Department of Energy & Climate Change

Policy summary of UK analysis on EU 2030 targets

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Evidence on the costs and benefits of EU 2030 targets

- The Enerdata study shows that the costs of either 40% or 50% targets are moderate at the EU level, with a 40% domestic target equivalent of 0.19% of the EU's annual GDP in 2030. This is in the context of projected EU growth to 2030 of more than 25%[1].

- The Member State level costs and benefits depend on the approach to burden sharing of effort across the EU. There are significant benefits of 40% and 50% GHG targets, including increased energy efficiency, reduced energy import dependence and improved air quality.

- Enerdata's study suggests that imposing a binding technology specific target on a Member State, in this case, a renewables target, adds greater cost than allowing Member States to meet a GHG target in least cost way for them.

- This supports the findings in the Commission IA which also shows that costs are moderate. The IA shows that the additional energy system costs to the EU of a 40% GHG target-only option are 0.15% of GDP. Enerdata findings are similar to the Commission's in this regard.

- This is the additional cost[2] of decarbonising the energy system, compared to the reference scenario. The total cost of providing the energy system is naturally a much larger figure, whether you adopt a 40% target or not. The Commission IA identifies the energy system costs in the reference scenario as 14.03% of GDP in 2030. This is the cost Member States face to replace aging plant and keep the lights on whether they take action on climate change or not. The additional costs of tackling climate change by adopting a 40% target are only 0.15% of GDP.

- The Commission's Low Carbon Roadmap shows that an EU 2030 target reflecting domestic reductions of –40 to -44% on 1990 levels is on the least cost trajectory to –79 to -82% for 2050. An EU reduction of 80-95% by 2050 on 1990 levels is consistent with a global 2°C scenario.

- The Enerdata study suggests that under some technology costs assumptions an EU GHG target alone may result in significant levels of renewable energy (similar to the Commission's 27%) in 2030. However, the precise level of renewable energy is still highly uncertain. The analysis is based on a specific set of assumptions. In practice, the level of renewable energy will depend on a range of factors including total energy consumption, fossil fuel prices, relative technology costs, and the development of other low carbon technologies.

- Enerdata's study also suggests that imposing a binding renewables target on Member States, burden shared in a similar way to under the 2020 package, will produce an uneconomical distribution of renewables between Member States, resulting in significant additional costs (estimated annual costs to the EU of more than €11bn in 2030).

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[1] GDP projections are taken from the IMF (April 2013 WEO database) and European Commission (latest Reference Scenario projections

[2] Total costs in this report include abatement cost, permit trading cost, the purchase of international credits, and renewables subsidies (costs from deploying renewable technology specifically). For more details, please see page 3 of the Enerdata Report.

Policy summary of UK modelling on EU 2030 targets

1. What has been modelled?

DECC commissioned Enerdata to model the impacts of a range of 2030 targets which cover the climate and energy framework. The results provide an EU-wide and Member State level assessment of the costs and some benefits of different target options. The analysis was developed using POLES – a long-term, energy-economy model jointly developed by Enerdata, the University of Grenoble, and the EC-JRC IPTS (with key economic assumptions based on credible publicly available EU wide sources). The key assumptions that underpin the model are in the Appendix to this note. This policy summary also refers to the Commission's 2030 Impact Assessment[3], the European Commission's 2050 Roadmap[4] and previously published UK analysis on 2°C consistent EU targets[5].

2. Consistency of EU targets with 2°C and the least cost trajectory to 2050 objectives

The Low Carbon Roadmap presents a Roadmap for possible action up to 2050 which could enable the EU to deliver GHG reductions in line with the 80 to 95% target reconfirmed by European Council in February 2011. The Roadmap shows that an EU 2030 target reflecting domestic reductions of -40 to -44% is on the least cost trajectory to –79 to -82% for 2050. This means that taking a target less ambitious than 40% will make it more expensive for the EU to meet the 2050 goal due to the extra effort required after 2030 to bring us back on track.

A 40% domestic target as described in the Commission White Paper could be increased in the context of a global climate agreement, for example by access to international carbon credits making up the difference to a 50% target.

[3] European Commission, 2014, Impact assessment on energy and climate policy up to 2030.

[4] European Commission, 2011, A Roadmap for moving to a competitive low carbon economy in 2050.

[5] UK analysis of EU 2030 GHG target options
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/253209/UK_Analysis_of_EU_2030_GHG_Targets_FINAL_TO_WEBSITE.pdf

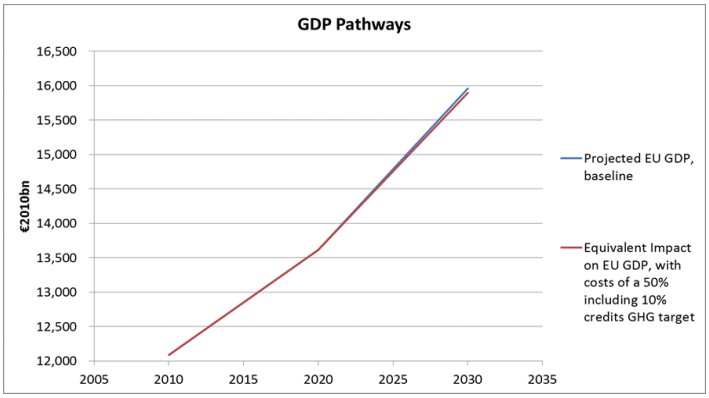
3. The costs of ambitious GHG targets are manageable

At an EU level the Enerdata report shows that the costs of both a 40% EU GHG target and a 50% EU GHG target would be moderate. These are summarised in the table below:

Table 1: Summary of modelling of EU level results[6]

	EU additional Costs in 2030, % GDP	Equivalent % reduction EU's annual growth rate (2014-2030)	Air quality benefits in 2030 (%GDP)	Change in fossil fuel import bill in 2030 (€bn)
40% domestic	0.19%	0.012%	0.12%	-70
50% including 10% credits	0.42%	0.027%	0.12%	-60
50% including 5% credits	0.46%	0.029%	0.15%	-80
50% domestic	0.59%	0.038%	0.17%	-110
60% including 5% credits	1.29%	0.082%	0.19%	-130

These additional costs must be seen in the context of projected EU growth to 2030 of more than 25%. Thus a 50% EU GHG target (including 10% credits) would be equivalent to reducing EU annual GDP in 2030 by 0.42%. This is shown in the graph to the right[1].



Graph 1: Equivalent GDP impact of 50% GHG target

Member states and stakeholders are also concerned about how GHG reduction targets may impact the price of energy and thus the EU's international competiveness. The International Energy Agency have said that enhancing energy competitiveness is not incompatible with efforts to tackle climate change, whilst noting that Governments need to be attentive to the design of their subsidies to renewables. The IEA attributes the widening of energy price disparities between the United States, Europe and Asia mainly to the increasing shale gas production in the United States; an increase in oil-indexed gas prices in other regions; and higher spot prices for liquefied natural gas (LNG) in Asia, largely as a result of the surge in Japanese gas demand[7].

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[6] Enerdata, 2014. Costs and Benefits to EU Member States of 2030 Climate and Energy Targets.

[7] World Energy Outlook 2013 (OECD/IEA, 2013)

4. Member State level impacts depend on burden sharing approach taken

The costs of GHG targets at the Member State level depend on the burden sharing approach taken in allocating effort across the EU. The Commission Impact Assessment includes tables which show the most cost-effective share of effort across the EU[8]. The Enerdata reports uses assumptions about burden sharing which are based on the approach of the 2008 package, and these are shown in Table 2 below alongside Member State-level breakdown of air quality benefits. Ultimately, the decision on which burden sharing approach to take will be a political choice that is to be decided by Member States.

Member State results	40% (only domestic)			50% (including 10% credits)		
	Additional costs in 2030, % GDP	Equivalent reduction in annual growth rate (2014-2030)	Air quality benefits, % of GDP in 2030	Additional costs in 2030, % GDP	Equivalent reduction in annual growth rate (2014-2030)	Air quality benefits, % of GDP in 2030
Austria	0.17%	0.01%	0.03%	0.37%	0.02%	0.03%
Belgium	0.31%	0.02%	0.03%	0.64%	0.04%	0.03%
Bulgaria	0.14%	0.01%	0.30%	0.50%	0.03%	0.33%
Croatia	0.35%	0.02%	0.00%	0.75%	0.05%	0.01%
Cyprus	0.31%	0.02%	0.04%	0.73%	0.05%	0.03%
Czech Republic	0.10%	0.01%	0.26%	0.20%	0.01%	0.26%
Denmark	0.15%	0.01%	0.18%	0.31%	0.02%	0.20%
Estonia	0.13%	0.01%	0.86%	0.40%	0.03%	0.89%
Finland	0.19%	0.01%	0.12%	0.52%	0.03%	0.15%
France	0.13%	0.01%	0.05%	0.27%	0.02%	0.05%
Germany	0.19%	0.01%	0.21%	0.44%	0.03%	0.22%
Greece	0.17%	0.01%	0.27%	0.41%	0.03%	0.29%
Hungary	0.14%	0.01%	0.14%	0.48%	0.03%	0.15%
Ireland	0.14%	0.01%	0.05%	0.35%	0.02%	0.06%
Italy	0.29%	0.02%	0.03%	0.64%	0.04%	0.03%
Latvia	0.17%	0.01%	0.00%	0.42%	0.03%	0.00%
Lithuania	0.27%	0.02%	0.00%	0.56%	0.04%	0.01%
Luxembourg	0.33%	0.02%	-0.02%	0.70%	0.04%	-0.01%
Malta	0.19%	0.01%	0.02%	0.42%	0.03%	0.02%
Netherlands	0.28%	0.02%	0.04%	0.62%	0.04%	0.05%
Poland	0.20%	0.01%	0.36%	0.45%	0.03%	0.37%
Portugal	0.11%	0.01%	0.03%	0.29%	0.02%	0.05%
Romania	0.16%	0.01%	0.18%	0.35%	0.02%	0.19%
Slovak Republic	0.18%	0.01%	0.09%	0.41%	0.03%	0.10%
Slovenia	0.17%	0.01%	0.16%	0.37%	0.02%	0.17%
Spain	0.18%	0.01%	0.10%	0.40%	0.03%	0.09%
Sweden	0.13%	0.01%	0.05%	0.29%	0.02%	0.05%
United Kingdom	0.16%	0.01%	0.07%	0.35%	0.02%	0.08%
EU 28	0.19%	0.01%	0.12%	0.42%	0.03%	0.12%

[8] European Commission, 2014, Impact assessment on energy and climate policy up to 2030, Table 31: Project Member State total GHG reductions vs 2005

5. There are significant non-climate benefits of high ambition greenhouse gas emission reduction targets

The Enerdata report shows that there could be significant wider benefits in terms of reduced fossil fuel imports and improvements in air quality, both of which are shown at the EU level in Table 1. A 40% target could reduce Europe's annual fossil fuel import bill by around €70bn.

Ambitious greenhouse gas targets will also help Europe's low carbon market flourish. The EU's share of the global low carbon and environmental business market is worth over €900 billion a year. Some of the most dynamic low carbon markets are now among Visegrad and South East Member States with average market growth of over 6% a year[9].

An ambitious and flexible GHG target will result in increased ETS auction revenues for Member States.

6. A greenhouse gas emissions reduction target alone brings on significant amounts of renewable energy, but the absolute level is very uncertain

The Enerdata study shows that, under the technology cost assumptions made, a 40% greenhouse gas emissions reduction target (GHG target) alone is expected to drive significant levels of renewable energy in the EU. This finding is consistent with the Commission's White Paper that found that a "greenhouse gas reduction target of 40% should by itself encourage a greater share of renewable energy in the EU of at least 27%".

However, the precise level of renewable energy is still highly uncertain. The analysis is based on a specific set of assumptions. In practice, the level of renewable energy will depend on a range of factors including total energy consumption, fossil fuel prices, relative technology costs, and the development of other low carbon technologies such as nuclear power and CCS. Considering this level of uncertainty, all estimates of the level of renewables in 2030 must be treated with some caution.

7. Member State level renewable energy targets result in an expensive and inefficient distribution of renewable energy

While the modelling suggests that a 40% domestic GHG target drives a significant level of renewable energy across the EU, this does not mean that Member State level renewable energy targets would be costless. The modelling suggests that the renewable energy distribution driven by the GHG target varies significantly from that under a renewable energy target burden shared in the same way as the 2020 target:

- This difference alone would cause more than €11bn of additional annual costs to be incurred across the EU by 2030 under the scenario of a 30% EU RES target.
- These unnecessary and additional costs are concentrated in a number of Member States including Italy, France, UK, Netherlands, Sweden & Finland (see table).

Even if renewable energy targets for MSs were set according to a modelled expectation of how they would meet a 2030 GHG target, the inherent uncertainties about relative technology costs would still mean that these could result in significant additional costs.

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[9] Low Carbon and Environmental Goods and Services Report for the UK's Department for Business, Innovation and Skills, page 15, July 2013:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224068/bis-13-p143-low-carbon-and-environmental-goods-and-servic¬es-report-2011-12.pdf

Additional Costs to meet an EU 30% RES target, vs a 40% GHG target alone

Country	Additional Annual Cost of a RES target in 2030, €bn
Finland	1.5
Latvia	0.3
Luxembourg	0.3
Netherlands	0.7
Austria	1.9
Lithuania	0.1
Italy	5.1
Sweden	1.3
France	3.0
Slovenia	0.1
Belgium	0.2
Denmark	0.5
Czech Republic	0.4
United Kingdom	1.3

8. Limitations of the modelling

This modelling used data consistently available across all Member States, and inevitably has less detail on each Member State's unique technology options (e.g. specific technologies in areas such as direct heat use or transportation modal shifts, are not modelled explicitly), constraints, additional policies (e.g. CCS demonstration programmes) and other circumstances. This uncertainty over the cost effective technology mix to decarbonise is however unlikely to significantly impact the overall findings on the total costs of decarbonising. And, for example, additional technology options or policies are likely to reduce the costs of meeting a GHG target (though may increase the costs from meeting a specific renewable energy target if they result in a greater diversity of technologies).

The references to the energy mix within the report should therefore not be seen as a prediction for or as a suggestion of "the" optimal mix, but rather as an illustrative outcome if MS relied on EU-level policies alone and given the assumptions, constraints and limitations assumed. For those countries which, for example, plan to have an extensive range of additional policy measures, the Enerdata model findings may vary from those that MS own detailed models have shown. This difference underlines the difficulties inherent in setting any 2030 RES targets based on EU wide modelling.

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