

*Dialogue on a RES  
policy framework  
for 2030*



D4.1

Identification and qualitative analysis of target setting options

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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](http://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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# 1 Target design elements

Even though a greenhouse gas (GHG) emissions reduction target for 2030 is not formally agreed upon by Member States yet, this analysis assumes that a future target structure for the EU will be built on at least a binding GHG target. Other target options always encompass a GHG target combined with some more detailed sub-target(s).

In this section, a selection of target frameworks resulting from combination of the design elements in **Fehler! Verweisquelle konnte nicht gefunden werden.** will be described in more detail. The selection has been based on which target framework options have been or are currently relevant in the policy discussion. The focus here is on the target structure itself (blue design elements). In a second step, the selected target structures are assessed according to a number of criteria. Burden sharing options (red design elements) will be discussed in the next section.

The current European energy and climate policy framework centres on the “20-20-20” headline targets to be achieved by 2020 (European Commission 2014a): A reduction of GHG emissions by 20% compared to 1990 levels; a share of 20% RES in gross final energy consumption; and a 20% improvement in energy efficiency. This bundle of targets was agreed upon by the EU Member States in 2007 under the German council presidency (Geden & Fischer 2014). Recent political discussions have revolved mainly around the question of whether this framework ought to be continued or whether further RES and efficiency targets would be unnecessary for 2030. However, for the sake of a more comprehensive view, other possible target structures are explained here as well. The focus here is on the existence or non-existence of a RES target. Possibilities for an efficiency target are discussed where they are directly linked to the RES target.

## 2 Setting the target

### 2.1 Target framework 1: GHG-only

#### Description:

RES Reference value	Not applicable
Application level (sectoral)	<b>GHG target</b>
Bindingness of target	<b>Binding</b>

Under the current 2020 framework, the 20% emissions reduction is split up into a reduction of ETS sectors' emissions by 21% compared to 2005 levels; and a reduction of non-ETS sectors' (mostly road transport, the residential and the tertiary sectors) emissions of 10% compared to 2005 levels.

#### Problems and open questions

- Stakeholders have complained that the current ETS provides no reliable investment signal. Regarding a future target framework, the absence of a RES target and the ETS as the sole additional remuneration source for RES can be expected to cause insecurity for investors.
- Would voluntary RES targets and RES support schemes still be allowed for Member States who wish to have them? Or only at a very limited scale, i.e. below the thresholds that would make them relevant for state aid?

### 2.2 Target framework 2: Continuous RES framework

#### Description:

RES Reference value	<b>Final energy or primary energy</b>
Application level (sectoral)	<b>GHG target plus RES overall target</b>
Bindingness of target	<b>Binding</b>

The GHG reduction target can be complemented by a RES target, and possibly also an energy efficiency target, as is the case in the current 2020 policy framework, and as is prominently discussed in the 2030 target debate.

The Commission has suggested a GHG target of 40% combined with a RES target of “around 30%” in its Green Paper public consultation on the European energy and climate framework for 2030 (European Commission 2013). The Green Paper builds on the results of the three Commission roadmaps for 2050 on a low-carbon economy, transport, and energy, respectively (European Commission 2011b; European Commission 2011c; European Commission 2011a). Following the sighting of almost 600 responses to the public consultation, the communication paper COM(2014)15 (European Commission 2014b) suggests:

- A 40% GHG reduction target;
- a RES target of “at least” 27%;
- and an unspecified ambition level for energy efficiency.

The responses to the 2013 Green Paper made clear that a number of Member States oppose the current target structure and would prefer a single GHG reduction target instead (Steinhilber et al. 2014). Nevertheless, the European Council at its meeting in March 2014 agreed for a future climate and energy policy framework to be “on the basis of the Commission communication”, with a final decision scheduled for no later than October (European Council 2014).

### Problems and open questions

Should the target refer to final energy or primary energy?

- *Final energy* refers to the energy supplied to the final consumer, usually in the form of electricity or heat, after it has undergone a transformation or conversion process. The 20% RES target for 2020 refers to final energy, being expressed as the share of renewable energy in gross final energy consumption.
- *Primary energy* refers to energy which has not undergone a transformation or conversion process. Losses occur as primary energy is transformed into electricity or heat for consumers to use, with efficiency varying greatly depending on the conversion processes taking place and the fuels used. Gas, coal, and biomass power and heat plants have efficiency rates far below 100%. For wind and solar, however, one unit of primary energy is assumed to equal one unit of final energy.

## 2.3 Target framework 3: focus on RES-E

### Description:

RES Reference value	<b>Final energy</b>
Application level (sectoral)	<b>GHG target plus RES subsector target (RES-E)</b>
Bindingness of target	<b>Binding</b>

Instead of combining the GHG target with an overall RES target, there could be specific RES targets for one or more of the three RES subsectors: electricity (RES-E), heating and cooling (RES-H), and transport (RES-T). In principle, a mandatory overall RES target could be split up into mandatory RES sector targets. Alternatively, one or two mandatory RES sector targets could be applied in the absence of an overall RES target.

At present, the RES Directive allocates an overall RES target to each Member State which was calculated according to a pre-defined burden sharing rule. In addition, the Directive originally obliged each Member State to achieve a minimum share of 10% RES-T by 2020. No mandatory sector shares are defined for RES-E and RES-H.



### Problems and open questions

Concerning the 2030 target structure, the Commission has already indicated that it considers a separate target for RES-T or any other subsector inappropriate (European Commission 2014a). Some eastern European Member States may also find a RES-E target unattractive, as they focus on RES-H, where they can often achieve their 2020 targets easily. They may consider RES-E a more costly, undesirable option.

## 2.4 Target framework 4: Specialised support for selected RES technologies

### Description:

RES Reference value	<b>Final energy</b>
Application level (sectoral)	<b>GHG target plus RES technology targets</b> (innovative / less mature technologies)
Bindingness of target	<b>Binding</b>

It is sometimes argued, especially by proponents of a GHG-only target, that a RES target is not necessary, as RES will have sufficiently matured in 2020 to be competitive with other GHG abatement measures. This may indeed be the case for some mature/maturing RES technologies such as PV or on-shore wind. However, in order to put a range of RES technologies “on the shelf” to have them available when the low-cost potentials of mature technologies are exhausted, specific RES technology targets for less mature technologies (e.g. offshore wind or concentrated solar power) can be an option.

### Problems and open questions

Which RES technologies should be selected for specific targets, and how ambitious should they be? Given the varying interests and different technology preferences of Member States, agreement on this may not be feasible.

- If the technology target stays on EU level and is realised via an EU instrument: Member States with the lowest-cost potentials benefit most from the investment, financed by all Member States.
- If the technology target is broken down into national/regional targets: Analogous to a RES-overall target, a range of effort sharing options are possible, see next section. All of them have benefits and drawbacks. As an additional drawback, Member States may not accept the even more limited flexibility that comes with a technology-specific RES target.

## 2.5 Target framework 5: RES imports from third countries

### Description:

RES Reference value	<b>Final energy</b>
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Application level (sectoral)	<b>GHG target plus RES overall target plus RES import target</b>
Bindingness of target	<b>Binding</b>

In addition to a RES target to be achieved within the borders of the EU, a minimum target is defined for RES which are to be imported from third countries. In reality, RES imports will take place almost exclusively in the electricity sector, as, for instance, cross-border district heating networks are not expected to become significant.

#### **Problems and open questions**

- RES imports from third countries with low-cost potentials are favourable with regard to cost-efficiency as they make use of best sites. However, care has to be taken to achieve a positive net RES deployment when moving European RES-E production abroad. Only third countries with own RES targets can be trade partners, and EU import policies must not have detrimental effects to RES deployment for local consumption.
- Public acceptance may be an issue, as EU citizens must (partially) pay, but benefits in the form of investments go to third countries.

## 2.6 Additional targets

This option does not constitute a target framework by itself, but can be combined with any of the above target frameworks. Additional targets can indirectly affect RES deployment or GHG emissions:

- Interconnection target
- CHP target
- ...

#### **Problems and open questions**

- If a RES target is not acceptable, are such additional targets more acceptable?

### 3 Criteria for target setting options

Criterion	Explanation
Consistency with long-term-targets until 2050	The EU has committed itself to a reduction in GHG emissions by 80-95% by 2050 compared to 1990 levels. 2030 target(s) serve as a milestone to ensure achievement of this long-term objective. The 2030 target structure therefore needs to be consistent with the trajectories necessary for the desired 2050 result.
Efficiency	This criterion refers to the costs associated with target achievement under each possible target structure. Energy system costs vary with the amount, technologies, and geographical distribution of deployed RES. Efficiency includes a medium-term and a long-term aspect:
Static efficiency	<ul style="list-style-type: none"> <li>Static efficiency in this case refers to the medium-term, i.e. the total system costs incurred to achieve the 2030 target(s).</li> </ul>
Dynamic efficiency	<ul style="list-style-type: none"> <li>Dynamic efficiency refers to the energy system costs incurred to achieve a largely decarbonised energy sector, in this case with the horizon set at 2050. Due to technological learning, the generation costs of electricity produced from RES decrease with increasing deployment. Immature and expensive technologies today can become economically attractive in the future. As low-hanging fruits are exploited, investments into currently immature technologies lower later generation costs incurred to achieve more ambitious future targets.</li> </ul>
Economic competitiveness of industry	<p>This criterion refers to the effects of a given target structure on the economic competitiveness of EU industry.</p> <p>The criterion is closely linked to both static and dynamic efficiency, as the overall costs incurred by abatement measures affect industry. The most straightforward effect is a negative one, as industry is faced with higher costs. However, for those sectors with energy efficiency potentials, this may actually incentivise innovation and improve competitiveness (see Porter and van der Linde, 1995). Additional costs to industry are determined not only by the ambition level and technological choices set in the target structure, but also by effort sharing arrangements between Member States as well as between industrial and private household consumers.</p> <p>Special cases are those industries which benefit directly from an increased demand for their products, resulting from target setting. This includes producers of RES and energy efficiency parts, installations, and related services.</p>

<b>Flexibility</b>	<p>This criterion refers to how much freedom remains for a Member State to set its own focus in reducing GHG emissions, i.e. to concentrate on RES deployment, energy efficiency, or other measures. Member States are only willing to delegate the relevant decision competence to the Commission to a certain degree. Many of them have a strong interest in retaining flexibility to adapt targets to their national circumstances and preferences.</p> <p>This criterion is closely linked to political acceptability.</p>
<b>Political acceptability</b>	<p>This criterion refers to whether a certain target structure is politically attractive for Member States at a given time. Factors influencing political acceptability are the policy's ambition level and associated costs, the political and public mood in Member States, and the binding nature of the target.</p>

Criterion	Consistency with long-term targets	Cost-efficiency		Economic competitiveness	Flexibility	Political acceptability
		static	Dynamic			
Target framework 1: GHG only	<p>“A 40% GHG target would ensure that the EU is on the Low-Carbon Economy Roadmap's cost-effective track towards meeting the EU's 2050 GHG objective to reduce GHG emissions by 80-95 percent in 2050 compared to 1990,” according to the Commission Impact Assessment SWD(2014)15 final.</p> <p>According to other sources a GHG only target (see e.g. Beyond 2020 project) does not sufficiently incentivise innovative technologies and sectors required for ambitious long term GHG targets.</p>	<p>According to Impact Assessment (SWD(2014)15 final) very high static efficiency (=lowest overall system costs until 2030), as least-cost abatement options are realised first. But: That depends on modelling assumptions. According to other studies (e.g. Beyond 2020 project), higher risk premiums result from investor uncertainty under this option. This leads to higher system costs until 2030, as compared to a target framework with a RES (and energy efficiency) target.</p>	<p>Low dynamic efficiency, as high-cost, immature technologies are not built and do not experience learning effects.</p>	<p>Benefit: GHG abatement costs (including energy costs) stay low.</p> <p>Drawback: less incentive for innovation leads to no benefits from Porter effect and no benefits from technological competitive edge.</p>	<p>Full flexibility, if MS are permitted to have their own complementary policies. Less so if the ETS is the only permitted mechanism.</p>	<p>Much discussed and very controversial. Acceptable for UK and Visegrad-countries. Unacceptable for DE, DK, AT.</p>
Target framework 2: Continuous RES framework	<p>Impact Assessment SWD(2014)15 final: Assuming enabling framework conditions, a RES share of 26.5% would accompany a 40% GHG target, even in the absence of a RES target. 27% RES target is thus the cost-effective track towards the 2050 objective.</p> <p>According to other sources, a higher RES target (i.e. at least 30%) would be necessary to sufficiently develop a technology portfolio until 2030, which will then be ready to use to achieve the long-term target of 80-95% GHG reduction in 2050 compared to 1990.</p>	<p>Slightly lower static efficiency: Total system costs until 2030 are slightly higher when RES as a higher-cost abatement option are deployed before lower-cost potentials are used up (according to the Commission Impact Assessment SWD(2014)15 final. But: That depends on modelling assumptions. According to other studies, lower risk premiums result from a RES target (and energy efficiency target). This leads to lower system costs until 2030, compared to target frameworks with only a GHG target.</p>	<p>High dynamic efficiency, as almost-mature RES are deployed further, and immature technologies are “put on the shelf” through technology learning.</p>	<p>Benefit: incentives for innovation lead to more competitive edge for RES industry. But: possibly higher electricity prices for consumers if higher LCOE of RES technologies are not compensated by lower risk premium due to a RES target.</p>	<p>Somewhat limited flexibility as RES target poses a constraint to other GHG mitigation options. But fully flexible within the RES sector (sub-sectors RES-E vs. RES-H vs. RES-T).</p>	<p>Much discussed and very controversial. Acceptability depends very much on ambition level of RES target.</p> <p>Although UK and many Eastern European MS would prefer no RES target, 27% RES may be suitable for a political compromise (March Council).</p> <p>30% RES or higher is unlikely to be politically acceptable.</p>
Target framework 3: Focus on RES-E	<p>Depends on ambition level of the RES-E target. However, the existence of a RES subsector</p>	<p>Depends on ambition level of RES-E target. Two opposing trends always apply, as in the</p>	<p>High to moderate dynamic efficiency, as learning effects for immature technologies focus</p>	<p>Benefit: incentives for innovation lead to more competitive edge for RES-E industry. But:</p>	<p>Somewhat limited flexibility as the RES-E target sets a clear constraint for thus sub-sector,</p>	<p>Commission has already announced that it is against sec-</p>

	target helps to put technologies “on the shelf” which will be needed in the long-term. A RES-E target is thus more helpful than the GHG-only option to ensure consistency with 2050 ambitions.	two above options. Which trend is stronger depends largely on modelling assumptions: A specific target creates investor security, thus lowering the risk premiums in the RES-E subsector. Outside the subsector, risk premiums rise => overall, lower risk premiums than under GHG only option, leading to lower overall system costs until 2030 and thus better static efficiency. <b>On the other hand, the RES-E target poses a constraint for the market-led use of lowest-cost abatement options =&gt; lower static efficiency than a GHG-only target and probably than an overall RES-target for all sectors.</b>	only on RES-E technologies.	<b>high electricity prices for consumers if higher LCOE of RES-E technologies are not compensated by lower risk premium due to a RES-E target.</b>	which decreases flexibility. On the other hand, outside the RES-E subsector, all other GHG mitigation options can be flexibly implemented.	<b>toral targets.</b> <b>MS with low-cost RES-H potentials will not find a focus on RES-E attractive =&gt; especially Easter European MS? Possibly still attractive for MS with low-cost PV or wind potentials.</b>
Target framework 4: Specialised support for selected RES technologies	Depends on ambition level of the technology target. However, the existence of a technology target helps to at least develop selected immature technologies and puts them “on the shelf” for 2050. A technology target is thus more helpful than the GHG-only option to ensure consistency with 2050 ambitions. <b>However, the developed technology portfolio will be narrower than under a RES or RES subsector target, and is thus less able to ensure consistency with long-term ambitions than target frameworks 2 and 3.</b>	Depends on ambition level of technology target. Two opposing trends always apply, as in the above options. Which trend is stronger depends largely on modelling assumptions: A specific target creates investor security, thus lowering the risk premiums for the specific technology. Outside that technology, risk premiums rise => overall, lower risk premiums than under GHG only option, leading to lower overall system costs until 2030 and thus better static efficiency. <b>On the other hand, the technology target poses a constraint for the market-led use of lowest-cost abatement options =&gt; lower static efficiency than a GHG-only target.</b>	Moderate dynamic efficiency, as learning effects for immature technologies focus only on those technologies which fall under the target.	Benefit: incentives for innovation lead to more competitive edge for the industries involved in the selected RES technologies.  As the selected technologies are limited in scope, they should not affect the electricity price for consumers too much.	Some flexibility. The technology target sets a clear constraint for the affected technology, which decreases flexibility. On the other hand, outside the technology target, all other GHG mitigation options can be flexibly implemented.	Depends on technology. Choice of technology will be result of difficult negotiations. If offshore wind: Attractive for MS with good offshore wind potentials, <b>not attractive for others.</b>  <b>Not attractive for MS who care about static efficiency: Why set a target for one of the most expensive technologies? Attractive for MS who care about dynamic efficiency, as selected immature technologies are further developed.</b>

Target framework 5: Third countries	This option includes a RES target, and thus the same considerations as for target framework 2 apply. In addition, developing the necessary infrastructure (hardware and political) for extensive RES imports by 2030 can be beneficial for the long-term 2050 view, when such imports may become even more desirable.	This option includes a RES target, and the same static efficiency considerations apply as for Target Framework 2. In addition, static efficiency may be improved by low-cost RES-E imports from third countries. <b>If RES-E imports are high-cost or require physical imports and investments in the grid infrastructure, static efficiency can deteriorate.</b>	High dynamic efficiency due to the inner-EU RES target, as almost-mature RES are deployed further, and immature technologies are “put on the shelf” through technology learning. The RES import target will probably have positive learning effects on technology costs in the countries of origin, as deployment there rises and the associated infrastructures are subjected to learning processes.	Benefit: incentives for innovation lead to more competitive edge for the industries involved in the selected RES technologies.  <b>But: RES target may lead to high electricity prices for consumers.</b> Additional import target may increase or decrease electricity prices, depends on how costly the import is (generation cost and network extension cost).	<b>Limited flexibility, as other GHG mitigation options are constrained by the RES target, and the RES options are further constrained by the RES-import target.</b>  However the import option was introduced as a flexibility measure as such.	<b>Forces some MS to strongly invest in grids. Unattractive if they have to finance this themselves.</b>  If imported RES-E is cheap, then a target is attractive for MS who value static efficiency. Then, theoretically, these imports would also happen without an import target (<= but: more secure investment signal with a specific target). <b>If imported RES-E is more expensive than domestic RES/other GHG mitigation options, then it is unattractive for MS who value static efficiency. Also, no benefits from investments in Europe, limited benefits for EU industry and innovation.</b>
Additional targets	These targets are not standalone options, but add-ons to the above target structures.  An interconnection target can remove infrastructural barriers which will impede not only 2030 target achievement but also 2050 ambitions.  A CHP target ensures better resource efficiency, also for conventional power plants. Long life cycles of RES and conventional power plants mean that a CHP target now can prevent undesired path dependency which will have effects until 2050.	These targets are not standalone options, but add-ons to the above target structures.	These targets are not standalone options, but add-ons to the above target structures.		These targets are not standalone options, but add-ons to the above target structures. <b>Any additional target further limits flexibility.</b>	

## 4 Options for effort sharing

A variety of effort sharing arrangements between Member States is detailed in this section. All of them are based on the assumption that a GHG target is combined with an EU-wide RES target.

### 4.1 Binding national RES targets

#### Description

Application level (geographic)	<b>EU target and Member State targets, with full allocation</b> to Member States
Target allocation procedure	<b>Top-down allocation</b>
Application level (sectoral)	<b>GHG target plus RES target</b>
Bindingness of target	<b>Binding</b>
Target setting flexibility	<b>Fixed</b>
Target achievement flexibility	<b>Cooperative</b>

This effort sharing option essentially follows the 2020 logic. The EU RES target is broken down into Member State targets according to a fixed formula. The allocation formula could once again include a flat rate component and a GDP-dependent component. The resulting Member State targets are legally binding. Reporting procedures are equivalent to the current system, with Member States delivering NREAPs for the time frame 2020-2030, followed by regular progress reports.

#### Problems and open questions

In the current political climate, this option is highly unlikely to be politically feasible. The UK and several Eastern European countries are strongly opposed.

### 4.2 Binding national RES targets through pledging

#### Description

Application level (geographic)	<b>EU target and Member State targets, with full or partial allocation</b> to Member States
Target allocation procedure	<b>Bottom-up allocation with benchmarking; EU-gap addressed with supercredits or pledging-proportionate financing</b>
Application level (sectoral)	<b>GHG target plus RES target</b>



Bindingness of target	<b>Binding</b>
Target setting flexibility	<b>Fixed</b>
Target achievement flexibility	<b>Cooperative</b>

The EU RES target is broken down into benchmark Member State targets according to a fixed formula, for instance following the GDP- and flat-rate-based allocation logic of the 2020 target. Member States are free to accept this suggested benchmark or to pledge to a higher or lower target, to which they have to commit as legally binding. Member States are then obliged to deliver an NREAP to the Commission to illustrate how they will achieve their pledged target.

If Member State pledges are not ambitious enough, their combined targets do not add up to the EU target, causing a target gap to remain on EU level. This gap would have to be covered by an EU instrument. Such a gap can be prevented by providing strong incentives to Member States for ambitious pledging:

- Ambitious pledging can be incentivised through financial incentives or supercredits. Certain parts of ambitious targets can be rewarded by additional incentives from EU sources (such as an ETS fund) or by multiplying it with a certain bonus factor (e.g. by counting it 1.1- fold). Bonus factors can be applied, for instance, to the amount realised using certain technologies, or to the amount realised in cooperation with other Member States.

A different kind of incentive can stem from the method of how the EU target gap is covered. An instrument has to be set up and financed. Financing can be designed so that Member States with more ambitious pledges are rewarded by having to contribute less, while Member States with less ambitious pledges have to contribute more.

### **Problems and open questions**

- Supercredits, if applied too generously, will dilute the target to an extent that makes it less ambitious – the exact thing it is supposed to avoid. Ambition loss through dilution must be weighed carefully against unambitious pledges.
- Pledging-proportionate financing neutralises an ambitious (unambitious) pledge through low (high) financing burdens to close the EU target gap. In effect, this leads to each Member State's overall burden being determined by the EU, which really makes it the same thing as top-down target allocation. Political feasibility is thus questionable.
- The pledging behaviour of Member States can be expected to be strategic. Are the two incentive mechanisms really meaningful, if they are known to the MS beforehand?

## 4.3 Binding regional targets

### Description

Application level (geographic)	<b>EU target and regional targets, with full allocation to regions</b>
Target allocation procedure	<b>Top-down allocation</b>
Application level (sectoral)	<b>GHG target plus RES target</b>
Bindingness of target	<b>Binding</b>
Target setting flexibility	<b>Fixed</b>
Target achievement flexibility	<b>Cooperative</b>

Member States are grouped into regions. Groups are suggested by the Commission, but Member States may act according to their own preferences. Member States who do not find attractive partners may remain by themselves. The grouping process is thus effectively an opt-in process, as only those Member States form groups who wish to do so. After the initial formation, the groups remain fixed. The EU RES target is allocated to Member States by a fixed formula. For those Member States forming regional groups, national targets are combined into a common regional target. The allocation formula could, for instance, once again include a flat rate component and a GDP-dependent component, as was the case for the 2020 targets. Member States are jointly responsible for the target achievement of the region they belong to.

### Problems and open questions

In what order will groups be formed and targets be allocated?

- If groups are to be formed first, then targets are allocated: Member States are unlikely to commit to a certain group if they do not know yet which target this will imply. This process is thus politically highly unlikely.
- If targets are allocated first, then groups are formed: Some Member States may be unwilling to accept binding national target allocation. They do not know yet whether they will find suitable group partners, and what cost implications this will have for them. For Member States who oppose national targets, this option may not be attractive either.

Joint responsibility for weaker Member States' inability to achieve a common target may discourage stronger Member States from entering into a group with them.

## 4.4 Indicative national RES targets

### Description

Application level (geographic)	<b>EU target and Member State targets, with full allocation</b> to Member States
Target allocation procedure	<b>top-down</b>
Application level (sectoral)	<b>GHG target and RES target</b>
Bindingness of target	<b>non-binding</b>
Target setting flexibility	<b>fixed target</b>
Target achievement flexibility	<b>Cooperative</b>

The EU RES target is broken down into Member State targets according to a fixed formula. The allocation formula could, for instance, once again include a flat rate component and a GDP-dependent component, as was the case for the 2020 targets. However, the resulting Member State targets are indicative, rather than legally binding.

### Problems and open questions

Even though the target is only indicative, it enables the Commission to monitor and encourage target achievement through “naming and shaming”. This may have no legal consequences but is still a political tool. For this reason, some Member States may oppose even indicative targets on Member State level.

## 4.5 Indicative national RES targets with incentives for over commitment

### Description

Application level (geographic)	<b>EU target and Member State targets, with full allocation</b> to Member States
Target allocation procedure	mix of <b>top-down</b> and <b>bottom-up allocation</b> , pledges with <b>benchmarking</b> ,; EU-gap addressed with <b>supercredits</b>
Application level (sectoral)	<b>GHG target and RES target</b>
Bindingness of target	<b>non-binding</b>
Target setting flexibility	<b>fixed target</b>
Target achievement flexibility	<b>Cooperative</b>

The ambition level for each Member State is allocated according to a fixed formula. Each Member State formulates an NREAP in which it states how it intends to achieve the target. Member States have the possibility to indicate in their NREAP their willingness to achieve a higher target than the one allocated to them. In order to incentivise such voluntary over commitment, ambitious Member States benefit from supercredits or from a redistribution of ETS allowances in their favour. As already described in section 4.2, supercredits can be applied, for instance, to the amount pledged above the benchmark target, to the amount realised using certain technologies, or to the amount realised in cooperation with other Member States.

### Problems and open questions

“Naming and shaming” is possible, which makes this option unattractive for some Member States. On the other hand, indicative targets are likely to be more easily accepted in the Council than binding ones.

## 4.6 Indicative regional targets

### Description

Application level (geographic)	<b>EU target and regional targets, with full allocation to regions</b>
Target allocation procedure	<b>Top-down allocation</b>
Application level (sectoral)	<b>GHG target plus RES target</b>
Bindingness of target	<b>Indicative</b>
Target setting flexibility	<b>Fixed</b>
Target achievement flexibility	<b>Cooperative</b>

Similar to the previous option: The ambition level for each Member State is allocated according to a fixed formula. However, Member states are grouped into regions, merging their national targets into a regional one. Group formation follows the same principle as for the binding regional targets (option 4.3): Groups are suggested by the Commission, but Member States may act according to their own preferences. Member States who do not find attractive partners may remain by themselves. The grouping process is thus effectively an opt-in process, as only those Member States form groups who wish to do so. After the initial formation, the groups remain fixed. Each regional group formulates a REAP in which it states how it intends to achieve the indicative target. Regions have the possibility to indicate in their REAP their willingness to achieve a higher target than the one resulting from their combined targets. In order to incentivise such voluntary over commitment, ambitious regions benefit from supercredits or from a redistribution of ETS allowances in their favour.

### Problems and open questions

“Naming and shaming” is possible for regions, but not for individual Member States. This may make this option more politically attractive. Nevertheless, the same problems as in option 4.3 apply for the group formation process: In what order will groups be formed and targets be allocated?

- If groups are to be formed first, then targets are allocated set: Member States are unlikely to commit to a certain group if they do not know yet which target this will imply. This process is thus politically highly unlikely.
- If targets are allocated first, then groups are formed: Some Member States may be unwilling to accept binding national target allocation. They do not know yet whether they will find suitable group partners, and what cost implications this will have for them. For Member States who oppose national targets, this option may not be attractive either.

In addition, just like for option 4.3, joint responsibility for weaker Member States may deter even ambitious Member States from agreeing to such an arrangement.

## 4.7 Binding national RES targets and gap-filler

### Description

Application level (geographic)	<b>EU target and Member State targets, with partial allocation to Member States</b>
Target allocation procedure	<b>bottom-up allocation with benchmarking, EU-gap covered by non-pledging-proportionate financing</b>
Application level (sectoral)	<b>GHG target and RES target</b>
Bindingness of target	<b>Binding</b>
Target setting flexibility	<b>fixed target</b>
Target achievement flexibility	<b>Cooperative</b>

This target allocation procedure is similar to the one described in 4.2: The EU target is broken down into benchmark Member State targets according to a fixed formula. Member States are free to accept this suggestion or pledge to a higher or lower target, to which they have to commit as legally binding. In the absence of strong incentives, it must be expected that many Member States pledge to a target lower than the benchmark. This results in a gap on EU level, which must be achieved with an EU-level instrument. This policy instrument is financed from the EU budget - and thus, finally, by the Member States. However, financial contributions of the Member States to the EU instrument are not related to the ambitiousness of their national target pledge.

## 4.8 Binding national RES targets through free pledging

### Description

Application level (geographic)	<b>EU target and Member State targets, with partial allocation to Member States</b>
Target allocation procedure	<b>bottom-up allocation with free pledging, EU-gap covered by non-pledging-proportionate financing</b>
Application level (sectoral)	<b>GHG target and RES target</b>
Bindingness of target	<b>Binding</b>
Target setting flexibility	<b>fixed target</b>
Target achievement flexibility	<b>Cooperative</b>

Under free pledging, Member States commit to a RES target determined by them. No benchmark value is provided by the Commission. The self-determined targets are legally binding. It can be expected that the sum of the national targets ends up being less than the EU target. One or more iterations can follow the first round, in order to negotiate higher targets with the Member States and close the EU gap. If, after repeated iterations and negotiations, a gap still remains, this part of the target is covered by an EU-

level instrument. This instrument is financed from the EU budget, with Member State contributions not related to how ambitious their target pledge was.

### Problems and open questions

- If Member States know in advance that repeated iterations and negotiations will follow the first pledge, they may resort to strategic behaviour to minimise their own effort: Enter the process with a first, low pledge and hope that other Member States pledge high. Then negotiate an increase to a slightly higher pledge which reflects their actual ambition level.
- If Member States do not know of the iterations in advance, they may immediately pledge their actual ambition level. However, Member States would not agree in the first place to a burden sharing arrangement with an unclear process in case of insufficient pledging.
- If the financing of the gap-filler is equally distributed among Member States (independent of the ambition level of pledges) this is an incentive for low pledges.

## 4.9 Binding regional RES targets through free pledging

### Description

Application level (geographic)	<b>EU target and regional targets, with full allocation to regions</b>
Target allocation procedure	<b>Bottom-up allocation with free pledging; EU-gap addressed with non-pledging-proportionate financing</b>
Application level (sectoral)	<b>GHG target plus RES target</b>
Bindingness of target	<b>Binding</b>
Target setting flexibility	<b>Fixed</b>
Target achievement flexibility	<b>Cooperative</b>

Similarly to the free pledging procedure for Member States, regions commit to a RES target determined by them. No benchmark value is provided by the Commission. Regions are created following the same principle as for the binding regional targets (option 4.3): Groups are suggested by the Commission, but Member States may act according to their own preferences. Member States who do not find attractive partners may remain by themselves. The grouping process is thus effectively an opt-in process, as only those Member States form groups who wish to do so. After the initial formation, the groups remain fixed. The self-determined targets are legally binding for the regions. It can be expected that the sum of the national targets ends up being less than the EU target. One or more iterations can follow the first round, in order to negotiate higher targets with the Member States and close the EU gap. If, after repeated iterations and negotiations, a gap still remains, this part of the target is covered by an EU-level instrument. This instrument is financed from the EU budget, with Member State contributions not related to how ambitious their target pledge was.

### Problems and open questions

- This burden sharing option faces the same problems as the previous one: Strategic behaviour if regions know of the iteration process in advance, or else unwillingness by Member State to accept an arrangement with unclear processes which would allow for “surprising” iterations. In addition, just like for regional benchmarked pledging, joint responsibility for weaker Member States may deter even ambitious Member States from agreeing to such an arrangement.
- If Member States may choose whether to form a group or pledge a national target by themselves, the second problem may not be significant. Member States voluntarily choosing partners is in effect equal to bottom-up convergence.
- If the financing of the gap-filler is equally distributed among Member States (independent of the ambition level of pledges) this is an incentive for low pledges.

## 4.10 RES target on EU level

### Description

Application level (geographic)	<b>EU target</b>
Target allocation procedure	not applicable
Application level (sectoral)	<b>GHG target plus RES target</b>
Bindingness of target	<b>Binding</b>
Target setting flexibility	<b>Fixed</b>
Target achievement flexibility	not applicable

The target is set on EU level and financed wholly through an EU-wide harmonised instrument.

### Problems and open questions

Burden will be shared across all EU electricity consumers. Will this be related to GDP?

Who is held (legally) responsible in case the target is not achieved?

Are additional voluntary RES support schemes allowed for Member States who want them?

## 5 Criteria for burden sharing options

Criterion	Explanation
Efficiency	This criterion refers to the costs associated with target achievement under each possible target structure. Efficiency includes a medium-term (static) and a long-term (dynamic) aspect. Dynamic efficiency is less relevant with regard to burden sharing arrangements. We therefore limit this analysis to static efficiency:
Static efficiency	<ul style="list-style-type: none"> <li>Static efficiency refers to the total system costs incurred to achieve the 2030 target(s). Energy system costs vary with the amount, technologies, and geographical distribution of deployed RES. Burden sharing arrangements between Member States have an effect on the geographic distribution of RES installations.</li> </ul>
Flexibility	<p>This criterion refers to how much freedom remains for a Member State to set its own focus in reducing GHG emissions, i.e. to concentrate on RES deployment, energy efficiency, or other measures. Member States are only willing to delegate the relevant decision competence to the Commission to a certain degree. Many of them have a strong interest in retaining flexibility to adapt targets to their national circumstances and preferences.</p> <p>This criterion is closely linked to political acceptability.</p>
Applicability	A meaningful target structure must be practicable in its implementation and measurable in its effects. This includes the possibility to identify a baseline, and clarity on which instruments can be applied for target achievement by whom.
Political acceptability	This criterion refers to whether a certain burden sharing arrangement is politically attractive for Member States at a given time. Factors influencing political acceptability are the policy's ambition level and associated costs to individual Member States, and the bindingness of commitments.



Target	Efficiency (static)	Flexibility	Applicability	Political acceptability
Burden sharing option				
4.1 Binding national RES targets	<p>If allocation formula is similar to 2020 allocation (GDP-based rather than potentials-based), static efficiency is relatively low. Flexibility mechanisms exist to increase efficient use of best sites. Nevertheless, Member States have a tendency towards fulfilling their target within their borders, so flexibility mechanisms will be used below optimal levels.</p> <p>Binding target creates certainty for investors, lowering the necessary support levels.</p>	<p>Top-down allocation of binding RES target offers minimum flexibility to Member States, both with regard to sectors (RES vs. other abatement measures), and geographically.</p>	<p>Fully applicable. The currently existing framework is based exactly on this model.</p> <p>The clear division of responsibilities helps to implement corrective measures in case the target is missed.</p>	<p>All factors combined, this option has very low political acceptability:</p> <p>Binding targets may be unacceptable to some Member States.</p> <p>Top-down target allocation is unacceptable to many Member States.</p>
4.2 Binding national RES targets through pledging	<p>If allocation formula is similar to 2020 allocation (GDP-based rather than potentials-based), static efficiency is relatively low. Flexibility mechanisms exist to increase efficient use of best sites. Nevertheless, Member States have a tendency towards fulfilling their target within their borders, so flexibility mechanisms will be used below optimal levels.</p> <p>Binding target creates certainty for investors, lowering the necessary support levels.</p>	<p>Pledging with benchmarking (mix of top-down and bottom-up) offers some flexibility for Member States regarding sectors (RES vs. other abatement measures). Possibility for “naming and shaming” reduces flexibility, politically speaking. Geographically, flexibility is only provided through cooperation mechanisms between Member States.</p>	<p>Applicable. The clear division of responsibilities helps to implement corrective measures in case the target is missed.</p>	<p>Binding targets may be unacceptable to some Member States. Pledging with benchmarking allows for “naming and shaming” which is also unwanted by some Member States.</p> <p>The fact that ambition level of individual targets can be influenced by Member States might increase acceptability.</p>
4.3 Binding regional targets	<p>Static efficiency is better than for national targets, as best sites are used within regions.</p> <p>Binding target creates certainty for investors, lowering the necessary support levels. However, the regional approach is new and untested, may create some new uncertainties.</p>	<p>Top-down allocation of binding RES targets leaves minimum flexibility to regions regarding sectors (RES vs. other abatement measures). Geographically, however, the Member States can freely allocate burdens within their region; RES are deployed according to best-sites principle.</p>	<p>Limited applicability. Unclear who is legally responsible in case the regional target is missed.</p>	<p>Binding targets may be unacceptable to some Member States.</p> <p>Ambitious Member States may be deterred by the idea of taking responsibility for less ambitious Member States in their regional group.</p>
4.4 Indicative national RES targets	<p>If allocation formula is similar to 2020 allocation (GDP-based rather than potentials-based), static efficiency is relatively low. Flexibility mechanisms exist to increase efficient use of best sites. Nevertheless, Member States have a tendency towards fulfilling their target within their borders, so</p>	<p>Even though the target is allocated top-down, it is indicative, providing flexibility to Member States with regard to sectors (RES vs. other abatement measures). Possibility for “naming and shaming” reduces flexibility, politically speaking. Geographically, flexibility is only provided through coopera-</p>	<p>Applicable. Similar to 2010 RES-E targets. The indicative character allows for corrective measures, but less binding than in case of binding targets.</p>	<p>Especially less ambitious Member States will find indicative targets more attractive than binding ones.</p> <p>Top-down target allocation allows for “naming and shaming” which is also unwanted by some Member States.</p>

	<p>flexibility mechanisms will be used below optimal levels.</p> <p>Indicative targets create less investor certainty than binding targets, but still more than no target at all.</p>	<p>tion mechanisms between Member States.</p>		
4.5 Indicative national RES targets with incentives for overcommitment	<p>If allocation formula is similar to 2020 allocation (GDP-based rather than potentials-based), static efficiency is relatively low. Flexibility mechanisms exist to increase efficient use of best sites. Nevertheless, Member States have a tendency towards fulfilling their target within their borders, so flexibility mechanisms will be used below optimal levels.</p> <p>Indicative targets create less investor certainty than binding targets, but still more than no target at all.</p>	<p>Even though the target is allocated top-down, it is indicative, providing flexibility to Member States in case of unexpected developments (e.g. regarding costs of RES technologies) and with regard to sectors (RES vs. other abatement measures). Possibility for “naming and shaming” reduces flexibility, politically speaking. Geographically, flexibility is only provided through cooperation mechanisms between Member States.</p>	<p>Applicable. The indicative character allows for corrective measures, but less binding than in case of binding targets.</p>	<p>Especially less ambitious Member States will find indicative targets more attractive than binding ones.</p> <p>Top-down benchmarking allows for “naming and shaming” which is also unwanted by some Member States.</p>
4.6 Indicative regional targets	<p>Static efficiency is better than for national targets, as best sites are used within regions.</p> <p>Indicative targets create less investor certainty than binding targets, but still more than no target at all. However, the regional approach is new and untested, may create some new uncertainties.</p>	<p>Even though the target is allocated top-down, it is indicative, providing flexibility to Member States in case of unexpected developments (e.g. regarding costs of RES technologies) and with regard to sectors (RES vs. other abatement measures). Geographically, Member States can freely allocate burdens within their region; RES are deployed according to best-sites principle.</p>	<p>Limited applicability. Unclear who is legally responsible in case the regional target is missed.</p>	<p>Especially less ambitious Member States will find indicative targets more attractive than binding ones.</p> <p>Ambitious Member States may be deterred by the idea of taking responsibility for less ambitious Member States in their regional group.</p> <p>Top-down benchmarking allows for “naming and shaming”, but only for regions, not for individual Member States</p>
4.7 Binding national RES targets and gap-filler	<p>If allocation formula is similar to 2020 allocation (GDP-based rather than potentials-based), static efficiency is relatively low. Flexibility mechanisms exist to increase efficient use of best sites. Nevertheless, Member States have a tendency towards fulfilling their target within their borders, so flexibility mechanisms will be used below optimal levels.</p> <p>Binding target creates certainty for investors, lowering the necessary support levels</p>	<p>Even though the target is binding, the fact that it is allocated through benchmarked pledging provides flexibility to Member States in case of unexpected developments (e.g. regarding costs of RES technologies) and with regard to sectors (RES vs. other abatement measures). Possibility for “naming and shaming” reduces flexibility, politically speaking.</p> <p>Financing of the gap-filler instrument is set according to rules independent of pledging ambitiousness. Some flexibility if financing</p>	<p>Applicable. The clear division of responsibilities helps to implement corrective measures in case the target is missed.</p>	<p>Binding targets may be unacceptable to some Member States.</p> <p>The EU-gap has to be financed from the EU budget. Attractive for net beneficiaries of EU budget, unattractive for net contributors.</p>

		<p>rule is negotiable. <b>No flexibility if financing rule is according to established EU budget contribution rules.</b></p> <p>Geographically, flexibility is provided through cooperation mechanisms between Member States, and fully flexible for the gap-filler part.</p>		
4.8 Binding national RES targets through free pledging	<p><b>Ambitiousness of national pledges is determined by each Member State's GDP, political factors, and availability of low-cost potentials. The former two are probably the more dominant factors. Static efficiency is thus relatively low. Flexibility mechanisms exist to increase efficient use of best sites. Nevertheless, Member States have a tendency towards fulfilling their target within their borders, so flexibility mechanisms will be used below optimal levels.</b></p> <p>Binding target creates certainty for investors, lowering the necessary support levels</p>	<p>Even though the target is allocated top-down and binding, the fact that it is allocated through pledging provides flexibility to Member States with regard to sectors (RES vs. other abatement measures). No "naming and shaming", thus more politically communicable as well, for unwilling Member States.</p> <p>Financing of the gap-filler instrument is set according to rules independent of pledging ambitiousness. Some flexibility if financing rule is negotiable. <b>No flexibility if financing rule is according to established EU budget contribution rules.</b></p> <p>Geographically, flexibility is provided through cooperation mechanisms between Member States.</p>	Possibly applicable, although process of negotiation and iteration have to be clarified. The clear division of responsibilities helps to implement corrective measures in case the target is missed.	<p>In principle, binding targets may be unacceptable to some Member States. However, as they are allocated by free pledging, Member States will only pledge what they are sure they can achieve. The EU-gap has to be financed from the EU budget. <b>Attractive for net beneficiaries of EU budget, unattractive for net contributors.</b></p> <p><b>Iteration and negotiation rounds are difficult: Incentivising strategic pledging if announced beforehand; leading to low political acceptability of no details are announced beforehand.</b></p>
4.9 Binding regional RES targets through free pledging	<p>Static efficiency is better than for national targets, as best sites are used within regions.</p> <p>Binding target creates certainty for investors, lowering the necessary support levels. <b>However, the regional approach is new and untested, may create some new uncertainties.</b></p>	<p>Even though the target is allocated top-down and binding, the fact that it is allocated through pledging provides flexibility to Member States with regard to sectors (RES vs. other abatement measures). No "naming and shaming", thus more politically communicable as well, for unwilling Member States.</p> <p>Financing of the gap-filler instrument is set according to rules independent of pledging ambitiousness. Some flexibility if financing rule is negotiable. <b>No flexibility if financing rule is according to established EU budget contribution rules.</b></p> <p>Geographically, Member States can freely</p>	<b>Limited applicability. Unclear who is legally responsible in case the regional target is missed.</b>	<p>In principle, binding targets may be unacceptable to some Member States. However, as they are allocated by free pledging, Member States will only pledge what they are sure they can achieve, which increases acceptability. The EU-gap has to be financed from the EU budget. <b>Attractive for net beneficiaries of EU budget, unattractive for net contributors.</b></p> <p><b>Ambitious Member States may be deterred by the idea of taking responsibility for less ambitious Member States in their regional group.</b></p> <p><b>Iteration and negotiation rounds are difficult: Incentivising strategic pledging if announced beforehand; leading to low</b></p>



		allocate burdens within their region; RES are deployed according to best-sites principle.		political acceptability if no details are announced beforehand.
4.10 RES target on EU level	Maximises static efficiency, as best sites are used.	<p>Sector-wise flexibility is only limited through the existence of a RES target. However, under an EU-harmonised instrument, Member States have limited influence on how much RES is deployed within their borders, as distribution theoretically follows market principles and is only hindered by administrative and political barriers. Thus, low sector-wise flexibility for Member States, except if they willingly impose barriers.</p> <p>Full geographic flexibility, as best sites will be used.</p>	Limited applicability. Unclear who is legally responsible if target is not achieved.	Acceptable for some Member States, who in the past pleaded for harmonisation. Or for those who actually want a GHG target only, and as a compromise option, will accept a RES target on EU level. Not acceptable for some ambitious Member States such as DE.

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