Dialogue on a RES policy framework for 2030

towards2030

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Implementing the EU 2030 Climate and Energy Framework – a closer look at renewables and opportunities for an Energy Union

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Context

On 23/24 October 2014 the European Council decided on a new set of targets for 2030 by adopting the "2030 Climate and Energy Policy Framework." This framework includes binding targets for (i) domestically reducing greenhouse gas emissions by 40% until 2030 compared to 1990 and for (ii) increasing the share of renewables to 27%. Finally, there is an indicative target to improve energy efficiency by at least 27% compared to "business-as-usual" projections of the future energy demand.

The framework decided raises several practical questions that need to be addressed in the upcoming legislative process, specifically regarding renewables. The main issues revolve around the need for dedicated support for reaching the renewables target, how to ensure a legally binding character of the EU-target in the absence of binding national commitments and how to share the overall 27% target among individual entities such as single EU member states or groups of EU member states. The aim of this paper is to provide a first analysis of the above-mentioned issues and to offer policy recommendations based on our findings.

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Policy recommendations

1. Moderate dedicated support for renewables is required to reach the 2030 target of 27% renewables.

The ambition level of a 27% target should not be underestimated, also because some of the existing installations will reach the end of their technical lifetime in the upcoming decade and will have to be replaced. Considering the uncertainty regarding future power and carbon prices, moderate support will be needed to provide sufficient investment security for renewable energy technologies and therefore lower the costs of target achievement. Therefore, the European Commission should propose a suitable legislative framework for the use of dedicated support systems for renewables beyond 2020 – at EU, regional or national level.

2. Benchmarks of how to break down the EU-wide target to member states should be provided in order to encourage sufficiently ambitious pledges.

The European Commission should publish benchmarks or indicators of how to break down the EU-wide target. This first benchmark could be based on the same logic that was used to allocate the 2020 target to single EU member states.[1] This way, the European Commission would encourage sufficient pledges of member states. In addition, it would provide some leverage to the European Commission with respect to achieving the overall target in the absence of any other measures.

3. The concept of an Energy Union can be developed further by supporting regional targets for renewables and grid infrastructure.

The EU-wide target for renewables is an opportunity to further develop the concept of an Energy Union. To this end, regional targets – i.e. targets for groups of EU member states – for both renewables and grid infrastructure should be supported and possibly incentivised by the European Commission.

[1] Results of what this means for individual EU member states are shown below.

Moderate dedicated support for renewables is required to reach the 2030 target of 27% renewables

The ambition level of a 27% target should not be underestimated, also because some of the existing installations will reach the end of their technical lifetime in the upcoming decade and will have to be replaced. Considering the uncertainty regarding future power and carbon prices, moderate support will be needed to provide sufficient investment security for renewable energy technologies and therefore lower the costs to achieve the target. Therefore, the European Commission should propose a suitable legislative framework for the use of dedicated support systems for renewables beyond 2020 – at EU, regional or national level.

To evaluate the ambition level of the 27% target, it is necessary to assess the required increase of renewable energy, both in terms of net and gross figures, which also consider replacements.[2] Assuming a share of 27% renewables in 2030, between 500 and 910 TWh of *additional* renewable energy will have to be deployed in the decade from 2020 and 2030, depending on the level of final energy demand (see left-hand side of Figure 1).[3] These are the net figures, which do not consider potentially needed replacements of older renewable energy installations. Compared to the decade from 2010 to 2020, in which about 1000 TWh of additional renewable energy is required to achieve a 20% share of renewables by 2020, the 2030 target does not appear to be ambitious in terms of net increase.

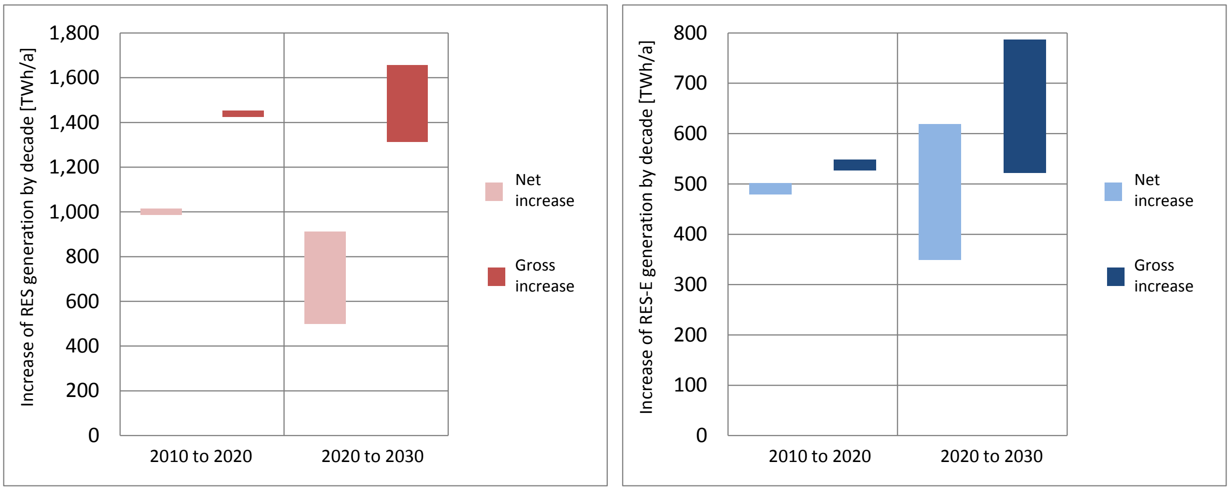

Figure 1. **Net and gross increase of renewable generation at EU level by decade (2010-2020 vs. 2020-2030) across all energy sectors (left) and in the electricity sector (right) in accordance with a 27% renewables target for 2030 (Source: own assessment (Green-X) based on PRIMES scenarios)**

The required gross increase is, however, 82 to 163% higher, because gross figures include replacements for plants that will be decommissioned after 2020. The additionally required renewable energy ranges from 1,314

[2] Figures on the gross increase in renewables stem from a detailed model-based assessment where scenarios of future renewables deployment are calculated with the Green-X model in accordance with a 27% renewables target for 2030 and with the distinct future energy demand projections (reference and projections). A brief recap of the approach taken and assumptions made is given in Annex I to this paper.

[3] The lower value refers to an improvement in energy efficiency of 30%, whereas the upper value refers to a 21% improvement compared to the 2007 baseline of the PRIMES model. Although a target of 27% for energy efficiency has already been fixed for 2030, we show ranges with regard to the actual achievement of energy efficiency to cover both, a higher or substantially lower level of ambition in terms of energy efficiency policy. The 21% case represents the reference scenario presented in the European Commission's Impact assessment (SWD(2014) 15) related to its Communication on "A policy framework for climate and energy in the period from 2020 to 2030" (COM(2014) 15 final) as of January 2014. The 30% case represents the energy efficiency scenario of medium ambition disclosed therein.

to 1,656 TWh for the above-mentioned projections for the future energy demand. Therefore, significant investments in renewables will be needed in all three sectors: electricity, heating/cooling and transport.

A closer look at the power sector (see right-hand side of Figure 1) indicates an ambiguous development for the necessary net increase in renewable electricity: compared to the time horizon between 2010 and 2020, the required volumes may decline by 29% or increase by 26%. This depends on the level of final energy demand as well as on the role of bio-fuels in the transport sector after 2020. A stronger decline of energy demand corresponding to a 30% energy efficiency target would lead to the lower boundary, while moderate energy efficiency measures (leading to energy demand savings of 21% compared to baseline) combined with no dedicated support for biofuels beyond 2020 may lead to an increase of additional net deployment of renewables in the electricity sector when compared to the decade from 2010 to 2020. When considering gross instead of net figures, the difference between this and the upcoming decade is even more striking: the additional amount of renewable electricity between 2020 and 2030 would have to remain *at least* on the same level as in this decade but might also have to increase by up to 46%. The strong increase is expected, if bio-fuels play a minor role in decarbonising the transport sector and if only moderate energy efficiency results are achieved.

To which extent dedicated support for renewables can be phased out in the upcoming decade will mainly depend on (i) the costs of renewable energy technologies and on (ii) future power and carbon prices. Further cost reductions for renewable energy technologies can be expected in the upcoming decade, also due to the increasingly global deployment of renewables. This will lower the costs of supporting the deployment of renewables. Future power and carbon prices are, however, subject to higher uncertainty. The EU carbon market is currently confronted with an oversupply of CO_2 emission allowances, while many EU power markets are struggling with overcapacity. Resolving these issues is also a matter of political intervention and therefore subject to high uncertainty. In the event that these markets regain their equilibrium, support costs for renewables can further decrease.

However, moderate support for renewable electricity generation will still be needed even beyond 2020, for two reasons:[4]

- Some less mature technologies (e.g. offshore wind, wave and tidal stream or concentrated solar power) will experience significant cost reductions thanks to technological learning also after 2020. Support for these technologies is motivated by the fact that they will most likely be needed for the long-term decarbonisation objectives of the EU by 2050.
- Due to the price-reducing effect of renewables with variable generation costs close to zero, the market value[5] for variable renewables like solar and wind power is lower than the reference electricity price (see for example Sensfuß et al. 2008).

A model-based assessment of future renewables deployment at national and EU level assuming achievement of the 27% target by 2030 confirms that the necessary remuneration for renewables is expected to decline over time, cf. Figure 2.[6] On the one hand, the analysis indicates a strong decline in remuneration levels for renewables over the whole assessment period as a result of expected technological progress across all key renewable technologies. This positive trend is driven by cost reductions for onshore and offshore wind as well as solar photovoltaics, which are expected to be the dominant renewable energy technologies in the power sector beyond 2020. On the other hand, the decrease in market values of variable renewables partly diminishes these gains in later years. Market values for variable renewables are expected to more strongly decouple from aver-

[4] Further explanations on the impact of both opposing trends on the need for support are provided in Annex II.

[5] The market value of renewable electricity is defined as the potential income from selling the generated electricity at power exchanges. Therefore, it depends on electricity market prices weighted according to the actual feed-in of renewables into the grid. It typically deviates from average market price, as the output of variable renewables like wind and solar is not constant but weather-dependent.

[6] More details on the model-based assessment are given in Annex I.

age wholesale electricity prices. Overall, the need for net support, i.e. the difference between necessary remuneration and market value, is shrinking for renewable electricity through to 2030: compared to the current situation (2015) a decline by more than 70% can be observed by 2030.

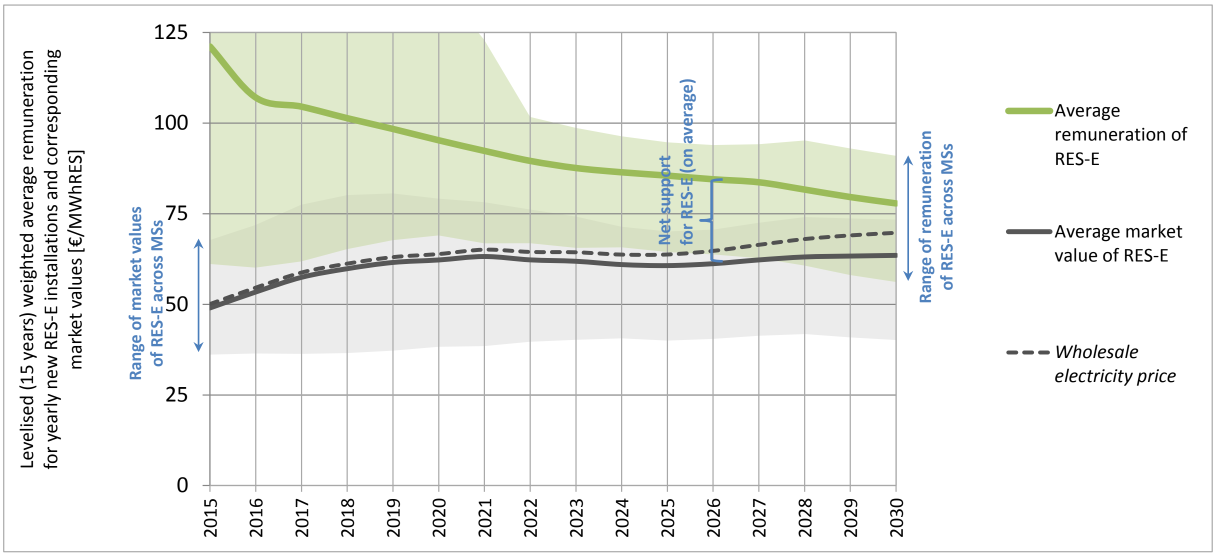

Figure 2. **Future development of remuneration levels and corresponding market values of renewable energy technologies (on average) at EU-28 level according to a Green-X scenario of meeting 27% renewables by 2030 (Source: Own assessment (Green-X) based on PRIMES scenarios)**

Benchmarks of how to break down the EU-wide target to member states should be provided in order to encourage sufficient pledges

It is currently not clear how individual EU member states can or should contribute to the EU-wide 2030 target for renewables. In order to get a clearer picture, the European Commission should publish benchmarks or indicators of how the EU-wide target could be broken down. This first benchmark could be based on the same logic that was used to allocate the 2020 target to individual EU member states.[7] This way, the European Commission would provide guidance to encourage sufficiently ambitious pledges of EU member states and allow them to better assess the contribution needed by each member state for achieving the EU target. Such benchmarks could be a reasonable compromise between the continuation of setting national targets and free pledges by member states in the absence of national targets.

In principle, the EU-wide target can be allocated to smaller regional entities either via a top-down or bottom-up approach. In the first case, the European Commission would follow a predetermined allocation formula and set individual national targets accordingly. In the latter case, EU member states would pledge their planned contribution. Whilst in the case of a top-down allocation individual targets typically sum up to the overall target of 27%, individual pledges may fall short of the overall EU-target. This would require to close the gap accrued, either by a separate financing mechanism or by an iteration of pledges until the gap is closed. To better guide the pledging procedure, the European Commission should provide a first benchmark on regional or national targets. EU member states or regions could then put pledges forward specifying a higher or a lower target than proposed in the benchmark. Major benefits of combining national or regional pledges with an initial top-down benchmark include a first quantitative indication for a potential national or regional target that can help structuring the pledging process. In addition, extremely low pledges may be avoided by publicly comparing the pledged target with the benchmarking. For these reasons, we encourage combining national or regional pledges with a top-down benchmark.

This top-down benchmark should be based on transparent criteria such as the potential availability of renewable energy resources and related costs, the economic strength of an EU member state or efforts already achieved. The allocation logic of the 2020 target is laid down in Directive 2009/28/EC. It combines a flat-rate increase, where each member state has to increase its share of renewables by a fixed number of percentage points, with an increase based on the economic strength of a member state, measured in terms of GDP per capita, as well as efforts made in the past. Other aspects such as the potential availability of renewable resources and related costs are not taken into account though.[8]

The results of applying a similar allocation logic[9] to the 2030 target are illustrated in Figure 3. In terms of increase compared to 2020, the resulting national targets would be most ambitious for Denmark followed by Malta and the UK, facing an increase of 8-9% for Denmark, about 8% for Malta and roughly 8% for the UK. By contrast, moderate GDP expectations for the Baltic States and several member states specifically in the Southern and Eastern part of Europe lead to an increase of only 5% to 6% compared to 2020. In absolute numbers, Sweden shows the most ambitious target of almost 56% followed by Latvia (around 47%) and Finland (around 44%). The national target of the Czech Republic, Luxembourg and Malta would be in the range of 18% to 19%. It is worth noting that target *ranges* are shown for each member state. These originate from considering two

[7] Results of what this means for individual EU member states are shown below.

[8] For a detailed description of the methodology used for the calculation of the binding national renewable energy targets for all 28 EU member states expressed as a share of renewables of the gross final energy demand projected for 2020 see SEC(2008) 85, Annex 6, p. 175-178.

[9] One important difference to the 2020 allocation logic is that policy efforts from the past are not considered given the fact that the 2030 targets build upon the 2020 targets and therefore implicitly consider past efforts. A more detailed description of the allocation methodology and its main assumptions is given in Annex II.

different energy demand scenarios: A reference case and an energy efficiency scenario.[10] The impact on the target allocation results is, however, limited.[11]

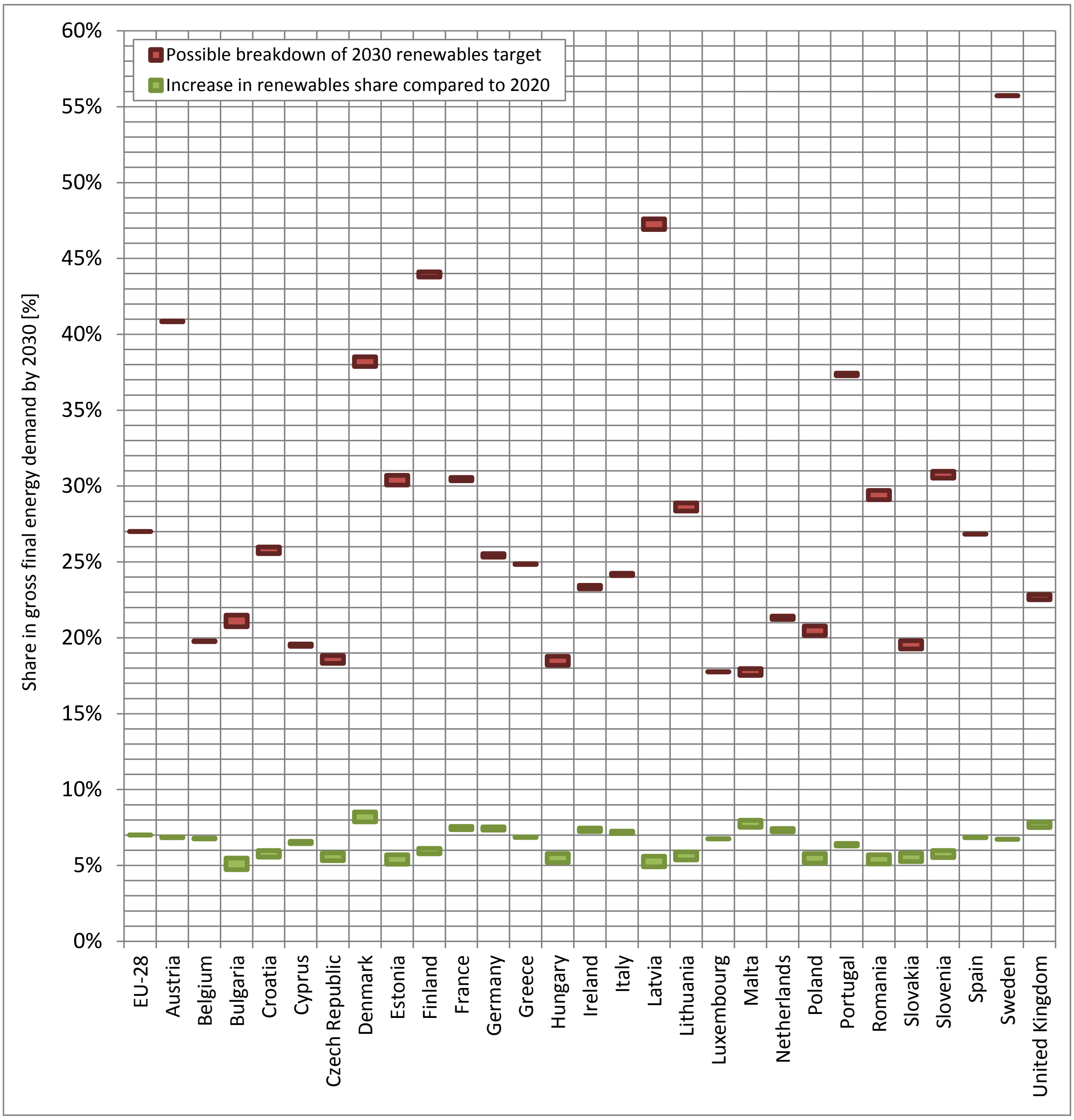

Figure 3. **Allocation of the EU-wide 27% renewable energy target for 2030 to individual member states, applying the 2020 methodology of the European Commission for effort sharing (Source: own assessment based on PRIMES scenarios)**

[10] In accordance with the scenarios of the future deployment of renewables and the identification of support requirements (see first section), data on energy demand and GDP expectations and are based on the European Commission's Impact assessment (SWD(2014) 15) related to its Communication on "A policy framework for climate and energy in the period from 2020 to 2030" (COM(2014) 15 final). More precisely, the 21% case represents the reference scenario, while as energy efficiency scenario we make use of the 30% renewables case combined with a medium ambition level of energy efficiency (i.e. the scenario named "GHG40EERES30").

[11] Note that Annex III provides further information on the target calculation logic and the impact of the underlying demand trend.

The concept of an Energy Union can be developed further by supporting regional targets for renewables and grid infrastructure

The EU Energy Union is still in a conceptual phase.[12] The EU-wide target for renewables represents an opportunity to develop this concept further. To this end, regional targets – i.e. targets for groups of EU member states – for both renewables and grid infrastructure should be supported and possibly incentivised by the European Commission. Such a regional target would require co-ordinating national energy policies across borders and would therefore represent an important first step towards an Energy Union. Support and incentives could, for example, be granted by including the required cross-border infrastructure in the list of "Projects of Common Interest." As a result, these projects could be provided access to financial support and benefit from faster permit procedures. Alternatively, regional pledges could receive a higher weighting compared to purely national pledges with respect to monitoring the achievement towards the overall EU target. This should be balanced with the weighting of national pledges in such a way that the overall target of 27% will still be reached at EU-level.

As outlined above, a bottom-up approach such as pledging appears to be a workable procedure to identify the contribution of individual EU member states to the overall European target. However, instead of single EU member states pledging themselves to a national target, groups consisting of several EU member states could pledge themselves to a joint or regional target. This implies to gradually move beyond strictly national energy policies towards a more co-ordinated approach as part of a broader EU vision.

Such a regional initiative has several advantages. First, agreeing on a joint target requires a regional assessment of its cross-border effects. Therefore, EU member states would acknowledge the fact that there are cross-border effects – both beneficial and unfavourable ones. Second, a common understanding on these cross-border effects enables the cooperating member states to design action plans and policies seeking to maximise beneficial cross-border effects and fairly share the burden of unfavourable ones across all affected parties. Planning and discussing this at an early stage lowers the potential for conflicts. Those are more likely to arise when trying to re-allocate costs and benefits after these have already occurred, as the example of the on-going debate between Germany and its neighbours on so-called unexpected loop flows shows.[13] Third, a regional target for renewables would encourage the collaborating EU member states to pursue a more integrated planning approach when it comes to building interconnectors and deploying renewables. Currently, infrastructure has to follow supply. This has resulted into an increasing intensity of loop flows as well as higher balancing costs and more back-up capacity than necessary. A more synchronised planning of supply and infrastructure would reverse the undesired development of loop flows. It would also enable renewables to make better use of the balancing effect of interconnectors, because the variability of fluctuating renewables such as wind decreases with increasing geographical dispersion.

Joint, i.e. transnational support systems for renewables could very well be a result of this co-operation. Such a development immediately raises "issues of governance and more specifically the role and involvement of the European Commission" (De Jong and Egenhofer 2014). Still, it appears more effective to test this cross-border policymaking process in smaller groups than trying to find a solution that fits all 28 EU member states at once. Regional approaches could nevertheless become relevant for the EU as whole, as ideas that have proven to work well could be translated into EU framework guidelines by the European Commission. This approach effectively bridges the gap between EU and national levels.

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[12] see COM(2015) 80 final

[13] Unexpected loop flows originate from Northern Germany and affect countries on its Eastern and Western border. The growing intensity of loop flows is caused by an insufficient grid connection between Northern and Southern Germany, unable to transmit the increasing amount of wind power from North to South. Moreover, these loop flows are often *unexpected* because the output of wind farms deviates from their planned production. As a reaction to this, almost all neighbouring states have installed so-called phase shifters that can be used to redirect electricity flows.

Concluding remarks: lessons learned from energy efficiency policy

The aim of this section is to review the experience of the Energy Efficiency Directive (2012/27/EU – EED) and to derive lessons that can be learned for the design of the governance structure regarding the implementation of the 2030 renewables target. Similar to the EED, the 2030 target for renewables is set at the EU level, potentially coupled with national pledges, but without binding national commitments.

The EED establishes a framework of measures to ensure a 20% reduction of projected primary energy consumption by 2020 as defined in the 2007/2008 EU energy and climate framework. The Directive aimed at providing impetus on various energy efficiency policy fields such as cogeneration, billing and metering, public buildings and public procurement, energy audits and the introduction of energy efficiency obligation schemes with pre-defined savings targets for the period of 2014-2020 (Art 7). As a framework for these policy requirements, EU member states were invited to set up National Energy Efficiency Action Plans (NEEAPs) and to define indicative national energy efficiency targets for 2020.

In 2014, the European Commission assessed the energy efficiency target achievement at the EU-28 level, cf. COM (2014) 520 final. It came to the conclusion that the 2020 efficiency target would be missed in the range of 1 to 2% points.[14] On the basis of its assessment the European Commission had to choose whether to remain inactive (putting at risk the 20% target), introduce new legislation (which would probably not become effective before 2020) or to enforce a better implementation of existing policies. The last option was identified as most promising, focussing on those pieces of the energy efficiency acquis where further savings can be acquired from the member states (i.e. including EED, Energy Performance of Buildings Directive EPBD, Ecodesign Directive and the product labelling acquis).

The analysis of the energy efficiency target and its implementation allow to draw three major conclusions with respect to the 2030 renewables target.

- In terms of energy efficiency, the EU has a strong leverage on the member states' energy savings performance due to the high share of mandatory EU legislation in this policy field (i.e. EED, EPBD, product requirements etc.). However, the probably missing mandatory/legally-binding policy measures for renewables support at EU level do not allow for corrective measures as realised e.g. in the context of the EED. Therefore, alternative areas for providing leverage would be required, offering the ability for taking measures guaranteeing target achievement:
  - Setting a benchmark for member states pledges (as suggested in policy recommendation 2), and/or
  - other fields of EU leverage, for example linking EU incentives for infrastructure development to member state pledges.
- The EU energy efficiency target for 2020 is not very ambitious: national pledges almost reach the target at community level. Compared to that, the recently agreed 2030 renewables target can be classified as more ambitious, specifically once the gross increase in renewables deployment is considered (as outlined in the motivation for policy recommendation 1, see Figure 1).
- Whilst most energy efficiency measures tend to be cost-efficient on a longer term, increasing the share of renewables to 27% may lead to moderate additional costs in the power sector corresponding

[14] When the European Commission assessed target achievement, two potential demand development paths were sketched: (1) Based on the PRIMES 2013 reference scenario and considering all energy efficiency measures adopted before spring 2014 (including EED but with conservative assumptions) an energy consumption of about 1540 Mtoe can be expected by 2020, that equates to a 16.8% reduction from the baseline or a 3.2% gap compared to the 2020 target (SWD(2014) 255 final). (2) New information derived from the NEEAPs, the notification on the implementation of Art 7 of EED and the lower than expected GDP indicates that the gap would be further reduced to 1-2% (i.e. corresponding to 20-40 Mtoe at EU level).

to less than 0.25% of total system costs (Held et al. 2014). Although technology costs and required support decrease considerably over time, support for renewables will still be needed to meet the 2030 targets, which further underlines the relevance of policy recommendation 1. However, additional costs are kept low by the policy certainty created by the renewables target and reduced financial risk for capital intensive renewable technologies. In addition, ambitious energy efficiency policies reduce the required demand for renewables that – again – limits the support needed.

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Annex I: The model-based assessment of a 27% renewables target

Based on a specialised energy system model (Green-X) a quantitative assessment was conducted to show pathways of possible renewables developments up to 2030 in accordance with the recently agreed 2030 target of 27% renewables. Scenarios indicate renewables deployment at sector, at technology and at country level that can be expected under distinct policy concepts. Complementary to results on deployment, related impacts on costs and benefits are derived. Selected outcomes of this analysis are discussed throughout this paper while a complete result depiction is provided by Resch et al. (2014). Below we aim for a brief recap of the approach and assumptions taken.

Overview on key parameters

In order to ensure maximum consistency with existing EU scenarios and projections the key input parameters of the scenarios presented in this report are derived from PRIMES modelling and from the Green-X database with respect to the potentials and cost of RES technologies. Table 1 shows which parameters are based on PRIMES, on the Green-X database and which have been defined for this study. The PRIMES scenarios used for this assessment are the *reference scenario* and a climate mitigation scenario building on an enhanced use of energy efficiency and renewables named "GHG40EERES30" as presented in the European Commission's Impact assessment (SWD(2014) 15) related to its Communication on "A policy framework for climate and energy in the period from 2020 to 2030" (COM(2014) 15 final).

Although a target of 27% for energy efficiency has already been fixed for 2030, we show ranges with regard to the actual achievement of energy efficiency to cover both, a higher or substantially lower level of ambition in terms of energy efficiency policy: Under reference conditions an improvement in energy efficiency of 21% compared to the 2007 baseline of the PRIMES model is projected for 2030, whereas in the "GHG40EERES30" case, assuming a medium ambition level for energy efficiency, an increase to 30% is assumed.

Table 1 Main input sources for scenario parameters

Based on PRIMES	Based on Green-X database	Defined for this assessment
Primary energy prices	Renewable energy technology cost (investment, fuel, O&M)	Renewable energy policy framework
Conventional supply portfolio and conversion efficiencies	Renewable energy potentials	Reference electricity prices
(CO_2 intensity of sectors)	Biomass trade specification	
Energy demand by sector	Technology diffusion / Non-economic barriers	
	Learning rates	
	Market values for variable renewables	

Overview on assessed cases

Different scenarios have been defined for the deployment and support of renewable technologies in the EU in the 2030 context. Obviously, the renewable policy pathway for the years up to 2020 appears well defined given by Directive 2009/28/EC, the corresponding national 2020 renewable targets and the accompanying National Renewable Energy Action Plans (NREAPs) for the period up to then. Exploring renewables development beyond 2020, however, involves a higher level of uncertainty – both with respect to the policy pathway and with regard to the potentials and costs of applicable renewable energy technology options. Thus, the scenarios defined for this assessment aim to provide a first reflection of the decision on the 2030 energy and climate framework taken at the recent Council meeting in October 2014.

While the scope of all scenarios calculated and discussed in Resch et al. (2014) is broader and includes different policy concepts (i.e. European or national approaches) for reaching 27% renewables by 2030, we focus on the concepts aiming for a least-cost resource allocation from an European perspective in this paper. More precisely, the assumption is taken that beyond 2020 an EU-wide harmonised support scheme, i.e. a quota scheme with accompanying certificate trading, is used for supporting the development of renewables in the electricity sector. This quota scheme is assumed not to differentiate between different technologies. Similar approaches, i.e. harmonised incentives across all countries are then also used for renewables in other sectors (i.e. heating and cooling and transport). As a further sensitivity variant for the 27% renewables target we assessed the impact of not having any dedicated support for biofuels in transport post 2020. Both policy scenarios are then calculated for the two distinct demand trends (i.e. reference and efficiency) as discussed above.

For the assessment of net and gross increases in renewables generation (cf. Figure 1) we made use of all four scenarios as sketched above in order to indicate a range of possible developments. Thus, the future demand development turns out to be the key criterion in this respect.

In the discussion of the required net support, i.e. the difference between total remuneration and market values for variable renewables (cf. Figure 2), we only applied one selected scenario since deriving exact figures on support requirements is beyond the scope of this brief discussion. Exemplarily we used the default least-cost policy approach for meeting the 2030 renewables target in combination with a medium ambition level for energy efficiency (30% compared to 2007 baseline).

Annex II: Opposing trends determine the need for renewables support

Two opposing trends determine the need to support renewables in the electricity sector: cost reductions resulting e.g. from technological progress lead to a decreasing level of necessary remuneration, whilst increasing deployment of variable renewable energy technologies cause reductions in their market value (see Sensfuß et al. 2008). The need for net support depends on the country and technology-specific circumstances.

Generally, the need to incentivise deployment of renewables can be justified thanks to expected technology cost reductions in the future. Technological progress and related cost reductions are triggered by the market deployment of a technology. This has been shown, for example, by the strong development of PV in particular in Germany and other countries, and the corresponding achieved significant decline in capital costs over a short time horizon.

In contrast, the ongoing market deployment of variable renewables including solar and wind demonstrates an opposing tendency that may ultimately cause an increase in the need for financial support. This concerns the market value of the generated electricity that is fed into the grid, provided that an increased use of technologies with close to zero variable generation costs such as wind and solar PV may lower electricity prices in the current market design (see Sensfuß et al. 2008). For these technologies it is becoming apparent that in future years (with ongoing deployment) a unit of electricity will be less valuable than that produced by a dispatchable renewables such as biomass where the plant may interrupt operation during periods of oversupply and wholesale power prices are correspondingly low.

Thus the net level of required support is determined by the difference between generation costs including a profit level for investors and the market value. Whether the cost decreases resulting from technological learning outweigh the need for increased support as a result of the decreasing market value, or vice versa, depends on the country and technology-specific circumstances.

Annex III: The applied target allocation logic

In order to provide a first benchmark of how the EU-target for 2030 could be broken down to national commitments, we apply an approach similar to that used by the European Commission for the 2020 targets – except for not considering policy efforts from the past given the fact that the 2030 targets build upon the 2020 targets and therefore implicitly consider past efforts. The applied allocation logic combines a flat-rate increase, where each member state has to increase its share of renewables by a fixed number of percentage points, with an increase based on the economic strength of a member state, measured in terms of GDP per capita.

For the calculation we assume the year 2020 as the starting point and expect an exact fulfilment of the 2020 renewable energy targets by all member states. Half of the effort required to fulfil the binding EU-target of 27% renewables is distributed across all member states as a flat-rate, and the other half is distributed according to the individual GDP per capita of a member state. We base our assessment on two energy demand scenarios: a reference scenario projecting energy savings of 21% by 2030 (compared to the 2007 Baseline projections) and an energy efficiency scenario projecting energy savings of 30%. This approach is chosen, because there is currently no public data available for a 27% energy efficiency scenario, which is the indicative target of the 2030 climate and energy framework. Moreover, this approach allows us to assess the influence of energy demand on the target *allocation*. It is worth noting that the European Commission exclusively used a reference scenario for the allocation of the 2020 target (see SEC(2008) 85, 176).

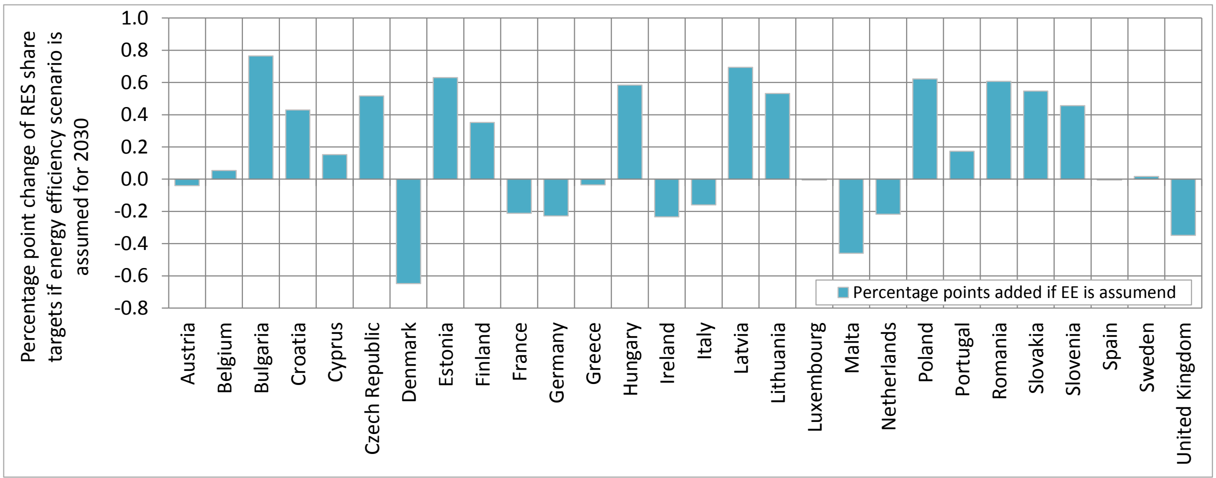

Figure 4. The changes in percentage points in the individual renewable energy targets, if an energy efficiency scenario is assumed instead of the reference scenario. (Source: own assessment based on PRIMES scenarios)

Results of this sensitivity analysis are shown in Figure 4. In general, differences are minor but slightly more noticeable for the Baltic States and South-Eastern Europe. For the member states in these regions, a more efficient use of energy implies a more stringent renewable energy target in relative terms. Overall, the required absolute effort to achieve the renewable energy target decreases with increasing energy efficiency. Differences between member states decrease under the energy efficiency scenario, provided that the GDP per capita criterion is applied to a smaller amount of additional renewable final energy required.

Overall, for a potential top-down benchmark we recommend combining a flat-rate approach with the GDP per capita approach in order to require similar efforts by each EU member state on the one hand, but at the same time consider their economic circumstances. From our point of view, including renewable resource availability and costs could make the allocation fairer, but major uncertainties in assessing the potentials for renewable energy sources are good reasons not to include them in the allocation benchmark formula.

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About the project

The aim of **towards2030-*dialogue*** is to facilitate and guide the RES policy dialogue for the period towards 2030. This strategic initiative aims for an intense stakeholder dialogue that establishes a European vision of a joint future RES policy framework.

The dialogue process will be coupled with in-depth and continuous analysis of relevant topics that include RES in all energy sectors but with more detailed analyses for renewable electricity. The work will be based on results from the IEE project beyond 2020 (www.res-policy-beyond2020.eu), where policy pathways with different degrees of harmonisation have been analysed for the post 2020 period. **towards2030-*dialogue*** will directly build on these outcomes: complement, adapt and extend the assessment to the evolving policy process in Europe. The added value of **towards2030-*dialogue*** includes the analysis of alternative policy pathways for 2030, such as the (partial) opening of national support schemes, the clustering of regional support schemes as well as options to coordinate and align national schemes. Additionally, this project offers also an impact assessment of different target setting options for 2030, discussing advanced concepts for related effort sharing.

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