



EU OVERVIEW

THE EUROPEAN UNION IS CURRENTLY ON TRACK IN TERMS OF ITS INDICATIVE TRAJECTORY.

In 2011, the EU-28 were slightly above track regarding the overall RES share planned in their National Renewable Energy Action Plans (NREAPs), and thus also comfortably above the 2011/2012 interim target defined in the RES Directive.

RES SHARE IN GROSS FINAL ENERGY CONSUMPTION

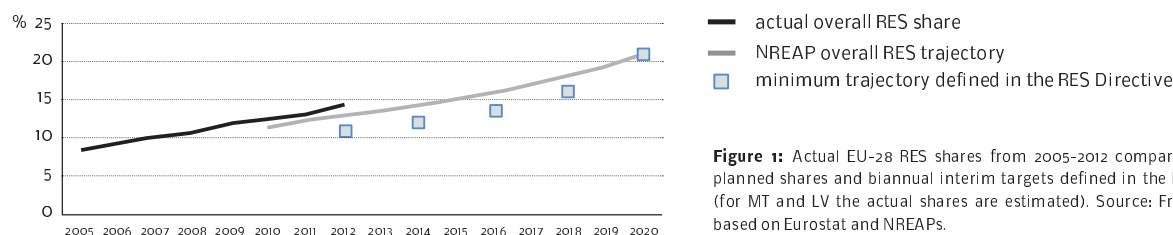


Figure 1: Actual EU-28 RES shares from 2005-2012 compared to NREAP planned shares and biannual interim targets defined in the RES Directive (for MT and LV the actual shares are estimated). Source: Fraunhofer ISI based on Eurostat and NREAPs.

The EU-28 are on track with an overall RES share of 14.07% in 2012, compared to a planned share of 12.87% according to the NREAPs.

RES SECTOR SHARE IN FINAL SECTORAL ENERGY CONSUMPTION

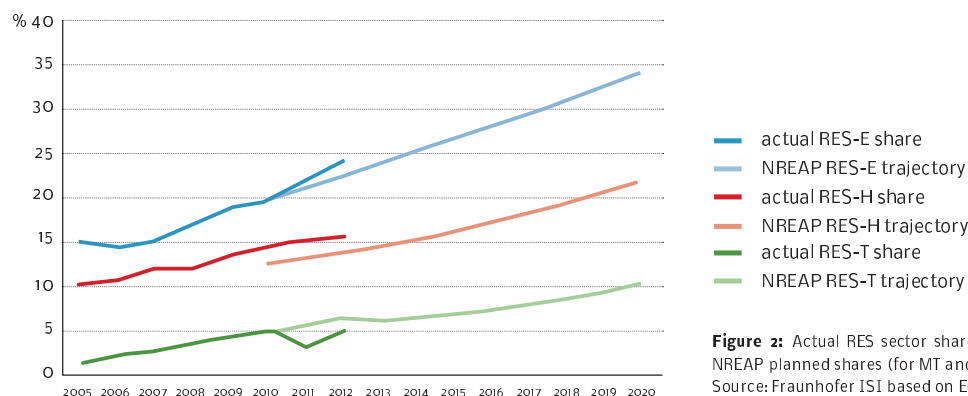


Figure 2: Actual RES sector shares in the EU-28 from 2005-2012 and NREAP planned shares (for MT and LV the actual shares are estimated). Source: Fraunhofer ISI based on Eurostat and NREAPs.

Regarding the individual sectors, the shares of renewable electricity (RES-E) and renewable heating and cooling (RES-H&C) were bigger than planned, while the share of renewable energy sources in transport (RES-T) was lagging behind.

From 2010 to 2011, the RES-T share suddenly decreased and rose again thereafter. This has been caused by a statistical issue: to count towards the RES target, biofuels and bioliquids must be compliant with sustainability criteria under Articles 17 and 18 of the Directive 2009/28/EC. This legislation was supposed to be fully transposed by 2010. Until 2010, all biofuels counted towards the target. As of 2011, Member States report only biofuels and bioliquids compliant with Article 17 as well as Article 18², which led to a drop in the share. As Member States gradually improve the compliance and the respective reporting of their biofuels, the RES-T share can be expected to rise again.

ACTUAL VERSUS PLANNED RES SHARES

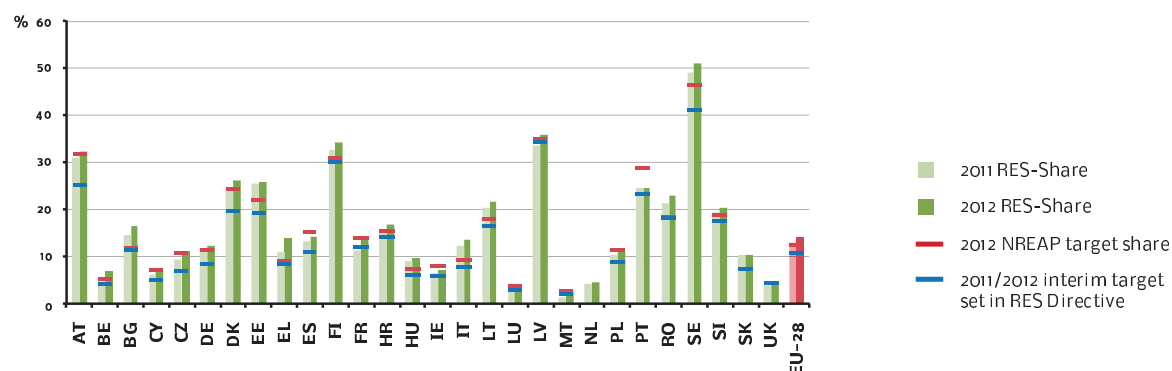


Figure 3: Actual overall RES Share in 2011 and 2012 vs. 2011/2012 interim target of RES Directive and 2012 NREAP target (%) (Eurostat actual share is tentative for LV. For MT the Progress Report share has been used.). Source: Fraunhofer ISI based on Eurostat, NREAPs, and Progress Reports.

The NREAP targets for 2012 were met or exceeded by 22 Member States (compared to 16 Member States in 2011 and 20 in 2010), and failed by 6. However, 26 Member States are still on track regarding their 2011/2012 interim target from the RES Directive. Only France and the Netherlands did not meet their targets³.

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 Eurostat Shares Exercise, available at http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/other_documents

³ According to the EUROSTAT shares exercise, Malta had a share of 1.39% and therefore would have missed the 2011/2012 target. However, in its own Progress Report, Malta reports a share of 2.7% and is thus on track. As in the case of Malta the EUROSTAT figure relies on estimates, the Progress Report figure is used here. The UK missed its interim target by a very slight margin of 0.04%, which is considered negligible by the European Commission.

RES GROWTH RATE 2010-2012 VERSUS AVERAGE ANNUAL GROWTH RATES REQUIRED

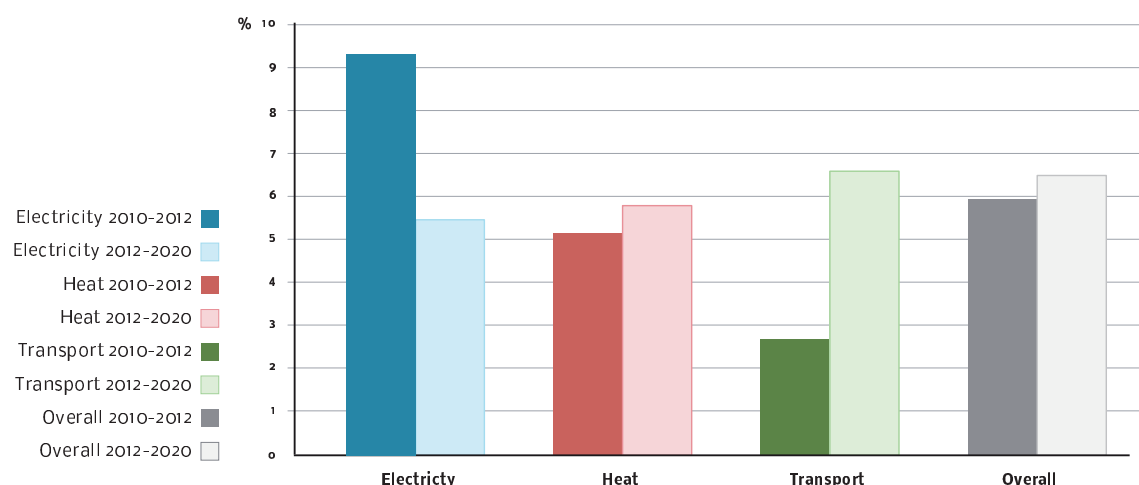


Figure 4: Growth rates of RES sector shares 2011-2012 [%/a]⁴ and average annual growth rates [%/a] required from 2012 to 2020 to achieve the 2020 target. Source: Fraunhofer ISI based on Eurostat and other sources.

The growth in the overall RES share over the last two years has been slightly lower than the necessary average annual growth rate needed to achieve the 2020 target. If maintained, the 2011-2012 RES-E growth rate for the EU-28 is high enough to achieve the share planned for 2020. In contrast, the growth rate for the RES-H&C share has been slightly too low. The provisional growth rate in the RES-T share over the last two years has been lower than the necessary annual growth rate. Note, however, the above-mentioned break in the data series for biofuels in 2011. The recent growth rate for RES-T is therefore just a rough indication.

ACTUAL VERSUS PLANNED RES-E SHARES

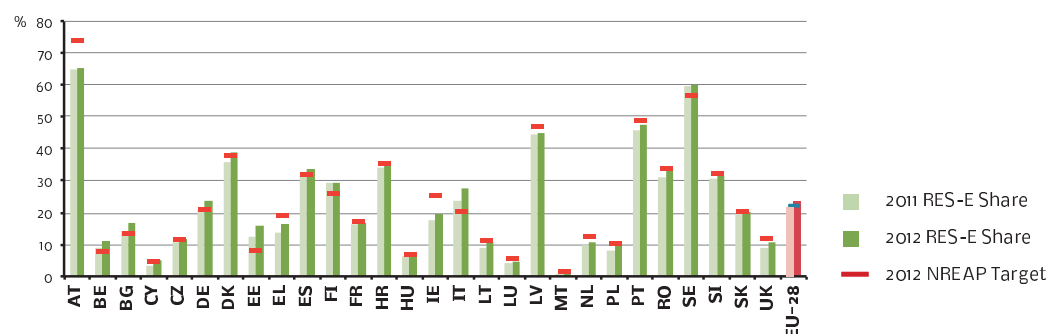


Figure 5: RES-E shares vs. NREAP target shares (Eurostat actual share 2012 is tentative for LV. Progress Report share has been used for MT). Source: Fraunhofer ISI based on Eurostat, NREAPs, and Progress Reports.

Twelve Member States were above their indicative trajectory in 2012. The most significant overachievement has been recorded in Estonia, with 95% more RES-E than planned in the NREAP for 2012. Sixteen MS stayed below their target. The result is thus slightly worse than in the previous year, where 13 Member States had exceeded their targets and 14 had missed them.

⁴ Due to the above-mentioned data problems regarding biofuels in 2011, the growth rate for RES-T from 2011-2012 would be very high and not reflect reality. As an alternative indicator, the average annual growth rate from 2010-2012 is used for RES-T. However, note that this is an interim solution. The values for 2010 do not take biofuel compliance into account, while the values for 2012 do.

ACTUAL VERSUS PLANNED RES-H&C SHARES

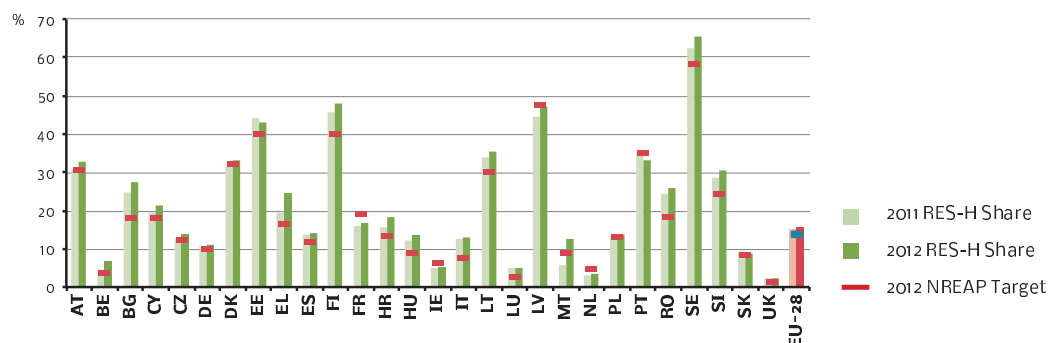


Figure 6: RES-H&C shares vs. NREAP target shares (Eurostat actual share 2012 is tentative for LV. Progress Report share has been used for MT). Source: Fraunhofer ISI based on Eurostat, NREAPs, and Progress Reports.

In the RES-H&C sector, 23 Member States were above track in 2011. Similarly, in 2012, 23 Member States were on track⁵, and only 5 Member States underachieved (Ireland, Portugal, Latvia, France, and the Netherlands).

ACTUAL VERSUS PLANNED RES-T SHARES

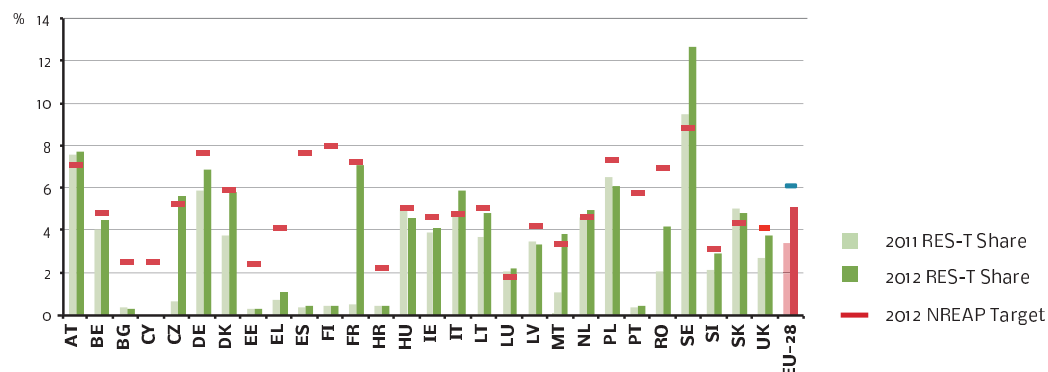
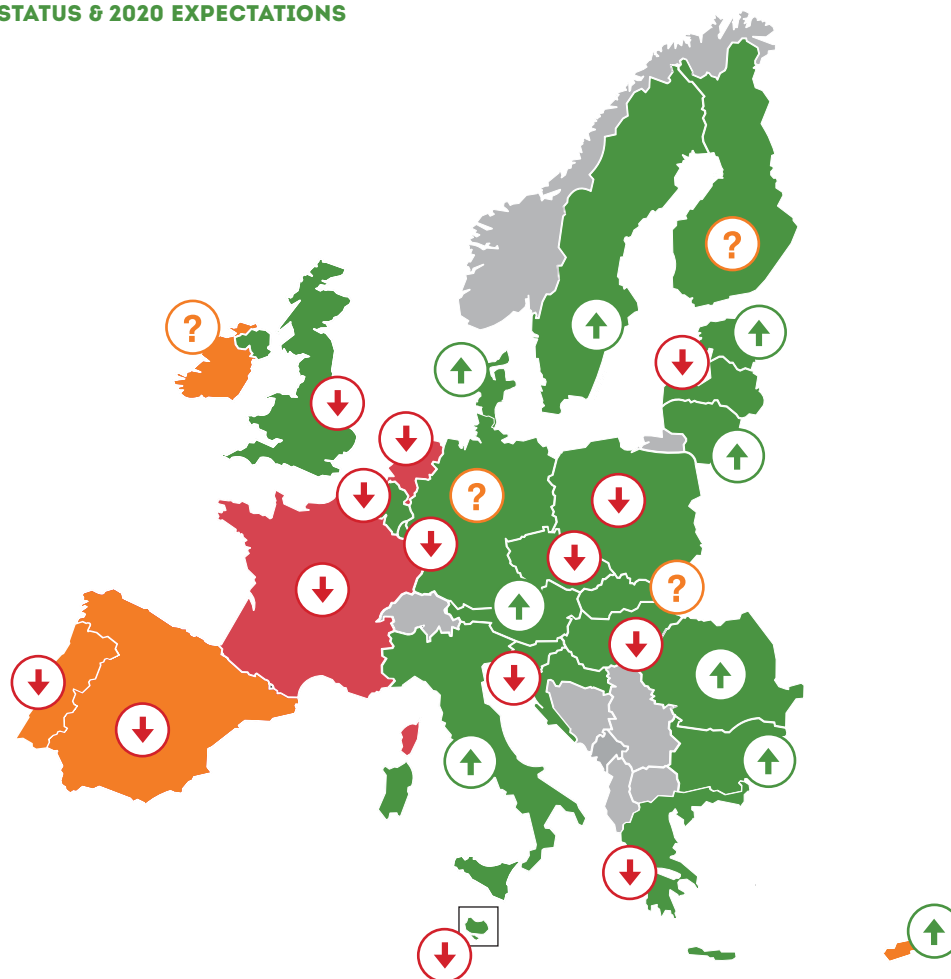


Figure 7: RES-T shares vs. NREAP target shares (Eurostat actual share 2012 is tentative for LV. Progress Report share has been used for MT). Source: Fraunhofer ISI based on Eurostat, NREAPs, and Progress Reports.

The RES-T sector has seen less progress than the former two, with only 8 Member States in line with or above their NREAP 2012 target. Twenty Member States stayed below target, 8 of which even achieved less than half their targeted share (Portugal, Malta, Croatia, Finland, Spain, Estonia, Cyprus, and Bulgaria). However, this may also be due to the above-mentioned transposition problems regarding compliant biofuels. In 2011, 9 Member States had exceeded their target, one had been just on track, and 18 had missed their targets.

⁵ According to the EUROSTAT shares exercise, Austria had a RES-H&C share of 32.8% in 2012. This share is used here. The Austrian Progress Report, in contrast, claims a very high RES-H&C share of 45%.

ACHIEVEMENT OF RES TARGETS BY MEMBER STATES: CURRENT STATUS & 2020 EXPECTATIONS



The 2014 EU Tracking Roadmap is focusing on 27 EU-Member States (Croatia will only be added to the EU Tracking Roadmap in 2015).

The above map provides an overview of the 27 Member States in terms of whether or not they have achieved their 2012 targets (both the 2011/2012 interim targets set in the RES Directive and the NREAP 2012 targets). The map shows also expectations regarding their meeting the 2020 targets.

The 2020 expectations are based on a scenario modelling done by EEG TU Vienna, using their Green-X model to assess the feasibility of Member States in meeting their binding 2020 RES

targets as set by the RES Directive with currently implemented RES policies (business-as-usual (BAU) scenario).

Out of the 27 Member States analysed in this publication, nine are expected to meet their 2020 targets (Austria, Bulgaria, Cyprus, Denmark, Estonia, Italy, Latvia, Romania and Sweden). There are doubts concerning four Member States (Germany, Finland, Ireland and Slovakia). It is expected that Belgium, the Czech Republic, Spain, France, Greece, Hungary, Luxembourg, Latvia, Malta, the Netherlands, Poland, Portugal, Slovenia and the UK will not meet their 2020 targets.

ON THE WAY TOWARDS THE 2020 TARGETS: POLITICAL AND ECONOMIC FRAMEWORK AS THE MAIN ISSUES

The Keep on Track! project analyses the barriers hindering the development of renewable energy sources across all three energy sectors in the European Union. To this end, a bottom-up approach has been adopted to identify the broadest barriers at a national level. Barriers identified were classified under global categories, allowing for a comparison across Member States.

AS A CONSEQUENCE OF THE CHOSEN APPROACH:

- The non-identification of a barrier in a certain country does not necessarily mean that it does not exist. Other national barriers may have been perceived as more important or more urgent and were therefore prioritised.
- The identification of a large number of barriers in a specific Member State does not necessarily correlate with the degree of severity of the overall situation of renewables. The identification of a large number of barriers might be the result of high barrier awareness in certain countries, favoured by high transparency or a high level of information availability.
- In addition, the number of barriers per country may depend on the development stage of a certain technology: a high number of barriers would therefore be the result of technology maturity.

In total, 780 single barriers were reported as preventing RES deployment in all sectors in the 27 Member States. These break down into 419 barriers for the electricity sector, 201 for the heating and cooling sector and 160 for the transport sector.

For the sake of comparability, the identified barriers were grouped into 5 main categories:

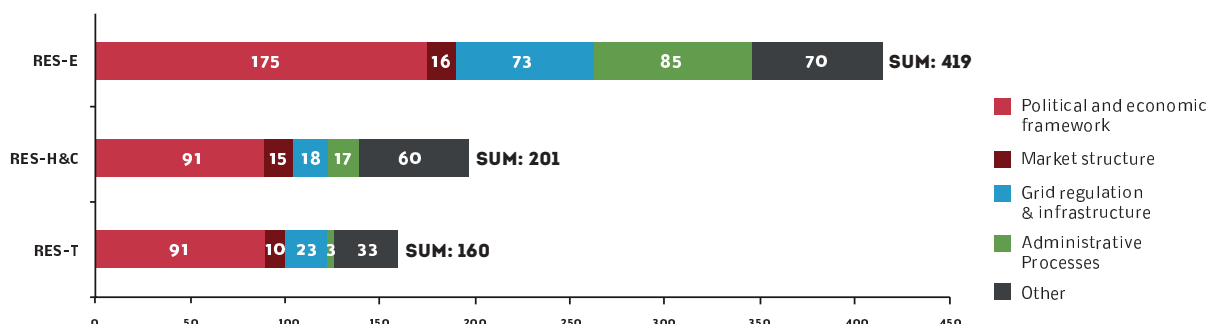


Figure 8: Share of barrier categories in the RES-sectors. Source: eclareon based on own research and information of the 11 National Renewable Energy Associations, partners in Keep on Track!

The most important category across all sectors relates to the political and economic framework: it gathers 357 barriers out of 780. This category mainly refers to the existence and reliability of a general RES support scheme, access to finance and the remuneration level of existing support schemes. Sector-specific issues such as the European institutions' position on RES-T are also addressed under this category.

For the RES-E sector, the second most significant category deals with shortcomings of administrative processes, more specifically related to the integration of RES-E in spatial and environmental planning, as well as to the duration and complexity of administrative procedures. The category of

grid regulation and infrastructure is ranked as the third most important category of barriers for the RES-E sector.

As far as the RES-H&C sector is concerned, the second most dominant category groups topics such as the public perception of RES-H&C, operational issues, as well as training and taxation. In the RES-T sector, the residual category "other" is ranked second, followed by the category grid regulation and infrastructure. Beside the topics of public perception and operational issues, in the RES-T sector the category other is also referring to issues such as certification and information exchange, respectively the communication between the relevant stakeholders.

GREEN-X SCENARIOS ON 2020 RES DEPLOYMENT

MODEL-BASED ASSESSMENT OF 2020 RES DEPLOYMENT

By use of a specialised energy system model (Green-X), a quantitative analysis has been conducted. The aim of the analysis was to assess feasible RES developments up to 2020 according to selected policy pathways (i.e. a business-as-usual and a policy recommendations case), indicating RES deployment to be expected in the near future at Member State and at EU-27 level, as well as related impacts on costs and benefits. Subsequently we present background information and key outcomes in a brief manner. Note that Resch et al. (2014)⁶ provides a detailed description of the methodology and the assumptions taken for this analysis, and a discussion of results and findings gained.

METHODOLOGY AND KEY ASSUMPTIONS

The Green-X model was applied to perform a detailed quantitative assessment of the future deployment of renewable energy on country- and sector level. The core strength of this tool lies on the detailed RES resource and technology representation accompanied by a thorough energy policy description, which allows assessing various policy options with respect to resulting costs and benefits. For a detailed description we refer to www.green-x.at.

In order to ensure consistency with existing EU scenarios and projections data on future developments of demand and of energy/carbon prices are taken from PRIMES modelling - i.e. the PRIMES scenarios used is the most recent *reference scenario* as of 2013 (NTUA, 2013)⁷. With respect to the potentials and cost of RES technologies we refer to the Green-X database, respectively. Table 1 shows which parameters are based on PRIMES and which have been defined for this study.

BASED ON PRIMES	DEFINED FOR THIS STUDY
Energy demand by sector	RES policy framework
Primary energy prices	Reference electricity prices
Conventional supply portfolio and conversion efficiencies	RES cost (Green-X database, incl. biomass)
CO ₂ intensity of sectors	RES potential (Green-X database)
	Biomass trade specification
	Technology diffusion
	Learning rates

Table 1: Main input sources for scenario parameters



Figure 8: Overview on assessed cases

⁶ Resch G., A. Ortner, S. Busch, L. Liebmann (2014): Green-X scenarios on 2020 RES deployment - a brief assessment if Member States are well on track for 2020 RES target achievement. A report compiled within the Intelligent Energy Europe project Keep-on-Track!, coordinated by Eufores and Eclareon. TU Vienna, Energy Economics Group, Vienna, Austria, 2014 (forthcoming).

⁷ NTUA (2013): PRIMES Reference case - conducted by National Technical University of Athens (NTUA), 2013.

RESULTS ON 2020 RES DEPLOYMENT AND TARGET ACHIEVEMENT

In a next step, a closer look on the key outcomes of the expected future RES deployment and the related costs, expenditures and benefits is taken at the aggregated (EU-27) level.

First, Figure 9 shows the contribution of RES to meeting gross final and sector-specific energy demands in 2020 for both assessed cases. It turns out that under current RES support and related framework conditions (BAU case) only a RES share of 17.9% appears feasible at EU-27 level. Thus, improving national RES policies, for example following the recommendations provided within this project, appears essential for several Member States to bring them back on track. This is demonstrated by the results of the alternative policy pathway (Policy Recommendations case), where a RES share of 21.0% can be achieved by 2020. To achieve this, RES in all energy sectors have to contribute more. Possibly the most impressive changes can be identified for RES in the electricity sector, where 37.2% (PR case) instead of 30.9% (BAU case) are reached in 2020, and for biofuels in transport, i.e. 7.9% (PR case) instead of 5.5% (BAU case).

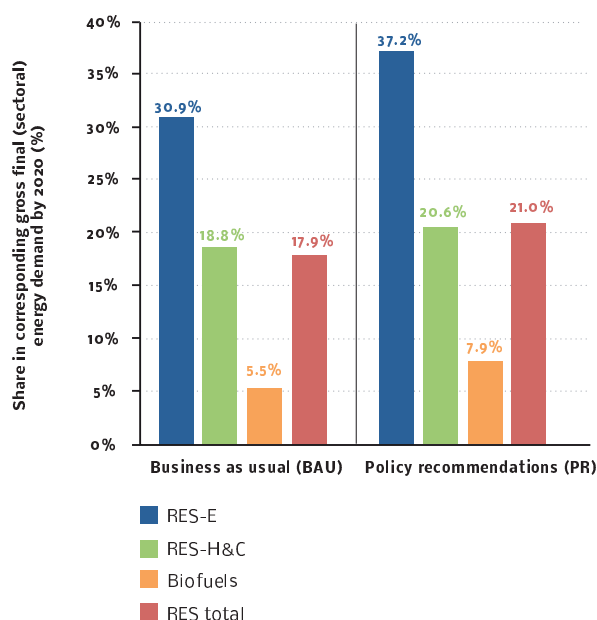


Figure 9: Sector-specific RES shares by 2020 at EU-27 level according to the assessed cases (BAU vs. PR)

RES deployment and RES target achievement at the national level is discussed next. Figure 4 provides a graphical illustration of the outcomes of our model-based assessment of 2020 RES target achievement, indicating the likeliness of target achievement by Member State following an “traffic light approach”⁸. Complementary to that, Figure 5 offers further insights in the expected national RES deployment under BAU

Indicators on the costs and benefits of an accelerated RES deployment in the European Union offer important information for decision makers. In this context, Figure 10 summarises the assessed costs and benefits arising from the future RES deployment in the focal period 2011 to 2020. More precisely, this graph provides the average annual investment needs and the resulting costs - i.e. additional generation cost and support expenditures for the cases researched throughout the period 2011 to 2020. Moreover, they offer an indication of the accompanying benefits in terms of security of supply (avoided fossil fuels expressed in monetary terms - with impact on a country's trade balance) and climate protection (avoided CO₂ emissions - monetarily expressed as avoided expenses for emission allowances). Other benefits - even of possibly significant magnitude - such as job creation or industrial development have not been included in this assessment. Apparently, with improved policy design and mitigated non-cost barriers, RES deployment and consequently also related investments increase strongly. The scenario shows an increase in investments of about 35%.

Moreover, a significantly improved balance between costs and benefits can be observed.

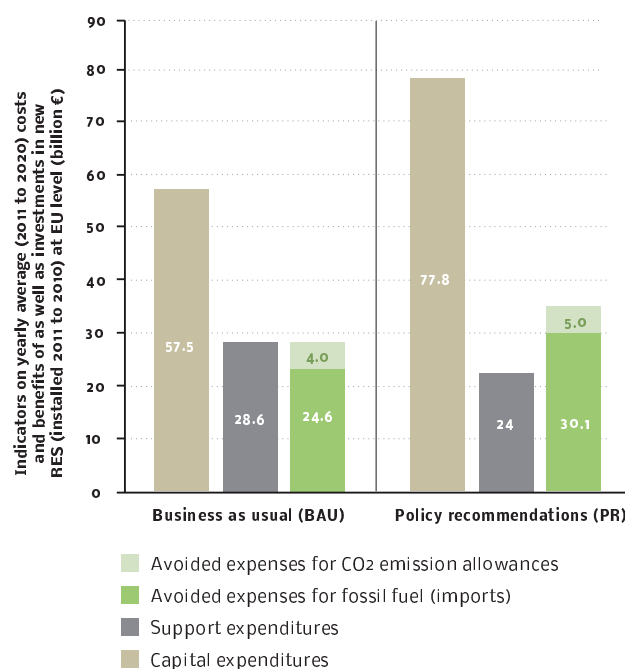


Figure 10: Investments, selected costs & benefits at EU-27 level according to the assessed cases (BAU vs. PR)

conditions. This graph also shows the additional deployment at sector level that would occur according to the Policy Recommendations case. Under BAU conditions, nine out of the assessed 27 Member States, including Austria, Denmark and Italy, appear well on track. In another four Member States (i.e. Germany, Finland, Ireland and Slovakia) there are doubts whether the 2020 targets can be reached with the already

⁸ Following the traffic light approach a green colour is used to show that a MS is expected to achieve its 2020 target while an orange colour indicates that there are doubts whether this MS may achieve its given RES target. Finally, red highlights that a MS is not well on track with respect to target achievement.

implemented measures, while the remaining fourteen Member States can be classified as “not well on track.” In contrast to that, if the recommended policy measures are implemented well in time, all Member States still have the possibility to achieve their 2020 RES targets. The majority of countries would even exceed their obligation. There are good reasons for doing so since, as

discussed above, additional RES deployment contributes to increased supply security and local employment, to name only some additional benefits. Finally, by 2020, five Member States (i.e. France, Luxembourg, Malta, the Netherlands and the UK) could make use of RES cooperation mechanisms as a buyer while all others act as (possible) sellers.

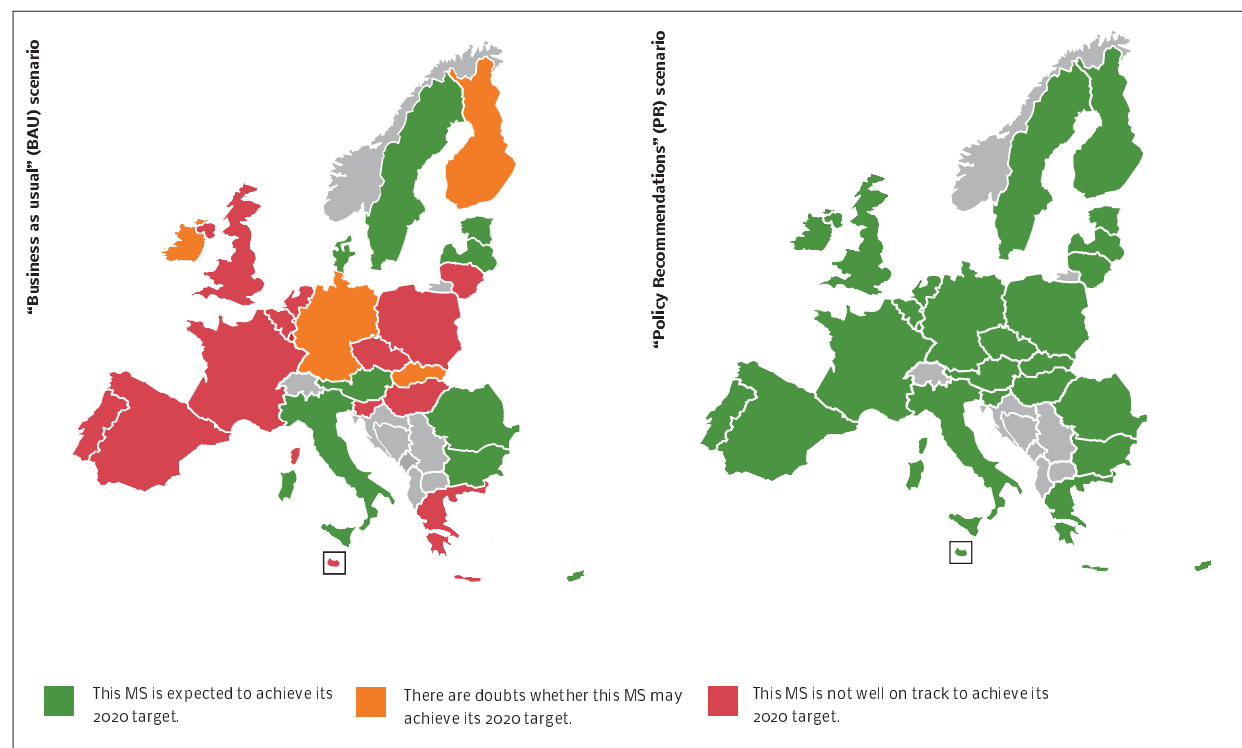


Figure 11: Assessment of 2020 RES target achievement according to the assessed cases: BAU (left) vs. PR (right)

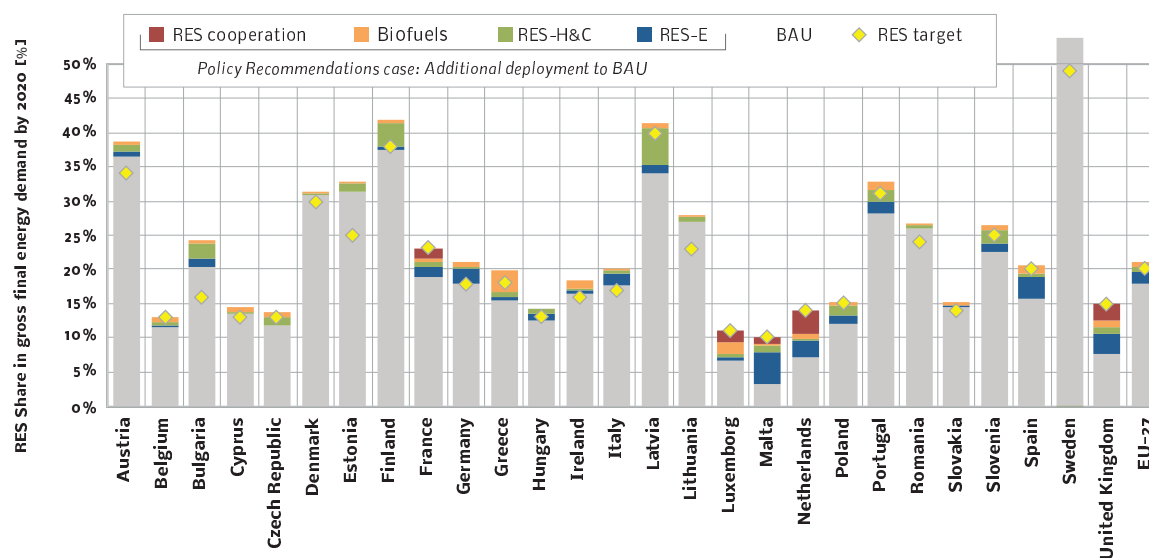


Figure 12: Comparison of 2020 RES targets and RES deployment according to a Business-as-usual (BAU) scenario by Member State, and additional (sector-specific) RES deployment in the Policy Recommendations case

THE KEEP ON TRACK CONSORTIUM RECOMMENDS TO:

1 ADOPT AN AMBITIOUS BINDING RENEWABLE ENERGY TARGET FOR 2030, INCLUDING BINDING NATIONAL TARGETS, ALONGSIDE ENERGY EFFICIENCY AND GREENHOUSE GAS EMISSIONS TARGETS.

The 2030 outlook needs to be reliable and support the achievement of the binding 2020 renewable energy target.

2 ENSURE A PREDICTABLE AND STABLE LEGISLATIVE FRAMEWORK FOR RES AT THE NATIONAL LEVEL AND IN PARTICULAR TO AVOID ANY RETROACTIVE CHANGES TO EXISTING SUPPORT SCHEMES.

Stop-and-go policies and disruptive changes are currently jeopardising the achievement of the 2020 targets.

3 INCREASE THE FOCUS ON THE RES-H&C AND RES-T SECTORS, WHICH ARE STRONGLY DEPENDENT ON THE EXISTENCE OF A SUPPORTIVE AND COMPREHENSIVE FRAMEWORK.

Due to the lack of coherent support, current growth rates are too low to reach the 2020 targets.

4 REVISE THE GUIDELINES ON STATE AID FOR ENVIRONMENTAL PROTECTION AND ENERGY 2014–2020 TO MAKE SURE THEY ARE CONSISTENT WITH THE RES DIRECTIVE AND SUPPORT THE ACHIEVEMENT OF ITS OBJECTIVES.

The newly adopted State aid guidelines are limiting the member states' freedom of choice of support schemes that have proven to be effective.

5 RE-ESTABLISH A CLEAR SUPPORTIVE FRAMEWORK FOR RES-T AT EUROPEAN LEVEL IN ORDER TO REMOVE THE CURRENT POLICY VACUUM.

In addition, there is scope to increase renewables-driven electric mobility.

6 RETAIN THE FOCUS ON THE REMOVAL OF ADMINISTRATIVE BARRIERS.

The duration and complexity of administrative procedures is still one of the main barriers identified by European stakeholders, together with the integration of RES in spatial and environmental planning.



2013 KEY FACTS:

The EU renewable energy sector employed more than 1.2⁹ million people directly and indirectly.

The EU economic activity stemming from renewable energy is valued at more than €130 billion¹⁰.

According to the European Commission, the EU net import bill for fossil fuels amounted to €545 billion.

⁹ EurObserv'ER: The State of Renewable Energies in Europe. 2013

¹⁰ EurObserv'ER: The State of Renewable Energies in Europe. 2013