

## Auctions and Revenue Recycling under Carbon Cap-and-Trade

In January, Senior Fellow Dallas Burtraw testified before the U.S. House of Representatives Select Committee on Energy Independence and Global Warming. This article is drawn from his full testimony.

There are not many viewpoints you can get public finance economists to agree on, but one exception is the role of an auction in the implementation of an emissions cap-and-trade program. Compared to free allocation, auctions are, by far, the most efficient way to allocate emissions allowances.

The primary reason is that auctions satisfy the goals of simplicity and transparency, which are important for the formation of a new market for an environmental commodity. Also, they are administratively simple and preclude regulated parties from seeking a more generous future allocation.

Auctions also have efficiency benefits that apply specifically to the electricity sector, which holds the greatest potential for the largest emissions reductions in the first decades of climate policy. Specifically, auctions can reduce the difference between price and marginal cost for electricity generation, a source of inefficiency that is endemic to the electricity industry.

The second and equally forceful reason that economists favor auctions is that they generate funds that can be used to achieve related goals. Depending on how these revenues are used, they can help reduce the social cost of policy significantly. For the purposes of minimizing the cost of climate policy on the economy and promoting economic growth, economists would favor dedicating auction revenues to

reduce preexisting taxes.

Like any new regulation, climate policy imposes costs on households and firms, and that cost acts like a virtual tax, reducing the real wages of workers. This hidden cost can be especially large under a cap-and-trade program because the price placed on the scarcity value of carbon is reflected in the cost of goods that use carbon in their production.

However, one of the most important findings in environmental economics and public finance in the past 15 years is that the use of revenue raised through an auction (or an emissions tax), if dedicated to reducing other pre-existing taxes, can reduce this cost substantially. This so-called revenue recycling

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would have truly dramatic efficiency advantages compared with free distribution. In a study for the State of Maryland, my colleagues and I found that the dedication of 25 percent of the allowance value to investments in end-use efficiency could offset any increase in retail electricity prices that would occur from the state's joining the Regional Greenhouse Gas Initiative, a cooperative effort by Northeastern and Mid-Atlantic states to reduce carbon dioxide emissions. Investing just a portion of the allowance revenues can offset the impact of the policy on consumers, while also advancing climate policy goals, according to our findings.

Auction revenue can also help support the attainment of efficiency in our energy infrastructure more broadly. A small sliver of auction revenues could provide a substantial infusion of support for research and development of new technologies or incentives for investment, such as an investment tax credit aimed at promoting innovative technologies or modernizing industries that are especially vulnerable to the policy.

Finally, a related issue involves adaptation to climate change. Atmospheric scientists tell us that we are already at the point where some climate warming is inevitable and that adaptation will be necessary. Adaptation to climate change will likely involve significant investment by the private and public sectors. An auction provides revenues that can be directed toward these activities. ■

► Dallas Burtraw's full testimony can be found at: [www.rff.org/rff/Documents/CT-Burtraw-Testimony-08-01-23.pdf](http://www.rff.org/rff/Documents/CT-Burtraw-Testimony-08-01-23.pdf).

## The Oil Security Problem

Hillard Huntington

Today, three of every five barrels sold on the world petroleum market originate from insecure regions: the Persian Gulf, North Africa, Nigeria, Angola, Venezuela, Russia, and the Caspian states. Political, military, or terrorist events could disrupt oil markets and quickly double oil prices. If these events happen at a time when monetary authorities find it difficult to control inflationary expectations, a trend much more likely today than just a few months ago, the world could return to the 1970s and stagflation.

Reducing our vulnerability to such events is the main task for oil security policy. Curtailing imports from sources like our major oil trading partners (Canada and Mexico) is unlikely to benefit us. But reducing our imports is important only if we can reduce the market share of vulnerable supplies. Doing so would mean that disruptions will remove less oil from the market and thus cause severe price shocks.

Our vulnerability also depends upon how closely our infrastructure is tied to petroleum use. When disruptions cause oil prices to double, that price applies to any oil used in the U.S. economy, including domestic oil and ethanol supplies. Therefore, efforts to reduce oil demand may be more valuable than efforts to simply replace vulnerable imported supplies.

Pursuing energy security is relatively simple in conceptual terms. The nation is buying an insurance policy against future recessions caused by unanticipated oil price shocks. Today's insurance policy should cost no more than the value of avoiding these possible damages. Higher avoided damages could be due to either a greater probability of a disruption happening

## Climate Change: Addressing Competitiveness Concerns

In March, Senior Fellow Richard Morgenstern testified before the U.S. House of Representatives Committee on Energy and Commerce. This article is based on his full testimony.

Due to the diversity of greenhouse gas (GHG) sources, efforts to address climate change will, of necessity, impact nations, industries, and individuals. In general, pursuing a cost-effective approach that minimizes the overall cost to society of achieving a particular emissions-reduction target will minimize the burden imposed on businesses and consumers.

The first step to addressing concerns about competitiveness should be paying close attention to considerations of cost and efficiency. Broad, market-based strategies—such as an emissions tax or a cap-and-trade program that effectively attach a price to GHG emissions—offer significant advantages. In order to limit hardships on selected industries, however, additional mechanisms to increase flexibility will be required. These could include recognizing offset credits from sectors or gases not included under the cap and from projects undertaken in other countries.

But even with a cost-effective strategy for reducing U.S. GHG emissions, some domestic producers will incur increased production costs and face increased challenges to their ability to remain globally competitive, particularly in trade-sensitive, energy-intensive sectors.

The question will likely be asked: why should U.S. firms be disadvantaged relative to overseas competitors to address a *global* prob-

lem? The difficulty, moreover, is not just political: if, in response to a mandatory policy, U.S. production simply shifts abroad to unregulated foreign firms, the resulting emissions "leakage" could wipe out some of the environmental benefits sought by taking domestic action.

As policymakers consider options to lessen these competitiveness impacts, an important caution is in order. As compelling as the argument for protecting vulnerable firms or industries might be, few provisions or program modifications designed to accomplish this can be implemented without some cost to the environment, as well as to the overall economy. Nor are trade-related actions costless: they might raise legality concerns under World Trade Organization rules or risk provoking countervailing actions by other nations.

Efforts to address competitiveness concerns in the context of a mandatory domestic climate policy typically involve one or more of the following options: weaker overall program targets; partial or full exemptions from the carbon policy; standards instead of market-based policies for some sectors; free allowance allocation under a cap-and-trade system; and trade-related policies, such as a border adjustment for energy- or carbon-intensive goods.

These options can also be mixed and matched to some extent. One option would be to start out with a generous allowance allocation for the most severely affected industries, which could then be phased out at a future time, either a certain date or once trade-related measures were in place or other key nations adopted comparable climate mitigation policies. In general, the more targeted policies will be difficult to police and many industries will have strong incentives to seek special protection by taking advantage of these various mechanisms without necessarily being at significant competitive risk. ■

► Richard Morgenstern's full testimony can be found at: [www.rff.org/rff/Documents/CT-Morgenstern-08-03-05.pdf](http://www.rff.org/rff/Documents/CT-Morgenstern-08-03-05.pdf).

or to more serious economic impacts from such a disruption.

Stanford University's Energy Modeling Forum recently completed two studies that may help resolve some of the uncertainties related to damage estimates associated with oil insecurity.

In the first, a group of geopolitical and oil-market experts assembled to provide expert judgment on the risks of one or more disruptions occurring over the next 10 years. The experts considered four separate, oil-producing regions and identified specific disruption events and the conditions that could make them more or less likely. From there, they evaluated the probability that certain events could happen and the amount of oil removed from the market in each case.

In their view, another disruption is very likely, given today's conditions. Over the next 10 years, there is an 80 percent chance of at least one disruption of 2 million barrels per day (MMBD) or more that would last one month or longer.

Compared to previous periods, the risks today are greater for disruptions below 7 MMBD. Not only are there more insecure regions today, but fewer opportunities exist to offset any disruption with excess oil production capacity elsewhere. These offsets tend to be highly concentrated in Saudi Arabia and are unlikely to be available if oil is disrupted in that country.

In the second study, macroeconomic experts gathered to discuss the likely economic impacts of oil price shocks. An important distinction concerns the nature of an oil price increase. During the 1970s and early 1990s, oil supply disruptions caused prices to rise suddenly and sharply. These price shocks were fundamentally different from recent price increases, which have been rising more gradually than during the 1970s. Price shocks are likely to create great uncertainty, forcing firms and households to delay investments, producing spillover effects throughout the economy. Gradual price elevation, on the other hand, may anger the driver who fills his gasoline tank, but it is unlikely to delay investment and lead to a recession.

The other unknown is how economic policymakers will respond to disruptions. Over the last

few years, inflationary fears around the world have been very low, which has allowed monetary authorities to ease the money supply to offset lost economic output without creating additional inflationary pressures. In recent months, however, inflationary fears have grown and may become more intense yet. These developments would make it much more difficult for governments to intervene and offset lost output without exacerbating future inflation.

If inflationary fears tie Mr. Bernanke's hands, does the nation have a fallback position? Yes, although it seems unlikely that the political process will adopt these policies. First, larger public oil stockpiles would have limited value without a more explicit "trigger" mechanism for releasing oil during emergencies. Second, domestic ethanol or Alaskan oil supplies

could replace more vulnerable supplies, but would do nothing for our infrastructure's oil dependence. Third, fuel efficiency may be more valuable because it does both, reducing vulnerable supplies as well as our economy's reliance upon oil. And finally, automobile insurance rates could discourage excessive driving by being based partly on the miles driven.

More than a half century ago, the very possibility of oil vulnerability shocked the western world with the closure of the Suez Canal. Despite other major disruptions since that explosive event, there has been little evidence of "learning by doing" in current oil security policy. ■

▶ see [www.rff.org/weeklycommentary](http://www.rff.org/weeklycommentary).

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# Managing Costs in a U.S. Greenhouse Gas Trading Program: Workshop Summary

With federal action on climate change seen as increasingly likely, debate over the details of a workable legislative proposal has sharpened. Cost containment has emerged as a major point of contention, forcing policymakers and stakeholders to weigh the need for environmental certainty (in terms of confidence in future greenhouse gas reductions) against the need for safeguards to protect the U.S. economy in the event of high costs.

Recognizing the practical and political importance of these concerns, RFF joined with the National Commission on Energy Policy and Duke University's Nicholas Institute for Environmental Policy Solutions to host a workshop devoted specifically to the topic of cost containment. The workshop, held in March, featured presentations from senior RFF researchers and invited speakers with expertise in economics, financial markets, and environmental regulation.

The day began with an attempt to frame overarching issues related to cost containment. Speakers reviewed the recent evolution of this concept and described some of the specific approaches that have been put forward in various legislative proposals. The second part of the workshop focused on the idea of creating an independent board, akin to the Federal Reserve, that could intervene in future carbon markets to respond to cost concerns. Full details of the workshop, including presentation materials and audio and video recordings of the event are available at [www.rff.org/cost](http://www.rff.org/cost) containment.

Several key themes and questions emerged over the course of the workshop:

Is the point of a cost-management mechanism primarily to limit expected costs or to guard against unexpected costs?

Many workshop participants agreed that the primary focus ought to be on managing unexpected, short-term costs.

■ Cost management has multiple dimensions. Are policymakers chiefly concerned with managing costs in the short term or over the long run? Is the point of a cost-management mechanism primarily to limit expected costs or to guard against unexpected costs?

■ There are trade-offs between providing economic certainty and environmental certainty. A hard cap on future costs (as would exist under a simple safety-valve mechanism) would provide absolute certainty about maximum costs but has the disadvantage not only of creating uncertainty about final emissions,

but—without a corresponding guard against low costs—of diminishing incentives to invest in technology innovations that could yield major emissions reductions in the future.

■ With sufficient inter-temporal flexibility, markets should—in principle—be able to manage short-term cost fluctuations using conventional financial and risk management tools. In practice, however, reliance on banking and borrowing is likely to be constrained by institutional and other concerns (for example, the existence of default risk or the possibility that firms may not always operate rationally or with adequate foresight).

■ The concept of an independent entity that could intervene in markets if necessary (a "Carbon Market Efficiency Board") would seem to offer a number of advantages—such as an entity could serve an important information-gathering purpose and respond quickly to market developments in a way that Congress cannot. Numerous questions about the specific form and function of such an entity still need to be answered—especially how much discretionary authority it would wield—but independence, transparency, accountability, and an expert staff would all seem to be critical attributes for success.

These and other points generated a lively interchange of questions and comments at the workshop. Several core themes emerged. First, many workshop participants seemed to agree that the primary focus ought to be on managing unexpected, short-term costs. "Uncertainty about whether allowance prices are \$15 or \$100 over the first five years of the program make it very difficult to reach a consensus," said Billy Pizer, a senior fellow at RFF and moderator of the first panel. Concerns about expected short- and long-term costs, several speakers argued, are better handled through other program design features, such as the choice of targets and timetables, the inclusion of technology provisions, and linking the program to international efforts. Likewise, concerns about the distribution of expected costs within the economy can be handled through allocation. Finally, unexpected long-

term costs will be difficult—and in many ways undesirable—to address through any prescribed mechanism now; future events and decisions by future generations must ultimately weigh in.

Second, there was substantial support for banking and borrowing as an important means—but likely not the only one—for addressing short-term price and volatility concerns. One idea currently under discussion is the establishment of a quantity-limited “reserve” of carbon permits that could be drawn upon when market conditions warrant. Such a reserve could be created by withholding a small percentage of permits from future-year emissions budgets. Other concepts that merit further exploration, in the view of workshop participants, include symmetrical cost management (that is, combining any price ceiling with a price floor), the use of offset credits as a further means of increasing compliance flexibility while simultaneously promoting investment in low-cost mitigation opportunities in the United States and abroad, and the creation of an independent board to oversee future carbon markets. Workshop participants seemed to agree that such a board could serve several important functions, but they also noted that it would likely take some time for any new entity to build the kind of institutional authority and credibility currently enjoyed by the Federal Reserve.

Finally, a recurrent theme throughout the day was the need for policy credibility and confidence in the long-term integrity of underlying regulatory commitments to support a robust emissions market. Several workshop participants emphasized that policymakers need to be constantly mindful of trading political risk against economic risk in devising cost-management mechanisms that attempt to respond to concerns about the impact of mandatory greenhouse gas limits on the U.S. economy. ■

## *Pennsylvania Environment Secretary Kathleen McGinty Delivers 5th Annual Landsberg Lecture*

**I**n February, RFF hosted a presentation by Kathleen A. McGinty, Secretary of the Pennsylvania Department of Environmental Protection, at the Fifth Annual Hans Landsberg Memorial Lecture. The series honors the memory of Landsberg, a pioneer in energy and mineral economics who was a devoted member of the RFF staff for nearly 40 years.

With the reality of mandatory climate policies being crafted at both the state and federal levels, Kathleen McGinty encouraged the audience to keep in mind the old saying of “all things in moderation” when considering three options that could be counted as part of a comprehensive strategy to reduce greenhouse gas emissions: corn-based ethanol, carbon taxes, and cap-and-trade systems.

McGinty acknowledged that while carbon taxes and cap-and-trade systems to control emissions are both enjoying considerable “enthusiasm and exuberance” for their potential, “everyone now seems to love to hate corn-based ethanol.” She nudged listeners that “maybe, at least for a time, we could dial up our enthusiasm” for the gasoline alternative that she considers to be an “okay start from an environment point of view,” especially when considered along with the need to increase national energy security.

One concern people have about corn-based ethanol is that while it is net-energy positive, it’s not dramatically so, especially as compared to cellulosic ethanol, said McGinty. She noted that many feel that “we can’t afford the ‘whoops’ in terms of ethanol in building all that technology and infrastructure—let’s wait for

cellulosic.” But, according to McGinty, “about 78 percent of the capital plant equipment for a corn-based ethanol plant is exactly what you would use for a cellulosic ethanol plant. So to me, it’s not a dead end.”

Nor is a carbon tax a dead end or the sole answer for McGinty, which she believes to be an elegant solution to the “perfect storm of the Katrinas, the Iraqs, and the \$3 per gallon gasoline. To me, there is an essential role for a carbon tax to send a price signal.” She also discussed the inherent difficulty in overcoming the fact that a carbon tax alone, in order to make significant reductions in carbon emissions, would have to be set at what she considers to be an unsustainably high level.

The third part of the equation for McGinty is a cap-and-trade system, again emphasizing its role as an “absolutely essential, fundamental building block of an overall climate policy,” but acknowledging that it cannot bear the heavy weight of reducing overall emissions alone. “The job is bigger when we see what is unfolding around the world. We might not have the 2°C head room we thought we had. We might not have the 450 ppm head room we thought we had, and we might not have the 2050 head room we thought we had.”

There is no panacea or quick answer to the complex issues surrounding climate change, McGinty said. Policymakers will need to carefully craft a blend of policies in order to address the global changes that will be the result of a warming planet. ■

Full coverage of Secretary McGinty’s lecture can be found at ► [www.rff.org/McGinty.cfm](http://www.rff.org/McGinty.cfm)