Study on 2030 overall targets (energy efficiency, renewable energies, GHG emissions reduction) for the Energy Community

Approach for 2030 RE target setting

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Study on 2030 overall targets for the Energy Community

Approach for **2030 RE target setting** within the Energy Community

EnC level

- To increase the RE share at CP level according the *formula set out in Annex Ia* of the Amendments adopted by the European Parliament on 17 January 2018.

- This approach follows an *integrated concept that takes into account*:
  
  - the differences in economic development,
  
  - the potential for cost-effective RE deployment, and
  
  - the interconnection level in the European Network of Transmission System Operators for Electricity (ENTSO-E) across the EU and the EnC.

- This approach strictly follows the formula set out in Annex Ia, and *distributes the efforts across all CPs* (and EU Member States) *while maintaining the RE ambition level as presumed at EU level* (i.e. to aim for (at least) **32% RE** as share in gross final energy demand).
The details of the calculation...

Amendment 270, Proposal for a directive Annex Ia (new) - Text proposed by the Commission

1. A Member State's targets for 2030 shall be the sum of the following components, each expressed in percentage points:

   (a) the **Member State's national binding target for 2020** as set out in Annex I of the Directive COM(2016) 767 final/2 and Decision D/2012/04/MC-EnC, Article 4 for the Energy Community.

   (b) a **flat rate contribution** ("C_{Flat}");

   (c) a **GDP-per-capita based contribution** ("C_{GDP}");

   (d) a **potential-based contribution** ("C_{Potential}");

   (e) a **contribution reflecting the interconnection level** of the Member State ("C_{Interco}").
2. $C_{\text{Flat}}$ shall be the same for each Member State. All Member States' $C_{\text{Flat}}$ shall together contribute $30\%$ of the difference between the Union’s targets for 2030 and 2020.
3. $C_{GDP}$ shall be allocated between Member States based on a GDP per capita index to the Union average, where for each Member State individually the index is capped at 150% of the Union average. All Member States' $C_{GDP}$ shall together contribute 30% of the difference between the Union targets for 2030 and 2020.
4. $C_{\text{potential}}$ shall be allocated between Member States based on the difference between a Member State's RES share in 2030 as shown in PRIMES EUCO... scenario and its national binding target for 2020. All Member States' $C_{\text{potential}}$ shall together contribute 30% of the difference between the Union targets for 2030 and 2020. (Least cost allocation)
The selection of RE technologies in the period post 2020 follows a least-cost approach, meaning that all additionally required future RE technology options are ranked in a merit-order, and it is left to the economic viability which options are chosen for meeting the presumed 2030 RE target.

In other words, a least-cost approach is used to determine investments in RE technologies post 2020 across the Energy Community. This allows for a full reflection of competition across technologies and countries (incorporating well also differences in financing conditions etc.) from a European perspective.

Support levels and related expenditures follow then the marginal pricing concept where the marginal technology option determines the support level (like in the ETS or in a quota/certificate trading regime, or similar to the concept of liberalised electricity markets).
Approach for **2030 RE target setting** within the Energy Community

For the Energy Community (EnC) level, the component $C_{\text{Potential}}$ shall take into account the CPs cost-effective potential for RE sources.

The approach used within this study: **Green-X modelling (instead of PRIMES)** for deriving a least-cost allocation of the RE potentials across the EnC.

More precisely: **TU Wien’s Green-X model combined with REKK’s EEMM power system model** (as used e.g. in the SEERMAP study).

The diagram illustrates the relationship between the Green-X and EEMM models, with arrows indicating the flow of data:

- **EEMM**:
  - Electricity system model, power plant dispatch
  - RE-E installed capacities and cost (investment, operation)

- **Green-X**:
  - Electricity prices, Market values, Curtailment
  - RE investment model, detailed energy policy representation

This approach ensures a comprehensive and cost-effective allocation of renewable energy resources across the Energy Community.
5. $C_{\text{interco}}$ shall be allocated between Member States based on an electricity interconnection share index to EU average, where for each Member State individually the interconnection share index is capped at 150% of the EU average. All Member States' $C_{\text{interco}}$ shall together contribute 10% of the difference between the EU targets for 2030 and 2020.
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Approach for 2030 RE target setting within the Energy Community

Figure: Resulting RE share net increase between 2020 and 2030 for all CPs and the EnC region according to the proposed target setting approach (i.e. a “four component” approach).

(Source: EUROSTAT, 2018; IEA, 2018; IMF, 2018; NTUA, 2012; own calculations)
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Approach for **2030 RE target setting** within the Energy Community

### EnC level

**Figure: 2030 RE Targets for all CPs and the EnC region according to the proposed target setting approach (i.e. a “four component” approach).**

(Source: EUROSTAT, 2018; IEA, 2018; IMF, 2018; NTUA, 2012; own calculations)
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Approach for 2030 RE target setting within the Energy Community

EnC level

Figure: Comparison RE shares per region and Contracting Party. The historic RE share for the year 2015 (grey) in gross final energy consumption (GFEC) is compared to the 2020 target (light blue) and 2030 target (dark blue).

(Source: EUROSTAT, 2018; IEA, 2018; IMF, 2018; NTUA, 2012; own calculations)
## Study on 2030 overall targets for the Energy Community

### Approach for 2030 RE target setting within the Energy Community

#### EnC level

<table>
<thead>
<tr>
<th>RE share in gross final energy consumption</th>
<th>RE share as of EUROSTAT Shares tool [%]</th>
<th>2020 Targets as of RED [%]</th>
<th>2030 Targets according the 4 components approach</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2015</td>
<td>2016</td>
<td>2020</td>
</tr>
<tr>
<td>Contracting Party</td>
<td>Albania</td>
<td>34.4%</td>
<td>37.1%</td>
</tr>
<tr>
<td></td>
<td>Bosnia and Herzegovina</td>
<td>26.7%</td>
<td>25.3%</td>
</tr>
<tr>
<td></td>
<td>Georgia</td>
<td>33.0%</td>
<td>33.4%</td>
</tr>
<tr>
<td></td>
<td>Kosovo*</td>
<td>18.5%</td>
<td>24.4%</td>
</tr>
<tr>
<td></td>
<td>Moldova</td>
<td>26.2%</td>
<td>26.9%</td>
</tr>
<tr>
<td></td>
<td>Montenegro</td>
<td>43.1%</td>
<td>41.5%</td>
</tr>
<tr>
<td></td>
<td>North Macedonia</td>
<td>19.5%</td>
<td>18.0%</td>
</tr>
<tr>
<td></td>
<td>Serbia</td>
<td>21.9%</td>
<td>21.0%</td>
</tr>
<tr>
<td></td>
<td>Ukraine</td>
<td>4.9%</td>
<td>5.8%</td>
</tr>
<tr>
<td></td>
<td>Energy Community</td>
<td>12.1%</td>
<td>11.5%</td>
</tr>
</tbody>
</table>

Remark:

1 The RE share for Georgia for the years 2014 and 2015 is an approximate value, as the available data is not as detailed as needed to calculate the exact RE share.

Table: RE Targets and historic shares
(Source: EUROSTAT, 2018; IEA, 2018; NTUA, 2012; own calculations)
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Assessing the impacts – exemplified for **Serbia**

**Part 1: Energy efficiency**

Derived **options for setting 2030 Energy Efficiency Targets:**

<table>
<thead>
<tr>
<th></th>
<th>Final Energy Consumption [ktoe]</th>
<th>Comparison to default (Harmonised Reduction=100%) [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EE targets for Serbia by 2030</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Perspective</td>
<td>11,078</td>
<td>120.2%</td>
</tr>
<tr>
<td>Harmonised Reduction (Baseline III)</td>
<td>9,215</td>
<td>100.0%</td>
</tr>
<tr>
<td>Comparable Efforts (Historic Trend)</td>
<td>8,139</td>
<td>88.3%</td>
</tr>
</tbody>
</table>
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Assessing the impacts – exemplified for Serbia

Part 1: Energy efficiency

Harmonized Reduction (Baseline II)) reflects “top-down” target allocation as described in Resch et al. 2018

Comparable Effort is based on a comparison of historic trends*

National Perspective reflects the CPs own plans

*Example: the fit in historic development of FEC per GDP between 2005 and 2017
Assessing the impacts – exemplified for **Serbia**

**Part 2: Renewable Energies**

A “No Policy” scenario to showcase no policy action.

Two “RE target” scenarios to assess the feasibility and impacts of 2030 RE target achievement:

- **“RE target fulfilment – without RE cooperation”** ... pure domestic RE target fulfilment with no (or only limited) cooperation
- **“RE target fulfilment – with RE cooperation”** ... “Community perspective” is taken with efficient and effective RE target achievement at EnC level
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Assessing the impacts – exemplified for Serbia

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Assessing the impacts – exemplified for **Serbia**

Part 2: Renewable Energies

Analysing the impact of **EE target setting options**, exemplified for the “national perspective”:

- **Harmonized Reduction** (default options ... as discussed previously)
- **National Perspective** (high demand growth)
- **Comparable Effort** (derived from historic trend analysis, low demand growth)

→ **Modelling indicates that high demand in “National Perspective” requires RE cooperation for achieving the Serbian 2030 RE target (due to perceived domestic limits for a cost effective deployment)**
Assessing the impacts – exemplified for **Serbia**

**Part 3: GHG emission reduction**

Illustrating the impact of changes in EE and in RE deployment on **GHG emissions in Serbia** (rough indication)

<table>
<thead>
<tr>
<th>No Policy cooperation</th>
<th>RE target fulfillment - RE target fulfillment -</th>
<th>RE target fulfillment - RE target fulfillment -</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RE target fulfillment - RE target fulfillment -</td>
<td>RE target fulfillment - RE target fulfillment -</td>
</tr>
<tr>
<td></td>
<td>EE-Option: National Perspective</td>
<td>EE-Option: Comparable Effort</td>
</tr>
<tr>
<td>72%</td>
<td>61%</td>
<td>56%</td>
</tr>
<tr>
<td>74%</td>
<td></td>
<td>48%</td>
</tr>
</tbody>
</table>

... compared to 2005 levels
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Assessing the impacts – exemplified for **Serbia**

**Part 3: GHG emission reduction**

Illustrating the impact of changes in EE and in RE deployment on **GHG emissions in Serbia** (rough indication)

<table>
<thead>
<tr>
<th>Approximation of fossil generation</th>
<th>Comparison: 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>GWh</td>
</tr>
<tr>
<td>Heat</td>
<td>GWh</td>
</tr>
<tr>
<td>Transport fuels (road transport)</td>
<td>GWh</td>
</tr>
<tr>
<td>Residual fuels (i.e. mainly other transport modes)</td>
<td>GWh</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>GWh</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Approximation of GHG emissions (fossil fuel use)</th>
<th>Comparison: 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>kt CO2</td>
</tr>
<tr>
<td>Heat</td>
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<td>kt CO2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>kt CO2</td>
</tr>
<tr>
<td><strong>Total non-ETS (rough indication)</strong></td>
<td>kt CO2</td>
</tr>
</tbody>
</table>
The proposed **approach for RE target setting within the EnC follows the principles laid out at EU level**, specifically how benchmarks are introduced that indicate a fair contribution of individual MSs to the EU target.

This approach builds on 4 components (i.e. flat rate, GDP/capita, least-cost allocation and the interconnectivity of the electricity grid) that sum up the required increase at country level.

The **ambition level for renewables is influenced by the target set for Energy Efficiency** – here distinct options are analysed:

- Harmonized Reduction (default options ... as discussed previously)
- National Perspective (high demand growth)
- Comparable Effort (derived from historic trend analysis, low demand growth)

The **EE target has a strong impact on the feasibility of target achievement in RE and in GHG mitigation** → an unambitious EE target challenges the achievement of RE targets and endangers the feasibility of GHG limits.