

# Comments on the Discussion Paper “Emissions Reduction Trading System for Ontario” issued March 24, 2001, by the Government of Ontario

Andrew Muller  
Department of Economics  
McMaster University, Hamilton, Ontario  
mullera@mcmaster.ca  
June 24, 2001  
with minor corrections July 5, 2001

## *Abstract*

*The proposed system undermines the “tough, new regulations” in the electricity sector by allowing it to meet its cap with low-cost or ‘anyways’ credits. The system could evolve into an effective policy if it were accompanied by credible, increasing and binding constraints on emissions or emission rates in the non-capped sectors. Even then, a pure cap-and-trade system is likely to be more transparent and less administratively difficult.*

*Restrictions on the use of ERCs and foreign allowances may be justified if the quality of ERCs is in doubt. They would be less important under an effective system of tradable performance standards. Banking is useful in maintaining price stability and should be permitted unless it is expected that aggregate emissions will be rising in the future. The government should retain the right to conduct a random audit of emission reduction credits offered for redemption. The Discussion Paper’s concern about double counting is well founded and its solution reasonable.*

*Many of the issues arising in the design of emission trading plans can be studied in the laboratory. Expertise in conducting laboratory experiments in Economics may be found in Ontario, especially at McMaster University.*

## **Introduction**

I am pleased to have the opportunity to comment on this discussion paper. My comments are based on my position as Professor of Economics at McMaster University. My areas of specialization include Natural Resource and Environmental Economics. I have a special interest in the area of emissions trading. Together with my colleagues and former students at McMaster University I have published a number of journal articles dealing with the design of emission trading systems. These articles are based on laboratory experiments which investigate the response of controlled economic markets to changes in institutional rules. In particular I have investigated the properties of emissions trading with shares and coupons, of the type recommended in Ontario in the early 1990s, and I have investigated whether monopoly and monopsony power can be manifested in emissions markets conducted under the double auction

mechanism. I have also participated in emissions trading policy discussions in the Regional Municipality of Hamilton-Wentworth and have organized a seminar on emissions trading for regional staff and councillors.

## General Comments

The discussion paper proposes a hybrid system for NO<sub>x</sub> and SO<sub>2</sub> emissions trading in Ontario, in which the fossil fuel portion of the electricity generating industry would be regulated under a mandatory cap-and-trade system while the rest of the province would be allowed to create and sell emission reduction credits (ERCs) for project-based reductions of emissions below a specified baseline. The baseline would be calculated as the emissions rate per unit of activity in the year before a project was undertaken times the amount of activity during the first five years of the project's life. ERCs could be sold to entities in the capped sector. Entities in the capped sector would receive tradable emissions allowances in amounts specified in the discussion paper. Entities in the capped sector would be required to retire one ton of allowances or ERCs for every ton of gross emissions.

The announced purpose of this plan is "to accelerate reductions in emissions of specific pollutants that contribute to air quality problems in Ontario." The proposed trading plan could evolve into an effective instrument for this purpose. As presently written, however, *the plan is seriously flawed because it does not propose mandatory and increasingly binding limits on emission rates in the non-capped sector.* Without such limits, there is no effective control on total emissions of SO<sub>2</sub> and NO<sub>x</sub> in the province. Even worse, the proposed rules allow the creation of "anyways" credits, that is, credits for actions that would have been undertaken even in the absence of the trading plan. "Anyways" credits allow power generators to increase emissions without leading to any offsetting reduction in emissions in the uncapped sector.

Even if the ERCs generated by the non-capped sector are additional to normal operations, they may still represent very low cost ways of reducing emissions. As ERCs generated in these low-cost ways are offered to the market, they will reduce the price of both ERCs and allowances. As allowance and ERC prices fall, firms in the capped sector have a reduced incentive to control emissions. Thus the system proposed in the discussion paper actually weakens the effect of the apparently "tough new regulations" for fossil fuel generators.

The system proposed in the discussion paper *could* evolve into an effective instrument for environmental regulation in Ontario, but *only if it is accompanied by binding constraints on emissions or emission rates in the non-capped sectors.* This would transform the proposed plan into a plan for tradable performance standards. If the province were to set performance standards (emission rates) for all major industries in the non-capped sector, if the baselines calculated using these rates were consistent with aggregate provincial emissions objectives, and if firms failing to meet the baselines were required to purchase and retire ERCs to offset the deficiency, then trading would result in the prescribed aggregate emissions rate being reached as cheaply as possible.

Such a system of tradable performance standards would be much better than the system proposed in the discussion paper, because it would provide a strong monetary incentive for emission reduction in the non-capped sector. In fact, it would be equivalent to a cap-and-trade system in which the cap is allocated on the basis of output or some other measure of activity. Because a cap-and-trade system is conceptually and administratively simpler than a baseline-and-credit system, I recommend that the Government focus on cap-and-trade as the ultimate goal, if not the immediate one.

Even though a system of tradable performance standards is better than the proposed system, it may not be the best system for the Province to adopt. In addition to the administrative complexity just noted, a system of tradable performance standards is equivalent to an emissions tax plus an output subsidy. As such, it creates an incentive for polluting industries to expand their output so as to procure additional credits. From the point of view of economic efficiency it would be preferable simply to impose an emission fee on SO<sub>2</sub> and NO<sub>x</sub> emissions. The proceeds of the fee (think of it as an environmental user's fee) could be used to reduce payroll taxes, income taxes or property taxes, thus increasing the government's ability to offer tax cuts in these areas.

If an emissions trading system is adopted, it would be preferable for the province to sell emission allowances rather than to distribute them freely as gratis allocations or regulated baselines. The reasons for this are presented the report of the Tradable Permits Working Group. In brief, auctions raise funds which can be used to reduce taxes in other areas of the economy. They also ensure that the average cost of output reflects the full cost of production, including the use of environmental inputs.

In summary, the present proposals for emissions reduction trading are inadequate and misleading unless they are accompanied by specific and credible plans to extend mandatory and binding baselines into the non-capped sector. If they are accompanied by such plans, then the present proposals will be an effective method for reducing the cost of complying with environmental regulations. Even then, however, the proposals would be inferior to a provincial cap-and-trade system or a system of emission fees.

In the following sections I offer some comments on specific issues raised in the discussion paper. Before doing so, I should like to acknowledge that I have had an opportunity to read the draft comments on the Discussion Paper prepared by the Group Having an Emissions Trading Theory for Ontario. That group makes a strong argument in favour of mandatory and declining baselines for non-capped sources. I agree that their proposal would substantially strengthen the system proposed in the Discussion Paper. On the other hand, I cannot support their proposal to grant credits for emissions reductions generated off-site.

## **Trading Credits and Allowances (pages 7 and 8)**

This section enumerates the advantages of trading emissions allowances and emissions reduction credits. This section is somewhat misleading. The key advantage of emissions trading is that it

reduces the overall cost of meeting regulatory constraints on emissions. The discussion on page 7 leaves cost minimization to the end of the list of advantages, thus effectively reducing emphasis on it.

Moreover, the first advantage claimed for emissions trading is misleading. The Discussion Paper claims that “trading creates incentives for emissions reductions beyond those required by regulation.” This is true *only* to the extent that a certain fraction of credits traded will be retired (see Issue 6, page 23 of the Discussion Paper). Aside from this feature, every ton of emissions reduction generated by a seller of credits is offset by an increased ton of emissions by a purchaser. Thus emissions trading in itself does not create any incentive to reduce aggregate emissions below those required by regulation.

The distribution of SO<sub>2</sub> allowances is not discussed in the paper. This leaves the impression that OPG will receive all the SO<sub>2</sub> allowances. This should be made explicit.

## **Issue 2: Use of ERCs and Allowances**

This section suggests that retirements of ERCs by an entity should be limited to a specified fraction of 33% (for NO<sub>x</sub>) and 10% (for SO<sub>2</sub>) on the grounds that this will require emissions from capped generators to be lower than their base year emissions. The reasoning behind this claim is not clear.

The only strong reason for limiting the use of ERCs and foreign allowances is doubt about the quality of these credits. There would be no need for these limits if the Emissions Reduction Trading System were accompanied by mandatory and increasingly binding performance standards in the non-capped sector. In the absence of such binding emission standards, limits are required to prevent excessive dilution of the cap in the capped sector.

## **Issue 3: Airshed, Distance, and Directionality**

The document is correct in noting that the issue here is whether the increased accuracy of modeling impacts on local air quality is offset by the costs of increased complexity and reduced liquidity in the permit market. As in the previous Issue, the appropriate position depends on whether the trading system is embedded in a system of increasingly binding performance or emission standards. If both Ontario and the surrounding US states adopt effective aggregate constraints there may be a case against imposing distance and directionality constraints. If they do not adopt binding standards, then distance and directionality constraints are important to prevent dilution of the cap in the capped sector.

## **Issue 4: Banking of ERCs and Allowances**

The Discussion Paper proposes that banking of ERCs and Allowances be allowed without

restriction. Banking provides a method of moving emissions across time. Banked permits represent an additional reduction of emissions in the present that will be offset by increased emissions in the future. Thus banking effectively shifts emissions forward in time. Banking will be environmentally beneficial if the marginal damage caused by one ton of emissions is expected to fall over time. Conversely, banking will be environmentally damaging if the marginal damage is expected to rise over time.

Consequently, unrestricted banking is clearly advantageous only if the trading system is embedded in mandatory and increasingly binding constraints on emissions in the non-capped sector. If such constraints are not present, we may assume that the future will be more polluted than the present. In this case, banking should be restricted because the damage done from future emissions will exceed the gains obtained from current reductions.

Laboratory evidence produced and reviewed by me and my colleagues amply demonstrates that some form of time shifting of emissions, such as provided by banking, is essential for price stability. Without some form of banking, an unexpected surge in demand for the output of polluting firms could drive up prices dramatically. Banking greatly reduces the occurrence of extremely high and extremely low permit prices. However, the advantage gained from unlimited banking can also be achieved by much more restrictive plans, such as allowing permits to be banked for a limited time interval or by issuing staggered permits, with one-half expiring every compliance period. Therefore there is no need to permit unrestricted banking on these grounds.

## **Issue 5: Allocation of Allowances to Capped Emitters**

The Discussion Paper proposes to segregate the pool of allowances in 2004. A certain number of allowances will be reserved for non-OPG sources. These allowances will be allocated at the end of the compliance year in proportion to the relevant firm's output.

It is not clear whether this process is to occur annually or simply in the first year. In any case, allocating a fixed number of allowances in proportion to current output creates a "common property" dilemma similar to that faced in the fishery with a first-come, first-served total allowable catch. In the case of the fishery, this induces excessive costs as fishermen race to catch as much as possible of the quota before it is claimed by others. In the case proposed in the discussion paper, firms have an incentive to excessively increase their output of electricity in order to capture a larger share of the allowances. This will tend to increase the aggregate output of electricity and aggregate gross emissions from the electricity sector and the demand for emissions reduction credits. Unless the ERCs are of equivalent quality to allowances (i.e. unless they have been generated from an effective tradable performance standard system), aggregate emissions in the Province will rise.

As I mentioned in my introductory comments, it would be preferable to allocate the allowances to new firms on the basis of a *revenue-generating* auction.

## **Issue 11: Verification of ERCs**

The Discussion Paper proposes that MOE will accept any credit which has been certified by a nominated third party and which confirms to Ontario's regulations concerning such matters as distance and directionality. It rejects Option 1, which would have permitted MOE to conduct a detailed review of randomly selected ERCs. Moreover, the liabilities of users of ERCs extend only to providing evidence that the ERCs being retired have been certified.

Surrendering the right to conduct random investigations of ERCs would severely reduce the credibility of the trading program. It is equivalent to the governments' surrendering the right to examine income tax returns prepared by authorized chartered accountants. No government should assume that the private sector will automatically follow prescribed regulations in the absence of a monitoring and enforcement mechanism.

On the other hand, allowing the public to comment on individual cases would greatly increase the uncertainty inherent in using ERCs and would greatly reduce their value to purchasers. This part of Option 1 should be rejected.

I support the line of argument, developed on page 32 of the Discussion Paper, that making users liable for invalid ERCs would create the proper incentive for ensuring that ERCs are valid. There is some laboratory evidence demonstrating that buyer liability can encourage sellers of permits to be more careful in verifying the permits they offer for sale. Users of ERCs should be required to replace any ERCs which have been found invalid on the basis of a random audit. In turn, they should have legal recourse against the seller of the permit or the certifier of the ERC.

## **Issues 14 and 15: Double Counting and Credits for Off-Site Reductions**

The Discussion Paper correctly emphasizes the importance of avoiding double counting of emissions reductions. It points out that allowing firms to create credit for demand side management programs or new power generation projects could lead to the same emissions reduction receiving double credit: first as an ERC for the entity undertaking the DSM or new power project and second as a reduction in the allowances which the capped entity must retire. This effectively provides the capped entity with surplus allowances that it can use or sell. The effect of double counting is to increase aggregate emissions in the province, because the one ton of reductions which generated the credit will be more than offset by two tons of increased emissions (one from the ERC and one from the surplus allowance).

The Discussion Paper proposes to deal with this problem by refusing to create ERCs for programs which displace power production and emissions at capped generators. This is an eminently sensible way of dealing with the problem.

The three Options considered on pages 35 and 36 have serious flaws. Option 1 clearly

involves double counting and should be rejected out-of-hand. Option 3 is untenable for the reasons described above at Issue 5. Option 2 is superficially plausible. It could be argued that *not* granting some of the cap to new sources constitutes a subsidy to “dirty” fossil fuel generation. However granting credits to new power sources for power generation displaced at off-site capped facilities generates a double advantage for the new source. First, the new source has an advantage because it does not need as many credits or allowances as the existing capped sources do. Therefore its costs are lower. Second the new source is relatively advantaged because its competitors in the capped sector are granted fewer grandfathered permits and hence receive an additional financial penalty. Similarly, granting credits to Demand Side Management programs gives the firm undertaking the program a double advantage. First it receives monetary benefits from the credits created and secondly it benefits from the additional penalty it places on the fossil fuel sector. Consequently Option 2 should be rejected.<sup>1</sup>

## **Final Comment: The Importance of Laboratory Research**

The design of emission trading systems requires decisions on many items for which field experience is completely or partially lacking. For example, it is not known whether baseline-and-credit systems with a fixed baseline are in fact equivalent to cap-and-trade programs. All we have are theoretical arguments. Similarly, it is not known whether allocating allowances on the basis of output will lead to serious distortions, as alleged in this document. Finally, it is suspected but not known for sure that making buyers liable for invalid permits will increase the incentive for sellers and certifiers to conform to regulatory requirements. It is very expensive and generally impractical to conduct field experiments to answer these questions. It is frequently possible, however, to reproduce the essential elements of a proposal in the context of a laboratory experiment. In laboratory experiments, human subjects make trades subject to rules similar to those proposed for emissions trading. They are paid for their success in making profits in this environment. Such experiments provide tests of the theoretical arguments made in favour of one proposed emissions trading rule or another.

Experimental Economics is a rapidly growing field in North America, Europe and elsewhere in the world. My colleagues and I have substantial experience in designing and implementing computer-based experiments to test proposed emissions trading plans. We also have contacts with others conducting similar research world-wide. We would be delighted to put this expertise to use in helping design an effective emissions trading program for the Province of Ontario.

---

<sup>1</sup>See the Appendix for further discussion of the disadvantages of allowing ERCs for activities by non-capped firms that displace power generation in the capped sector.

## Appendix

### Further Comments on Double Counting, Credits for New Sources, and Subsidies

To understand why Option 2 on page 36 is not desirable, one must recall the distinction between a *lump-sum* subsidy and a *marginal* subsidy. Compared to a system of auctioning allowances in a revenue-generating market, grandfathering existing fossil capacity by granting it a fixed number of allowances constitutes a lump-sum subsidy. The total costs of the capped entity are reduced by the market value of the grandfathered allowances. This may be viewed as fair if the cost of abating emissions in older, established generators is very high and if the new regulations could not reasonably have been anticipated. However, such cost relief should be viewed as temporary assistance. There is no reason to subsidize the abatement costs incurred by new sources. Moreover, if the cost relief is not required by the fossil fuel generators, then grandfathering allowances represents a waste of public funds which could otherwise have been available for improvements in public services or reductions in taxes.

A lump-sum subsidy does not alter marginal costs.<sup>2</sup> The marginal cost of a MWh of electricity will still contain a component representing the cost of the additional credits or allowances the entity must purchase to cover its extra emissions. These costs reflect the additional abatement expenditures that are imposed on society by the increase in power production. In the long run, consumer prices will reflect this full marginal cost of production. Higher prices encourage consumers to reduce power demand.

In contrast, granting credits to a new power source *reduces* the marginal cost of power, because the new source does not need to purchase credits to cover its extra emissions. In fact the new source receives a monetary benefit from any surplus credits it can generate and sell. This creates an artificial incentive for new sources to expand. The expansion puts downward pressure on electricity price and reduces the incentives for consumers to reduce consumption. As the new sources expand, their own emissions add to the provincial aggregate. Under Option 2, a fixed annual tonnage of credits will have been set aside for these firms. In this case the emissions of the capped sector will not change, but their reduced holdings of allowances will have a lower market value. This decreases the lump-sum subsidy. As argued above, the original lump-sum subsidy was rationalized on the ground that it is very expensive to alter the emissions rate of an established power station and consequently that requiring such a station to purchase all its permits will lead to financial distress. But if the capped sector requires its grandfathered permits to survive, setting some of them aside for new power sources will increase financial distress. If the capped sector does not require the grandfathered permits to survive, it should not have been granted the permits in the first place.

---

<sup>2</sup>Marginal cost is the amount by which total costs increase when output increases by one unit.