Dialogue on a RES policy framework for 2030

towards2030

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The EU 2030 Framework for renewables – effective effort sharing through public benchmarks

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1 Context

The '2030 Climate and Energy Policy Framework' was adopted by the European Council on 23/24 October 2014. The centre pieces of this framework are a binding target of a 40% reduction of greenhouse gas emissions until 2030 compared to 1990, a 27% share of renewable energies in gross final energy demand and an indicative target of a 27% increase in energy efficiency compared to a 'business-as-usual' projection of the future energy demand. Contrary to the 2020 policy framework, the EU-target for renewables will not be broken down into legally binding national targets. Instead, the EU-target shall be reached by clear, self-imposed commitments of each EU member state and guided by a solid governance framework as part of the Energy Union.[1] To this end, the European Commission plans to develop indicators for evaluating national energy plans.

During the **towards2030**-***dialogue*** stakeholder workshop on 'Implementing the EU 2030 climate and energy framework: a closer look at renewables' held on 18 March 2015 at the premises of CEPS in Brussels, the question was raised how the EU will ensure that the sum of those self-imposed commitments will be sufficient to reach the overall EU-target. In the case of a top-down allocation, individual targets sum up to the overall target of 27%, while the sum of individual pledges may fall short of the overall EU-target. To close this gap, either a separate financing mechanism would be required or an iteration of pledges, until the gap is closed.

As stated in a previous issue paper of the **towards2030**-***dialogue*** project,[2] public benchmarks of how the EU-target could be broken down into individual contributions are a useful starting point for the pledging process. 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 also be part of the set of indicators used by the European Commission to evaluate national energy plans as part of the Energy Union governance mechanism.

The aim of this paper is to present and assess various benchmark setting options. One option is to re-use the allocation method of the Renewable Energy Directive (2009/28/EC), as discussed in the last issue paper. However, it was sometimes critically remarked in the discussions on the adoption of the Directive that by following a flat-rate and/or GDP-based approach for defining national efforts, the potential availability of renewable resources and related costs are not taken into account. Therefore, such options are further explored in various combinations in this paper.

[1] see COM(2015) 80 final

[2] see Held et al. (2014)

2 Benchmark setting options

2.1 The allocation method used for the 2020 target

The 2020 allocation method combined a flat-rate increase, where each member state had to increase its share of renewables by the same fixed number of percentage points, with an increase based on the economic strength of a member state, measured in terms of GDP per capita. To be more precise, half of the increment needed to reach the 2020 target of 20% renewable starting from the 2005 share of 8.5% was allocated to EU member states according to the first indicator, whereas the other half was allocated according to the second indicator. Other aspects, such as the potential availability of renewable energy resources and related costs, were not taken into account. In the following, this approach will be referred to as *2020 allocation method*.

Applying this allocation method to the 2030 target, means that half of the overall increase from a 20% to a 27% share of renewables would result from a flat-rate increase, i.e. 3.5 percentage points for each EU member state. The other half of the increase would be allocated to each member state according to its GDP per capita index and its share in total EU population.

The results of applying this method are illustrated in Figure 1. The blue column shows the 2020 target, while the red column indicates the increase required to reach the 2030 target calculated using the above-mentioned method. It is worth noting that as starting point for the calculation it is implied that all EU member states succeed to meet their 2020 target.

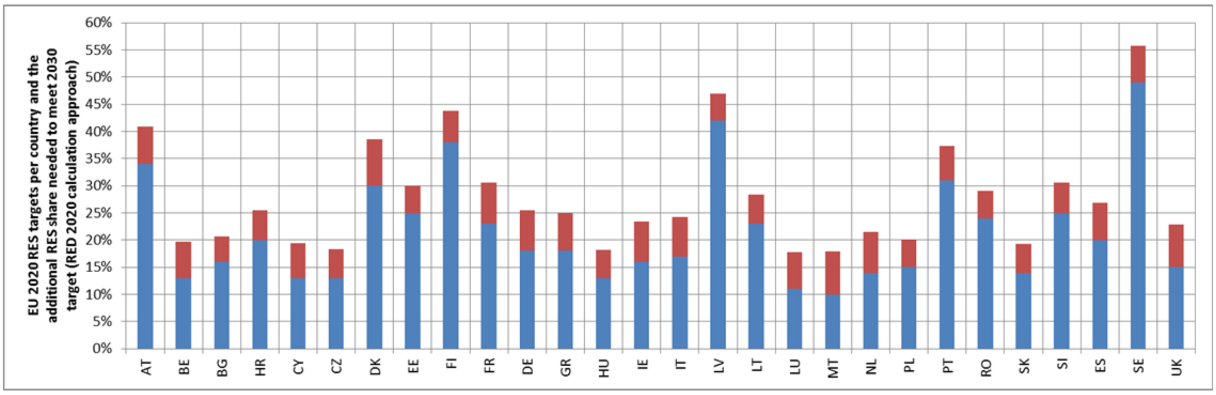

Figure 1. 2020 targets (blue) and increase required to reach 2030 target (red) based on 2020 allocation method

Table 1. 2020 targets and increase required to reach 2030 target based on 2020 allocation method

in %	AT	BE	BG	HR	CY	CZ	DK	EE	FI	FR	DE	GR	HU	IE	IT	LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK
2020 target	34	13	16	20	13	13	30	25	38	23	18	18	13	16	17	42	23	11	10	14	15	31	24	14	25	20	49	15
Increase 2020-2030	6.9	6.7	4.7	5.6	6.4	5.3	8.5	5.1	5.8	7.6	7.5	6.9	5.2	7.5	7.3	4.9	5.4	6.8	8.0	7.4	5.2	6.3	5.1	5.3	5.5	6.8	6.7	7.9

The spread between the contribution of different member states is moderate. In terms of increase compared to 2020, the resulting national benchmarks would be most ambitious for Denmark (+8.5%) followed by Malta (+8.0%) and the UK (+7.9%). 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, with Bulgaria at the lower end of the range with 4.7%. In absolute figures, Sweden shows the most ambitious benchmark of almost 56% followed by Latvia (around 47%) and Finland (around 44%). The national benchmark of the Czech Republic, Luxembourg and Malta would be in the range of 18% to 19%.

In the following sections, five alternative benchmark setting options will be explained and assessed: (1) pure flat-rate, (2) GDP-based (default), (3) GDP-based (modified), (4) potentials-based and (5) combination of flat-rate and potential-based. To understand the effect of different benchmark setting methods it is necessary to have a basic understanding of the level of the various input factors. As starting point, Figure 2 and Figure 3 below show the GDP and gross final energy consumption (GFEC) per capita of all member states in relative terms, i.e. indexed to the EU-average. The GDP per capita index is the main indicator for the economic strength of a country, with Luxembourg and Denmark at the upper end of the range, and Bulgaria and Romania at the lower end of the range. The GFEC per capita index is an indicator for the energy intensity of a certain country. Luxembourg is once again at the top of the range, followed by Finland and Sweden, and Malta and Romania are at the bottom end of the range. Those two indicators are the main input factors for the 2020 allocation method, as well as for the first three alternative approaches (sections 2.2 -2.4).

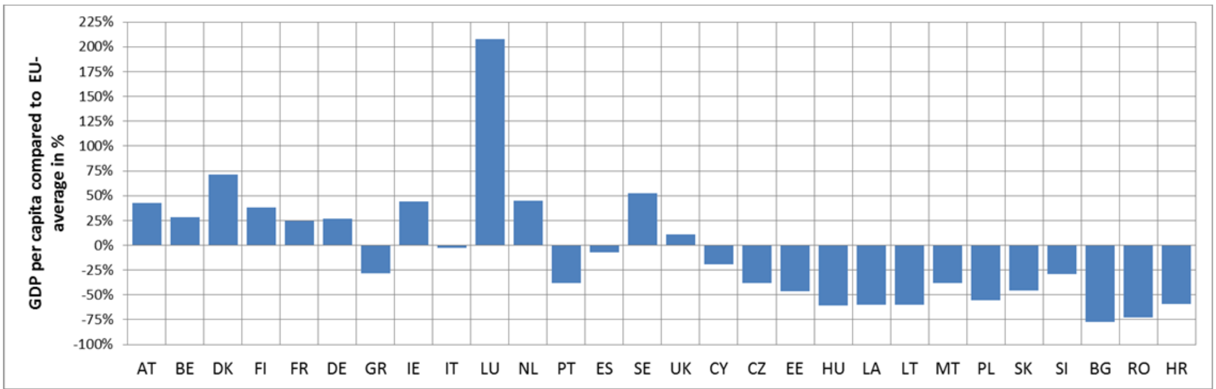

Figure 2. GDP per capita compared to EU-average in %

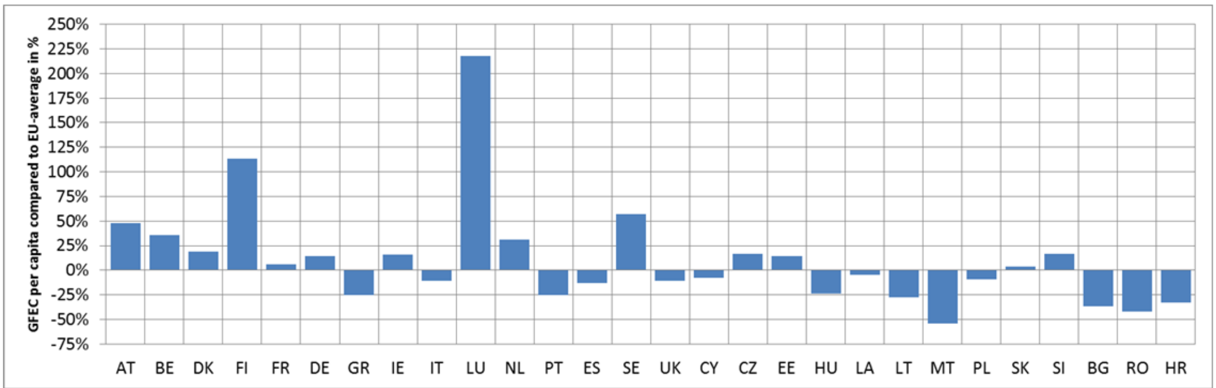

Figure 3. GFEC per capita compared to EU-average in %

In section 2.5 and 2.6, two alternative approaches are presented, which are based on the potential availability of renewable energy sources and corresponding costs in the various member states.

The results of all alternative benchmark setting options will be compared to the results of this base case, i.e. the 2020 allocation method.

2.2 Pure flat-rate benchmark

A pure flat-rate benchmark means that all member states should aim for a similar (net) increase in renewables deployment in the period from 2020 to 2030, i.e. an increase of 7 percentage points compared to their 2020 target. The argument for such a method would be to treat all member states equally. Nevertheless, the actually required deployment of renewables in a flat-rate benchmark is implicitly determined by the energy intensity of the respective country, since the flat-rate benchmark is measured in relative and not in absolute terms. Thus, such a benchmark option favours member states with a lower than average GFEC per capita.

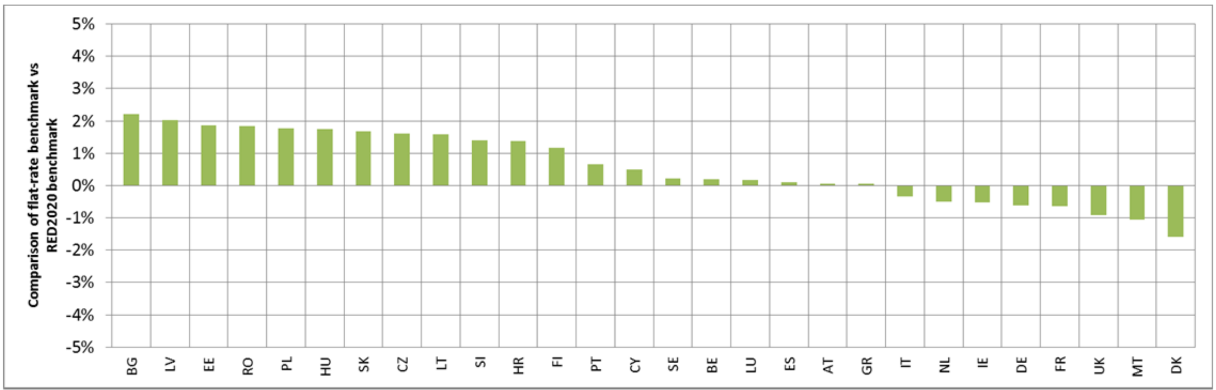

Figure 4. Deviation of the flat-rate benchmark from the 2020 allocation method in percentage points

Table 2. Increase required to reach 2030 target: 2020 allocation method vs flat-rate benchmark

in %	BG	LV	EE	RO	PL	HU	SK	CZ	LT	SI	HR	FI	PT	CY	SE	BE	LU	ES	AT	GR	IT	NL	IE	DE	FR	UK	MT	DK
2020 method	4.7	4.9	5.1	5.1	5.2	5.2	5.3	5.3	5.4	5.5	5.6	5.8	6.3	6.4	6.7	6.7	6.8	6.8	6.9	6.9	7.3	7.4	7.5	7.5	7.6	7.9	8.0	8.5
Flat-rate	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9

Compared to the 2020 allocation method, which also considers the differences in GDP per capita, the pure flat-rate approach would mean more ambitious benchmarks for countries with a lower than average GDP such as Bulgaria, Latvia and Romania and less ambitious benchmarks for countries like Denmark, France and Germany. Bulgaria's benchmark would be 2.2 percentage points higher, whereas Denmark's benchmark would be 1.6 percentage points lower than using the 2020 allocation method.

In this flat-rate only benchmark, Luxembourg and Finland would have more ambitious benchmarks than using the 2020 allocation method, even though they are both economically strong countries compared to the EU-average. The reason for this lies in the proportion of the indicators shown in Figure 2 and in Figure 3. The GFEC per capita index (energy intensity) of Finland and Luxembourg is higher than their GDP per capita index, and therefore their contribution to the EU-target increases using a flat-rate benchmark.

The opposite extreme can be observed for Malta. Even though the GDP per capita of Malta is 38% below the EU-average, their contribution to the EU-target would decrease from 8.0% under the 2020 method to 6.9% in a pure flat-rate benchmark. Again, the reason for this can be found in the GFEC per capita of Malta, which is even further (54%) below the EU-average.

2.3 GDP-based benchmark (default)

In the default GDP-based benchmark, the additionally needed production from renewables to meet the 2030 target of 27% for the EU at large will be distributed to the member states according to their GDP share in the total GDP of the EU. To express this term relative, i.e. as renewables share, the outcome has to be divided by the GFEC of the respective member state.

This approach is supposed to factor in the economic strength of member states and therefore indicate stronger contributions for countries with a higher than average GDP per capita. This approach forms 50% of the 2020 allocation method.

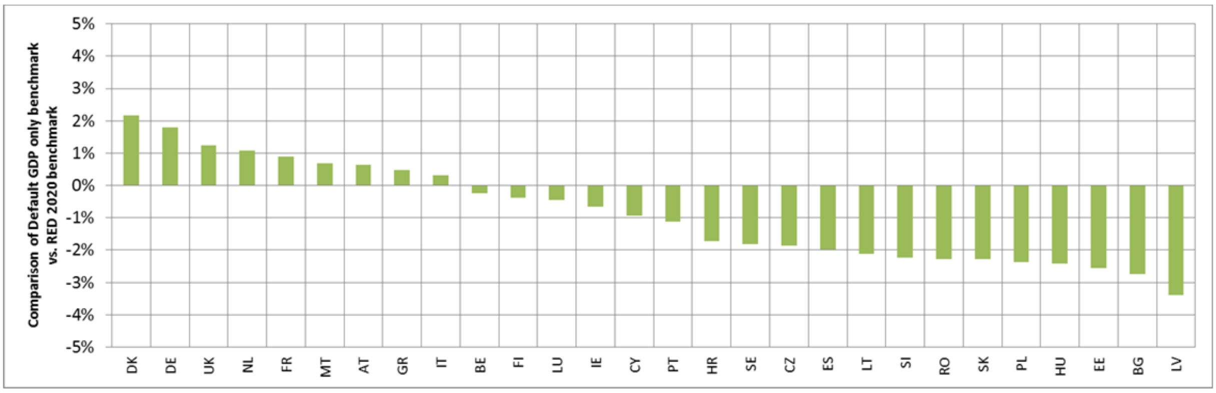

Figure 5. Deviation of the GDP-based benchmark (default) from the 2020 allocation method in percentage points

Table 3. Increase required to reach 2030 target: 2020 allocation method vs GDP-based benchmark (default)

in %	DK	DE	UK	NL	FR	MT	AT	GR	IT	BE	FI	LU	IE	CY	PT	HR	SE	CZ	ES	LT	SI	RO	SK	PL	HU	EE	BG	LV
2020 method	8.5	7.5	7.9	7.4	7.6	8.0	6.9	6.9	7.3	6.7	5.8	6.8	7.5	6.4	6.3	5.6	6.7	5.3	6.8	5.4	5.5	5.1	5.3	5.2	5.2	5.1	4.7	4.9
Default GDP	10.7	9.3	9.1	8.5	8.5	8.7	7.5	7.3	7.6	6.5	5.4	6.3	6.8	5.5	5.2	3.8	4.9	3.5	4.8	3.2	3.3	2.8	3.0	2.8	2.8	2.5	2.0	1.5

As Figure 5 and Table 3 show, this benchmark would lead to a higher spread between the contributions of individual member states. Until 2030, Denmark would contribute an additional 10.7 percentage points (from 30.0% to 40.7%) compared to the 8.5 percentage points in the 2020 allocation method, whereas Latvia would only contribute an increase of 1.5 percentage points (from 42.0% to 43.5%) in the respective share compared to the 4.9% of the 2020 allocation method.

Apparently, this approach does not always yield the expected and desired result. Countries like Finland, Sweden, and Luxembourg have a GDP per capita which is more than 50% above the EU-average. Yet, their benchmark is significantly less ambitious with this approach compared to the 2020 allocation method. The explanation for this can be found in Figure 3 which shows the GFEC per capita for each member state compared the EU-average. In case the GFEC index of a certain country is higher than its GDP index, this country will have a lower benchmark than in a pure flat-rate benchmark or using the 2020 allocation method. Actually, this benchmark represents a combination of energy-intensity-based and GDP-based indicators.

2.4 GDP-based benchmark (modified)

As seen in the section 2.3, the default GDP-based benchmark, which aims to yield higher benchmark results for economically stronger countries, does not always lead to this outcome. Thus, a modified GDP-based approach, which factors in the GDP index more heavily, is assessed as well. In this modified approach, the flat-rate of 7% would be directly weighted with the GDP per capita index shown in Figure 2. This approach would open up the spread between the benchmark results of the different member states even stronger than the default GDP-based approach. The range of the benchmarks for the additionally needed share of renewables until 2030 would start at 1.5% for Bulgaria and end at 20.4% for Luxembourg.

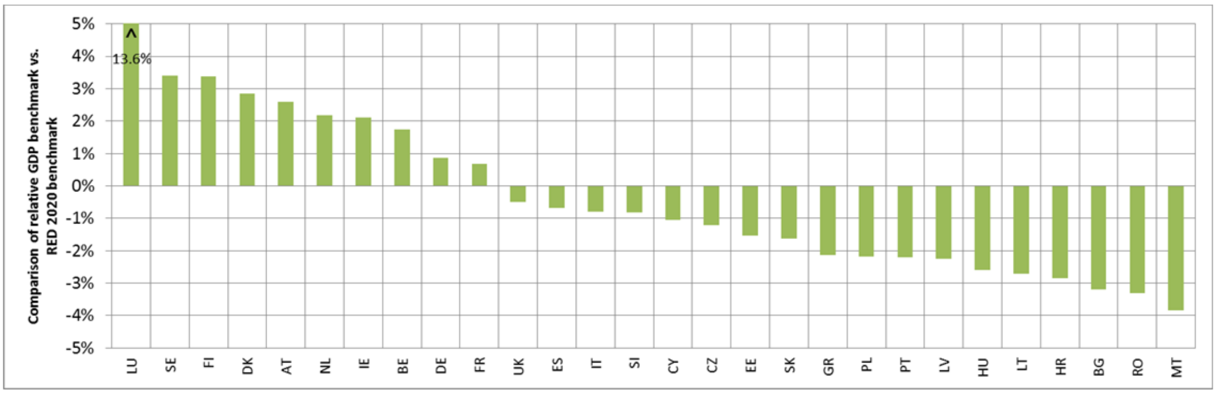

Figure 6. Deviation of the GDP-based benchmark (modified) from the 2020 allocation method in percentage points

Table 4: Increase required to reach 2030 target: 2020 allocation method vs GDP-based benchmark (modified)

in %	LU	SE	FI	DK	AT	NL	IE	BE	DE	FR	UK	ES	IT	SI	CY	CZ	EE	SK	GR	PL	PT	LV	HU	LT	HR	BG	RO	MT
2020 method	6.8	6.7	5.8	8.5	6.9	7.4	7.5	6.7	7.5	7.6	7.9	6.8	7.3	5.5	6.4	5.3	5.1	5.3	6.9	5.2	6.3	4.9	5.2	5.4	5.6	4.7	5.1	8.0
Modi-fied GDP	20.4	10.1	9.1	11.4	9.5	9.6	9.6	8.5	8.4	8.3	7.3	6.2	6.5	4.7	5.4	4.1	3.5	3.6	4.7	3.0	4.1	2.7	2.6	2.7	2.7	1.5	1.8	4.1

This approach would have a significant impact on the benchmark of Luxembourg, since it would mean an increase of 13.6 percentage points compared to the 2020 allocation method (from 6.8% to 20.4%). The benchmark for all other member states would change somewhere between +3.7 percentage points (Sweden) and –3.9 percentage points for Malta.

Although this approach seems to reach the aim of having higher benchmarks for economically stronger countries, it does put an exceptionally high burden on certain countries, which have a high energy intensity and a high GDP per capita. In some member states, this approach would also create a stark difference between the benchmark and the actually available potential for deploying renewables, as can be seen in the following section.

2.5 Potentials-based benchmark

It was sometimes critically remarked in the discussions on the adoption of the Directive that by following a flat-rate and/or GDP-based approach for defining national efforts, the potential availability of renewable resources and related costs are not taken into account. Thus, as alternative to a pure political benchmark setting approach, this variant aims to illustrate the impact of taking renewable energy potentials and related costs into consideration. For doing so, Green-X model of TU Wien was used to derive distinct scenarios of the required future expansion of renewables for reaching the 2030 target of 27%. Thus, we focus on the concepts aiming for a least-cost resource allocation from a European perspective in this brief assessment. Modelling comes into play to calculate “least-cost” scenarios under changing framework conditions and efforts are consequently allocated to the countries where the deployment would take place. More precisely, the assumption is taken that beyond 2020 an EU-wide harmonised support scheme, i.e. for example an EU-wide harmonised quota scheme with accompanying green 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). Further sensitivity variants assess the impact of not having any dedicated support for biofuels in transport post 2020 and of mitigating fully or partly prevailing non-cost barriers.

Since the data used for indicating the outcomes of such an approach builds on different scenarios, the outcome is a range of benchmarks. Figure 7 shows the deviation of this range from the 2020 allocation method.

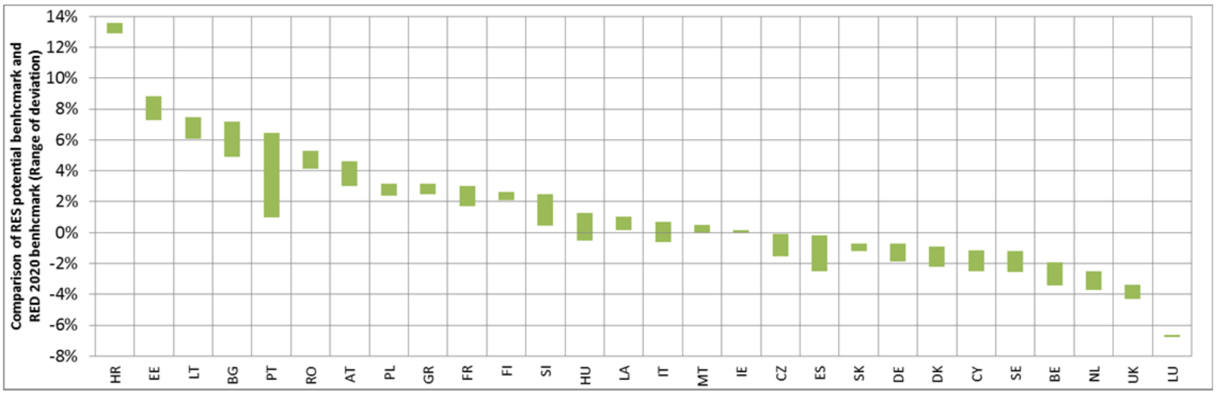

Figure 7. Deviation of the potentials-based benchmark from the 2020 allocation method in percentage points

Table 5. Increase required to reach 2030 target: 2020 allocation method vs potentials-based benchmark

in %	HR	EE	LT	BG	PT	RO	AT	PL	GR	FR	FI	SI	HU	LV	IT	MT	IE	CZ	ES	SK	DE	DK	CY	SE	BE	NL	UK	LU
2020 method	5.6	5.1	5.4	4.7	6.3	5.1	6.9	5.2	6.9	7.6	5.8	5.5	5.2	4.9	7.3	8.0	7.5	5.3	6.8	5.3	7.5	8.5	6.4	6.7	6.7	7.4	7.9	6.8
min. of Poten-tials	18.5	12.4	11.4	9.6	7.3	9.2	9.9	7.5	9.3	9.3	7.9	6.0	4.7	5.1	6.6	6.9	6.2	3.8	4.3	4.0	5.7	6.3	3.9	4.1	3.3	3.7	3.5	0.0
max. of Poten-tials	19.1	13.9	12.8	11.9	12.7	10.4	11.5	8.3	10.0	10.6	8.4	8.0	6.5	6.0	7.9	8.5	7.6	5.2	6.7	4.6	6.8	7.6	5.3	5.5	4.8	5.0	4.5	0.1

Similar to the modified GDP-based benchmark in chapter 2.4 and contrary to the 2020 allocation method, this variant opens up a wide range of benchmarks starting at 0% for Luxembourg up to over 18% for Croatia. Due to the small area and the dense population of Luxembourg the country is missing significant potentials for renewable energies beyond the already agreed 2020 target, when compared to the EU-average.

Looking at Table 6, one can also see that this approach would mean higher benchmarks for the majority of the South-Eastern and Baltic European member states, especially for Croatia, Estonia, Lithuania and Bulgaria, since those countries do have the highest potential for renewable energy deployment. This brings up the question of burden sharing and cooperation mechanisms in the support systems, as those high benchmarks would be a serious challenge for the budgets and the public acceptance of support costs in the South-Eastern and Baltic European member states. On the other hand, several economically strong countries like Sweden, Luxembourg or the Netherlands would have very low benchmarks, so following such a benchmark would need further discussions about a feasible cost allocation between the various member states.

2.6 Combination of flat-rate and potentials-based benchmark

This benchmarking option represents a compromise between a pure political setting (following a flat-rate / GDP approach) and the above sketched alternative of defining the possible 2030 efforts of member states according to the resource availability. Thus, building on the modelling exercise as described and used above, under this variant we combine inputs and outputs of modelling: We take the assumed increase in RES-E deployment at EU-level – i.e. the harmonised quota targets for new renewable electricity installations – and add to that the country-specific contribution of RES in other sectors (i.e. heating and cooling and (the demand for) biofuels in transport) that would follow in the case of offering similar incentives for the deployment of these options across the EU. That results into a flat rate approach for RES-E and a potentials-based approach for renewables in heating and cooling.

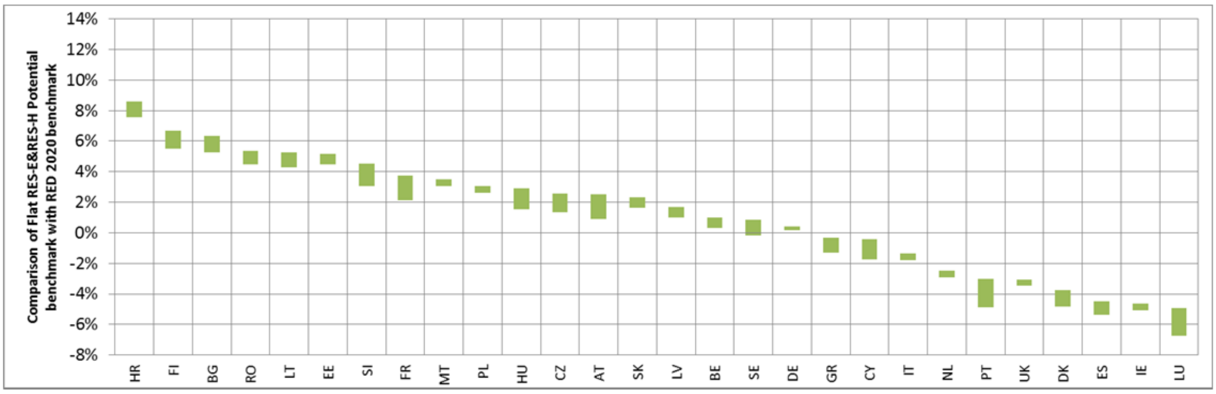

Figure 8. Deviation of the combined benchmark from the 2020 allocation method in percentage points

Table 6. Increase required to reach 2030 target: 2020 allocation method vs combination of flat-rate and potentials-based benchmark

in %	HR	FI	BG	RO	LT	EE	SI	FR	MT	PL	HU	CZ	AT	SK	LV	BE	SE	DE	GR	CY	IT	NL	PT	UK	DK	ES	IE	LU
2020 method	5.6	5.8	4.7	5.1	5.4	5.1	5.5	7.6	8.0	5.2	5.2	5.3	6.9	5.3	4.9	6.7	6.7	7.5	6.9	6.4	7.3	7.4	6.3	7.9	8.5	6.8	7.5	6.8
min. of combined	13.1	11.3	10.0	9.6	9.6	9.6	8.6	9.7	11.1	7.8	6.7	6.7	7.7	6.9	5.9	7.0	6.6	7.7	5.6	4.7	5.5	4.5	1.4	4.4	3.7	1.5	2.4	0.0
max. of combined	14.2	12.5	11.1	10.4	10.6	10.2	10.0	11.3	11.5	8.2	8.1	7.9	9.4	7.6	6.6	7.8	7.6	7.9	6.6	6.0	5.9	5.0	3.3	4.8	4.8	2.3	2.8	1.8

The result of this approach would look similar to the pure potentials-based approach described in section 2.5, but the spread of the benchmarks would be smaller, ranging from 0% for Luxembourg to over 13% for Croatia. Nevertheless there would still be several economically weaker countries with high benchmarks and the open question about the social acceptance of the accompanied costs of the renewable deployment in these countries.

3 Conclusions

We have explored six different benchmark setting options and their results. The different approaches aim to consider factors like the economic strength, the energy intensity and the potential availability of renewable resources and related costs. Figure 9 gives an overview of the range of results of the different methods. The dark red bar shows benchmark stemming from the 2020 allocation method, the flat-rate and the default GDP approach and they indicate already known approaches, whereas the light red bars show the results of the modified GPD, the potentials-based and the combined flat-rate and potentials-based approach.

From a political point of view the benchmarking approaches, which do have a more moderate spread between the different member states (which means the efforts are shared more equally) will be easier agreed upon than benchmarking approaches which have a very wide spread. Therefore, the dark red bars can be seen as the core range of benchmarking alternatives.

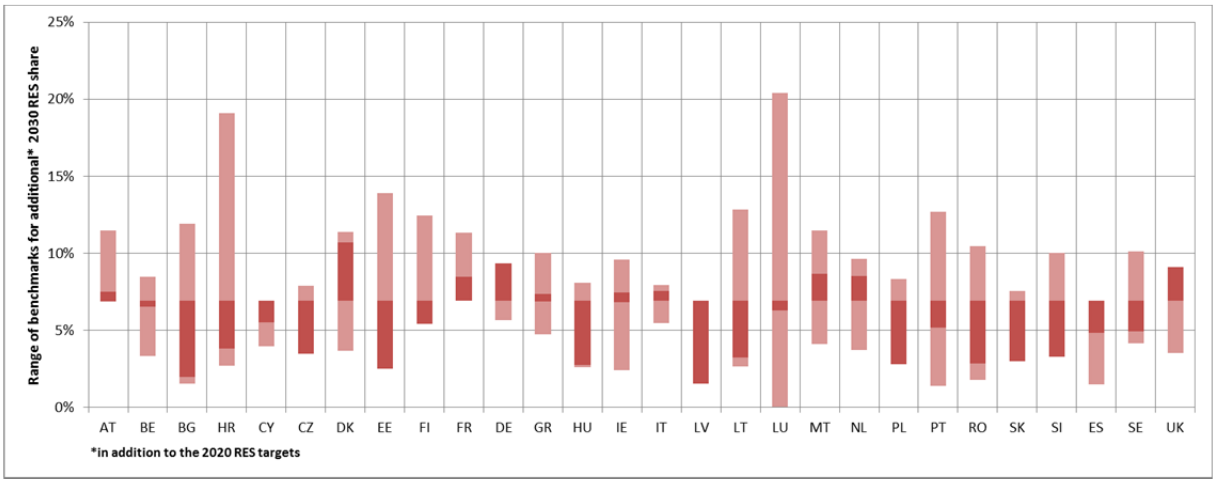

Figure 9. Range of all benchmark setting options discussed

Table 7. Range of benchmarks for the increase required to reach the 2030 target

in %	AT	BE	BG	HR	CY	CZ	DK	EE	FI	FR	DE	GR	HU	IE	IT	LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK
min.	6.9	3.3	1.5	2.7	3.9	3.5	3.7	2.5	5.4	6.9	5.7	4.7	2.6	2.4	5.5	1.5	2.7	0.0	4.1	3.7	2.8	1.4	1.8	3.0	3.3	1.5	4.1	3.5
max.	11.5	8.5	11.9	19.1	6.9	7.9	11.4	13.9	12.5	11.3	9.3	10.0	8.1	9.6	7.9	6.9	12.8	20.4	11.5	9.6	8.3	12.7	10.4	7.6	10.0	6.9	10.1	9.1

For certain countries like Cyprus and Italy the range is very narrow, so their benchmarks will not change very much – whatever method is applied. For other countries, like Luxembourg, Bulgaria, Croatia and Portugal, Figure 9 shows a wide range of different benchmark possibilities. In Luxembourg, the upper limit of the range stems from the high GDP per capita, while the lower limit of the range stems from the low potential for renewable resources. For Bulgaria, Croatia and Portugal it is the other way around.

Another important fact should be highlighted. Most countries with high and low-cost potentials for renewable energies are not economically strong compared to the EU-average and will therefore have challenges financing the respective renewable energy deployment. One way of overcoming this discrepancy might be to strengthen the cooperation between member states. This could be done by a stronger emphasis on the use of cooperation mechanisms or by introducing regional targets or benchmarks. Even though the 2014 European Council conclusions excluded the breakdown of the binding EU-target into national binding targets in a top-down approach, they did not explicitly exclude regional targets. In a regional target setting approach, there would be one common target for a defined region consisting of several member states. In case the self-imposed commitments fall short of meeting the overall 2030 target, the European Commission has to react to that problem and regional targets might be an alternative way to reach a consensus between the member states. Additionally, regional targets would also have the advantage that countries need cooperate to develop joint renewable strategies and to plan accompanying, coherent infrastructure development, which would reduce the overall costs of investments for deploying renewables.

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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.

Who we are?

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Centre for European Policy Studies (CEPS), Belgium
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