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The Concept and Potential of Adaptation Markets

By Gwynne Taraska July 10, 2014

The idea of using market mechanisms to reduce emissions is now relatively well-known. Within the past decade, emissions-trading systems have proliferated at the multinational, national, and subnational levels in places ranging from the European Union, California, and Québec to Kazakhstan, China, and New Zealand. In fact, in the United States, it is possible that existing carbon markets will begin to expand or that new carbon markets will begin to emerge in response to the Environmental Protection Agency's proposed plan to reduce emissions from power plants.[1]

In contrast, the idea of using market mechanisms to facilitate adaptation to climate change is relatively new and unfamiliar, but there are many reasons why it deserves consideration.[2] This issue brief explores these reasons, explains how adaptation markets could work, presents several design options, and considers next steps in the path toward implementation.

The sort of adaptation market presented here is an adaptation target system. Whereas a carbon market aims to limit something negative—greenhouse gas emissions—and therefore sets caps on those emissions, an adaptation target system aims to promote something positive—climate resilience—and therefore sets goals. The entities that are assigned goals are responsible for averting a certain amount of damage caused by climate change. As developers come forward to propose resilience projects that could be applied to these goals, a market will emerge.

Definitions

Mitigation is the process of limiting further anthropogenic climate disruption by, for example, reducing greenhouse gas emissions.

Adaptation is the process of modifying natural or human systems in order to reduce the damage caused by global warming.

Reasons to consider the development of adaptation markets

There are a number of reasons for national and subnational governments, as well as international bodies, to consider the development of adaptation market mechanisms.

Adaptation efforts are now critical

The new National Climate Assessment found that climate disruption affects every region in the United States. It reports adverse effects of climate change, such as water shortages, damage to critical systems and infrastructure due to extreme weather and sea-level rise,

and declines in crop productivity.[3] Globally, the new report from Working Group II of the Intergovernmental Panel on Climate Change, or IPCC, found that climate disruption affects every continent and ocean. It reports adverse effects of climate change such as food and water insecurity, disrupted livelihoods, and exacerbated poverty.[4] Addressing a problem of this scale and severity requires an arsenal of techniques. New methods that could facilitate local and international climate adaptation warrant development.

There is a shortfall in adaptation finance

The World Bank anticipates that the cost for developing countries to adapt to a global temperature increase of 2 degrees Celsius by 2050 will be $70 billion to $100 billion per year.[5] Although cost estimates vary, current levels of public finance for adaptation will likely be insufficient to meet even the lowest-cost scenarios. The Climate Policy Initiative, for example, has found that only $22 billion of public funding was applied to adaptation measures in 2012.[6] The cost of adaptation in the United States alone could be in the tens of billions of dollars per year.[7] As public climate finance is unlikely to dramatically increase in the near term, policymakers should consider methods of climate finance that mobilize private capital.[8] Adaptation markets could facilitate resilience projects that otherwise would not have been undertaken due to limited public funds.

There are outstanding international commitments

In the Copenhagen Accord, developed-country parties to the U.N. Framework Convention on Climate Change, or UNFCCC, agreed to mobilize $100 billion per year in climate finance for developing countries by 2020.[9] The Climate Policy Initiative finds that public climate finance from developed to developing countries was $35 billion to $49 billion in 2012. Adaptation market mechanisms could help developed countries fulfill their Copenhagen commitment.

The Green Climate Fund, which was created by the UNFCCC as an instrument to transfer climate finance to developing countries, has the goal of supporting adaptation and mitigation equally over time.[10] Mitigation finance has always surpassed adaptation finance by a large margin.[11] Adaptation market mechanisms could help the Green Climate Fund meet its goal of scaling up investments in adaptation to match investments in mitigation.

At the 2012 U.N. Conference on Sustainable Development, also known as Rio+20, member states decided to begin a process to create a set of sustainable development goals, or SDGs, that will be integrated into the post-2015 U.N. development agenda. The preliminary draft of SDGs, known as the "zero draft," contains goals for building resilience, such as strengthening early warning systems in vulnerable regions by 2030.[12] Adaptation market mechanisms could help realize many of the aspirations in the post-2015 development agenda.

Adaptation markets have economic and social benefits

Adaptation markets could increase the levels of funding available for resilience projects, many of which would create jobs and stimulate local economies as a co-benefit of protecting local communities, ecosystems, and economies from the effects of climate change. But in addition to having general value as a source of resilience funding, adaptation markets can have particular economic and social benefits. The sort of system described below—an adaptation target system—could drive investments that produce the greatest adaptation benefit—in other words, the greatest levels of avoided death, disease, and damage—for the lowest cost. With thoughtful design, adaptation markets could also target the most vulnerable populations. Both the National Climate Assessment and the report from Working Group II of the IPCC found that economically or socially marginalized populations are particularly at risk for climate-related hazards. Adaptation market mechanisms could therefore support local governments' goals to protect their most vulnerable community members, as well as the commitments of bodies such as the UNFCCC to pay particular attention to regions that are most at risk for the adverse effects of climate change.

Overview of an adaptation target system

There are several different ways to use markets to address the problem of climate vulnerability. One way is to modify a carbon-trading system and grant emissions credits for investments in projects that protect communities from the effects of climate change. It is not ideal, however, to grant flexibility on emissions reductions for the sake of building resilience. Since adaptation and mitigation are not fungible, they should be pursued aggressively and concurrently.

Developing a stand-alone adaptation system is more challenging—and potentially more rewarding—than incorporating adaptation into a carbon market and consequently weakening it. The sort of system described here is therefore after Michaelowa and others (2012)[13] and Butzengeiger-Geyer and others (2011),[14] rather than a system that unites adaptation and mitigation in one mechanism.

Adaptation target systems set compulsory goals to avert a certain level of damage caused by the effects of climate change. Any averted climate-caused damage that is quantifiable could be permitted to count toward the targets. Quantifiable harm includes, for example, harm to infrastructure, livelihoods, or ecosystems—which can be expressed in dollars—or harm to human life or health—which can be expressed in disability-adjusted life-years, or DALYs.[15]

Entities that are assigned targets could be public or commercial; including commercial entities in the system could generate higher levels of funding. Parties could participate on a voluntary basis as well. For example, businesses seeking to demonstrate industry leadership and corporate responsibility or to protect their supply chains may want to contribute to the system.

The targets for averted damage would create demand for adaptation units that satisfy them, which in turn would create supply: Developers would propose projects that would yield units of averted damage. If the system is designed to allow the units to be traded, third parties could invest in projects and sell the generated units, and entities that have been assigned targets could sell any excess units they have accumulated. It would be necessary to also establish an independent body for monitoring and verification.

Entities in the market would pursue the projects that produce the most averted damage for the lowest cost. In this way, the adaptation system is economically efficient, unlike an arrangement in which the targets are expressed in terms of dollars invested rather than damage averted.

Several design parameters—including the region of the system, the entities that would take on targets, and the metrics used in the targets—will give detail to this broad description of an adaptation target system.

Features of an adaptation target system

- Target for a certain amount of avoided damage is set in DALYs and dollars.
- Entities that are responsible for meeting targets could be governments or private-sector actors.
- Systems that mobilize private capital could generate higher levels of funding for adaptation.
- Developers propose projects that yield units of avoided damage, which could be traded.
- Entities pursue projects that generate the greatest avoided damage for the lowest cost.
- These projects primarily benefit local communities, ecosystems, and economies.

Metrics

Climate change can cause economic, human, and environmental harm. The metrics used in the adaptation targets will track the types of harm that the system aims to prevent.

If a goal of the system is to prevent economic harm, it would establish a target for a dollar amount of avoided loss.[16] If a goal of the system is to prevent human damage, such as death or ill health, it would establish a target for a certain number of avoided disability-adjusted life-years,[17] a metric that is used by the World Health Organization for disease burden and that refers to the years of healthy life lost by premature death or disease.[18] The ability to set nonmonetary targets is essential to ensure that adaptation measures reach the most vulnerable populations, where there may be comparatively little economic value to protect.

The avoidance of environmental harm may be a co-benefit of avoiding economic or human harm. For example, the restoration of coastal ecosystems to protect near-shore communities from storm surges may also protect endangered species or promote biodiversity.[19] It is possible, however, to design a system that could facilitate the protection

of environmental value in a nonincidental way by permitting the use of a willingness-to-pay analysis, which enables the assignment of a monetary value to nature that is not useful to human wealth or safety.[20] Willingness to pay refers to the amount someone would pay for a good—in this case, environmental protection.

Economic, human, and environmental goals are not mutually exclusive. An overarching adaptation target for a region, which could be divided among entities within it, could therefore combine a target for avoided economic loss—which avoided environmental loss could be permitted to count toward—and a target for avoided DALYs.

Projects that avoid climate-related damage would create units that count toward the target. For example, a mangrove restoration project that mitigates storm surges might result in averted death and averted water- and vector-borne disease; it would therefore generate a certain number of avoided DALYs. It also might result in averted damage to coastal infrastructure, crops, and livelihoods, and it would therefore generate a certain dollar amount of avoided economic loss. Additionally, it might result in averted environmental damage and would therefore generate a certain dollar amount of avoided economic loss that would be determined with a willingness-to-pay analysis.

Coverage

Region of coverage

Climate change can have a cascade of effects that spill across borders; changes to local environments can cause food and water insecurity, displacement, and conflict. Nevertheless, the benefits of adaptation efforts tend to be more locally concentrated than the benefits of mitigation efforts. For example, projects that aim to improve irrigation management, conserve wetlands, diversify livelihoods, strengthen infrastructure, implement early warning systems, and improve flood protection will most strongly advance the welfare of nearby communities, ecosystems, and economies. These projects will also create jobs in local communities. Projects that promote clean energy and energy efficiency, on the other hand, have a clear global mitigation benefit.

The fact that the benefits of adaptation efforts are relatively local informs the decision about whether to design a multinational, national, or subnational adaptation market.

In a multinational system, it is likely that many adaptation efforts would be undertaken in developing countries, where projects would tend to produce a greater adaptation benefit for a lower cost. Policymakers should therefore prefer a multinational system if a primary goal is for developed countries to fulfill international commitments to provide adaptation support to developing countries that are vulnerable to the effects of climate

change. A self-interested co-benefit of building resilience overseas is the prevention, as Hans Joachim Schellnhuber of the Potsdam Institute for Climate Impact Research puts it, of disaster-induced "unrest and revolutions, with the export of angry and hungry people to the industrialized countries."[21]

Policymakers should pursue national or subnational systems if the goal is to reduce domestic or local vulnerability to climate change. It is also possible to design a national or subnational system that provides some adaptation support to other areas by allowing a certain number of adaptation units to be created by the implementation of adaptation projects in regions that are not covered by the system.

Entities to be assigned targets

Part of the appeal of adaptation market mechanisms is that they could mobilize private capital to help reduce the gap in adaptation funding. In a national or subnational system, policymakers could do this by assigning adaptation targets directly to commercial entities. Businesses along the fossil-fuel supply chain, from extraction to end use, are the obvious candidates. That is, businesses that contribute to carbon pollution would be required to shoulder responsibility for generating a certain amount of adaptation to its effects. Regulators may want to ensure that the commercial entities assigned adaptation targets differ from the commercial entities involved in any mitigation markets in order to avoid objections about being "double-taxed."[22]

In a multinational system, such as a system established through the U.N. Framework Convention on Climate Change, adaptation targets could be assigned to countries according to emissions levels and income. Countries could meet the targets with public funds or could transmit them to their domestic industries that contribute to climate change. The funding mobilized through the system could count toward developed countries' climate finance commitments—such as the Copenhagen pledge to generate $100 billion per year in climate finance for developing countries by 2020—rather than taking the form of new commitments.

Systems that assign adaptation targets to businesses along the fossil-fuel supply chain have the co-benefit of putting downward pressure on emissions. If the transition to a zero-carbon economy comes to pass, adaptation funding derived from these sorts of systems would dwindle and disappear, and the adaptation targets would need to be reassigned. This is a problem that is not likely to emerge in the near term.

Fine-tuning the system

Other design elements could be added to adaptation market mechanisms in order to achieve different policy goals. For example, regional quotas could ensure that adaptation projects are implemented in the areas that are vulnerable to the effects of climate change but have low cumulative emissions and therefore low responsibility for climate disruption. Regional quotas could also be added if a barrier, such as social bias, prevents adaptation projects from reaching the system's most vulnerable populations. Additionally, policymakers could require that the adaptation projects protect public rather than private goods and that they are additional—that is, that they would not have been undertaken if the adaptation market did not exist.

Next steps

As adaptation target systems are promising but have never been implemented, pilot programs should be developed to test adaptation market systems for effectiveness. To make the pilots more manageable, they could focus on a single sector, such as coastal resilience, or could utilize the verification bodies that have already been established for carbon markets.[23]

One pilot should be a multinational system established through the U.N. Framework Convention on Climate Change that would facilitate adaptation measures in developing countries and enable industrialized countries to move some distance toward meeting their Copenhagen pledge.

A second pilot should be geographically smaller—in the United States, for example, it should be subnational—in order to facilitate local resilience. With the Environmental Protection Agency's proposed rule to cut carbon pollution from power plants, which sets emissions reduction targets for states, it is possible that new carbon markets could emerge at the state or regional level.[24] In order to reduce local vulnerability to the effects of climate change, states should consider creating an adaptation market alongside a new carbon market and establishing a single body for the management and verification of both markets.

It will take time to develop, implement, and evaluate a pilot. However, as the effects of climate change are not expected to improve, and as the shortfall in adaptation funding is not expected to disappear under the status quo, it could be well worth the effort.

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5 World Bank, "Economics of Adaptation to Climate Change: Synthesis Report" (2010), available at http://siteresources.worldbank.org/EXTCC/Resources/EACC_FinalSynthesisReport0803_2010.pdf. An increase of 2 degrees Celsius is considered the threshold for avoiding the most dangerous effects of climate change.

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