could benefit from protection under the principle of legal certainty as recognized in EU law (given the retroactive aspect of the tax). Thirdly, it would go against EU renewable energy law and policies and in particular against the idea that renewables should not be discriminated when compared to conventional energy sources (due to the fact that conventional power generators could simply pass this new tax to the electricity end consumers, while the majority of RES-E producers being remunerated with fixed tariffs could not do so). Besides, the ruling conservative party, Partido Popular (PP), approved an amendment to the draft law in the High Chamber of the Spanish Parliament (Senado) that introduces the financing of the RES-E remuneration through the state budget. As this ruling was also finally approved on 20th of December 2012 in the Low Parliamentary Chamber (Congreso) and thereby became definitive, this not only signifies state aid which have to be notified to the European Commission (with all this would imply, mainly lengthy notification procedures and an increase legal insecurity until a respective final decision by the EC) but mainly will lead to an even stronger increase of investment and legal insecurity as the financing of RES-E will depend on the yearly amount(s) earmarked within the State Budget for this purpose, possibly strongly fluctuating/changing according to the overall budget situation, in times of economic and financial crisis be ruled by (strict) austerity requirements. (Bechberger, APPA)

Furthermore, in recent years the effective **tax burden** on wind farms over other renewable energy facilities has increased substantially, for two main reasons related to special taxes on wind farms at municipal level: an increase of the taxable amount of the Tax on Construction, Installations and Repairs (ICIO), an inclusion of wind farms in the Property Tax of Special Characteristics (BICES). Moreover, in some regions the extra-fiscal pressure on wind farms has increased considerably by imposing additional fees on wind farms. The mentioned additional wind farm fees and municipal taxes for wind projects in Spain clearly reduce the attractiveness of regions / municipalities which apply these extra tax measures. Although they might achieve more tax revenue in the short term, they thereby remove the possibility of attracting wealth and employment based on wind investments in the future. In general, a lot of wind projects confronted with these extra taxes lose too much profitability to remain viable. What is needed is a greater coherence and consistency between the central and local fiscal regulations. (Bechberger, APPA)



The Spanish RES-H Sector

Support scheme

A tax reduction mechanism is in place for solar thermal installations and some other subsidies are available, depending on the technology (RES LEGAL Europe Database).

Barriers to RES-H

Support schemes

Presently, some support schemes are in place, however a more comprehensive instrument is still lacking, and the existing remuneration levels are deemed to be low (REPAP). There may also be some political aspects to the current situation. For example, Directive 2002/91/EC on the energy performance of buildings has still not been transposed in the Spanish legislation (García Brea, Fundaciòn Energías Renovables).

The **few existing subsidies for low enthalpy geothermal facilities** are in fact reinterpreted subsidies that had been established for other renewable technologies and in consequence are not particularized for geothermal energy. The administrative procedures and permits required for obtaining the grant does not take into account the long installation works of geothermal plants, so that the short documentation deadlines make it almost impossible to access the subsidies. The possibility of not accessing such subsidies creates legal uncertainty both with respect to the promoter and the user and discourages the implementation of new facilities. (Bechberger, APPA)

Beside the fact that only a **few support programs for solar thermal energy** (STE) are left in Spain, those still existing are normally affected by the following shortcomings:

- Most application for grants can be submitted only in a short period of time once a year (often only 4 weeks) and the submission dates differ in each region
- Reference costs (for STE plants) and level of assistance are different in each region
- The volume of aid relies on available annual budgets
- Different criteria to allocate funds
- Little or no diffusion by the Autonomous Communities
- Limitations by de minimis ceiling regarding the aid available in some regions, which prevents carrying more than 2 solar thermal installations

A proper **support mechanism for biomass heat** is also currently unavailable. Despite the fact that a biomass heat plant in Spain results profitable in the mid/long-term, the initial investment costs of this types of RES heat installations are high and there is only relatively poor (financial) support existing. The main effect of this barrier is that biomass heat in Spain until now remains strong behind its potential. (Bechberger, APPA) Recommendations brought forward by stakeholders to overcome this issue included



- Promoting of the installation of biomass heating networks;
- Investment subsidy of 30% on equipment for domestic use of biomass;
- Development of standards and regulations for thermal biomass installations in buildings;
- Direct support for the installation of biomass heat installations in new buildings, public facilities, residential buildings, rural housing, residential, industrial or business premises.

As to the shortcomings described above regarding the existing support programs for RES-H before, the new RES Plan 2011-2020, adopted in November 2011, included a recommendation of implementing a production based support instruments for RES-H installations, called **ICAREN (RES Heat Incentive)**. ICAREN was thought to be applied to projects developed by Energy Service Companies (ESCOs), which would receive a premium per unit of energy sold (invoiced) to the final consumer. Although the aid would have been non-cumulative with investment grants and limited to a certain number of projects (with annual quotas according to the different RES-H technologies), it would have been the first time that an operation-based support instrument for RES-H would be introduced in Spain. As a government change took place in Spain at the end of 2011, however, no concrete steps have been taken and stakeholders report that the new government does not seem interested to introduce ICAREN anymore. This hesitance is maintaining the Spanish RES-H sector in general and the solar thermal sector in particular in a quite desperate situation, without functioning or sufficiently attractive support to be able to fulfil the fixed technology targets for 2020 (Bechberger, APPA).

Lack of demand

A lack of sufficient demand has been outlined for several sources. Multiple causes have been brought forward with respect to this issue.

As for **biomass**, it appears difficult to ensure a steady and guaranteed biomass supply to biomass plants despite its large availability in Spain. Reasons for this differ depending on the source (Bechberger, APPA):

- Forest biomass:
 - Unclear regulation for forest biomass (except for waste and crops)
 - Existence, in some cases, of alternative uses.
- No biomass pre-treatment to reach (sufficient) resource adequacy
- Woody and herbaceous agricultural waste:
- Availability of resource quantity, quality and price.
- Dispersion and small scale of the farms generating the biomass resource.
- No biomass pre-treatment to reach (sufficient) resource adequacy
- Energy crops:
- Need for a legislative framework and aids.
- High costs that compromise the profitability of their cultivation.



As for **geothermal energy**, there is a general lack of knowledge regarding the technology both from the side of the professional agents and the users, as well as concerning financial institutions. In particular, there is no demand for such facilities because the technology is not known, being a relatively new one. In addition, the geothermal energy sector currently appears as a residual market for manufacturers of heat pumps. (Bechberger, APPA)

In addition **the economic downturn has also reduced demand for solar thermal installations**. The severe economic and financial crisis in Spain directly affected the Spanish housing sector: The number of new buildings annually constructed dropped from 615,000 in 2008 to just around 150,000 in 2011. This also reduced the number of new solar thermal installations accordingly: the amount dropped by 14% between 2009 and 2010 and by another 21% in 2011 in comparison to 2010. With the expected continuation of this tendency in the coming years, the installation target for solar thermal according to the Spanish NREAP and National Energy Plan (10 million m² of solar collector surface installed until 2020) will surely be failed. A possible solution would be the swift adoption of a support scheme for RES-H like ICAREN or similar and the adaptation of the existing Spanish Technical Building Code (CTE) to the new situation, not only by applying more ambitious and binding installations targets, but also by widening its scope/area of application also on existing buildings (Bechberger, APPA).

Regulatory framework

Further, with respect to the current **Spanish Technical Building Code (CTE)**, it appears that there is a lack of control of compliance with the minimum standards / obligations regarding the use of solar thermal installations as established in the CTE, paired with some alleged cases of unclear exceptions regarding the reduction of the minimum usage of STE installations as stipulated in the CTE. In particular, it was pointed out that the lack of controls on the STE installations is quite strong, and that because of this, the percentage of inactive installations on buildings may be reaching 50% (García Breva, Fundación Energías Renovables)

Other issues include:

- Lack of specific and qualitative formation/training of designers and installers of STE facilities
- Lack of obligation to install STE meters, to allow direct control of the installations by users
- Lack of control regarding the certification of the STE installation
- High costs of legalisation/certification of the installations

These issues may lead to a slow progress regarding the installation of STE facilities in new buildings. Furthermore, these issues may result in a considerable number of new dwellings with STE installations of poor quality or not-complying with some of the standards set by the RTE which clearly affects negatively the confidence of users in STE technologies. Stakeholders indicated that a modification to the existing CTE may be advisable in this case, possibly providing that all new buildings and up to 20% of the existing buildings should produce the energy they consume with renewable energies. Furthermore, stricter and more efficient control mechanisms regarding the compliance with the standards / criteria it establishes should be considered. (Bechberger, APPA)



The Spanish RES-T Sector

Support scheme

The support measures in the transport sector for renewable energies consist of an obligatory share of renewables in transport fuels and of a tax exemption of renewable energies. (RES LEGAL Europe Database) According to the 2020 targets, Spain is to reach a 13.6% share for the transport sector, and a target of 5.83% for biofuels and other renewable fuels for transport is set for 2010. Within this context, the CNE has been designated as the body responsible for the issue of biofuel certificates, management of the certification and supervision mechanism and control of the mandatory commercialization of biofuels. The tax exemption, defined in Law 22/2005, establishes a zero tax rate for biofuels in order to improve their market position compared to fossil fuels. The scheme will remain in effect until 31st December 2012, when it will be revised. (RES LEGAL) As regards the renewable transport infrastructure, it is improving and some technical barriers have been removed. However, studies indicate that there are still some concerns of how Spain will achieve its RES transport target (mainly due to the dubious position of the major oil companies) (REPAP).

Barriers to the transport sector

Support schemes

The **tax incentive for biofuels** established in Spain to compensate the higher production costs of biofuels finalizes on 31st December 2012. After that date the hydrocarbon tax for biofuels will be as for the corresponding fossil fuel. As a consequence, the price of the fuels containing biofuels will increase, especially for those with higher biofuel blends (B30, B100, E85). Therefore the consumption of these higher blends, which are considered better from an environmental and energy strategic perspective, will disappear. A suggested solution to avoid this, would be to modify articles 49.2 and 50.1 of Law 38/1992 of 28 December on excise duty to maintain the tax incentive at least for the biofuel contained in the higher blends (i.e. those that have to be labelled due to a higher content of biodiesel or bioethanol than the established in the corresponding fuel standards for diesel fuel and petrol). (Bechberger, APPA)

Biofuels in higher blends (B10, B30, B100, E 85) also suffer from a **lack of a specific incentive scheme**, causing a great barrier to their commercialization and consumption. As consequence, the consumption of these products in Spain is negligible.

This barrier could be avoided with proper regulation on the following:

- Increasing obligation of commercialization of higher blends of biofuels in services stations.
- Creation of national technical specifications for some of these products (B10, B30, E85).
- Establishment of obligation to the vehicle manufacturers to guarantee their vehicles for the higher blends of biofuels.
- Establishment of tax incentives to purchase vehicles guaranteed for higher blends of biofuels.



- Obligation to adapt all the logistic facilities to be able to store and blend biodiesel with diesel fuel and bioethanol with petrol.

Issues linked to the transposition of the Fuel Quality Directive (2009/30/EC)

Bioethanol blending restrictions due to the protection grade petrol

The petrol quality in Spain follows European standard EN 228. However, an additional restriction has been established: the obligation that all petrol stations should offer “protection grade petrol” with max. bioethanol 5% (V/V) and max. oxygen 2,7% (m/m), which has to be the lower octane index petrol (95 OI). The protection grade petrol restriction is established by the second transitional provision of the Spanish Royal Decree 1088/2010, 3rd September, that partially transposes the Fuel Quality Directive (FQD). In practice this obligation undermines the development of E10 petrol with max. bioethanol 10% (V/V) and max. oxygen 3,7% (m/m) and its consumption. As around 90% of the petrol consumed in Spain is 95 OI, the restriction that all petrol stations should deliver at least the protection grade petrol with this OI forces 95 OI petrol with higher bioethanol or oxygen content out of the market and halts thus the consumption of E10. A suggested solution would be to amend the current regulation to allow the introduction of the E10 in the Spanish market. This could be achieved by eliminating the obligation that this petrol has to be the lower OI and that it has to be present on each petrol station. (Bechberger, APPA)

Lack of waiver in the petrol vapour pressure

The Fuel Quality Directive establishes that only Member States with the permission of the Commission are allowed to place on the market, during the summer period, ethanol with a maximum vapour pressure of 60 kPa and a higher vapour pressure on condition that the ethanol used is a biofuel. Member States that wish to obtain this permission as regards the increased vapour pressure, shall apply for a waiver to the European Commission. In May 2010 Spain notified the EC the will to make use of this provision, but the EC rejected the application due to the lack of compliance with community legislation on air quality. Currently, emission data show a compliance with this legislation, and therefore Spain could apply again for the waiver in the petrol vapour pressure. Stakeholders reported that currently the lack of authorisation by the EC to apply for this waiver has the consequence of blocking direct blends of petrol with bioethanol in the summer period in Spain, leading to a decrease in bioethanol consumption. The Ministry of Industry, Energy and Tourism is experiencing delays in requesting a new waiver to the Commission and consequently direct blend of petrol with bioethanol does not take place during the summer period. Only blends of petrol with bio-ETBE can be consumed, allowing a lower overall consumption of biofuels in petrol (Bechberger, APPA).



Other barriers

Lack of regulation on double counting of biofuels

The Renewable Energy Directive (RED) establishes that for the purposes of demonstrating compliance with national renewable energy obligations placed on operators and the target for the use of energy from renewable sources in all forms of transport, the contribution made by biofuels produced from wastes, residues, non-food cellulosic material, and ligno-cellulosic material shall be considered to be twice that made by other biofuels. Although this provision of the RED has been transposed into the Spanish legislation, it has not been implemented in practice and therefore the consumption of this kind of biofuels is not been incentivized in Spain as expected by the Community legislation, preventing therefore the increase of their consumption. (Bechberger, APPA)

Disloyal commercial practices applied by Argentina and Indonesia

The Differential Export Tax policies applied by Argentina and Indonesia provide their domestic industries of biodiesel with a substantial and unfair advantage in relation to their competitors abroad. As a consequence, massive imports of biodiesel originating in Argentina and Indonesia are flooding the Spanish market, negatively affecting the Spanish biodiesel industry. In August 2012 the EC initiated an anti-dumping procedure concerning imports of biodiesel originating in Argentina and Indonesia and is currently analysing the possibility to initiate also an anti-subsidy procedure. The Spanish Ministry of Industry, Energy and Tourism published a Ministerial Order to prevent these disloyal practices in April 2012, however this has not yet had an effect due to the lack of the finalisation of the procedure. The Spanish biodiesel industry is thus facing difficulties as a result of the import wave from these two countries. 82% of the biodiesel consumption in Spain during the first nine months of 2012 was covered with imports from Argentina and Indonesia. Intervention at European level would be needed to limit such practices. (Bechberger, APPA)



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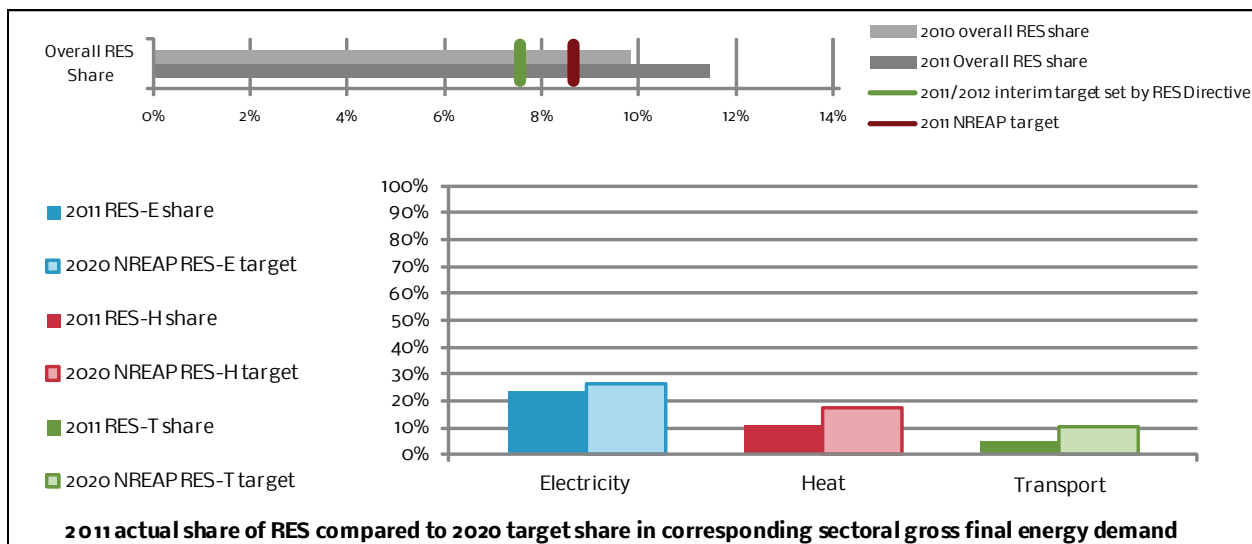
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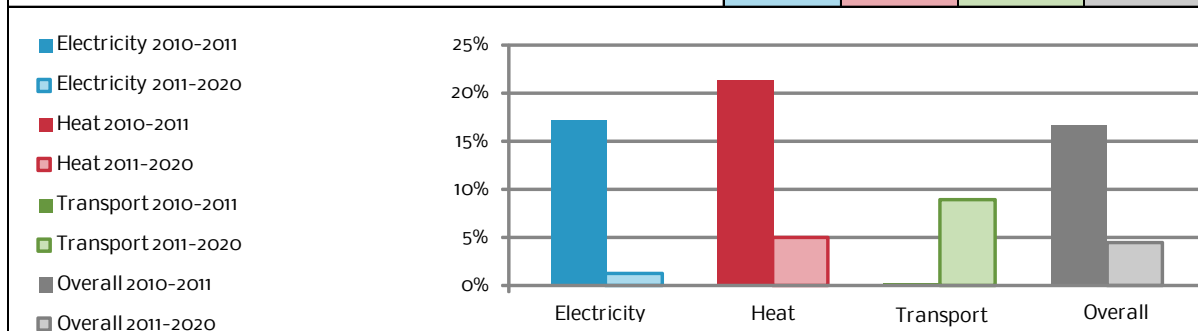


G. ITALY

1. NATIONAL DEVIATIONS REPORT



	Electricity	Heat	Transport	Total
2011 actual share of RES in sectoral gross final energy demand	23.5%	11.0%	4.7%	11.5%
2011 NREAP target	19.6%	7.1%	4.1%	8.7%
2011/2012 interim target set by RES Directive	-	-	-	7.6%
2020 NREAP target	26.4%	17.1%	10.1%	17.0%
Percentage of sector consumption in total final energy consumption in 2011	24%	44%	33%	101%
2011 Production [ktoe]	7,013	6,070	1,641	14,724
2010 Production [ktoe]	5,924	5,257	1,643	12,824
2005 Production [ktoe]	4,166	1,966	0	6,132
2020 NREAP target production [ktoe]	8,504	10,456	2,530	21,490
Deviation [%] of actual from planned share in 2011	20.32%	54.69%	13.46%	32.64%



RES growth rates achieved from 2010 to 2011 compared to RES growth rates required from 2011 to 2020 by sector

- Italy has met its 2011/2012 interim target and the NREAP 2011 target with an overall increase in RES production from 2010 to 2011 by 16.7 %.
- The 2010-2011 growth rate in the electricity sector almost doubled compared to the prior 6-year average while growth in the heat sector remained on a constantly high level.
- With the growth rates of 2010-2011, targets will be achieved in the electricity and heat sectors while transport production needs to grow faster.



2. NATIONAL BARRIERS REPORT

The Italian RES-E Sector

Support scheme

In Italy, electricity generated from renewable energy sources is promoted through a number of feed-in and premium tariffs and a tendering system. Depending on the source and the size, RES-E plant operators may be obliged to opt for a certain system or may choose between the available ones. Electricity not promoted through a FIT system may be sold on the free market or through “ritiro dedicato” (purchase by Gestore dei Servizi Energetici at a guaranteed price). Under certain conditions, electricity producers can make use of “scambio sul posto” (net-metering) (RES LEGAL Europe database). These last two mechanisms are not compatible with new support scheme introduced by the Legislative Decrees of 5 and 6 July 2012 (the first for PV sector, the second one for the other RES).

Barriers to RES-E

Authorisation procedures for grid connection, grid expansion and plant construction

Authorisation procedures play a relevant role in terms of posing a barrier to RES-E development, deployment and integration. As regards grid connection, three main issues have been reported as relevant: **time-consuming grid connection procedures, lack of stability of the current regulatory framework** and **frequent legal modifications changes** (Bruno, Urania, Viganò, APER) needed to deal with the issue of virtual saturation. (Galliani, AEEG) These issues have been referred to as able of creating a bottleneck in the plant construction process. Because of their parallel presence - along with other issues, outlined below - producers find themselves often facing delays in grid connection and being offered connection solutions (points of connection to the grid) not deemed efficient and that imply high costs for carrying out the connection process. In addition, authorisation procedures are to a large extent regulated at regional level, thus plant operators need to deal with different regulations and procedures, depending on the area in which they need to build a plant. (Zorzoli, ISES) This may be particularly relevant in case the plant and the connecting line range across two regions with different regulations.

Grid operators, also face **difficulties in the expansion and reinforcement of the grid** because of existing blockages linked to authorisation procedures. This barriers concerns in turn also RES-E plants, as reinforcing and expanding the grid is a necessary step to accept additional RES-E capacity. Given their steep growth, PV and wind are the most affected technologies. Because of the current regulatory framework for grid expansion and reinforcement, grid operators need to obtain permission to construct or reinforce the line from all local authorities affected by the project. With respect to the previous situation, Legislative Decree 387/2003 managed to simplify the procedure to a large extent, although it was not fully able to solve the issue and issues linked to the administrative procedure for grid expansion and reinforcement still persist (RES Integration - National Report Italy). Furthermore, in some parts of Italy, especially in the south of the country, the grid is relatively weaker and there is wide availability of wind energy. Plants, however are generally located far away from urban centres and industrial areas, and cannot always exploit their full potential because of the weaker grid infrastructure (Bruno,



Urania, Viganò, APER). RES-E have grown at a very fast rate in recent years, and to match this growth in generation, grid capacity should also have kept pace with this development. This, however, has not always been the case because of the administrative issues mentioned above. As a consequence producers' waiting times for grid connection can be very lengthy (RES Integration - National Report Italy), causing in turn a disincentive to producers to invest in new plants (Bruno, Urania, Viganò, APER). It should also be mentioned that, although the investment level in grid expansion and reinforcement is now adequate, there has been a delay in adapting the level of investments in grid development to the needs of RES-E generators in the past years (Zorzoli, ISES), creating further difficulties for plant operators. A possible solution could be to further facilitate the authorisation process for the construction of new lines. Contextually, additional resources for grid development could be invested.

Although in the last years there were some progresses to simplify procedures, with Legislative Decree 387/2003 and especially for small plants, experts indicated that the **complexity of the authorisation process** does not yet fully allow full certainty in programming timing and investment costs for developers. Specifically, this complexity is caused by some lack of clarity of procedures and by the delay experienced in the release of documents from authorities. In addition, laws may be interpreted differently in different areas of the country and different documents may be required for the same process, further adding to this complexity. An example of this is the non-homogeneous application, across the country, of Legislative Decree 115/08, related to building-integrated PV panels and small wind turbines. According to the law, in case a building is located in an area not subject to regulatory constraints, no Activity Start-up Notice (ASN) should be required for installing a RES-E plant. According to stakeholder, however some small municipalities are not aware of this decree and still require and ASN application required even if no restriction is present. The main consequence is a delay (the 30 days required for the tacit approval) and an increase in the costs of the authorisation process for the ASN application (AEON), thus again contributing to longer lead times, and causing additional costs for the authorisation process (Bruno, Urania, Viganò, APER)

Virtual saturation and speculation

The complexity of the above-outlined authorisation procedures, together with the difficulty of expanding the grid to accept all generated RES-E capacity create a fertile ground also for another set of barriers: virtual saturation and speculation.

Virtual saturation occurs in situations in which grid capacity is technically available, but is reserved for plants under construction and cannot therefore be used for connecting other plants. During the RES-E plant project lifecycle, in fact, producers need to inform the grid operator about their plant's size and connection point. This is needed because the grid operator has to reserve a certain amount of capacity for the plant while it is under construction. This way, as soon as the plant is realised and connected, the grid will be able to accept and transmit its produced electricity. While plants are being built, then, the grid is not physically congested, but the available



capacity is reserved for projects under construction. Even if other plants could quickly be built and could start generating electricity, they would not be able to connect directly because no capacity is available. To connect, they would in fact first need to request a grid reinforcement or expansion to the grid operator. The complex administrative procedures for grid expansion outlined above, though, impede a swift expansion of the grid, creating longer waiting times for grid connection for plant operators. (RES Integration - National Report Italy)

Because of this situation, **speculation practices** are also taking place in areas with large RES resources and long waiting times for grid connection. In practice, some investors would apply for several projects and request grid connection for them. Once grid capacity has been reserved, they would then attempt to obtain profits by selling the whole project for a higher price. This is made possible as buying a project with reserved capacity results attractive to interested investors. This would in fact allow other investors to jump in front of the queue of projects currently waiting for capacity reservation, and thus to realise their intended project in a shorter time. (RES Integration - National Report Italy)

This barrier leads to longer waiting times and higher costs for developers, as well as to a slower process for RES-E development. The presence of speculative behaviours, furthermore strongly fosters virtual grid saturation, giving thus rise to a vicious circle. (RES Integration - National Report Italy)

The Authority tried to solve the problem of virtual saturation in different ways, including a financial guarantee. APER and some operators have taken a legal action against this provision (Bruno, Urania, Viganò, APER). A different solution is now being applied with AEEG Regulation 226/2012: capacity reservation is now granted only after the building consent has been obtained by the plant operator, thus only after the time and effort involved in a project would justify realising the plant.

As regards real grid saturation, which is also present but limited to some lines in the southern regions (which are already being reinforced) a possible solution could be to improve energy storage, especially for PV and wind technologies. Such systems may in fact contribute to mitigate this issue (Galliani, AEEG). In most cases, however batteries remain expensive and cumbersome even if these are a highly promising solution (Bruno, Urania, Viganò, APER).

Financial environment

Because of the major changes in the past year in terms of support schemes, including also the delays that accompanied their drafting, the financial environment for RES-E producers has been indicated as uncertain to some extent (Bruno, Urania, Viganò, APER).

Currently, the **support scheme environment** presents a quite complex structure, counting on several instruments which include feed-in and premium tariffs, net metering, bidding schemes and tax incentives; the existing quota system “Certificati Verdi” is currently being phased out, as directed by Ministerial Decree 6 July 2012. Reasons reported for causing this uncertainty among stakeholders include, among other factors, the delay with which the



Ministerial Decree has been published (several months after the established deadline), and specific aspects linked to the new bidding scheme. Until the bidding process is over, plants accessing incentives via this new scheme suffer uncertainty not only with respect to the exact amount of the tariff they will be granted, but also with respect to the access to the incentive itself. Clearly, this may create additional issues, e.g. with respect to business forecasts. Stakeholders clearly indicated that more stability in the overall framework could be advised (Bruno, Urania, Viganò, APER). It should be considered, nevertheless, that it is reasonable to expect only minor modifications in this framework in the coming months, given the extent of recent changes.

Problems have also been outlined with respect to **access to finance**. Contacted associations, in fact, have outlined how the new Decrees have introduced more demanding administrative requirements as well as a limit to the amount of plants that could receive the incentive. Because of this limit, then it may be that not all plants that apply would be granted access to the support scheme at the end. Considering that in general the economic viability of a RES-E investment still depends on support schemes, stakeholders have reported that banking institutions are being more cautious to grant loans for such investments, making it in turn more difficult for producers to actually undertake the investment for a new plant (Bruno, Urania, Viganò, APER).

Clarity in terms of taxation is a further aspect that has been outlined as problematic. Specifically, the tax structure is quite complex and many bureaucratic fulfilments are necessary at this stage. In addition, at times local tax agencies may provide different interpretations for the rules, thus leading to different treatments of operators. Experts outlined that a revision of the laws, providing a clearer, unambiguous rule, could be advisable (Bruno, Urania, Viganò, APER).



The Italian RES-H Sector

Support scheme

In Italy, a tax regulation system is currently in place for the promotion of RES-H. In addition, a loan is also provided for the years 2012, 2013, 2014, for new installations (RES LEGAL Europe database).

Barriers to RES-H

Information and awareness about RES-H

The first barrier outlined for RES-H is mainly of a cultural type. Users may not know about RES-H and the opportunities they offer, or may be misinformed and may not trust the technologies, considering them unreliable or having doubts about their renewable aspect. Banking institutions, on the other hand, may also lack sufficient knowledge about these sources and may thus prove more cautious in allowing credit for investments in this technology. This lack of awareness, apparently, also applies to the public side, where sometimes bureaucratic requests for the granting of permits from authorities exceeded the ones set by law, particularly in the case of geothermal and biomass. In some cases this also took place with respect to requesting incentives. This lack of knowledge is deemed likely to affect the decision-making processes of operators and can lead therefore to negative choices related to misjudgements and to delays in the technology diffusion and market development.

In time, bodies such as ENEA, Itabia and other industry associations, as well as regions and universities tried to solve this issue by producing brochures and other tools to raise awareness, but more effort seems to be required. In the so-called decree "conto termico" (at the time of research still a draft decree for a new incentive scheme for RES-H) some information measures that could reduce the problem are provided. Similarly, media attention about the topic has increased, in connection with the growing general interest in "green" topics and because of this basic information about RES-H is being streamlined. Further steps to be taken to overcome the issue call for the non-commercial involvement of relevant RES-H associations, possibly, with collaboration with third parties such as universities, energy agencies and scientific and technical associations (Di Santo, FIRE).

Qualification of operators

According to contacted experts, and in connection with the above-mentioned issue, the level of qualification of installers is often insufficient in Italy, except for the ones specializing in renewable heat technologies. This means that in the majority of cases, final users are not directly in touch with specialised operators and therefore it is less likely that they are provided with advice as regards the implementation of RES-H plants. Moreover, because of this lack of specialisation, projects and installations are not always carried out at a sufficiently high standard and may lead to lower returns for end users. Examples brought forward by experts in this regard include incorrect integration in existing building plans, sub-optimal sizing of the plant or flaws in the operational set-up.

One of the main causes of this barrier has been identified in the lack of control in buildings by central and local authorities. Stakeholders indicated that because of this lack of control, no actual reward is in place for installers



that invest time and resources in training and therefore an incentive to undertake such activities is lacking. Furthermore, it has been reported that there is a non-negligible black market for interventions of limited size, which also does not help end users to protect themselves against lower standard works for RES-H installations. This issue appears to be particularly relevant in the case of smaller technologies for the residential market, where an extremely large number of small and unspecialised installers is operating. Only medium and large size plants, usually entrusted to specialised companies and technicians, and users in areas particularly competitive for RES-H such as mountain areas not reached by a natural gas grid, are exempt from this barrier.

As a consequence of this issue, users may be more inclined to choose traditional technologies over RES-H. Furthermore, incorrect RES-H installation projects may cause economic losses to individual users and a consequent loss of image of the technology. In the longer term, experts reported that a lack of qualified technicians may hamper a large market growth for renewable heat, except in the areas outlined above. (Di Santo, FIRE)

Legislative Decree no. 28/2011 provides that specific programs for qualification of operators, in accordance with the existing EU directives are to be initiated from 2013 onwards, although there is evidence of delays in their implementation (Zorzoli, ISES). To this aim, trade associations and large players in the RES-H technology manufacturing sector have been working in to improve the qualification framework. Furthermore ENEA, following a recommendation of the Ministry of Economic Development, is currently drafting training programs that will be passed on to the regional administrations and given at regional level. Regional administrations can improve or adapt these programs to their needs. The solution brought forward by Legislative Decree no. 28/2011 goes some way to solve the problem, however much of it will depend on the quality of the training programmes drafted by ENEA, on their actual implementation by regional authorities, and on the controls at the local level. Additional actions to be undertaken could be to associate to these trainings an adequate system of controls on the achievements planned and to encourage the spread of skill certification schemes by accredited third parties. (Di Santo, FIRE)

Lack development of the biomass supply chain

This barrier mainly refers to the need to set up a modern logistics infrastructure for the biomass supply chain, necessary to tackle a large-scale biomass industry. This involves, for example, forest management, short rotation forestry, emission reduction, system automation, transport logistics, management of ashes. Experts have indicated that the current lack of such systems is mainly due to a insufficient controls and land management policies. It should also be considered, however, that supply-chain-development-issues may occur in general in the market start-up phase or in the transition phase from a local market level to the national or international level. In other words, these issues are not unique to biomass, but may occur also in other sectors, depending on the development stage.

Two consequences have been identified as a consequence of these supply-chain issues:



A tendency to use imported biomass, with negative effects on the overall balance of payments and a blockage to the development of local activities.

A strong brake on the spread of technologies on a large scale.

Biomass, because of this supply chain underdevelopment, results less competitive in comparison with traditional sources and with imported biomass backed by a developed supply chain. Traditional sources supply chains, in particular, can count on several years of development and are fully automatic, less polluting and logistically developed, whereas biomass supply chains are generally not. This has another important implication: a less-developed supply chain may present higher risks than one adequately developed, and for this reason accessing finance for biomass plants may also present additional difficulties.

Other consequences of this issue include higher costs for users that need to rely on other sources or imported biomass, as well as indirect effects in terms of land not exploited or abandoned. Relevance of this barrier is quite widespread: only mountain areas not reached by the natural gas grid are exempt from the barrier, but even in this case there may be problems for the diffusion of small biomass systems and district heating networks could be favoured.

A round table at the Ministry of Agriculture has been initiated following the requests of some associations; however discussions are still in the initial phase. Experts have indicated that a larger role of the Ministry of Agriculture could be beneficial in terms of promoting laws that support a national industrial production of biomass and that include forest management in a wider perspective (Tomassetti, FIRE).

Legal framework and support schemes

A first aspect that arose about the legal framework is its peculiar **complexity**. Several laws regulate the RES-H sector and some clarity lack and instability have been brought forward as an issue. In particular, several legal provisions are set up at regional level and thus lack common references (REPAP).

Contacted stakeholders have brought forward **specific cases** with respect to different RES-H sources when it comes to the overall legal framework. In particular, problems affecting the sector include a lack of implementation of primary measures and inconsistency between measures of different nature. For example:

solar thermal is affected by a lack of regulations related to the installation of systems suitable with users in new buildings of systems suitable and the dissemination of integrated systems in the building;

For medium to large size biomass plants, the regulatory management of products causes some potential fuels to end up in the waste cycle; same goes in the case of ashes, that at the moment are not always used as soil improvers;

ground water systems are subjected to very different regulations at provincial level.



These issues, though technology-specific, can be traced back to the distribution of responsibilities to local, regional and national authorities as regards the overall legal framework. Responsibilities, in fact, appear not to always be organised and consistent when it comes to drafting and implementing provisions, or to granting authorisations. Furthermore, stakeholders have indicated in some cases a lack of internal governance organisation and of effective internal procedures both at national and at local level.

This barrier has important consequences on the implementation of legal provisions. On the one hand it makes their adoption sporadic, on the other hand it creates uncertainties that make access to credit more difficult and costly. In addition to this, this barrier has been reported to divert and waste resources within administrations, and to disadvantage the development of large corporations or the entry of foreign players in the market.

In the recent National Energy Strategy launched by the Ministry of Economic Development, some space is devoted to the review and the efficiency of the governance system, however stakeholders outlined that it is unlikely that this transformation will be able to take place if efforts are only concentrated in the energy sector, as reviewing the governance system is a long and difficult undertaking. To this aim an introduction of a single, centralised legal source could provide additional clarity. This could be published, for example, as a legal regulation of the Authority for Electricity and Gas.

A further issue outlined in this context is that **specific support schemes for RES-H** are currently lacking. Some incentives and tax deductions exist for energy efficiency measures and these cover in some cases also RES-H plants (RES LEGAL Europe database), namely:

- A 55% tax deduction scheme, linked to proof of energy savings with a new RES installation
- A loan for new installations (“Fondo Kyoto”), running at least until 2014.

These schemes do not currently have the same breadth as a larger, specific support scheme. It should be indicated, however, that a more comprehensive support scheme for RES-H is currently being drafted and that the draft law, is undergoing the approval process in the parliament. It is expected that this new scheme will enter into force in early 2013.⁶⁸

For building-integrated solar panels, the **non-homogeneous application of Legislative Decree 115/08** is a further identified barrier. According to the Decree, if the building is located in an area not subject to regulatory constraints, project developers do not need to submit an Activity Start-up Notice (ASN) to the competent authority. Some local authorities (e.g. small municipalities), however, may not be aware of Legislative Decree 115/08, and may thus require the ASN application even if no specific restriction is present on the area. This has been reported to cause delays in the process, beyond the 30 days after which a tacit approval is granted by law if no answer from the authority is received, and an increase in the costs of the authorisation process for the ASN application. (AEON)

⁶⁸ At the time of research, such a scheme had not yet been adopted. With Ministerial Decree 28 December 2012, however, a renewable heat incentive has been officially established.



Administrative procedures for environmental processes have also been indicated as disproportionate in the case of low enthalpy geothermal energy plants. Legislative Decree 22/2010 places vertical loop ground heat pumps under the jurisdiction of local authorities. Two consequences arise from this: firstly, a fragmentation in terms of regulation, and secondly, since in most Italian Regions geothermal heat pumps must comply with stricter general environmental, soil and water protection legislation, specific environmental legislation for these plants is lacking. For this reason, this technology might be burdened in some cases with having to comply with disproportionate administrative requirements. This is particularly relevant if the case of closed loop technologies is considered: these have lower groundwater and soil contamination risks, but need to comply with the same environmental requirements of other technologies. As a consequence, the authorisation process is further stretched and may take longer than expected.



The Italian RES-T Sector

Support scheme

The main support scheme for biofuels in Italy is a quota system. This scheme is the main tool through which the 2020 biofuels goal are meant to be achieved. (RES LEGAL Europe database)

Barriers to the transport sector

Information

The main barriers outlined in this context are the lack of sufficient information and the insufficient knowledge of involved actors. According to experts, this issue is impacting all the process steps in the RES-T sector, from the beginning (initial decision process) to the identification of suitable support schemes. A possible solution brought forward would be a further involvement of the Ministers of Transport and of Agriculture in terms of implementing a more specific regulatory framework for the development of sustainable transport systems (Bruno, Urania, Viganò, APER)



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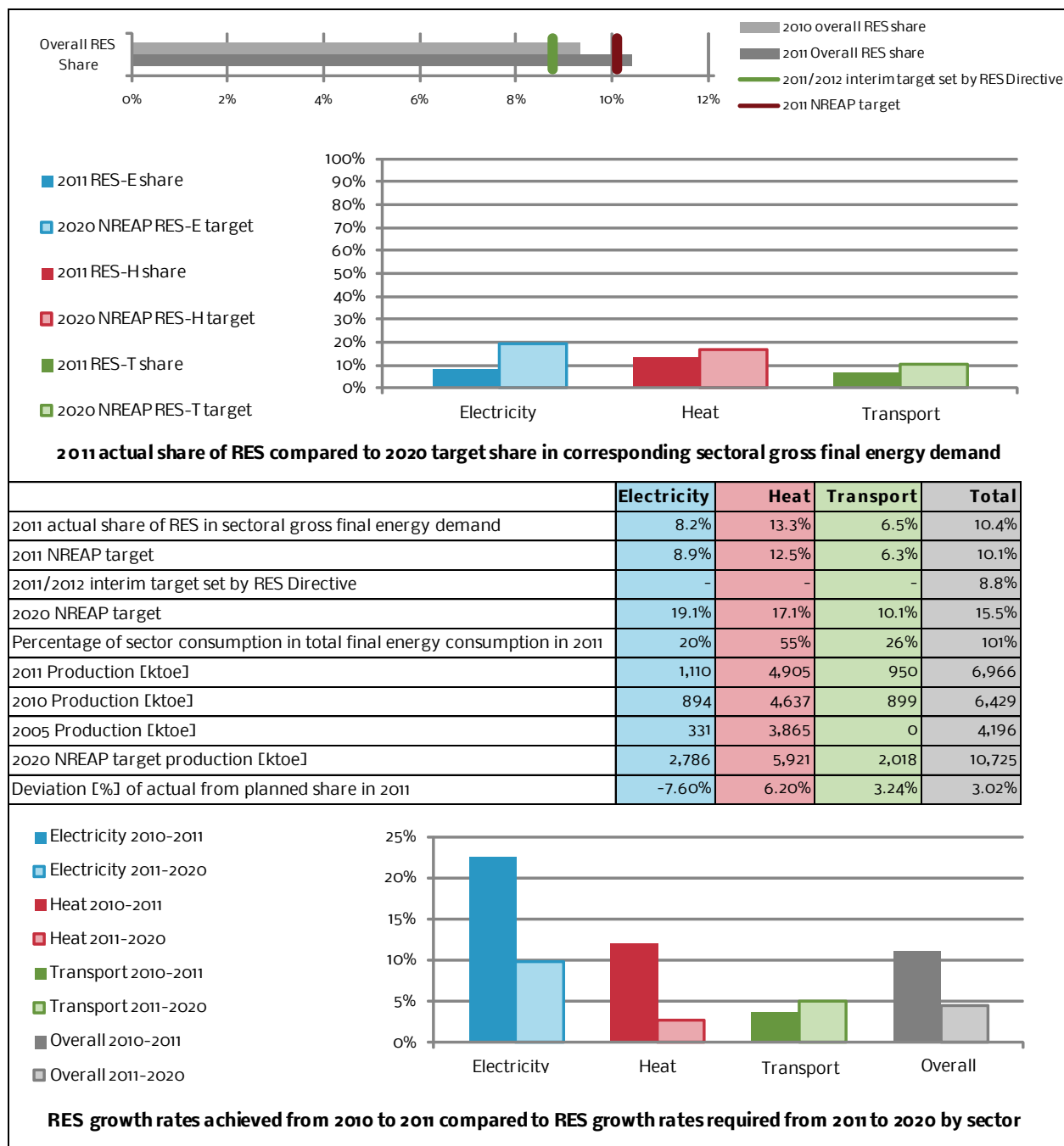
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H. POLAND

1. NATIONAL DEVIATIONS REPORT



- Poland has complied with its 2011/2012 interim target and the NREAP 2011 target although the target for the electricity sector was slightly missed.
- 2010-2011 growth rates were higher than the prior 6-year average. The electricity sector share experienced the highest growth.
- Regarding the growth rates of 2010-2011 the only sector with an insufficient growth rate is the transport sector. The



2. NATIONAL BARRIERS REPORT

The Polish RES-E Sector

New RES-Law (Draft)

The Polish government is currently working on the implementation of the new Law on renewable energy sources (RES-Law). This law addresses the required implementation of Directive 2009/28/EC into national law of European Member States. The deadline to implement the given directive into national law passed already in December 2010, and since that time the Polish Government did not present new consistent legal solutions that ensure a sustainable development of RES in Poland. The draft RES-Law changes the existing support scheme for RES-E. For small installations the support system would be based on feed-in tariff and for larger installations it would still be based on so called green certificates multiplied with a correction factor. The factor indicated specifies the amount of certificates per MWh and is dependent on the used technology, installed capacity and the date of the plant's commissioning. Generally, higher than 1 the factor level should generate higher support per MWh and vice versa. The feed-in tariff is a completely new support scheme in Poland. Only small RES-E installation will be eligible under this scheme. The proposed level of the financial support through feed-in-tariff is considered very high, especially for the currently yet not existence PV sector. In case of quota system, there is still no minimum price of green certificates guaranteed and in case of oversupply the price falls as it is observed now in the market in Poland and which we will describe below. So, corrector factor higher than 1 only theoretically leads to higher revenues.

Support schemes

In the Republic of Poland, electricity from renewable sources is currently promoted by green certificates with no constraints as to the deadline (which means: for the whole period of the use of a particular installation). The rule governing the certificate receipt is identical to all RES technologies - one certificate is obtained for 1 MWh of energy produced from a licensed/registered source and confirmed with the proper readings of the measuring devices. The upper limit of the certificate price is determined by the value of the unit substitute fee. Furthermore, electricity from renewable sources is supported through loans and tax relief.⁶⁹

Barriers to RES-E

Grid connection issues

The most severe barriers for the deployment of renewable energy sources in electricity sector in Poland are the obstacles related to the grid connection procedure. Access to the grid for new plants, especially those using renewable energy sources is very limited. (Ćwil, PIGEO)

⁶⁹ Source: RES LEGAL Europe (<http://www.res-legal.eu>)



First and most important barrier is **lack of free grid capacity**. The poor infrastructure of transmission and distribution grid is not adjusted to distributed electricity generation as the one coming from the usage of renewable energy sources. This is due to the centralised electricity generation system prevailing in Poland. This situation is intensified through insufficient investments in network extension in the desired scale and scope in order to achieve the objectives concerning the development of renewable energy sources by 2020 and beyond. Nowadays Poland's annual capital expenditures on grid extensions amount to about PLN 500,000 (€ 120,000) with estimated needs of about PLN 2 billion (approx. € 500 m.). The scarce grid capacity limits or sometimes even unables the connection of RES-E plants in some regions. In some cases the plant may be connected but only for the reduced capacity in comparison to the one which was applied for. (Ćwil, PIGEO)

Apart from that there is **no guarantee and no priority of grid connection** for plants using renewable energy sources. The priority for renewable energy sources applies only for the transmission of the electricity but this can only be applied after connection. (Ćwil, PIGEO)

Another barrier with regard to grid connection procedure is the **advance payment**. The amendment of the Energy Law of March 2010 introduced the obligation to make an advance payment. According to the Energy Law, a developer wishing to connect his plant to the grid needs to submit an application along with additional planning documents and an advance on the connection fee. The payment amounts to PLN 30 for each kilowatt of the connection capacity he applied for. This payment must not exceed the final connection fee and the amount of PLN 3,000,000. The connection requirements will be specified only if the advance payment is made within seven days from the submission of the application. Otherwise the application will not be considered. (Ćwil, PIGEO)

The introduction of the advance payment was a reaction to speculations on available connection capacity that were commonplace in the past. The speculations resulted from the specific obligation related to the connection requirements: When a developer receives the information on the connection requirements from a grid operator, the connection point and capacity specified in the application are reserved for the next two years. This means that these capacities are not available for any other applicant. In the past the application for the connection details was free of charge and not binding. This led to the virtual lack of available capacity: A large percentage of applications were not backed by a real investment plan. The reserved capacity was sometimes intended to block competitors in specific regions, or to be sold. The applied connections exceeded the actually available capacity so that a serious developer had no chance to connect his plant to the grid. In order to stop such behaviour, the Polish government introduced an advance payment that should reduce the incentive to reserve grid capacity without intending to actually develop a RES-E plant. (RES Integration - National Report Poland)

This mechanism is temporarily halted the process of **speculative blocking of the access to the grid**, but did not solve the problem of already blocked capacities by the speculators who applied for the connection conditions, before the advance payment has been introduced and for which the grid capacities are "reserved". (Ćwil, PIGEO)



The advance payment has to be paid on account of the grid operator. Advance payment is dedicated to the payment of the connection fee. The Energy Law states that the grid operator has to pay the advance payment back when the grid connection permit is refused due to no technical or economic conditions of the connection. The advance shall also be paid back if the connection simply does not occur, no matter on which grounds. Yet this is not regulated by the Energy Law. There is a risk that a developer may receive connection conditions, which make the investment unprofitable and do not allow for the further development of the project and the advance payment will not be paid back. It should be noted that the amount of the advance payment shall be used to finance the design and construction works associated with the connection of the plant to the grid and, therefore, if such an investment does not take place, it is reasonable that the payment shall be returned to the developer. The decision on if the investment will take place or not should be made in a timely manner. Therefore, if an investor comes to the conclusion that the connection conditions make the investment not feasible and notify the grid operator within the prescribed period of time, the operator shall pay the advance payment back. However, depending on the length of the period, it is possible that certain works related to designing or construction of the connection may have been performed and thus the energy company would be entitled to reduce the refunded advance payment by the costs already incurred in that respect. (Ćwil, PIGEO)

The connection costs are not clearly defined. According to the Energy Law, the connection charges are equal to the actual connection costs. Most developers state that the connection costs should be understood as so-called “shallow” costs, i.e. the developer only has to pay for the connection of his plant to the closest connection point. All additional costs should be borne by the grid operator. However, transmission and distribution companies continue to include costs of grid modernisation and expansion outside the connection point - the “deep” costs - into a connection fee. This is not consistent with the verdict of the District Court in Warsaw - Court of Competition and Consumer Protection of 25 June 2009 concerning the connection fee. In some cases the connection fee claimed by the grid operator differs for the same RES-E plant type and the same capacity significantly. At one place in the country the connection conditions demanded connection fee at a level of PLN 13,000 per MW (€ 3,144 per MW), in another PLN 4 million per MW (€ 970,000 per MW). (Ćwil, PIGEO, RES Integration - National Report Poland)

In addition to this fee in order to connect a plant with a capacity of more than 2 MWel to the grid it is required to prepare an **expertise on impact of the plant’s connection on the grid system**. The results are used to assess whether or not the connection is technically feasible. This expertise has to be prepared by the grid operator, but the plant’s developer has to bear the costs. As it is the grid operator that prepares the technical studies, the developer has no direct access to the results of the study. Therefore, it is more difficult for the developer to comprehend the decisions of the grid operator if the latter refuses the connection for technical reasons. (Ćwil, PIGEO, RES Integration - National Report Poland)

Another barrier with regard to the grid connection procedures is the **long lead time of issuance of grid connection requirements**. The Energy Law sets up binding deadlines for issuing the connection requirements. A



grid operator is obliged to notify a developer of the connection requirements within 30 days after the submission of the advance payment if the plant is going to be connected at a voltage level of up to 1 kV, and within 150 days if a plant is being connected at a voltage level of more than 1 kV. But since almost all RES-E plants are connected to the grid with a voltage level of more than 1 kV, the actual deadline is always 150 days (5 months!). This applies to all RES regardless of the grid voltage (however exceeding 1 kV), and the type of the installed plant. (Ćwil, PIGEO)

Site selection issues

Another type of barriers are these connected to the site selection. First barrier is the **lack of local spatial development plans**. Most investments in renewable energy sources may be located in an area on the basis of including generation facilities in the local spatial development plan. This applies particularly to investments in wind farms. Currently, a majority of municipalities in Poland do not have a local spatial development plans and if they have, the plans seldom provide for location for the RES plants in the area. In this situation, the building permit is issued on the basis of a planning permission (rarely possible for wind farms) or a new local spatial development plan needs to be approved. The procedure of a new plan approval is costly and time-consuming and extends the process of preparing the investment project by minimum one year. The procedure for obtaining the local development plan is in many cases connected to with an assessment on the environmental impact. (Ćwil, PIGEO)

The **availability of information on possible connection and vacant capacity is not sufficient**. The Energy Law obliges the operators of grids with a voltage of more than 110 kV (TSOs) to publish the current connection capacity for a given connection point and the planned changes for the next five years. However, since most RES plants (around 90%) are connected to the distribution grid (with a voltage of less than 110 kV) this obligation does not help further development of RES. Most grid companies do not comply with the provisions of the law to provide information. In some cases published data do not bring any information, which might be of interest for RES-E developers. Also most of the grid operators avoid giving notice on no available capacity for new connections. (Ćwil, PIGEO)

Unstable support system

For nearly a year now there is **oversupply of green certificates** on the market for green certificates. It caused the fall of the green certificate prices by over 20% (as of October 2012), the tendency still being downward. The main reason for this phenomenon is the rapid growth of RES-electricity production in co-firing plants, which amounts to the volume of about 50% of all electricity generated from renewable sources. At the same time the obligation to purchase "green certificates" stayed at the level of 10.4%. In practice, this means that over 50% of the revenues from the sale of green certificates goes to the big energy companies using co-operating plants. The actual support system currently supports primarily conventional energy sector. (Ćwil, PIGEO)



The bill proposes a mechanism to prevent oversupply of green certificates. Opinions of experts in this field, however, show that the belief in the effectiveness of such a mechanism is illusory because it is discretionary and is based on a false premise. The provision states that the Minister of Economy can be able to, but not obligated to, start the regulatory intervention, if the average price of the certificates on the exchange market will remain below 75% of the compensatory unit fee for a period of 6 months. In practice it is therefore accepted that the prices of green certificates can for any time remain at the level of nearly a quarter lower than the amount of the compensation unit fee, and periodically (up to 6 months) at a much lower level. The minister in charge of economy cannot in any way respond to and counteract against the oversupply of the certificates, even in a situation where the certificates' price would be much lower than 75% of the compensation fee, but would remain at this level for a period shorter than 6 months. (Ćwil, PIGEO)

The published draft of **the Renewable Energy Sources Law does not include provisions ensuring the valorisation of the compensatory fee with the inflation rate** - the fee is fixed for the whole time of the functioning of the law. This means that the price of the green certificates will stay the same (or fall down in possible case of oversupply of green certificates). In the long run the inflation will cause that the producers of renewable electricity will receive a lower support than the support provided for in the regulations valid now. The proposed mechanism completely ignores the fact that inflation affects the operating costs of each renewable energy projects. (Ćwil, PIGEO)

The project includes a proposal to **limit the period for which the renewable source of green certificates will be awarded** to up to 15 years from the commissioning of the plant. Currently there is no deadline set - the plant operator receives green certificates as long as the plant is in operation. This new regulation may be problematic for the plants commissioned before 1998. For them the effective time of support would be no more than 7.5 years, i.e. the period from 1 October 2005 to 31 December 2012 - the period since the introduction of green certificates until the date when the new Renewable Energy Law is planned to come into force and the 15-years period ends. This reduction of the support period may cause that the older plants will no longer produce energy in general, which in turn will reduce the share of electricity from renewable energy sources in final consumption. (Ćwil, PIGEO)

Regulatory instability and delays in the implementation of Directive 2009/28/EC

Member States of the European Union were obliged to implement the RES-Directive 2009/28/EC into their national law no later than by the 5th December 2010. Polish and international RES sector stakeholders await the development of renewable energy sources in Poland. For that to happen, the Polish government has to propose and carry out the law on renewable energy sources, which will determine the long-term and stable growth prospects of the energy sector and introduce stable and predictable support scheme for the currently operating and planned installations using renewable energy sources. (Ćwil, PIGEO)



Unfortunately up to this day (late November / December 2012) **the draft of the RES Law has not been presented to the Parliament**. That means that additionally to the already 2-years delay at least another year will add up in the adoption of the final Act and implementing regulations. (Ćwil, PIGEO)

Apart from that the published **draft of the RES Law does not correspond with the objectives of the RES-Directive**. The strategic objective of the adoption of the Directive 2009/28/EC should be not only to ensure adequate participation of "green energy" in the final energy consumption (15% for Poland) until 2020, but also to create a stable basis for the systematic growth of the share in the next decades. Proposed version of the new RES-Law does not meet these expectations. (Ćwil, PIGEO)

The latest draft of the RES-Law from 9 October 2012 raises serious doubts, including possible constitutional claims, economic rights violations and concerns from the side of the European Commission. Moreover it lacks a view over the whole energy sector in general and renewable energy sources in particular. It does not cover engagement of local authorities and civil society. The draft concerns the electricity sector only and ignores the heating and transport sectors. It does not include subjects of the wider perspective, such as smart grids or electro vehicles based on RES. (Ćwil, PIGEO)



The Polish RES-H Sector

Support schemes

In Poland, heat generated from renewable energy sources is supported through three different programmes, two subsidy and one loan scheme.⁷⁰

Barriers to RES-H

Limited access to biomass

Since the introduction of green certificates and quota system as support scheme for renewable energy sources in 2005 the access to solid biomass is very limited. In the view of the fact that there has been no differentiation between different technologies for RES-E generation, primarily the cheaper technologies and sources have been used, among others also biomass. The support scheme caused the transfer of a large part of the biomass supply from the heating sector to the electricity sector. Moreover most of the generated electricity from biomass in Poland comes from plants co-firing biomass with coal. The availability of solid biomass for energy at a reasonable cost for heating is very limited. (Ćwil, PIGEO, Wnuk, KAPE)

It should be noted that the draft of the RES-Law from 9th October 2012 propose introduction of following solutions:

Restrictions on the use of sterling wood for energy purposes. This only applies to domestic wood.

Reduction of support for co-firing biomass with fossil fuels. However, at the same time it is foreseen to increase the level of support for electricity producers using only biomass.

Insufficient support system

In comparison with renewable energy sources in electricity sector RES used for heating purposes are poorly supported. There is no quota system with certificates for generation heating from RES, no guaranteed prices and no tax exceptions or reliefs. (Ćwil, PIGEO)

Renewable energy sources in heating are only indirectly supported though a certificate system. Apart from the “green certificates” granted for electricity generation from renewable energy sources, there are also certificates for supporting co-generation: “yellow certificates” granted for CHP using agricultural biogas and CHP using other RES with capacity up to 1 MW el or “purple certificates” granted for CHP using gas derived from any biomass and “red certificates” granted for CHP using solid biomass or bioliquids with an installed capacity of at least 1 MW. (Ćwil, PIGEO)

⁷⁰ Source: RES LEGAL Europe (<http://www.res-legal.eu>)



Certificates are issued for electricity generated in high-performance cogeneration plant, but the amount of the certificates granted strongly depends on the amount of generated heat. Renewable energy sources are eligible for this support only from 11 March 2011. The **certificate system supporting co-generation will terminate in a very short time**: yellow and red certificates by the end of 2012 and violet certificates by the end of 2018. Without this support scheme the development of renewable sources in heating sector would be threatened. The government plans to extend the operation of the certificates for cogeneration till the end of 2020. Yet, the adoption of the law prolongs and passing legislation by the end of 2012, as was planned, seems no longer possible. (Ćwil, PIGEO)

Apart from the short term of functioning of this scheme, **the minimum price of the certificates** is not guaranteed. That means that in case of oversupply of the certificates, their price may significantly fall. There is a maximum price of the certificates based on the published compensation fees, which are determined by the President of the Energy Regulatory Office. This maximum price for the purple certificates is too low (PLN 60 per MWh) to set an incentive to invest into plants using gas derived from biomass, including biogas. (Ćwil, PIGEO)

There is **no tax relief for the purchase of renewable energy equipment for heating purposes**. This barrier affects primarily smaller units. The tax law does not include any suitable mechanism supporting installation of units generating heat using renewable energy sources, as for example heat pumps, solar collectors and biomass boilers in residential buildings. (Ćwil, PIGEO)

Restrictions to purchase obligation of RES-heating

Energy Law obliges energy enterprises trading and selling heat to purchase the offered heat generated using renewable energy sources connected to the grid at the quantity not larger than the demand of the customers of that enterprise connected to the same grid. An additional order restricts this already limited obligation even more. It states that these energy enterprises shall purchase RES-H only in the scope that does not cause price increase higher than the last year average price index of consumer goods and services published by the president of the Central Statistical Office. (Wnuk, KAPE)



The Polish RES-T Sector

Support schemes

In Poland, renewable energy in transport is promoted through a biofuels quota obligation. The producers, importers and suppliers of fuels are obliged to meet an annual quota of biofuels in the total amount of liquid fuels produced/supplied/imported. The obligation levels - the National Indicative Target - are determined every three years for a period of 6 years by the Council of Ministers.⁷¹

The ruling act - the Act on biocomponents and liquid biofuels will be modified in order to implement the European RES Directive 2009/28/EC into national law. (Rogulska, PIMOT)

Barriers to the transport sector

Limit of maximum permitted content of biofuels

The most severe barrier with regard to renewable energy sources in the transport sector is **the limit of maximum permitted content of biofuels in fuels**. According to current legal regulations in Poland diesel fuel may contain up to 7% of methyl esters, and motor petrol up to 5% of ethanol (whereas the Directive 2009/30/EC prescribes permission of 10% of bioethanol in petrol). This results from the physical and chemical properties of bio-components, which influence the quality of the normative fuels. The use of the bio-components shall not affect the work and lifetime of vehicle engines. The quantitative limit of maximum permitted content of biofuels is determined to a large extent through the technological development of the automotive industry, which - by working closely with the refinery industry - is not interested in the use of biofuels on a large scale. Another reason for that limitation is the **age of the car fleet in Poland**. Because of that, increasing the bioethanol content in petrol is from a technical point of view not a safe solution for all vehicles using petrol in Poland. Nearly every auto engine manufactured after 2000 can safely use E10 fuel, however, according to the Central Statistical Office the average age of cars used in Poland is 12 to 14 years. (Stępień, KIB)

The barrier limits the use of biocomponents in Polish transport sector, which lowers the share of renewable energy sources in the general fuel consumption and directly hinders the possibility of reaching the goal of 10% renewable energy in transport fuels by 2020. It also affects the opportunities to reduce greenhouse gas emissions (Stępień, KIB). It has to be noted that Poland already prepared a draft of amendment to the law on monitoring and controlling the quality of fuels and other acts, which aims at changing the definition of motor petrol by increasing the permitted share of bioethanol from 5 to 10% and at the same time shall change the definition of biofuels. However, so far there have been no relevant amendments to regulation on quality requirements for liquid fuels planned because of lack of European and Polish quality standards for E10 fuel. (Stępień, KIB)

⁷¹ Source: RES LEGAL Europe (<http://www.res-legal.eu>)



Implementation of European RES Directive 2009/28/EC

Poland has not yet introduced a **national certification system for biofuels in terms of sustainable development criteria**. As Poland is obliged to do so, investors currently feel uncertain about further situation on the Polish market. (Rogulska, PIMOT)

RES Directive committed Poland to achieve 10 percent share of alternative fuels in transport. In Poland, this is achieved by biodiesel from rapeseed and bioethanol. Both of these fuels are first-generation biofuels. Planned amendments to the RES Directive provide that only 5% of that 10% shall be achieved by the first-generation and the remaining 5% by the **second-generation fuels**. These amendments may be problematic for the Polish market. (Rogulska, PIMOT)

Lack of interest in investing and buying/using biofuels.

In Poland, with the exception of biofuels BIO100, there is practically **no supply market of biofuels**, due to the lack of appropriate infrastructure (limited number of tanks at tank stations) and **no consumers' interest in purchasing them** (caused by the age of the car fleet in Poland and prices of biofuels - small price differences do not compensate for **lower energy content of biofuels as compared to petroleum-derived fuels**). (Stępień, KIB)

The reason for that situation is **lack of financial incentives for the use of biofuels**. Moreover the lack of availability of liquid biofuels on the market determines the choice of vehicle and their availability on the market. Other reasons are the prices of agricultural resources and consequently **high production costs of biocomponents and biofuels**, the lack of interest of fuel producers in expanding the offer of liquid biofuels as they constitute a competition to the conventional fuels produced by these producers. (Stępień, KIB)

It has to be noted here that the Ministry of Economy has developed a draft regulation to introduce clean transport funding in the form of a refund for the difference of higher purchase costs of liquid biofuels and launching public transport vehicles using biofuels, as well as to allow local governments introduce decreased fees for parking for vehicles powered by biofuels. (Stępień, KIB)

Support scheme issues

Until 30 April 2011 there has been an **excise tax relief** for fuels with biocomponents and biocomponents as direct fuel, as well as exemption from fuel tax for biocomponents as direct fuel. From 30 April 2011, there is no excise tax relief for liquid fuels and liquid biofuels. (Rogulska, PIMOT)

The government is working on a compensation of these additional costs. From 2013 it is planned to introduce support for producers of biofuels and biofuel. As a source of support it is considered to transfer 1.5% of revenues from the excise tax (in 2012 it was PLN 400 million - approx. € 97 m.) for the deployment of biofuels in form of direct support, education and information programs and pilot projects. (Rogulska, PIMOT)



Grey fuel market

Some fuels retailer companies illegally trade with fuels. This does not only affect the producers of the fuels but also limits the use of bio-components. The fuels traded in this “grey market” are not blended with biocomponents. The problem has grown rapidly since the beginning of 2012, when the amount of excise duty tax has risen. The share of this “grey market” in the wholesome diesel market is estimated at about 8% in the first and second quarter of 2012. (Stępień, KIB)

Multiple trading of the same product commonly called "carousel B100"

The targets of the quota obligation (as indicated by National Indicative Target) are mainly met by blending biocomponents into normative fuels, while the difference between the National Indicative Target and the share achieved by blending is covered through the sale of liquid biofuels. This is in Poland reduced to the trade of B100 (methyl esters forming self-contained fuel). Due to the high costs of B100 and the need of artificial lowering prices of this fuel to make it more attractive in comparison to the normative fuels a phenomenon of multiple trading of the same product commonly known as "carousel B100" came to life. (Stępień, KIB)

E-cars using renewable energy sources

In Poland, there is **no mechanism to promote and support the development of vehicles powered by electricity from renewable energy sources.** (Ćwil, PIGEO)



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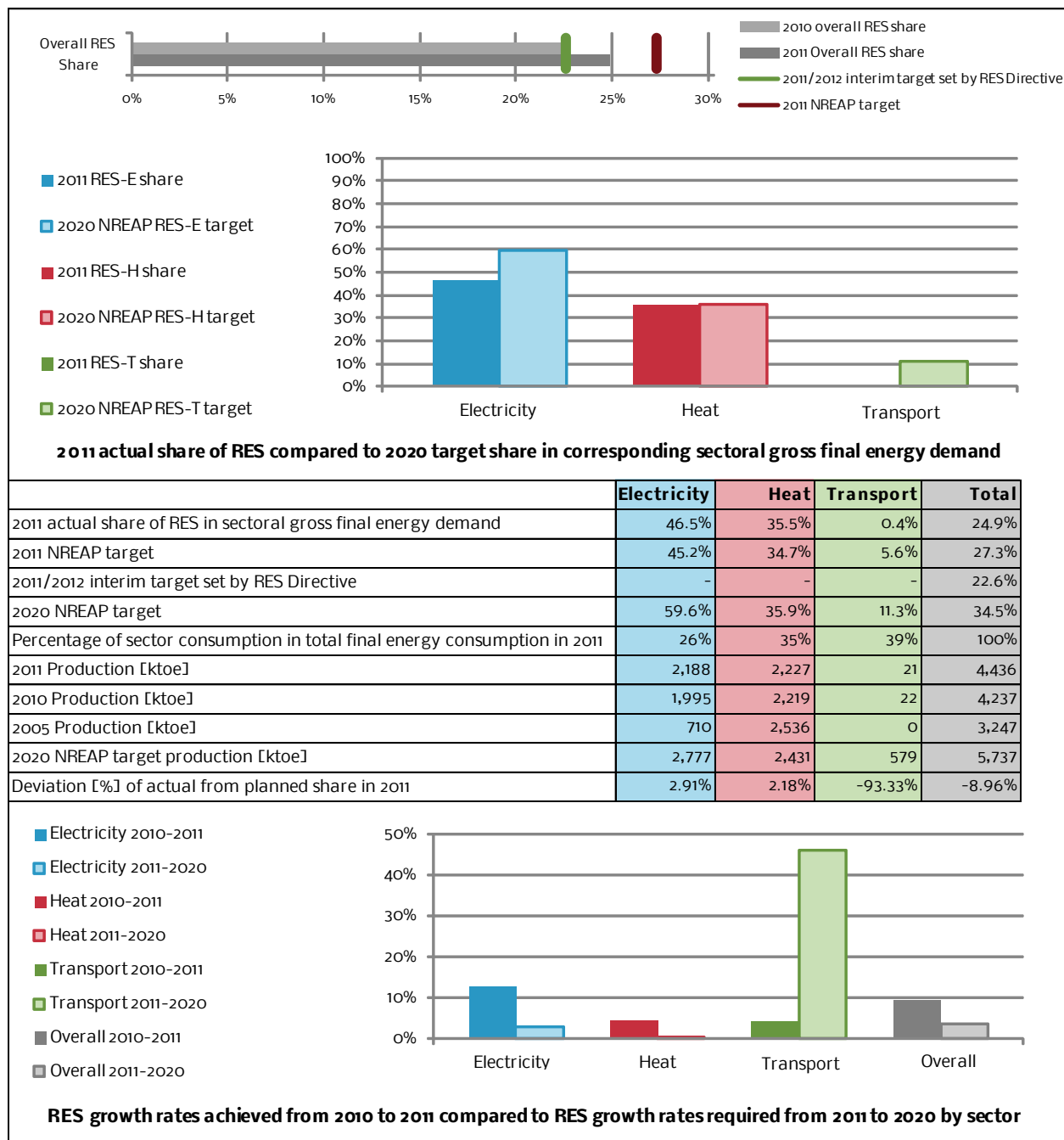
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I. PORTUGAL

1. NATIONAL DEVIATIONS REPORT



- Portugal has achieved the 2011/2012 interim target, but is slightly behind in the NREAP trajectory due to a negative deviation in the transport sector share.
- Overall growth from 2010 to 2011 increased compared to the prior 6-year average due to acceleration in the heat and transport sectors.
- With the growth rates of 2010-2011, the only sector not set to meet its 2020 target is the transport sector. The overall 2020 target would be achieved if these growth rates could be maintained.



2. NATIONAL BARRIERS REPORT

The Portuguese RES-E Sector

Support Scheme

In Portugal, the generation of electricity from renewable energy sources (RES-E) is promoted through a feed-in tariff (hereinafter FiT), which varies depending on the technology.⁷² The tariffs are applicable to renewable technologies (except large hydropower plants) for a certain time frame (i.e. 2, 12, 15, 20, 25 or 35 years) or until an upper limit of electricity produced is reached, whichever occurs first (RES LEGAL Europe Database).⁷³ After that, "RES-E production will be remunerated at market price plus the value of TGC at that time" (Cancela de Abreu, APREN, 2012).

There is a purchase obligation of the energy produced under Art. 55 of DL 172/2006 (amended by DL 215-B/2012), which creates favorable conditions for the deployment of RES-E installations. Nevertheless, the regulation of the electric sector is under review and major changes related to the FiT are expected to take place in 2013 (Santo, DGEG, 2012).

Barriers to RES-E

Unfavourable Political and Economic Context

The **unfavourable political and economic context** was mentioned as a barrier with severe effects on the development of installations in all three sectors: electricity, heating and transport (Cancela de Abreu, APREN, 2012). According to APREN, it is possible to notice an "overall reduction of support for RES projects and lack of long term vision for the national energy strategy" (Cancela de Abreu, APREN, 2012). This view is also shared by other experts, including Fernandes, who points out that a lot of incentives have been cut, not only on RES projects; however, the cut of RES incentives leads to a greater problem in the future since renewables are connected with sustainability (Fernandes, ISEG, 2012).

Regulatory Instability

Portugal has experienced several **legislative changes in the FiT system** in the past few years and besides the changes in the organisation of the national grid system recently introduced,⁷⁴ a new regime for the remuneration

⁷² Micro and mini generation (installed power below 250kW) have their own regime. See: DL 363/2007 and its amending act DL 118-A/2010 (Microproduction) and DL 34/2011 (Miniproduction). DL 25/2012 amended both.

⁷³ For more information see <<http://www.res-legal.eu>>.

⁷⁴ Changes to the organisation and operation of the national electricity grid system were introduced in October 2012 by Decree-Law 215-B/2012 available at: <<http://dre.pt/pdfisdisp/2012/10/19401/0004500133.pdf>>. In early 2012, a moratorium that suspended new power allocation, except for exceptional situations of relevant public interest concerning the objectives of national energy strategy, was introduced by Decree-Law 25/2012. DL 25/2012 was repealed by DL 215-B/2012.



of the electricity produced from new RES plants ⁷⁵ is under development and will likely move the system from FITs to market regime (Santo, DGEG, 2012). For the moment, special taxes or retroactive changes are not foreseen; however, **regulatory instability** creates loss of investors' confidence and brings **difficulties to obtaining financing from the markets**, hampering the chances of getting funding for RES-E projects (Cancela de Abreu, APREN, 2012; Santo, DGEG, 2012). It is worth adding that the regulation of the Micro and Mini generation regimes are under review and might be merged into a single diploma (Santo, DGEG, 2012).

Time-consuming Procedures to Obtain Permits

The regulation of RES-E production has been spread over many documents, which sometimes hampers the understanding of the rules to which producers are subjected to. In terms of grid connection, **the procedure is considered long,⁷⁶ complex and expensive**, especially when it is necessary to assess the environmental impact of the activity.⁷⁷

The lack of compatibility of RES-E projects to spatial planning instruments in the municipalities (e.g. Municipal Master Plans) also delays the issue of permits. Actually, the **complicate and time-consuming procedure to obtain a permit** has been extensively mentioned in previous studies as a central barrier (e.g. RES Integration - Country Report Portugal, 2011: 23; Ragwitz *et al.*, 2011:82; AEON - Portugal Final Report, 2010:9) and the implementation of a one-stop-shop could minimize it.

Regarding onshore wind installations, **overpowering projects in wind farms are currently impossible** due to tougher financing conditions of the banks, as well as due to the lacking of a simplified licensing regime (Cancela de Abreu, APREN, 2012).

With regards to SHP projects, the **imposition of stringent environmental requirements** and **difficulties on finding grid connection points** were also mentioned as barriers. According to APREN, the obligation to comply with environmental requirements often go beyond the dimension of the investments and the scope of the activity and there are usually difficulties on finding grid connection points at distances compatible to the dimension of the project (Cancela de Abreu, APREN, 2012).

A **lack of coordination between authorities** was another barrier identified, which is directly connected to the aforementioned ones, considering that it commonly leads to burdensome and time-consuming procedures (Fouquet & Sharick, 2011:42; Cancela de Abreu, APREN, 2012).

⁷⁵ Existing projects will continue to receive the FIT.

⁷⁶ One of the stakeholders interviewed for the RES Integration Report mentioned that the average time to connect wind farms is 6 years. Nonetheless, it could take longer if the farm was planned to be installed in an environmentally sensitive area. See RES Integration - Country Report Portugal, 2011 at 23. For wind barriers also see EWEA, 2010.

⁷⁷ APREN highlights that "the procedures of the Environmental Impact Assessment Committees also impact negatively on the project, as there is no deadline to answer to additional information requests and the presence of a representative of the promoter is not possible to answer immediately all the requests [...]" (Cancela de Abreu, APREN, 2012).



Inadequacy of Feed in Tariffs

According to APREN, **most of the FiTs were defined in 2007 and could be updated**, considering that for some technologies the FiT could be lower (e.g. solar PV), for others it is not attractive enough (e.g. wave) and some technologies do not have a defined FiT (e.g. wind offshore for capacities above 2MW, geothermal, reversible SHP). Additionally, APREN stresses that "the calculation formula for the FiT should also be updated, the reference value of conventional electricity to be substituted is no longer valid and the starting date of the FiT inflation update should be reviewed" (Cancela de Abreu, APREN, 2012).

Fiscal Issues

Some municipalities in Portugal are charging high **Real Estate taxes**, which according to APREN, should not be charged in the first place, considering that wind farms are not real estate projects. In addition to that, the association also highlights problems with the long amortization periods (e.g. 25 years). As the promoter cannot substitute the equipment in between, a shorter amortization period could be implemented (e.g. between 12 and 16 years) (Cancela de Abreu, APREN, 2012).

Reduced Interconnection Capacity between Spain and France

Portugal has a reduced interconnection capacity with Spain, which is aggravated by the **limited interconnection capacity between Spain and France** (Santo, DGEG, 2012). The reduced interconnection capacity between Spain and France actually prevents the export of renewable electricity out of the Iberian Market and limits the development of RES-E projects in Portugal (Cancela de Abreu, APREN, 2012).⁷⁸

Lack of Reliable Information on the Real Costs of Support to RES-E Projects

There is a **lack of transparent information and studies that account all the costs and benefits of RES-E projects**, as well as information detailing the real costs of RES support. In addition to that, according to APREN, incorrect information has been spread, affecting public opinion, and no correct explanation on the origin of the tariff deficit and the contribution of RES in electricity tariffs has been provided (Cancela de Abreu, APREN, 2012).

Lack of Resource Potential Assessment Studies and Strategies to Develop Certain Technologies

The **lack of studies to identify the most appropriate sites** for projects to be developed can also be considered a barrier, as well as **the lack of studies to quantify the existing potential of some RES technologies** (e.g. SHP). These barriers limit the exploitation of RES sources (Cancela de Abreu, APREN, 2012).

⁷⁸ With regards to the development of a trans-European electricity network, the REPAP assessment highlights Portugal's intention to reinforce its interconnection capacity with Spain to 3GW by 2014 through the construction of two lines with 400 kV each. Ragwitz *et al.*, 2011 at 229.



In terms of **micro wind certification** and resource assessment, **the certification procedure is still under development** and there is a "lack of detailed urban wind assessment tools and methodologies that may be applied to the generality of urban areas" (Estanqueiro, LNEG, 2012).

In the field of **geothermal use**, despite being developed in the Azores Islands, there is a **lack of experience and studies to assess the feasibility** of using this technology in the continent (Santo, DGEG, 2012). Thus, a **lack of research, regulation and environmental studies** related to geothermal can also be identified (Rosa, LNEG, 2012).

With regards to **offshore technologies** (i.e. ocean and wind-offshore), there is a **lack of strategy and site studies** outside the pilot zone. In addition to that, the **lack of definition of grid access, connection procedures and respective cost sharing** were also listed as barriers to the development of this technology (Cancela de Abreu, APREN, 2012).

Reduction of the Microgeneration Cap and Inflexibility under the CPV Tender

The **reduction of the annual cap for microgeneration installations** and the **inflexibility to change suppliers under the CPV tender** were also barriers mentioned. The annual cap for microgeneration installations was reduced in 2012 from 25 MW to 10 MW⁷⁹, leading to less development of the national market (Freitas, APISOLAR, 2012).

Regarding the CPV Tender, according to APREN, the existing permits for the development of CPV are linked to a given supplier, which was defined on tender by the producer to justify technology R&D; however, some suppliers are no longer producing solar modules and project developers **do not have flexibility to change suppliers** and some projects end up not being implemented (Cancela de Abreu, APREN, 2012).

Lack of a Special Expropriation Regime for Producers

In Portugal, the plant operators whose plant is to be connected to the grid have to construct the lines connecting the plant to the grid connection point, bearing the respective costs. Afterwards, the lines are delivered to the grid operator at no costs (RES LEGAL Europe Database). According to APREN, as producers are not entitled to a **special expropriation regime** like grid operators are, they usually pay high prices to land owners for land rental in order to install the aerial lines. In some cases, they have to use longer lines to contour conflict areas. Considering that the FIT is set by a price index of the month before the entry into operation and every delay corresponds to a lower FIT, producers are tempted to accept very high prices (Cancela de Abreu, APREN, 2012).

The Portuguese RES-H Sector

Support Scheme

⁷⁹ See Art. 2 of Order 284/2011 available at: <<http://dre.pt/pdfisdip/2011/10/20800/0472604727.pdf>>. The annual cap and reduction in the FIT for 2013 was published by Order 430/2012 and 431/2012: minigeneration cap stayed at 30 MW and microgeneration cap was set at 11 MW.



The heating sector is indirectly supported via the micro generation regime, considering that in order to be entitled to the FiT, electricity producers shall install a minimum of 2m² of solar thermal panels or a biomass boiler (with equivalent thermal energy production). In November 2012, the Edifício Eficiente 2012 Program was launched with a budget of € 1 million from Portugal's Energy Efficiency Fund (FEE) for the installation of solar thermal panels in existing buildings. 50% of the costs (including installation) up to € 1.500 are eligible (Cancela de Abreu, APREN, 2012).

Barriers to RES-H

Insufficient Information on RES-H Technologies

A barrier with severe effects on the development of RES-H installations is the **lack of public awareness** concerning these technologies and their benefits, leading to an **insufficient use of the potential** and a certain resistance to a widely implementation (Ferreira, Quercus, 2012; Gonçalves, LNEG, 2012). Actually, many people have already heard about renewable energy in the country, but associate them mainly with the production of electricity and not heat, as well as do not have a practical knowledge of the use of renewables in the residential sector (Fernandes, ISEG, 2012). Fernandes also highlights that the language used to communicate the benefits of RES-H installations can also be seen as a barrier if it is not simple and easily understood by non-experts.

Another barrier mentioned is the **lack of official updated information** on the use of RES-H&C. For solar thermal, it is possible to know the total installed m², but that is not the case for biomass. For this technology, at the household level, national statistics are only collected every 10 years for the census and at the industrial level, the inquiries made by the DGEG are not well structured and companies not always answer the enquiries from the Centre for Biomass (Cancela de Abreu, APREN, 2012).

Absence of Support Mechanisms and Long-term Strategy

Other barrier with severe effects to the development of RES-H is the **lack of a long-term incentive strategy** to the development of this sector. It might jeopardize the achievement of the 2020 targets and is very harmful to small companies, which are "very susceptible to small changes in the market and the lack of support, even if only for short periods, might lead them to bankruptcy easily" (Cancela de Abreu, APREN, 2012).

A **decrease in the share of renewables in the H&C sector** is expected to happen between 2005 and 2020 (Fouquet & Sharick, 2011:22; 33). According to APREN, the share of RES-H&C was 37,8% in 2009, dropping to 34,4% in 2010 and is expected to be 30,6% in 2020 (Cancela de Abreu, APREN, 2012).

It is worth mentioning that some of the regulatory and financial measures to encourage the use of RES mentioned in the Portuguese NREAP are not in place anymore, such as the environmental tax deduction of 30% of the amounts spent on acquisition of new equipments to use renewable energy. This tax deduction was repealed by Law 55-A/2010, which approved the State Budget for 2011 (RES LEGAL Europe Database).



According to Fernandes, it is necessary to associate the incentive to a retail activity (widening the access and bringing on board agents with a large retail chain), following the success of the initiative for solar thermal equipments in 2009 when there was a partnership with the national bank and installations doubled (Fernandes, ISEG, 2012). Additionally, the offer should include a credit option and also a mandatory maintenance plan (Fernandes, ISEG, 2012).

Lack of Certification Schemes

In the AEON Report, Portugal was rated in 2010 as insufficient in the table showing the Member States that have sufficient training on RES during the formal education of installers, planners and architects (AEON, 2010: 69). The **lack of certification schemes to installers and equipments** was still mentioned in 2012 as a barrier; however, with the remark that the barrier has been already acknowledged by the competent authority (Ferreira, Quercus, 2012; Gonçalves, LNEG, 2012).

Insecurity Regarding Biomass Supply and National Equipments

Considering specific technologies, a few barriers related to biomass can be listed, such as **insecurity regarding biomass availability**, an **undeveloped national market of the equipments** and the **lack of a certification system** to ensure fuel quality. In terms of **biomass availability**,⁸⁰ according to APREN, the biomass production in Portugal is not sustainable and affordable enough to guarantee its availability over the long term, considering the high costs of collection, treatment and transportation involved and the differences between support schemes among Member States, which leads to export of biomass to other countries and less use in Portugal (Cancela de Abreu, APREN, 2012). The **lack of reliable biomass supply** has been already mentioned as an important barrier in many EU countries, with Portugal being one of them (AEON, 2010:118).

Concerning the **national market of pellet stoves and boilers**, a lack of equipments produced nationally was also mentioned as a barrier (Almeida, CBE, 2012). In fact, there are key players in the manufacture of solar thermal equipments, but not many when it comes to other technologies (Fernandes, ISEG, 2012). Finally, there are **no mandatory certification or quality control systems to check the fuel quality** (i.e. the physical properties of refined biomass fuels, e.g. wood pellets) (Almeida, CBE, 2012).

No Intention to Develop District Heating

According to the AEON - Portugal Final Report, the use of RES in H&C has received less attention in Portugal and the main barrier is the **absence of infrastructure** additional to the existing well developed networks for natural gas and electricity, a situation that hinders the use of renewables in this sector (2010:13). District heating does not play a significant role in Portugal and according to the NREAP (2010:86), "the targets for 2020 relating to the share

⁸⁰ This barrier was also mentioned related to the RES-E sector (Cancela de Abreu, APREN, 2012).



of energy consumption for heating and cooling based on RES do not include the construction of significant infrastructure for district heating and cooling" (RES LEGAL Europe Database).

Infrastructure for district heating is expensive and the country does not have tradition in this kind of system, what is understandable considering its climate and the fact that heating needs are concentrated in a short period of the year, making more sense to have district heating and cooling, instead of only district heating (Cancela de Abreu, APREN, 2012; Gonçalves, LNEG, 2012).⁸¹ District heating is related to the construction of new areas; where the infrastructure is built from scratch and therefore is possible to plan for district heating and cooling (Fernandes, ISEG, 2012).

Lack of Awareness in terms of Geothermal Use and Potential

A **lack of awareness of the use of geothermal and its potential** was mentioned, considering that currently, there are not much information, research nor certification available (Rosa, LNEG, 2012). According to the AEON - Portugal Final Report, "Portugal has good conditions for the use of low-enthalpy geothermal systems but the effective potential and the types of heat-pumps better suited for each situation still require a better investigation" (AEON - Portugal Final Report, 2010:14).

⁸¹ The interviewees mentioned the ClimaEspaço, a neighborhood in Lisbon constructed for the 98 World Exhibition and where inhabitants reduced their energy consumption by 40%.



The Portuguese RES-T Sector

Support Scheme

A tax exemption to small producers and a biofuel quota are currently in place in Portugal. The former comprises a total exemption of the petrol product tax known as ISP (Imposto sobre Produtos Petrolíferos e Energéticos) to small producers of biofuels (known as Dedicated Small Producers - PPDs).⁸² The latter imposes domestic biodiesel plants to produce certain amounts for the domestic market based on the sales of the previous year and each plant's annual capacity. Furthermore, oil companies are obliged to blend by the end of 2014, a minimum of 6.75% (v/v) of domestically produced biodiesel (specified by EN 14214) into road diesel. At the same time oil companies are currently, obliged to blend a certain amount of renewable energy into the transport fuels' market. This energy percentage increases gradually, starting in 5% (2011-2012) and reaching 10% (2019-2020) (Brouzos, Galp, 2012).⁸³ There is also the specific obligation to incorporate 2.5% in energy content of gasoline substitute biofuels, based on the gasoline quantities to be supplied into the market starting from year 2015. If oil companies are unable to fulfill these mandates, they are subject to the payment of a compensation, which is € 2.000 per biofuel energy certificate (TdB) missing (RES LEGAL Europe Database).⁸⁴

Barriers to the Transport Sector

Domestic Production Regime

As mentioned above, oil companies have to incorporate a certain percentage of biodiesel in the road diesel supplied to the market. According to Brouzos, the rules protecting the national biodiesel market that oblige blenders to source a minimum of biodiesel domestically lead to the final use of only one type of biofuel and prevent imports of other types of biofuels other than biodiesel, considering that they are not entitled to renewable energy blending certificates (Brouzos, Galp, 2012). On the other hand, it is important to mention that there is a proposal from biodiesel producers to review the EN 14214 and increase to 10 the percentage of biodiesel blended in the diesel (Nogueira, APPB, 2012).

Maximum Selling Price for Biodiesel

Decree-law 117/2010 provided for the fixing of a maximum selling price for biodiesel. Currently, there is a cap for the selling price of biodiesel set by Ordinance 41/2011. According to Brouzos, this cap is defined by "the monthly

⁸² It is worth adding that large biofuel producers benefited from an exemption of the ISP from 2007 to 2010. Nowadays the exemption only applies to the above-mentioned Dedicated Small Producers (PPD) defined by Article 19(1) of Decree Law 117/2010 available at: <<http://dre.pt/pdfisdipl/2010/10/20700/0478204795.pdf>>.

⁸³ For more information see <http://www.res-legal.eu>.

⁸⁴ See Art. 24 of Decree Law 117/2010. TdBs are titles of biofuels valid for two years that can be traded among producers. Each TdB usually represents one TOE (Art. 13 of Decree Law 117/2010), but in case the raw materials are waste or derived from certain cellulosic materials, two TdBs are issued per TOE (Art. 14 of Decree Law 117/2010).



average of international quotations of vegetable oils and methanol added to a fixed factor that reflects capital, operational and transport costs, as well as the profit margins". Brouzos adds that "the pricing of biodiesel produced in Portugal based on the volatile international quotations of this product doesn't seem to ensure the necessary profit margins for the industry to sustain its business for the long term" (Brouzos, Galp, 2012). Adding to that the policy of non-importation practiced by the Portuguese government, it can be argued that biodiesel does not have a competitive price and the cap associated does not leave enough room for negotiation towards more competitive prices (Nogueira, APPB, 2012; Brouzos, Galp, 2012).

Withdraw of Support for Electric Mobility

Despite the fact that most of the infrastructure for a national-wide network of charging stations is already in place, the current government has withdrawn the support to the electric mobility program Mobi.E,⁸⁵ which was one of the most known projects for electric mobility from the previous government (Ferreira, Quercus, 2012). Ferreira also points out that the current fleet of electric vehicles is not representative, considering that only 231 EVs were sold in the country between 2010 and February 2012 (Ferreira, Quercus, 2012).

Misinformation and Taxation of Biodiesel Production in 2011

Queirós & Freitas add another barrier to the development of the biodiesel production in Portugal, which is the fact that the Portuguese government started taxing biodiesel production in 2011, based on road diesel duty paid in Portugal, making it more expensive and less competitive than the production of diesel (2012:12-13).

Resistance from Car Producers to Make Adaptations in the Engines

According to Queirós & Freitas, car producers still resist to allow increased use of biodiesel due to the investments required to make adaptations in the car engines. Additionally, consumers usually choose not to use biodiesel if it leads to losing the vehicle's warranty (2012:12-13).

⁸⁵ Financial and fiscal incentives to electric cars have been removed (as of September 2012). Previously, there was a subsidy of € 5,000 for the acquisition of the first 5,000 electric cars, which could reach € 6,500, if there was a delivery for destruction of an old car (Cancela de Abreu, APREN, 2012).



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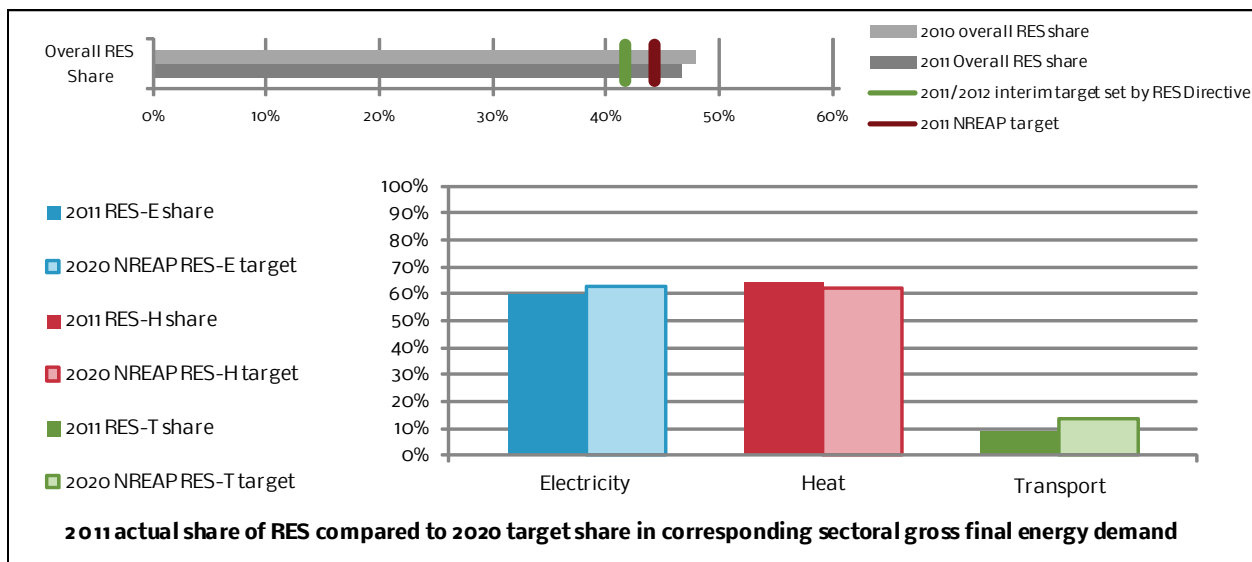
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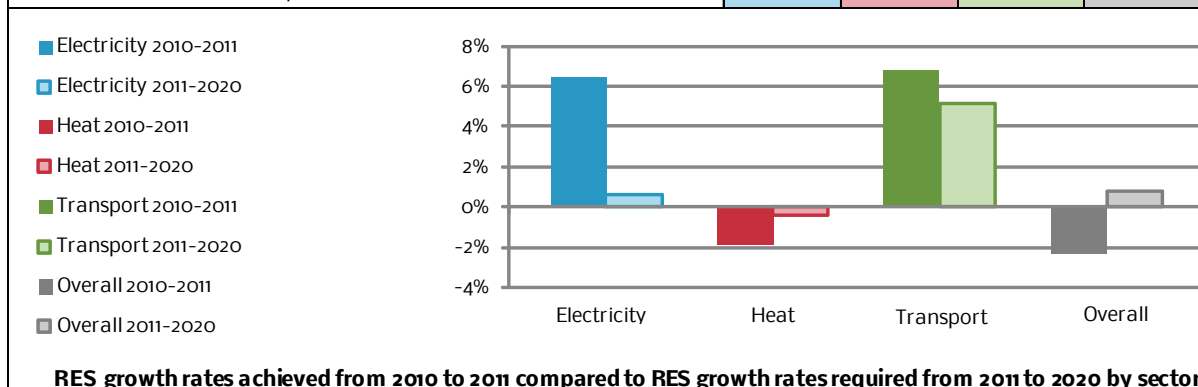


J. SWEDEN

1. NATIONAL DEVIATIONS REPORT



	Electricity	Heat	Transport	Total
2011 actual share of RES in sectoral gross final energy demand	59.6%	64.5%	8.8%	46.8%
2011 NREAP target	55.7%	57.6%	8.1%	44.2%
2011/2012 interim target set by RES Directive	-	-	-	41.6%
2020 NREAP target	62.9%	62.1%	13.8%	50.2%
Percentage of sector consumption in total final energy consumption in 2011	37%	36%	26%	99%
2011 Production [ktoe]	7,331	8,196	550	16,077
2010 Production [ktoe]	7,247	9,878	491	17,615
2005 Production [ktoe]	6,980	7,608	0	14,588
2020 NREAP target production [ktoe]	8,356	10,543	1,008	19,709
Deviation [%] of actual from planned share in 2011	7.03%	12.04%	8.64%	5.83%



- Sweden is well on track, even though its RES share has decreased slightly since last year. It achieves both its 2011/2012 interim target and its NREAP 2011 target.
- The overall growth of RES slowed down from 2010 to 2011 compared to the prior 6-year average due to deceleration in the heat sector.
- The overall negative growth rate needs to be reversed, but preliminary statistics for 2012 show that this is the case.



2. NATIONAL BARRIERS REPORT

The Swedish RES-E Sector

Support schemes

In Sweden renewable electricity is supported through a quota system. This scheme obliges energy suppliers to prove that a certain amount of the electricity supplied by them was generated from renewable energy sources. Energy suppliers shall provide this evidence by presenting tradable certificates allocated to the producers of electricity from renewable sources.

Apart from that electricity generated from wind energy is eligible for tax privileges consisting in a reduction of the real estate tax, and a reduction of the energy tax. Furthermore Sweden grants subsidies for photovoltaic installations.⁸⁶

Barriers to RES-E

Low profitability of RES-E investments

The most severe obstacle for the deployment of renewable energy sources in electricity sector is the existing **support scheme of quota system with tradable green certificates, which is regarded as insufficient**. It hampers the ability and willingness to increase the production of electricity. The possible investors are reluctant to start an investment in new RES-E installations because the profitability is too low. This barrier concerns all RES-E technologies. However, especially the development of smaller, not market-mature technologies is hindered.

The quota system as the one used in Sweden has been considered as not as effective as the feed-in system used in e.g. Germany and Finland. The system has led to a rapid expansion for some years but it supports primarily big investors and only the market-mature technologies like on-shore wind. The low level of the financial support and its incalculability constitute a substantial barrier for smaller and medium-sized enterprises, which are willing to invest in renewable energy. Moreover new technologies, which are not yet market-mature, have little chance of development in country using quota system as a support scheme. Above all, it is difficult to obtain bank loans for investment in facilities that produce renewable energy, as one cannot predict the value of the certificates in the future.

The Swedish government is not willing to change the support scheme, mostly because of its emphasis on nuclear power, which already delivers 40% of electricity in Sweden and in the next years will be developed even further (Bryntse, Karlsson, SERO).

The insecurity of the investment into RES is even higher because of the **low price of electricity** on the energy market. The surplus of electricity caused by a high share of nuclear power contributes to decrease of the price of

⁸⁶ Source: RES LEGAL Europe (<http://www.res-legal.eu>)



electricity power in Sweden. The RES-E plant operators receive on one hand money for the electricity they sell at the market and on the other hand the revenues from selling the green certificates. The low price of electricity at the market combined with the insecurity of the certificate price (barrier already described above) hinders investments in renewable electricity sector. Also this barrier concerns all RES-E technologies (Persson, Bryntse, SERO).

Military resistance to wind turbines

Another barrier concerns only wind energy plants, both on-shore and off-shore. Obstacle is caused by the Swedish Armed Forces, which believe that wind turbines may interfere with the JAS aircraft. Affected is around 50% of Sweden's total area. The concerned part is the southern part of Sweden, which is the area with most cities and industries - the electricity consumers. The expansion of wind turbines in southern Sweden is severely hampered (Bryntse, SERO).

Costs for small-scale electricity producers

The small-scale electricity producers can use the electricity they generated without additional costs (e.g. tax on electricity) only if the electricity is used directly. In Sweden there is no net-metering scheme in place, so if an electricity producer does not use the whole produced electricity directly, he cannot feed it into the grid and use its equivalent at any other time without paying additional costs of sales tax, energy tax and certificate fee. Additionally if the small-scale electricity producer generates more electricity in a year than he consumes he should also pay an additional measurement cost (Jansson, Swedenenergy; Ehrenberg, Egen El).



The Swedish RES-H Sector

The small scale market (single family houses) uses a lot of electric heating and heat-pumps. Furthermore 10% of small houses are connected to district heating (DH) network.

In the bigger buildings market (i.e. apartment and office buildings) almost all buildings are connected to DH-network. District heating plants are combined heat and power plants (CHP). In these plants more than 70% of used fuels is biomass (solid biofuel, biooils, pellets). Some of the others also use waste heat from industry. Only 5% of district heating plants use fossil fuels.

In the total heating market, around 50% comes directly (e.g. heat-pumps) or indirectly (DH) from bioenergy.

Support schemes

Renewable energy sources used for heating purposes are supported through numerous tax exemptions. First of all renewable energy sources are exempt from energy, carbon dioxide and nitrous oxide taxes. Furthermore the installation of renewable energy devices and the replacement of conventional heating sources with renewable ones may be deducted from tax for households.⁸⁷

Barriers to RES-H

Electricity as heating source

The most severe barrier to deployment of renewable energy sources in heating sector is the electric heating, which is used in small scale market (single family houses). The introduction of this kind of heating occurred in the 1980s and 1990s when Sweden developed a lot of nuclear power plants. Almost all single family houses come from that period. Since there is a surplus of electricity in the country, the price of the power is very low. It is therefore very hard to convince house owners to change the heating system in their houses. Some owners of the houses, where the electric heating is spread in the house using water pipelines, decided to change the heating source into heat-pumps. But if the house is heated with electric radiators, there are only two ways to change the heating system for the one using renewable energy sources. You can either put a small pellet oven in a living room or to put water piping in the house. The first solution is based on air heating, which is very limited and may require using another heating source in the other rooms. The second option - putting water piping in the house - is a very expensive option. The government awarded investment grants for that purpose, but these have been put on hold, because of the political decision on not phasing out the nuclear power plants in Sweden (Andersson, Svebio).

⁸⁷ Source: RES LEGAL Europe (<http://www.res-legal.eu>)



Prohibition on heat pumps in some municipalities

This barrier does not really constitute an obstacle for usage of renewable energy sources in the heating sector, but rather favours one type of heating system (district heating) over another (heat-pumps).

Some municipalities in Sweden force property owners to connect their houses to the district heating network and thus prevent the property owner from installing heat pumps. House owners are hindered in installing heat pumps, as they are forced to invest in a district heating connection, even if they do not intend to use that it. The reason for that is that some municipalities believe that heat pumps not as environmentally friendly compared with district heating. However, this situation is relatively rare and occurs only in a few municipalities.

Energy Agency and the Environmental Court have already acted in the problem. According to a ruling of the Environmental Court, a heat pump installation cannot be considered as less environmentally friendly than district heating (Forsén, SVEPINFO).



The Swedish RES-T Sector

Support schemes

The main incentive for renewable energy use in transport is an exemption from energy and carbon dioxide taxes. The exception concerns biofuels.⁸⁸

Barriers to the transport sector

Absence of policy instruments for biofuels from 2013

In Sweden biofuels are the most important renewable energy source used in the transport sector. They are currently supported through tax exceptions. This regulation may not be continued because of the concerns from the European Commission. The Commission wants to stop this tax exception, because of the rules for state aid. As for now there is no clear information on policy instruments for biofuels after 2013. This hampers investments in new facilities producing biofuels. If this support scheme cease to exist, investments in producing biofuels will not be economically feasible any more. The Swedish market for biofuels is very uncertain right now. The state aid is still very important for the deployment of this market, since it is not mature yet. At the present state all investments in new facilities for the production of biofuels are withheld, because of this uncertainty (Andersson, SVEBIO; Johansson, Lund University).

⁸⁸ Source: RES LEGAL Europe (<http://www.res-legal.eu>)



Common barriers for the electricity, heat and transport sector

The 2020 RES target already reached

Sweden already reached its 2020 RES target of 49% in the year 2012. This success is at the same time the most severe barrier for further deployment of renewable energy sources in all energy sectors (electricity, heating & cooling and transport) in Sweden. This target has from the beginning been set too low. In fact, the share of RES was already 48% in 2009, according to the Swedish Energy Agency.⁸⁹ So there has been not enough room for the development of new RES installation. This barrier is also a cause of almost every other barrier to development of RES in Sweden.

Since the set target has been reached already 8 years before the deadline, there is no incentive for the Swedish government to invest and support the deployment of new RES investments. To get started with reasonable discussions of policy instruments for RES, as well as increased investment and technology development, the Swedish government has to raise the targets to a sensible level.

Unknown is the reason why the Swedish government set such a low target, since the RES capacity in the country is estimated at the level of 70%. As long as the government will not set new, more ambitious goal, it cannot be expected that Sweden will introduce any new encouraging policies, support schemes or development programmes. It may also mean that the government will not intend to make much effort to solve the issues that are barriers to RES today (Mattison, SERO).

Insufficient financial support

Clear consequence of the barrier described above are insufficient financial support schemes for new renewable energy investments. This barrier will be described more detailed in the sector specific paragraph (Bryntse, Danielsson, SERO).

⁸⁹ Source: European Renewable Energy Council: Mapping Renewable Energy Pathways towards 2020.



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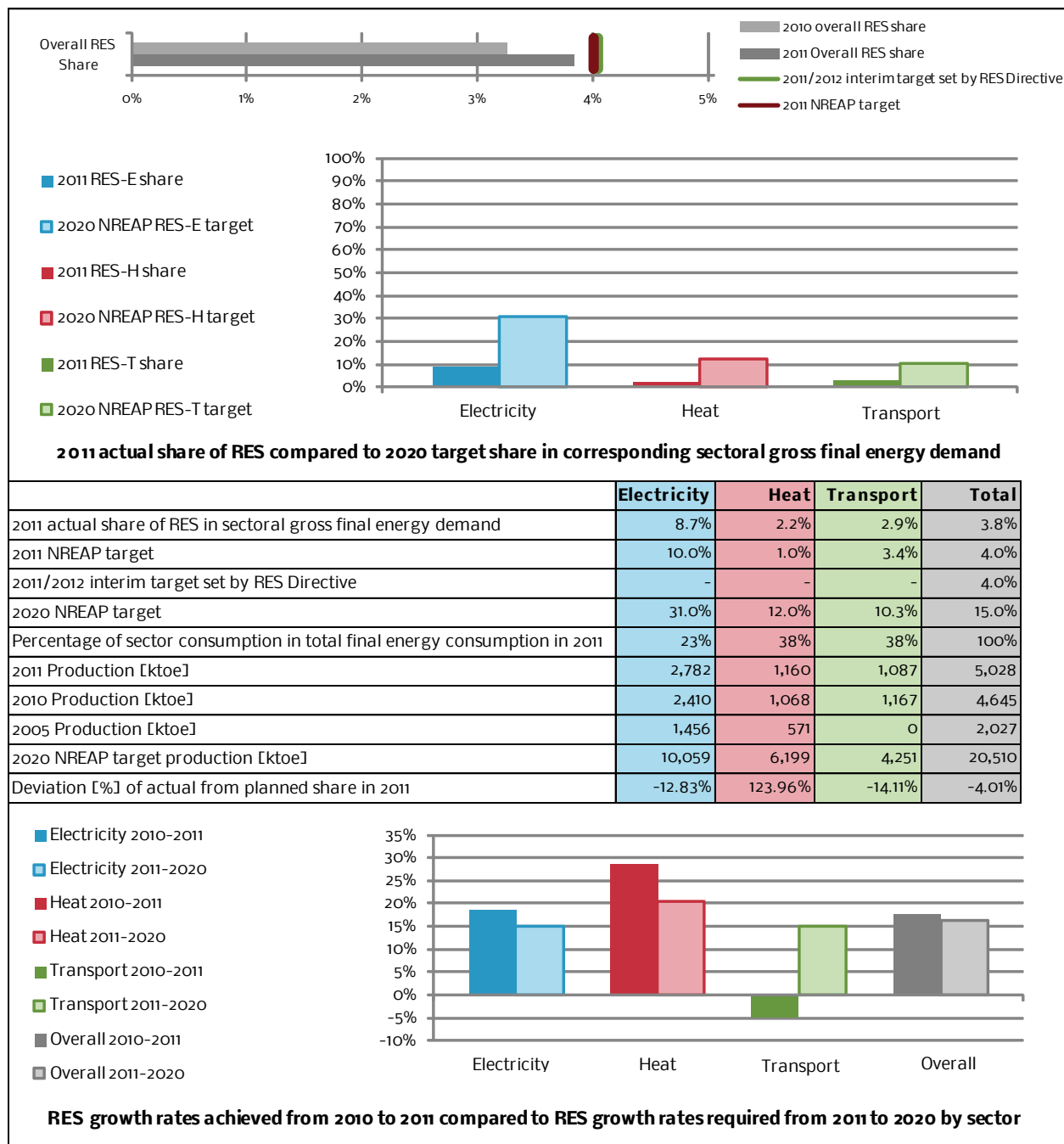
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K. UNITED KINGDOM

1. NATIONAL DEVIATIONS REPORT



- The United Kingdom is slightly off track regarding its NREAP 2011 target, and has not yet achieved its 2011/2012 interim target.
- Average annual growth in RES overall has slightly decreased between 2010 and 2011 compared to the prior 6-year average, with the transport sector even showing a negative growth trend.
- Growth rates in the electricity and heat sectors would be sufficient to reach the 2020 target. Only in the transport sector growth is too low to if the 2020 targets are to be achieved.



2. NATIONAL BARRIERS REPORT

Introduction to the UK situation

Under the Renewable Energy Directive⁹⁰ (hereafter - RED) the UK has to achieve one of the most ambitious growth rates to attain its 15% renewable energy sources (hereafter - RES) deployment target by 2020. According to the UK Renewable Energy Association (hereafter - REA), the deployment figure amounted to 3.8% in 2011. The UK Government claims to be committed to achieving the target however its actions fall short of creating the environment to make this possible. Furthermore, whilst some senior Government ministers see renewables as a major policy goal, others in the coalition are openly hostile towards renewable. The open conflict within the Government seriously undermines industry's confidence and enthusiasm towards getting involved. Having this in mind, the overarching barrier in the UK can be called '**Political Risk**' and many of the other individual barriers stem directly or indirectly from this (REA 2012).

Besides, as suggested by REA (2012) the UK has always been extremely focused on cost issues with respect to renewables. Therefore much of the industry has felt that it is struggling against difficult odds to make a clear financial case (though some technologies have fared better than others). Whereas marginal economics is clearly a very major barrier, the barriers stated in this report relate more to imperfections in the legal/regulatory environment, and for which there are often low-cost and/or practical solutions. Many of these issues have been well-known for a long time, like for examples issues relating to planning and environmental constraints, grid connection, financing of small-scale projects, etc. The industries have been seeking solutions with the relevant authorities for many years. In the end the discussion usually comes back to the issue of the lack of a clear Government commitment to renewables, being a crucial issue in the UK (REA 2012).

⁹⁰ Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, OJ L 140, 5.6.2009, p. 16



Common Barriers to the Electricity, Heat and Transport Sector

Policy risk and uncertainty

According to REA (2012), the overarching barrier affecting all technologies, across all sectors, in the UK renewable energy industry, and directly or indirectly impacting on all project development steps, is the policy risk and uncertainty in the market. It stems from continually changing policies, making the development of an investment in UK renewables high risk - and for some technologies like for instance dedicated biomass, nigh on impossible. Lack of agreement between Treasury and Department of Energy and Climate Change (hereafter - DECC) and coalition partners led to delays in publishing the Renewable Obligation Bands and the Electricity Market Reform (EMR). Moreover, the Government is permanently altering the financial support schemes. As a result, it is not clear what approach Government employs when it determines which technologies to support. For example, is it technologies offering the lowest cost to consumer; the lowest cost per tonne of carbon saved; a variety of technologies; the least visually intrusive or contentious; small scale or large scale technologies? The developers lack clarity of the effects of the changing policies on their existing projects in the medium and long run. Investors are unclear about the level of Renewable Obligation Certificates (ROCs) for certain projects and are concerned that the Government will withdraw or reduce the financial support despite promises of grandfathering.

The policy risk and uncertainty in particular hits some RES-E technologies. For example, “hard won battles have resulted in a relatively simple means to reward success in generating electricity from the waves and tides through 5 ROCs. However the short horizon between now and 2017 and the time it will take to get these pioneering machines built (if invested in now) means that the moment the machines get to the water will be the moment the multiple ROCs ends. Lack of clear commitment by the Government to either guarantee a comparable regime beyond 2017 for even the first farms/machines, or to take marine out of the larger EMR process, leads to uncertainty and frustrates the industry. As a result, there are no commercial sites operating yet and they are finding it hard to attract investment despite a real interest to invest in marine” (REA 2012).

According to REA (2012), there are also great uncertainties surrounding the UK Government proposal to impose sustainability criteria within the Renewables Obligation (RO) in October 2013 and within the Renewable Heat Incentive (RHI) in 2014. The main concern here relates to the implementation details and potential administrative burdens once these are finalised. The developers fear that the burden of adhering to too strict sustainability criteria will deter investors. They are convinced that complying with such tighter regulations will add to operational risks and costs. In addition, developers fear that, even if none of these regulations are decisive in themselves, the cumulative effect of regulations on sustainability, air quality, etc. will discourage people from choosing biomass power or heat. The main concern by the project developers is that delay in resolving uncertainties will mean projects are unable to be confident of RO support before it closes to new entrants in 2017.



In terms of the transport sector, not only has the Renewable Transport Fuel Obligation⁹¹ (RTFO) been amended twice since its introduction, but the Government has refused to set a trajectory to reach 10% renewable energy in transport (RES-T) target by 2020. The European biofuels market is driven exclusively by mandatory targets so the absence of a forward trajectory represents a significant risk for the funders in the biofuels sector - for both first and second generation biofuels. The RED began to create some investor confidence as the EU seemed to be committed to reducing its dependency on fossil fuels and to combating climate change. However, the European Commission (hereafter - EC) proposal of October 2012⁹² to effectively reduce the target for 2020 through the cap of 5% from crop based biofuels would impact virtually all current producers and investors as the market stability would be severely damaged to the extent that the RED RES-T target (and potentially the entire UK RES target) could be threatened in the proposed review of 2014 (REA 2012).

Furthermore, it was suggested by REA (2012) that “by not putting in place any trajectory to 2020 or setting increased targets to 2030, the EC has now destroyed investor confidence in the European biofuels sector, particularly at this time of financial fragility when potential investors look very closely at market certainty. Given the high capital costs of biofuel facilities, banks, are unlikely to be willing to commit funds until this is resolved. Without this clarity hardly any additional facilities will be constructed”.

In addition, in July 2012, the Department for Transport (DfT) announced proposals to include Non-Road Mobile Machinery (NRMM) within the scope of the RTFO. Because DfT does not want to increase the volume of biofuel supplied to the market, the RTFO target is expected to decrease from 5% to around 4.7% by volume for 2013/14 and subsequent years (REA 2012).

⁹¹ www.legislation.gov.uk

⁹² European Commission proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources, COM(2012) 595 final



Common Barriers to the Electricity and Heat Sector

Lack of skilled workforce

According to REA (2012), lack of a skilled workforce for the installation of all renewable microgeneration technologies is one of the main barriers to the electricity and heat sector in the UK. It was reported that not enough engineers are coming into the renewable industry. This is largely because companies want to see a long-term, stable support regime before committing themselves to training staff and installing new technologies. Moreover, it is hard to find skilled people for the highest level project development positions in case of very complex offshore wind projects (REA 2012a). If this problem continues to remain, there will be not enough suitably trained individuals to install at the required rate to meet the UK objectives under the RED and any growth in the UK market might be stalled (REA 2012).

Cost and Complexity of the Microgeneration Certification Scheme

The Microgeneration Certification Scheme⁹³ (MCS) is perceived by many as a barrier to the widespread implementation of small-scale renewable technologies within the UK. The MCS Installer Certification Scheme is currently the only recognised scheme for the certification of renewable energy installers wishing to access governmental fiscal and financial incentives. The scheme therefore has an extremely important role to play in protecting those who wish to invest in the industry. The high costs and complexity of the MCS however are perceived as significant barriers acting as a dis-incentive for many small installation companies or sole traders willing to enter the UK renewables market and ultimately preventing the scheme from working effectively and achieving its aim (REA 2012).

According to REA (2012), the barrier affects all renewable technologies within the UK aiming to access governmental incentive schemes. Moreover, it restricts access to the UK market to installers who already have installer certifications awarded by other EU Member States and thus infringes the RED on the mutual recognition of installer certifications issued by other EU Member States. It also affects installations going into public buildings since the compliance with MCS is usually a minimum requirement.

⁹³ MCS is an industry-led and internationally recognised quality assurance scheme, supported by DECC. The Scheme was launched in 2008. It certifies microgeneration products used to produce electricity and heat from renewable sources. MCS also certifies installation companies to ensure the microgeneration products have been installed and commissioned to the highest standard for the consumer. MCS covers electricity generating technologies with a capacity of up to 50kW, and heat generating technologies with a capacity of up to 45kW. More on MCS see <http://www.microgenerationcertification.org>



High focus by UK Government on costs

The high focus by the UK Government on costs constitutes a barrier to renewable electricity and heat in the UK. Cost reductions can often result in compromises whereby corners are cut and errors are made. This may result in project failure and in turn damaged industry reputation. A specific example of this concerns the gasification and pyrolysis industry whereby the reputation of these technologies has been damaged due to the plant failure. Therefore it has to be acknowledged that successful cost-related compromises cannot always be made in these complex technologies (REA 2012).



The United Kingdom RES-E Sector

Support schemes

In the UK, the generation of electricity from renewable energy sources (RES-E) is supported through Feed-in Tariffs (FiT) and the RO - a quota system based on certificates. Under the feed-in tariff, accredited producers whose plants have a capacity of up to 5 MW can sell their electricity at fixed tariff rates established by the DECC; the scheme is managed by the Gas and Electricity Market Authority (Ofgem). Under the quota system, licensed electricity suppliers are obliged under the Renewables Obligation Orders⁹⁴ (ROO) to present a certain number of ROCs obtained from renewable generation or pay a forfeit (the 'buy out price') (RES LEGAL Europe 2012).

Barriers to RES-E

Grid related issues

Currently the grid is underdeveloped in the UK for renewable energy, resulting in **too little capacity to transmit and distribute RES-E** at the required scales and in some locations. The electricity grid needs to be upgraded within an overall strategy to provide power grid infrastructure where it is needed. For RES-E, this often means in places where historically no electricity was generated (AEON 2010). These issues affect all technologies, but in particular large wind (especially offshore) and marine energy installations. Regarding marine energy technologies, the grid rules were written for a time of carbon based generation and sought to minimise waste in transmission. They do not recognise the strategic nature of marine resources and the fact that they are dispersed at the periphery of the country. No encouragement is provided to harvest resource at the most efficient locations (REA 2012).

As suggested by REA (2012), the strategic configuration of the grid to accommodate increasing penetration of dispersed and embedded renewable generation is needed. Renewable installations are meant to compete with established conventional electricity generating technologies, however they have to fight with a playing field designed to support centralised generation. Furthermore, greater costs are incurred and longer timescales to connect are observed.

Technical practices differing among Distribution Network Operators (hereafter - DNOs) are further perceived as a barrier hindering all renewable technologies in the UK electricity sector while incurring costs in grid connection to the developers. These issues are not under open governance and therefore it is difficult to engage with the DNO on such technical practices. Specific examples include reluctance by some DNOs to utilise full reactive capability of generators, insistence on two physically close circuit breakers in series, etc. (REA 2012).

According to REA (2012), **DNOs are also reluctant to publish hv network data on line and free of charge.** Although perceived as being of moderate severity, this barrier affects all technologies below few MW that may

⁹⁴ www.legislation.gov.uk



connect at hv, i.e. projects in the 500kW to 3MW band. As a result developers of such projects have difficulties to quickly assess the likely ease and cost of connecting to the grid at a particular location.

During the RES-Integration survey carried out in 2011 stakeholders indicated some **offshore wind specific issues** in this context. It was complained about the tender process favouring a less-than-optimal structure of the offshore grid or generator use of system charges varying by location, with higher charges in areas remote from the load centre. These areas often have the greatest RES-E resource and therefore the charging regime may not play in favour of developing generating facilities in such locations. In addition, before the actual connection and the payment of a connection charge, a user commitment shall be provided by generators to the System Operator in order to secure the connection for both onshore and offshore technologies. According to one stakeholder, these commitments, particularly the ones paid by offshore developers, had reached very large levels, up to billions of pounds, and consequently investments for such subjects were unsustainable (RES-Integration 2011). According to REA (2012), it has however been improved given that generators can build the infrastructure themselves and then auction it to the person who will take it on and run it for the lowest overall cost. Basically this becomes a competition between entities with the lowest cost of capital.

A further technical grid issue adversely affecting RES-E deployment is that of the **over-voltage**. “It has been found, specifically in small-scale PV generation that inverters cut out frequently due to over-voltage. The inverters can connect to the grid at up to 300v, yet G83 and G59 generation connections constrain the connection from reaching this voltage. Therefore when the grid voltage exceeds the set parameters on the inverters, they cut out. The owner can request the DNO to reset the parameters however in some cases owners are not even aware that the inverters are cutting out. The consequences of grid over-voltage are lost revenue to the owner, and more power having to be generated from elsewhere to compensate” (REA 2012).

The whole charging system is currently undergoing an extensive review, known as project TransmiT⁹⁵. As suggested by REA (2012), the “outcome of the project will not be known until spring or summer next year. There will still be locational differentials, although they may be slightly lower particularly for lower load factors and intermittent generation”.

Planning issues

Most RES-E installations need to obtain **planning permission** before they can proceed. As suggested by REA (2012), this is often cited as one of the key barriers to RES-E deployment in the UK. For large projects (>50MW) applications are made to the Government (DECC). Projects below 50 MW have to apply to the Local Authority (LA). There have been significant changes to the planning requirements for RES-E projects lately; some of them being helpful, and others not. There is now a National Policy Statement for Renewable Energy Infrastructure⁹⁶ (EN-3)

⁹⁵ Project TransmiT is Ofgem's independent review of the charging arrangements for gas and electricity transmission networks, and the connection arrangements. More on the project see <http://www.ofgem.gov.uk/Networks/Trans/PT/Pages/ProjectTransmiT.aspx>

⁹⁶ www.official-documents.gov.uk



providing useful guidance for projects above 50MW. The guidance below 50MW should in principle reflect that document, but a comprehensive renewable energy Planning Policy Statement has recently been replaced by a much shorter National Planning Policy Framework⁹⁷ providing only very general guidance for renewable (REA 2012). According to REA (2012), so far it is not clear what the impact of all these changes will be. However it is expected that planning will continue to constitute a significant barrier for some technologies, especially wind and bioenergy.

A number of previously carried out surveys suggested that the planning procedures in England, Wales and Scotland often cause long administrative times due to a very comprehensive involvement of subjects (AEON 2010, Wind Barriers 2010, RES-Integration 2011). These issues are relevant both in terms of connection and of grid development (RES-Integration 2011). Whilst in general renewable energy is quite popular in the UK, many individual proposals are strongly opposed by a very vocal and active minority. The Localism Act⁹⁸ introduced in November 2011 gives even more weight to localism agenda. Thus it may be assumed that social opposition will continue to constitute a barrier for some renewable technologies, especially bioenergy and wind projects (REA 2012a).

Planning consent is sometimes refused due to **competing public interests**. For example, “airports have been seen to be cautious with regards to using new technology in order to ensure that there is no radar interference with wind turbine projects. One worry is that changing technologies may have public safety implications” (REA 2012).

LAs are meant to develop policies on renewable energy deployment in their area as part of their development plan. This can be very politically contentious and result in deployment being heavily restricted. However there is currently **no way to ensure that the UK 15% national renewable energy target is reflected in local planning policies** (REA 2012). Moreover, the UK Energy Minister declared that there is no need for more onshore wind, because there are already enough consented projects to meet the 2020 target. Such statements hamper onshore wind development, not only because of the resulting uncertainty of the project developers, but also because the LAs feel that they are justified in refusing planning consents to onshore wind projects (REA 2012a).

Finally, **planning consent is treated differently** in Scotland and in England/Wales, being under different pieces of legislation (RES-Integration 2011). This in itself constitutes a barrier.

Biomass specific issues

According to REA (2012), developers and funders of RES-E projects are concerned about the **future security of biomass fuel supply**, i.e. that the necessary quantity and quality of biomass fuel may not be available, at least at an affordable price, over the life of a biomass power plant project. One stakeholder suggested that this barrier is caused by the very large biomass power plant projects proposed, and the export of biomass contained in waste,

⁹⁷ www.official-documents.gov.uk

⁹⁸ www.legislation.gov.uk



including Refuse Derived Fuel (RDF) and Solid Recovered Fuel (SRF) from the UK. REA (2012) suggested that a significant share of biomass power projects have been shelved due to such concerns.

Biomass projects are also hindered by the **insufficient focus and commitment from potential on-site power users**. Although many developers have a good project, since this is not necessarily their main area of business, focus is elsewhere and therefore the biomass power project does not receive the required commitment for success. Furthermore there is a **lack of readily available and trusted information** for such businesses and organisations. This barrier affects a number of technologies, but most specifically biomass (REA 2012).

Additionally, **contractor related problems** have been reported by some stakeholders. As suggested by REA, “too few projects have proceeded in the UK for a significant contractor supply base to be established. Large, experienced and international contractors are too expensive and inflexible for biomass power plant projects in the range 2 to 15 MWe to be viable. Small evolving contractors on the other hand are too inexperienced to develop biomass power projects. A significant number of biomass power projects have proven to be unbankable due to this” (REA 2012).

Marine specific issues

According to REA (2012), the generation of electricity from marine sources is seen as strategically important for the future RES-E supply of the UK. One stakeholder has identified that a key barrier to this progress are the rules set by Ofgem for test sites. The **rule sets are incapable of accommodating several scenarios for testing** and are not reflective of the experimental nature of this stage of development. A specific example of this given by REA is that when surrendering a registration (for upgrade, attraction of higher support), it is necessary to show that the original electricity generating station is no longer in existence. This requires having to demonstrate a machine being physically dismantled, even when it may just be necessary to move the plant elsewhere, or to make short term changes.

A further issue concerning the rules for testing is that the grid capacity for export is not able to accept the highly variable generation from test machines. As the grid capacity is currently not capable of expansion, in order to ensure the maximum generation it has been proposed that a load dump be installed on the site and the excess energy over and above the export limit is dissipated. As advised by Ofgem, such an arrangement would render the entire site ineligible for ROCs even if the intent would be to only claim the exported energy, not that which has been dissipated. According to REA, these **rules are unnecessary** and are delaying testing activities and therefore the realisation of the benefits of marine energy (REA 2012).



The United Kingdom RES-H Sector

Support schemes

In the heat sector the main instrument for funding heat from renewable energy sources (RES-H) is the RHI, supporting RES-H installations with a fixed amount per kWhth produced. Currently the scheme is only open for non-domestic installations. Domestic installations are covered by the Renewable Heat Premium Payment (RHPP), which provides a grant to households that apply for the scheme for installing RES-H generators. The RHPP will be discontinued in 2013 (RES LEGAL Europe 2012). However from summer 2013 domestic installations will be covered by the RHI.⁹⁹

Barriers to the heat sector

Well developed gas infrastructure

One of the main barriers to the renewable heat in the UK is a very well developed gas infrastructure. Since a very large part of the country has access to gas, it is a challenge for renewable energy sources to compete with it (REA 2012b).

Market perception

RES-H technologies have not been widely employed in the UK (REA 2012b). Poor understanding of the benefits and potential of certain renewable technologies inhibits their deployment. An example of this can be seen in the solar thermal industry. It is often claimed that there is not enough solar resource in the UK in order to make it a worthwhile investment (this also applies to PV). Although this is not the case, such statements and beliefs may adversely affect deployment of renewable technologies (REA 2012).

Insufficient support for district heating

According to REA (2012), district heating has a significant potential to deliver renewable heat but is still very poorly developed in the UK. A lack of regulatory support and a wide range of legal and regulatory issues (such as the set up of the scheme, access to land, continuity of supply and consumer repayment), inhibit the progress of the industry.

Biomethane injection - Capacity Issues

The capacity of a gas network to accept biomethane depends on the consumer demand on the network. During the times of low demand (e.g. summer nights), there may be an issue as to what to do with the excess gas production. This issue depends mainly on the location of the biogas plant, i.e. whether it is in an area where there is sufficient capacity to accept the gas all year round. Usually it is impossible to overcome this issue by restricting

⁹⁹ www.decc.gov.uk



the flow of biomethane into the grid. According to REA, the ideal solution is to inject the biomethane into the medium pressure gas grid which has the capacity to accommodate the output from the biomethane. However where there is only a low pressure connection available, a compression facility to transfer gas from low to medium pressure gas grid has to be installed in order to balance demand with supply. Since, however, the compression facility is always remote from the plant it can be difficult to reach an agreement between the grid operators and project developers as to who is responsible for paying and running the compressor, therefore posing a barrier to the implementation of this solution (REA 2012).

Proposed EU end-of-waste criteria

In the UK, an industry specification against which producers can verify that the digestate derived from the AD of source-segregated biodegradable materials is of consistent quality and fit for purpose (i.e. ceased to be a waste and can be termed 'bio-fertiliser'), is provided in PAS110¹⁰⁰ and the Certification Quality Protocol¹⁰¹. Although these specifications work well, the EC is proposing to adjust end-of-waste criteria so as to suit all Member States. As requirements for this standard differ across the countries, such as due to different industries and quality of digestates, the biggest fear of the industry is that the criteria may become increasingly complex. This will likely result in operators having to carry out numerous and unnecessary tests, using complicated machinery and consecutively causing the costs related to AD end-of-waste to increase. Furthermore, according to REA, if this EU standard is not fairly achievable, then the operators will be unable to meet the end-of-waste criteria. On the other hand, if the standard is too lax, there will be no market for digestate and the disposal of this digestate will become an issue. Therefore whilst this is not yet a barrier, it is highly likely that in case the EU standards are passed, it will act as one in the future, and will affect a large number of RES-H installations (REA 2012).

¹⁰⁰ PAS 110: Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated - <http://www.biofertiliser.org.uk/pdf/PAS-110.pdf>

¹⁰¹ Quality Protocol. Anaerobic digestate - <http://www.environment-agency.gov.uk/static/documents/Business/W524AnaerobicDigestatev4%281%29.pdf>



The United Kingdom RES-T Sector

Support schemes

An obligation system for biofuels has been in place in UK since 2008 (DfT 2009). Fuel suppliers for transport are obliged to supply a volume of biofuels based on a percentage of the volume of fossil fuel they supply onto the market. This percentage is set annually. There is a certificate system for providing proof of compliance (RES LEGAL Europe 2012).

Barriers to the transport sector

Government reluctance to introduce E10

Whilst a number of other EU Member States have taken steps to introduce E10 (a fuel mixture containing 10% ethanol and 90% gasoline), the UK Government appears to be reluctant to sanction such a move despite the European Committee for Standardization (CEN) (and the UK standards organisation, the BSI) approving the specification. As reported by the stakeholders, in absence of a greater leadership towards this end, the UK will be physically unable to reach the 10% RES-T target at the current biofuel blend levels (E5 and B7). This will further lead to a lack of investor confidence in the market and consequently negatively impact the whole biofuels industry. If fuel suppliers would launch E10 without Government support, this might confuse consumers and harm the reputation of the biofuels industry (REA 2012).

Fuel duty based on volume

As suggested by REA (2012), “fuel duty based on volume instead of energy content prevents the use of bioethanol as a diesel replacement in high ethanol blends (e.g. ED95). As the energy density of bioethanol is much lower than that of both gasoline and diesel it would carry a much higher fuel duty and VAT burden than the fossil fuel it displaces. This is important because diesel fuel use is growing in Europe at the expense of petrol and diesel is mainly used for heavy goods vehicles / fleets. ED95 can be used as a low carbon displacement for diesel in HGVs (heavy goods vehicles) and passenger cars. As many bus and truck fleets have dedicated refuelling stations, the use of ED95 can reduce CO₂ emissions from fleets and achieve high penetration quickly; however the issue surrounding fuel duty prevents this from reaching its potential”.

European Commission proposal to amend the Renewable Energy Directive



The EC made a series of proposals on 17 October 2012 to amend the RED¹⁰². According to REA (2012), a number of the proposals will in themselves constitute further barriers for the transport sector in the UK. Of these the most significant barriers are:

A 5% cap on the amount of crop-based biofuels that can count towards the RED target

The EC is proposing a 5% cap on the amount of crop-based biofuels, because to its opinion the use of all crop-based biofuels increases CO₂ emissions and takes land away from food production. However, REA (2012) suggests that this position ignores:

- the fact that there are good crop-based biofuels which make a significant contribution to reducing CO₂ emissions;
- the additional market provided by biofuels has incentivised increased crop productivity for a number of crops and led to greater agricultural production;
- crop-based biofuels provide the market bridge to the commercialisation of advanced biofuels

According to REA (2012), if these proposals are agreed this will deter investment for all good biofuels and impose a severe barrier to achieving the RED target.

Introduction of Indirect Land Use Change (ILUC) factors

The industry is concerned over the EC's proposal to introduce the ILUC factors that will be applied to the carbon intensity calculations of biofuels. It is suggested that the ILUC factors as they stand now are not based on comprehensive science. For example the International Food Policy Research Institute (IFPRI) model used to calculate the factors fails to take into account certain agricultural realities and animal feed co-products. If fuel suppliers are required to report against the factors as they stand now, they will be seen to be producing a product that is against the aims of the RED. This in turn will cause significant damage to the public perception of biofuels in the EU (REA 2012).

Proposed double/quadruple counting

According to REA (2012), both first and second (advanced) generation biofuels are struggling to obtain project finance due to perceived market and technology risks. "Although the proposal for double or quadruple counting for second generation biofuels is welcomed, it will not help to get projects financed as the mechanism is yet untested and the value uncertain. Without a stable market beyond 2020 and a timeframe that allows returns to be made in line with rational business plans, technology developers and potential investors will not be willing to commit to the market. Lacking longevity and stability, even quadruple counting is unlikely to bring forward the necessary investment".

¹⁰² European Commission Proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources, COM(2012) 595 final.



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