

Submission to the Ad Hoc Working Group on the Durban Platform for Enhanced Action

Workstream 1: The 2015 Agreement

By the

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The Wuppertal Institute welcomes the opportunity to provide input to the deliberations of the Ad Hoc Working Group on the Durban Platform for Enhanced Action, responding to the invitation in documents FCCC/ADP/2012/3, paragraph 29, and FCCC/ADP/2013/L.2, paragraphs 4 and 6. Our submission includes the following elements:

Summary.....	1
1 Preface: Climate Policy Needs to Overcome the Win-Lose Narrative	6
2 Ways of Defining and Reflection Enhanced Action	12
2.1 The Quantity-Based Approach Is Arguably Good Policy But Bad Politics.....	12
2.2 Emission Pricing Is Key But No Silver Bullet	13
2.3 Countries Should Adopt Multi-Dimensional Commitments	15
2.4 Commitments Need to Give Clear Short-Term and Long-Term Directions	18
2.4.1 Short-Term Direction: Regular Review and Re-Negotiation	18
2.4.2 Giving Long-Term Directions	19
2.5 Parties' Commitments Should Constitute Fair Shares of the Global Effort.....	20
3 Climate Mainstreaming and Outreach	22
4 Means of Implementation: The Climate Regime Should Be Made Self-Financing.	23
5 Transparency and Accountability: Parties Should Agree to Common Emissions Accounting.....	25
6 The Negotiation Process Needs Focus and High-Level Attention	25
7 Interested Parties Should Jointly Pursue Focused Sector-Specific Initiatives	26

Summary

Climate Policy Needs to Overcome the Win-Lose Narrative

One key reason for the slow pace of climate policy is that it is based on a win-lose narrative: either economic development wins or climate protection. Climate policy will never get where it needs to be going if this narrative of pain and sacrifice is not overcome. Whether reducing emissions does indeed impose a net economic burden does in fact seem questionable for a number of reasons:

First, maintaining the current energy system is hardly cheap and will tend to become ever more expensive in the future as fossil fuels become increasingly scarce. Already today the world's countries each year spend trillions of dollars on fossil fuel subsidies and imports. Second, a high share of the necessary reductions can be achieved at a net economic benefit through energy efficiency. Third, the economics of energy from renewable sources are changing rapidly. Renewables are already cost-competitive in various settings and the rapid decline of equipment costs through technological progress and increasing market penetration continues. According to increasing numbers of analysts wind and solar will probably be fully competitive in most of the world by the end of the current decade. Fourth, in addition to the global climate externality fossil fuel use also causes substantial local externalities, such as local air, water and land pollution, which have to be borne by the public and need to be taken into account in cost-benefit analyses. Fifth, the discussion about risks of carbon leakage is rather disproportionate to the share of national emissions that is actually at risk, and the risk decreases further the more efforts to tackle the climate problem pick up speed globally.

Emission reduction policies hence also provide strong immediate benefits to society. The net economic return may well be positive even without accounting for the mitigation of damages caused by climate change. At the very least it is an open question whether the net impact will be positive or negative. The more pertinent problem is that climate policy is effectively economic policy with substantial distributional impacts and thus naturally engenders resistance. Those who stand to lose from the low-emission transition have so far managed to dominate the narrative while the innovation impulses and new markets created by climate policy have so far not received adequate attention.

The Quantity-Based Approach Is Arguably Good Policy But Bad Politics

Arguably, a key factor in the framing of the narrative is how commitments are framed. We recommend to reconsider the political wisdom of focusing almost exclusively on emission quantities, as the climate regime has so far done. This approach has the advantage of providing environmental clarity – but all political incentives point in the direction of setting weak rather than strong emission targets. There is hardly any country in the world where setting strong emission targets yields political rewards for politicians. As long as emissions are seen as inextricably linked to economic well-being, framing commitments in terms of emission reductions directly triggers the perspective of seeing climate protection as an economic loss. In addition, quantity commitments are equivalent to giving countries money. If emissions were restricted globally following a Kyoto-like approach and with a level of ambition in line with the

2°C target, the value of emission allowances would be several trillion dollars a year. Moreover, adopting quantity commitments is risky for governments as key emission drivers such as economic and population growth are largely beyond their influence. The prevalence of fears that quantity commitments may become a “cap on development” is hence not surprising. These factors directly give rise to the distributional controversy that has dominated the climate negotiations. Finally, quantity commitments constitute not only a minimum but also the maximum emission reduction and adjusting commitments once they have been set has proven to be nearly impossible. The Kyoto approach thus effectively caps ambition.

It may also be fundamentally sub-complex to see climate change solely through the lens of emissions because it frames climate change as an environmental problem only. But arguably climate change is fundamentally a development problem, not a traditional environmental problem, so the traditional end-of-pipe approach to environmental regulation will arguably not do if pursued in isolation. Unfortunately, in the UNFCCC sustainable development has been relegated to the status of a "co-benefit" that is seen as nice to have but not strictly necessary. Which is fundamentally at odds with the priorities of developing countries, who clearly see development as their fundamental priority and emission reductions as a co-benefit. The climate regime may therefore benefit from turning the priorities around and framing commitments in a way that puts sustainable development benefits front and centre.

Emission Pricing Is Key But No Silver Bullet

Emission pricing has so far been at the centre of the international regime and can, if designed well, indeed be a key instrument to incentive emission reductions. However, it is not a silver bullet as climate-friendly investments are impeded by a variety of non-economic barriers. If prices were the sole determinant of investments, the world would not dispose of gigatonnes of no-regret potential, as analysed by the International Energy Agency and others. Through its focus on lowest-cost solutions, emission trading also provides only limited incentives for new technologies which in their infancy still have high costs but may in the longer term become the most cost-effective solutions, as demonstrated by the rapid cost decreases of renewables.

Emission trading may also be the opposite of efficiency-enhancing if conducted by governments. Arguably, governments' decisions on whether to pursue domestic reductions or purchase emission units from outside will often be based on political rather than on macro-economic considerations.

Furthermore, the ultimate goal of emission trading, to ultimately establish a globally uniform emission price and thus establish a level playing field, may in fact be illusory as the effective carbon price also depends on other taxes and overt and hidden subsidies that are in place. Adding a uniform emission price to highly uneven national taxation and subsidy regimes will not produce a level playing field.

A globally uniform emission price may also not be as equitable as is generally held to be the case, given the strong divergence in economic capacity and related purchasing power parities among countries. And treating different cases equally is as inequitable as treating similar cases differently.

Regarding the Kyoto Protocol more specifically, its basket approach whereby different gases with strongly different global warming properties can be traded off against each other is arguably also a weakness. It suggests an equivalence of greenhouse gases where in fact none exists, allowing relatively easy reductions of short-lived gases to substitute for more difficult reductions of long-lived CO₂. Cumulative carbon is the key determinant of future warming. And

most CO₂ emissions are caused by long-lived infrastructure such as power plants, buildings and transport infrastructure, which once in place, cause emissions for decades. Offsetting reductions of CO₂ with other reductions therefore means losing time, not buying time.

Parties Should Adopt Multi-Dimensional Commitments

The climate regime clearly needs a reference to emissions as these constitute the environmental problem that is supposed to be solved. However, emission targets should arguably not be tradable and bankable by governments to reduce the incentives to adopt weak commitments and to prevent targets from becoming a cap on ambition. Emission trading should arguably only be pursued at the level of companies, for example in domestic emission trading systems, as companies actually make their trading and investment decisions on the basis of economic rather than political considerations. The Kyoto basket approach should be abandoned, each GHG should be regulated separately.

In addition, emission targets should be complemented by other types of commitments that do not trigger fears of imposing a “cap on development” and that are more in line with what governments can actually deliver: implementing policies. We recommend to adopt commitments related to policies and to economic inputs such as energy sources. Addressing policy and economic inputs will allow to develop approaches that reduce emissions while at the same time promoting sustainable development more generally.

Since tackling climate change is a highly complex problem, it is also a problem-adequate approach to address it from as many angles as possible. If some lines of attack fall short, others might still carry the day.

As regards policies, all countries should commit to phasing out fossil fuel subsidies as soon as possible. The benefits from these subsidies are in fact mostly captured by wealthy households, the social impacts of removing them should therefore be manageable, but will nevertheless require attention. A win-win approach would be to redirect the resources that have so far gone into subsidies into supporting low-income households in upgrading the energy efficiency of their buildings, appliances and transport options.

In addition, governments should incorporate the costs of climate change into all government procurement decisions, in particular investment decisions on long-lived infrastructure. That is, instead of market prices, investment decisions should be based on a shadow price that includes all territorial and extraterritorial externalities that will be caused by the investment.

Parties should ideally also commit to limiting fossil fuel extraction. Analysis by the IEA and others suggests that to achieve 2°C at least 2/3 of global fossil fuel reserves will need to be left untouched.

Countries should also be encouraged to commit to scaling up certain climate-friendly technologies or improving energy efficiency, which may dovetail more directly than emission targets with what is seen as being in the national interest. Experience suggests that the sum of such sector or technology specific commitments may well often be more ambitious than the respective country's overall emission commitment. Experience also seems to indicate that overachieving clean energy targets is often seen as a prompt for doing more, while overachieving emission targets is seen as an invitation to rest on one's laurels.

However, such dynamics will only have a positive climate impact if emission targets do not effectively cap ambition as is the case in the Kyoto Protocol. The 2015 agreement needs to be organised to allow a race to the top rather than a race to the lowest common denominator.

Evaluation of the experience from implementing concrete actions based on systematic monitoring should contribute to shifting opinions about the feasibility of climate protection and thus allow knowledge-based adoption of ever more ambitious commitments step by step.

Commitments Should Give Clear Short-Term and Long-Term Directions

Commitments should be reviewed regularly after they have been adopted. However, the history of the UNFCCC suggests that reviews are only taken seriously if they are coupled with the expiration dates of commitments. Therefore, commitment periods should not be longer than five years as in the first Kyoto period. Moreover, five years is compatible with the time horizon of most policy-makers. Commitments that are due longer into the future are quickly seen as somebody else's problem.

Nevertheless, in addition to clear directions for the short term the climate regime should also provide long-term certainty for investments. A substantial part of emissions stems from long-lived infrastructure, such as power plants, buildings and transport infrastructure. Once built, this infrastructure will stay in place for decades. To give proper direction to these investments, Parties should agree to a long-term goal of reducing net global emissions to zero by 2050. This high level of ambition will probably be necessary to compensate for the probable shortfall of ambition in the current decade.

Parties' Commitments Should Constitute Fair Shares of the Global Effort

Ideally, Parties should agree on common equity criteria for determining fair shares and use these to determine their commitments. If this is not possible, countries should as a minimum include a justification of why their level of effort is in line with their respective responsibility and capability when submitting their draft commitments.

Parties Should Adopt Zero-Emission Development Strategies

To actually achieve the necessary reductions, climate protection needs to become fully part and parcel of all government decisions. Therefore, all countries, with possible exceptions for Least Developed Countries and other poor countries to be identified based on equity criteria, should commit to adopting comprehensive zero-emission development strategies (ZEDS) covering all sectors. ZEDS should be grounded in a strategic vision to reduce emissions to zero by 2050.

Parties Should Invite Non-State Actors to Make Pledges

To achieve societal mainstreaming, Parties could also explore the possibility of inviting non-state actors to make their own pledges under the 2015 agreement or in a parallel document or register. Parties might also explore the possibility of fast-tracking such pledges for support from the Green Climate Fund or from domestic resources. However, such actions by non-state actors can only be a facilitator of, not be a substitute for ambitious government action, as all of these actions will count towards national commitments.

The Climate Regime Should be Made Self-Financing

Finance commitments should be in line with scientific estimates of needs of poor countries related to achieving the ultimate objective of the Convention and related to adapting to the impacts of climate change and to address loss and damage. Ideally, the climate regime should be made self-financing through emission pricing instruments, that is, auctioning of emissions allowances in domestic emission trading systems and putting an emission price on international shipping and aviation.

Parties Should Agree to Common Emissions Accounting

Common accounting is a crucial ingredient for the 2015 agreement. The Copenhagen/Cancún pledges are characterised by a high level of uncertainty. In addition, having a clear picture of how emissions are developing and what drives them is a core precondition for being able to develop appropriate mitigation actions. Therefore, all countries above a certain level of responsibility and capability as defined according to certain indicators should agree to common emissions accounting based on the rules of the Kyoto Protocol.

The Negotiation Process Needs Focus and High-Level Attention

One reason for the failure of the Copenhagen summit was maybe that the undertaking was too broad, trying to simultaneously develop new architectures for mitigation, adaptation, finance, technology cooperation and capacity building. The task for the 2015 agreement could arguably be made easier by limiting it from the outset to top-level items and delegating implementation details to COP decisions. The key top-level items are in our view commitments on mitigation, adaptation and finance as well as common accounting.

In terms of negotiation process, Parties should define clear milestones to be achieved at the 2013 and 2014 COPs. Initial offers for commitments should be put on the table by countries in 2014 already in order to allow review by the international community and subsequent strengthening in case the initial offers fall short of the required level of ambition.

Political leaders should be involved much more closely than so far and much earlier than in the Copenhagen process. As climate policy is effectively economic policy with strong distributional impacts, these impacts need to be judged by heads of state and government. Delegates will not be able to work out the high-level items if they do not have high-level guidance as a basis.

The negotiation process would probably benefit substantially if majority voting was introduced as per the draft rules of procedure. As long as all decisions have to be taken by consensus, countries that actually have no interest in ambitious climate protection may veto all advances.

The negotiations could also benefit from stronger involvement of stakeholders, who so far play only a marginal role. A possible model is provided by FAO's Committee on World Food Security, the world's highest-level body on global food security policy, where constituencies have essentially equal standing to Parties, except for the right to vote.

Interested Parties Should Jointly Pursue Focused Sector-Specific Initiatives

In addition to the common agreement, individual countries should be encouraged to take up sector-specific initiatives with other countries which share common interests. One possible starting point for forming such initiatives might be the multi-dimensional commitments we recommend to adopt. For example, countries that adopt ambitious commitments to scale up renewables may find it in their common interest to collaborate in achieving these commitments. Joint initiatives may be particularly promising if they have an ambitious shared vision, limit membership to countries that actually share that vision, provide significant real benefits to members and have a pathway to start quickly and scale up over time.

1 Preface: Climate Policy Needs to Overcome the Win-Lose Narrative

Climate policy in general and the UNFCCC climate negotiations in particular are being conducted by most participants in a win-lose mindset: Either we protect the climate, but then we will have to shoulder an economic burden. Or we put the economy first, but then we get severe climate change. Being able to use fossil fuels is seen by most as indispensable for economic well-being. Statements by world leaders frequently boil down to a belief that reducing emissions sharply would mean losing industry and jobs, have negative impacts on living standards and would amount to limiting “development space.”¹

Former UNFCCC Executive Secretary Yvo de Boer reportedly identified the lack of confidence in the viability of low-emission development as key factor behind the failure of Copenhagen to deliver the hoped-for agreement.² If this is the case, climate policy will never get where it needs to be going unless the fundamental narrative is changed.

Whether reducing emissions does indeed impose a net economic burden does in fact seem questionable for a number of reasons.

First, maintenance of the current energy system is far from cheap and will tend to become ever more expensive in the future. According to a recent study by the International Monetary Fund (IMF), the world each year spends trillions of dollars on energy subsidies, which mostly benefit fossil fuel use. The IMF puts the value of the subsidies at 0.7% of world GDP on a pre-tax and 2.5% of world GDP on a post-tax basis (including externalities). And while the purported objective of these subsidies often is to help with energy access of the poor, according to the IMF, most of the benefits are actually captured by higher-income households. Just removing these subsidies could according to the IMF reduce CO₂ emissions by 13%.³ The recent World Energy Outlook (WEO) special report on climate change by the International Energy Agency (IEA) complements that global fossil fuel subsidies are six times the level of support received by renewable energy technologies and that 15% of global CO₂ emissions effectively receive an incentive of US\$110 per tonne through fossil-fuel subsidies.⁴

¹ See e.g. a collection of statements in Moomaw, William; Papa, Mihaela (2012): “Creating a mutual gains climate regime through universal clean energy services”, in: *Climate Policy*, Vol. 12, No. 4, pp. 505-520.

² Quoted in: Murray, James (2012): Doha: Loss and damage in the desert - 10 Dec 2012. <http://www.businessgreen.com/bg/james-blog/2230841/doha-loss-and-damage-in-the-desert>, last accessed 24 June 2013.

³ International Monetary Fund (2013): *Energy Subsidy Reform: Lessons and Implications*. January 28, 2013. <http://www.imf.org/external/np/pp/eng/2013/012813.pdf>, last accessed 24 June 2013.

⁴ IEA (2013): *Redrawing the Energy-Climate Map*. World Energy Outlook Special Report. Paris: OECD/IEA. www.worldenergyoutlook.org/energyclimatemap, last accessed 24 June 2013.

The EU alone spends around €400 billion on oil imports each year, which corresponds to around 3% of the EU's GDP. The IEA's chief economist Fatih Birol has commented that this is "the equivalent of a Greek crisis – every year". Sub-Saharan African countries in 2011 spent more on oil imports (\$18bn) than they received in official development assistance (ODA) (\$15.6bn).⁵

Second, in the mid-term a large share of the necessary emission reductions can be achieved at a net economic benefit through efficiency improvements. For instance, Fraunhofer ISI concluded that the EU's overall final energy demand could be reduced by 57% compared to the baseline projection by 2050, resulting in annual cost savings of about €500 billion (in year-2005-euro).⁶ Regarding the global level, the IEA for the 2012 WEO developed an "Efficient World Scenario" that is based on doing no more than exploiting energy efficiency opportunities which justify themselves economically in terms of rates of return and payback periods but are not being utilised due to a variety of barriers. According to the IEA, mobilising this potential through appropriate policies to remove these barriers would result in a global emission trajectory that up to 2020 would be nearly identical with the IEA's 450 Scenario, which represents a trajectory that would lead to a stabilisation of atmospheric GHG concentrations at 450 ppm CO₂-eq. The Efficient World Scenario would lead to a peak of energy-related CO₂ emissions before 2020, and even up to 2035 implementation of the Efficient World Scenario would take the world nearly halfway to the 450 Scenario.

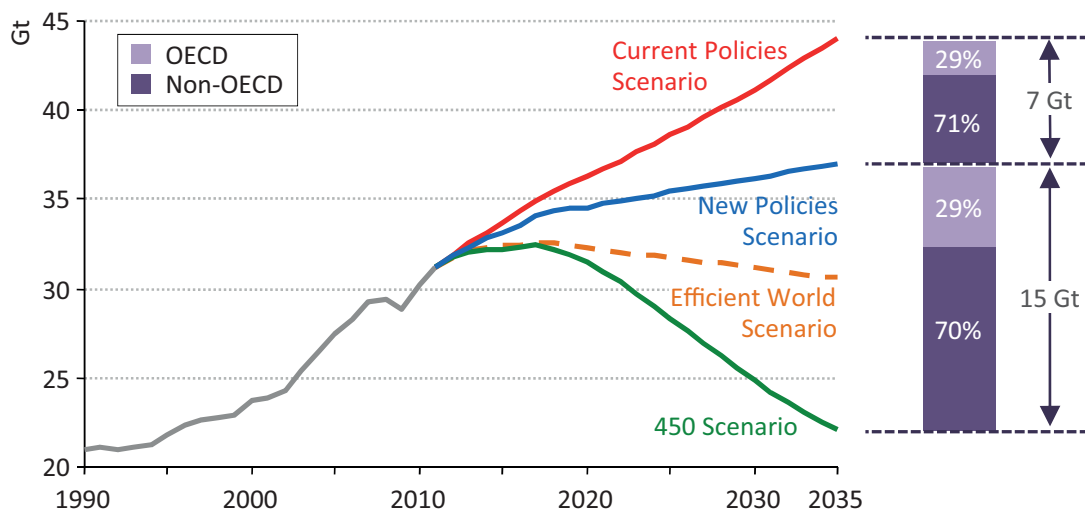


Figure 1: Energy-related CO₂ emissions in the 2012 WEO's Current Policies, New Policies, Efficient World and 450 Scenarios⁷

⁵ Quoted in: The Guardian: Overseas aid to Africa being outweighed by hefty costs of importing oil, 1 April 2012, <http://www.guardian.co.uk/world/2012/apr/01/overseas-aid-africa-oil-imports-costs?newsfeed=true>, last accessed 24 June 2013.

⁶ Boßmann, Tobias; Eichhammer, Wolfgang; Elstrand, Rainer (2012): Concrete Paths of the European Union to the 2°C Scenario: Achieving the Climate Protection Targets of the EU by 2050 through Structural Change, Energy Savings and Energy Efficiency Technologies. Accompanying scientific report – Contribution of energy efficiency measures to climate protection within the European Union until 2050. Karlsruhe: Fraunhofer ISI. http://www.isi.fraunhofer.de/isi-en/e/projekte/bmu_eu-energy-roadmap_315192_ei.php, last accessed 25 June 2013.

⁷ IEA (2012): World Energy Outlook 2012. Paris: OECD/IEA, p. 318.

According to the IEA, the Efficient World Scenario would result in a more efficient allocation of resources, boosting cumulative economic output through 2035 by US\$18 trillion, with a 0.4% higher global GDP in 2035 than in the New Policies Scenario, which reflects current and announced policies. Additional investment of \$11.8 trillion in more efficient end-use technologies would be needed, but this would be more than offset by a US\$17.5 trillion reduction in fuel expenditures and US\$5.9 trillion lower supply-side investment. One may also note that the scenario mainly considers incremental changes to the technologies and practices used, but not more holistic concepts, such as prioritising energy efficiency at all levels of urban planning, or lifestyle changes.

Third, the picture on the energy provision side is changing rapidly. According to the IPCC's Special Report on Renewable Energy, renewables are already cost-competitive in various settings.⁸ And the economics continue to improve rapidly through technological progress and increasing market penetration. Equipment costs of solar photovoltaics (PV) have fallen by about 80% within the last five years. Wind turbine costs have fallen by 29% in the same timeframe even though starting from a much lower level.⁹ A recent report by GTM Research notes that 2009 industry roadmaps were targeting US\$1.00/W module costs as a medium-term goal, while in fact best-in-class Chinese producers are now already approaching costs of US\$0.50/W. The report projects that solar PV module costs will fall further to US\$0.36 per watt by the end of 2017.¹⁰ McKinsey has similarly projected that solar PV costs will continue to fall by as much as 10% annually by 2020.¹¹ A recent report by Citigroup projects that both wind and solar will be fully competitive with other energy sources in most parts of the world by 2020.¹²

While some point to renewables' need for backup, which entails additional costs, total energy-related expenditures in a renewables-based energy system are also expected to become lower than those of a fossil-based system in the not too distant future. The German Reference Study (*Leitstudie*), which analysed the impacts of the Energy Concept adopted by the German government, projects that total energy expenditures in a system based on efficiency and renewables, as foreseen in the German Energy Concept, will fall below those in a fossil-based energy system around 2025. The balance of higher upfront investments and subsequent savings is projected to turn

⁸ IPCC (2011): IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation. Prepared by Working Group III of the Intergovernmental Panel on Climate Change [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schlömer, C. von Stechow (eds)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1075 pp.

⁹ Liebreich, Michael (2013): Keynote. Bloomberg New Energy Finance Climate Summit. 23 April 2013. <http://bnf.folioshack.com/document/summit2013/1czp7t>, last accessed 25 June 2013.

¹⁰ Mehta, Shyam (2013): PV Technology and Cost Outlook, 2013-2017. GTM Research. <http://www.greentechmedia.com/research/report/pv-technology-and-cost-outlook-2013-2017>, last accessed 25 June 2013.

¹¹ Aanesen, Krister; Heck, Stefan; Pinner, Dickon (2012): Solar power: Darkest before dawn. McKinsey&Company. http://www.mckinsey.com/client_service/sustainability/latest_thinking/solar_powers_next_shining, last accessed 25 June 2013.

¹² Channell, Jason; Lam, Timothy; Pourreza, Shahriar (2012): Shale & renewables: a symbiotic relationship. Citi Research. <https://ir.citi.com/586mD+JRxPXd2OOZC6jt0ZhiqcxXiPTw4Ha0Q9dAjUW0gFnCIUTTA==>, last accessed 25 June 2013.

positive around 2030, with cumulative savings amounting to around 570 billion Euros by 2050. Taking into account climate damages, the balance would turn positive around 2020 already.¹³

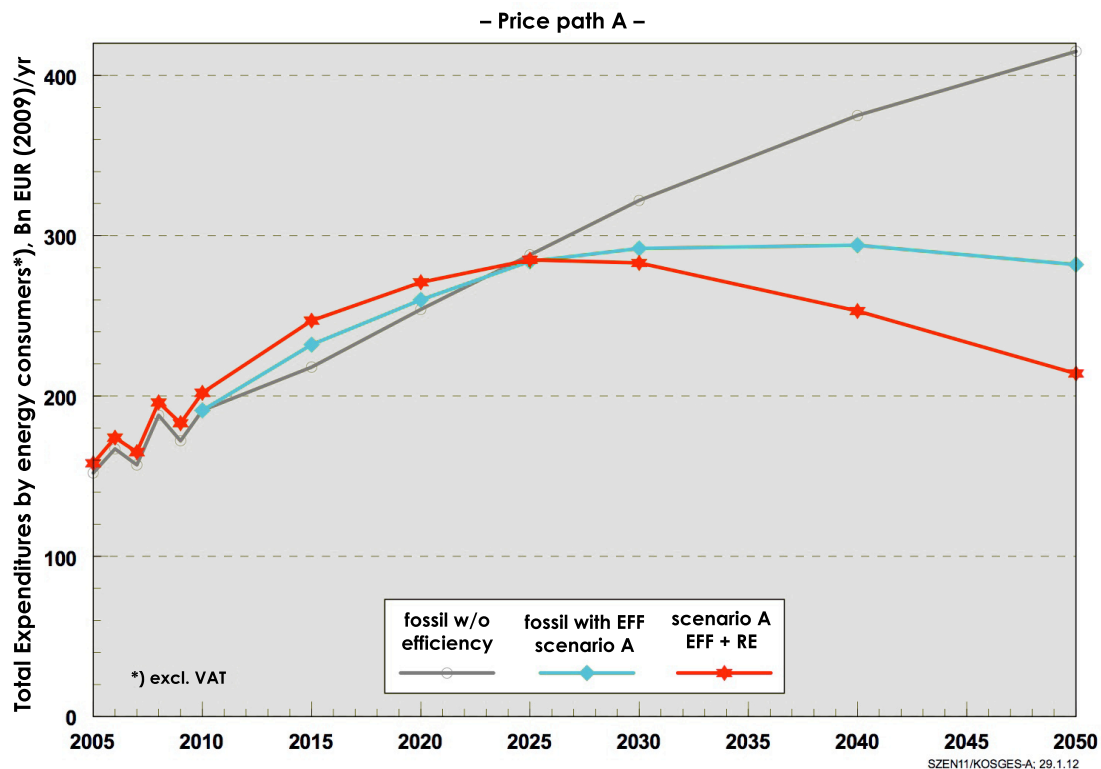


Figure 2: Total energy expenditure of all consumers with exclusively fossil provision of current energy consumption levels (grey line), with implementation of the German Energy Concept's efficiency targets (blue line), and for the renewables-dominated energy mix as aimed for in the German government's Energy Concept (red line).¹⁴

Fourth, in addition to the global climate externality fossil fuel use also causes substantial local externalities that have to be borne by the public, such as local air, water and land pollution. Climate change is far from the only problem the world has with its current fossil-based energy system. A recent study by Stuttgart University concluded that local air pollution from fossil fuel use causes 22,000 premature deaths per year in Europe, as well as costs of billions of euros for disease treatment and lost working days.¹⁵ Another recent study concluded that 500 million people in Northern parts of China have a 5.5 year lower life expectancy (which amounts to in total 2.5 billion life

¹³ Nitsch, Joachim et al. (2013): Langfristszenarien und Strategien für den Ausbau der erneuerbaren Energien in Deutschland bei Berücksichtigung der Entwicklung in Europa und global. Schlussbericht. Stuttgart, Kassel, Teltwo: Deutsches Zentrum für Luft- und Raumfahrt (DLR), Fraunhofer Institut für Windenergie und Energiesystemtechnik (IWES), Ingenieurbüro für neue Energien (IFNE).

¹⁴ Adapted from Nitsch et al., p. 32.

¹⁵ Preiss, Philipp, Roos, Joachim, Friedrich, Rainer (2013): Assessment of Health Impacts of Coal Fired Power Stations in Europe. Stuttgart University, Institute for Energy Economics and the Rational Use of Energy (IER) and Department for Technology Assessment and Environment (TFU). http://www.uni-stuttgart.de/hkom/presseservice/pressesmitteilungen/2013/130405_Deliverable_IER_to_GREENPEAC_E_DE.pdf, last accessed 22 August 2013.

years lost) than their Southern compatriots due to higher air pollution from coal combustion, which is 55% higher than in Southern China.¹⁶

Fifth, much of the discussion is being dominated by fears of carbon leakage. The question is, however, what percentage of emissions is actually exposed to this risk? Is transport going to be relocated if some countries pursue stringent climate policy and other countries do not? Are buildings going to be relocated? Are power plants, waste, agriculture and forestry going to be? And even in industry most sectors are either not emission intensive or not strongly exposed to international competition.¹⁷ Nevertheless, overall climate ambition is being substantially held back by concern about a rather minor share of overall emissions.

Emission reduction policies hence also provide strong immediate benefits to society. Whether the net macroeconomic impact will be positive or negative at the very least seems to be an open question. It may well be that “the current world energy system (and with it the entire, fossil fuel-based world economy) is situated in a “local sub-optimum” – as a sled is stuck in a local hollow, which is separated from a deep valley (the “global optimum”) only by a short and relatively gently rising slope. If one exerts a minor extra effort to push the sled across the slope, the vehicle can get moving rapidly! The energy transition needs exactly this push from governments – in the long term the extra-investment will pay off double, triple and manifold.”¹⁸

The above-mentioned finding that energy subsidies mostly benefit wealthy rather than poor households points to where the probably more pertinent problem lies: Climate policy is essentially economic policy and will have substantial distributional impacts. While at the macro level benefits may well outweigh negative impacts even without taking into account climate damages, at the micro level there will be losers as well as winners, which naturally engenders resistance. Companies and entire sectors that have so far based their business models on the use of fossil fuels will either have to fundamentally restructure, or be replaced by others that provide the same societal service in a low-emission manner. According to the recent IEA special report, net revenues for existing nuclear and renewables-based power plants would be boosted by US\$1.8 trillion (in year-2011 dollars) through to 2035 under in the 450 Scenario, while the revenues from existing coal-fired plants would decline by a similar level. 8% of new fossil-fuelled plants would be retired before their investment is fully recovered.¹⁹

Pursuing a 2°C compatible climate policy would also amount to effectively devaluing the majority of global fossil fuel reserves. According to the IEA and others, at least 2/3 of global fossil fuel reserves will need to remain untouched if the 2°C target is to be

¹⁶ Chen, Yuyu, Ebenstein, Avraham, Greenstone, Michael, Li, Hongbi (2013): Evidence on the impact of sustained exposure to air pollution on life expectancy from China's Huai River policy. PNAS Early Edition, <http://www.pnas.org/content/early/2013/07/03/1300018110>, last accessed 22 August 2013.

¹⁷ For the EU, see e.g., Graichen, Verena; Schumacher, Katja, Matthes, Felix Chr.; Mohr, Lennart; Duscha, Vicky; Schleich, Joachim; Diekmann, Jochen (2008): Impacts of the EU Emissions Trading Scheme on the industrial competitiveness in Germany. Dessau-Roßlau: Federal Environment Agency (Umweltbundesamt).

¹⁸ Rahmstorf, Stefan / Schellnhuber, Hans Joachim (2006). Der Klimawandel. Diagnose, Prognose, Therapie. München: Beck, p. 114, translated from the original German by the authors.

¹⁹ IEA (2012): World Energy Outlook 2012. Paris: OECD/IEA.

met. However, these reserves are already on companies' books. Analysis by HSBC concluded that if adequate policies to achieve the 2°C target were introduced, this could strip as much as 60% of the market value off fossil fuel companies.²⁰

The challenge ahead is, of course, a different one in different countries. For developed countries it is one of fundamentally redeveloping their established energy infrastructure. Developing a narrative that frames this challenge positively and as a worthwhile investment into a prosperous future will be indispensable particularly for those developed countries that have been hit hard by the financial and economic crisis.

For emerging countries the challenge is one of deviating development to a sustainable path, rather a question of redirecting the momentum to correct the course of development than turning it around. For those countries it is essential to develop a positive vision of a society and economy at which to aim their development efforts. The model of the present developed world is no longer viable. If emerging economies succeed in developing that vision, they might even surpass today's industrialized countries on the way to a sustainable society.

For least developed countries and countries with low development the challenge is to find a completely new path of development. Taking the fossil fuelled route is no longer an option. For these countries a short-cut has to be found avoiding unsustainable path dependencies.

A global climate change agreement must acknowledge these differences and support parties in taking on this challenge.

Those who stand to lose from the low-carbon transition have so far managed to dominate the political narrative while the innovation impulses and new markets created by climate policy have so far not received adequate attention. This narrative will need to be turned from its head on its feet if climate policy is ever to get where it needs to be going.

We consider that a key factor in the framing of the narrative is how commitments are framed.

²⁰ Spedding, Paul, Mehta, Kirtan, Robbins, Nick (2013): Oil & carbon revisited. Value at risk from unburnable reserves. London: HSBC Bank plc.

2 Ways of Defining and Reflection Enhanced Action

2.1 The Quantity-Based Approach Is Arguably Good Policy But Bad Politics

Commitments may in principle be behaviour-based or outcome-based. That is, commitments may refer to what countries are supposed to do or to what they are supposed to achieve. The World Trade Organisation is one example that prescribes desired behaviour rather than desired outcomes. The climate regime has so far been outcome-based, commitments in the Kyoto Protocol have been conceived of in terms of emission targets and there is a widespread sentiment that emission targets for developing countries would also be the most adequate approach to address climate change. This may be called a very “scientific” approach. As climate change is caused by the accumulation of greenhouse gas emissions in the atmosphere, it was concluded that policy should put a cap on emissions and ratchet that cap down over time. And ideally use this cap as a basis for an emission trading system, which would put a price on emissions and thus drive investments and innovation into low-emission alternatives.

However, all political incentives point in the direction of setting weak rather than strong emission targets. There is hardly any country in the world where setting strong emission targets yields political rewards for politicians. To the contrary, emissions are seen as inextricably linked to economic well-being; framing commitments in terms of emission reductions therefore directly triggers the perspective of seeing climate protection as an economic loss. This general tendency is compounded by the political influence of special interest groups who will indeed lose out from shifting economies away from emission-intensive business models.

In addition, it is in fact hardly possible for governments to credibly promise achievement of specific future emission levels as emissions are strongly influenced by factors such as economic and population growth which governments can at best influence indirectly, if at all. Technology choices are in many cases also not under the control of national policy. One of the best examples is the energy efficiency of cars, which is decided on in the headquarters of the production centres, in the USA, Europe, Japan, South Korea and (perhaps) China – all other countries are “takers” of such decisions. These risks are especially pertinent for the rapidly industrialising countries. Rapid industrialisation and urbanisation is in itself a challenge for reducing emissions. In addition, future emission levels are much more difficult to forecast in rapidly growing economies than in less rapidly growing ones.

In addition, turning the Earth’s GHG absorption capacity into a commodity inevitably gives rise to controversy about who should receive what share of this commodity. Quantitative commitments are contentious because they are equivalent to giving countries money – lots of money. Stiglitz notes that, “If emissions were appropriately

restricted, the value of emission rights would be a couple trillion dollars a year – no wonder that there is a squabble over who should get them.”²¹ Countries thus have an incentive to keep their commitments as weak as possible in order to maximise the volume of sellable allowances.

Moreover, the Kyoto approach effectively caps ambition. If a country overachieves its target, this yields no benefit to the atmosphere. Instead, the overachievement yields a surplus of emission allowances, which can be sold to others or banked to offset required emission reductions elsewhere or in the future. Which is exactly what is supposed to happen according to textbook theory, based on an assumption of adequate ambition, but in the real world this system rather serves to lock in insufficient levels of ambition.

The theoretical advantage of quantity commitments, that they provide clarity on the environmental outcome, therefore loses much of its lustre as in practice it has turned out to be near-impossible to set commitments at the level where they would need to be set, or indeed to set any commitments at all.

Finally, it may also be fundamentally sub-optimal to see climate change solely through the lens of emissions because it frames climate change as an environmental problem. But arguably climate change is fundamentally a development problem, not a traditional environmental problem, so the traditional end-of-pipe approach to environmental regulation will arguably not do. Industrialised countries will have to fundamentally redevelop their economies and developing countries will have to develop fundamentally different from how industrialised countries have (mis-)developed.

Unfortunately, in the UNFCCC sustainable development has been relegated to the status of a "co-benefit" that is seen as nice to have but not strictly necessary. Which is fundamentally at odds with the priorities of developing countries, who clearly see development as their fundamental priority and emission reductions as a co-benefit. The climate regime may therefore benefit from turning the priorities around and framing commitments in a way that puts sustainable development benefits front and centre.

2.2 Emission Pricing Is Key But No Silver Bullet

If well designed, emission pricing instruments can be a key instrument to incentive emission reductions. However, they are not a silver bullet as climate-friendly investments are impeded by a variety of non-economic barriers, such as split incentives, e.g. the landlord-tenant problem, risk aversion against new technologies, lack of capacity and information, and others. If prices were the sole determinant of investments, the world would not dispose of gigatonnes of no-regret potential, as analysed by the IEA and others.²² Through its focus on lowest-cost solutions, emission trading also provides only little incentives for new technologies which in their infancy still have

²¹ Stiglitz, Joseph (2010): Overcoming the Copenhagen Failure, 6 January 2010, <http://www.project-syndicate.org/commentary/overcoming-the-copenhagen-failure>, last accessed 2 August 2013; see also Stiglitz, Joseph E. (2006): Making Globalization Work. New York / London: W W Norton & Co.

²² The 2012 World Energy Outlook has a detailed discussion of the barriers that are impeding the mobilisation of the available cost-effective energy efficiency potential.

high costs but may in the longer term become the most cost-effective solutions, as demonstrated by the rapid cost decreases of renewables. Renewables would hardly have come down the learning curve as fast as they have if no dedicated support had been provided.

Emission trading may also be the opposite of efficiency-enhancing if conducted by governments. Arguably, governments' decisions on whether to pursue domestic reductions or purchase emission units from outside will often be based on political considerations of how much effort may be required from affected constituencies rather than on macro-economic calculations.

Furthermore, the ultimate goal of emission trading, to ultimately establish a globally uniform emission price and thus establish a level playing field, may in fact be illusory as the effective price also depends on other taxes and overt and hidden subsidies that are in place. Verbruggen argues that, "Present energy subsidy, levy and tax systems are of such a high diversity and complexity that comparing the systems of two similarly developed countries is already a hell of a job. Smearing over the uneven systems, the uniform layer of a global carbon tax or global price of traded emission permits will not and cannot deliver a levelled playing field for emitters."²³

A globally uniform emission price may also not be as equitable as is generally held to be the case, given the strong divergence in economic capacity and related purchasing power parities among countries. And treating different cases equally is as inequitable as treating similar cases differently.²⁴ Slum dwellers in developing countries may hardly see the equity in paying the same carbon price on their energy use as affluent Western Europeans or North Americans, especially as they typically pay already higher prices per unit of energy as they often lack access to the most affordable forms of energy.

Regarding the Kyoto Protocol more specifically, its basket approach whereby different gases with strongly different global warming properties can be traded off against each other is arguably also a weakness. It suggests an equivalence of greenhouse gases where in fact none exists, allowing relatively easy reductions of short-lived gases to substitute for more difficult reductions of long-lived CO₂. For instance, methane is a very powerful GHG in the short term but the atmospheric concentration is determined by the emissions of the previous 10 years. By contrast, reducing the atmospheric CO₂ concentration is a matter of centuries. The idea of some is that by taking out short-lived forcings one may delay the time until hitting a certain warming threshold such as the 2°C target. However, once the world does hit that threshold it is essentially stuck there. Cumulative carbon is therefore the key determinant of future warming. And most CO₂ emissions are caused by long-lived infrastructure such as power plants, buildings and transport infrastructure, which once in place, cause emissions for decades. Offsetting reductions of CO₂ with other reductions therefore means losing time, not buying time. Climate scientist Raymond Pierrehumbert commented that, "IPCC-style Global Warming Potentials attempt to trade off radiative forcing against lifetime in a

²³ Verbruggen, Aviel (2011): A Turbo Drive for the Global Reduction of Energy-Related CO₂ Emissions. In: 637

²⁴ Ibid.

Procrustean attempt to boil all climate forcings down to a single handy-dandy number that can be used in climate treaties and national legislation. In reality, aerosol-forming emissions, short-lived greenhouse gas emissions, and CO₂ emissions are separate dials, controlling very different aspects of the Earth's climate future. CO₂ emissions play a distinguished role, because they ratchet up the Earth's thermostat. It's a dial you can turn up, but you can't turn it back down. CO₂ is a genie you can't put back in the bottle. Climate forcings should not be aggregated. Each category should be treated in its own right. Otherwise, there are perverse incentives to do too much too soon on short-lived forcings and too little too late on CO₂.”²⁵

2.3 Countries Should Adopt Multi-Dimensional Commitments

The climate regime clearly needs a reference to emissions as these constitute the environmental problem that is supposed to be solved. However, as discussed above the Kyoto approach arguably has several weaknesses. Emission targets should arguably not be tradable and bankable by governments to reduce the incentives to adopt weak commitments and to prevent targets from becoming a cap on ambition. Emission trading should arguably only be pursued at the level of companies, for example in domestic emission trading systems, as companies actually make their trading and investment decisions on the basis of economic rather than political considerations. The Kyoto basket approach should be abandoned, each GHG should be regulated separately.

In addition, emission targets should be complemented by other types of commitments that do not trigger fears of imposing a “cap on development” and that are more in line with what governments can actually deliver: implement policies. We therefore recommend to adopt commitments related to policies and to economic inputs such as energy sources. Addressing inputs will allow to develop approaches that reduce emissions while at the same time promoting sustainable development more generally.

Multi-dimensional commitments, furthermore, reduce the risk of failure of a climate regime if the different components are not perceived as building blocks of one ambitious target but rather prescribe the same emission reductions from various perspectives.

Some analysts argue that the climate regime should shift fully to a policy-based approach such, taking as their model the WTO with its high level of detailed policy coordination.²⁶ However, while such an approach may have much to recommend it, it bears noting that the WTO also started out small, focusing mostly on tariffs, and took half a century to develop to its current status.

Nonetheless, there are key policy levers that recommend themselves for special attention. One is fossil fuel subsidies, which should be phased out by all countries as

²⁵ Pierrehumbert, Raymond: Losing time, not buying time. <http://www.realclimate.org/index.php/archives/2010/12/losing-time-not-buying-time/>, last accessed 21 August 2013.

²⁶ See e.g. Victor, David (2011): Global Warming Gridlock. Creating More Effective Strategies for Protecting the Planet. Cambridge et al.: Cambridge University Press.

soon as possible. As noted above, according to the IEA global fossil fuel subsidies are currently six times the level of support received by renewable energy technologies and 15% of global CO₂ emissions effectively receive an incentive of US\$110 per tonne through fossil-fuel subsidies. Since as noted above the benefits from these subsidies are mostly captured by wealthy households, the social impacts of removing them should be manageable, but will nevertheless require attention. A win-win approach would be to redirect the resources that have so far gone into subsidies into supporting low-income households in upgrading the energy efficiency of their buildings, appliances and transport options.

In addition, governments should incorporate the costs of climate change into all government procurement decisions, in particular investment decisions on long-lived infrastructure. In infrastructure planning in developing countries that is done on behalf of development agencies, the usual method of valuation in feasibility studies is to include damage costs into the shadow pricing procedure. That is, instead of market prices, investment decisions are based on a shadow price that includes all territorial and extraterritorial externalities that will be caused by the investment, as the otherwise neglected external effects have to be paid by the inhabitants of the state. This kind of decision-making should not only apply to developing countries which need the support of international development banks. It should be generally recommended as standard governmental procedure, including in industrialised countries, as the rationale of this procedure does also hold for them. One further benefit would be that negative income effects for society as a whole as result of external effects could be avoided.

Parties should ideally also commit to limiting fossil fuel extraction. As noted above, analysis by the IEA and others suggests that to achieve 2°C at least 2/3 of global fossil fuel reserves will need to be left untouched. But currently the same governments that are trying to reduce fossil fuel use are often at the same time still promoting the maximum possible exploitation of fossil fuel reserves.

As for economic inputs, taking the example of energy-related CO₂ emissions, which account for about 60% of global emissions, these are determined by: size of the population, size of the economy, energy intensity of the economy and CO₂ intensity of energy supply. Economic and population trends are largely beyond the influence of governments and will anyway hardly be made subject of international agreements. Governments should therefore commit to reducing the energy intensity of the economy and reducing the CO₂ intensity of energy provision.²⁷

Taking a multi-dimensional approach to commitments could well build on what is already in place under the UNFCCC. Many developing countries have made their Copenhagen/Cancún pledges in terms of emission intensities and many also aim at low-emission energy provision as part of their pledges. Another example is the EU with its multiple internal targets to reduce emissions and improve energy efficiency by 20% and to expand renewables to 20% by 2020.

²⁷ Verbruggen, Aviel (2011): A Turbo Drive for the Global Reduction of Energy-Related CO₂ Emissions.

Technology scale-up and energy efficiency improvements can be more directly influenced by government action than emissions and may dovetail with countries' and citizens' interests to promote certain technologies and energy security. The German shift to renewables is largely driven by private citizens, based on the enabling environment put in place with the German feed-in tariff. Private citizens account for half of the installed renewable electricity capacity, more than 500 renewable energy cooperatives have been created over the last years and there are now 120 "100% renewable energy regions" all over the country aiming to become independent of fossil fuels.²⁸ In many countries it is not (only) a lack of financial support for renewable energies but other barriers hamper their deployment: Bureaucratic planning processes, restricted access to the grid, non-availability of technologies or lack of capacities are examples for such barriers. Countries should commit to systematically identify barriers to the deployment of low-carbon technologies and develop strategies to remove these.

Multi-dimensional commitments might also often be more ambitious than mere emission commitments. Achieving the EU's renewable and energy efficiency targets would lead to emission reductions of 25% rather than only 20%.²⁹ China may offer a similar example. In addition to lowering its CO₂ emissions per unit of GDP by 40–45% by 2020 compared with the 2005 level, it also pledged to increase the share of non-fossil fuels in primary energy consumption to around 15% by 2020. And according to analysts, the 15% non-fossil energy target is more ambitious than the emission intensity target.³⁰

In addition, experience seems to indicate that overachieving clean energy targets is often seen as a prompt for doing more, while overachieving emission targets is seen as an invitation to rest on one's laurels. For example, the Chinese solar PV target for 2015 was initially set to 5GW and then raised to 10GW, 15GW, 21GW and finally 35GW, with 10GW to be installed in 2013 alone.³¹ In Germany, while at federal level the renewable target in the power system has been left untouched in the post-Fukushima realignment of energy policy, remaining at 35% in 2020 and 50% in 2030, the federal states (*Länder*) have developed ambitions far beyond, which has resulted in aims (and probable developments) of 40% in 2020 and 72% in 2030. We experience here a dynamic competition between "member states" in the multilevel state Germany. The same has to be allowed to unfold at UN level.

²⁸ Energiegenossenschaften investieren 800 Millionen Euro in Energiewende, <http://www.solarwirtschaft.de/presse-mediathek/pressemeldungen/pressemeldungen-im-detail/news/energiegenossenschaften-investieren-800-millionen-euro-in-energiewende.html>; 100ee-Map: 100%-EE-Regionen, <http://www.100-ee.de/index.php?id=100eemap>, last accessed 25 June 2013.

²⁹ European Commission (2011): Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions. A Roadmap for moving to a competitive low carbon economy in 2050. Brussels, 8.3.2011 COM(2011) 112 final.

³⁰ China – Developing countries – Climate Action Tracker, <http://climateactiontracker.org/countries/china.html>, last accessed 24 June 2013.

³¹ Parkinson, Giles (2013): Solar Insights: China lifts PV target to 35GW. <http://reneweconomy.com.au/2013/solar-insights-china-lifts-pv-target-to-35gw-10104>, last accessed 25 June 2013.

Another example of escalating targets is Denmark, which will oblige its energy network or distribution companies to save 2.4 per cent of final energy each year from 2015 onwards.

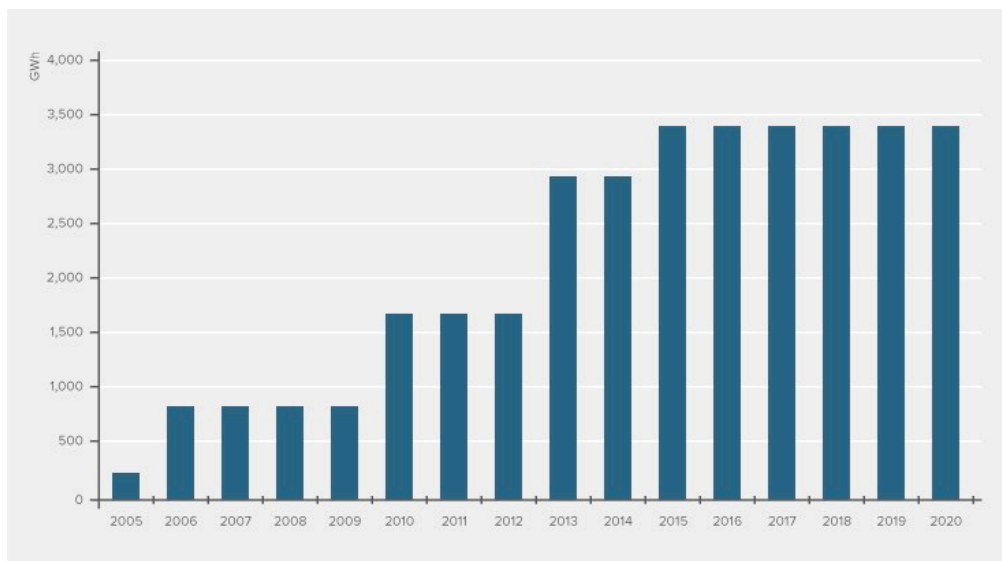


Figure 3: Development of Danish energy-saving targets of energy network or distribution companies from 2005 (electricity only) to 2020 (electricity, gas, district heat and heating oil)³²

The strongest mobilisation of political support might be achieved by framing commitments as a joint international undertaking to provide universal access to sustainable energy services by a specific date, as such an undertaking would be fully aligned with the aspirations of many governments and people.³³

Evaluation of the experience from implementing concrete actions based on systematic monitoring should contribute to shifting opinions about the feasibility of climate protection and thus allow knowledge-based adoption of ever more ambitious commitments step by step.

2.4 Commitments Need to Give Clear Short-Term and Long-Term Directions

2.4.1 Short-Term Direction: Regular Review and Re-Negotiation

Commitments should be reviewed regularly after they have been adopted. The 2015 agreement may well not fully complete the task of setting the world on a 2°C pathway. In addition, given the rapidly declining costs of renewable energy technologies, the world in 2020 may look very different from the world in 2015. At the same time, the findings from climate science are becoming ever more alarming by the year.

³² Source: Ea Energianalyse, NIRAS and Viegand & Maagøe (2012): Evaluering af energiselskabernes energispareaktiviteter (in Danish). www.bigeee.net/s/chuz82, last accessed 24 June 2013.

³³ Moomaw, William; Papa, Mihaela (2012): "Creating a mutual gains climate regime through universal clean energy services", in: *Climate Policy*, Vol. 12, No. 4, pp. 505-520.

International climate policy therefore needs to be designed so as to be able to react flexibly to new opportunities and new scientific findings. The agreement should therefore include regular reviews of ambition levels.

However, the history of the UNFCCC suggests that reviews are only taken seriously if they are coupled with the expiration dates of commitments. The review of adequacy foreseen in Art. 9 UNFCCC has so far been an empty shell.

Therefore, commitment periods should not be longer than five years as in the first Kyoto period. Lengthening commitment periods could lock the world into a long-term trajectory not compatible with preventing dangerous climate change. Moreover, five years is compatible with the time horizon of most policy-makers. Commitments that are due longer into the future are quickly seen as somebody else's problem.

In addition, countries should have the opportunity to strengthen their commitments at any time without needing the approval of other Parties.

2.4.2 Giving Long-Term Directions

In addition to clear directions for the short term, the climate regime should also provide long-term certainty for investments. A substantial part of emissions stems from long-lived infrastructure, such power plants, buildings and transport infrastructure. Once built, this infrastructure will stay in place for decades. To give proper direction to these investments, Parties should agree to a long-term goal of reducing net global emissions to zero by 2050. This high level of ambition will probably be necessary to compensate for the probable shortfall of ambition in the current decade. The less stringent trajectories that are usually cited include a peak of global emissions by 2020, which does, however, currently not seem to be in sight.

Just as emission targets, other types of commitments should ideally be oriented on the global scale of transformation that is necessary. The current pace of climate science and climate change itself are leaving behind not only climate policy but also energy scenario research. Although existing global energy scenarios have ambitious targets, none of them show a pathway to achieve a reduction of global GHG emissions to zero by 2050. Much greater efforts will therefore probably be necessary than scheduled in the existing world energy scenarios. Thus, the following figures are for the time being indicative illustrations and assumptions of the scale of transformation that would be needed to meet the 2°C target based on achieving an 80% reduction of global emissions by 2050:

- Aim to improve global average primary energy intensity by at least 3% per year until 2050.³⁴

³⁴ The "Sustainable Energy for All" initiative aims at an annual improvement of 2.6% by 2030 (Sustainable Energy for All. Global Tracking Framework. Executive Summary). The Global Energy Assessment considers annual improvements of 2.5% for industrialised countries and 3.1% for developing countries (GEA 2012: Global Energy Assessment. Toward a Sustainable Future. Cambridge et al.: Cambridge University Press). The energy [r]evolution scenario considers an average annual change in final energy intensity in 2009-2050 of 2.9% and an average annual change in primary energy intensity of 3.1% (Teske et al. 2012: energy [r]evolution. A Sustainable World Energy Outlook. Greenpeace/EREC/GWEC). China currently aims at an energy-intensity reduction of 16% in 5 years according to its current Five-Year-Plan, which is equivalent to reducing energy intensity by 3.4% per

- Aim to reduce global per capita final energy demand at least by 5% in 2020, by 10% in 2030 and by 20 to 25% in 2050.³⁵
- A long-term goal should be set to obtain the entire global energy supply from renewable sources. The following mid-term assumptions could help to promote this development:
 - The share of renewable energy in final energy demand (around 18% in 2010) should increase to 30% by 2020 and minimum 45% by 2030.³⁶
 - The share of renewable energy in power supply should increase from currently 22% to about 40% in 2020 and 60% in 2030.³⁷
 - Global installed electricity generation capacity from renewable energy should increase from currently 1,500 GW to at least 3,500 GW by 2020 and 7,000 GW by 2030.³⁸
- Public funding by developed countries for energy research, development and demonstration should at least triple from its current level of about US\$15 billion per year.³⁹
- The goal set by the “Sustainable Energy for All” initiative to secure access to modern energy services for everyone by 2030 should be vigorously pursued.

As regards the feasibility of meeting such targets, the growth of renewable energy use in Germany is one example where developments have repeatedly outperformed even optimistic assumptions. For example, the target of reaching a renewables share of 12.5% in electricity supply in 2010 was already reached in 2007.⁴⁰ But it does indeed seem likely that the potential of technology alone to achieve the necessary reductions will be insufficient and will therefore have to be accompanied by more fundamental changes in the patterns of production and consumption, particularly by the wealthy among the world's population.

2.5 Parties' Commitments Should Constitute Fair Shares of the Global Effort

Ideally, Parties should agree on common equity criteria for determining fair shares and use these to determine their commitments. If this is not possible, countries should as a minimum include a justification of why their level of effort is in line with their respective responsibility and capability when submitting their draft commitments.

year. For the European Union, the technical energy efficiency potential would allow an improvement in primary energy intensity of 3.6% per year by 2050 (Bossmann, Tobias, Wolfgang Eichhammer, Rainer Elstrand 2012: Contribution of Energy Efficiency Measures to Climate Protection within the European Union until 2050. Policy Report. Berlin: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)).

³⁵ The Global Energy Assessment considers -7% by 2020, -15% by 2030 and -18% by 2050. The energy [r]evolution scenario considers stabilisation by 2020, -9% by 2030 and -25% by 2050.

³⁶ The “Sustainable Energy for All” initiative aims at a doubling of the 2010 share by 2030. The energy [r]evolution scenario considers shares of RE in FE of 28% in 2020 and 45% in 2030.

³⁷ The energy [r]evolution scenario considers an increase of the share of RE in electricity generation of 37% in 2020 and 61% in 2030.

³⁸ The energy [r]evolution scenario considers 3,724 GW in 2020 and 7,392 GW in 2030.

³⁹ IEA (2013): Tracking Clean Energy Progress 2013. IEA Input to the Clean Energy Ministerial. Paris: OECD/IEA. http://www.iea.org/publications/freepublications/publication/TCEP_web.pdf#page=126, last accessed 28 August 2013.

⁴⁰ Umweltbundesamt (German Federal Environment Agency) (2009): Daten zur Umwelt. Erneuerbare Energien. <http://www.umweltbundesamt-umwelt-deutschland.de/umweltdaten/public/theme.do?nodeId=2322>, last accessed 30 August 2013.

The results of the “South-North Dialogue”, which the Wuppertal Institute conducted in 2003-2006 with partners from 12 developed and developing countries, may be of interest in this regard. The outcome of the Dialogue was the “South-North Proposal” for how to differentiate among countries.⁴¹ In this proposal, differentiation is based on the following principles and indicators:

Responsibility as a reflection of a Party’s contribution to the climate problem through historic and ongoing GHG emissions

Indicators: Cumulative CO₂-emissions per person since 1990. 1990 was chosen as it was the year of the first IPCC assessment report, which can be taken as the date from which policy should have tackled climate change as a matter of urgency.

Capability as a reflection of a Party’s financial and socio-economic strength to help overcome the climate problem

Indicators: GDP per person on a power-purchasing parity basis and Human Development Index rating

Potential as a reflection of the mitigative opportunities within a Party’s economy to reduce or limit GHG emissions

Indicators: Emission intensity (CO₂ / GDP), GHG per capita and growth of emissions since 1990.

The South-North proposal suggests three decision rules on this basis:

<i>Potential to mitigate</i>		
High potential	→	High domestic reductions
Medium potential	→	Limitation of domestic emissions
<i>Responsibility to mitigate</i>		
High responsibility	→	Binding absolute reduction target
Medium responsibility	→	Quantitative commitments only binding if all ‘high responsibility’ countries take on commitments and conditional on transfer of adequate financial and technological resources
Low responsibility	→	Optional/voluntary mitigation commitments
<i>Capability to mitigate</i>		
High capability	→	Financial transfers for mitigation activities to ‘low/medium capability’ countries
Medium capability	→	Co-sharing: mitigation partly funded by ‘high capability’ countries
Low capability	→	All mitigation activities funded by ‘high capability’ countries

⁴¹ South-North Dialogue: Equity in the Greenhouse. <http://wupperinst.org/en/projects/details/wi/p/s/pd/45/>, last accessed 25 June 2013.

3 Climate Mainstreaming and Outreach

To actually achieve the necessary reductions, climate protection needs to become full part and parcel of all government decisions. Making commitments multi-dimensional as suggested above, by inviting countries to make sector- and technology specific commitments and to adopt shadow pricing in investment decisions, could in our view strongly contribute to mainstreaming climate change in other policy areas.

In addition, all countries, with possible exceptions for Least Developed Countries and other poor countries to be identified on the basis of equity criteria such as those discussed above, should commit to adopting **comprehensive zero-emission development strategies (ZEDS)** covering all sectors by 2017, with updates at least two years prior to the start of each new commitment period. To ensure that the ZEDS have a sufficiently transformative level of ambition, they should be submitted to an international review.

- ZEDS should be grounded in a strategic vision to reduce net emissions to zero by 2050, including by identifying barriers to the deployment of low-emission solutions and developing measures to overcome these.
- ZEDS should reflect the individual challenges with regards to the respective countries development.
- ZEDS should both lay out the necessary efforts as well as the developmental yields of the transition.
- ZEDS should be organised by sectors and subdivided by greenhouse gas.
- The ZEDS should set out a credible pathway to comply with commitments through mitigation actions that cover all sectors. This pathway should cover both medium-term goals, including the commitments for the next commitment period or periods as agreed in the 2015 agreement, as well as the long-term goal to reduce emissions to zero by 2050.
- Draft ZEDS for the period 2020-2025 should be submitted by the end of 2017 at the latest.

The process for reviewing draft ZEDS could build on the procedures already in place for International Assessment and Review (IAR) and International Consultation and Analysis (ICA).

- Where the review process finds that a ZEDS is not in line with meeting the global long-term target, the analysis should explore options to raise the level of ambition of the ZEDS.

- The Conference of the Parties should constructively review the results of the analysis and may decide to request countries to revise their ZEDS to ensure that they are consistent with meeting the global long-term target.

The implementation of ZEDS should be reported on regularly in the national communications and biennial reports/biennial update reports and also be reviewed in the IAR/ICA processes or their future replacements. ZEDS reporting should contain an obligatory assessment of long-term impacts, including environmental and social integrity. Focusing attention and effort on the broader ZEDS context and long-term impacts would promote interlinkages with other policies /instruments in the countries.

To achieve societal mainstreaming, Parties could explore the possibility of inviting **non-state actors** to make their own pledges under the 2015 agreement or in a parallel document or register. The spotlight afforded by such an approach might strongly contribute to receiving ambitious pledges and promoting subsequent implementation. Such non-state actions could also be regularly reviewed under the UNFCCC to check implementation and the potential for scaling up.

Parties might also explore the possibility of fast-tracking such pledges for support from the Green Climate Fund or from domestic resources. Such an approach may be especially effective if coupled with sourcing international revenues for the GCF, such as emissions trading or levies on international aviation and shipping. According to the UN Secretary-General's High-Level Advisory Group on Climate Financing (AGF), 2°C-compatible pricing instrument for international aviation and shipping could yield dozens of billions of dollars of new revenues (see also next section).

However, such actions by non-state actors cannot be a substitute for ambitious government action, as all of these actions will count towards national commitments. Rather, they should be seen as a means to fast-track action and give additional momentum to implementation, hopefully leading to overachievement and subsequent strengthening of government commitments in the course of the international review process.

4 Means of Implementation: The Climate Regime Should Be Made Self-Financing

Industrialised countries have so far pledged to scale up climate finance to US\$100 billion annually by 2020. The 2015 agreement will therefore need to contain commitments for the time after 2020. These commitments should be in line with scientific estimates of developing country needs related to achieving the ultimate objective of the Convention and related to adapting to the impacts of climate change and to address loss and damage.

Ideally, the climate regime should be made self-financing through emission pricing instruments. According to analysis by the AGF, the revenue potential from these sources is substantial. Table 1 below summarizes the public revenues that according to the AGF could be derived from auctioning of emissions allowances in industrialised countries, levies on offsets and putting a carbon price and international shipping and aviation.

Public Sources	Revenue Potential (billion US\$)		
	10-15	20-25	50
CO₂ Price (US\$/t CO₂-eq.)			
Auctioning of allowances (2-10% of estimated auctioning revenues dedicated to international climate finance)	2-8	8-38	14-70
Levies on offsets (levy of 2-10% of offset transactions)	0-1	1-5	3-15
International maritime transport (no net incidence on developing countries, 25-50% dedicated to international climate finance)	2-6	4-9	8-19
International aviation (no net incidence on developing countries, 25-50% dedicated to international climate finance)	1-2	2-3	3-6

Table 1: Potential Public Revenues from Carbon Market-Related Sources According to the AGF⁴²

Looking at the AGF assessment, it is noteworthy that the underlying assumptions are rather conservative. The AGF focuses its analysis on the medium-range carbon price (US\$20-25/t CO₂-eq.), which is not in line with achieving the 2°C target, and it assumes that only relatively low shares of revenues from carbon markets could be dedicated to international climate finance. If one assumes that mitigation commitments will hopefully at some point be brought in line with the 2°C target, which according to the AGF would lead to a carbon price of about US\$50, and that revenues from international sources, in particular carbon-related sources in international transport, could be fully dedicated to climate finance, mobilizing US\$100 billion and more does in fact appear as eminently viable. International aviation and shipping alone could provide as much as half of this amount and only a relatively minor share of 7% of the revenues of auctioning allowances in industrialized countries would be needed for the other half.

In addition, climate change needs to be mainstreamed into all public finance flows, including official development assistance, export promotion etc.

⁴² Adapted from Sterk, Wolfgang; Luhmann, Hans-Jochen; Mersmann, Florian (2011): How much is 100 billion US Dollars? Climate finance between adequacy and creative accounting. Berlin: Friedrich-Ebert-Stiftung. <http://library.fes.de/pdf-files/iez/08158.pdf>, last accessed 24 June 2013.

5 Transparency and Accountability: Parties Should Agree to Common Emissions Accounting

Common accounting is a crucial ingredient for the 2015 agreement. The Copenhagen/Cancún pledges are characterised by a high level of uncertainty, the UNEP Emissions Gap Report therefore has no less than four scenarios of where global emissions might end up in 2020, based on different interpretations of the pledges. In addition, having a clear picture of how emissions are developing and what drives them is a core precondition for being able to develop appropriate mitigation actions.

Therefore, all countries above a certain level of responsibility and capability as defined according to indicators such as those discussed above should agree to common emissions accounting based on the rules of the Kyoto Protocol.

From a political science perspective, compliance with commitments is mostly determined by a cost-benefit calculation to what extent meeting the commitment is seen as in the national interest and what would be the consequences of non-compliance, including consequences inside and outside the agreement. Taking a multi-dimensional approach to commitments, as suggested in response to questions 1 and 2, should contribute to countries seeing compliance as in their own interest. As for costs of non-compliance, no recalcitrant country will be dissuaded if even the purported champions of an agreement do not take steps to defend it where necessary. Canada was able to walk away from the Kyoto Protocol with impunity, there is no indication that other countries tried to exact any kind of price from Canada.

Compliance could also be promoted by constituting strong privileges that would only be open to complying countries. One possible venue could be to establish a strong plank of international technology cooperation.

6 The Negotiation Process Needs Focus and High-Level Attention

One reason for the failure of the Copenhagen summit was maybe that the undertaking was too broad, trying to simultaneously develop new architectures for mitigation, adaptation, finance, technology cooperation and capacity building. However, these architectures have subsequently been put in place through the Cancún and following agreements. There is now a bevy of new institutions which can be built on: the Green Climate Fund, the Standing Committee on Finance, the Technology Executive

Committee, the Climate Technology Centre and Network (CTCN), the Adaptation Committee and the Adaptation Framework.

The task for the 2015 agreement could arguably be made easier by limiting it from the outset to **top-level items** and delegating implementation details to COP decisions. The key top-level items are in our view commitments on mitigation, adaptation and finance as well as common accounting.

The negotiation process would probably benefit substantially if **majority voting** was introduced as per the draft rules of procedure. As long as all decisions have to be taken by consensus, countries that actually have no interest in ambitious climate protection may veto all advances.

The 2015 process should define **clear milestones** to be achieved at the 2013 and 2014 COPs. Draft commitments should be put on the table by countries in 2014 already in order to allow review by the international community and subsequent strengthening in case the initial offers fall short of the required level of ambition.

Political leaders should be involved much more closely than so far and much earlier than in the Copenhagen process. Climate policy is effectively economic policy with strong distributional impacts. These impacts need to be judged by heads of state and government. Delegates will not be able to work out the high-level items if they do not have high-level guidance as a basis. At the same time, heads of state and government should not be involved in the minutiae of the negotiations. The world leaders' summit UN Secretary-General Ban-Ki Moon will convene in 2014 may provide a good format for giving high-level guidance but without getting bogged down in details. Another such summit should be held in 2015 to give further guidance for the final shape of the agreement.

The negotiations could also benefit from **stronger involvement of stakeholders**, who so far play only a marginal role. A possible model is provided by FAO's Committee on World Food Security, the world's highest-level body on global food security policy, where constituencies have essentially equal standing to Parties, excepting the right to vote but including the right to intervene, join breakout discussions, and submit and present documents and formal proposals.

7 Interested Parties Should Jointly Pursue Focused Sector-Specific Initiatives

In addition to the common agreement, individual countries should be encouraged to take up other sector-specific initiatives with other countries which share common interests. One possible starting point for forming such initiatives might be the multi-dimensional commitments we recommend to adopt. For example, countries that adopt ambitious commitments to scale up renewables may find it in their common interest to collaborate

in achieving these commitments. The World Resources Institute in a recent paper proposed some characteristics such “clubs” should have to actually provide added value: Notably, an ambitious vision, limiting membership to countries that actually share that vision, providing significant real benefits to members and a pathway to start quickly and scale up over time.⁴³

⁴³ Two Degrees Clubs: How Small Groups Of Countries Can Make A Big Difference On Climate Change, <http://insights.wri.org/news/2012/10/two-degrees-clubs-how-small-groups-countries-can-make-big-difference-climate-change>.