

The 2°max Climate Strategy – A Memorandum

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Abstract

If the European Union is to succeed with its global climate protection objectives, a more effective and more just climate protection strategy needs to be developed and implemented quickly. This is the context of the *2°max climate strategy* that is based on the “budget approach” of the German Advisory Council on Global Change (WBGU, 2009; Messner et al., 2010) and contains a number of specific implementation components:

- A fixed, global emissions limit compatible with the 2°C guard rail, beginning with a global emissions peak in this decade, stabilization phase and ensuing stepwise emissions reduction.
- Allocation principle “one human - one emissions right”: initial equal per capita allocation to enable active participation of developing countries with incentives for low carbon development and financial benefits through the sale of unused emission allowances.
- A global price for carbon dioxide (CO₂) by means of a “*peak and trade*” *emissions trading scheme* targeting upstream carbon sources. As a result, a level playing field for CO₂ emissions is established with widespread incentives for low carbon development.
- Integrated support and redistribution mechanisms to advance sustainable development and to eliminate poverty while at the same time avoiding an over-burdening of industrialized countries and the world economy as a whole.

The failure of the Copenhagen negotiations and the dim prospects for Cancún can also be an opportunity to refocus efforts on the development of a global climate protection system that can deliver in order to realize the climate targets set at the highest political level.

Keywords: cap-and-trade; burden sharing; equity; global carbon market; world climate bank

Copenhagen Accord: Basis for a New 2°max Climate Strategy

The failure of the Copenhagen negotiations to lay out a roadmap for global climate stabilization along with defining policy instruments for goal achievement is regrettable. Yet the conference might also be a starting point for an effective and fairer climate protection architecture that incorporates sustainability principles (see Schnellhuber et al., 2010). In particular, the Copenhagen Accord contains some key elements whose implementation could form the basis of a more promising strategy in international climate policy. Among these elements are the acceptance of the 2 degree guard rail for global mean temperature increase, the speedy attainment of the global emissions peak, the provision of adequate and reliable financial resources by the developed countries, cost effectiveness in climate protection, the recognition of the equity principle as a basis for cooperation and the target of the industrialized countries to collectively mobilize 100 billion dollars for climate protection in developing countries as of 2020. These are also the starting points and the frame of reference for the 2°max climate strategy approach, which was presented in 2010 (see Wicke, Schellnhuber, Klingenfeld, 2010a and 2010b for a comprehensive account) and whose key elements will be put up for discussion in a concise format.

Structural Shortcomings of the Existing Climate Protection Regime

In the period between 1990 and 2010 global energy-related CO₂ emissions are expected to have increased by 37%, from 20.9 to 28.6 billion tons annually (International Energy Agency, 2009), clearly overwhelming all mitigation efforts to date. Even if the – legally non binding – pledges of several major countries announced in the context of the Copenhagen Accord will be realized, total greenhouse gas emissions are projected to increase to almost 70 billion tons per year by 2050 (www.climateactiontracker.org, November 2010). In order to keep within the limits of the 2°C guard rail, however, emissions would need to decline to 20 billion tons, with an emissions peak occurring before 2020 (*ibid.*). Latest scientific research (see The Copenhagen Diagnosis, 2009) has only amplified the urgency to act in order to counter the long-term risks of

unchecked climate change. For the beginning decade, the overriding climate policy objective from a global perspective thus becomes to develop and implement appropriate policy instruments to bring global emissions growth to a halt and to then reverse the trend that has persisted since the beginning of Industrialization.

Five major constructional flaws in the existing international climate regime can be identified that need to be overcome to enable a timely response to the challenge of global climate change:

1. The current global climate protection regime embodied by the Kyoto Protocol and the Copenhagen Accord is based on individually negotiated, national self-commitments for emissions reductions. The German Advisory Council on Global Change (WBGU) likened the current pattern of international climate negotiations to a “*climate bazaar*” that is leading into a dead end (WBGU, 2009). Indeed, without an aggregate view on *global* targets and a deductive approach to burden sharing, this type of negotiation cannot create the necessary link to the two climate targets aimed at on a global scale: reaching the global emissions peak before 2020 and halving emissions by 2050 in comparison to 1990.
2. Another critical shortcoming of the international climate regime is the lack of equity principles in allocating obligations for mitigation: on the one hand, the almost unchecked use of the Earth’s atmosphere as a free greenhouse gas landfill is contributing to a destabilization of the climate system. With significantly higher per-capita emissions industrialized countries keep contributing disproportionately to this development. On the other hand, the problematic “logic” of the current global system for climate protection still lies in the fact that the efforts of emissions reductions by industrialized countries and future limits for developing and emerging economies are geared to specific reference years that do not adequately reflect varying contributions to the problem and capacities in addressing it (see Müller et al., 2010).
3. The almost exclusive reliance on national pledges for future emissions reductions is another serious weakness: without agreeing on clearly defined policy *instruments* with which the targets set can actually be met, goal achievement is far from being assured and can only be verified conclusively at the end of a specific commitment period. Since international enforcement is structurally weak (see Aldy et al., 2003), international agreements on

emissions targets without corresponding institutional arrangements and specific policy instruments are subject to implementation uncertainty and are likely to lead to inadequate results.

4. Another disadvantage of the current global system for climate protection is the lack of incentives for countries, companies and consumers to engage in further-reaching climate protection measures beyond the relatively modest targets for Annex I countries which cover only a fraction of global emissions. Flexible, market-oriented instruments included in the Kyoto Protocol (CDM, JI) and the European Emissions Trading System primarily ensure that the targeted emissions reductions can be met at lower costs, without providing additional climate protection incentives in the context of the so far first and maybe only commitment period running from 2008 to 2012.
5. A further constructional flaw is the fact that in an open system with emissions mitigation incentives for only some regions, greenhouse gas reduction efforts can lead to leakage effects. Under certain conditions, fossil fuel suppliers even have an incentive to act strategically by increasing extraction (Sinn, 2008; Edenhofer and Kalkuhl, 2009). The unintended consequence could be more emissions in a world with highly fragmented climate policies.

The 2°max Climate Strategy: a Viable and Efficient ‘Peak and Trade’ Concept

A coalition of pioneers to lead the way to a global market

The 2°max strategy aims to overcome the structural shortcomings of the current climate protection system described above and to combine appropriate emissions limits from a climate-physical perspective with implementation devices that offer an operationalization of the principle of “common but differentiated responsibilities” (Article 2 UNFCCC, 1992).

Despite its ultimate objective of establishing a truly global emissions cap and a global carbon market, the 2°max climate strategy is not a thought experiment anchored in a purely theoretical first-best setting without a link to actual negotiation dynamics. On the contrary, the strategy lays

out practical ways to reconcile climate policy interests in developing and developed countries while taking the elements of the Copenhagen Accord as a starting point.

Nevertheless, it is likely that the failure of the U.S. Senate to pass national climate legislation has dealt a final blow to the near-term prospects for a comprehensive international climate agreement. Besides, structural opposition of fossil fuel-exporting countries to ambitious global emissions limits may be an even more permanent roadblock. However, the architecture proposed can be built up gradually if a coalition of pioneering states moves ahead: the European Union, Japan and the BASIC countries, particularly the three heavyweights China, India, and Brazil, could become a powerful nucleus for an effective global climate protection strategy that can deliver. While carbon leakage as well as inadequate global emissions mitigation due to incomplete coverage would remain as major challenges, the incentives for free-riders can be lowered by means of strategic trade measures in the form of border tax adjustments, whose implementation may be necessary in a transitional period (see for example Mattoo et al., 2009; Lessmann et al., 2009). In addition, technology cooperation could raise the benefits of cooperation and induce other countries to join an emerging global regime over time (see Lessmann et al., 2010). Therefore, the comprehensive approach described in the following charts the course for global action and sketches a goal for global climate policy development in this decade. A coalition of cooperating states that lays the foundation for establishing the necessary institutions and that tackles the question of burden sharing among countries with unequal development profiles may, in fact, be the most promising way to move forward.

Focus on a global emissions peak in 2015

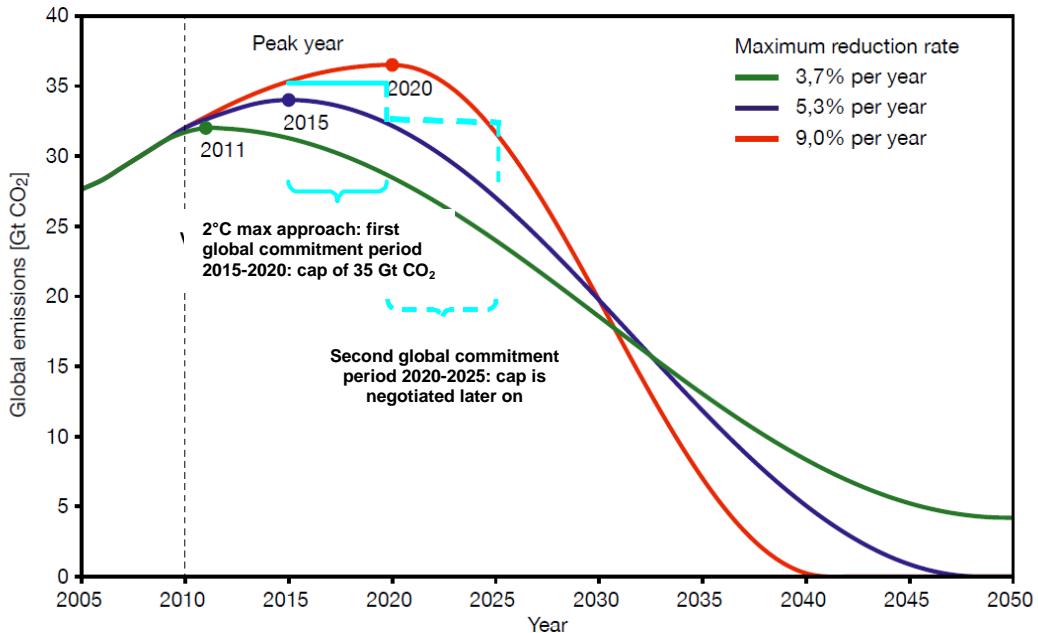
An implementation strategy consistent with the politically accepted 2°C guard rail (WBGU, 1995; 2006; 2008) requires that a balance is struck between oftentimes conflicting national interests. In this context, the following six prerequisites appear necessary: (1) There should be *no national* limits but a *global* emissions constraint (or initially a common cap for a coalition of pioneers). (2) The crucial *initial global limit* should be chosen as a peak in such a way that possible economic disruptions can be kept at a minimum. (3) An *incentive system with global reach* has to be created that prevents an overburdening of citizens and the global economy. (4) The active, climate-friendly participation in the 2°max climate system must be *economically*

attractive for the majority of countries, especially in the developing world where most of the emissions increases would otherwise occur. (5) The industrialized countries as main financial contributors must have assurance that the new climate architecture can *tackle emissions globally, minimizes climate damages* in the long run and leaves them and all other nations *as much emissions leeway as possible through global reduction incentives.* (6) Last but not least, the *costs* of the 2°max system have to *remain affordable* for the industrialized countries and could be geared to the already envisioned transfer payments for climate protection, as stipulated under the Copenhagen Accord.

Reaching the global emissions peak clearly before the year 2020 and halving global emissions by the year 2050 as compared to the reference year 1990 (IPCC, 2007) are the benchmarks for the climate policy targets of the 2°max climate concept. In the near term, a global emissions limit for CO₂ should be set that imposes a gradually increasing constraint. The global emissions trading scheme required for implementation can be called “peak and trade” system – a modification of the term cap and trade emphasizing the targeted turnaround in *global* carbon dioxide emissions. The year 2015 is a timely start date of the system with a proposed global emissions cap set at 35 billion tons CO₂. From 2015 on, this annual global maximum amount is equally distributed among the global population of 6.9 billion people in the base year 2010, equating to 5.1 tons of CO₂ per capita. 35 billion climate certificates for the emission of one ton of CO₂ each would be issued every year for the duration of a first compliance period of five years until 2020, after which the global cap would be lowered.

Besides the global peak and a long-term emissions objective for reaching the 2°C climate target, further quantified reductions of the global emissions limit would have to be negotiated every 5 years (see also Article 12 of the Copenhagen Accord). The following figure illustrates the cap for the first global trading period between 2015 and 2020 and exemplarily outlines the reduction of the cap for the years 2020 to 2025. Based on this, further emissions reductions have to be very ambitious in order to achieve compliance with the 2°C guard rail, as the curves for a 750 Gt CO₂ emissions budget depicted in figure 1 indicate.

Figure 1: Peak-and-trade emissions limits to remain within the 2°C guard rail



Source: modified from WBGU, 2009, p. 16

Explanation: The three depicted emissions trajectories until 2050 correspond to a residual global carbon dioxide budget of 750 Gt CO₂ that holds a 67% probability of achieving compliance with the 2°C guard rail. The differences in slope relate to different peaking years.

More equity with “one human – one emissions right”

The 2°max climate strategy banks on more equity in global climate protection by means of an initial equal-per-capita allocation of emissions allowances. Although this distributional principle can only be an approximation for equity (see for example WBGU, 2009; Wicke, 2005), an equal distribution of emissions rights among all people based on the democratic principle “one human – one emissions right” at least offers the possibility to overcome the inequity gap of the current system and to include, most notably, developing countries in the trading scheme. In fact, countries with below-average per-capita emissions will turn into important partners in climate protection (see WBGU, 2009; Messner et al., 2010). These countries can sell surplus emissions rights to countries with higher per-capita emissions and receive significant sums for low-carbon development.

However, there are several developing and newly industrialized countries, such as Mexico, South Africa, Algeria and, crucially, China, that will already have surpassed the per-capita emissions limit by 2015 and would thus be required to purchase emissions allowances. Given the development status of these countries, the allocation principle should be modified: for a

transitional period, that is the first and if necessary the second 5-year period until 2020 or 2025, a transitional per-capita limit should apply that would result from a growth target expressed as “business as usual” development minus x percent as of 2015 (refer to the proposal by Frankel, 2008). The effective allocation could be brought in line with the voluntary pledges already made by some countries. China for example announced to almost halve its emissions per unit of GDP by 2020 compared with 2005 levels, which could serve as its baseline under the proposed scheme. Only if the modified per-capita limit is surpassed, countries would have to purchase further climate certificates while strong incentives for climate-friendly development are created. In addition, by integrating higher-emitting developing countries in the global emissions trading system, this would avert the risk of carbon leakage to these countries.

A global price for CO₂ emissions and limitations on transfer payments

The free of charge per-capita distribution of climate certificates based on the population of each country would result in significant global imbalances in terms of demand and supply of emissions certificates, due to large differences in actual per-capita emissions. These differences are to be balanced by means of a global emissions trading system. The resulting global price for CO₂ emissions ensures a level playing field worldwide and provides strong incentives for climate-friendly development on a global scale, including the developing world.

However, without additional mechanisms, the market imbalances created by the allocation scheme would possibly lead to strongly fluctuating certificate prices, which could unsettle the global economy. Risks include a difficult adjustment of supply and demand, hoarding or withholding of surplus certificates in order to obtain more adequate prices from the surplus countries’ point of view.

The problems described can be avoided by creating two partially regulated certificate markets (Wicke, 2005; Wicke and Dürr-Pucher, 2006). On the so-called transfer market between the countries operated by a neutral World Climate Bank (detailed later) a balance must be created between the interests of developing countries (high transfer earnings) and of industrialized countries (tolerable transfer costs). To this end, the so-called “transfer price”, that is the price that developing countries receive from industrialized countries per certificate sold, should be negotiated politically and fixed for a period of several years. If the transfer payment

offers of 100 billion US\$ per year (beginning in 2020) made by the industrialized countries in the Copenhagen Accord are considered, this could result in a transfer price of 5 to 15 US\$ per certificate – depending on the outcome of the negotiations. Next to the transfer market among countries as primary burden sharing mechanism, the quantified emissions limit would be implemented through a common fuel certificate market creating a level playing field for all companies under the cap, irrespective of the country they operate in.

An efficient fuel certificate market with a safety valve

The 2°max climate strategy is based on the fuel certificate system proposed by the German Advisory Council on the Environment (see SRU, 2002 and 2008), which sets the point of regulation upstream on the first level of trading, i.e. at the level of the producers and importers of fossil fuels. A major advantage of such a setup is the relatively small number of regulated entities leading to reduced administrative complexity and lower transaction costs. Particularly in view of global application of such a system also in developing countries, this setup is superior to other, more regulatory-intensive approaches, like the European Union Emissions Trading Scheme with its downstream focus. In addition, comprehensive emissions coverage and a uniform price signal trigger numerous search processes both on the supply and demand sides for energy across all economic sectors in order to minimize compliance cost.

However, the intended global price increase for fossil fuels and its secondary products and services could cause tangible social problems especially in developing countries where energy costs constitute a high percentage of income. These adverse effects can be compensated by payments on a per-capita basis financed with the receipts from domestic auctions of the fuel certificates received free of charge as well as by means of the net transfer payments from industrialized countries (for a discussion of the possible role of auctions on the global level, see Klingenberg, 2010).

Given a fixed emissions cap, the uncertainty as to certificate prices on the company-level market may, depending on factors, such as economic growth and the relative ease or difficulty in substituting away from fossil energy sources, present the risk for sharply increasing certificate prices with detrimental effects on the global economy. A so-called safety valve

(proposed for example by Aldy, Orszag and Stiglitz, 2001) could be negotiated at which additional emissions certificates would be made available.

The importance of institutions: a World Climate Bank as coordinating agency

The upstream focus of the carbon market facilitates global applicability and effective monitoring, while keeping complexity manageable. Nevertheless, an appropriate institutional framework is required to implement the system described. The creation of a so-called World Climate Bank as principal coordination device among countries is proposed as its cornerstone.

A politically neutral “World Climate Bank” (for similar concepts see Wicke, 2005; WBGU, 2009; Edenhofer et al., 2009; Klingensfeld, 2010) and a system of national implementing agencies would assume a number of critical functions in order to enable the global carbon market. Its statutory tasks include overseeing the allowance distribution among all participating countries and coordinating the allowance transfer market between countries. The bank also monitors compliance with the rules of the global carbon market. In particular, trade in fossil fuels between and within states is recorded and the requirement to surrender emissions allowances is supervised and enforced. Finally, the World Climate Bank is qualified to intervene in the climate certificate market by conducting open market certificate purchases and sales in order to prevent price spikes above the safety valve level, while assuring the integrity of the emissions cap over the long run (see also Whitesell, 2007).

Refocusing international climate policy efforts on a strategy that can deliver

There is urgent need for implementing adequate policy instruments on a global scale in order to counter the long-term risks arising from unmitigated climate change. A global system for climate protection needs to combine fair burden sharing between developing and developed countries with an appropriate implementation concept. The 2°max climate strategy strives to address these goals. An objective assessment of the current global system for climate protection as required by Article 9 of the Kyoto Protocol would lead to similar conclusions: the “appropriate action” to realize the global climate target as called for in the Protocol can in practice only be realized with global emissions management within the framework of a global cap and trade system. That is why it is necessary for Europe to refocus its efforts in view of

building a coalition for a gradual implementation of this or a similar concept – also to prevent long-term economic disadvantages if major partners do not take corresponding measures.

Amidst the general lack of orientation and the scaling-down of ambition in light of recent negotiation results, it is our intent to deliver an impulse for an unbiased economic and political debate on strategies to bring about a global emissions peak in a timely way so as to prevent dangerous anthropogenic interference with the climate system. The objective must be the development and negotiation of a comprehensive approach that can be accepted as globally as possible and is thus viable and effective.

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