


Executive Summary

Effective response to the threat of climate change will require the global economy to shift to a low-carbon energy system in the coming decades. This transition may entail huge costs which policy makers want to minimise. A least-cost approach also improves public acceptability, minimises various economic impacts, and helps achieve climate stabilisation. Emissions trading is one effective means to reduce the cost of abating greenhouse gas emissions, at both international and domestic levels. Emissions trading's underlying principle is simple – sources are liable to meet emission objectives, in the form of tradable emission allowances, which must match emission levels. A source with cheap emission reduction opportunities can sell unused allowances to another that faces high abatement costs. Such transactions reduce the compliance costs and eventually create a price for allowances, which guides all sources' decisions to reduce emissions.

The 2005 entry into-force of the Kyoto Protocol spurred international carbon markets. Emissions trading systems are being developed, covering regional emissions from large industries, but are also being established at sub-national levels. Carbon markets promote projects in developing nations and those with economies in transition, which generate units of traceable emission reductions. With current energy policies, annual demand for allowances by OECD member countries should range between 800-1 100 million tonnes of CO₂ equivalent, over 2008-2012. Emission trends of countries with economies in transition (primarily Russia and Ukraine) show enough potential supply of allowances to satisfy this demand. Projects undertaken under the clean development mechanism (CDM) will also generate emission credits for use by industrialised countries.

Experience to date and current research on climate policy produce the following insights:

- Emerging emissions trading systems promise active trading and a potentially powerful price signal on the unit cost of carbon emission reduction to guide corporate budget decisions. The EU emissions trading scheme which covers the electricity sector and heavy industry caps about half of the European CO₂ emissions.
- The price of carbon does not currently affect all activities emitting greenhouse gases. In theory, domestic trading schemes may expand to incorporate activities beyond large stationary emissions sources. However, policy makers should account for market imperfections in certain end-uses when expanding existing regimes.
- New forms of emissions reduction goals and other features may facilitate more international participation in GHG abatement and in emissions trading. To mitigate uncertainties in reduction costs, these new brands can be: (1) targets indexed to economic growth, (2) a cap on the price of traded carbon, and (3) non-binding targets. However, the energy realities of most developing countries make them less prone to develop broad domestic greenhouse gas trading systems.
- A global market can technically incorporate domestic and regional systems, despite divergences in design.
- The current design of emissions trading systems does not yet provide an incentive sufficient to reduce emissions at least-cost. There is room for improvement.
- Whether domestic or international, emissions trading is not the panacea for the challenge of long term climate stabilisation. Nevertheless, emissions trading has the potential to play an important role as one measure to promote cost-effective emissions abatement.

From an international carbon price to domestic climate policy

Most existing domestic trading systems cover large energy-intensive industries and the power sector, while more than half of energy-related CO₂ and other GHG emissions are emitted elsewhere. As a consequence, the international price of carbon does not permeate the broad energy market and end-users. Countries committed to mitigating climate change have introduced other policies that reduce emissions from activities that have no direct link to the international CO₂ market.

Under the Kyoto Protocol, governments must meet emission targets representing all domestic emissions. The Protocol authorises international emissions trading mechanisms as a means of compliance with emission objectives, a boon to governments seeking emissions reductions at least cost. While they strive to implement domestic trading regimes and other policies to address their emissions, governments in most OECD countries will need to buy allowances on the international emissions market in order to most economically comply with their objectives. Participation will require considerable preparation and should be a priority for governments – on the buying and selling sides alike.

A number of countries – as well as private companies – have created funds to acquire emission units including via project-based mechanisms: the CDM allow generating emission credits for reductions in developing countries; Joint Implementation follows the same logic for reduction projects in industrialised countries. While there is clear demand, the supply of emission reductions, in particular from the CDM, appears to lag behind. Administration of project approval must be streamlined and scaled up to reflect this urgency, though without compromising projects' environmental integrity.

Can domestic trading systems deliver?

Political realities, concerns for competition, uncertainties over the future of the international regime, and the thus far limited experience of authorities in charge of emissions trading systems, hamper system operation at theoretical efficiency. The national allocation plans of the EU emissions trading scheme often lack mandate beyond 2012, though long-term planning is vital to sectors with long-lived capital stocks – power plants installed in the coming decade may operate until 2040, or beyond. Short-term emissions objectives discourage investments in more ambitious GHG reductions, which can only be cost-effective over the course of decades. Greater visibility is necessary now to trigger such decisions. The free allocation of allowances to new entrants and the cancellation of allowances when plants close also undermine the efficacy of the systems, as they do not encourage investors to take full account of the carbon cost. The treatment of these questions requires harmonisation to avoid countries competing to offer better investment conditions to industry at the expense of least-cost GHG mitigation.

At the same time, industrial energy users worry about the cost of meeting their cap and the rising cost of electricity, while much of their international competitors are unscathed. Energy policy makers must address the negative implications of this situation – in particular in removing the barriers to a broader engagement in mitigation and defining appropriate incentives.

From segmented to global market

Linking systems with various design features is feasible technically, although some differences in design may be harder to reconcile than others. Existing domestic systems have proven the feasibility of trade between regimes of emission objectives indexed on growth and those based on absolute caps. A broader issue relates to the emergence of

trading systems that evolved separately and led to different price levels. Investments based on pre-existing price levels may become unfounded as linking occurs and, with it, a new equilibrium price. However, efficiency gains will argue strongly in favour of linking.

Beyond industry

Several design options for systems of emissions trade enable to include domestic sources beyond industrial activities. An *upstream system* shifts the burden of compliance from fossil fuel users to producers and importers. These firms must surrender allowances commensurate with the CO₂ content of their fuel sales inside the country. This option can be implemented in concert with existing, downstream, systems in which sources, large stationary users, are liable for emissions. Because upstream systems would function more or less as a new tax on small energy users, acceptability rests on credible ways to return the rent to the public.

Further, while a higher fuel price is conducive to less energy consumption in principle, a number of market imperfections stand in the way of an effective response to price changes. In “landlord-tenant” situations, energy users have little or no control on their energy using equipment and are therefore unlikely to react effectively to a price signal. These obstacles must be first addressed if the price signal of carbon markets is to be effective.

Transport is a priority for climate policy, being responsible for a quarter of global CO₂ emissions and the second fastest growing source after power and heat generation. As an alternative to an upstream system, car manufacturers could be made responsible for the CO₂ emissions of their products. This would foster quicker technical improvements in new cars, yet fuel use by these cars, the source of CO₂ emissions, would not carry an additional cost. If applied, emissions trading may not sufficiently reduce CO₂ emissions in road transport by itself, but provide transport, in the short run, with cheaper mitigation options from other activities.

The international civil aviation organisation endorsed the further development of emissions trading systems for international aviation open across economic sectors. It would curb these rapidly growing emissions, the bulk of which are not currently included in countries' emission inventories.

Broadening international participation

New types of emission targets will allow countries that have not ratified the Kyoto Protocol, nor have adopted emission targets yet, to participate in international emissions trading. Regardless of stance on the Kyoto Protocol, all nations would benefit from options to mitigate uncertainty surrounding GHG reduction costs. Dynamic targets, indexed to actual economic growth, could accommodate fluctuations in emissions related to changes in economic growth. Caps on the price of traded carbon could help industrialised countries to adopt more ambitious targets by adding certainty to their costs, alleviating a concern that may otherwise prevent participation.

Non-binding emissions targets allow developing countries to sell allowances on international GHG markets if their emissions are lower than an agreed level, without requiring them to buy if emissions are above. Were the international community to agree to this type of target, developing nations would be encouraged to look for domestic potentials for mitigation, which they could finance with international GHG markets, without compromising economic development.

Despite the theoretic allure of emissions trading systems, practicalities of developing nations' energy use often prevent an extensive use of domestic emissions trading. Persistent energy poverty, the paucity of conservation incentives in most energy sectors, and the institutional requirements of domestic trading all hamper developing nations' participation in emissions trade. Low energy prices and available income would make the pass-through of an internationally-determined price of carbon difficult to accept. Traditional reliance on biomass as a

principal fuel source suggests that discouraging the switch to relatively efficient fossil fuel technology could be counterproductive to public health, the local environment and economic growth. Architects of energy policy in developing nations especially must ensure the return of any carbon rent to fossil fuel consumers.

Short of country-wide commitments, mechanisms can be envisioned to credit countries for reductions in specific sectors, based on targeted policies, e.g. in the transport or buildings sector, and sector-wide targets for industries. At domestic level, heavy industry and power generation seem most suited to structure emissions trading.

Transnational sectoral targets for global industrial activities that are concentrated among few players also offer an avenue for broader engagement in mitigation, with possibilities to link with international carbon markets. This idea is gaining ground as it may solve competitiveness concerns that hamper progress in international climate policy, although implementation may be complex.

Industrialised countries may adopt dynamic targets as well, or introduce price caps in future architectures. Price caps would take the form of unlimited supplementary allowances at an agreed price. Ideally, a cap on the price should be set above the anticipated marginal abatement cost. A much lower level would turn the cap into a tax and cancel the environmental benefits of more ambitious targets. When planning to link schemes of differing incentives, architects must account for the selective application of price caps, especially if the system includes several price levels or non-binding targets or both. In any case, only countries or entities in compliance should be allowed to sell on the markets. Different price caps across countries, if they were activated, would require a careful management of transactions, and may affect the carbon market's efficiency.

Dynamic targets, non-binding targets, price caps, all may encourage countries to adopt relatively more ambitious targets. These options reduce cost uncertainty, at the expense of greater uncertainty on short

term abatement. However, because climate change is a cumulative issue, long term emissions trends matter more than short term variations.

Other policy instruments will be needed

What role will emissions trading play in the multilateral abatement of greenhouse gas emissions? Emissions trading provides market players and policy makers with information thus far absent from decision-making: the actual, unfettered cost of GHG mitigation in a range of economic activities. With cost-effectiveness delivered by the market, emissions trading allows policy making to focus on the acceptability of efforts required from various players through the allocation process, both at domestic and international level. As such, emissions trading appears foremost among instruments to mitigate greenhouse gas emissions.

Emissions trading is not necessarily practical to limit GHG from all sources; additional measures must shift energy systems away from carbon consumption. A number of market imperfections impede rational energy choices leading to lower, more efficient energy use. Current carbon markets only provide a short-term view; the long-term challenge of climate mitigation is not fully reflected in today's carbon prices. The spill-over effects of private R&D deter companies from engaging in appropriate technology developments. Government intervention in this domain is needed to foster new technologies, to go beyond existing short term abatement potentials, and significantly reduce GHG emissions from the energy sector.