

Using Emissions Trading to Regulate U.S. Greenhouse Gas Emissions

Part 2 of 2: Additional Policy Design and Implementation Issues

I N T E R N E T E D I T I O N

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Introduction

In Kyoto, Japan, in 1997, the U.S. government agreed that between 2008 and 2012 it would limit average annual emissions of green house gases (GHGs) to seven percent below 1990 levels. Participants in the climate policy debate are expressing considerable and growing interest in the use of an “emissions trading” policy to achieve these limits. Through the trading of emissions permits, society as a whole benefits from having environmental goals achieved at lower cost than command-and-control. Over time, GHG controls implemented by permit trading will induce investments in the development and diffusion of new technologies (such as renewables and enhanced energy efficiency) for reducing GHG emissions. Several recent experiments with emissions trading to control other pollutants, notably the phaseout of lead in gasoline and the ongoing reduction of SO₂ emissions from electric utilities under Title IV of the US Clean Air Act, suggest that an emissions trading policy is very promising. However, there is still considerable debate and some confusion about how a GHG emissions trading program would be organized and operated in practice.

In the first of two issue briefs devoted to the subject of U.S. GHG trading we considered a number of basic questions related to designing and implementing a domestic system. In this paper we consider additional issues related to initiation of trading and the treatment of early reduction credits; provision of flexibility in the timing of emissions reductions (the “borrowing” issue); and interactions of

This issue brief is adapted, in part, from the longer RFF discussion paper, *Using Emissions Trading to Regulate U.S. Greenhouse Gas Emissions: An Overview of Policy Design and Implementation Issues*, by Fischer, Kerr and Toman. To download the discussion paper as a PDF file, on the internet go to http://www.rff.org/disc_papers/1998.htm. To order it in hard-copy (paper), call RFF’s fulfillment office at (202) 328-5025. Reference discussion paper 98-40.

permit trading with the tax system. As in the first paper, we consider the overall cost-effectiveness of alternative approaches (including administrative costs), their distributional implications, and political economy considerations.

Our fundamental conclusions are:

- There are potential cost savings from allowing reductions prior to the beginning of the commitment period to be banked for use after the commitment period begins. However, this approach requires an economically and environmentally defensible baseline for assessing early reductions, and a change in the Kyoto Protocol.
- Allowing permits to be borrowed from future commitment periods also has the potential to substantially reduce the cost of compliance. However, to implement such an approach it is necessary to determine how tighter future constraints would be made credible for current decisionmakers, a problem that has not yet been solved.
- The efficiency of permit markets will be reduced somewhat by broader distortions in the economy related to the tax system's treatment of capital gains. These distortions will be smaller if permits are auctioned than if they are distributed gratis. If permit are issued gratis, they should be taxed on their market value.

Early Reduction Credits

A key question is how any pre-2008 reductions of GHG emissions or fossil fuel use would “count” in terms of compliance with subsequent regulatory limits. Some early reductions will be undertaken as firms prepare for the binding targets in the future. There are benefits also from beginning trading somewhat before the beginning of the commitment periods in order to provide a chance for participants to gain experience with the system, and to learn about what prices equate the demand and supply of permits.

The overall cost of compliance could be reduced if low-cost early reductions were banked for use when the compliance period commences, increasing the total level of emissions permitted during the commitment period but holding constant (or even reducing) atmospheric concentrations of GHGs. For example, it may be possible for the utility sector to alter the utilization of existing generating facilities to produce nontrivial reductions in GHG emissions (by running gas plants a little more, and coal plants a little less) at fairly low cost. Some of these activities will be undertaken before 2008 in any event, as fossil fuel suppliers and GHG emitters prepare for future compliance (assuming they believe the Protocol will be enforced). However, it seems likely that at least some of these low-cost opportunities for reducing emissions are lost if “scoring” emissions reductions is delayed to 2008.

This approach is not currently an option under the Kyoto provisions. Right now bankable early reductions are possible only through actions by industrialized “Annex I” countries to reduce emissions in developing countries through the “Clean Development Mechanism.” Banking industrialized countries’ own early reductions would require changes to the Kyoto Protocol. Any such crediting depends on the establishment of credible, internationally recognized baselines for assessing the early reductions. One concern of environmentalists with early reduction banking is that it would implicitly undercut the emission reduction targets of the Protocol, which were predicated on the expectation of interim reductions. This concern must be traded off against the desire to reduce the cost of compliance (and thus increase the prospects for compliance) in establishing the baseline for measuring and crediting early reductions.

Another proposal would divide up post-2008 in part on the basis of who undertook early reductions. However, other than the social value provided by early experimentation with emission control, this strategy amounts to government encouragement of uneconomic rent-seeking. Additional costs would be incurred early with no reduction in future compliance requirements, just a redistribution of the rents generated by those requirements. For this reason, we believe it is better to determine an economically and environmentally acceptable approach for banking early reductions.

Flexibility in the Timing of Emissions Reductions

As we discussed in the previous issue brief, banking of unused permits is important for improved efficiency when regulatory targets are such that marginal control cost is rising over time faster than the relevant rate of interest. Under these circumstances, some permits are more valuable when used to offset future abatement costs than if they are used today. This kind of arbitrage improves market efficiency in the same way that intertemporal contracting and inventories improve the efficiency of conventional commodity markets.

By the same token, long-term borrowing against future allocations to meet nearer-term targets will be attractive if the price of permits otherwise is expected to rise more slowly than the rate of return on other assets, indicating a disproportionate short-term burden of controlling GHG emissions relative to the longer term. This could occur because the composition of energy-using capital is more flexible in the longer term than in the shorter term, and because tougher short-term requirements provide relatively less opportunity to embed technical improvements over time. If carbon permits can be borrowed from the next commitment period, unnecessary short-term costs from excessive capital obsolescence can be avoided and there will be a greater prospect for incorporating new technical innovations into investment decisions over time. The same kind of flexibility could be provided if, instead of issuing permits only for the first commitment and allowing borrowing, regulators provided stocks of permits for long periods of time and allowed holders to freely allocate them over time as well as among participants in the GHG market.

Modeling studies (see Further Reading) suggest that emitters can stabilize atmospheric concentrations of GHGs at far lower cost (well over 50 percent savings), with little or no adverse climate change

implications in the short-to-medium term, if emitters can maintain significantly higher emissions in the next couple of decades than are allowed under the Kyoto Protocol. During these decades they would begin to install higher-efficiency capital that will allow much lower emissions subsequently. A key element of these models is that assume emitters or fossil fuel sellers view future constraints on GHGs as credible, and that in anticipation of these future constraints emitters rationally begin to adjust their capital stocks in advance.

Critics of these analyses have raised several objections. One is that postponement of short-term emissions reductions, by lowering energy prices below what would have occurred with tighter standards, also will retard some induced innovation and learning-by-doing that is assumed by proponents to be available in the future. Note that innovation will not be neglected entirely if participants in the GHG market do anticipate tighter future controls. However, to the extent that innovation is slower than is assumed in the abovementioned modeling studies, reaping the cost savings pointed to by advocates of borrowing might require increased government commitments to R&D. (A more complex question, which we do not address here, is what level of public and private R&D actually is desirable, and the extent to which a desirable level will be undertaken when a policy like emissions trading is imposed.)

Critics of borrowing also have raised more fundamental questions related to consistency and credibility of policy over time. What is to stop emitters from rapidly depleting their endowments of permits in anticipation that today's regulators will not be willing to impose sanctions in a few years? Moreover, if future regulatory actions to enforce repayment of borrowed permits are not seen as credible, then some needed investments in R&D will not be undertaken. In addition, what would prevent future regulators, who will themselves have incentives to defer control costs, from not going along with the higher control cost burdens that a current decision to defer abatement would place on them? And if emitters today anticipate this possibility, then the long-term credibility of the program also is undermined.

These problems might be countervailed if new, significantly lower-cost ways to limit GHG emissions are discovered and diffused, perhaps with government support, so that postponement is less attractive. Another possibility is that if permits are sold well in advance (but cannot be used in advance), then private holders will have an incentive to resist subsequent efforts by the government to add permits to the system and create capital losses on banked holdings.

Because the potential cost savings from providing increased intertemporal flexibility are so great, it is important to continue to investigate ways that flexibility might be credibly implemented in practice. The government also could attempt to approximate the results of intertemporal borrowing by announcing a sequence of tighter emission limits over time. With this approach there is still a credibility problem related to whether the government will follow through on a commitment to tighten emissions limits. At the same time, however, the higher cost of stricter near-term emission controls also creates a credibility problem in that it deters compliance from the outset. Unless society has an underlying long-term commitment to reducing GHG emissions and eventually stabilizing their atmospheric concentrations, *no* time path of emissions controls will be credible; and paths with higher costs arguable will be even less credible.

Permit Trading and the Tax System

Any permit system has to operate within the context of the existing tax system. Each system will have an effect on the efficiency of the other, raising important design issues for GHG trading. Of particular concern is the tax treatment of banked permits over time, as general inefficiencies in the taxation of capital income raise some specific issues for intertemporal emissions abatement choices.

Permits are potential assets as well as inputs to production. This dual nature poses a challenge in choosing proper tax treatments and achieving efficiency in the permit market. When market conditions favor banking of permits (that is, when abatement costs are expected to rise sufficiently in the future to warrant holding permits for later use), the taxation of capital gains can introduce distortions in permit markets. One distortion is a “lock-in” effect that stimulates excessive banking of permits. Given the choice of (a) selling a permit and paying tax on capital gains accrued to date, then investing the sale proceeds, and (b) holding the permit in expectation of further capital gains, which will only be taxed when the permit finally is sold, existing permit holders will tend to defer permit sales that might otherwise be economically efficient.

The tax system also creates a kind of reverse lock-in: allowance purchase costs cannot be deducted as inputs until use, which deters purchase of allowances in advance. However, because of the first lock-in effect, the deferral of deductibility is crucial in order to deter inefficient tax avoidance. Without this rule, taxes could be saved by purchasing and immediately deducting allowance costs, and deducting interest in funds borrowed to finance the purchase, while only paying tax on the accrued return when the asset is sold. Still, the same kind of tax arbitrage can occur when permit buyers purchase and fully deduct higher-cost permits while holding permits with a lower cost basis for accrual of gains. This particular scenario can be avoided by a type of FIFO (first-in, first-out) rule.

Inefficiencies arise when permits face different effective tax rates across different individuals. For example, an owner of a permit would require a lower rate of return to holding permits to offset the lock-in effect and sell today rather than hold the asset. But with different cost bases, different owners will require different premia to overcome the particular lock-in they face and sell today. On the other hand, for a buyer to be willing to purchase and hold a permit, she would require a higher rate of return, since she cannot deduct the cost until later. No permit price path can simultaneously make all these actors indifferent to buying, selling, and holding.

Gratis allocation creates more of a bias toward excessive permit banking, the first lock-in effect. This will tend to inefficiently “tilt” the permit price path downward: permits today will be more expensive, and the greater volume of banked permits will lower future price expectations. The excessive tilting of the price path in turn will shift abatement activities inefficiently toward the present. On the other hand, with auctioned permits the bias is against holding, since the deduction must be deferred. In this case, to have banking the price path must inefficiently tilt up; correspondingly, some abatement will be inefficiently deferred.

Ultimately, reducing these distortions would require broader reform of capital gains taxation. Simply eliminating the taxation of capital gains on permits would not eliminate the problems; as long as permits are deductible, gains must be taxed. Otherwise, two permit users could swap permits, with each deducting the full value and neither being taxed on the proceeds. Exempting permits from taxation completely would treat firms symmetrically and get rid of this incentive to “churn.” However, differences in income tax brackets among individuals and corporations mean that different investors still will face different tradeoffs between permits and other assets, and distortions will remain. If permits were tax-exempt then people with high marginal tax rates would invest in them, driving down the rate of return to the low after-tax rate of return these individuals would reap on other assets; consequently, the lower rate of return would cause excessive amounts of early abatement effort. Furthermore, exempting permits from taxation would tend to narrow the tax base, leaving other forms of income-generating activities to shoulder more of the distortionary tax burden.

How substantial are distortions to abatement decisions, as well as the potential loss of tax revenues through arbitrage activity, from these features of the tax system? Recent evidence in the literature on capital gains taxation (see Further Reading) suggests that when people choose to realize capital gains is not that sensitive to tax rates over the long term, implying a relatively small lock-in effect. However, gratis permits pose a larger potential lock-in effect than most assets: since the cost basis for gratis permits is zero, they in effect instantaneously accrue the market value. The incentive to defer gains by holding onto permits is not only the postponement of taxes on the price increases, but also the postponement of taxes on the initial permit price itself. Short of auctioning permits, this problem could be mitigated by taxing the recipient on the market value of the allocation, thereby allowing the initial basis to be the market rate and not zero. Firms would then deduct that market value for the permits they use, so at tax time they would effectively only be liable for gains tax on the gratis permits they did not use.

As we noted in the previous issue brief on domestic trading, a permit system also can interact with the tax system through the generation of auction revenue that can be used to lower existing distorting income taxes. Coupling an auctioned permit system with broad-based income tax reform thus would not only minimize additional labor market inefficiencies, but also lessen tax distortions to the permit system itself.

Concluding Remarks

Our conclusions that the permit system should be upstream, auctioned, and that auction revenue should be recycled are still controversial. However, if one assumes a longer-term national commitment to potentially costly GHG emissions control there is both a fair amount of time for regulatory institutions to evolve and gain public acceptance, and a pressing need to choose the best institutions possible. Without such a commitment, which is currently lacking in the political arena, any discussion of regulatory options is somewhat beside the point. Only time will tell if our proposal gains currency in the 10 years between now and the start of binding commitments under the Kyoto Protocol. Many important practical questions need to be addressed before a GHG trading system in the United States can be constructed and implemented. However, the deployment of a relatively efficient and transparent system seems within our grasp, especially once key issues related to who benefits from the revenues created by such a system are resolved. A well-developed domestic trading system in turn would provide a good foundation for taking advantage of the potential opportunities afforded by GHG trading on an international scale.

Further Reading

General

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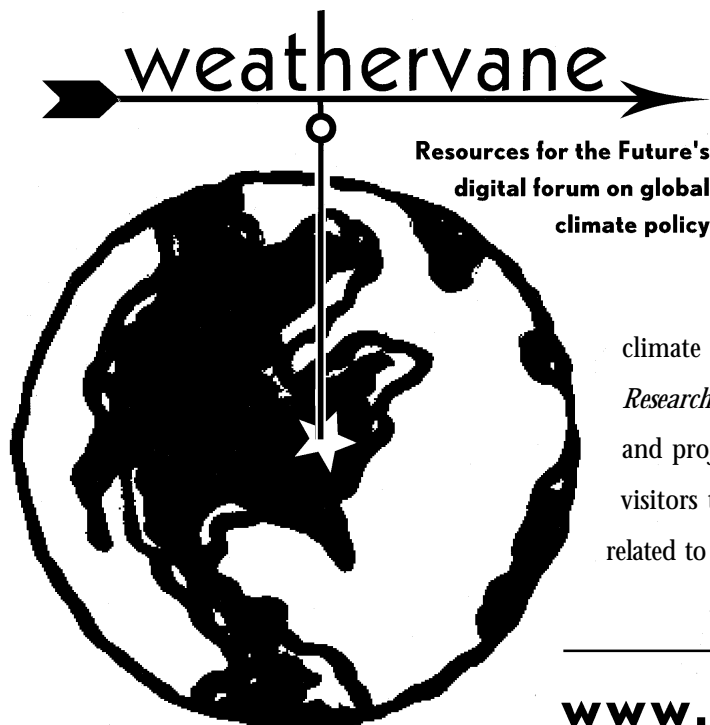
Our editorial aim is to present balanced and objective information, with no one perspective or viewpoint dominating our analysis and reporting. Now with an eye on the Fourth Conference of Parties, to be held in Buenos Aires, Argentina in November 1998, and the stakes potentially enormous on all sides of this complicated issue, *Weathervane* continues to provide a neutral forum for careful analysis to complement the political calculations that so often drive decisions.

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climate change policy and players in the debate; *Research Spotlight*, which reports new climate findings and projects; and *Sounding Off*, an open forum for site visitors to voice their opinions on a variety of topics related to climate change.



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