Market Mechanisms and Incentives: Applications to Environmental Policy

PROCEEDINGS
SESSION SIX

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Session VI Proceedings

Table of Contents

Comparison of Multi-Pollutant Trading Proposal
William Pizer, Resources for the Future

This talk is centered on Multi-pollutant legislation. When David and I talked about this a few months ago at RFF we focused exclusively on allocation. The conclusion was that the differences in the bills, namely the inclusion of carbon in the Jeffords Lieberman Bill and the exclusion of carbon in the Administration's Clear Skies initiative really seem to explain a lot of the differences between the two. With carbon present, there is a lot more money at stake, and the burden is not being borne primarily by the electric power sector, instead a lot is being borne by the consumers. In such cases, if you are going to deal with the equity concerns as well as the political concerns with the people who are adversely affected, you need to have to have some element of an auction in the system. In contrast, this is not true when dealing with conventional pollutants. With conventional pollutants, a lot of the costs were being borne by the regulated entities (the power plants), in which case it made more sense to have a larger grandfather program, although both programs did eventually tend to an auction.

So in thinking about what I was going to talk about today and make it a little more interesting, I thought I'd broaden it and talk a little more about the differences among pollutants. Some of my personal thinking about elements to bill, the two proposals, and things that might be done different in both and draw some conclusions.

Let me state that I am not going to summarize the bills in detail. On the RFF Website Dallas Burtaw and I wrote up a summary, primarily of Jeffords-Lieberman and the Clear Skies initiative, and we added a column for the Carper Bill. We had a column comparison as well as a write up. The overall conclusion of that analysis was that there is actually a lot of similarities among the bills. In particular you have very similar long term caps for NOx and SO_2 and you also have very flexible trading programs. In a lot of ways we felt this was a very significant step given where environmental regulation was 20 or 30 years ago. Right now we are discussing and debating the nuances of the specific caps, the specific pollutants, and various architectural features. We are no longer discussing whether or not there should be trading, as this is a given, and illustrates how far we have come in our thinking.

In addition, both bills encourage auction. As I mentioned a second ago, the Jeffords Lieberman bill which includes carbon dioxide has an auction right up front, in contrast to the Clear Skies initiative which moves very slowly towards an auction.

As stated earlier, the major difference between the bills is the no carbon dioxide requirement in the Clear Skies Initiative (CSI), in contrast to the Carpers Bill (CB) and the Jeffords-Lieberman Bill (JLB). Another difference between the bills is that there is a much lower Hg target in the JLB than in the CSI. Moreover, there are also quicker declines in NOx and SO_2 under JLB than under CSI (on the order of a decade). Part of this is due to using auctions early on in the JLB than in CLI.

The main points I want to make today fall into two categories. One category deals with architectural issues and the other category deals with the specifics of the pollutants. Between the two categories there exists some overlap.

From an architectural standpoint, the first issue is to use a safety valve. This builds off a lot of research I have done and is addressed below. There is a lot of uncertainty in the forecast that modelers do in order to estimate the cost and benefits of these policies, specifically the costs. Even if such estimates were very accurate, there is a lot of inherent uncertainty in electric generation and fluctuation due to weather and other unpredictable things. Since you want to have a regulatory system that is resilient to those sorts of events, I believe a safety valve is good way to go.

The second point in the general architectural categories is that there are some legitimate reasons, including some political ones, which may preclude an auction right off the bat. There are some significant losers when environmental regulations are enacted. They bear a lot of costs and you are going to have to compensate them if you are going to make a political reality of a proposal. However, in the long run a lot of those arguments break down, and in fact, you create problems not having an auction.

The third architectural point is that most people agree that we will have to deal with carbon dioxide across the entire economy. Only about 33% to 40% of emissions are coming from electricity. There is a large chunk coming from transportation. The costs of a long term carbon dioxide policy are likely to be quite large. Having sectors at different levels of effort is really quite inefficient and potentially very expensive. So if you know in the long run you want an economy wide program, what does it mean to have a fourth pollutant in your power plant bill? Is that fundamentally a good or bad idea?

And the last two points are really just focusing on a couple of things. One is that the Hg costs and benefits are very uncertain and we should think about what that means for our policy choices. The last point is that the rough calculations of marginal benefits from, at least SO_2, appear to exceed their costs. This leads to the question of whether we should be going for more reductions of SO_2 based on a cost benefit analysis, rather than the Clean Air Act.

In terms of a safety valve, this graph (shown) highlights the potential problems. Bear in mind this is not necessarily the best designed trading in the world, it is the NOx reclaim market. What are shown are graphs of the price of different vintages of allowances in different years. The blue line that's labeled 2000 is a 2000 vintage allowance that could only be used to meet your requirements in 2000 if you are in this particular market. The 1999 is the 1999 and all the lines grouped at the bottom are the preceding 5 years. What happened in California where this market exists, beginning in 1999 to 2000 there was dramatic shortage of allowances, primarily due the power shortages, more generation taking place of electricity, and the fact that there wasn't as much coming from the hydro sources in Northwest. All this lead to a shortage of allowances because there was no banking in this market people didn't have a rainy day fund to provide them with allowances and the prices shot up. Whereas prices had typically been in the order of a

couple thousand dollars per ton, they shot up to almost fifty thousand dollars per ton. The idea of a safety valve is that when prices reach a certain point, and that point might be $15,000, $10,000, it might be $5,000, the government or regulatory agency sells additional allowances at that point to allow people participating in that program to meet their requirements without having to pay an exorbitant price. So it caps the amount people have to pay to meet the requirement.

This does not mean that you are guaranteed to meet your cap. For example, if you had a particular number of allowances that you had given out and then you give out extra allowances at the safety valve price you are going to go over your emissions allowance (your initial allocation). The point is that usually when we set these allowances schemes and set the target, we balance cost and benefits and if the cost end up being much higher than they were supposed to be we probably don't care if the emissions get a little higher than they were in the original plan. In my mind if we had a safety valve in this market we would not have had the break down that happened in 1999 and into 2000.

This is just a graph to illustrate a South Coast Air Quality Management (SCAQM) analysis of what happened in 1999 and 2000, and what should be done to fix it. All their calculations showed that you could have obtained reductions for about $3,000 a ton, that there was really no need, in the long run, for prices to go up to $50,000 in order to encourage reductions. Yet the design of the policy allowed that to happen.

So what does that mean? Even the SCAQM that was responsible for the reclaim program effectively recommended a price cap, a safety valve at about $15,000 a ton which is pretty high but it still adopts the philosophy of a safety valve.

The Clear Skies Initiative, which is one of the two things that was a focus of this conversation, has a safety valve built in at exactly $4,000 per ton for SO_2 and NOx and about $2,200 per ounce for Hg. The research that I did two years ago which was subsequently published last year, examined the fact that even though CO_2 had a really high safety valve, huge benefits were still present. For example, in the NOx reclaim program, maybe their cost benefit analysis suggested that their allowances should be about $3,000 per ton. In fact, even having a safety valve at $15,000 is very beneficial in terms of the expected out comes and what might happen in a bad situation.

In summarizing, the safety valve is a very integral part or should be an integral part of these policies. It need not be low in order to be effective. I think initially when people at RFF were talking about safety valves we were talking about levels that people thought of as just valves, they weren't safety valves, they were always just open. And they were effectively fixing the price at a particular level. That may be people's preferences, including my own, but the value of the safety valve is that it helps you avoid bad outcomes. So I think it's just a sensible thing to think about.

The second broad point, architectural point, concerns auctions. Earlier today, you heard about the efficiencies advantages of auctions, namely raising revenues and off setting distortionary taxes elsewhere in the economy.

The reality, as Sam [Napolitano] pointed out, is this runs counter to the interests of a lot of the regulated entities paying for those allowances when they think they should be getting them for free, as well as getting some compensation for the fact that they may be bearing the cost of control. My point is simply over the long run if you have competitive markets, in 20 or 30 years facilities that aren't efficient are going to be exiting the market anyway, and consumers are going to be bearing the costs of those emission allowances as they will likely be passed on. In the long run, it's hard to argue that the owners of the electricity generator units need to compensated or receive their allowances for free. The equity concerns that drive the near term interests really don't apply in the long term.

The existence of these allowances can create a hurdle when you try to reform the policy. People who hold these allowances have some expectation that their property right (interests in these allowances), is going to be propagated in the next regulatory scheme. They naturally don't want the value of those allowances to decline. So for example if you look at the CSI, the SO_2 allowances are allocated primarily based on the Title IV allocations, which in turn were based on data from 1985. You think about the fact that allowances in 2010 are going to be based on the circumstances that existed data wise in 1985 and the politics in 1990 when these were debated. It does not appear that this is the most practical way to allocate allowances. So that's a sense in which I think existence of such perpetual entitlements creates problems in the future.

So just to summarize, the arguments for grandfathering or giving away the allowances freely don't appear advantageous in the long run, although in the short run there may be a basis. Also, formulas that were developed for allocating allowances are out dated or irrelevant. Lastly, efficiency while it points to auctions, equity in the future probably points towards the consumers and not towards the owners of the power plants.

Now let's talk briefly about the different pollutants that are being covered by these bills, the differences between them and why we might think the regulation would look different and the design of the policy would look different for the allowance allocations as well as the other features.

First let's discuss CO_2. While Hg, SO_2 and NO_x are all controlled by some sort of end of pipe treatment, CO_2 is controlled by switching from coal to natural gas or coal and natural gas to carbon free technologies. The prospect of actually capturing CO_2 and doing something with it, injecting it into the ground for example, is going to be very costly for the next couple of decades. It's important to keep that in mind that we're not simply talking about making coal fire generation more expensive, we're talking about getting rid of some coal fire generation if we're going to have some significant reductions.

The second feature to keep in mind is the origin of the emissions. Hg and SO_2 are only associated with coal and oil, but oil is not used very much, and a point to keep in mind is that coal is usually not the marginal cost producer (they are not setting the price of electricity). When you have a regulation that only affects coal, none of that gets passed

on to the consumers and all of it basically gets eaten up by the people in the coal plants. In the short run this is going to be a significant cost, and that's why for Hg and SO_2 there are certainly strong arguments just on the equity concerns for grandfathering allowances. For NOx it's different, because both gas and coal emit it (although nuclear doesn't) and other sources don't. You have to think about in the future there are going to be more gas plants, those new gas plants are going to emit NOx and how are they going to feel if all these old gas plants got their allowances for free, which is basically the concern that a lot of people raised.

Let's discuss regulating specific pollutants. For CO_2, the costs are relatively well understood. While there is a lot of uncertainty about cost in the short term, it is driven by unseen events, e.g., whether or not we have a cold winter and a warm summer, whether not there's a drought in the northwest where they use hydro power. However, we know exactly what needs to be done in order to reduce CO_2 emissions and how much it's going to cost.

The benefits from CO_2 reduction from mitigating global climate claims are highly uncertain, but what's interesting is that we actually have estimates. People have tried to work through the consequences of climate change and make estimates of what mitigating climate change and reducing CO_2 emissions would actually be valued at.

For Hg, I would argue that we actually have uncertainty on both sides. The costs, at least when I was in the administration, were hotly debated – there was the questions about how much Hg reductions you get for free when you reduce other pollutants. There are also concerns about the fact that we haven't done many studies of pollution control technologies for Hg, we just don't have the best handle on how much it's going to cost. The other issue is that we really have very little idea of the exact quantitative benefits of reducing Hg. We understand what's happening and why it's a problem, but the actual quantification in terms of dollars per ton or dollars per ounce have been elusive so far. Meanwhile for NOx and SO_2, we have a much better grasp of costs and benefits so we can say a little more.

My point on CO_2 emissions is mainly that electricity is only a piece of the puzzle. Here we see an estimate of what emissions will be like in 2010 and what you see is that while electricity emissions from gas and oil and coal are a large chunk of the problem, an enormous piece is transportation.

So relative to long term costs, you need to be very concerned about making sure you're looking for equivalent reductions or equally cheap reductions in all sectors. This is the basic argument, you're looking for significant reductions in the long term and those significant reductions are going to cost a lot. Thus, if you only focus on one sector, aside from high cost, you may actually distort choices. For example, if electricity is regulated and industrial sources don't have to pay any overhead on direct emissions of CO_2 from burning gas, this will create leakage and encourage people just to burn directly instead of using electricity in a way that's not efficient.

Let's discuss the costs to reduce CO_2. I'm showing you economy wide costs pilfered from a study by the energy modeling forum, and these are estimates of the marginal costs on the vertical axis and percent reductions in the US on the horizontal axis. The prices are in 1990 dollars, but what you see is that for the economy as a whole we may be slightly more expensive in the electricity sector. Prices on the order of $50 per ton are only getting you between 5 and 10, 15 percent reductions depending on which of these models you believe. So is this expensive? Well, when you start talking about large percentage reductions (for example 25% reductions) the area under the curve yields a total cost estimate of about $30 billion. This would make CO_2 the most expensive regulatory program in the country by a large margin. In comparison, both the CSI and the JLB are estimating costs on the order of $10 billion, so when you start talking about significant reductions in CO_2 you're really talking about a lot of money.

This slide discusses the estimate of benefits. The point to keep in mind is that even though CO2 and greenhouse gases and their consequences are very uncertain, the IPCC in their 1995 second assessment report surveyed the literature, and found you have a range of estimates and people have been able to bracket what the marginal cost should be. For example, a high estimate by William Kline is up to about $150 per ton but most of the estimates are much lower on the order of $20 or $30 dollars a ton. If you escalate these estimates up to 2000 dollars, the mean is roughly $30 per ton.

In summary, the conclusion is that eventually we're going to need an economy wide program to avoid wasting billions of dollars. The question I have is how do you grow an economy wide program out of an electricity only program? Moreover, what problems arise? I would argue the longer the discrepancy exists between the cost of CO_2 in the electricity sector and the cost elsewhere, the harder it's going to be to get them to come together at some point in the future. But that's just sort of a gut reaction. In this case, I have put forward my own belief that it may be better to wait to get the design right than going ahead with CO2 in the power sector. That's open to debate.

I want to briefly talk about Hg. The important thing to remember with Hg is that you have a lot of uncertainty with the cost. In particular, guessing the right price for how much it's going to cost to reduce Hg is an uncertain game. In addition, there is no quantification of benefits, due to the fact that we don't exactly know how emissions from the power plants get deposited. There is kind of a global circulation of mercury in the world and if we reduce the emissions of the US, it's not clear how much the deposition of the US is actually going to decline. We probably have a better model of accumulation in the biosphere. The mechanism for affecting humans and the largest benefit, if we were going to try to monetize them, come from consumption of fish. There may be a lot of inexpensive ways to deal with this like encouraging people to not eat fish that are cheaper than spending a lot of money on Hg reductions from power plants.

We should try to evaluate what we are getting under CSI ($1,000 an ounce), while under the JLB, it's more like $10,000-$20,000 an ounce. The question is not whether Hg is bad, it's whether we are using our resources wisely to reduce emissions by this much from power plants.

On the cost and benefits of SO_2 and NOx, the EPA analysis (which is the only analysis of the exact proposal), shows cost ranging from $400 per ton to $1,800-$1,200 depending on which pollutant you are talking about and which zone because NOx has two zones (an east and a west) under CSI. On the benefits side, EPA has two estimates in their technical summary. There's a base case which estimates $96 billion and there's a conservative summary $14.2 billion. The difference between the estimates is the discount rate they use and how they value mortality, in terms of life years. Even if you take the conservative estimate of $14.2 billion, and divide it by the ton reductions you are getting in 2020, you obtain $1,900 per ton on an average as the benefit.

Whether or not the benefit are linear or not is a separate question, but it's certainly suggestive to me there are a lot of benefits there. An additional point is that you can't really treat SO_2 and NOx as being equally contributing to the particulate problem. If you divide the $14.2 billion into the 5 million tons of SO_2 reductions, you actually get a higher marginal benefit on SO_2. The point therefore is if you look at the marginal analysis where the costs are on the order of a thousand dollars (maybe going up to $1,400 for NOx and never really going over a thousand dollars for SO_2), under CSI you want to ask the question of whether or not we're really at the right point on SO_2 or NOx. This is where we actually have the best data.

This slide summarizes the cost and benefits of the two bills, and illustrates the JLB analysis. You see a cost of $50 to $100 per ton carbon, and the studies I cited earlier seem to be at about $30 a ton carbon. The JLB costs on Hg are quite high at about $10,000 to $23,000 an ounce. In CSI in 2010, they are $600 an ounce going up to $800 or $1,000 an ounce by 2020, and we have no idea what the benefits are, and we may be very uncertain about those costs. On NOx and SO_2, we see benefits in the order of $2000 per ton (they may be higher for SO_2 than NOx). Meanwhile the costs are actually lower for SO_2 than for NOx. So it suggests on the margin that maybe we should be looking at tighter regulation on SO_2 and less strict regulation on NOx. I would note of course that this has nothing to do with what is mandated under the Clean Air Act. This is just our economics coming to bear on these pollutants. If you are going to make changes or debate different bills it's kind of handy to have this information on hand.

In conclusion, I think we need to focus first on architecture because I think that's where economics has the most "cleanly cut" things to say. A safety valve makes sense no matter what at some level and then we can debate what the level is. If you want to encourage people to use a market based program you don't want to set up a system where you may accidentally have the market fall apart, as has happened with the reclaim market. Especially if you are thinking about CO_2, and you are thinking about a long term strategy, you don't want to mess-up in the first step because that first stumble could set you back quite a ways.

I think in the long run, there really are no strong arguments against auctions. I think in the short term for some pollutants it makes sense to think about giving them away.

On CO_2, I think you have to think about the long term of having an economy wide approach and how exactly you are going to go from having a sector based approach if you a introduce a 4-P bill to an economy wide approach where there's going to be a large discrepancy in prices for 10 or 15 years.

On the targets themselves, just quickly summarizing, per evidence on Hg I think we should ask the question is it really worth a $1,000 or $10,000 an ounce - given other opportunities and maybe doing further research on it.

There seems to be good evidence on SO_2 and NOx that it might be worth, especially on SO_2, to probably do a little bit more than what the bills are currently suggesting.

More Multi-Pollutant Trading Proposal Comparisons
David Doniger, Policy Director - Natural Resources Defense Council

[speaker opens with a disclaimer stating that he'll skip over some of the background information on "the four pollutants" that he would normally cover with a more-general audience—dives right into it]

We think there really is an opportunity in a four-pollutant bill to achieve these four values – lower emissions, lower costs, greater certainty, and greater consistency. We don't think the three-pollutant approach has any merit—it doesn't address CO2. Less attention has been paid to the comparison between what's in the Clear Skies Bill (CSI) for SOx, NOx and Hg and what would be required by the Clean Air Act (CAA) or what was considered in the original Clear Skies proposal that was developed by EPA, which was much watered down before it came out of the administration. Either under this original proposal, which is available and has much of the same analysis behind it with the same tools that EPA uses for CSI, shows that it would have much greater benefits at marginally higher costs to make much quicker and deeper cuts in SOx, NOx and Hg. [sic]

The difference between this original EPA proposal on Clear Skies and the administration's proposal is an estimated 61 billion dollars per year in benefits when you get out to the year 2020. That dollar figure represents the projected savings in health and medical expenditures associated primarily with the proposed tighter controls on fine particles. The extra industry costs for implementing this EPA proposal were estimated to be about 3.5 billion dollars annually. So, that's 61 billion dollars in extra health costs placed on the public to save the power industry 3.5 billion dollars a year—not a good deal.

In comparing CSI with existing laws, we find that: (1) It delays the implementation of the air quality standards. (2) It would allow local pollution increases, because it weakens the new source review controls. (3) It weakens downwind states' abilities to control upwind state's pollution. (4) It weakens the protection of the special air quality values of the national parks and wildernesses.

Now, separately, the President has a climate plan, a voluntary climate plan. To his credit he acknowledged a year ago in February that some day, somehow, we have to slow, stop, and then reverse the growth of global-warming pollution. But voluntary goals have been tried and failed. What is a voluntary goal? It's industry self-regulation. The President's goal for industry self-regulation works out—it's stated in terms of an intensity target and a reduction in intensity of emissions—but it works out, when you do the math, to the same 14% percent actual increase in CO2 and other global-warming pollution over the next decade as we had in the last decade, so it presents no progress over the voluntary programs of the past. One of the cute things is that the power sector itself volunteered, in response to a call for new pledges from the administration, to a target that works out to even more emissions than the business's usual calculations of the Energy Information Administration (EIA).

Here you see these two things graphed - 14% economy-wide emissions growth in the last 10 years and 14% expected in the next 10 years if the President's plan is fully carried out by the industries. In the power sector the EIA projected 11% more CO2 in 2010 than in 2000 and the Edison Electric Institute is graciously promising to bring us 13-16% more. This little box in the lower left represents sort of an envelope of carbon concentration on the y- axis and temperature on the x-axis. We've never gone above 380 and that's about where we are right now, and we're about a degree higher than we were at the beginning of the Industrial Revolution in terms of average temperature. Here we are, sitting on the right hand corner of the graph and going northeast. It's not a pretty picture and it has a lot of risks. Most of those risks can't be well captured in cost benefit analysis, which attempts to gather known information, because we've never been there before. We know a lot about what these risks are, but it's very hard to quantify them and put benefits on them. In the words of the MasterCard ad…some things are priceless.

We focus on the power plants, but not exclusively. I should say that the targets—the priorities—of the climate center of the NRDC are on power plants, because they represent 40% of the U.S. CO2 emissions, and on motor vehicles—passenger vehicles—because they represent 20% of the emissions. That's a good chunk between them. But more than that, we think that if someone cracked the nut on these industries, had a break-through on these industries, the rest of the economy would follow. It is not our objective to have any long-term condition of separate sectoral approaches, but we do think the path forward is to focus on power plants and vehicles first. Most of our vehicle work these days is in California, where the state passed its law last summer to regulate CO2 and other global-warming pollution from vehicles. We will also be supporting an oil savings provision that will likely come up in the energy bill debate later on this spring.

Going back to power plants…we need to act now. There is a basic point about power plants that everyone in the debate agrees on, and it can be summed up in a train analogy. There are three trains that are already leaving the station. They are running on different tracks at different speeds, and some would think the tracks are maybe criss-crossing each other and there is some inconsistency. There certainly is a lot of uncertainty—which train do I catch?—and how do I coordinate them? And there's a fourth train sitting at the station that everybody knows is going to move at some point. So, does it make sense to pass a bill—even one that rationalizes three of the four problems—and not deal with the fourth? We think there is a logical economic argument as well as an environmental one for integration, which saves a ton of money by reducing regulatory uncertainty and surprise and reducing the potential for companies making a lot of choices that turn out to be stranded.

Another reason to move forward here, though I basically agree with Billy [Pizer] that the primary pathway to solve the global warming problem is to move away from putting fossil carbon into the atmosphere, that does not necessarily mean that you can't use fossil fuels—if you can find a way to tuck the fossil carbon back underground. Our organization has been somewhat forward-leaning among the environmental groups in considering and even talking up the potential for carbon capture and underground sequestration as a significant part of the solution, for at least the middle century so to

speak, where the coal resources and the coal industries might continue to have life provided they can isolate the carbon from the atmosphere. And, finally, a signal would be sent to other sectors that would be helpful in getting the whole economy under control.

Now, a hugely important consideration is this one: the longer we wait the more painful the cuts. If you assume that there is some target out there, some atmospheric concentration that you do not want to exceed because it would be dangerous, you can make a respectable case that we are already at levels that are dangerous. Certainly 450 - 550 parts per million carbon a great many people would consider the impacts that would come with that to be dangerous and to be avoided. Higher levels bring even higher levels of danger. Whatever level you settle on, the longer you run the emissions up, the steeper the slope you have to come down on if you are going to stay within that target—and the gentler path is one which starts sooner.

We want to strengthen, not weaken, the CAA. We want to protect public health and we want to include CO2 both for environmental and economic reasons. A quick comparison between the CSI and the Jeffords-Collins-Lieberman Bill shows a big difference on Hg, a big difference on SOx, a fairly big difference on NOx, and a big difference on CO2.

A couple of structural issues, or hotspots: The original premise of the original Clear Skies bill proposed by the EPA in 2001 was that you could deliver the same overall tonnage reductions that were anticipated to come from implementing the CAA through a cap-and-trade program, and that doing so might eliminate the need for some of the command-and-control infrastructure that's currently in the bill. There was a belief that you would pick up some efficiencies, and there is a case for this. However, there are two problems: (1) Even in that setting, there needs to be some addressing of the potential that pollution can be loaded up in one place in ways that are detrimental to local public health. You can end up with increases in pollution in one particular place, even though overall levels are going down, because of the workings of emissions trading. So, when the Acid Rain Program was added to the CAA in 1990, it was not—and never has been—the only safeguard against dangerous SO2 concentrations or particulate levels. The New Source Review program and SIP process remain underneath the Acid Rain Program, and we think that it's essential to keep some serious curbs on local pollution increases within any cap-and-trade program. It's especially acute a problem under the Clear Skies proposal that was actually made because the emission limits for SO2, NOx and Hg under the President's proposal are much weaker and much delayed compared to the original EPA proposal, which in turn was intended to be an approximation of what the CAA right now was going to deliver. So, I think there's a very strong case that the President's proposal is a rollback of the CAA. One of the most troubling statements the administration spokesmen make is that in comparison to the CAA there is a 35-million-ton benefit coming from CSI. This is based on a set of assumptions that Jeff Holmstead, the Air Chief, has repeatedly characterized as the Rip Van Winkle scenario. In this scenario, you implement the Acid Rain Program and the NOx Sipcal—the 1997 Sipcal for power plants—but you don't do anything else—you put the CAA to sleep for 10 years and make that your baseline. That's not what the CAA requires; it's not a fair comparison. We think a fair comparison shows CSI to be running about 20 million tons *behind*

implementation of the CAA in that time period—not 35 million tons ahead. The precise number is not important, but the *sign* is tremendously important.

The Clean Power Act doesn't allow any Hg trading for this hotspot reason: There are reasonable arguments that can be made that there's some hybrid approach that might be used for Hg that allows some amount of trading above a minimum reduction or a maximum emission rate for individual sources. These hotspot issues are generally not an issue for CO2.

Second structural issue is a question of whether to use off-system flexibility. I want to make clear that the Jeffords bill, the Clean Power Act, contemplates that there will be carbon caps for other sectors, and automatically there should be a window for seamless trading between any two carbon-cap sectors. If there are tons of allowances in another sector, they should be equally usable so that the trading would allow the tons to flow into the power sector or, if the situation is reversed, out of the power sector to the other one. The bill is constructed so that you don't need any new enactments with regard to the power sector to turn on inter-sectoral trading once there is another sector to trade with.

What we are very concerned about, however, is credit trading from uncapped sources. The 1605-B program run by the Department of Energy is a walking, stumbling example of what happens when you turn loose the uncapped credit trading. Every lesson we learned from the bubble concept about how that can be abused is being repeated in the 1605-B context. We put out a report that demonstrates that even as the power sector, which is the only sector that actually has to report its emissions, so you actually know what the power sector's emissions are, even as they report their emissions (and they have gone up by more than 400 million tons over the last decade), the power industry has reported more than 100 million tons of bogus reductions to the Department of Energy. There may be a couple of small opals or semi-precious stones tucked in there somewhere, but mostly it can be characterized with a barnyard metaphor—it's real junk. Most of the reductions are for the selfless act of running nuclear power plants up to their economic capacity and then comparing that to a base case in which they were not run well and in which they were shut down more and coal plants had to be used instead. Most of the emissions credits come from this counter-factual.

Bad credits inflate the cap. The Carper Bill, which is another entry into the sweepstakes here, allows for unlimited use of off-sector offsets from uncapped sources. It doesn't specify any real criteria for controlling the quality or the quantity, and you can end up with some bad results from our vantage point. You could even have a situation where the off-sector credits allow the power sector to emit even more than in the BAU case.

The McCain-Lieberman Bill, which we haven't talked about much here, does allow for some use of these off-system credits from uncapped sources but there is a quantity limit on how many there can be. There are also some useful controls in the McCain-Lieberman Bill to make sure that sequestration in the biosphere is done with some credibility to it.

A little bit on allowance allocations: This probably does sky off what Billy [Pizer] has said fairly well. Especially when one is talking about a program with carbon in it you have this anomaly where the total value of the allowances is much greater than the program resource costs. So when you ask how much is it really costing the power plants to reduce carbon to a given level it turns out to be only a small fraction of the total value of the allowances. At least in a competitive market situation the allowance value is folded into electricity prices just as fuel or other inputs and passed on to consumers. So you can have a very massive resource transfer to the owners of the power plants if all the allowances are grandfathered. Dallas [Burtaw] has done some work that shows, if I have interpreted it correctly, that CO2 allowances can be worth 10 to even 13 times more than the impact on the power industries' assets from the control costs. In other words if you figure out by how much power industries' assets are reduced if they have to absorb all the control costs, and then you ask yourself how many of the allowances would you have to give them to make them whole but not enrich them, the answer is something on the order of 7.5% (according to Dallas' work). Other estimates I've seen show 10 –15% of the allowances going to the power sector's asset owners in order to offset the impact of the controls. If you give them more, they end up with tens of billions of dollars in what can only be described as an unjust enrichment.

Most of the ideas of auctioning are variations on these themes that the allowances to pollute or the use of the atmosphere is a publicly owned resource and it should be used to the benefit of consumers—in this case to counter the wealth transfer that might otherwise be occurring with admittedly economically efficient tool of cap and trade.

So, we favor using the slices of the allowance pie to accomplish different public purposes, such as protecting consumers or promoting such initiatives as efficiency renewables, clean generation, and carbon capture and sequestration. This is implicitly done through another one of the allocation formulas called output-based standards. Basically, the idea is that if you give renewables, or clean generation, or even efficiency an award of allowances for each kilowatt-hour that they produce or save, then their cost is being bought down and you'll get more of those "incentivized" technologies more rapidly than you would otherwise.

Another use that can be made of part of the allowance pie is to take care of the communities and employees and even some businesses who may be adversely or disproportionately affected by the transitional costs of this program.

So here's one hybrid example and we support this bill—we support the concept in this bill—because we think that in the end any allowance allocation system for carbon, and for other pollutants too, will not likely be a pure system. The administration has already proposed a hybrid that goes from grandfathering to auctioning. Carper has his proposal on the table, which is a pure output-based approach—and there may even be other approaches—but you will see a hybrid.

[The speaker goes off into a story about how he was the only representative of an interest group allowed into the room where the House Energy and Commerce Committee was

meeting to mark-up the final version of the Acid Rain bill in 1990. Remarking that he was led past a drooling pack of well-dressed lobbyists, who were being held at bay, he was led into the room where the legislators were "carving up the sulfur pizza—over pizza." As they sat around trading favors—securing each other's votes on various issues—sculpting the Acid Rain Program, they were literally carving up and eating dozens of pizzas. He concludes the story by commenting that any eventual carbon allowance allocation system will undoubtedly go through the same process, and he continues--]

There is going to be some constructive constituency work and deal-making to come up with a package that meets needs. Some of those needs will include the needs of the power generators but, as I said, they can be made whole for a relatively small slice of the carbon allowance pie. There's a need to take care of the mine workers and others who feel a need for transition assistance. From our vantage point, it's very desirable to incentivize some of the cleaner technologies that we need to get over the hump that has come from the fact that carbon has been zero-priced for so long. And we need to take care of the consumers who should not have to bear the wealth transfer that would come if the allowances were otherwise given over to the owners of the power plants.

So these slices can grow, and they can shrink, and there are other colors in the rainbow for other slices if people have other proposals to add. It obviously must add up to no more than 100% of the allowances, but there's a lot of room to work with.

Those are some thoughts about what's going on from our vantage point.

May 2, 2003 4:15 PM
Question and Answer Session

Q: Bill Jaeger, Oregon State University
I have a question related, Sam, to your comment that maybe the auction idea is ahead of its time because firms aren't in favor of it and coal miners aren't in favor of it. Seems to me that those people will never be in favor of it, because you're asking them to give up some money or give up some jobs. Until we identify the constituency that will benefit from the revenues from an auction, I'm not sure how we can build political support. If we were able to link the auction to what those revenues from the auction would be used for and who would benefit from them, then it seems to me you could identify a group that would say, 'Hey I'm in favor of auctions.'

A: David Doniger: I can understand why it's not particularly attractive to the mine workers to look at an auction in which only 20% of the value, or less, is actually captured and 80% or 90% is grandfathered. It's not substantially different. So to walk over the edge and support this without knowing that there's significant money involved and that it's going to come to them, which is partly your point, is to expect too much. When a carbon program is no longer avoidable, the mine workers are going to be there with a demand to be in some way made whole—taken care of. One can evaluate how much it's just that they should receive or other claimants should receive, but unless you have a structure that does something like this with the allowances, there's no revenue, there's no value to meet that need with. Put another way, there's a real opportunity if you approach it this way.

A: William Pizer:
Two things: One is that I think you do see firms that are not actually in favor of grandfathering if they don't think they are actually going to be the ones at the table getting it. I mean it could be people who perceive themselves as new entrants in the future, for example new gas-fired facilities—it could be large energy consumers, but they're not necessarily pushing for an auction—they're maybe pushing for something else—but they probably don't like standing up for the grandfathering. The other thing that is interesting about what David just said (about once the mine workers see that a carbon policy is inevitable)—I think one thing that struck me about this problem, because CO2 is so pervasive in the economy and so pervasive in electricity generation too, it's going to have to start out small. I think that's something that is hard sometimes to grasp, just because the consequences for the mine workers are going to be huge; the consequences for the communities are going to be huge. I think expecting a large sudden reduction is kind of putting the cart before the horse. It's interesting, David, in your presentation you talked about how hard it gets as we delay, and certainly that's true to some extent, but a certain amount of delay is certainly reasonable because the future gives us time to turn around the capital stock, gives us time to invest in new technologies. Who knows, maybe in 30 years we'll actually have some solutions to problems that right now seem somewhat intractable. That isn't an excuse for not doing anything, but it may be a reason to think about a more gradualist approach. I had to slip this in—you mentioned the MasterCard commercial about some things being priceless. I am

wondering whether you were referring to the value of the thing you were getting or the price you were paying. It seemed like there was a big difference if we could get the priceless environmental benefit for some reasonable cost. On the other hand, if we're spending an infinite amount of money to get the environmental benefit, I think it has a slightly different punch line.

A. Sam Napolitano
Adding to it, I thought the way we went about doing the auction in the Clear Skies Bill was about as clever as you could be in terms of gradually phasing it in, in that it doesn't come into being a complete state that you've totally turned over until about 50 years out. An amazing amount of the wealth sits with those people who are now getting the grandfathered allowances as we speak, but basically there is not a company that has come out. In a flip way, I can remember talking to Capitol Hill staffers who called over and asked about the auction and why we did this. They said something along the lines of, 'Do you have any supporters for this?' I said, 'Well, environmental and welfare economists throughout the country.' They said, 'Well, how many votes do they have?' That's almost the way it's being treated even though it's an elegant idea. You have the idea, I know when you talk about the revenue coming back to people, but there's a little bit of "the check's in the mail" aspect to this when it comes to actually seeing that revenue coming into the treasury and that there would be any tax change that possibly could happen. It's kind of the attitude that exists.

A. David Doniger
Actually, that's why the Jeffords structure is interesting for people to study. Most economists who approach this say the clean way to do this is to auction out of the treasury, bring the money into the treasury and then disperse it through tax reductions or other kinds of spending, so it's a revenue and spending thing. When you think about that politically, it has a lot of hurdles. I will not go into all of them, but one of them is that you involve three committees in each body of Congress instead of one. You involve the Environmental Committee, obviously that's the constant, and you involve the Finance Committee and you involve the Appropriations Committee. Well, the Jeffords Bill concept is that the allowances are what are being allocated. Think about the chart that I gave as all grandfathering—the question is to whom are they going to be grandfathered?—Who are they going to be given to? The first cut, which is what the bill represents, is to create a trustee who receives the allowances on behalf of certain targeted beneficiaries and then outside the federal budgetary machinery conducts the sale. If you read the bill, you will not find the word "auction"—instead, it says the trustee "liquidates" the allowances he has been allocated, and the proceeds go to the beneficiaries. You can achieve the economic benefits of the normal auction model without using the word and without using the usual structures. That may be more doable in a political context.

A. William Pizer:
One thing I didn't bring up here that we talked about actually in our earlier discussion about allocations is it is actually significant that the revenue under the Jeffords Lieberman is not going into the treasury. A lot of the advantages . . . well, it is under the

Clear Skies—it's just not very much money. If you're attuned to auctions because of the revenue recycling, the Jeffords Lieberman approach is not really getting at that. As David just explained, it's grandfathering in a different way. There's really no way to achieve the kind of auctioning results that economists like without involving all these committees, which is kind of a mess.

Q. Bill Shobe, Virginia Department of Planning and Budget:
I wanted to ask whether we know enough about the science of NOx and SOx to allow trading between the two. I heard some talk of inter-pollutant trading, but it seems here are two that seem likely candidates. Is there much discussion about that?

A. William Pizer:
I know Randy Lutter actually wrote a paper on that, but I don't know where it is. He was at the American Enterprise Institute and he's a big advocate of that.

A. Sam Napolitano:
At one point, that was actually posted on our website when Randy did some looking at the relationship. You could have two ways to do it: One way is you could set up that relationship and allow for trading in terms of setting up the different values for each of the pollutants where they can be traded against each another. Or alternatively, what you can grossly do is try to set up cap-and-trade programs that effect roughly the same thing—i.e., take more SO2 out of the air than NOx. In a crude sense, that's what we think Clear Skies is actually doing.

Q. Bill Shobe continued:
I'm sorry, I just want some clarification. In these bills is there going to be trading across pollutants or is it just trading within each pollutant?

A. Sam Napolitano:
I think each one can trade with each pollutant. But I think each one of the bills makes a more substantial reduction in SO2. So, in a gross sense each one of them has it right about which pollutant is greater and more cost-effective to tackle.

A. William Pizer
It also varies by zones. Clear Skies has two zones for NOx and I think the Jeffords Lieberman has two zones for SO2. So for various reasons there have actually been further regional bifurcations of the pollutants.

Q: Robert Hearne, North Dakota State University:
Has there been any thought about what would happen if we gave state and local governments these permits to allocate as they would like—kind of a decentralized market without the auction? Any thought on that?

A. William Pizer
I know that when about 3 or 4 years ago a group of us at RFF talked about an economy-wide carbon program, in that program we envisioned a system somewhat like you just

said—namely that a large chunk of the revenue from the sales of these CO2 allowances or greenhouse gas allowances would be given back to the states, basically as block grants to assist the states with whatever transitional needs they had. The allocation to the states would be based on a mixture of what their emissions were as well as what their energy consumption was. So we tried to balance production and consumption of carbon intensive goods. That was the idea—admittedly, at the time it was because we really didn't have a good idea of how to structure a transitional program.

A. Sam Napolitano:
Actually, for what you are talking about from the NOx and NOx SIP Call we have, that's exactly what we have. We have allocations of allowances, but the state of Virginia will decide how those are given out to its sources, and that's what's happening throughout the states that are involved in that. I have not heard it discussed at all to let the states particularly be the solution at the federal level what we're talking about for multi-pollutant bills.

Q. William Pizer:
The SIP Calls, also, not just power plants, right?

A. Sam Napolitano:
Yes, it's got some industrial sources in some cases.

Q. Richard Dixon, Government of Alberta:
We just finished on Friday and I am not sure when it will be released, but there is a major feasibility study where we're looking into emissions trading for the province. We have our three P's--carbon, SO2 and NOx--and a bit of a different type of regime we have with Hg.

What we found though in our feasibility study, and it wasn't discussed here, is that the relationship with the 3P trading system is very important in terms of the tradeoff of technologies that we use for abatements given whether it's electricity . . . or this kind of thing. So it's quite different--it's not the science that's of interest so much as it is the technologies--and then the drive on the technologies and innovation. So that's where we're heading with that.

Q. Andy Patterson, Environmental Business International:
I wanted to ask you about the nuclear provisions in the new Dominici Bill since that's a big difference from last year. Particularly what impact it might have on the outlook for carbon trading if you included new nuclear production, not running the current fleet better, but new nuclear production because some of the utilities are weighing that option now. One of the interesting elements that Dominici put in the bill was financial incentives for construction of conventional nuclear but then threw in another provision for hydrogen production from gas-cooled nuclear. So you have two, in essence, public policy pushes for nuclear that would have an impact (a) possibly on reducing carbon reduction from coal plants by replacing them with convention nuclear; (b) you can move over to the transportation sector of your pie, Bill, by producing hydrogen. How do you

see the debate going on whether nuclear gets included going forward for offsets or not if it's new nuclear rather than just running the current fleet better, particularly since it's in the Dominici version of the energy bill now.

A. William Pizer
I don't think any of the bills . . . I mean the Jeffords Lieberman . . . obviously Clear Skies doesn't have carbon, and the Jeffords Lieberman I don't think has off-system credits, so there's really no way you get . . . I know Jeffords Lieberman you can put any price on carbon so you would be favoring nuclear by some amount. Coupled with those other incentives you might make nuclear competitive with gas or something. It would obviously help. My impression is that with nuclear the problem is siting, it's not just the cost.

Andy Patterson:
It's actually not the siting, you could build 20 to 30 more reactors.

William Pizer: . . .on the current existing sites, yeah.