Emission Trading in Transition Economies: The Link between International and Domestic Policy

By Meredydd Evans, Battelle, Pacific Northwest National Laboratory[1]

Abstract

International emission trading has the potential to significantly lower carbon mitigation costs and to promote environmentally friendly investment in transition economies. The design of domestic systems to complement international emission trading will likely play a major role in emission trading's effectiveness. This paper will examine the benefits and challenges of proposed domestic systems and the related flows of emission trading revenue in transition economies.

Governments in countries such as Russia and Poland are interested in the potentially significant revenue they would reap from emission trading, and some in those governments feel the money would go to best use as general revenue for the government. Others argue that emission trading should involve the private sector in order to provide maximum incentives to reduce emissions and generate additional revenue. Still others feel that special carbon mitigation funds would allow the government to maintain control yet stimulate additional emission reductions. Each policy has its own challenges, such as stimulating further emission reductions, credibly monitoring emissions and emission reductions, and applying adequate fiscal accounting to the money flows.

Introduction

International emission trading allows market-based incentives for environmental protection. The United Nations Framework Convention on Climate Change (FCCC), agreed to in Rio de Janeiro in 1992, encourages nations to reduce their greenhouse gas emissions to protect the global climate. The FCCC, however, does not require countries to reduce emissions below their 1990 levels. The Kyoto Protocol, agreed to in 1997, will require most industrialized nations to reduce emissions by up to 8 percent compared to their baseline year, typically 1990.[2] The Kyoto Protocol also allows emission trading to provide signatories flexibility in meeting their climate obligations. Signatories who have agreed to take on specific reduction commitments are permitted to trade emission allowances among themselves. These signatories, listed in Annex B to the Protocol, include most developed nations and countries in transition. The innovation of emission trading is that it can allow the market to determine where it is cheapest to reduce emissions, which should significantly lower the cost of compliance globally.[3] Lowering compliance costs in turn makes it feasible to set more stringent emission reduction requirements than would be possible under a less flexible or prescriptive system.

Each Annex B country will have an emission allocation calculated according to its baseline emissions (usually 1990) and its commitment to reduce emissions. Poland, for example, had emissions of 459 Mt of carbon dioxide equivalent in its baseline year of 1988 and agreed to cut these emissions by 6% during the first Kyoto commitment period of 2008-2012. Russia had emissions of 2,999 Mt of carbon

---

[1] For further information contact: Meredydd Evans, Battelle, 901 D St, SW, Suite 900, Washington, DC, USA, tel. 1-202-646-7811, fax 1-202-646-7824, e-mail m.evans@pnl.gov

[2] The Kyoto Protocol has not yet entered into force. Many major emitters such as the United States and Russia have not yet ratified the agreement.

[3] Jae Edmonds, Michael J. Scott, Joseph M. Roop and Christopher N. MacCracken, *International Emissions Trading and Global Climate Change. Impacts on the Cost of Greenhouse Gas Mitigation*, Pew Center on Global Climate Change, Arlington, VA, 1999.

dioxide equivalent in 1990, its baseline year, and agreed to stabilize these emissions in the first commitment period. The countries must use the allocations to cover their actual domestic emissions during the commitment period, but if emissions are lower than necessary, they can sell the excess.

Countries in transition are rich in carbon mitigation opportunities. Under the socialist economic systems of the past, energy users had few incentives to limit energy consumption because the state subsidized energy prices and most large energy users had no hard budget constraints. This led to high energy intensity. Many of the low-cost opportunities for energy efficiency and other carbon mitigation strategies have yet to be tapped, which typically makes mitigation costs very low in transition economies.

The international community has not yet worked out rules for emission trading under the Kyoto Protocol. While much time has been spent in negotiating sessions on the degree to which international emission trading can meet national commitments in a buyer nation, the negotiators have focused less attention on what international emission trading will mean domestically, particularly in countries with net emissions to sell. Ultimately, each country will need to define its own domestic systems to complement international emission trading, yet international rules and systems will have a significant impact on the options open for countries.

This is particularly important given the ongoing debate between the European Union and the Umbrella Group[4] (in which the United States participates) over so-called "hot air". Hot air is a term some have applied to the emission reductions achieved in countries in transition as a result of economic decline and transition in the 1990s. Countries such as Russia and Ukraine feel strongly that these reductions are legitimate because they are real reductions gained through economic hardship. The European Union feels there should be limits on the trade of such emissions because they do not represent new emission reductions and because each nation must make significant and meaningful reductions domestically first. The United States and other Umbrella Group members believe the limitations they agreed to under Kyoto are only possible if they are allowed to engage in emission trading to the extent that it is cost-effective, since any other approach would by definition mean higher costs of compliance.

This paper focuses on the importance of designing domestic systems in transition economies to complement international emission trading. A well-designed domestic system can tap significant mitigation opportunities, reducing the likelihood that emission reductions sold are a one-time windfall.

Designing Domestic Systems to Complement Emission Trading

Several options are available for designing domestic systems to complement international emission trading. An element of the system that is particularly important is the flow of funds, as much of the system and policy design will follow from this choice. The following section examines the advantages and disadvantages of three potential systems:

- A system under which proceeds of international emission trading go to the national budget for use as general revenue (National Budget).
- A system where proceeds go to a carbon fund which then allocates money for carbon mitigation projects (Carbon Fund).

[4] The Umbrella Group is a group of Annex B countries that share similar negotiating positions on climate issues. The group consists of Australia, Canada, Iceland, New Zealand, Norway, Russia, Ukraine, and the United States.

- A system where the private sector and other emitters receive a significant portion of the proceeds and the government receives the remainder for a carbon fund or general revenue (Private Sector).

National Budget

A country may decide to use the proceeds of international emission trading for the national budget. Most countries considering such an arrangement are interested in having the money available for use as general revenue, which would provide the country with maximum flexibility in how it spends the funds. Some countries may instead want to target the money for use in a specific government program, such as a federal energy conservation program, through a line item in the budget.

A key advantage of a system in which all proceeds go to the national budget of a seller nation is simplicity. A country needs to set up only minimal administrative structures to manage such a system, primarily to agree to a price and transfer the emission allowances, called assigned amount units or AAUs. Such a system is also easy to verify because the country only needs to demonstrate that its total emissions are lower than the agreed level; no individual emitters need to monitor emissions or verify reductions. Such a system appeals to many politicians in countries in transition because the emission trading revenue can ease the domestic tax burden or provide the government with extra money for its programs. Some economists argue that this system is the most economically efficient option because it allows a country to spend the incoming resources on the programs that provide the greatest national return (which is theoretically what politicians do for a living).

However, such a system also has significant disadvantages. If the funds go to general revenue, it is unlikely that significant new funds would be spent on mitigation efforts because there would be neither economic incentives nor financing for such investments. This means that the pool of emission reductions available for trade will not increase significantly and will likely decrease as countries in transition experience economic growth. Ultimately, such a system could cause compliance problems for a country in transition if the country has not invested in emission reduction efforts early enough or it has not established levers on emitters to encourage them to reduce their greenhouse gas emissions.

Likewise, if such a system were adopted in most countries in transition, it would probably heighten the "hot air" controversy between the European Union and the Umbrella Group because it could appear that countries in transition were not making efforts to reduce emissions. In addition, this system would likely drive up the global costs of compliance because it would limit the supply of unused AAUs since little new mitigation would take place. This is clearly not in the interest of the United States, Canada or the other likely buyers in the Umbrella Group.

Carbon Fund

A country could decide to establish a carbon fund, which would receive the proceeds of emission trading and allocate the money to specific mitigation projects. The government would likely control the fund, though it might have independent management. An example of this type of a fund is the National Fund for Environmental Protection and Water Management in Poland, which was set up to provide funding for environmental projects using money from a debt-for-environment swap.

In creating a carbon fund to manage the proceeds of emission trading, the government would be demonstrating a clear commitment to further reduce emissions. This could alleviate some of the EU concerns about hot air. It would also ensure that a country was investing in mitigation efforts, thus

creating a constantly growing pool of tradable AAUs. Verification could be relatively easy, particularly if a country decided not to track how funds were spent; conversely, verification could also be complicated if a thorough verification system were established to check the performance of the funded projects. Such a fund would also allow the government flexibility in how it spends the proceeds of emission trading. For example, money could be spent on specific mitigation projects or it could be spent on developing more energy-efficient codes and standards. The most prominent example of such a fund is a proposed "Green Fund" or energy carbon fund in Russia.

The disadvantages of a carbon fund include high administrative costs, potential for corruption, separation of the externality (greenhouse gas emissions) from the market, and ineffective use of money. Establishing such a fund would not be inexpensive because the fund would need to employ experts in various mitigation technologies to identify and/or evaluate projects, to manage the projects, and to verify their results. Every dollar, ruble or zloty spent on administration would reduce the funds available for actual mitigation efforts, yet limiting funds for administration could lead to ineffective or poorly managed projects and policies. Likewise, having a separate fund for carbon mitigation could lead to corruption, because it could be difficult to determine if a project received funding strictly because of its economic and political merits or for other reasons. Russia, for example, has been criticized for allegedly mismanaging government funds including those set aside for carbon mitigation and the European Bank for Reconstruction and Development has ranked the former Soviet region as among the most corrupt in the world.[5]

If individual emitters must apply to a carbon fund for money to invest in specific carbon mitigation projects, their transaction costs will be comparatively high and they will be less likely to take the initiative except in special cases. Many potential projects will not be tapped. This is particularly true if the application process and criteria are complex, opaque, or both. In effect, a carbon fund might create a system resembling joint implementation on the domestic scale because projects would need to be scrutinized on an individual basis. Actual project implementers might not benefit from the lower transaction costs of emission trading.

As a rule, governments do not make investment decisions in as economically effective a manner as the private sector. This is because government officials must balance numerous political and bureaucratic considerations as well as economic ones. Thus, a carbon fund might end up financing projects that promote economic development of a certain sector or region, yet create few tons of mitigated carbon for the money spent. Private sector entities have less need to consider political issues, and more competitive incentive to seek out creative solutions. They are more likely to find and finance the most cost-effective carbon mitigation opportunities, which ultimately should result in more total emission reductions.

Moreover, once a government organization has the ability to raise revenue from emission trading, it is unlikely to cede that power or revenue without a fight. This is one reason that it is important to get the system right from the start and not assume that the system could easily be transformed once established. Independent management for the fund might help in this regard as it would separate the decision-makers from the implementers.

---

[5] Susan Legro, *Climate Change Policy and Programs in Russia: An Institutional Assessment,* Pacific Northwest National Laboratory, Washington, DC, 1999; EBRD, *1997 Transition Report,* London, 1997.

Private Sector

Allowing the private sector and other emitters to receive proceeds directly from international emission trading has several advantages. Most important among these is that it provides individual emitters with an incentive to reduce emissions. Private sector investment in tradable emission reductions will likely provide a relatively large volume of emission reductions per dollar spent on mitigation. This will lower the global cost of mitigation and make it easier to achieve greater emission reductions. Subsidiary bodies under the FCCC currently are considering language that would allow legal entities to participate in emission trading as buyers and sellers.[6] This proposal, if adopted, would significantly boost efforts to involve the private sector in mitigation.

The theory behind emission trading is that it can serve as a powerful tool to internalize the cost of environmental damage by giving polluters a market incentive to reduce emissions. This is the basis of the U.S. sulfur dioxide (SO_2) trading program, often hailed as a model for international emission trading. The U.S. SO_2 program and most other emission trading programs around the world involve the actual emitters. While countries are the entities that take on commitments under the FCCC and the Kyoto Protocol, it is important to involve emitters as well to effect actual change. An emission trading program that does not directly involve emitters may fail because emitters will have only indirect incentives to limit emissions.

Having numerous sellers seeking emission reduction opportunities will not only increase the supply of emission reductions, but it will also likely create a more competitive environment and lower prices. This will benefit the United States and other buyers. Limiting sellers to a few national governments, on the other hand, could create a distorted market with near monopolies. Russia will be the largest seller and thus could have a major influence in setting the price of AAUs.

Furthermore, a system with direct private sector involvement will likely be easier to administer than a carbon fund, though it will be more complex to manage than a system where money flows to general government revenue.

Finally, the private sector eventually will need to play a role in carbon mitigation even in countries with net emissions to sell today. Every country in transition anticipates economic growth. While this growth has been slow to come after reforms began, most transition economies are now growing. Table 1 describes emission trends in several countries in transition.

---

[6] Subsidiary Body for Scientific and Technological Advice and Subsidiary Body for Implementation, *Mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol: Consolidated text on principles, modalities, rules and guidelines,* prepared for Thirteen Session of the Subsidiary Bodies in Lyon, France, 11-15 September 2000, FCCC Secretariat, 1 August 2000.

Table 1. Greenhouse Gas Emissions and Prognoses in Selected Countries in Transition[7]

	Total GHG emissions in 1990 in Mt CO_2 Equiv.	Commitments of countries for budget period 2008-2012		Prognoses for 2010 (Mt CO2 equiv./yr)		Potential annual surplus in 2008-2012 (Mt CO2 equiv./yr)	
		% Reduction	Mt CO_2 equiv./yr	Min.	Max.	Min.	Max.
Czech Republic	197	8	181.2	155	197.6	26.2	-16.4
Kazakhstan	270	NA		207	266	NA	
Poland	459	6	537.7	450.1	571.4	87.6	-33.7
Russia	2,999	0	2,999	1,008	2010	1991	988.77

Even though most transition economies have at least a few years until they need to make domestic reductions to meet their Kyoto obligations, it is important to begin involving the emitters now. Emitters will be more willing and able to make future emission reductions if they are given the carrot of being allowed to trade in emission reductions. A system involving emitters should be internationally credible because it fosters new mitigation investments.

The largest hurdle for involving the private sector is the need to establish an excellent monitoring system for each participating emitter in order to ensure that emission reductions are not overstated. Companies themselves, however, would have a strong incentive to establish such a system if a strong monitoring system were a prerequisite for participating in emission trading. Also, many countries and companies in the region have taken significant steps toward establishing viable monitoring systems. Several Russian regions, for example, are developing high quality, bottom-up monitoring systems.[8] In addition, Poland has received strong praise for the quality of its national inventory in an independent United Nations review.[9] Poland, like many countries in the region, is now seeking to establish a national reporting system with detailed information on emissions from individual entities.

Another major disadvantage from the perspective of individual governments is that they would lose control over the funds and thus may have less interest in supporting an international emission trading regime. This could be an issue in countries like Poland and the Czech Republic that are planning to join the European Union and typically support the European Union position on limited international emission trading. It is not likely to be an issue in any of the potentially major AAU sellers such as Russia and Ukraine. On the other hand, large companies in countries in transition are encouraging their governments to support emission trading, particularly if individual companies will be able to participate; this provides a positive political base for establishing a system with private sector involvement.

---

[7] Data are from the respective countries' National Communications, as represented on the UNFCCC website (www.unfccc.org). Russian data are from: A. Golub et al, *Study on Russian National Strategy on GHG Emission Reduction*, World Bank and State Committee of Russian Federation on Environmental Protection, Moscow, 1999.

[8] Alexey Kokorin et al, *Novgorod Region Greenhouse Gas Emissions in 1998: Results of the Regional Inventory Project*, Institute for Global Climate and Economy, Moscow, 1999; Alexey Kokorin et al, *Manual on Preparing Regional Inventories of Greenhouse Gas Emissions in Russia*, (based on IPCC Guidelines), Institute for Global Climate and Economy, Moscow, 1999 (In Russian); Ilya Popov, *Monitoring Greenhouse Gas Emissions in Russia: A Foundation for Climate Accountability*, Pacific Northwest National Laboratory, Washington, DC, 1999.

[9] Milos Tichy et al, *Summary of the Report of the In-Depth Review of the National Communication of Poland*, Secretariat, United Nations Framework Convention on Climate Change, Bonn, 1998.

Table 2 summarizes the advantages and disadvantages of the three potential systems described in this paper.

Table 2. Comparison of Domestic Systems to Complement International Emission Trading

Characteristic/System	National Budget	Carbon Fund	Private Sector
Incentives for further mitigation	--	+	++
Reduction in Global Mitigation Costs	0 (compared to other 2 options)	+	++
Ease of administering	++	--	-
International credibility	--	++	+/++
Domestic political popularity	++	0/+	-/+
Symbols: -- (most negative influence), - (somewhat negative influence), 0 (little influence), + (somewhat positive influence), ++ (most positive influence)			

Possible Design of a Domestic System Involving the Private Sector

Several issues are key to any emission trading system, including allocation of credits, funding flows, and compliance. This section describes how each of these issues could be addressed to create a feasible, cost-effective system to allow private sector participation in international emission trading.

Allocation

Countries could set up domestic systems to allocate a portion of their national emission allowance to individual entities such as private manufacturers and municipal heating companies. Countries would not need to allocate all their emissions to domestic emitters, and in fact, they probably would never want to allocate them all in this way because many emission sources are small. They could, however, allocate a meaningful portion of their emissions and increase this portion over time as more and more entities meet certain criteria. Additional allowances could be distributed or even auctioned off on an annual or other regular basis, ensuring that new competitors could always enter the emission trading market.

Countries could choose to make domestic allocations of AAUs or AAU-equivalents based on emission levels lower than those in the country's international baseline year.[10] (Russia, for example, might want to select 1995 as the domestic baseline year for individual emitters as emissions were comparatively low that year). This would help ensure that a country would meet its Kyoto obligations.

Countries could select entities for inclusion in the domestic allocations based on specific criteria such as the existence of actual greenhouse gas emissions and a high-quality system to monitor these emissions, and a good record on meeting other environmental regulations. Each country may also have additional criteria that it wishes to impose. The monitoring systems are particularly important

[10] Countries may need to develop a separate AAU-equivalent trading system for domestic use if legal entities are not allowed to participate directly in international emission trading. Under an AAU-equivalent system, countries could provide private companies with domestically valid emission trading instruments. (To simplify the link with international emission trading, these instruments could have serial numbers parallel to those of specific AAUs). The AAU equivalents would then be automatically converted into AAUs upon international sale or transfer, but the country itself would have to initiate the international transfer when it accepts and retires the domestic AAU-equivalent. While direct access for legal entities is less complicated and may be perceived as less risky, a domestic AAU-equivalent system could also work effectively to involve the private sector in international emission trading.

because they help ensure compliance. The lack of such systems is often cited as a reason for not allowing the private sector to participate directly in international emission trading. However, if companies are told that they must create such a system to participate, they will have a strong incentive to create the system. Several companies are already creating such systems, including RAO EES and Gazprom, two large Russian energy corporations and among the largest greenhouse gas emitters in the world. The existence of monitoring systems has collateral benefits too because it improves the ability of a country to understand and manage its overall greenhouse gas emissions.

Once an entity receives an emission allocation, it would be required to emit less than that amount or purchase additional allocations from another party. On the other hand, if an entity does not use all of its AAUs or AAU equivalents, it could sell them at home or abroad. This creates a strong incentive to limit emissions on site. Companies that receive emission allocations could also be required to pay a fee to cover the administrative costs of the program, which could make such a scheme more politically feasible in certain countries.

Participation in such a domestic program would be voluntary, but once a participant joins, it should be required to stay within its emission allowance or purchase emission credits from other sellers. Provisions could also be made for allowing an entity to obtain additional allocations from the government if it expanded operations or purchased subsidiaries.

Funding Flows

The government would grant each allowance holder the right to sell the allowances internationally as long as the entity's domestic emissions were covered first. Thus, funding would flow directly to the holder who sells the AAU or its equivalent. The government could revoke this right if a company becomes insolvent, sells more than it is allowed, or otherwise violates environmental regulations.

Compliance System

The government would still maintain its obligation to keep total domestic emissions within agreed levels based on the FCCC and the Kyoto Protocol. A domestic emission trading system, such as the one proposed here, would serve as one of several policy instruments that a country could use to help ensure compliance, since participants would have to agree to limit their emissions in order to obtain the right to sell excess emission allocations.

In addition, each company or participant would have to monitor its emissions and provide the government with detailed emission data. This data would be used to check for compliance. The government would also likely institute a verification program under which it could conduct independent checks on emission allocation holders for compliance. The monitoring system would need to be computerized and possibly linked to government registries through the internet. Governments might want to require that emission allocation holders re-certify their monitoring systems every few years to ensure accuracy and reliability. The government would also need to track the transfer of emission allocations and AAUs to other parties, both domestically and internationally. This would tell the government how much each participant was allowed to emit and the size of the total remaining domestic emission budget.

Example: RAO EES Rossiya

The following example might help illustrate how an emission trading system with involvement of emitters might work in actuality. Initially, companies allowed to participate in emission trading would likely be large with well-established monitoring systems. RAO EES Rossiya is the largest Russian power company; it is currently majority state owned. It owns the country's regional generation companies, which in turn own over 70% of Russia's power generation capacity. It also controls 70% of the Russia's distribution system.[11]

RAO has voluntarily conducted a detailed inventory of its own greenhouse gas emissions; the U.S.-based organization Environmental Defense, is now reviewing this inventory. The inventory could serve as a first step in helping RAO EES Rossiya create a comprehensive greenhouse gas monitoring system. Such a monitoring system, in turn, could help certify RAO EES Rossiya for a domestic emission trading system.

Once RAO EES Rossiya meets all the government-established criteria for participating in an emission limitation and trading system, the government would allocate it a set number of AAUs or AAU equivalents. To improve transparency and simplicity, this number should preferably be established by a baseline or formula and not by negotiation. The government would need to assign these emission allocations to RAO EES Rossiya in a national registry to ensure that they are not counted twice.

RAO EES Rossiya would keep track of its actual emissions with its monitoring system, and transmit emission data to the federal government on a regular basis. The government would use this data to determine if RAO EES Rossiya were within its emission quota and if AAUs were available for sale. The government would also want to independently verify the data on a periodic basis.

RAO EES Rossiya could then sell any emission allocations that it would not need between 2008 and 2012. The company could use the proceeds from these sales to finance improvements in its existing power plants. For example, RAO EES Rossiya might want to purchase new, more efficient turbines or boilers. These investments would help RAO EES Rossiya better serve its customers, lower its costs through energy savings, and generate additional emission reductions that could then be sold. As soon as the sale occurs, RAO EES Rossiya would need to register it with the national registry, which would decrease RAO EES Rossiya's allocation. Finally, the national registry would inform the UNFCCC Secretariat, and Russia's total allocation would be reduced.

Conclusions

How emission trading is implemented at the national level will be critical to its effectiveness as an environmental policy tool. National systems to complement international emission trading should ideally have several goals:

- Ability to promote new emission reductions by providing direct incentives to emitters;
- International credibility (including monitoring and verification systems); and
- Feasibility, both to launch the system (political) and manage it (administrative).

---

[11] RAO EES Rossiya website: http://ues.elektra.ru/en/; Energy Information Agency, U.S. Department of Energy, "Russia" Country Report at http://www.eia.doe.gov/emeu/cabs/russia.html.

While many nations may opt for a combined system, it is important that they allow the private sector—actual emitters—access to emission trading. An emission trading system that involves actual emitters will be more sustainable over the long term because it will create strong incentives to continuously reduce emissions.

Some governments argue that allowing so many participants access to emission trading is not feasible, yet it should be possible to create a system with private sector involvement that grows as the capabilities of the system grow. For example, a government initially could allow the private sector direct access to only 20 or 30% of the country's AAUs, most of which would remain in the country to cover domestic emissions. Over time, the percentage of AAUs allocated to the private sector could grow, possibly through annual review processes or auctions. The remaining AAUs would stay in the hands of the government, which the government could trade if they were not needed domestically.

It is also very important that international negotiations do not inadvertently thwart the role of the private sector and actual emitters in emission trading. For example, requiring a country to establish a carbon fund as part of the negotiations on emission trading rules could ultimately backfire, causing unintended difficulties in reducing emissions in the future. Likewise, encouraging Annex I countries to use all proceeds from emission trading for general revenue could hinder these countries' future ability to achieve new emission reductions, although it might entice the countries to support emission trading in the near term. In short, the design of emission trading programs at the domestic level is critical and should not be overlooked or used as an insignificant bargaining chip in negotiations on emission trading. Current proposals to allow legal entities to participate in emission trading could also play an important role in promoting private sector involvement.

Whatever the ultimate design of greenhouse gas emission trading systems on both the international and national level, involving the private sector from the beginning is key. This lends credibility to emission trading by fostering real emission reductions. Involving the private sector also will likely lower total costs of compliance globally and make the goal of protecting the climate that much easier to achieve.