Climate Mitigation Works

Financing Climate Adaptation Measures Using a Credit Trading Mechanism:

Initial Considerations

Abstract

While a market in trade able emissions allowances and project-based credits for reductions in greenhouse gas emissions has resulted in large-scale mobilization of finance for projects in developing countries, no similar mobilization of resources has occurred for climate change adaptation. Adaptation funding and proposals have been "top-down" multi-lateral/government-sponsored or managed funds resourced to a fraction of the estimated costs.

This paper presents a proposed framework for mobilizing resources for adaptation using market mechanisms. This approach assumes that emissions need to be limited to a "safe level" and that additional resources need to be transferred from wealthy economies to pay for additional mitigation and adaptation based on cumulative emissions as compensation for climate impacts. It assumes that further mitigation or adaptation are (from a global perspective) fungible in terms of global societal costs and benefits.

These assumptions are the basis for a financing mechanism that promises to efficiently find and allocate investments in adaptation or mitigation in poor and vulnerable countries. The results, if designed and managed effectively include:

- Significant flow of capital from North to South to address climate change,
- Fair designation of responsibility for cumulative emissions and funds for additional mitigation or adaptation measures - over and above mitigation measures to stabilize emissions, and,
- An optimal efficiency of resource allocation as price signals stimulate least cost investment (for the resulting adapation or mitigation) and potential for more innovative sustainable adaptation solutions.

Challenges to the effective design and implementation of this scheme include:

- Overcoming political resistance by wealthy countries and industries to accepting their responsibility for the damages caused by historical emissions,
- Developing reasonable, equitable, and not overly burdensome benchmarks for investments in adaptation that will not prejudice capital flows towards large scale infrastructure at the expense of small scale (down to household-level) adaptation measures, and,
- Related to the previous point, ensuring that vulnerable and poor potential claimants (governments, communities, individuals) have the absorptive capacity to benefit from adaptation and mitigation finance.

In any case, the proposed system ought to be evaluated against the alternative schemes. To date, this largely is an amorphous collection of calls for public-sponsored and managed "funds" that presumably would accept applications from governments.

This paper will briefly outline the proposed scheme, potential benefits and challenges.

Introduction

Capital investment in greenhouse gas mitigation measures exploded in scale when the EU Emissions Trading Scheme first came into effect, creating demand from companies covered by the scheme to identify the least cost emission reduction options. The result was an unprecedented interest by the private sector in financing mitigation projects in developing countries, in order to generate "certified emission reductions" under the Kyoto Protocol's Clean Development Mechanism (CDM). Approximately 1,800 projects have been registered by the CDM with an anticipated 1.2 billion t of carbon dioxide equivalent reductions by the end of 2012 representing approximately €12 billion in revenue for the carbon credits.[1] With the International Energy Agency estimating that it will cost an additional $10 trillion in investment by 2030 to stabilize atmospheric concentrations to avert "disastrous" warming, governments and the private sector, in developed and developing countries generally accept the essential role of carbon credit mechanisms in resourcing these costs and implementing projects in sufficient numbers to achieve the necessary emission targets.[2]

The costs of climate change impacts, or the investment needed to adapt to climate change is similarly immense, even with measures taken to stabilize emission. Studies indicate costs could be in the range of $50 billion to over $300 billion/year with two thirds of these costs in developing countries.[3] Questions of how to finance adaptation in developing countries are now at last central in the negotiations for a follow-up treaty to the Kyoto Protocol.

Current international resources for financing adaptation in developing countries are trivial compared to the needs, and it is difficult to delineate what should count as investment in "adaptation to climate change" in developing countries versus what is investment in development generally. However, an analysis of the existing climate funds is that only about $100 million have been spent on adaptation measures to date.[4] Most of these funds are to provide capacity development for national experts or governments, or demonstration projects. Most of the money goes from the donor to the national government.

A number of proposals for financing facilities (typically following various development bank and bi-lateral development agency lending and grant facilities) paints a picture not dissimilar to the typical approach to development: significant but insufficient resources allocated largely to governments for reallocation to specific projects, with some uncertainty regarding the efficiency of the investments and that it will reach the most needy communities.

[1] From Point Carbon, 2 October 2009 based on UNEP Risoe Centre analysis and assumption of a €10/credit price.

[2] IEA study quoted in Point Carbon, 7 October 2009.

[3] See Parry et al., Assessing the Costs of Adapting to Climate Change: a review of the UNFCCC and other recent estimates, August 2009.

[4] See www.climatefundsupdate.org for a listing of the existing funds and projects that have been supported.

Proposals for financing adaptation tend to focus on creation of joint mitigation/adaptation funds supported by wealthy nations, administered by multi-lateral organizations, and allocated to governments in developing countries. One proposal that the Norwegian government has forwarded is to sell two percent of emission permit quotas from rich nations to raise funds, estimated at €15-25 billion/year. A Mexican proposal is to raise an international fund from all nations, based on their responsibility for causing climate change, national wealth and population that it estimates could initially raise $10 billion/year. The Least Developed Countries' proposal is to impose a levy on international jet and shipping fuels that could raise $28 billion per year. The European Union acknowledges that €100 billion/year will be needed, but proposed that a public fund should raise only €22-50 billion/year.

Less discussed alternatives to this collection of "top-down" approaches include employing indices of vulnerability to serve as benchmarks for insurance protection against severe weather events devastating agricultural production. [5] "AdMit" is a nascent concept being developed that would harness voluntary interest in undertaking efforts to support climate mitigation and adaptation in developing countries with a strong emphasis on sustainability and without granting greenhouse emission "offsets," unlike other voluntary emission reduction crediting schemes.[6]

A conclusion to be made is that the funding on the table and proposed, however necessary and worthwhile, looks insufficient to meet the needs and little attention has been paid to how governments will raise the funds. There is also the risk that funds will not be efficiently and fairly disbursed owing to their top-down governance structures.

The Case for Adaptation Finance through Market Mechanisms, Using Cumulative Emissions as the Target Setting Metric

The case for having wealthier countries compensate developing countries for the impacts of climate change can be made clearly based on the "polluter pays" principle. The wealthier countries, ironically, have developed in part owing to their consumption of fossil fuels during industrialization. 46% of global 2004 emissions were from industrialized nations compared to 30% from the largest-emitting developed nations. Looking at cumulative emissions from 1850-2000, however, gives a different picture with 74% of emissions from major emitting industrialized nations, versus 10% from the largest-emitting developing nations.[7] Equitable development in a period where the science is clear that greenhouse gases threatening vulnerable nations requires recognition of this fact and

[5] Earth Institute at Colombia University Press Release, 24 June 2009.

[6] IIED and NEF, AdMit: Responsible choice on the carbon market, August 2008.

[7] Data on 2004 emissions comes from IEA (2006) CO_2-Emissions from Fossil Fuel Combustion and EPA (2006) Global Anthropogenic Non-CO_2 Greenhouse Gas Emissions: 1990-2020. Data on cumulative emissions is from Climate Analysis Indicators Tool (CAIT) version 5.0. See Navigating the Numbers: Greenhouse Gas Data and Climate Policy, World Resources Institute, 2008).

leads to the conclusion that future development is sustainable only if it is ultimately carbon neutral and that developed countries have a responsibility to reverse their cumulative emissions debt and pay for the costs of developing country adaptation to climate change.

A second premise is that decisions on the choice between financing mitigation or adaptation in developing countries are at least somewhat fungible and that the choice between these could, and probably should be left to a well-regulated market. In other words, to accept that only a certain level of warming is tolerable, then the conclusion must be that emissions must unequivocally decline to reach atmospheric greenhouse gas concentrations consistent with this level of warming. Beyond this point, however, the theoretical (global) net social welfare utility can be achieved through either adaptation or mitigation measures.[8]

If we accept the above premises, how can a market based scheme be designed that provides sufficient incentives, flexibility, and transparency for pro-poor mitigation and adaptation in developing countries supported by industrialized countries? A possible framework for integrating developing country climate adaptation into an international climate trading scheme could incorporate the following demand drivers and project implementation mechanisms:

Creating Demand:

1. Emissions are capped by wealthy countries to a level consistent with an acceptable atmospheric concentration (e. g., 350 ppm carbon dioxide equivalent). This is a cap based on a recent baseline and must be met through reducing greenhouse gas emissions, not through adaptation measures.

2. Cumulative emissions are calculated for each of the industrialized countries dating back to the industrial revolution (e. g., 1850).

3. Estimates of the 100 year, cumulative costs of climate change impacts are calculated (and revisited periodically) for all developing countries.

4. Based on (2) and (3), the costs/t of CO_2 equivalent emissions on developing countries is calculated.

[8] There is a wrinkle in this premise. The global net benefit (over time) will be fungible, but adaptation measures presumably benefit local recipients more than mitigation measures. This can be addressed by focusing investment (either for mitigation or adaptation) on the developing world; the results for developing countries will equalize somewhat as mitigation and adaptation measures can both bring local benefits. In addition, designing a scheme that would place minimum levels of finance (such as meeting 75% of the estimated costs) on adaptation would further reduce any welfare allocation problems. Adjustments to the climate change impact cost estimates (step three in demand creation) would also redress imbalances in the allocation of resources between mitigation and adaptation.

5. The wealthy countries need to either mitigate their own emissions or secure international mitigation credits or emission allowances from other countries, or secure credits from adaptation measures undertaken in developing countries that will result in complete retribution of the 100-year climate impacts cost. Allowances could be auctioned to provide revenues for state-sponsored international aid for adaptation.

6. Credits for adaptation measures are based on how much the costs of climate impacts have been reduced going forward. Thus, there is an incentive to identify projects that will most cost-effectively reduce the costs of future adaptation.

7. Each year (or longer period), each country under the secondary, joint mitigation and adaptation cap must secure enough (additional) mitigation or adaptation credits to balance out an equal quantity of the proportion of cumulative emissions attributed to it.

Implementation Options:

1. Countries may finance these measures directly through government treasuries, or reassign some or all of their obligations to third parties such as emitters under an (augmented) existing or purpose-built emissions trading scheme.

2. Developing countries must approve all projects, and create policies regarding how funds are allocated. As with the existing CDM, these countries may transfer property rights to credits and permit 3rd parties in their countries to sell these directly from projects they create.

3. An international body (presumably the UN Framework Convention on Climate Change Secretariat) will also create mitigation and adaptation credit registries, approve project registrations, and issue credits.

4. Projects or adaptation programs will be registered based on reasonable baseline estimates (at project, program, or sectoral levels – this needs to be worked out) and indications that the activities will result in real, additional emission reductions or reductions in vulnerability to climate change.

5. Calculations and issuance of the emission reduction credits will follow existing project, programmatic, or sectoral approaches such as the Clean Development Mechanism.

6. Issuance of the vulnerability reduction credits (VRCs) will be based on estimates of the ex post reduction in estimated cost (risk adjusted based on climate forecasts and impact assessments) as calculated by third party, accredited expert companies.

It is obvious that a considerable amount of research and programming will be necessary to design and implement such a system. Following a case study that will illustrate how one hypothetical project is financed and implemented, we shall revisit the system design and consider the challenges

and issues that need to be addressed.

A Market Mechanism to Finance Adaptation in Developing Countries

Wealthy Nations cap their emissions to meet climate targets, and may delegate caps to industry.

Extra reductions are calculated based on the countries' historical emissions to pay to reduce climate vulnerabilities in developing countries or reduce impacts by further lowering emissions.

The extra target can be met in any of four ways:

1. Reducing emissions at domestic facilities
2. Trading allowances from other capped nations or facilities
3. Purchasing Credits from Emission Reductions in Developing Countries
4. Purchasing Vulnerability Reduction Credits (VRCs) from Adaptation Projects in Developing Countries

Allowances, Emission Reduction Credits, and Vulnerability Reduction Credits are Measured:

Tonne of CO2 equivalent emission reduction, verified

Tonne of CO2 equivalent emission reduction, verified

Tonne of CO2 equivalent emission reduction, verified

Accredited auditor estimate of reduced climate vulnerability from baseline level of vulnerability. The VRC is based on cumulative historical emissions/total cost estimate of global adaptation, revisited regularly

All projects – reducing domestic emissions, projects to reduce emissions in developing countries, and vulnerability reductions can be undertaken by any party, identifying any viable project if the baseline and emissions/vulnerability reduction activity can be satisfactorily be established, quantified, and verified.

Such a scheme may result in more efficient, innovative, and dynamic climate action that mobilizes resources from the polluters.

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<u>The System in Practice: a hypothetical case study:</u>

In this hypothetical scenario, the world's economies emitted approximately 1 trillion t of CO_2 equivalent since industrialization. The wealthy countries emitted about 75% of these gases. As such, they are responsible for 750 billion t of CO_2 equivalent. The United Nations estimates annual baseline costs of the impacts of climate change on developing countries averaging $200 billion/year over the next 100 years, for a total cost of $20 trillion during this period. Hence, the cost of damages for these industrialized country historical emissions is $26.67/t of CO_2e.

The United European Principate (UEP), a hypothetical country, was responsible for 6% of global cumulative emissions, or 60 billion t CO_2e from 1850 – 2000. In the upcoming year, the UEP has a responsibility to reduce its emissions by these 60 billion t/100 years (=600 million t), or reduce 600 million t of emissions in developing countries, or pay for adaptation measures that result in a reduction of climate impacts of 600 million t x $26.67/t = $16 billion. Or, it can do a combination of the above. The UEP decides to allocate responsibility directly to industry to achieve this goal, rather than through taxes and emissions reduction and adaptation financing directly by the government. It lowers allowances to facilities capped by the EU Emissions Trading Scheme (EU ETS) by 600 million t and permits facilities to offset their emissions via emissions credits (such as "certified emission reductions" (CERs) under the CDM) or via climate "vulnerability reduction credits" (VRCs).

A UEP electric utility, CoalWindNeutrons Limited (CWNL), is allocated under the EU ETS scheme one million allowances for the year under the EU ETS, but UEP reduces this allocation to 900,000 to help meet its cumulative emissions retribution obligation. CWNL has baseline emissions of 1,100,000 t, and thus has a deficit of 200,000 t. CWNL reduces its own emissions by 50,000 t. It then secures 74,900 VRCs, from a project on a remote, densely populated Pacific Island. It has to purchase on an exchange another 75,100 allowances or emission reduction credits, such as CERs under the CDM.

The project builds storm-water drainage canals in a slum district of a secondary city. A project document, validated by a UN accredited engineering company, estimates that the project will reduce the costs to this community (including infrastructure and health damage costs) of increased precipitation and severe weather events by $1,000,000,000 over the project's expected life of 50 years. One year after construction, an accredited verifier inspects the project and identifies that it provides 94% of the amount of storm-water drainage protection estimated in the project document, and issues a report to the UN crediting the project with $2,000,000 (the average estimated cost reduction/year) x 94% (the assessed vulnerability protection level)/$26.67 (the calculated global developing country cost of climate impacts (CCI) for the period) = 74,900 VRC credits.

The following year the project, through some improved maintenance and capital enhancements, achieves 104% of anticipated protection, and the calculated global costs have gone down by 1% in part owing to a surge of investments in adaptation measures. The result is that the CCI has declined by $0.27, and thus the project secures $2,000,000 x 104%/$26.40 = 78,787 VRCs. It should be noted that this project is attractive for CWNL as the price it pays for allowances is $50/t and the marginal cost of the project is $15/VRC (less than the global average estimated costs climate impacts at around $26/t cumulative emissions).

Challenges and Issues in System Design:

Calculating the demand, from an analytical perspective, is relatively easy compared with creating the measures in order to register and issue VRCs. The two most challenging areas on the demand side are (1) getting countries to accept responsibility for their past emissions and damage this is causing poor countries and their people and (2) estimating the costs of adaptation in developing countries, and revisiting these costs on a regular basis.

In order to create a system that fairly attributes credits is more challenging. First of all, compared to climate mitigation, where it doesn't matter where the emission reductions occur, the impact is the same, for adaptation there is a risk that all activity will occur in limited areas, countries, or project types, resulting in certain regions, countries, or issues ignored. Measures must be taken to ensure that, for instance, just because it is easier to work in middle income countries with good governance regimes, that the least developed and ineptly governed countries are not ignored. As the intent of financing adaptation in developing countries is, presumably, to compensate the poor for the damage done by emissions created by wealthier industrialized countries, it is also reasonable and just for the VRCs to be issued for projects that directly help the poor and vulnerable in developing countries. It would be certainly less legitimate for VRCs to be issued for investment in port facilities benefitting international shipping conglomerates than investment for storm drainage systems that reduces flooding in a poor urban neighbourhood.

An understanding of the marginal costs of abating vulnerability across countries and project types will be critical in then coming up with measures to ensure that the VRCs are mobilized somewhat evenly, or, if this is not possible, that the conventional adaptation financing mechanisms focus on areas ignored. And certain project types or ownership may be explicitly excluded from qualifying: climate adaptation measures primarily benefitting multi-national corporations, or protection for golf courses, to give two clear examples of measures that may not contribute to sustainable, pro-poor development.

An alternative approach to incentivize pro-poor adaptation activities might be to quantify the VRC issuance level by considering per-capita benefits rather than economic loss costs. A hybrid approach could be to create a modified economic loss cost that uses economic loss cost assumptions for all countries based on per capita costs in OECD nations. Thus, for the storm drainage example given above, the vulnerability would be based on costs per capita as if the project was taking place in an OECD country, and benefits would be counted based on how many people are protected. To the extent that adaptation costs per capita are lower in least developing countries, this would create a greater incentive to doing projects in the poorest countries that might compensate the people of these countries more and overcome some of the potentially greater investment risks and challenges developing projects. Because VRCs would be based on benefits based on the extent and number of people benefiting, it might also favour pro-poor investment over investment that protects fewer people but with higher capital levels vulnerable. No matter what, the challenge in developing baselines that are equitable and efficient are great. But, to the extent that even some options are identified, then the benefits are likely to outweigh the difficulties.

While in simple (but wrong) theory, the proposed scheme will optimize investments between mitigation and adaptation as investments will be undertaken until the marginal costs of adaptation and mitigation balance. And also according to this theory, the allocation of measures between adaptation and mitigation do not matter as more mitigation reduces adaptation costs, and more adaptation measures reduce the need for mitigation. The reality is likely to be constrained by transaction costs, politics, and imperfect information and thus there is a risk that a disproportionate share of the investment is allocated for mitigation rather than adaptation. That would be wrong as climate change is already occurring based on historical emissions, and so there is a compelling need for resources to go into both areas.

A potential “supply release mechanism” could be incorporated into the scheme to ensure that some finance is allocated to adaptation, in the event that mitigation measures are found to be preferred. While this paper argues that conventional financing mechanisms (grants to government programs, for instance) are sub-optimal means of efficiently and fairly reducing vulnerabilities to climate change, this supply release mechanism kick in during a given period, if the share of mitigation reduction credits exceeds a certain share (such as 65%), then the capped entity (country, or facility, or other) is required to pay at the estimated adaptation cost/t into a fund that would then allocate resources towards adaptation measures using grants, loans, or other means.

In addition to the creation of VRCs through investment in adaptation projects, VRCs could be used to finance non-physical measures and insurance against the impacts of climate change. For instance, a local government could impose and regulate building codes that would make a neighbourhood less

vulnerable to climate change, or a premium could be paid to an insurance company that would effectively, to some extent, "cover" a certain climate impact risk. Both policy and insurance measures, however, must be carefully studied and only sanctioned if they are deemed to avoid leakage. In the building code example, non-enforcement or migration of poor households outside of the jurisdiction to avoid costs or penalties, in the insurance example, making sure risks and coverage matched up to the real, verifiable determination that compensation for climate impacts fairly mitigated the vulnerability costs. The United Nations accredited validators and verifiers would have to review against these concerns before projects could be registered or issued with VRCs.

Conclusion

As with climate mitigation, the use of market mechanisms alone to tackle adaptation is insufficient – even with the most cleverly designed schemes, certain clear market failure will result in funds not being allocated to protect certain vulnerable communities or natural systems or the level of investment required is too great for the private sector to tackle alone. However, this paper provides an outline for a system that mobilizes resources from polluters – often directly – to finance adaptation that is both flexible, efficient, and with the potential to be the most equitable means of redeploying resources from polluters to vulnerable communities.

As there is no known literature on the design of such a system for adaptation, this paper is just the beginning of a necessary process of multi-disciplinary research and debate on the economics, policy framework, and methodology creation for measuring vulnerability and adaptation.

For Further Information and Dialogue:

Climate Mitigation Works and its founder, Karl Schultz, prepared this concept in hopes it would help provide a viable approach to source sufficient funds to meet adaptation costs, in an equitable way, employing mechanisms that will stimulate efficient deployment of innovative, bottom-up adaptation measures. We are interested in feedback; please contact karl@climate-mitigation.com.

Also, feel free to visit Climate Mitigation Works' website at www.climate-mitigation.com.