

The Climate Compensation Fund for Climate Impacts

by

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Abstract

Climate change is very likely to lead to undesirable climate impacts. Compensation for such negative impacts have, hitherto, received little attention. Our paper reviews the various legal bases for the obligations of states vis-à-vis climate impacts or damages and concludes that no practically convincing mechanism has yet been found to deal with climate impacts. We subsequently outline our architecture for a voluntary, international compensation mechanism with a specific system of adjudicating cases of climate impacts by way of independent climate courts. Further below, we demonstrate the viability of our proposal by reviewing established compensation systems for transboundary environmental harm. We suggest that double proportionality (i.e. member contributions proportional to past emission shares and awards in proportion to the proportion of past emissions covered by the compensation fund) is an enabling condition for the fund and protects it against early depletion, we propose that a frontrunner creates such a fund based on limited membership, and conjecture that information markets be established to monitor the trustworthiness of the climate compensation fund.

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1. Climate Change, Unavoided Impacts and Compensation

Climate changes is increasingly likely to occur, and humans are playing an important part in its creation and the response to it (e.g., Intergovernmental Panel on Climate Change 2007; Intergovernmental Panel on Climate Change 2007). As a result of a changing climate, we are likely to witness, inter alia, changes in vegetation, water budgets of river basins, changes in biodiversity, and a rise in sea-levels, even if we were to stop emitting greenhouse gases now.¹ These effects will not be uniform around the world but are expected to differ regionally. The international community has responded to the challenge of climate change by way of international agreements, such as the 1992 UN Framework Convention on Climate Change and its 1997 Kyoto Protocol, as well as with national and regional programs (Luterbacher and Sprinz 2001). Ultimately, it appears desirable to opt for a low greenhouse gas future (e.g., European Environment Agency 2005), but the avenues to be taken to reach the long-term goal to

to achieve ... stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system (United Nations 1992, Article 2)

are yet unclear and will be debated over the coming years if not decades. Two human response options have attracted particular attention so far, namely mitigation (i.e., curbing emissions) and adaptation (i.e., take anticipative and/or curative measures in light of actual or anticipated climatic impacts). We argue in this paper that a third policy instrument that provides both incentives for mitigation as well as resources for adaptation – a compensation scheme – has largely been omitted from the discussion as well as scholarly endeavors.² Given that politically feasible mitigation and adaptation responses leave us with “committed” climate change, a mechanism has to be found to cope with the climatic impacts not avoided. Damages induced by the buildup of

¹ This is also called “‘committed’ climate change” (http://www.ipcc.ch/publications_and_data/ar4/wg2/en/annexessannexes-glossary-a-d.html, accessed 24 Jan 2011).

² For a notable exception, see Verheyen and Roderick (2008).

greenhouse gases are stochastic in terms of when they occur and their magnitude. We propose to create a voluntary international compensation fund for such impacts in order to facilitate an orderly settlement by way of (i) the build-up of such a fund among like-minded countries, (ii) a court-like legal system that adjudicates compensation claims, and (iii) the disbursement of funds to actors which have convinced the climate courts that damages on their territory are created by anthropogenic greenhouse gas (GHG) emissions. In order to provide for the long-term financial health of such a voluntary compensation system, we suggest strict proportionality in terms of contributions to the fund and proportionality in terms of the compensation offered by the fund (double proportionality, see below).

Before introducing our own proposal, we first review the various legal bases for obligations of states vis-à-vis climate impacts or damages and concur with the mainstream of the literature that no practically convincing mechanism has yet been found to deal with climate impacts (Section 2). Subsequently, we propose a voluntary compensation fund with a specific system of adjudicating cases of adverse climate impacts (Section 3). In the fourth section, we demonstrate the viability of our proposal by reviewing established compensation systems for transboundary environmental harm. We suggest, that double proportionality is both an enabling condition for the fund and protects it against early depletion, propose that a frontrunner creates such a fund based on limited membership, and conjecture that information markets be established to monitor the trustworthiness of the climate compensation fund.

2. Compensation Through State Responsibility

Climate change is not the first challenge to bring the issue of redress for residual transboundary environmental harm to the attention of the international community. In fact, earlier cases have led to the emergence of a set of norms that govern the responsibility for such damages under

international law. Thus, before calling for new climate-change-specific compensation instruments we looked at the existing legal mechanisms.³

It is a basic principle of international law that states are responsible for breaches of international law. This responsibility also entails the duty to compensate residual damages that have occurred as a result of that breach (Shaw 2003, 694). Hence, if a breach can be demonstrated, compensation will be provided and no need for a new compensation scheme would arise. Liability purely on the basis of harm without an element of wrongdoing (direct state responsibility⁴) has been agreed upon for some specific activities, for example the use of outer space (United Nations 2002, Art. VII). But since none of these agreements relate to climate change, direct state responsibility does not yield further importance in this context.

Two sources for obligations exist, which when infringed upon, could trigger state responsibility and compensation: international treaty law and international customary law. We will review relevant customary law first, reiterating which elements are required to form a binding rule; review related aspects, its components and highlight potential difficulties arising from applying it to the compensation of climate change damages. Thereafter, we scrutinize international treaty law for provisions which might entail state responsibility and present obstacles in the context of climate change.

For a norm to be recognized as international customary law it has to be supported by regular state practice and, while acting in accordance with the norm, states must do so believing that their behavior is required by law (Shaw 2003, 70).

³ For a detailed analysis of state responsibility for climate change see, e.g., Faure and Nollkaemper (2007, 123-179), Kilinski (2008, 378-416), and Verheyen (2005).

⁴ The term “direct state responsibility” is used here as used by Tol and Verheyen (2004, 21). For an extensive analysis of the terminological challenge see Lefeber (1996).

The no-harm rule is the only norm relevant to climate change litigation that satisfies both requirements and is considered customary law (Tol 2004).⁵ The rule is breached when damage beyond a level of “seriousness” is inflicted on the territory of a country. Furthermore, the state on whose territory the damage-causing activity is pursued must have failed to adhere to a certain standard of care (negligence) in regulating that activity (Verheyen 2005, 152). To be successful, a claim based on the no harm rule must demonstrate that both qualifications are met.

Among the factors that determine the appropriate level of care, four are most frequently referenced. First of all, the level of care depends on the hazardousness of the activity: higher risk activities generally require a higher level of care (Lefeber 1996, 68). A second concept is foreseeability. A state always acts without due diligence when it should have foreseen a high probability of potential damage (Voigt 2008, 10). Third, it is argued that an appropriate level of care is not adhered to when a certain technological standard that would have reduced the risk has not been employed, such as the best available technologies (Tol and Verheyen 2004, 1117). Fourth, the scope of measures which a state must take shall be proportional to its technical and economic abilities and balanced against the potential damage to the injured state. This originates in the right of a country to use its territory according to its needs (territorial sovereignty) and the right not to be harmed by activities outside its territory (territorial integrity). Solving this conflict necessarily involves a subjective element, since territorial integrity has to be balanced against territorial sovereignty (Voigt 2008, 17). It is the determination of the “appropriate level of care” that makes the application of the norm complex and controversial. Additionally, while it might be relatively easy for coastal communities which have lost land due to rising sea levels to show that the harm passes the “serious consequences” threshold, in a variety of other cases this could prove more difficult.

⁵ Whether the precautionary principle might also be customary law is not fully clarified, see, e.g., Bergkamp (2001), citing Kourilsky and Viney (2000).

The difficulties in defining the standard of care can be avoided if a claim is based on treaty law where no lack of care must be demonstrated (International Law Commission 2001, Art. 2). Both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol contain norms that could potentially provoke state responsibility. Furthermore the United Nations Convention on the Law of Seas also contains provisions possibly suited for compensation claims, yet they are too narrow for our purposes as only damages to marine resources would be covered.⁶

With regard to the UNFCCC, claims could be based on Article 4 in conjunction with the ultimate objective of the treaty to prevent “dangerous anthropogenic interference with the climate system” (United Nations 1992, Art. 2). Article 4 is divided into two parts, Article 4 (1) requires all parties to take “measures to mitigate climate change” among other general duties such as to publish emissions data and cooperate in the transfer of technology and knowledge. There is consent among scholars that Article 4 (1) constitutes a very weak base for compensation claims, due to its vague wording and the lack of a time horizon for the mitigation measures to be completed by (Tol and Verheyen 2004, 1114).

Article 4 (2) UNFCCC is more precise, but binds only the industrialized countries listed in Annex I, thereby excluding major emitters such as China, India, and Brazil. Those countries named in Annex I

shall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases (GHG) and protecting and

⁶ For a successful claim, the effects of climate change on the sea would have to qualify as pollution in the sense of Art. 1 (4) UNFCCC - which is not obvious. Furthermore in contrast with the UNFCCC and the Kyoto Protocol, the obligations of the UNCLOS are subject to due diligence see Tol and Verheyen (2004, 1109 - 113), citing general opinion as expressed in United Nations Secretary-General (1989).

enhancing its greenhouse gas sinks and reservoir (United Nations 1992, Art. 4.2 (a)).

These measures must be suitable to modify “longer-term trends in anthropogenic emissions” reservoirs (United Nations 1992, Art. 4.2 (a)). In contrast to the first paragraph, the second paragraph of article 4 has no reservations to its obligation such as the reference to “specific national and regional development priorities (United Nations 1992, Art. 4.1). It also contains a suggested time horizon (“by the end of the present decade”) that is “recognized” to contribute to the overall aim of averting the long term emissions trend (United Nations 1992, Art. 4.2 (a)). Consequently, it appears likely that a continuous increase of GHG emissions would amount to a breach of international law for which the offending state would be accountable (Voigt 2008, 7).

An even stronger case could be based on the Kyoto Protocol which assigns Annex I Parties clear obligations to be achieved until 2012 (United Nations 1997, Article 3.1). There is little doubt that emitting more than specified under the Kyoto Protocol would be considered a breach of the treaty and would give rise to state liability for those damages caused by the emissions in excess of the individual targets.

Both treaty and customary international law provide a theoretical legal basis for compensation of residual climate change damage through the rules of state liability. But while all states are bound by the no harm rule, it will be very difficult for the injured state to prove that the defendant state failed to act with due diligence as this includes the need to balance the interest of the harmed state with the interests of the offending state. In comparison, state responsibility arising from a breach of the obligations in the Kyoto Protocol would be much easier to prove, yet many of the major emitters of GHG including the United States, China and Brazil have either not ratified the protocol or have not taken on specific targets in the Kyoto Protocol. All of these states are parties to the Framework Convention on Climate Change, but while

it may be possible to base a solid claim on Article 4(2) against the United States, it would be nearly impossible to successfully claim compensation from India, China, or Brazil since they are only subject to very vague obligations under Article 4(1) UNFCCC.

Besides the question what law to apply, other major challenges exist. For example the need to find an adequate international forum to hear the case, which usually requires consent by both parties and might be politically difficult to obtain from the state against which the claim is filed.⁷

Altogether the perspectives for effective compensation on the basis of current law look dim. Nevertheless almost all authors agree that a liability scheme would be a potentially effective instrument in the fight against climate change if it could be made to work (Cullet 2007, 100). This requires “new thinking” and innovative concepts (Voigt 2008, 22).

3. The Climate Liability Fund: Basic Architecture

International law provides us with some directions on how to cope with climate impacts, but international law has so far shied away from proposing specific mechanisms how negative climate impacts shall be institutionally compensated. We propose an international climate compensation fund (short: compensation fund). The architecture consists of five components. First, we need an ultimate goal that gives some operational meaning to the objective of the UNFCCC (United Nations 1992, Article 2). Second, climate courts should consider and adjudicate cases brought before it. Third, we suggest that liability pools of GHG-emitting countries use strict proportionality of emissions to determine the share of contributions, and the share of cumulative contributions covered by the fund shall reflect the proportion of damages to be compensated. Fourth, a lead country or group of countries could set a

⁷ Exemplary for the United States, see Strauss (2003).

compensation system in motion that might grow in membership over time. And fifth, compensation may be partially distributed as prepayments for adaptation to limit damages.⁸

First, a benchmark is needed to establish compensation. Immanuel Kant's categorical imperative stipulated:

Act only according to that maxim whereby you can at the same time will that it should become a universal law (Kant 1993 [1785], 30).

Kant suggests that a concerned party should act in accordance with a collective goal in mind and no fallacy of aggregation exists (Sprinz 2000). If everyone behaved accordingly, there would be no need for a compensation fund as everyone would be satisfied, i.e., the ultimate goal would be reached via perfect cooperation. The authors of the UNFCCC had something similar in mind when they agreed on the ultimate objective of the Framework Convention:

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, *stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system*. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner (United Nations 1992, Article 2, emphasis added).

An environmentally ambitious interpretation of this objective requires a transition to a low-GHG world economy. The latter is expected to take several decades to perhaps a century. The UNFCCC of 1992 and its Kyoto Protocol of 1997 succeeded in creating the difficult-to-revert belief that the price for GHG

⁸ A range of our proposal could be mistaken to resemble aspects also covered by Verheyen and Roderick (2008). While our reasoning developed independently of their publication, our institutional proposal also goes substantially beyond listing a broad menu for choice for each aspect by making a range of concrete proposals and justifying them from a social choice perspective. In addition, we innovate by adding a range of aspects omitted by Verheyen and Roderick (2008).

emissions will be positive henceforth. But prices neither necessarily reflect an accurate operationalization of a long-term environmental goal, nor do they necessarily avoid “residual damage” (Verheyen 2005), i.e., damages not prevented by mitigation or adaptation. Interpreting Article 2 UNFCCC is a non-trivial undertaking (Ott, Klepper et al. 2004). The Conference of the Parties at its 2009 Copenhagen and 2010 Cancun meetings politically agreed that “... reducing global greenhouse gas emissions so as to hold the increase in global average temperature below 2°C above pre-industrial levels”⁹ to be the long-term climate goal of the international climate regime. In effect, this can be interpreted as the operationalization of Article 2 UNFCCC.¹⁰

Whatever the ultimate ambition is in operational terms, it is the climate impacts associated with an operationalization of Article 2 UNFCCC which constitute a zero compensation benchmark, and any excess damages beyond this benchmark could be considered for compensation. The damages themselves need to be caused by anthropogenic climate change, not by natural fluctuations in climate as the latter have been endured by countries and citizens over the past millennia.

Second, attribution of cause and effects ought to be in the hands of a neutral judicial body that has no interest whether and which amount to award for climate damages. For simplicity, let us define this institution as the climate court. It should apply judicial rules and procedures to see whether there is sufficient evidence that links anthropogenic GHG emissions to climate-induced damages. If this link can be credibly established based on judicial best practice, the climate court would make an award based on the fraction of damages originating from anthropogenic climate change (Jaeger, Krause et al. 2008). As an initial step, we consider countries to be the entities liable under a liability and compensation regime. Climate courts could be built anew, or, for

⁹ http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf (page 2) (accessed 12 Jan. 2011).

¹⁰ Alternative operationalizations are conceivable (e.g., 1.5°C or 2.5°C above pre-industrial levels).

example, the International Court of Justice could be entrusted with this function.¹¹

In terms of establishing cause and effect, climate change resembles liability for smoking-induced health care damages. While early warnings were issued already by the midst of the 20th century (Doll and Hill 1950), it took several decades of litigation to establish cause and effect relationships and make financial awards to relevant parties¹² and to arrive at the WHO Framework Convention on Tobacco Control of 2003 (World Health Organization 2003). The rule of law and independent adjudication are at the core of our compensation system for anthropogenic climate change. Awards would only go to members of the compensation fund, thereby inducing a plaintiff's country to become a contributing member of the compensation fund.

Third, the compensation fund to be created would be endowed in proportion to a country's emissions over time and make awards in proportion to the emissions covered by its aggregate membership. For example, if the group of countries who are members of the voluntary climate fund account for 35% of emissions, they would only compensate 35% of the damages recognized by the climate court.^{13,14}

While there are many alternatives to strict proportionality considered in the climate negotiations (e.g., Schröder, Clausen et al. 2002, 140-141), it appears

¹¹ Based on the statutes of the International Court of Justice (United Nations 1945, Art. 36 (1)), it is possible to refer such decisions to the International Court of Justice, yet the UN Charter clearly states that the sheer existence of the International Court of Justice shall not prevent states to set up other tribunals (United Nations 1945, Art. 95).

¹² E.g., the US Master Settlement Agreement on tobacco, <http://ag.ca.gov/tobacco/pdf/1msa.pdf> (accessed 14 Feb. 2011).

¹³ Assume the expected total climate-related damages were € 100b in 2050 (net present value) and that the climate fund covers 35% of these damages through its membership. Consequently, it must make provisions for € 35b to be available in 2050 for potential disbursement.

¹⁴ Additionally, proportional compensation is one approach to alleviate the legal issue of multiple causation. See Faure and Nollkaemper (2007, 123-179). From an economic perspective this approach could be the most efficient, see Faure and Nollkaemper (2007, 123-179).

that simplicity and transparency are of immense practical value. Proportionality adjusts over time who is liable to which degree. An increase in the share of global emissions would, *ceteris paribus*, result in an increase in the percentage of contributions to the compensation fund. Such a system has an undisputable advantage: It rewards any country for outright mitigation, as GHGs not released cannot lead to liability and calls for compensation. Zero emissions also lead to zero contributions to the compensation fund. This rule applies to past emissions since the reference year, and also provides incentives to curb future emissions regardless of current aspirations for economic development.

Liability based on the proportion of emissions would normally refer to a specific time span. Our compensation system is agnostic about the temporal domain. While earlier suggestions point to historical emissions,¹⁵ the UNFCCC and its Kyoto Protocol are likely to suggest 1990 or 1992 (the latter referring to the year of opening for signature of the UNFCCC). It is the integral of emissions since the reference year (minus potential depreciation of GHGs due to atmospheric processes) that creates the basis for counting cumulative emissions. In order for a successful plaintiff to receive an award, the country of the plaintiff also has to join the compensation fund, and make payments to it in proportion to its average share of emissions since the reference year.¹⁶ Until now, most industrialized countries would be predominantly liable due to their high share of emissions over the past decades (see Figures 1 and 2). This picture is, however, rapidly changing with China being the single largest carbon emitter since 2007.¹⁷ A proportionality rule dynamically adjusts for the changes in the contributions to carbon emissions over time.

¹⁵ The “Brazilian Proposal” suggested to link emission reductions among industrialized countries to the effect of historical emissions on climate parameters, such as temperature increases. See <http://www.iisd.org/cckn/compendium/brazil.asp> (accessed 14 Feb. 2011).

¹⁶ Membership in the compensation fund for the plaintiff’s country could either start at the time of opening the case or when an award shall be paid. No payment would be allowed to non-members.

¹⁷ <http://www.nytimes.com/2008/06/14/world/asia/14china.html> (accessed 12 Jan. 2011).

Those countries actively expecting a net benefit in their favor are likely to join the fund, others expecting to be net contributors are more likely to abstain in the beginning. The proportionality rule limits the threat of immediate insolvency and of a run on the fund - besides the length of time expected for the adjudication of the case. If the damages from smoking are any guidance, it will take several decades for court decisions to lead to payments. In the meantime, the fund could be build up to relevant size.

Fourth, in order to have an initial endowment, a major emitter needs to join the compensation fund as a frontrunner. This frontrunner is ideally an actor of sufficient share of cumulative GHG emissions and wishes to demonstrate its sincerity for emission reductions. Countries abstaining from joining a mutual compensation fund would remain politically vulnerable to being sued directly through their own court system (e.g., the USA), politically targeted in other international fora of the UN system (Sprinz 2005; Ochs and Sprinz 2008), the court of the media, and increasingly in domestic elections. Climate courts and compensation funds are a civilized procedure to cope with the challenge of climate damages. In Section 4.3, we suggest specific criteria for potential frontrunners.

Fifth, what should the compensation fund actually fund? Since mitigation is the central action variable to reduce one's contributions to the compensation fund, only adaptation and compensation for residual damage remain as potential purposes. In effect, adaptation and compensation for damages not avoided are essentially two different forms of compensation related to unavoided damages. Funding for adaptation ought to be transferred in anticipation of damages; compensation (in the narrow sense) is awarded ex post facto. The fund should be used to compensate actual damages, yet this may unduly increase damages that could be reduced by earlier adaptation measures. Therefore, we suggest that adaptation funded by the compensation fund should be considered as prepayments under a potential settlement. To make sure that resources are left for ex post compensation for actual climate

impacts neither avoided by mitigation nor adaptation, at least 50% of the funds should be held back for ex post adjudication. This rule reduces potential misuse of advance payments and the depletion of the fund before claims for compensation for manifest damages can be adjudicated.

4. Viability of a Climate Liability Fund

In the following, we deal with four central aspects of the compensation fund. First, we probe whether likeminded compensation arrangements already exist. Second, we argue that the rule of proportionality makes it difficult to exploit the fund. Third, we propose that the EU is a candidate to be a frontrunner to establish the Climate Compensation Fund. Finally, we suggest the use of information markets to inform interested parties about the trustworthiness of the Climate Compensation Fund.

4.1 Comparison With Existing Funds

Liability is a well-established instrument in international environmental politics: A variety of schemes for specific threats or regions exist (see below).¹⁸ In order to determine the viability of our own liability proposal, we looked at some of the existing regimes. Special attention is placed on the issue of state liability and compensation funds with mandatory contribution quotas for members, two tenets of our proposal.

Nearly all liability regimes are civil liability regimes. These regimes usually involve states only in so far, as that they implement the provisions agreed upon, which allow transnational claims to be brought against the operator/owner of the facility responsible for the damage. Our scheme differs

¹⁸ Further below, we outline the relevant features of regimes for environmental damages due to oil pollution or nuclear incidents. For an example of a special regional liability regime, see Secretariat of the Antarctic Treaty (1991).

from this approach: we propose a state liability regime that would shift the liability burden from the operator to the state. With the exception of state liability for objects launched to outer space, such an approach is rarely practiced.¹⁹ Yet this is only due to political reasons. There is no debate that activities pursued on the territory of a state – including the emission of GHGs – are attributable to the state (Tol and Verheyen 2004, 1111).

The second pillar of our proposal is the compensation fund, to which all parties of the compensation regime contribute, based on their relative emission shares. Funds which ensure that compensation will be available through regular mandatory contributions by its members exist in the fields of nuclear energy and oil pollution damage.

The Convention on Supplementary Compensation for Nuclear Damage established a fund that provides an additional layer of compensation in case of damage exceeding the provisions of the Convention on Third Party Liability in the Field of Nuclear Energy (1960) and the associated regulations.²⁰ Similar to our proposal, the fund receives regular payments from all member states. A complex formula, taking into account the nuclear capacity and the contributions to the United Nations budget, is employed to determine the due amount (International Atomic Agency 1998, Art. 4).

Another compensation fund based on regular contributions was created by the Convention on the Establishment International Fund for Compensation for Oil Pollution Damages. This fund covers claims that exceed the liability of the owner of a ship that caused the harm (International Oil Pollution Compensation Funds 2003, Art. 4 and 5). Contributors to this fund are not

¹⁹ A notable exception can be found in the United Nations Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (United Nations 2002). Under this treaty a state is responsible for the damages caused by any object which has been launched from its territory, regardless which entity launched the object.

²⁰ For requirements to become a member of the Convention on Supplementary Compensation for Nuclear Damage, see Churchill (2001).

states, but all entities (private and state owned) that have received oil in excess of 150,000 tons in a specific year (International Oil Pollution Compensation Funds 2003, Art. 10). The oil pollution fund is well practiced: More than £ 4m in compensation have been paid out in 2008 (International Oil Pollution Compensation Funds 2009, 33). The key features of our proposal, state liability for activities conducted on the territory of the state and compensation funds, based on regular contributions, are accepted and regularly practiced components in the international community.

4.2 Proportionality Limits Exploitation of the Fund

Proportionality in contributions and awards has a range of useful features. First, it avoids the need for universal membership at the outset and replaces it with the requirement of a frontrunner (or group of frontrunners) of substantial size to get started (see above). Thus, a perfectly voluntary system could evolve.

Second, a proportional award system is more difficult to exploit than a system that provides complete (i.e., 100%) provision of a (global) public good by privileged actors (Olson 1971). This is the case as the awards are limited in proportion to the emissions covered, and remaining proportions of compensation could be claimed from non-parties through other means. A proportional compensation system is completely unexploitable if it covers zero % of emissions (no members and no funding) or if it covers 100% of emissions (universal membership). In between these extremes, potential plaintiffs (whose countries have to become members before actual payouts) have incentives to seek net benefits (expected awards minus expected contributions). Yet these expected net benefits are the legitimate goal of the fund as it compensates those who are disproportionately effected by otherwise uncompensated adverse climate impacts.²¹

²¹ In this Article, we implicitly assume that all climate impacts are negative. This assumption is likely to hold for many regions of the world, but not necessarily all regions. Positively impacted regions cannot claim damages.

The case for exploitability would be strongest if all fund members were net recipients of funds. For simplicity, assume that all (self-selected) members are equal in all respects and hold ex ante expectations of net benefits from the fund. As the sum of contributions cannot exceed the sum of compensation over time and members, the net award would be zero. The lack of congruence between the benefits arising from emissions and the damages resulting from those emissions and voluntary membership in the fund give rise to the idea of international compensation fund as a predictable settlement system for asymmetric, negative externalities.

4.3 The EU as a United and Ambitious Frontrunner

In order to make a compensation fund attractive it should initially cover at least 10% of global emissions. Under this premise only China, the US, and the European Union (EU) are possible candidates. We argue that the EU could act as a credible front runner. To lend weight to this argument, we first have to establish that the EU acts as a single entity with regard to climate change and then to show that its long term ambitions support a 2°C goal.

In the Treaty on the Functioning of the European Union the member states laid down a number of objectives for the union policy for the environment. The EU proposes several general objectives but puts a special emphasis on international measures “combating climate change” (European Council 2008, Art. 191). Since the treaty entered into force only in 2009, one could argue that it is not clear how these provisions will be put in to practice, but further decisions taken by the member states also suggest a united approach in the fight against climate change. In Appendix I to the Copenhagen Accord the EU and its member states formulated a collective emission target for 2020.²² In the Kyoto Protocol of 1997, emission targets were still assigned individually, yet the

²² See <http://unfccc.int/home/items/5264.php> for the current status (accessed 13 Jan. 2011).

European Community and the member states agreed to share the responsibility as allowed under Article 4 of the Kyoto Protocol.²³ Taken together, if a compensation scheme were to be established, it seems likely that the EU would participate as a united entity.

The European Union (EU) is willing to bind itself to the 2°C goal. Most recently, in the run up to the 16th Conference of the Parties to the UNFCCC and the 6th Meeting of the Parties to the Kyoto Protocol, the European Union affirmed its position to reduce their GHG emissions by at least 20%, or if a comprehensive treaty can be agreed upon, by 30% till 2020 as compared to 1990. In addition, the EU created a carbon trading system for a substantial part of its industries. The EU repeated the need for developed countries to reduce their GHG emissions until 2050 by 80% to 95% as compared to 1990 in order to reach the 2°C goal.²⁴ This repeats the offers made in the Appendix I of the Copenhagen Accord and is the minimum reduction necessary in order to reach the 2°C target (Intergovernmental Panel on Climate Change 2007, 776).

The European Union thus emerges as a united and ambitious actor that could credibly become a front runner to start the compensation scheme.

4.4 Information Markets for Trustworthiness

To make the degree of credibility of the frontrunner's resolve transparent and to generally assess the credibility of the liability system over time, it would be desirable to create a Political Climate Exchange (PCX) - representing a prediction or information market (Wolfers and Zitzewitz 2006).

²³ Agreement between the European Community and its Member States under Article 4 of the Kyoto Protocol, FCCC/CP/2002/2, <http://unfccc.int/resource/docs/cop8/02.pdf> (accessed 14 January 2011).

²⁴ See "Preparation for the 16th Conference of the Parties to the UN Framework Convention on Climate Change", 29th of November 2010, http://ec.europa.eu/clima/documentation/international/docs/conclusions_envir_en.pdf (accessed 14 January 2011).

The PCX would trade assets similar to those found on the Iowa Electronic Markets.²⁵ Rather than offering bets on who the next US president will be or which monetary policy decision the US Federal Reserve Board will take in the near future, as traded on the Iowa market, the PCX could offer trades with different maturities whether the frontrunner will reach its own long-term mitigation goal. Prices of 100 (maximum) would signal 100% trustworthiness, a price of 0 (minimum) would signal complete untrustworthiness. The differences in quotes between different maturities would inform us about the expected evolution of trustworthiness over time. The PCX would also relate institutional performance to domestic budgets (or other types of financial allocation mechanisms) because it would signal the degree of trustworthiness to *domestic* constituents. Given the averaging mechanism over many market participants and reasonably frequent trading, a continuous assessment of credibility becomes possible. As long as sufficient liquidity is guaranteed via market makers, strategic interventions by influential actors curbed, and insider trading avoided, the PCX could signal the resolve of the frontrunner.

Furthermore, this system could later be extended to the compensation system at large once additional members join the compensation fund. The point is to make transparent to all interested parties whether the compensation system proposed is credible and when trust seems to be unwarranted. Ratings of sovereign bonds by rating agencies fulfill the same function – with all the known imperfections.

Compensation funds can be found elsewhere in the field of international environmental protection, frontrunners cannot be exploited, and the EU may serve as a credible frontrunner should it elect to do so. We suggest that the trustworthiness of a frontrunner and the compensation fund at large be evaluated by information markets in a continuous manner.

²⁵ <http://tippie.uiowa.edu/iem/index.cfm> (accessed 14 January 2011).

5. Conclusions

At present, Planet Earth is destined for considerable emissions of GHGs which will cumulate over the decades to come. It is unlikely to be the case that a “safe landing” will be accomplished in the near future. As a result thereof, we should expect considerable climatic impacts that will occur due to anthropogenic emissions. The Climate Compensation Fund provides a viable architecture for predictable compensation of anthropogenically caused climate impacts.

It has been argued that it could already be possible to pursue successful compensation claims on the basis of current international law. However, while solid legal grounds for cases against signatory states of the Kyoto Protocol exist, it will be very difficult to sue China or the US for compensation as they have either not ratified the Protocol or are not assigned specific targets. Thus, in international law general institutional mechanism to compensate for climate impacts have not evolved and litigation depends on the individual case and is surrounded by a high level of uncertainty. We suggest a five-fold architecture comprising an operational ultimate climate goal, independent climate courts, the rule of proportionality in fund contributions as well as payouts, the need for a frontrunner to initially endow the fund, and the use of payouts for adaptation and ex post facto compensation.

We provide evidence that a compensation fund for climate impacts is not entirely new to the field of international environmental law and politics, and strict proportionality rules provide considerable protection against exploitation by rent-seekers. Furthermore, we point out that the EU is a viable and ambitious actor who could serve as a founding member of the fund. Establishing information markets which would monitor the trustworthiness of the activities under the fund could add further enhance trust.

Overall, the Climate Compensation Fund may help alleviate the participation problem for credible and ambitious climate proposals and offer deeds instead of

words: Compensation for climate impacts. This would be a creative method to keep long-term climate policy on the agenda in a way many of us are accustomed to think of, grounded in the rules of law, and appropriate financial flows.

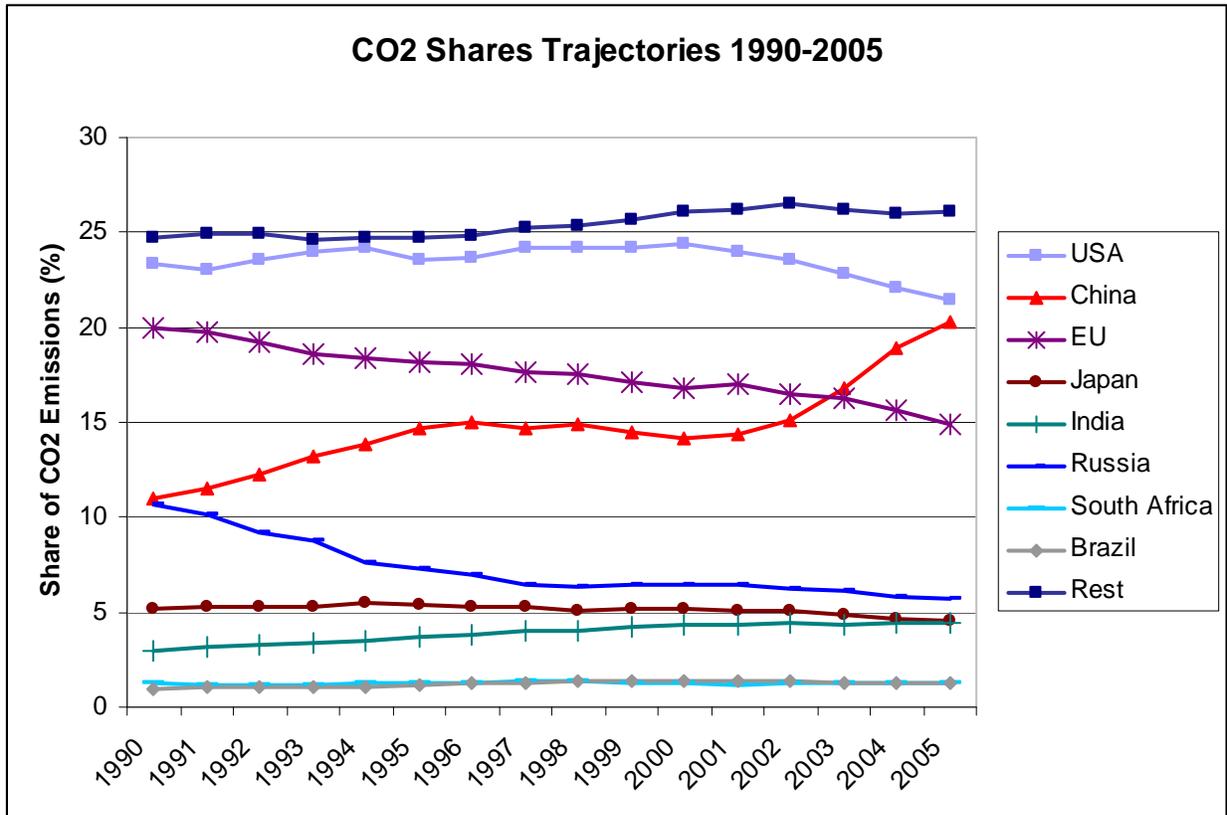
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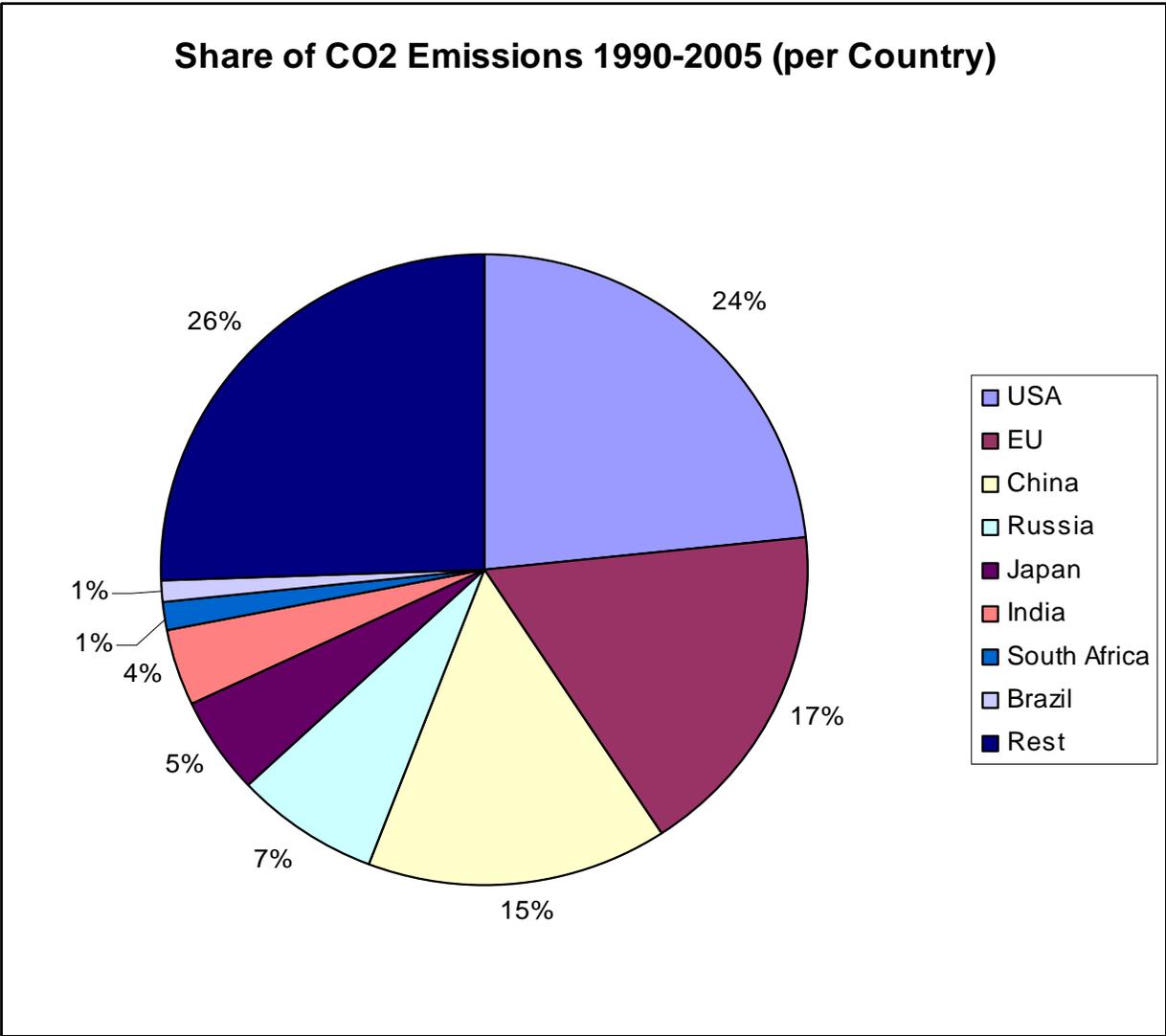
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Figure 1: CO2 Shares of Major Emitters (1990-2005)



Source: Climate Analysis Indicators Tool (CAIT) (2009).

Figure 2: Share of CO2 Emissions (1990-2005)



Source: Climate Analysis Indicators Tool (CAIT) (2009).