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OCCASIONAL
P A P E R



Evaluating Options for U.S. Greenhouse-Gas Mitigation Using Multiple Criteria

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Summary

Political support appears to be growing to establish national policies to curb greenhouse-gas (GHG) emissions. Much of the research on different options, particularly in environmental economics, is focused on their overall cost-effectiveness. In the policy arena, however, legislation that relies exclusively on cost-effectiveness as a criterion is probably not going to survive the give-and-take of the political process, especially when the legislation will have such large and differential impacts on a wide variety of producers and consumers.

Environmental-interest groups, elected officials, and the business community have not reached agreement on particular policies to tackle the challenge of substantially reducing GHG emissions. Some interests favor a mechanism to fix the amount of allowable emissions while permitting businesses to buy and sell emission allowances at market-set prices (a *cap-and-trade program*); others advocate for a tax on fossil energy or GHG emissions (a *carbon tax*) or for increased direct regulation. A carbon tax would establish a fixed price for each ton of GHGs emitted but would not establish the total amount of allowable emissions. Direct regulation would prescribe the amounts that power-plant operators, factory owners, automakers, appliance manufacturers, building owners, and others would be allowed to emit. Each of these policies comes with its own set of issues: how to allocate emission permits; which emission sources to tax and at what rates; which sectors to regulate and how; and whether and how to use revenues to assist those disadvantaged by the policies, to finance new energy resource development, or for other purposes.

This paper addresses these concerns by presenting a way to evaluate competing policies using a set of normative criteria. As background for developing these criteria, we reviewed three past attempts to develop policy in the related area of energy consumption, each using a different type of policy. These are the Partnership for a New Generation of Vehicles (PNGV), which involved direct federal investment in new technologies; the BTU (British thermal unit) energy tax, which attempted to tax energy output; and Corporate Average Fuel Economy (CAFE) standards, which regulate energy efficiency in new vehicles. These three initiatives met with varying degrees of success: PNGV produced concept vehicles but dissolved without bringing any to market, the BTU tax failed in Congress, and CAFE was successfully implemented, but the standards remained unchanged for many years.

The lessons drawn from these attempts, both failed and successful, can inform future decisions about the relative merits of certain types of policies—although three examples are not enough to establish these lessons definitively. The need for caution in drawing conclusions is also highlighted by the analytical disagreements surrounding whether taxation or regulation is more effective. Nevertheless, we draw the following general points from our review:

- Investments in technology must be consistent and predictable.
- What to tax is less important in policymaking than who pays the tax.
- It is difficult to achieve multiple goals with a single policy.
- A crisis can present a political opening for making policy that would otherwise fail.
- Technology solutions are easier to pass than price mechanisms because their costs are not explicitly revealed to the public.
- The greater the number of industries affected, the harder it is to pass legislation.
- Once in place, legislation may be hard to change.

Based on this review and additional conceptual reasoning, we developed four normative criteria to evaluate policies. These criteria—cost-effectiveness, fairness of distributional impacts, incentives for innovation, and adaptability of policy—acknowledge a range of important aspects of potential outcomes. Political viability is not separately identified in the list of normative criteria, but it is implicit in the other four. The argument advanced in this study is that it should be possible to modify suggested policy packages along different dimensions of the normative criteria to account for political realities.

We then developed three nominal policy packages—bundles of primary and supporting policies that would be adopted simultaneously—to evaluate against the four criteria. These policy packages are loosely based on existing proposals but are intended solely to illustrate the evaluative framework. The first is a comprehensive carbon tax on all fossil energy, levied on energy producers but assumed to be passed on, in part, to consumers, and whose revenues are used for deficit reduction. This represents the approach most often favored by economists as the most cost-effective. The second is a hybrid cap-and-trade program with free allowances to major fossil-energy users and some upstream suppliers, similar to proposals supported by industry. The third is a package of tighter regulations, including CAFE standards and other energy-efficiency standards in a variety of areas.

The carbon tax with deficit reduction fares best on cost-effectiveness and ranks in the middle on innovation and adaptability but low on distributional fairness and political viability. The inclusion of all energy sources is the main reason for cost-effectiveness. Innovation would be fostered by the market demand for lower-cost technologies, but it would not create a large incentive unless a large levy was imposed. While, in theory, a carbon tax can be raised or lowered, making it adaptable, in practice, adjusting tax rates often encounters resistance. The package is rated low on distributional fairness because deficit reduction does not target specific groups that would be adversely affected by higher energy costs, and it is considered the least politically viable because of its distributional impacts and general resistance to new taxes.

The cap-and-trade program with a significant number of allowances allocated for free shares the rankings of the carbon tax for similar reasons, with the exception that it appears to have higher political viability. This is because cap-and-trade programs with significant allocations of free allowances have been implemented successfully in other sectors to control emissions, and previous bills in Congress have received support from environmental advocates and from energy users who would not have to pay for baseline allowances.

The regulatory package ranks medium on distributional fairness and political viability and low on the other three criteria. Distributional fairness is higher than the other two packages if we assume that regulations will be targeted more heavily toward industries most able to afford investments to reduce emissions. Political viability is medium because, like cap-and-trade, regulations have been successfully introduced and the burden is not perceived to fall

directly on consumers. Cost-effectiveness is low because regulations do not necessarily target industries with the lowest reduction costs and because oversight is needed. Innovation and adaptability are also low, since, in both cases, firms are more locked in to particular technological paths.

We next modified all three policy packages to demonstrate how their ratings for political viability could rise through changes in their design without reducing the ratings on any of the four criteria. The carbon tax could become more politically viable with revenue allocated to programs for technology development and adoption, as well as to assistance for low-income consumers or workers displaced from high-emitting industries or fossil-fuel production. Cap-and-trade could become more politically viable if more allowances were auctioned instead of given away and if revenues were used in a manner that addressed burden sharing. Finally, regulations could be coupled with tax credits to assist some industrial sectors. After these adaptations, all policy packages ranked medium or high in all criteria, except that regulations retained a low score on adaptability and remain less cost-effective than the other options.

The paper concludes with some broad recommendations for creating a successful policy package. These include the following:

- While seeking to rely on incentive-based GHG mitigation policy, include burden-sharing mechanisms that are transparent, means-tested, and limited in scope and duration.
- Couple the mitigation policy with a strategic framework for research, development, and demonstration (RD&D) to reduce long-term GHG emissions, including a clear role for public-sector financing from revenues generated by the mitigation policy.
- In making unavoidable and necessary compromises among competing criteria and interests when designing the policy, seek to limit irreversible commitments in order to maintain the ability to adapt to uncertain and changing future circumstances.