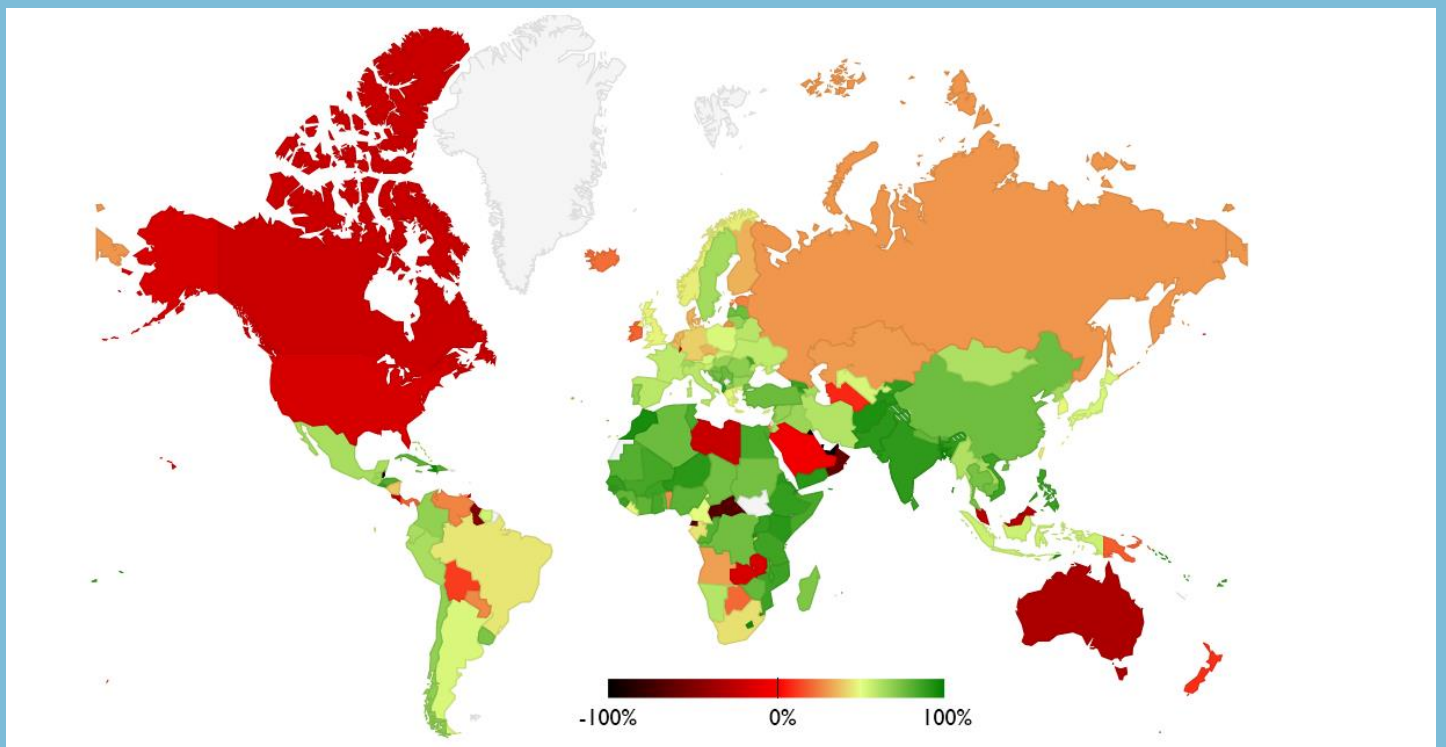


The Sovereign Emission Rights Framework:

An international emissions trading regime without the hot air



A special report prepared for the European Commission
consultation on a 2015 international climate change agreement

About Sandbag

Sandbag is a UK based not-for-profit campaigning organisation dedicated to achieving real action to tackle climate change and focused on the issue of emissions trading. Our view is that if emissions trading can be implemented correctly, it has the potential to help affordably deliver the deep cuts in carbon emissions the world so badly needs to prevent the worst impacts of climate change

Through producing rigorous but accessible analysis we aim to make emissions trading more transparent and understandable to a wider audience than those already involved in the market. In particular, we hope to shed light on the challenges the EU Emissions Trading System (EU ETS) faces in becoming a truly effective system for cutting emissions and to advocate the solutions that can help it to work better.

EU Transparency Register: 94944179052-82

About this report

The report below is prepared specifically for the European Commission's stakeholder consultation on the 2015 International Climate Change Agreement, and proposes an equitable approach to assigning emission rights under a global emissions trading framework.

We are always interested to receive feedback on our work and would welcome any reactions, comments or corrections. Please email us at info@sandbag.org.uk.

26th June 2013

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The Sovereign Emissions Rights Framework: summary for policymakers

The science of climate change lays two fundamental questions at the feet of politicians and the public. What climate impacts are we prepared to risk, and how shall we assign international responsibilities to minimizing those risks? As signatories to the Copenhagen Accord, 141 governments have now agreed that 2°C poses unacceptable risks to human welfare and the environment¹, but the second, more difficult political question remains unresolved. It will have to be resolved, openly and publically, within and between nations, if we are to have a reasonable chance of reaching an international agreement in December 2015 that enables us to avoid dangerous climate change.

In the report that follows we present our initial contribution to this debate. We here propose an equitable approach to establishing a post-2020 global climate framework compatible with a likely chance (>66%) of cost-effectively avoiding 2 degrees. Our approach aims to protect the EU's entitlement to a fair share of the global emissions space without unduly infringing on the emissions space of other, especially poorer, nations. We propose that:

- The total global greenhouse emissions budget to 2050 should be back-calculated from 1990, when the dangers of climate change were first globally acknowledged following from the IPCC's first assessment report.
- This 1990-2050 budget should be divided between nations based on their share of global population in 1990 at that particular moral and epistemological milestone.
- This new agreement should supersede previous agreements and that all historic territorial emissions produced since 1990 should be counted against these national budgets, as well as any as awarded emissions rights or offset credits issued under the Kyoto Protocol.
- All fossil and industrial CO₂ emissions under those national budgets should be tradable between countries, either at state level or through devolved cap and trade schemes, to allow cost-effective emissions reductions to be realised while ensuring ultimate financial responsibility for these reductions is appropriately apportioned.

We note that the current 2050 climate target around which much of Europe's climate policy is framed (i.e. 80-95% below 1990 levels), and which the G8 has also endorsed is not a scientific target, but simply the range of results returned from a bundle of different and sometimes incompatible effort-sharing models with different starting assumptions. We emphasize that there is not and cannot be a scientific answer to the moral and political question of how to share the responsibilities for avoiding dangerous climate change and that these decisions cannot be deflected to technicians under the IPCC or elsewhere.

On the basis of the model we defend here, we propose that Europe future climate pledges keep it within a budget of **87 billion tonnes** between now and 2050, conditional on other countries adopting budgets calculated from the same equitable principles.

We also propose that, independently of other countries commitments, Europe should aim, as a minimum, to uncover all the cost-effective abatement that falls in its own jurisdiction and territory under a cost-effective global pathway to two degrees. This implies a domestic trajectory as ambitious as that outlined in Europe's 2050 Low Carbon Roadmap, which specifies milestones of -25% for 2020, -40% for 2030, -60% and -80% for 2050.

Finally, we discuss how the budgets under this framework can be compared against business-as-usual emissions to help Europe politically assess other countries' climate pledges when determining at what level to set its international offer.

¹ http://unfccc.int/meetings/copenhagen_dec_2009/items/5262.php

Introduction

Figure 1: UNEP's emissions gap in current 2020 pledges

The closing window to avoid dangerous climate change.

As Europe prepares its 2030 framework and its negotiating position for a new international agreement in 2015, it should do so conscious that the window is rapidly closing to avoid dangerous levels of global warming. Importantly, a 2015 agreement that only enters into force in 2020 is already too late to do this cost-effectively. The latest edition of the Emissions Gap report prepared by the United Nations Environment Programme shows that in aggregate, global emissions need to peak this decade, and reach a point **8-13 billion tonnes** lower than current 2020 pledges if we are to realistically avoid 2 degrees of global warming against pre-industrial levels.² **Europe urgently needs to do more to bridge this gap and to encourage other major emitters to do the same**

The next emissions gaps:

2030 and 2050 under a 2°C emissions budget

The 2020 gap is just the first of several that the international community needs to bridge, however, with UNEP indicating that global emissions need to stay under 37 billion tonnes in 2030 and 21 billion tonnes by 2050.

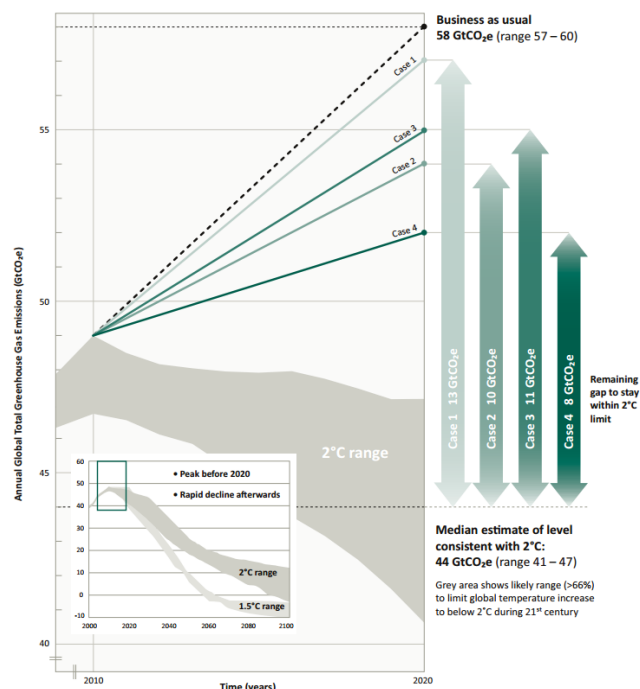
Table 1: UNEP global emissions targets for 2020, 2030 and 2050 (Gt CO₂e)³

	2020	2030	2050
Central estimate for avoiding 2°C (>66% chance)	44	37	21

The UNEP report's authors note that multiple trajectories are consistent with avoiding 2°C of warming against pre-industrial levels, as this is essentially determined by the cumulative budget of greenhouse gases emitted over time. **The report assumes an emissions budget of 1,250 billion tonnes remains for the period 2013-2050.**⁴

However, they note that the above pathway describes the lowest-cost trajectory to meet a two degree emissions budget, which assumes that cheapest abatement options consistent with that budget are exploited, wherever they happen to arise.

While the UNEP report gives an indication of which global sectors hold the cheapest abatement potential to meet their 2020 target, it avoids explicitly identifying the specific countries or regions where this abatement might take place. There is a very good reason for UNEP to be politically sensitive on this topic: were a national breakdown to be provided, there would be a danger that technological capacity for low-cost mitigation might be taken to imply responsibility for mitigation. This confusion could very easily allow rich developed countries to externalise the costs of mitigation on to poor developing ones. We shall return to the question of what Europe's domestic opportunities for cost-effective abatement might be under this pathway once we have separately determined what its responsibilities might be.



² Here, "realistically" corresponds to "likely" or >66% chance (See <http://www.unep.org/pdf/2012gapreport.pdf>)

³ UNEP 2012 Emissions Gap report, Table 3.1 page 25 <http://www.unep.org/pdf/2012gapreport.pdf>

⁴ Starting with a budget of 1,890Gt for 2000-2050, from which about a third is estimated to have been used over 2000-2012 (see p. 29) <http://www.unep.org/pdf/2012gapreport.pdf>

Chasing the wrong target to reach 2°C: the incoherent response to the 4th IPCC table

The science of climate change lays two fundamental questions at the feet of politicians and the public. What climate impacts are we prepared to risk? And how shall we assign international responsibilities for avoiding minimizing those risks? As signatories to the Copenhagen Accord, 141 governments have now agreed that 2°C poses unacceptable risks to human welfare⁵, but the second, more difficult political question remains unresolved.

Politicians have displayed an uneasy relationship with the science of climate change, which, amongst other things has led to a disproportionate share of political capital being tied up debating scientific questions that it is not the remit of politicians to resolve. Ironically, at the same time, policymakers have consistently deflected the most difficult moral and political decisions about how to respond to climate change back on to scientists and technicians.

But we observe that, while science can dictate the global budget to which nations must collectively adhere to avoid a specified level of global warming, science cannot determine what level of global warming is acceptable. Neither can it determine how the global carbon budget should be apportioned to meet that temperature target. These are ethical and political questions that policymakers and their constituents need to resolve for themselves and should be at the forefront of international debate.

In this regard we note that a relatively obscure table in the bowels of the IPCC's Fourth Assessment Report has assumed profound international significance, by becoming the global shorthand for the "scientific" answer to how much developed and developing countries should be reducing their emissions. We display the box below exactly as it appears in the IPCC report:

Figure 1: The IPCC table on international effort sharing

Box 13.7 The range of the difference between emissions in 1990 and emission allowances in 2020/2050 for various GHG concentration levels for Annex I and non-Annex I countries as a group^a

Scenario category	Region	2020	2050
<i>A-450 ppm CO₂-eq^b</i>	Annex I	-25% to -40%	-80% to -95%
	Non-Annex I	Substantial deviation from baseline in Latin America, Middle East, East Asia and Centrally-Planned Asia	Substantial deviation from baseline in all regions
<i>B-550 ppm CO₂-eq</i>	Annex I	-10% to -30%	-40% to -90%
	Non-Annex I	Deviation from baseline in Latin America and Middle East, East Asia	Deviation from baseline in most regions, especially in Latin America and Middle East
<i>C-650 ppm CO₂-eq</i>	Annex I	0% to -25%	-30% to -80%
	Non-Annex I	Baseline	Deviation from baseline in Latin America and Middle East, East Asia

Notes:

^a The aggregate range is based on multiple approaches to apportion emissions between regions (contraction and convergence, multistage, Triptych and intensity targets, among others). Each approach makes different assumptions about the pathway, specific national efforts and other variables. Additional extreme cases – in which Annex I undertakes all reductions, or non-Annex I undertakes all reductions – are not included. The ranges presented here do not imply political feasibility, nor do the results reflect cost variances.

^b Only the studies aiming at stabilization at 450 ppm CO₂-eq assume a (temporary) overshoot of about 50 ppm (See Den Elzen and Meinshausen, 2006).

Source: See references listed in first paragraph of Section 13.3.3.3

This is not and could not be a scientific answer to the question of how much different countries should emit. **A scientific answer to the question of what is fair does not exist.**

And yet it appears that on the basis of this table the European Parliament and the European Council endorsed an 80-95% target for Europe as its appropriate commitment under a global effort to avoid

⁵ http://unfccc.int/meetings/copenhagen_dec_2009/items/5262.php

2°C.⁶ The European Commission then moved to prepare the 2050 Low Carbon Roadmap to meet that target, and it is the pathway described by the Roadmap which currently frames the debate on Europe's 2030 targets.⁷ We also note that G8 leaders endorsed a target of at least 80% on the same basis.⁸

The Commission betrays its confusion that this somehow constitutes a scientific targets when in the Impact Assessment accompanying the 2050 Low Carbon Roadmap it says:

"To achieve the stabilisation of GHG concentrations at a sufficiently low level to be in line with the 2°C objective, IPCC AR4 concluded that the existing science estimated that developed countries would need to take a GHG emission reduction target within the range of 80 to 95%, below 1990 levels by 2050" [our emphasis].

A closer inspection of this IPCC table shows that it makes little pretension to the claim of being a scientific answer to the problem of effort sharing, but has simply been lent scientific weight because it happens to appear in an IPCC report. The table does not even seek to defend a particular approach, but merely presents the range of targets that are generated by the various effort-sharing models that were plugged into it. In many cases these were effort sharing models which have fundamentally incompatible starting assumptions in relation to equity.

We stress that the target ranges produced by such analysis are only as good as the effort sharing models that are accepted into them, and that the target ranges will be wider, and the central estimates skewed if effort sharing models are included which give highly preferential treatment to either developed or developing countries. We also note that relying on these amalgamated approaches should be the last recourse after all efforts to agree on a final effort-sharing model have failed, and every unsupported effort-sharing model discarded.

We must ask: where was the public debate between our elected representatives that the correct models had been considered, or that the ethical principles in the underlying models were correct? This debate simply did not take place. **The uncritical acceptance of this 2050 target belies policymaker's eagerness to duck the fundamental political question that climate change lays at their feet and lay it back at the hands of technicians. The public debate about what constitutes a fair distribution of the climate space must finally take place in earnest if a fair and adequate deal is to be reached in 2015.**

We note that the 2020 and 2050 target ranges specified under the IPCC effort-sharing bundle are meaningless without reference to the maximum volume of emissions dictated by each approach. One of the underlying models might support a 40% reduction in 2020 leading to an 80% reduction in 2050. Another might propose a 25% reduction in 2020 leading to a 95% reduction in 2050. None might allow a less ambitious pathway that starts with a 25% reduction in 2020 and leads to an 80% reduction in 2050, but Europe is currently failing to adhere to even this weakest interpretation of the evidence in the table. **The selective adoption of the 2050 target while ignoring the 2020 targets in the table represent a fundamentally incoherent reception to the evidence represented in the IPCC table.**

⁶ European Council, Brussels, 29/30 October 2009, Presidency conclusions. 15265/1/09; European Parliament resolution of 4 February 2009 on "2050: The future begins today; resolution of 11 March 2009 on an EU strategy for a comprehensive climate change agreement in Copenhagen; resolution of 25 November 2009 on the EU strategy for the Copenhagen Conference on Climate Change (COP 15)

⁷ European Commission, A Roadmap for moving to a low carbon competitive European economy. Brussels, 8.3.2011 COM(2011) 112 final

⁸ http://www.g8italia2009.it/static/G8_Allegato/G8_Declaration_08_07_09_final%2c0.pdf

We propose that, in the run-up to the 2015 international agreement, Europe, and the G8 will have to reconsider their 2050 targets in a more coherent way as part of a broader public debate, within and between nations, about what an equitable framework for addressing climate change and assigning emissions rights should be. Without this debate we are unlikely to reach a fair international agreement that allows us to reach our shared objective of avoiding 2°C of global warming.

In the sections that follow we present our initial contribution to this debate, which aims to protect the EU's entitlement to a fair share of the global emissions space without unduly infringing on the emissions space of other, especially poorer, nations.

A Sovereign Emissions Rights Framework for the next climate agreement

In our view, it is fundamental to distinguish both technical and financial capacity for mitigation from moral responsibility for it. This however risks stranding cost-effective abatement opportunities in countries with limited climate responsibilities, forcing countries with larger obligations to shoulder unnecessary costs.

To resolve these discrepancies between cost-effective territorial abatement, and international responsibility we advance a "Sovereign Emissions Rights" framework to be established to ensure we do not blow the 2 degree GHG budget remaining between now and 2050 (i.e. 1,250 billion tonnes of CO₂e). This framework takes its lead from the work performed by German Advisory Council on Global Change (WBGU) in their landmark 2009 report: "Solving the Climate Dilemma: The budget approach"⁹.

We propose that:

- The total global greenhouse emissions budget to 2050 should be back-calculated from 1990, when the dangers of climate change were first globally acknowledged following from the IPCC's first assessment report.
- This 1990-2050 budget should be divided between nations based on their share of global population in 1990 at that particular moral and epistemological milestone.
- This new agreement supersedes previous agreements and that all historic territorial emissions produced since 1990 should be counted against these national budgets, as well as any awarded emissions rights or offset credits issued under the Kyoto Protocol.
- All fossil and industrial CO₂ emissions under those national budgets should be tradable between countries, either at state level or through devolved cap and trade schemes to allow cost-effective emissions reductions to be realised while ensuring ultimate financial responsibility for these reductions is appropriately apportioned.

We discuss and defend the principles underlying this proposed framework in more detail in the following section, before demonstrating indicative budgets and targets calculated from these principles.

Three principles underpinning the Sovereign Emissions Rights Framework

While we feel the premises behind the above framework are fairly intuitive, they have far reaching consequences when compared against many prominent approaches. We examine the core principles and parameters of our approach, and some of their main implications below:

1. Budget-sharing not "effort"-sharing

Our proposed Sovereign Emissions Rights framework treats pollution space as a scarce global resource to be equitably distributed rather than treating mitigation as a burden to be equally shouldered. These two different contrasting frames have profound ramifications in terms of how emissions rights are apportioned.

The “effort-sharing” frame implicitly favours large historical emitters in developed countries by treating their historic emissions as a moral baseline, and essentially grandfathering emissions rights to them on that basis. One of the best known perverse consequence of this approach has been the problem of “hot air” under the Kyoto Protocol, where countries were awarded emissions rights against what turned out to be greatly exaggerated assessments of the difficulty of reducing their emissions.

Even some of the more progressive “effort-sharing” models like Contraction and Convergence™¹⁰ tend to defer the point at which developing nations gain equal access to emissions rights until some point in the future. Indeed many modellers of the Contraction and Convergence approach apply a convergence date of 2050 when most of the emission space will have been consumed by richer nations. While a just transition will inevitably involve a gradual convergence of emissions between developed and developing countries, this should not be taken to imply a deferred convergence of emissions rights. **Equal access to emissions rights under a 2°C emissions budget should be conferred to developed and developing countries from the outset.**

Perhaps the crudest application of the effort sharing frame is the one most commonly invoked by national manufacturing lobbies, namely that the relative cost of climate policies they face compared against their foreign competitors is an indicator of disproportionate climate effort. The cost of carbon (whether implicit or explicit) is at best a signal of the rate emissions reductions are being driven at a particular point in time, and in no way assesses the adequacy of those reductions. A case in point is Australia, which at AU\$23 currently has the highest explicit carbon price in the world, yet has been one of the last developed countries to adopt measures to curb its emissions, and should expect to incur “catchup costs”.

While it is clearly in each nation’s interest to minimize the competitiveness threats its industries face, **we note that some competitive disadvantage will almost inevitably accrue to large historical emitters from internalizing their climate costs**, especially when competing against industries from historically cleaner nations. This is a competitive international market working in good order, with climate mitigation costs properly internalised.

2. The 1990 watershed: the IPCC 1AR as an epistemological and moral turning point

A) Starting the budget in 1990

As Oliver Tickell points out in his book *Kyoto2*, “it was less than a decade before the Climate Convention was agreed in 1992...that global warming was recognised as a real danger, though not yet an actual phenomenon.”¹¹ We take the publication of the first IPCC assessment report in 1990 as the key moment in time when climate change as an ‘actual phenomenon’ was confirmed.

Our approach argues that governments should be held accountable for all cumulative long-lived greenhouse gas emissions from that moment in time, inaugurating a sixty year emissions budget of 2,274 billion tonnes compatible with realistically avoiding two degrees of warming against pre-industrial levels.

This approach essentially invokes the moral concept of culpability and the attendant legal principles of *animus nocendi* and *mens rea* which hold that agents should be held accountable for actions

¹⁰ <http://www.gci.org.uk/>

¹¹ P.231 *Kyoto2*

performed with knowledge of their harmfulness (or where they reasonably ought to have that knowledge). The first IPCC report represents a watershed after which that knowledge of harm should reasonably be presumed, both because of the international publicity it generated, but also because of the direct involvement of governments in drafting the final report.

Some budget approaches have advanced much earlier starting dates for historical responsibility, but we note that prior to 1990 few developing countries begrudged the emissions of developed nations, and most aspired to similarly fossil-fuelled economic growth. Also as Tickell also points out, paradoxically, “our whole knowledge of and understanding of the ‘greenhouse effect’ is the result of rich countries’ industrial and scientific development”.

Finally, any attempt to account for historical emissions before 1990 also faces a technical challenge insofar as detailed national emissions inventories had not been widely undertaken before that stage. Similar technical limitations prohibit accurate assessments of emissions consumed (rather than produced) since 1990, though we note that – while developed countries are likely to have consumed far more emissions than they have produced, the emerging economies to which production was outsourced were generally happy to profit from this arrangement. Producers can stand in as well as consumers as “polluters” under the polluter-pays principle. Both morally and technically, then, we feel comfortable with using territorial accounting of emissions produced since 1990 as the measure of historical pollution.

In the other direction, several prominent budget approaches advance starting with a “clean slate”, recommending that the budgets commence from the signing of a new climate deal.¹² We suspect that this is decision is frequently made on political grounds to prevent the methodology from returning negative emissions budgets to important developed emitters like the U.S.A., Australia and Canada who have consistently put off taking action to combat climate change.

These “clean slate” approaches generally assume that developing countries will be compensated by developed ones for the emissions rights forfeited under this late start date; however, **we feel that such an approach is likely to seriously under-compensate developing countries, noting that around 45% of the 2,274 billion tonne emissions space available over 1990-2050 has already been used and that developed countries account for a grossly disproportionate share of that.**¹³

This “compensation approach” approach is also likely to confuse financial responsibilities (on who should be compensating who, and by how much), and also confuse climate change responsibilities (by inviting other parameters to be shifted in favour of developing countries – see next subsection), rather than providing a clear and consistent internalisation of mitigation costs based on responsibilities.

B) Dividing the budget based on 1990 population

If 1990 is the moral turning point from which a greenhouse gases emissions space was recognised as a finite and non-renewable resource, then we contend that this should also be the point at which emissions rights should be retroactively divided amongst governments based on national shares of global population at that landmark year. **In our view, from 1990 it was incumbent upon on the governments of the world and the people they represent to manage their share of this finite and dwindling resource to maximise the welfare of their unborn citizens and heirs.**¹⁴

¹² Examples include the budgets approach in Friends of the Earth’s Reckless Gamblers report, Option 2 under the WBGU Budgets Approach, Effort sharing principles applied by the Oko Institut for the Greens/EFA Vision Scenario, and also in Oliver Tickell’s Kyoto2 upstream approach.

¹³ OECD countries account for 38% of all emissions since 1990 despite only accounting for 20% of the world’s 1990 population.

¹⁴ Both by investing in abatement, or even by selling allowances to aid development.

Several budget approaches advocate dividing up the carbon space based on projected future population. We note that we can find no historical precedent for a finite resource being divided between parties based on the different number of hypothetical offspring they might have. An estate is not divided unequally between siblings based on the children and grandchildren they might have in the future.

The noble goal of these approaches seems to be to award all individuals throughout the budget period equal access to carbon pollution space, but this seems to confuse the shared duty to ensure a safe climate for future generations beyond the lifetime of the budget, with the limited emissions budget put in place to protect that climate space. **A safe climate is a birthright: a right to pollute is not.**

We also note that there can be no half measures for this approach, if it seeks to preserve equal emissions space for all individuals within the budget period it must award emissions rights on the basis of total projected population across the period¹⁵, not the average population across the period¹⁶, nor the population at the end of the period¹⁷ as some propose.

This introduces a huge and uncertain variable into the apportioning of what promises to be an extremely valuable resource. We discussed earlier how “hot air” allowances accrued to developed countries based on exaggerated assumptions about the difficulty of reducing their emissions. In a similar way, “hot air” allowances risk accruing to developing countries based on exaggerated assumptions about their future populations. Any number of natural or geopolitical upheavals could transform national demographics between now and 2050.

In short, dividing carbon budgets based on projected per capita emissions basis poses as great a threat to the equitable division of emission rights as the “effort” sharing model, except that it distorts it in favour of populous developing countries, instead of large developed emitters.

3. Reconciling capacity with responsibility through international emissions trading

Dividing emissions rights up in this way promises to leave vast swathes of globally cost-effective abatement locked within populous developing countries which will have limited incentives or financial resources to realise them (owing to achievable emissions budgets and weak economies). It also leaves large developed emitters with punishing budgets which would be extraordinarily expensive or even impossible to stay within domestically; however **the international trading of sovereign emissions rights dissolves this impasse between national mitigation obligations and geographically remote mitigation opportunities.**

This emissions trading could be performed at state level, or could be devolved to private entities through cap-and-trade schemes. A global emissions trading mechanism would allow developed countries to reduce their emission cost-effectively, while hastening the clean development of developing countries under the two degree carbon budget. **Effectively, this process transfers wealth through the cost-effective and equitable internalisation of mitigation costs.**

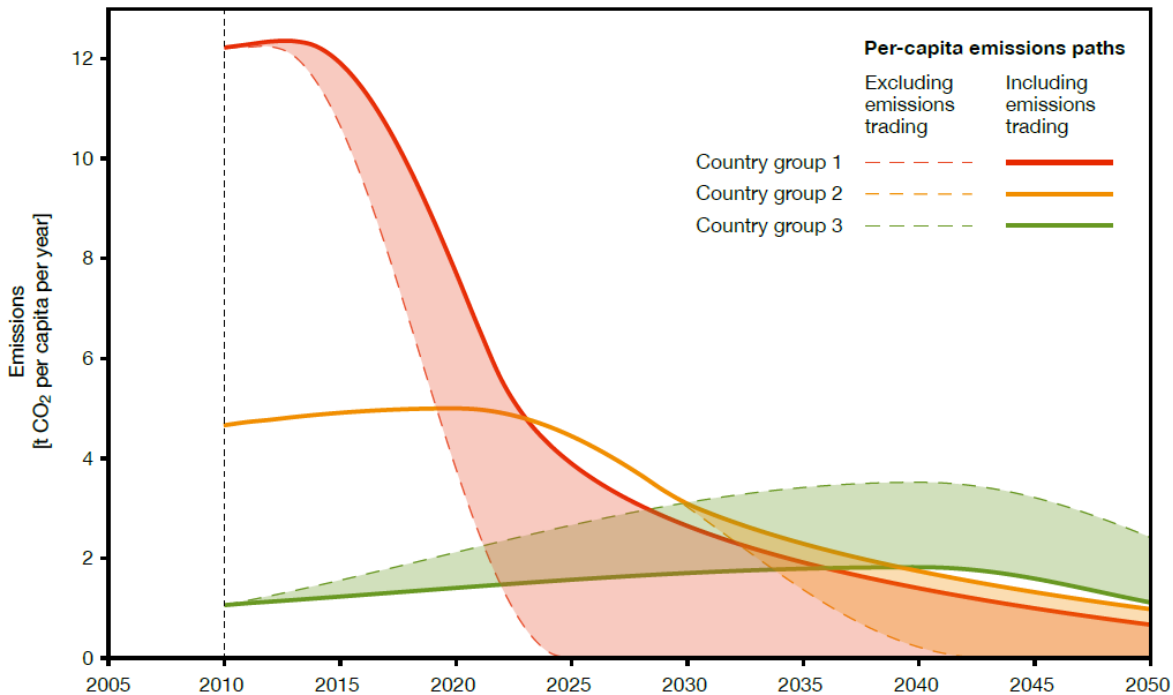
The following diagram from the WBGU illustrates how this might look in practice. Dotted lines show national emissions budgets before trading, unbroken lines show national emissions pathways with trading allowed.

¹⁵ This approach would be hugely preferential to poor and populous countries, but would also have many strange effects, for example, awarding more emission rights to countries with a higher population turnover, and especially high infant mortality.

¹⁶ As in Friends of the Earth’s *Reckless Gamblers* report.

¹⁷ As in the Oko institut’s effort sharing model as used in *The Vision Scenario* for The Greens/EFA group

Figure 2: WBGU's illustration of indicative emissions pathways under tradable emissions rights¹⁸



It is important to note that this equitable internalisation of costs does not automatically follow from any emissions trading system and that **emissions trading between countries that is not performed under an equitable division of emission rights risks disguising and compounding these inequities.** This is a key consideration when assessing both the emissions trading of Kyoto allowances and the linking of bottom up cap-and-trade schemes. As discussed above, historic or business-as-usual emissions are deeply inequitable bases from which to determine emissions rights. Tonnes of emissions reductions against these baselines are therefore not really comparable.¹⁹

We note that there will be some exceptional cases where poor countries will have fewer emissions rights than they need, and will have limited low-cost abatement opportunities to sell internationally, but we argue that this should not confuse the process of allocating sovereign emissions rights. Such circumstances can be resolved through aid programmes and existing financial instruments such as loans. A just policy framework for addressing climate change cannot be expected to resolve all of the world's problems. Indeed it will tend to inspire more political suspicion the more it seeks to exceed its specific remit and pursue other ideological aims. We therefore insist that **financial and technical capacity should not be used as criteria in assigning national emission rights.**²⁰

We would recommend that international emissions trading be limited to carbon dioxide emissions arising from fossil fuel combustion and large industrial processes (like cement manufacture), owing to the relative simplicity of measuring and reporting these emissions, and the importance of CO₂ as a greenhouse gas.²¹ The imprecise volume of emission implicated in land use practices is difficult to measure, so we would recommend policing these via a separate instrument.²² Similarly, it has often proved more cost-effective to regulate so called "exotic" or powerful industrial greenhouse gases using direct international regulations like the Montreal Protocol.

¹⁸ Broken lines show emissions pathways after emissions

¹⁹ This should be a consideration when Europe seeks to trade AAUs or plans to link its cap and trade schemes with other countries

²⁰ As it does, for example, in EcoEquity's Greenhouse Development Rights framework

²¹ Owing to its abundance and its atmospheric longevity.

²² This imprecision is particularly important if small volumes of emissions rights are traded under devolved cap-and-trade schemes

Indicative national budgets under the Sovereign Emissions Rights Framework

By applying this burden sharing methodology, the European Union would be awarded a sixty year budget of 204 billion emissions rights, representing 9% of the global budget corresponding to its share of global population in 1990. We note however that, as of 2012, it has used up around 57% of that budget²³.

A table showing how other prominent countries and negotiating groups fare under this approach is provided in the table below. We a comprehensive list of countries in the Appendices to this report.

Table 2: Indicative national budgets under the Sovereign Emissions Rights Framework

Country/region	Share of 1990 global pop ⁿ	1990-2050 budget under 66% chance of avoiding 2°C (Gt CO ₂ e)	Emissions produced 1990-2012E (Gt CO ₂ e)	Share of budget already used
Global budget	100%	2,274	1,024	45%
EU27 budget	9%	204	116	57%
Additional countries given for reference:				
Bangladesh	2.2%	50	2	4%
India	16.3%	370	45	12%
China	21.6%	490	145	30%
Africa	12.0%	274	81	30%
Thailand	1.1%	24	8	32%
Japan	2.3%	53	30	57%
Brazil	2.8%	64	43	66%
Russia	2.8%	64	54	85%
Saudi Arabia	0.3%	7	9	126%
United States	4.8%	109	153	140%
Australia	0.3%	7	12	160%
<p><i>Sources: UNEP 2012 Emissions Gap report gives a 1,890Gt budget for 2000-2050 of which 640 is estimated to have been used by 2012. To both figures we have added in 384Mt of estimated 1990-1999 emissions from Stockholm Environment Institute</i></p> <p><i>1990 population figures taken from CIA World Factbooks²⁴</i></p> <p><i>EU emissions for 1990-2012 taken from the European Environment Agency as reported to the UNFCCC (net emissions including LULUCF and bunker fuels and early 2012 estimates from Eurostat.</i></p> <p><i>Figures from remaining countries are taken from SEI estimates</i></p> <p><i>Figures are approximate and have been rounded</i></p>				

To ensure the two degree greenhouse budget is not exceeded, emissions rights prepared under this framework would need to supersede those awarded in previous climate agreements. For example:

- Any unused Emissions Trading or Joint Implementation project allowances from the Kyoto Protocol could be made fungible into the new carbon budgets, however this would require that the budgets of the country where these allowances originated were correspondingly reduced.
- Past offsets under the Clean Development Mechanism could also be counted towards those budgets, but only so long as they passed stringent retroactive additionality criteria that ensured the integrity of the global GHG budget was maintained could be counted towards these budgets. The countries that hosted the projects from which these offsets arose would see their new budgets diminished by a corresponding amount.

²³ Land use and international bunker fuels as reported to the UNFCCC in 2013 are included in this calculation

²⁴ http://www.nationmaster.com/graph/peo_pop-people-population&date=1990#source

- Past offset credits that fail these additionality criteria would be null and void, with host countries generally be expected to underwrite those void reductions with new emissions rights.
- Further baseline-and-credit offsetting would cease, replaced entirely by new forms of national and devolved emissions trading and new forms of joint implementation style projects.
- Countries with negative emissions budgets, would be forced to surrender any unused Kyoto allowances and eligible offset credits against these, before hastening to borrowing new emissions rights against these carbon debts.

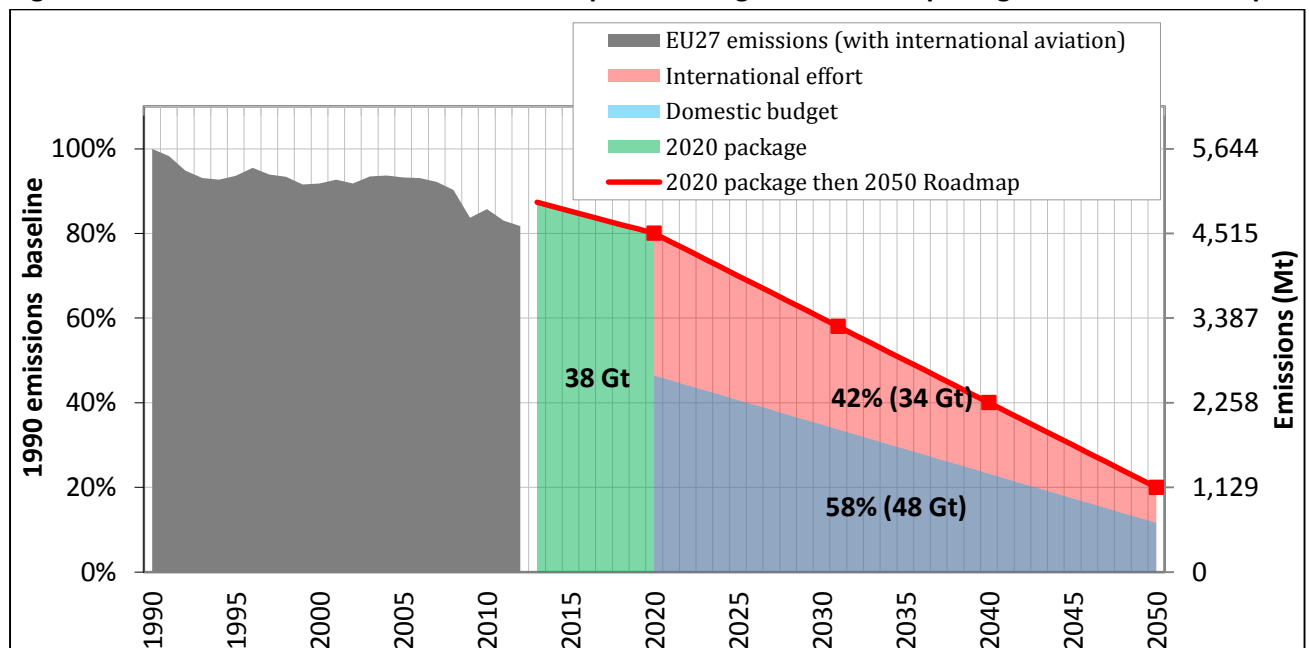
Implications for a Europe’s conditional international offer under a global agreement

If other parties likewise agree to national budgets based on this framework, Europe should be prepared to commit to limit its net emissions to roughly **87 billion tonnes** between now and **2050**.

We note, however, that under the Climate and Energy package, Europe is currently committed to emitting a further **38.5 billion tonnes** over 2013-2020 as implied by the carbon budgets in the Effort Sharing Decision and the EU Emissions Trading Scheme. Unless the European Union intensifies its 2020 package before a new deal enters into force, it risks being left with only **48.5 billion** emission rights for compliance over 2021 to 2050, less any surplus Kyoto allowances from the first commitment period that are not cancelled). In principle, past offsets would be allowed to extend these budgets, so long as they passed stringent retroactive additionality criteria which ensured that the global emissions budget was not breached and were removed from the budgets of the project host countries.

Indicatively, if Europe failed to increase its pre-2020 ambition and then adopted the domestic milestones in the 2050 Roadmap, it would be obliged to cover **42%** of its emissions after 2020 (around 34 billion tonnes) via emissions rights purchased in from other countries. Without international effort, the Roadmap trajectory would exhaust Europe’s carbon space as early as 2033.²⁵

Figure 3: International effort needed to meet equitable budget under 2020 package and 2050 Roadmap



²⁵ EU27 Effort Sharing Decision budget (20.9Gt) plus EU27 share of Phase 3 ETS budget (16.8Gt) plus EU27 carryover of length in the Phase 2 ETS budget carried over (0.7 Gt). 2021-2033 Roadmap pathway implies 48.4Gt. Past flex mechs and future land use emissions/sinks are not included in this calculation.

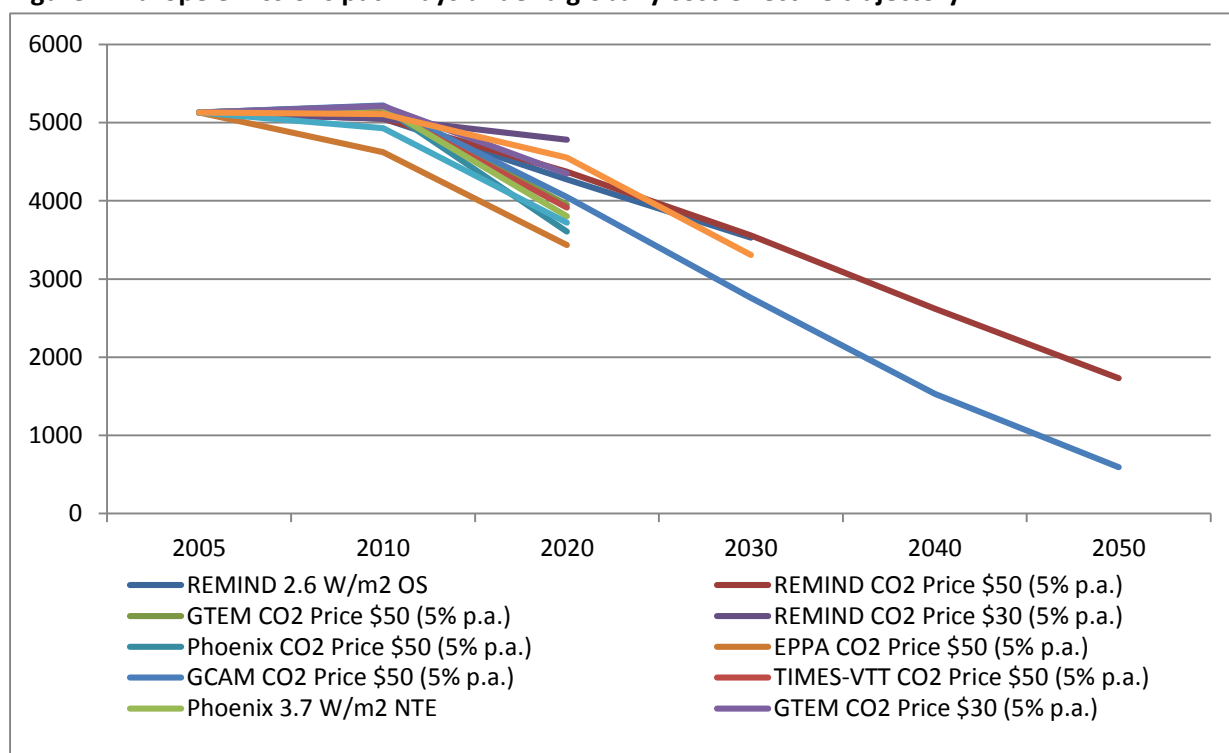
Europe would be likely to face steep competition for these scarce international emission rights, especially against nations like Australia and the United States that face a massive backload of carbon debt.²⁶ To keep its total costs down, Europe should therefore seek to fully exploit all the cost-effective global abatement that can be found in its territories, and to start doing so as early as possible.

Europe’s domestic emissions reductions targets, following a cost-effective global trajectory

Given Europe’s current distance from an international pledge commensurate with its climate responsibilities under our budget sharing approach, we contend that **as a minimum, Europe should commit to keeping its domestic emissions in line with the cost-effective global pathway, and should be prepared to make this pledge unilaterally.**

To determine what this pathway should be, we attempted to get “under the hood” of the models used to determine the UNEP cost-effective 2°C pathway to unpack the information the authors probably felt was too politically sensitive to publish, i.e. what national and regional trajectories does the UNEP global pathway imply. To do this we examined the 95 scenarios from the models in the Asia Modelling Exercise²⁷ that partly informed the 2012 UNEP report, extracting all of those scenarios that did not exceed UNEP’s prescribed global pathway. We then examined what the most cost-effective scenarios implied for Europe’s emission trajectory.

Figure 4: Europe emissions pathways under a globally cost-effective trajectory



As is indicated in the chart above these pathways assume the cost of carbon reductions stayed below \$50/tonne out to 2050, and below \$30/tonne out to 2020.

We found that the central estimates arising from these scenarios very closely track the cost-effective trajectory outlined by the Commission’s 2050 Low Carbon Roadmap for a Competitive European Economy, implying emissions reductions of roughly -25% in 2020, -40% in 2030, -60% in 2040 and -80% in 2050

²⁶ We offer no final solutions on the precise mechanism by which that carbon debt would be paid off. Though a multiplier on emissions allowances bought against new emissions might serve as one solution

²⁷ AME Database (Version 1.0) <https://secure.iiasa.ac.at/web-apps/ene/AMEDB> generated: 2013-06-06

Ironically, the cost-effective trajectory that Europe set to meet an incoherent target closely corresponds to the path it needs to beat if it is to pull its weight in terms of domestic effort. Europe should move to close as much of this domestic emissions gap as quickly as possible, noting that this only represents a very incomplete delivery of its responsibilities towards its share of a 2 carbon budget and that it would still be obliged to achieve a considerable share of its emissions reductions internationally.

Guidelines for comparing pledges when negotiating towards a fair and sufficient global deal

While the budgets approach outlined above represents our recommended ultimate arrangement for a fair and adequate global deal, we recognise that the climate negotiations are a fraught political process, and that other countries might not be willing to commit to the ambitious pledges described in this framework.

Under that circumstance, Europe needs to be able to assess how ambitious its commitments should be relative to those of others, to assume a position of leadership while discouraging free riders. To do this it needs a better yardstick than has hitherto been provided to measure comparability of commitments. We highlight again that the popular short-hands of historical or business-as-usual baselines, or even current per capita emissions are poor barometers of this.

The effort sharing model we describe above does not in itself serve as a yardstick of effort, but only the first half of one. The budget approach we recommend provides a destination towards which pledges should move, but the real measure of national commitments will be the distance travelled towards these from a counterfactual starting point, namely the business-as-usual emissions if no efforts to combat climate change were made.

Below we provide an indicative list of business-as-usual emissions for key countries, against their budgets under the Sovereign Emissions Framework.²⁸

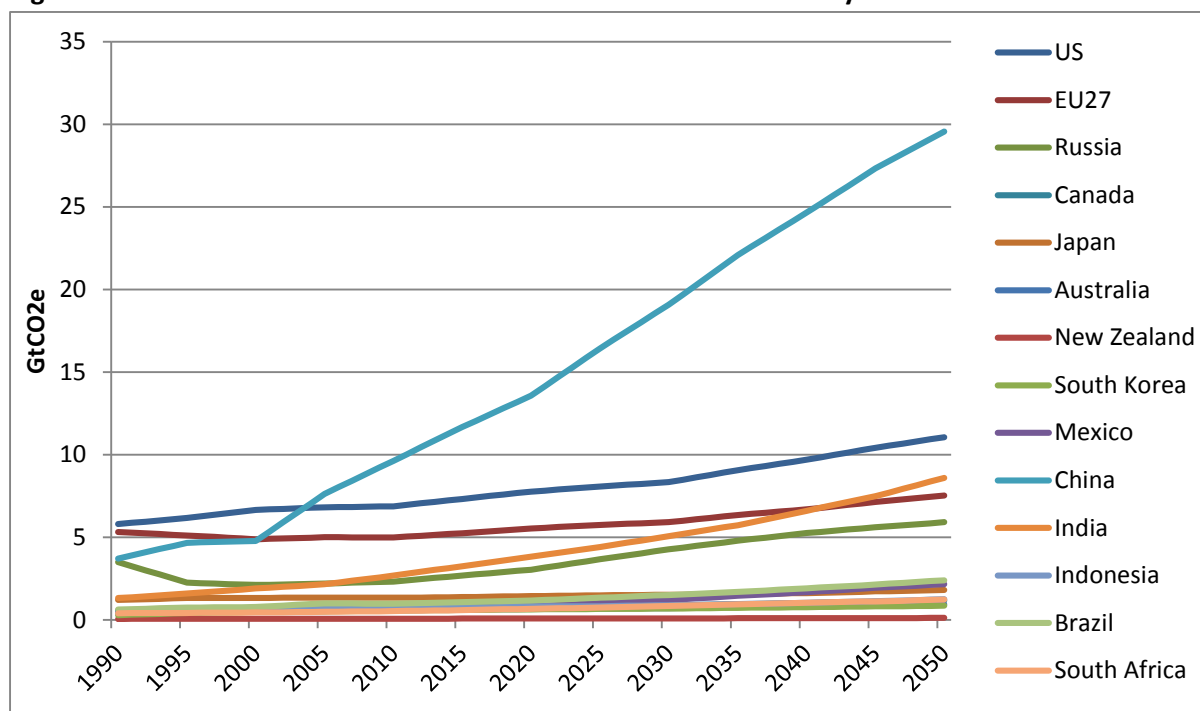
Table 3: A barometer for comparing national climate pledges

Country/region	BAU emisjons over 1990 - 2050 (GtCO ₂ e)	Emissions budget 1990-2050	Historical emissions and projected emissions under new policies proposed 1990-2050	% of required distance covered by new policy
United States	486.4806	109	?	?
EU27	351.5794	204	?	?
Russia	219.2149	64	?	?
Canada	50.77354	12	?	?
Japan	89.40196	53	?	?
Australia	40.54597	7	?	?
New Zealand	5.113612	1	?	?
South Korea	37.89063	9	?	?
Mexico	63.17012	36	?	?
China	907.2454	490	?	?
India	253.3716	370	?	?
Indonesia	49.1836	76	?	?
Brazil	80.74882	64	?	?
South Africa	44.11184	16	?	?
BAU data taken from C-ROADS GHG budgets as above				

²⁸ BAU estimates taken from C-ROADS

We note that the long horizon of these business as usual projections makes them highly speculative, and allows a fair degree of uncertainty to enter into the process. Note for example the conspicuously inexorable rise of China’s emissions over this timeframe.

Figure 5: C-ROADS counterfactual business-as-usual emissions for key countries



Such a yardstick would, of course, encourages national negotiators to inflate their business-as-usual emissions assessments; nevertheless, we feel this tool helps begin to shed some light in the otherwise dark art of comparing international climate effort.

This effort barometer should better equip Europe in determining where to position itself in the climate negotiations to ensure it fulfils its intended role as a climate leader, by matching or exceeding the relative “distance travelled” by the most ambitious countries elsewhere in the world.

It should also be used to determine whether the competitiveness threats that industry complains about are appropriate or inappropriate for Europe to endure in respect to other specific countries or regions.

Conclusion

The window is already closing on the chance to cost-effectively combat climate change. If we do not agree a global deal of sufficient scope and ambition in 2015, we are unlikely to avoid dangerous climate change at all. It is imperative, then, that Europe do everything in its power to ensure the 2015 Climate Conference is a success. Revising its 2020 target and Kyoto budget ahead of the Kyoto pledge review in 2014 would be a powerful gesture of goodwill and would cost Europe little by way of additional effort other than cancelling excess headroom in its carbon budgets under the EU ETS, and the Effort Sharing Decision.²⁹

Beyond that, if Europe offers to embrace stringent equitable carbon budgets if others do the same, and pledges to maintain a domestic emissions trajectory compatible with a low-cost global pathway, it can confidently assert that it has done its duty.

²⁹ See Sandbag’s latest ETS report *Drifting Towards Disaster* at www.sandbag.org.uk/reports

Appendix 1: EU27 historical emissions and GHG budgets

Country/region	Share of 1990 global pop ⁿ	1990-2050 budget under 66% chance of avoiding 2°C (Gt CO ₂ e)	Emissions produced 1990-2012E (Gt CO ₂ e)	Share of budget already used
Global budget	100.00%	2,274.0	1,024.0	45%
EU27 budget	8.97%	204.1	116.0	57%
EU27 states ordered by share of GHG budget remaining				
Latvia	0.05%	1.1	-0.1	-11%
Sweden	0.16%	3.7	1.0	27%
Slovenia	0.04%	0.8	0.2	28%
Lithuania	0.07%	1.6	0.4	28%
Romania	0.44%	10.0	2.9	29%
Bulgaria	0.17%	3.8	1.4	37%
Hungary	0.20%	4.4	1.7	39%
Portugal	0.19%	4.3	1.8	43%
Slovakia	0.10%	2.3	1.0	43%
Italy	1.08%	24.5	11.9	49%
Spain	0.73%	16.7	8.3	50%
France	1.07%	24.4	12.3	50%
Austria	0.14%	3.3	1.8	53%
Estonia	0.03%	0.7	0.4	55%
Finland	0.09%	2.1	1.2	55%
Poland	0.72%	16.4	9.1	56%
United Kingdom	1.08%	24.6	16.3	66%
Greece	0.19%	4.4	3.0	68%
Germany	1.50%	34.1	24.5	72%
Malta	0.01%	0.2	0.1	73%
Czech Republic	0.19%	4.4	3.3	74%
Cyprus	0.01%	0.3	0.2	76%
Denmark	0.10%	2.2	1.8	82%
Belgium	0.19%	4.3	3.8	88%
Ireland	0.07%	1.5	1.4	96%
Netherlands	0.28%	6.4	6.2	96%
Luxembourg	0.01%	0.2	0.3	172%

Sources: UNEP 2012 Emissions Gap report gives a 1,890Gt budget for 2000-2050 of which 640 is estimated to have been used by 2012. To both figures we have added in 384Mt of estimated 1990-1999 emissions from Stockholm Environment Institute
1990 population figures taken from the CIA World Factbooks
EU27 emissions for 1990-2012 taken from the European Environment Agency as reported to the UNFCCC (net emissions including LULUCF and bunker fuels and early 2012 estimates from Eurostat.
Figures are approximate and have been rounded

Appendix 2: Implications of SER budgets for “burden-sharing” within Europe

This framework also has important implications for Europe’s internal assignment of costs and responsibilities as it seeks to harmonize costs and responsibilities going forward, and should be considered when awarding internal emissions allowances under the effort sharing decision or the EU ETS (for auction receipts collected under harmonised auctions) or when assessing whether a particular Member State’s antagonism to deeper emissions reductions is potentially justified.

Observing historical effort through the lens of this budget-sharing framework yields some surprises, with environmentally progressive Member States like Ireland, Denmark and the Netherlands nearly through their entire emissions budgets. It might be deemed appropriate that they undertake a greater share of the effort going forward compared with countries who are progressing comfortably within their carbon space like Sweden and Slovenia.

In particular, we question the appropriateness of awarding additional access to ETS auction receipts on the basis for “Early Effort” or “Community Solidarity” to countries who have used up a disproportionate share of their carbon budgets. We note that Poland, the Member State that has been most outspoken in blocking increased European climate ambition, stands at approximately the same stage through its budget as the EU as a whole, and yet it receives a large share of additional ETS auction revenues through both of these provisions in the ETS Directive. We also note that Poland has been disproportionately outspoken in blocking greater climate ambition under the 2050 Roadmap milestones, and in decisions about unused Kyoto surpluses. In the light of their position, these benefits and this stance seem less viable.

Appendix 3: G20 country budgets

Country/region	Share of 1990 global pop ⁿ	1990-2050 budget under 66% chance of avoiding 2°C (Gt CO ₂ e)	Emissions produced 1990-2012E (Gt CO ₂ e)	Share of budget already used
Global budget	100.00%	2,274.0	1,024.0	45%
G20	73.54%	1,672.31	782.05	47%
India	16.27%	370.07	44.61	12%
Turkey	1.06%	24.07	6.88	29%
China	21.56%	490.22	144.79	30%
World	100.00%	2274.00	955.72	42%
Mexico	1.57%	35.80	16.05	45%
Italy	1.08%	24.47	11.96	49%
France	1.07%	24.40	12.33	51%
Indonesia	3.35%	76.14	40.96	54%
Japan	2.33%	52.88	30.18	57%
Argentina	0.61%	13.95	7.98	57%
EU27 budget	8.97%	204.1	116.0	57%
South Korea	0.81%	18.45	11.40	62%
United Kingdom	1.08%	24.57	15.43	63%
Brazil	2.82%	64.20	42.59	66%
South Africa	0.69%	15.77	10.70	68%
Germany	1.50%	34.10	24.37	71%
Russia	2.79%	63.55	53.87	85%
Saudi Arabia	0.31%	6.98	8.83	126%
United States	4.81%	109.40	153.26	140%
Canada	0.52%	11.89	17.35	146%
Australia	0.32%	7.34	11.71	160%

Other things we do



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