

UK analysis of EU 2030 GHG target options

Headline Summary:

- The EU wants to limit global warming to below 2°C. In the context of a global climate agreement that achieves this goal, the EU's 2030 Greenhouse Gas (GHG) reduction target should be 50% on 1990 levels, according to a range of modelling scenarios in which GHG reduction efforts are shared equitably amongst different countries.
- The EU's 2050 Low Carbon Roadmap states that the cost effective trajectory for domestic (i.e. internal EU) reductions is in the range of 40-44% in 2030. Agreeing additional effort through access to international carbon credits could add 5-10% to these reductions. Therefore if the EU agreed a target of 40% in 2030 this could be consistent with 2°C provided additional effort was agreed to from international credits as part of a global climate deal.
- Meeting a 50% EU target is affordable – the model used for this paper estimates that it is equivalent to a reduction in the EU annual growth rate of 0.04% between now and in 2030, and this does not include the economic and social benefits from non-climate effects such as improved air quality or energy security.

1. EU effort required to meet 2°C

In 2011 the European Council reiterated its commitment to limit global warming to below 2°C. Academics have identified a range of different approaches to allocating the mitigation or effort between countries to meet a below 2°C target, including income-based burden shares, equal per-capita emissions shares and equal relative costs shares. The following table shows how these different approaches translate into EU emissions reductions for 2030 noting that these do not necessarily represent the UK or EU's preferred approach:

Table 1: EU 2030 GHG mitigation target in various 2 degree effort share scenarios¹

Effort share approach	Resultant EU target for 2030
Income grouping based allocation ²	-50%
Income grouping based but with no separate Annex I grouping ³	-57%
Equal per-capita emissions by 2050 ⁴	-50%
Equal relative costs ⁵	-54%

The main result is that in all the effort shares modelled here the EU needs to be prepared to offer an international GHG mitigation target of 50% reduction on 1990 emissions in the context of an international climate agreement that is consistent with global action to deliver the 2°C target.

This result is broadly consistent with other analyses of EU 2030 targets required to stay on track for the below 2°C target, including PBL 2012 (showing 47%)⁶, Ecofys 2013 (49%)⁷ and Stern 2013 (50%)⁸.

2. How does this fit with the EU Low Carbon Roadmap to 2050?

The Low Carbon Roadmap⁹ 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 pathways for sectoral and total domestic reductions required to 2050:

Table 2: EU emission reductions from the EU Roadmap analysis¹⁰

	2005	2030	2050
Total GHG reductions compared to 1990	-7%	-40 to -44%	-79 to -82%

Table 2 shows that an EU 2030 target reflecting domestic reductions of –40-44% is on the least cost trajectory to –79-82% for 2050. The February 2011 European Council reconfirmed that the EU 2050 target should be 80-95%; **targets of beyond 44% will be required to be on the cost effective pathway to anything beyond 79-82% in 2050.**

The milestones in the Low Carbon Roadmap are for ‘domestic’ emissions reductions, where ‘domestic’ is described as “real internal reductions of EU emissions and not offsetting through the carbon market”¹¹. Member states and EU businesses are currently able to contribute to EU targets through international carbon credits bought through the carbon market (e.g. via the Clean Development Mechanism)¹². If the EU were to agree a target of 40% domestic for 2030, this would be on the **least cost trajectory as described in the Low Carbon Roadmap and would be consistent with a global 2°C scenario if additional action of between 5% and 10% through international carbon credits were included as part of a global climate deal.**

3. This level of action is affordable for the EU

Table 3 shows the EU cost in 2030 as a % of GDP, and the equivalent annual reduction in the GDP growth rate for each year from 2014 to 2030, of meeting 2030 targets in scenarios where Annex I countries do 40%, 50% or 60% emissions reductions on 1990, and the rest of the world still undertakes the requisite emissions reductions for the world to be on track for 2°C.

Table 3: Estimates of the cost in 2030, and as equivalent annual reduction in growth rate to 2030 (all targets relative to 1990)¹³

EU 2030 target	European Union	Average non-Annex I
	Equivalent reduction in the 2014-2030 annual GDP growth rate	Equivalent reduction in the 2014-2030 annual GDP growth rate
40%	0.02%	0.06%
50%	0.04%	0.03%
60%	0.07%	-0.01% ¹⁴

This table shows that for an EU 50% target the reduction in the EU’s annual GDP growth rate between 2014 and 2030 would be 0.04% (not including the positive impacts of non-climate benefits such as improved air quality or energy security – see below). This is because the model forecasts that EU GDP would reach a level in 2030 that would be 0.7% lower with an EU 2030 50% GHG target than it would be without such a target, again not including benefits¹⁵. This is in the context of expected growth in total EU GDP through this same period of over 30%.

The table also shows that in a scenario where Annex I countries and the EU take 40% emissions reductions only (e.g. excluding any additional effort through international carbon credits), the relative cost and effort is disproportionately borne by non-Annex I countries for the world to stay on track for below 2°C.

4. These modelling results do not include expected air quality and energy security savings

Table 3 shows the impact on EU GDP in 2030. These figures do not include economic savings from non-climate benefits such as air quality or energy security. The 2050 Roadmap estimates health savings through improvement in local air quality would save an up to €17 billion per year by 2030, and the IEA estimates that by 2035 2°C consistent policies could cut the EU’s annual fossil fuel import bill by 46% or €275bn (1% of EU GDP)¹⁶.

5. The potential cost savings that could be delivered through the use of international carbon credits:

If the EU adopts a 50% target there are options around how international credits such as the Clean Development Mechanism (CDM) can contribute towards it. Table 4 shows the effects on the total cost of the EU 2030 GHG target:

Table 4: Reduction in costs if international credits can count to EU target (relative to purely domestic target)

	Reduction in EU costs
50% with up to 5% of target made up of international credits	32%
50% with up to 10% of target made up of international credits	44%

The UK Government's full position on EU 2030 targets is provided in the response to the Commission Green Paper "A 2030 framework for climate and energy policies". All stakeholder responses are logged at: http://ec.europa.eu/energy/consultations/20130702_green_paper_2030_en.htm

References

¹ These results are from the GLOCAF model, developed in 2007 and run and maintained by the UK's Department of Energy and Climate Change. GLOCAF draws on business as usual emissions projections and marginal abatement cost curve inputs from PBL's IMAGE model, Enerdata's POLES model, and IIASA's GLOBIOM and G4M models. GLOCAF models GHG mitigation in 26 regions (including the EU) and 28 sectors. GLOCAF modelling has previously been used to support ETMA analysis, EU working papers and previous DECC papers e.g.

<https://www.gov.uk/government/publications/carbon-valuation-in-uk-policy-appraisal-a-revised-approach>.

² *Income grouping based allocation*: This approach graduates the ambition depending on a country's income level based on World Bank income classification thresholds. Annex I regions do a 50% reduction on 1990. Non-Annex I regions are split into income brackets based on World Bank income categories, with higher income regions taking on more ambitious targets than lower income ones. All regions within an income bracket are assumed to take on the same target (expressed as a % reduction on BAU emissions).

³ *Income grouping based but with no separate Annex I grouping*: Regions are split into income brackets purely based on World Bank income categories, with higher income regions taking on more ambitious targets than lower income ones. All regions within an income bracket take on the same target (expressed as a % reduction on BAU emissions). Unlike the above scenario this scenario does not separate out Annex I countries, so there is no distinction between high income Annex I countries and high income developing countries. This results in a potentially more equitable effort split between Annex I countries as it focusses on a larger group and a deviation from BAU.

⁴ *Equal per-capita emissions by 2050*: Regions aim for equal per capita emissions (of just over 2tCO₂e per capita) by 2050. 2030 targets based on linear emissions reductions between 2020 and 2050, scaled slightly to meet 41Gt global 2030 target.

⁵ *Equal relative costs*: Regions take on targets that meet global 41Gt target for 2030 with all regions having same cost as % of GDP after carbon trading (0.8% of GDP).

⁶ "Greenhouse gas emission reduction targets for 2030", PBL (2012)

http://www.pbl.nl/sites/default/files/cms/publicaties/PBL_2012_Greenhouse-gas-emission-reduction-targets-for-2030_500114023.pdf

⁷ "The next step in Europe's climate action: setting targets for 2030", Ecofys (2013) <http://www.greenpeace.org/eu-unit/en/Publications/2013/Ecofys-The-next-step-in-Europes-climate-action-setting-targets-for-2030/>

⁸ "World leaders must act faster on climate change", Lord Stern, Financial Times 30th September 2013 <http://www.ft.com/cms/s/0/e92fea1a-2771-11e3-8feb-00144feab7de.html#axzz2gUywfSBz> (subscription required)

⁹ "A Roadmap for moving to a competitive low carbon economy in 2050", The European Commission (2011) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011DC0112:EN:NOT>

¹⁰ Extract from Table 1 p6, Ibid

¹¹ P4 Ibid

¹² Such offsets are also important for finding the lowest cost abatement and generating climate finance

¹³ Based on GLOCAF modelling results

¹⁴ Non-Annex I costs are negative in this scenario as income from carbon trading exceeds domestic mitigation costs.

¹⁵ The rest of this table is also calculated on the same basis of calculating the implicit growth rate effect of the modelled 2030 costs.

¹⁶ "World Energy Outlook Special Report 2013: Redrawing the Energy Climate Map," IEA (2013)

http://www.iea.org/publications/freepublications/publication/WEO_Special_Report_2013_Redrawing_the_Energy_Climate_Map.pdf