RESOURCES
FOR THE FUTURE

Making Sense of EPA's Proposed Rule for Reducing Greenhouse Gas Emissions from Existing Power Plants

What follows is a transcript of the RFF seminar "Making Sense of EPA's Proposed Rule for Reducing Greenhouse Gas Emissions from Power Plants," held at RFF on June 5, 2014. It has been lightly edited and will not sync exactly to the video recording.

Phil Sharp: Ladies and gentlemen, welcome to Resources to the Future and welcome to our discussion of the proposed rule that the Environmental Protection Agency just put out on Monday to regulate carbon from existing electric utility plants. As you may know, RFF has been involved with climate issues for well over a decade. I just want to indicate a couple things about the way we approach things. First of all, we do not, as an institution, take positions on policy matters or on anything at all, as a matter of fact, other than trying to do serious analysis of potential issues, of impact of issues, of operations on the US economy of these various issues.

In the process, however, we have, on climate issues, looked at virtually every major federal proposal for what the United States might do in this area. So when cap and trade was under consideration in the US Congress, we were deeply involved in analysis of that, in particular on cost control mechanisms and on how to treat trade sensitive industries that might've been hurt in the process of adopting a US policy. We have been deeply involved and doing lots of work on the carbon tax proposals that have floated around in the academic arena for many years. We've done considerable work and submitted analysis to the Senate energy committee when, for a short period of time, there was talk of possibly a clean energy standard being adopted for the electronic utility system in the country. We've been doing work on the potential for EPA to regulating carbon for the last several years, led in particular by Dallas Burtraw and Nathan Richardson, who will be on the program today with us.

In that regard that the analysis done here over the last several year, we looked at the potential regulatory paths that were available for EPA to choose and what some of the economic consequences might be depending on the path chosen. We discovered, not to anybody's surprise, that some paths are much cheaper from a national economy perspective than others. In addition to that, at the request of the Environmental Protection Agency, we held one of their listening sessions for the electric utility

industry to try to get input before this rule was written. Our scholars have been engaged in multiple stakeholder discussions on this question.

Besides working on this broad range of issues, our folks have been deeply involved in very explicit decision making that's gone on in this country and elsewhere on carbon policy. For example, when the northeast states created the Regional Greenhouse Gas Initiative, Dallas Burtraw and Karen Palmer were technical advisors, ran computer simulations of different choices, helped design the auction that was ultimately adopted for the credits in that system. In California, as they developed their program, Dallas served on the market advisory committee to help define how you ought to make a carbon market work. In terms of the European Union, we've been deeply involved over the years in analysis, in recommendations, and indeed are engaged right now in a series of proposals back to the EU as they try to reform that system. In China, we are currently involved. The Chinese government, unbeknownst to many Americans, especially on Capitol Hill, actually is taking action on carbon, and indeed, they have invested in creating seven major pilot projects of cap and trade systems in various cities and provinces with anticipation they might adopt a national one in the next five year plan. One can only speculate as to that, but at the moment, one of our scholars is in China working on some of the design questions there.

In addition to that, we have been deeply engaged and been called to be a part of various analyses that go on internationally and around the world. Ray Kopp and Roger Cooke are lead authors in a couple of the chapters in the IPCC assessment that is rolling out this year, and others were called on for other roles in that process. You'll pardon this advertisement for our work, but the point is that we have been engaged and going ahead we intend to stay fully engaged as the state and federal governments proceed on these issues.

Let me make just a couple very broad points, partly out of my previous role as a member of the House of Representatives. My first point is that this obviously—as we all know, and the president has indicated—is part of the big initiative of the president for his climate program that he announced last June. However, it's very important to recognize that under the Clean Air Act, not only will there be suits filed to block action, there have suits previously and suits will be filed to force the agency to regulate carbon. Indeed, this already had occurred prior to this administration taking office, as most people know, and the Supreme Court had to deal with the question in Massachusetts vs. EPA. It simply came to a conclusion that there was authority under the Clean Air Act to regulate carbon as a pollutant if they went through the certain processes and findings in that process.

In 2009, when the administration and the Congress were dealing with trying to actually legislate a new program—the Waxman-Markey proposal, which passed the House of Representatives—of course it included a preemption of some of those authorities of the EPA in order to regulate carbon, putting in place instead the so-called cap and trade program that was recommended at that time. Now, obviously the Congress did not adopt that legislation, so they did not adopt the preemption either,

and as a result, those authorities stand. The point being that whether this administration is in office or not, no one should assume this issue is simply going to go away because lawsuits have been and will be filed to force action as well as to block it.

My second point is that while this issue will undoubtedly be a surprise and new to a number of people in the current political arena on Capitol Hill and in the states, in fact it is in no way new to any serious person in this industry that is about to be regulated. Nor is it new to most regulators that have experience with this industry. Indeed, for the last 25 years at least, there has been discussion of how and whether to regulate carbon dioxide, what mechanism to use in the electric utility system. In 1992, in the Energy Policy Act of that year, we actually set in place a voluntary program of disclosure at the Department of Energy of the carbon emissions of every utility that would sign up and subscribe, and a number of people in the industry did. Of course, then came on the actual requirement at EPA in 2009 after the Massachusetts vs. EPA suit in 2007 that they had to mandatorily report. Simple point: obviously there's been a lot of advance notice that this is going to be an issue that one has to deal with in this sector.

But let me suggest, too, that there's been at least a decade of focus on analysis—I mentioned here at RFF but in other universities, by Wall Street analysts, by industry planners that deal with electricity system—on what options, what techniques, how to deal with carbon constraint. So we're not unfamiliar with the technological possibilities, not unfamiliar with the options of energy efficiency, and not unfamiliar with most of the things that the rule puts in place. Indeed, many of them have been tried or required in various states to date. So this is not a new experience for this utility. Let me suggest to you what is, for many people, going to be a new experience, and that is this possibility of just having a single state plan to come back to EPA saying how you will implement this rule in your state, and the option is available that you join with other states in a multi-state plan or a coordinated plan. Now, frankly, most of us would assume that a multi-state plan opens up the possibility of cost reduction. But of course, that will not be equal across all the states and, the point is, it's going to be complicated and there isn't a lot of experience except in the RGGI process of dealing with this kind of a multistate approach.

And what that's going to mean to state leaders in business, in industry and the utility sector, in the government is, first, they evaluate if this is an option which would really pay off from the state's perspective or the interest within the state. Second of all, which states does it makes sense to join up with, and third, then if you actually have a group that are coalescing, how do you negotiate a plan. This is going to take lots of discussion, lots of analysis, it's going to take a lot of skilled leadership to carry it out, and that's part of the reason why the Environmental Protection Agency in their proposal allows a year extension—the two year possibility of coming back with a multi-state plan, as opposed to a one year possibility of coming back with a single state plan. And of course, this political leadership is going to occur in some states in a context that is going to be highly inflammatory. There will be one faction that wants

the state to take absolute resistance to the federal government and there will be another faction that will be saying, "We ought to be looking for the cheapest, most effective option for us to comply with this regulation."

So this is going to be a challenge to leadership, but it's one of the possibilities that is available to states that potentially could reduce their costs. Well, let me make a final point and caveat which is probably obvious to most people in this audience, but some of you may not have dealt with EPA or these issues prior to this time. First of all is that we're only beginning to understand what the agency has proposed. What came out on Monday, and I don't even have the numbers, were hundreds of pages of the rule, and hundreds of pages of regulatory analysis, and so do not expect, although some of them may, that either our panelists or audience have actually read it all or any human being in this society has read it all. That may be unfair. I'm sure there are some that are bleary eyed here this morning that spent their time doing that. And also, obviously, with these kinds of things there are always multiple interpretations of what it means, so that's the kind of thing we'll be working out, and of course, this is Washington, so there will be claims and counterclaims that are about some other subject that is applied to this, and that just complicates the possibility of trying to figure out what is potentially going to happen and where are we going to be. That's one of the reasons why we at RFF, why the nation's capitol, why the courts, why the legislatures are going to be dealing with this question for the next several years.

Well, with that, let me introduce somebody to try to get us down to the facts. We're delighted that the EPA was willing to send a representative, Reid Harvey, who is Director of the Clean Air Markets Division in the Office of Atmospheric Programs, to give us an outline for what is in this rule to begin with. Let me just say on your seats we have bios for all of our speakers and our general plan, I think, is clear in that we will have commentary first by Dallas Burtraw, who has led our team, and then we will have short commentaries by our panelists and then we will it open up to both the internet and local audience to questions. Reid, thank you so much for coming.

Reid Harvey: Good morning. So let's start by satisfying Phil's curiosity. Who has read the more than 600 pages of the preamble, raise your hand? Okay, so you all can join me up here since you know it quite well. I think there a number of people at EPA who have read the preamble hundreds of times, so we probably take the prize.

So I want to start by thanking RFF for asking us to be here today. I've been in the audience as you have been multiple times and it's always been very helpful to me and others at EPA to see the work that RFF has done, the work that Dallas and Karen and Ray and Nathan and all of you have done. We definitely value the work that RFF does, we've benefited from the convening that you've done with preeminent economists as well as other stakeholders, so we want to say thank you very much for the work that you do, it's been very valuable to us.

I want to say that I'm here representing a team of people at EPA. As you can imagine, with a rule of this size and scope, we have a large team of people from the air office.

I'm working on the rule with the lead office—the Office of Air Quality Planning and Standards. Peter Saragotas, who's the division director in that office, because his group does the new source performance standards, is the lead for this rule. My group did a lot of the analytic work, the modeling, the data crunching, and wrote a lot of the parts that dealt with renewable energy and electric energy efficiency, so it's been a real teamwork effort. The policy office at EPA has been heavily involved, obviously the general counsel's office, and so it's been an extensive effort. But again, I just want to make sure that I'm not the only person involved in this. And the last thing I wanted to say before I get started is unfortunately I have to give another speech at 10:00. I would much rather stay with you and listen to Dallas and to the panelists, but I have to duck out after this talk. I believe there may be a few people from my group and other parts of EPA here in the audience and they may be available to answer technical questions during the Q&A session, so let's get started.

Just a reminder that our proposal is focused on the power sector and, as most of you probably know, greenhouse gases come from a variety of areas of the economy. This graphic illustrates that the electricity sector is responsible for 32 percent of all greenhouse gases in the United States and about 40 percent of all CO2 emissions. There are too many slides to go through in detail with you, so I'm going to skip a few. I believe RFF will make these available and you can look at them when you have more time. So I'm going to give an overview of the proposal, talk a little bit about the cost and benefits of the broad form. I'm not going to dwell on the legal issues around 111(d) because we have a preeminent panel of lawyers who can speak to that in more detail. I'll talk a little bit about the outreach that we did (Phil referred to) and in particular I'll talk about how we set the state goals. We've already seen, because it's complex, that there's been a number of questions about that. I'm going to touch very lightly on the state plans part, just because of the time that's available, and then conclude with costs and benefits and give you sense of our timing going forward and how you can respond to us through the process of responding to the proposed rule, because obviously it's a proposal and we're working towards a final rule.

This rule is focused on reducing CO2 emissions from existing power plants. Many of you probably know that we issued a proposal for new power plants in January and the comment period recently closed on that. So for those of you familiar with the Clean Air Act, that proposal was 111(b) as in boy, this proposal is 111(d) as in dog. Our goal throughout this—and we talked a lot to stakeholders—was to ensure that we continue to maintain an efficient, affordable and reliable energy system, and you'll see that the flexibilities provided in this rule help us achieve that. If you look at the state goals and our modeling of how we think there's one pathway where states might achieve these targets, we believe that you could get to something like 30 percent below 2005 levels by 2030. Again, that's from our modeling. States may choose to do different things, but that is our best estimate of where we might arrive.

In doing that, we not only achieve climate benefits but we also achieve co-benefits protecting human health, and these are on top of the existing baseline of existing rules that we already have in place to protect human health. These protections apply

particularly for those Americans who are most at risk, children and older Americans, and we've quantified these benefits. We have a number here, about 55 to 93 billion. The rule achieves net benefits overall and even if you just look at the dollars that we would invest in the public health side, you would get something like a seven to one ratio.

So one of the important principles for us as we developed the rule was to ensure that we follow the Clean Air Act and that we work with states to build on things that states are already doing. We had conversations with all of the states, with multiple agencies in each state—the air offices, the energy offices, the utility commissions, and utilities in each state—and we learned a great deal about all the things that states are doing and there's a wide array of things that many states are doing. We're trying to build on those and follow in that path. We think as this rule is implemented that you'll see greater incentives for investment in cleaner and more efficient technologies, and we believe that people will get started soon.

That being said, we've provided a very flexible timeline. It's 2014 today, and I'll go through this in more detail, but we've got a long time period for firms and states to start working down the path to comply with the rule. We wanted to ensure that it's flexible. We wanted to ensure that people could take advantage of the wide array of options that are available to them. We know that it takes time to make the investments in the infrastructure needed to make these changes and we provided that time. We know that people have invested in existing infrastructure and we wanted to avoid straining those assets, and that's one of the reasons why we wanted to ensure a sufficiently long time period. We heard from a number of people as we went out that that was a critical aspect of our action, that giving time to act on this is critical, and we tried to provide a wide array of tools for states to work with this.

So that's the overview. As I said, I'm going to skip the Clean Air Act legal part. I'm assuming the panel will get into that more. Nathan will probably get into that more. We are guided under 111(d) to determine the best system of emissions reductions for meeting the standards and some of the factors that go into setting the best system of emission reductions are listed on this slide: cost, how much you get in terms of reductions, what's the technology, what's the feasibility of the technology. We consider all of those things in setting our best system of emission reductions, and I'll touch on that.

As I mentioned earlier, this is the most extensive public engagement, I think in my experience at EPA, that we've ever done. Each of our regional offices held public meetings, we had individual meetings with state agencies that I mentioned. We've had over 300 meetings in our offices with every group that's wanted to meet with us since last year. We've talked to every state across the country and we've tried to listen and find space in the proposal for the concerns and the issues that were brought to us, and we've listed a few here on this slide. We've heard from people that there is a need to tackle this problem and we're doing that. We've certainly heard that the electric power system across the country is a very dynamic and interrelated system. It's not state by

state, it's multi-state, it's regional, and we know that the system has been going through significant changes in recent years in terms of moving to greater use of natural gas, for example. And generally, we believe that as the power system modernizes that it'll lead to improvements for the economy. So common themes from this outreach were: reliability, the need for flexibility, ensuring affordability, and providing time for the states to develop plans and then time for affected entities to actually build out that infrastructure and to make the investments needed to comply.

I'm going to have to race through some slides. This is probably the most complicated part of our proposal. We'd be happy for those who want to come and get clarifications to talk to us about it, but we used our approach of setting the best system of emissions reductions to develop several "building blocks" to come up with an emissions intensity rate, pounds per megawatt hour. We also provided significant flexibility. I alluded earlier to the fact that we provide a glide path. So we're saying that over the ten years, from 2020 to 2029, we expect that states meet the intensity rate that we set, but we are not dictating a specific year by year path. We're saying that we recognize that there are differences across states and there's flexibility in as long as you meet that average over that period.

This graphic illustrates the fact that we looked at four building blocks, looking at what plants can do, looking at how you can dispatch away from higher carbon emitting sources to lower carbon emitting sources, the fact that you can build zero or low emitting sources and that you can do things like demand side energy efficiency. We took into account those factors in calculating the state goal, but we didn't put into the state goal everything that people can do, and so if you look at the right-hand column, what we're saying is there's a lot of flexibility that states have and that affected sources have in how they comply with those goals. There are a number of things that they can do that we did not account for in setting that goal, and this illustrates that. I'm not going to walk through each of these individually, and this is just an illustrative list. There are a number of things on the right column that we did not list. That doesn't mean that they can't be used, these are just illustrations.

I'm going to skip over, unfortunately, how state plans work. I think the bottom line here is we wanted to ensure that states had maximum flexibility, that they could do things that met their own unique conditions, because we know from our discussions with people that there are a variety of conditions in every state. I'm going to close with a discussion about the benefits and costs. I touched on these at the beginning, the 30 percent reduction effort overall, the total benefits, the avoided health impacts, very significant, and these are on top of existing rules that we have in place today. I'm going to go to the next slide.

One of the things that we did is we looked at the impacts not just on electricity rates but on electricity bills, and so we see that in the earlier years—and these are forecasts, so this is not a prediction of the future, this is just our modeling to look at one sort of illustrative way that folks could do this—we do see rates go up but as demand or electricity is reduced through increased use of energy efficiency, overall bills decline.

And we continue to preserve a diverse fuel mix for the power sector, and . . . I'm not sure what happened to the graphic. Sorry. I'm not sure, but we had a version that I thought I sent you that had the numbers. It's roughly a third and we'll get you a corrected version before you post it. Coal is not disappearing. If you look at this graphic, the tall column on the left is business as usual, 2020, 2030, coal declines in the base case, and then the two bars are the two options that we analyze. It does decline, it's not disappearing. So again, look at our regulatory impact analysis and you can see those numbers.

Just to conclude on this slide, this is a proposal, these are our ideas that are informed by our discussions with you and other stakeholders around the country. We welcome your comments. We would like to get your feedback and suggestions on how we can improve on this. We will have four public hearings at the end of July around the country. There'll be a 120-day public comment period on this when it's published in the federal register, and if you want to meet with us personally, you can contact me, you can contact Joe Goffman or we can get you in touch with the right people. Sorry to race through so quickly, but I appreciate your interest. Thank you.

Phil Sharp: Thank you very much, I'm delighted now to turn it over to our senior fellow, Dallas Burtraw, who has done extensive work over the years about the electric utility system, extensive work about the Clean Air Act and other restrictions on pollution, but he's been very engaged for the last several years on these climate rules. Dallas.

Dallas Burtraw: Thank you, good morning. Thanks for being here. For a couple decades, analysts such as myself have shared a vision of a comprehensive, efficient and ambitious climate policy regime that was designed from the top down, and that type of an approach has not come to pass. And maybe it was ill conceived that such an approach could really be given birth fully formed, and that took a lot of the wind out of the sails with respect to climate policy advocacy. Now we see at the international stage and in the microcosm here in the US a different type of approach which is a bottom up approach which, if successful, that success will emerge around the building of coalitions at the state level, among groups within states, to achieve a common policy foundation.

So we at RFF have been doing work on this for several years, as Phil mentioned, and I want to give a shoutout to Anthony Paul and Karen Palmer and Nathan Richardson, Josh Lynn, Art Fraas, and some great research assistants who've done extensive modeling to see what kind of pathways might be available under the Clean Air Act, under something that looked like sort of a bottom up approach. Although as Phil said, there's a lot of pathways that could turn out to be quite expensive, we've found several pathways that were relatively cost effective that would seemingly be available, so there were different choices that could be made but there's some architectural features that had to be in place and that's what I'm going to look for in these rules. The characteristic of these pathways is not just that they were cost effective policy designs but that there would be real costs. This isn't coming free. Those costs would be borne

primarily by producers and only to a small extent borne by consumers. It's a characteristic of some of the ways that these policies take shape.

The costs on the producer side we anticipate will fall most heavily on the smaller, older, least efficient coal fired power plants or their owners and operators. With respect to electricity consumers, we anticipate that there are multiple options in place for the states to achieve an outcome that leads to a very small change in the national average retail electricity price, almost unobservable to the average household. We heard the possibility that bills could actually go down in recognizing bills as price time quantity; the EPA suggested bills could go down over the course of the next decade.

There are some regional differences, but even in those regions that would be most heavily affected, under the kinds of pathways that we have identified, there would be at the most a five or six percent change in electricity price. So that's what we thought is possible. What I want to do is come to the question of the architecture in this proposal to see whether the pieces have been put in place. There's three things that I wanted to look for here. One was a signal of stringency, a clear signal. I'm not saying here now that it was a specific level of stringency, but just that it was certain, and so we see the target of approximately 30 percent reduction from 2005 levels by 2030. So for clarification, let's all be clear that since 2005, electricity sector emissions have fallen by about 12 percent. When I say 30 percent, I'm only talking about the electricity sector emissions. We've got about 18 percent more to go by 2030 that's to be achieved by this plan. That may not seem tremendously ambitious based on what's happened since 2005, but it's important to mention that this at the same time has to accommodate substantial expected economic growth, increasing electrification of the economy, and in fact, be implemented in a way that does not impede that economic growth. The time path is somewhat uncertain, but it appears from what EPA is saying that most of these emission reductions will be front loaded. Around 2020, I calculate that the emission reductions are roughly sufficient on an economy-wide basis to take the US past about 16 percentage points of the famous Copenhagen pledge of a 17 percentage point reduction from 2005 levels by 2020. In other words, within striking distance, but not quite there.

Secondly, architecture. I was looking for a distinction between compliance obligation and compliance activity. That is, obligation is the legal responsibility of states for what they had to do, activity is what they could do to get there. It's sort of like when you tell your kids that they've got some chores to do and they've got to clean their room and you don't tell them how to do it, they've just got to get it done.

Third, flexibility—that is deference to the states in the choice of activities that they implement. Back in 2011 we convened one of the early workshops on this and the framing issue that emerged for the EPA if a flexible outcome was to be achieved was a choice, a fork in the road, whether a flexible approach might be ordained by the EPA through a nationally designed clean energy standard or emissions rate trading program, or even cap and trade, even though the EPA at that point said they would

not mandate a cap and trade program nationally under the Clean Air Act. Or secondly, whether the EPA would rely on the states to introduce the options for such compliance flexibility, and the EPA has chosen the latter. They've chosen to give maximum deference to the states, and so therein is where flexibility emerges, and it is the essential ingredient of a cost effective outcome, and to economists and probably everyone in this room. Cost effectiveness is so important, not just because of efficiency and growth in the economy, but also in terms of attaining any kind of climate policy outcomes. It has to be done at the least cost measure because the cost in the aggregate at a national global level could be so substantial.

So what will I look for in the next year? This question that Phil has brought up, I put on central stage that our conversation is going to change to the question of coordination among the states. I'll return to that point in conclusion in just a minute. So what EPA did was identify a compliance obligation for each state, apparently taking many factors into account, but the obligations imposed on the states, are not, at first blush, apparently cost effective. That is there is not evidence that the choices that were made by the EPA were made primarily in order to equate the marginal costs of a ton of emission reductions in the different states. There's large differences in marginal cost at the outset of the regulation in terms of what the incremental ton would be from different measures and in different states. For example, the addition of an incremental investment in a wind farm or other some low or non-emitting resource would have different benefits to that state and there's different incentives for those investments to occur in one location than in another. Now, that might make some sense, because for example, a windmill may be displacing several times more tons of emissions in one region of the country than another.

But just to make the observation that it doesn't appear this was the driving criteria in organizing the EPA's thinking. Instead EPA seems to attempt to mitigate the difference in costs that are being borne across the different states. This is in contrast to the narrative that has emerged in some media this week that has tried to make a big deal about emphasizing that some states are bearing a greater cost than others. In fact, it looks like the EPA has leaned over backwards just the other way, to sort of balance the cost of being imposed to the extent possible on different states. So that's at the core of the policy design.

So the EPA has apparently not given us a cost effective outcome but has given us the tools. EPA has provided the architecture, a separate compliance obligation from the compliance activity, and the essential ingredient of flexibility to allow the outcome to be achieved, so the promise of a cost effective outcome really rests with the decision of the states. And the logic of this rule, interestingly, really strongly returns to the notion of cooperative federalism—this idea of a shared relationship between the federal government and the states and there's sort of a political jujitsu or ideological jujitsu in this, in which one thinks of sort of an assertive regulatory approach at the federal level often steps on the toes of state authority. In this case there's obligations imposed on the states but maximum deference in terms of what the states do to achieve that outcome. EPA has defined the obligations that might characterize the

starting point for a process or a negotiation or the property rights within a negotiation and then the states are free to negotiate within themselves and between themselves to lead to an improved outcome. So the states are given maximum flexibility to do that. Whether they are able to do that, we'll find out.

Now, environmental economics would suggest that governments at any level are not the best way to negotiate to an efficient outcome or to achieve the efficient outcome, but rather would suggest for greater reliance on markets. The market is the best mechanism to achieve a cost effective outcome. A broad trading program was suggested in Waxman-Markey to achieve this outcome. Probably there's two times as many explanations for why that didn't pass as there are people in the room, but I will observe that while Waxman-Markey was organized around achieving a cost effective approach. It also implicitly identified the winners and losers in that process. By attempting to launch a fully designed program, Congress is specifying the distributional outcome as well as the efficient one. The EPA's approach is not attempting to equalize marginal costs. Rather, it's balancing the effort or the contributions that have to be made across the different states to bring markets in to bear. Many states are already doing that, with cap and trade programs in ten states, and renewable portfolio standards which have a great resemblance to a market approach, even though carbon isn't the exact focus of that, in approximately 30 states, et cetera.

But states will also do a balancing act, making tradeoffs between cost and other considerations articulated in statute and regulatory precedent, such as other environmental outcomes, considering the remaining useful life of facilities which, for example, may have just made major investments in post-convection controls for SO2 or NOx, innovation technology, job preservation in their states, et cetera. So again, what I will be looking for next year, compared to the things I say I was looking for in the past, this is I think the regime change. This is what I think all the conversations are going to be about increasingly over the next year is the question of coordination among the states. This is important not just for reducing the costs in compliance activities, but at least as important because of interaction between these compliance activities and the smooth operation of existing power markets. In fact, that may be the real ball game where real money is made or lost under the implementation of this regulation. It's possible not just that poor coordination could muck up, but there is the possibility of strategic behavior and so it's going to be really crucial. We're going to be studying that a lot here at RFF to try to figure out what the elements of this dynamic are.

Now, when I said at the outset that there were multiple compliance paths that were available and cost effective, that was assuming that all the states did the same thing. All the states may not do the same thing and it's not necessary that they all do the same thing, but generally states within power pools will have to coordinate in order to avoid unfortunate outcomes. So finally, in closing, I just want to raise a couple ancillary points here. One is that analogies have been made in thinking about this deference to the states to the architecture of health care and what will happen and

how will this be received in the states. To be sure, there are going to be some states that practice civil disobedience around this regulation and there certainly is going to be a lot of rhetoric and lawsuits. But the difference here compared to the health care debate is the fundamental economic interest and role of companies that are engaged in the electricity industry already and actively engaged in these regional power markets. You can have companies that are operating in multiple states, like for example for one prominent company that's famously in Minnesota, Colorado and Texas, which is really quite a portfolio. This company is going to see it working in one place and want it to work elsewhere; they're going to want to rationalize their investment decisions. Companies are going to be having operations even across state borders within a contiguous system and they're going to want to rationalize their investment decisions, so they're going to be putting pressure on the states to solve this problem so that they aren't the ones holding major cost associated with any kind of dysfunction that comes down the road.

And a final point about timing. About these regulations, I'm going to leave it to your opinion about whether they're ambitious, not ambitious, sufficiently ambitious or whatever. But I think that I've got to argue that what they really do is they're locking in trends that are already emerging. When we think, "will they survive" (because a lot of people say, well, regulations aren't really real, and Phil nodded towards this at the outcome), will they survive in the face of legal challenge, well, in one sense we're about to find out of that from our panel of lawyers who are about to join us, but even in the face of such legal threats, these regulations cast a shadow forward. They affect the investment climate in the electricity industry, and the power industry can be reliably certain that it will forever face a carbon constrained future. An object that stays at rest tends to stay at rest. This has put this object in motion and an object in motion tends to stay in motion, and all decisions going forward are going to be affected by this new reality. Thank you.

Phil Sharp: Ladies and gentlemen, we're now going to hear from our panelists individually and then we'll be collectively up here to answer questions. Our first one on the program is Jeffrey Holmstead, who many of you know, a very knowledgeable and prominent person in his field. Regrettably, Jeffrey's trying to get here. He will get here but we're going to take things out of order and very pleased to introduce Benjamin Longstreth, who's the senior attorney with the climate and clean air program of the Natural Resources Defense Council.

Benjamin Longstreth: Thank you so much. It's really wonderful to be here and get the chance to talk to you all about this rule, which we are really extraordinarily excited to see and delighted with this first step, which we think is just critical. The first point I'd want to make just about the piece of it that we're most pleased with, which is the building blocks. We think that EPA absolutely got the right elements of the plan, has constructed it based on, as indicated, things that can be done at individual plants, that is heat rated improvements, more effective use of natural gas, renewables and energy efficiency. As some of you may know, NRDC had a proposal for how we thought EPA could use 111(d) and these were the elements in our plan, as well.

As Dallas indicated, it also maximizes flexibility for states, and we think that is a critical element, as well. The plan gets serious emission reductions, and it does so based on tools that we think have quite modest costs. I just thought I would offer a few more metrics. 18 percent below—and this is based on the numbers in EPA's materials—the business as usual forecast by 2020, and 25 percent below that business as usual forecast by 2030. Working off the 2005 number, which is the one that they've talked most about, those numbers are 26 and 30 percent below the 2005 numbers. It's also useful, I think, to think about where it is from today, so based on 2012 numbers, it's a 13 percent reduction by 2020 and a 17 percent reduction by 2030.

And as Reid Harvey indicated, there are very significant co-benefits in addition to the carbon pollution reductions, and as a whole, the projection is for much greater benefits than costs. At the same time, we think that the proposal can be strengthened. We're going to be looking at it. There are two particular areas where we think EPA took more modest, more conservative assumptions than it needed to. One is on energy efficiency in particular, the ramp up of energy efficiency that they assumed is very slow, slower than we think has been demonstrated by a number of states in recent years. It also reaches a lower total number of 1.5 percent of a state's electric output than we think is possible and has also been demonstrated. So those are a few of the areas we think where it could be strengthened.

I'd just like to note a few things about the general process. It's very much bottom up, to echo Dallas, but also in particular, bottom up in terms of starting with the particular tools that Reid describes described in the proposal as the building blocks. I identify these four tools again, the things that you can do at the plants, heat rate improvements (although not fuel switching at individual coal plants), but a more effective use of existing natural gas plants, so a state that doesn't have existing natural gas plants that tool's not very effective in that state, and then renewables and the size of the renewables is based on looking at different regions and looking at the renewable portfolio standards that states in those regions have adopted, and then energy efficiency.

So when you hear that sort of 26 to 30 percent reduction, EPA definitely has not taken that and imposed that on each state. Instead, it has identified these four blocks and then done the analysis to apply each of those blocks to each state, and so that means that each state's particular portfolio, their particular mix of power generation—the tools, when applied to that mix, achieve very different outcomes. I think legally, this is a very defensible approach. It is an approach that creates differences between states in terms of the percentage reduction target that each state has. But again, because it's based on that state's energy mix and each of the tools is really, in our view, of very modest cost, we think it is a fair approach.

Again, I'll just note also the importance of the flexible options for states. States can use a mass-based approach where they would set a cap. States can also use a rate-

based approach and can join with other states or go it alone. I'll just note also that as Dallas indicated, the utilities have been thinking about this for a long time, EPA has spent a long time talking with them. Our impression is that utilities, their reaction to this has been very reasonable, and I think it's useful to focus on what they're saying about it, rather than some of the more extreme statements from the political sector. So thank you so much, I look forward to talking more on the panel.

Phil Sharp: Very pleased now to introduce a resident fellow here at RFF, Nathan Richardson. As many of you know, most of the scholars on our staff are economists, but we every now and then like to let somebody else in just to stir things up and so we've let this lawyer into our ship, and risky as that is, we've been thrilled with his work and we're delighted to have him here.

Nathan Richardson: Thanks, Phil. I'm also glad to see that Jeff is here. I only have a couple of things to say and then my plan was to say them quickly and get on the panel. I was afraid I would have to stand up here and tell jokes while we're waiting for him to get here. I'll let you decided whether this Clean Air Act material is worth listening to. I know my stand up material is not worth listening to so you've been spared that. So like I said, I'll just say a couple of things here. I want to make some general comments about how I feel about the rule in context. Those'll be super quick because Dallas said a lot of the things that I was going to say anyway. That might be because I stole the ideas from him or it might be just because we happen to think along the same lines here, but I do think this is a really important rule for the same key reason that Dallas said, that it's not just the first and biggest federal move on climate, it's also a signal in some sense, a crossing of the Rubicon here, that we've moved into an era where I think industry and observers and everyone in this game can assume in the future that over time we'll decarbonize the economy.

In the future, we may have a price on carbon. We don't have that yet, although some states may have it, but there's a clear signal here and I think that's really, really important. As far as I know, there's been no significant environmental regulation after it's finalized and no major environmental law that's been repealed in this country. Of course, some of those, implementation changes over time, but I think there is an inertia here and it's really important inertia. That summary doesn't quite give enough credit to states. The moves that states have been doing for some time are very important. You add them all up, they're maybe not quite as important as what's going on here, but even that's not fair, because in EPA's estimates, a lot of these building blocks include things that states have already promised to do, so you're really adding a lot of the same things together, states deserve a lot of credit here. The federal signal is important but this is a state driven program.

On the benefits side, on the CO2 reduction side, my view is that they're relatively modest, and maybe that's the right step for now. Really, whether it's successful on the benefits of course depends on what other countries do. That's unclear at this point. You see some positive signals out of China but you really don't know how that's going to come out. At the same time, I think this is a risk. You're taking a risk that

other countries don't do anything and that you've spent all these resources without a lot of benefit. I think that's a risk that it would be irresponsible not to take. Nevertheless, it is a risk, you don't know what they're going to do, and if other countries don't act, then this may not end up being a good deal. That's something we can only know if we try it, though, in my view.

In the cost side, certainly I'll be looking to my colleagues at RFF and elsewhere to tell me more about what to expect. My initial impression is that there's nothing in this program that surprises me in terms of how costly it will be. I think the costs will be modest. I'm probably the last person on this panel or today you want to listen to on that, but that's my personal view. I think one signal for that is the fact that utilities do not seem, so far, to be that up in arms about this rule. Maybe that's partly because they expected it, and even if that's true, there are other businesses like coal mining that I wouldn't want to be in. Nevertheless, that was true before this rule. You look at some of the stocks for coal companies or coal mining companies, some of them have dropped 50 percent in the last year or two, and that was before this rule was announced. So maybe this rule doesn't change a whole lot for them.

All that said, this rule's not perfect. There's things I would do differently. I think along with a lot of other people in the room, although not everyone, I think in the long term we'd be better off with a carbon price that equalizes the cost of abatement across the economy more or less, one that increases over time, one that's able to respond to the moves that other countries make in a dynamic way. We don't have that, but there's a reason we don't have that. It's politically impossible today, and this is what we do have and it's the law and that's important. I think it'll take a long time to completely understand not just where this rule takes us but even what this rule means because so much is the responsibility of states. That's true from the legal side, analyzing a lot of these legal questions will depend exactly on what states do. It's just we don't have enough facts on the ground to analyze that, and the same is true for the economic side, either the costs and the benefits—we don't know exactly how that looks, the 30 percent goal, EPA has used its models to derive those estimates and those models have a lot of assumptions in them about what states will do. Those assumptions may be great, they may be not so great. We'll find out. Like Dallas and Phil said, I think collaboration among states will be really important and we don't know how much we're going to have.

So that said, I do want to talk a little bit about this legal risk because I think that's one thing I think is not perfect about this rule, there's some legal risks here. I think we could talk about that all day, I kind of wish we could. I mean, you may not share that view, but I wish we could, so what I'm going to do is focus on two or three things that I think kind of straddle the range of where the most legal uncertainty is. I'm sure other lawyers in the room would have different views, so I'm going to give you one thing that I think EPA did that's legally questionable, but in my view is legal; one that I think is probably not legal; and another where I just don't know yet. And that range for me is, I think, out at the extremes. It's not like there's other issues beyond that that I think are clearly out of bounds. For somebody else, this range may be in the middle

and there may be other things that they think EPA has done too much on or vice versa, they may have nothing they're concerned about.

The one that I think EPA did that I think is a little questionable that I wouldn't put a lot of money on, but I think on balance, is legal, is the inclusion of renewables and energy efficiency in the plan, those are the building blocks three and four. I struggled with this a lot. This was something that was in the NRDC proposal and it was certainly kicked around by a lot of experts before the rule came out. I struggled a lot with whether I thought it was legal. On balance, I think it is for the key reason that these are policy steps that do lead to reductions in emissions from the regulated sector and I think that's important. So on balance, I do think including those is legal. I think there are a lot of practical and implementation problems, how do you attribute those properly, how do you measure the benefits from those in terms of reducing emissions from the fossil sector, who's responsible for those, which gets to my second point. Where I think EPA is on very thin legal ground and my guess would be that they're going to have a lot of trouble with this in the courts is their decision to allow states to take responsibility rather than utilities for these renewable and energy efficiency commitments. So of course, the state has a renewable portfolio standard or has an energy efficiency program, that's great, it should lead to reduced emissions from the power sector. But instead of having the regulated sources take responsibility for those and whether they work or no and how we count them, EPA is allowing the states to do that and I don't think there's a strong basis in the statute for that. I think it's a pretty source focused program. If it comes up in the conversation, we can go into more detail, but this is something I just saw this week but my reading so far, I'm very skeptical about the legality here. And the third one that I don't really know how it comes out is the cost and benefit numbers here for carbon are based on the social cost of carbon, which is a global estimate. It uses integrated assessment models to drive social cost of carbon which has a global perspective. I have no philosophical objection to that number, as I know some people do, I don't. But I question whether it's appropriate to take the Clean Air Act, which is devoted to and aimed at benefits for Americans, and use that global number there, whether that's legal or not. It may not matter, because as Reid from EPA pointed out, you get benefits seven times the cost just from looking at the conventional pollutants alone, so even if you were to use some kind of smaller, America-only social cost of carbon, this would still be cost-benefit justified. But to the extent EPA continues to use the social cost of carbon, it's applicability to Clean Air Act rules focused on the United States hasn't been tested. So I would say that's an area of legal risk but one that I honestly don't know how it comes out.

So those are the three things I'm looking at most here, I want to hear what Jeff has to say, as well, and I certainly look forward to your questions when we're up on the panel. Thanks.

Phil Sharp: And now we're delighted that Jeff did make it. Jeff, we've mentioned just a couple times ahead of you being here and we appreciate your doing the struggle that it took for you to get here, but we're looking forward to your comments.

Jeffrey Holmstead: Well, thank you, I'm delighted to be here this morning, even though I think I'm here to play the role of skunk at the garden party, and I will admit, I feel a little awkward because I've spent most of my career for the past 25 years arguing in favor of market-based approaches to regulation, and especially under the Clean Air Act. I actually really look forward to the panel discussion because I think there's lots of interesting and tricky issues. Let me start my watch. I don't have a lot of time but I want to hit some legal and practical and political issues that I think it is wise to keep in mind.

Much has been made of the fact that EPA has enormous discretion here. David Donager of NRDC has famously said many times that Section 111(d) is the 40-year-old virgin, implying that EPA essentially has a blank slate on which to write. That's not really true, and let me explain why that is. The way Section 111 works is that EPA is required to set a standard of performance for new plants and then states are required to set a standard of performance for existing plants—and EPA provides guidance to the states—but what EPA does to new sources and what states do to existing sources is exactly the same, they set a standard of performance, and we have 40-some odd years of EPA interpreting what that term means, a standard of performance. Now, I know Nathan and many others have focused on that definition and they say, "Well, this is a very broad definition, it's the best system of emission reduction that's been adequately demonstrated," and that's true. It's a very broad definition but that's not the legal question. The legal question is the best system as applied to what, and EPA did take, I think, a very surprising step and they said, "Well, the best system of emission reduction as applied to the state as a whole," and that's just fundamentally inconsistent with the way the statute works. So under Section 111, it all starts with EPA putting sources into categories, and so they list specific categories, and under their regulations, they have to set sub-categories for different types and sizes of plants.

And then what they've done for 40-some odd years is they looked at the best system of emission reduction that can be applied to that particular type of plant, they say, "If you use that best system, what is the emission rate that you can achieve," and then they set a standard of performance based on that emission rate. So that's what EPA has done for 40-some odd years, and interestingly, that's what they did for new coal fired power plants, right? They said, "We know what a standard of performance is, we believe, and you can take issue with this, but the best system of emission reduction is carbon capture and storage, we've looked at the emission rate that we think you can achieve and we apply that to these plants," and they said, "Well, that turns out to be pretty expensive. We don't think anybody's going to do that because nobody's going to build new coal fired power plants, but if they did, it would cost maybe a billion dollars for a 500 megawatt plant or a 600 or 700," but a billion dollars is a lot of money. If you take the standard of performance that EPA is now essentially creating for existing sources and you applied that same standard for new sources, you could get much greater reductions at a lower cost.

So if a coal fired power plant had the option instead of spending a billion dollars on CCS, which no one is going to do anyway, but if they had the option and if you look at all the numbers that EPA and others have used, you would say, "Boy, this standard of performance gets me significantly greater reductions at lower cost." There's legal issues, there's history here, but it's just really legally problematic to try to put this into the Clean Air Act. And again, it's not because the best system of emission reduction, the question is best system of emission reduction as applied to what, and it's pretty clear—I won't read the statutory language, although I would be happy to during questions—but there's many places in the statute and EPA's regulations that talks about this standard of performance applied to a listed source. It's not a group of sources or a group of sources that somehow affect these sources, it's a standard of performance applied to a specific plant.

Let me mention another quick legal issue and then go on to, I think, some practical issues. If you see EPA's proposal, at least in the early years, by far the most reductions come from what the rule talks about as redispatch, right? And so the idea is there's a lot of underutilized combined cycle natural gas plants and so if we just shift generation to those plants and away from coal plants, then that will get us significant emission reductions. From an economic perspective, you can talk about that's a low cost way of doing it, but from a legal perspective, here's what that means, and let's not talk about electricity, let's talk about widgets. So over the course of time, there's two different ways to produce widgets, and over time, they use the best technology to control their emissions and they kind of grow up and they say, "Well, here's this way of producing widgets," and then there's another way of producing widgets. So EPA now comes along and says, "You know what, we just don't like that one type anymore, so we are going to take business from one type and we're just going to shift it to another type of plant, so we're going to take generation from coal plants, we're going to take their business away, and we're going to give it to gas plants."

Now, you may say, correctly, that most companies operate both coal and natural gas and maybe that wouldn't be such a significant economic impact. But as a legal matter, what EPA is asserting here is that the best system of emission reduction is to take business from one type of source that's completely legal that complies with our so on and so forth, and we're going to take that business and give it to another plant. I don't think that qualifies as a best system. I think that's legally problematic. Now, I will say this: EPA doesn't talk about the mechanism by which that would happen, and those of you that are familiar with the way dispatch works in RTOs and even in regulated states, essentially the only way you can do that is through a carbon tax or a cap and trade. I mean, in theory, there's other ways that you could possibly do it but they just don't work very well. So this really does, in fact, if you're getting those reductions through redispatch, the only way to do that is through a carbon tax or a cap and trade.

Finally, let me talk more generally why I think this is just a bad idea. It creates enormous legal uncertainty that will last for many years, and various people are right in saying that utilities have been cautious in reacting to this. That doesn't mean that

there won't be pitched legal battles. There certainly will be, and regardless of whether you believe me or someone else who says, "This is clearly within EPA's authority," this will be decided by the courts, and to some extent, it will decide on the legality of the new source proposal, because you have to have new source amendment before you have an existing source amendment. EPA kind of tries to explain that away with some hand waving, but I don't think that works, either. So you have that initial legal uncertainty, but let's assume that away and that this rule goes into a final rule, then it passes to the states to create these plans. I can tell you just politically, to get those plans, you will need new legislation in almost every state, right? I mean, that's the way the Clean Air Act has worked for SIPs is EPA sets these standards, the governor goes to the state legislature and says, "We need these changes in our regulations to meet this clean air." That's going to be much harder when it comes to creating a cap and trade, and so there are likely to be states that simply refuse to comply, and you say, "Well, that's fine because then EPA will just come in and do a FIP." It's really hard to see how EPA, with it's regulatory tools, can do much of this. I suppose they could try to do a cap and trade program in Texas, in Oklahoma, but legally and politically, that's a tough thing for EPA to do, and on the energy efficiency side, does EPA set up some sort of a program where they charge a fee and then they invest that? I mean, there's just no way for EPA practically to impose a FIP.

And finally, and I've said this before and I'd be curious if people disagree, there are some EPA rules that are very difficult for a subsequent administration to change, and I could talk about why that is, but that's true. There's some that even if a new administration hates something that a prior administration does, it's very hard to change. This is not one of those rules, and so there are reasons, both legal reasons and political reasons, that I think there's a high likelihood this will not ultimately be implemented. What I think that means is for a whole bunch of practical and political reasons, we need to get back to the hard political effort to come up with something that we can make compromises, we can get into statute, because that's the only way you're going to provide investment certainty going forward. Otherwise this can be undone in so many ways that people are going to be reluctant to make significant investments based on all these things, and I for one believe that's possible. I've used up more time but I wanted to give you a chance to at least get my big thoughts on some of these things and I really do very much look forward to the panel discussion. Thank you.

Phil Sharp: Thank you very much. Our panelists will now come forward and I'm going to start off with a couple of questions and then we'll be ready to open it to questions from our audience, both here and on the internet. First, let me just give our panelists an opportunity, Jeff's at a bit of a disadvantage since he did not get to hear the others, but let them, if they have some comments they want to make about each other's comments, I think it'd be useful at this point do that.

Benjamin Longstreth: Ben Longstreth with NRDC. I would make a few comments. One of them, I think Jeff, you alluded to the idea of whether standards are set by states or by EPA. I think the EPA addressed this fully in its regulations on 111(d) back in

1975 and was very clear that EPA determines what the best system of emission reduction is. The statute says that's determined by the administrator. I think the legislative history which EPA goes through in their '75 rules is very clear on that. Also, EPA needs to approve the state plans, so I think EPA is on solid ground in setting out the targets. I think we would agree that the flexibility for states to use those is very much appropriately in the states' hands.

There also are precedents for other rules for trading regimes in some of the 111(d) rules that EPA has proposed, some of which didn't get implemented, like the clean air mercury rule, and in rules that did like rules for municipal waste combustors. So I think there's precedent for the kind of flexibilities allowing methods other than just imposing controls on each individual plant. One other thing I'd note in terms of the question of the example of different widgets is simply that here, I think the widget being produced in each case is the same. There are precedents for EPA to consider different production technologies. For example, in the rules for cement plants, courts have upheld the idea that EPA can preference one production method than another. We may argue about whether that's analogous here. We think it is. I just also would say our—in our view—what they put forward is very much not a cap and trade regime. A rate-based system is possible. We certainly hope this will not happen, but a state could meet the standard and still have their total emissions go up. So I will leave it at that. Thanks.

Nathan Richardson: Sure, let me just add something quickly on this widget point. I think it's a good one and it's something I've struggled with as well. I think maybe the analogy is slightly unfair in that it draws this clean line because two different kinds of widget makers. It's tempting to do the same thing between coal and gas, but EPA has been treating different kinds of power generation differently for a long time. Coal with scrubbers, coal without scrubbers, turbines, gas, IGCC—all of them have been grouped down into two different categories in the statute. Within those categories, in both performance standards and other rules, it's been treating them differently and differentially advantaging one over the other all the time. I think the distinction between coal and gas is no more a bright line conceptually than those distinctions in the past were, but it is a bright line in the statute in that they're both in different source categories. Something to pay attention to here is that EPA has coproposed—and I confess I don't really know what that means—but coproposed two different options in the statute, one to keep coal and gas in separate categories the way they've been historically and another to merge them into one category. In my view, it's much more legally defensible to make these kinds of tradeoffs, including trading programs, that include both of them, both those types, if EPA merges those two categories together. I sent a comment to EPA on the new source rule advising them to do that if they're worried about that in the future. I hope they do here because I think that does a lot to solve the problem that Jeff is talking about. Now, he may argue EPA can't or shouldn't do that and maybe we disagree there, but I certainly think that's the direction EPA should go.

Jeffrey Holmstead: Let me just quickly—because I know Dallas won't have a legal argument, he'll have a much more important comment. It is certainly true that EPA regulations have disadvantaged one over the other, but they've only done that by requiring things that can actually be done at a certain source, right? So if you require a scrubber on a coal plant, that makes it more expensive relative to natural gas, but it still is based on something that EPA has determined. It's a system of emissions reductions that can be applied to that type of source. That's not what they're doing here. They're saying essentially, we're going to take business from one type and shift it to another type, without regard to what control technology that can be applied, so EPA clearly can impose regulations that have the effect of disadvantaging one over the other. That's what they did in the cement rule. But nowhere have they ever said, "Well, we just don't like this type of cement process anymore, so we're just going to shift business from one type to another." I think that that's legally much different from doing regulations that have the effect of doing that based on what can be applied at a certain type of source.

Dallas Burtraw: Okay, I knew that coming in I was going to be with three lawyers up here, so I decided not to be shy because really I can make a fool out of myself making a legal argument, right? But I've paid attention to the lawyers. Lawyers are some of my best friends. One of the things I think that's relevant here is that the amendment in 1990 took out the word technology from best system of emissions reduction. So it's not the best technological system of emission reductions, right, but a system of emission reductions. So I'm sort of thinking lately, in my professional life, there's been an increasingly use of common sense metaphors in judicial decisions like squeezing elephants into mouse holes or whatever. So I think, well, what does it mean for Congress to explicitly remove the word that said "technology" and talk about the best system of emissions reduction and it not being constrained to be a technology question?

So I think that's sort of a precondition that actually begs some sort of flexibility that's going across sources to achieve the same outcome. So to me, as a non-lawyer, it seems to provide safe ground for aggregating those types of measures that can be taken at a plant—so anything from heat rate improvement and other types of things that can be done at a specific facility, but that that could be achieved through a trading system that's implemented by the state, that seems logical to the non-lawyer. It seems safe in that context that the state would be the organizing mechanism for that to occur. It seems a little bit idiosyncratic to suggest that a state could not assume that role as the compliance authority in order to implement it as far as it goes there.

Then the second half of the argument is well, what about requirements and tying of stringency to the opportunity for increased use of renewables or energy efficiency. That's where I think I hear, in what Jeff's saying, is a fine line that lingers longer, which is, those maybe are measures that cannot be taken by a specific facility anyway, so you can't force that facility into an organizational system that requires investments at a different type of a site. And finally, a word on the political economy of this, the six percent average heat rate improvement that's identified in the first of

the four building blocks that Reid Harvey put up—we've done a lot of statistical work on this about whether the engineering cost studies that are out there are valid. Engineers have said you can get two to five percent. Recently engineering studies have suggested up to six percent, EPA suggested six percent heat rate improvement at existing coal fired power plants, and our statistical word finds that on net, yes, across the fleet, that is an attainable outcome. But that's expensive, too, and in any kind of system that was more rational, you wouldn't see that kind of investment at specific facilities because the companies would be the ones advocating, "No, give us flexibility. Let us back down from that by doing redispatch and other things to achieve the same or greater emissions rates change or emissions outcome without having to incur those costs to modernize our old dinosaurs, for some specific facilities that are older, smaller, and least efficient already."

Phil Sharp: In case you have been worried about declining work for Washington law firms, thing again.

Nathan Richardson: I think we can all agree on that.

Phil Sharp: Let me try out one question from the internet here and then if folks want to line up behind the microphone, we'd ask you to simply identify yourself and just kind of a reminder that a question has a question mark at the end of it. We've already had an array of speakers and so we would appreciate if you could be brief. One of the questions raised, which was partially raised by Jeff here was that the claim is that states' marginal costs could be equalized via regional cap and trade programs. What are the legal hurdles? This goes to that collective state action. What are the legal hurdles to a collected group of states under this proposal of setting up a cap and trade system to comply? Are there any?

Jeffrey Holmstead: No, if this proposal is upheld, there are none. I think Dallas pointed out some practical reasons why we're likely to see regional programs rather than state programs. So I think if this is upheld, that those are obviously legal, but that doesn't get the question of whether it's upheld. I just want to keep coming back to, people talk about the best system of emission reduction, that's absolutely what the statute says, but it's not the relevant legal question. The question is the best system for what? Is it for a state to reduce its emissions or is it for an individual facility to reduce its emissions? People have made a great deal out of that language and appropriately so. It no longer says technology, you can do other things, but I just urge people to think about not what that says, but what does the statute apply that to, and that's really the legal question.

Phil Sharp: By the way, you might just answer a sub-question here really quickly, which is at what point will we actually see someone getting standing to sue in courts to challenge what we've all been talking about here? So can you give us any kind of timetable when that might occur?

Nathan Richardson: We talked about this the other day. The short answer is I'm not sure, but I think it's certainly possible that some parties, most notably states but maybe some in industry too, would have standing to sue when the rule is finalized, next year if it's on schedule. Other parties might have to wait till there's an actual state plan in place that imposes a regulatory obligation.

Jeffrey Holmstead: I think that many people—especially the way the rule was proposed, if it's finalized in that way, that there are legally binding targets on states—that many people have standing. Again, I point people to the NAAQS example, right? I mean, EPA sets a NAAQS, that doesn't have any immediate impact on any particular company, right? I mean, it just says to states," Go out and develop a plan to meet this," but the courts have said for many years that it's not only states but industries who are likely to be affected. So I think that's a red herring argument that people are talking about. If these are only guidelines, then people can't challenge them. I think it's pretty clear that once they finalize the guidelines, that will be the initial round of litigation, and then there could be 50 different lawsuits in circuit courts around the country over the individual plans. So this is good for lawyers, there's no question about that.

Dallas Burtraw: So once again, I can boldly go where economists never go, but stipulating that everything Jeff just said is true, who has standing at the end of June 2015 when this rule is final and the timing of that and the timing of the sequence of events in court is of interest. The states would seemingly have standing. I don't know if the companies individually have standing because the companies don't have individual obligations yet until the state plans are complete, but—

Jeffrey Holmstead: As with the NAAQS.

Dallas Burtraw: As with the NAAQS, okay. What I will observe, though, is the companies are making a lot of other decisions at the exact same time. They're facing deadlines for MATS compliance in 2016, and there is now the likely opening of the ozone rule, so when I said that this regulation casts a shadow forward is that even given this potential legal uncertainty, there is going to be a lot of decisions that have to be made while these states and companies sort of belly up to the roulette table and try to decide what kind of risks they're going to make in terms of their investment and operational decisions going forward.

Phil Sharp: First question.

Connor Gibson: Hi, this is Connor Gibson from Greenpeace USA, so I'm, as ever, interested in the voice of the industry, so my question is for you, Mr. Holmstead. Some of your clients, Arch Coal, Duke Energy, Ameren, Southern Company, don't have the best reputation in terms of forward thinking on clean energy. Duke Energy, for example, is attacking distributed solar generation in North Carolina at the moment. Southern Company has bankrolled scientists willing to say that coal isn't the key contributor to climate change. Which of your clients, if any, feel like they're

ready to comply with a price on carbon period? Of any kind, be it a carbon tax mechanism, cap and trade, any of these options.

Jeffrey Holmstead: I think the answer is very clear. Once there is a rule in place that imposes a carbon tax, they will comply with it. Now, that's a different question of how many of them are arguing in favor of proposals that you would support, but I think all of these clients actually have a pretty good record of coming up with ways to deal with regulations. It always puzzles me a little bit when people attack Southern, which is one of my clients, which is, it turns out, probably not . . . well, anyway, I won't make comment on whether it's good or not, but they're the only people in the world who are actually investing in a full scale carbon capture and storage plant. So I think all of those companies actually have pretty good records in terms of technological innovation, but the short answer is when there is a carbon tax or a cap and trade or a regulation, they will comply with it.

Margaret Ryan: I'm Margaret Ryan with Interfax Energy. I wondered if any of you could comment on when you look at the rule, the current emissions, the carbon intensity of emissions by state, varies by about a factor of 7 and it continues to vary in 2030 by about a factor of 7. Do you foresee arguments by states that have very low emissions at this point that they shouldn't be subject to the law? Is there not enough credit being given to the early movers who started a decade ago to reduce their carbon?

Benjamin Longstreth: I'm happy to try to answer that. I think, as I tried to explain earlier, EPA took an approach with these different building blocks. It wasn't a top down, we're going to apply this percentage to all states, because that's BSER on a national level. It said these four sets of tools are adequately demonstrated methods for reducing emissions and they have reasonable cost. Those create very different outcomes for each state, those outcomes when rolled together, equal the 26 and 30 percent figures. I do think states are going to look at these numbers hard and think about them. I think a lot of the early mover states are—if they continue on the current path they're on and their existing policies—I think they will be fine under the rule like. I think that's the case with the RGGI states, I haven't done all that math yet. I think there's some states that are particular outliers like Washington State, I think that relates to particular facilities in those states that have already been committed, where there are commitments to close those facilities. When you get down to each state, one coal plant that may be closed in a state with no other coal plants is going to end up with a much lower target, but it doesn't mean that that target's harder for that state to meet. Really, the question states need to think about is this is my target, is this a reasonable level of effort for me to be able to make to meet this?

Nathan Richardson: I'd agree with that. I'd just say quickly that I wrote about this briefly yesterday. It's really hard to tell either from the list of EPA's targets or from the list of carbon intensity by state who's got the hardest burden or maybe more appropriately, who's got the toughest burden per capita. That's something I'm going to look to my economist friends to help me figure out. But since you don't know that in advance, it's hard to tell whether Washington down at a 200 target or Wyoming up at an 1,800

target has a harder job. Is it easier to make that next step or is it easier just, like Ben said, to shut down one coal plant? I don't know. All of this, it doesn't resolve this issue, but to the extent those costs are different, if states trade, it helps a lot. So if there are differences, it won't be exactly the same, and when there are differences, that gives states an incentive to trade, and there are always gains from trade.

Ed Barry: Ed Barry with the Sustainable World Initiative. I'd like to ask a quick question about a broader global perspective and that is in reading just a couple sentences leading into it. In 2011, the US dumped almost 7 billion tons of greenhouse gases into the global atmosphere but sequestered less than 1 billion tons from that same globally shared biosphere. These figures alone make it clear that US is one of the world's most egregious net CO2 polluters and the international is markedly out of balance for their domestic capacity to assimilate CO2, and laws in the US and throughout the world make it illegal for civilized humans to be harming or killing each other. Yet we know that global warming is putting life at risk, is taking away future generation opportunity, so my question is why aren't we also framing this issue in terms of ethical principles, just right and wrong and from a human rights perspective? Thanks.

Phil Sharp: Obviously we were talking about the legalities and the implications of this rule, but I would suggest that in the public arena there are clearly many voices who do frame it in those, but the law is not written to necessarily implement a system of ethics, it is a system of rules. That's why our focus is that today. I'm sorry we have such short time, we have so many good questions from the internet and I know we have standing, but let's try to quickly take another one or two here.

Teresa Pew: Good morning, Teresa Pew, American Public Power Association, that's representing 16 percent of the electric utility generation in the US. The question is to Dallas, but really to all of you on the panel. Can you help me out? The only thing more embarrassing to admit in front of 200 people is to admit it with your boss in the room, I can't find anywhere in this proposed rule or in references in the RIA or in any of the TSDs any reference to renewables under RPS or any other state law or city ordinance and getting credit for those verifiable RPS programs toward the ultimate goal. Please tell me I'm wrong and where I can find it.

Dallas Burtraw: Teresa, well, you know, you've put me on the spot, but I believe that renewables do get credit in the sense that renewable generation is counted towards total generation in the calculation of the emission rate obligations that the state have to meet. In contrast, I understand, new natural gas combined cycle facilities is not counted as part of the total generation mix and so isn't explicitly included in that emission rate calculation. Do I have that right, anybody?

Nathan Richardson: As I understand it, and admittedly, my understanding is evolving.

Benjamin Longstreth: That's my understanding also. I had some questions about how other aspects were sort of fed back into it and I think, at least I also haven't found the particular place in the rule where it indicates, but I think the same factors that go into

the rate target is what, when a state is complying, they will have to demonstrate, and the renewables go into the adjusted rate target along with other sources, and then those will be put into the denominator.

Teresa Pew: But you're talking about prospectively. I'm talking about since 2003, '04, '05. These states that had RPS programs, some municipal governments, some cities even have zoning ordinance and building codes that can verifiably and with certainty and precision show CO2 reductions. I don't see any credit in this proposed rule. Please tell me I'm wrong.

Jeffrey Holmstead: Well, I think what EPA would say is it doesn't really matter, and they will say that because of this, they say, "We look at the cost effective emission reductions that can be achieved from now on, so we're not really penalizing states that have big RPSs, because we're not benefiting people who have high emissions in the past." EPA's view here, and the question is whether it's legal, but the baseline question isn't really all that important except unless you believe that the economy as a whole is suffering and that somehow that in and of itself will make it harder to meet these targets. But the way EPA has done it, I don't think it really matters, because all they're doing is saying they're looking at all these things, they're looking at each and every state and they're saying, "We're going to equalize the burden across to everybody." That's done purely on a prospective basis, I think.

Dallas Burtraw: I'd just like to add that the optics of it seem like the early movers aren't being given credit, but I think Jeff is right that it comes down to sort of an algebraic calculation about those emission rates and what's being asked of the states, they probably could've written it to include those measures and have come up with the same numerical outcome.

Jeffrey Holmstead: Yeah, I think that's right, yes.

Shari Friedman: Hi, I'm Shari Friedman from the International Finance Corporation, and I wanted to ask a question about technology price assumptions on CCS or CCUS and whether in the background of the run-up to this analysis, either from the economic modeling perspective or from the company by company perspective, those thoughts on how a rule like this could change the pricing of CCS, which has largely remained non-commercial, and whether people are assuming this type of pressure might change that a bit or might create markets for the use of it and particularly also with the new announcement from China that just came on early this week that they're also putting downward pressure on their economy—what are your thoughts on what this could be doing for the price of CCS or CCUS for the markets?

Nathan Richardson: I mean, the short answer is I don't know but I can't imagine it being bad news. EPA does mention CCS retrofits in the rule, it says our more or less back of the envelope calculations revealed that they're too expensive so we're not going to require them or assume that you're going to do them, but to the extent this rule places positive cost obligations on the power sector to reduce their emissions, then that

makes CCS or any other technology or tactic to reduce emissions more appealing. Now, where that appears in the cost curve, I don't know, but if it turns out that EPA's wrong and it actually is further down, then states certainly and utilities certainly have the opportunity, and the ability, to do that and count it instead of whatever it is that EPA's assuming they're going to do.

Phil Sharp: We're going to take one or two more questions in 5minutes, we're already running 15 minutes over what we promised we would do here, but there seems to be quite a bit of interest.

Evan Webber: Thank you. Evan Webber with US Climate Plan, and my question is about using state level carbon taxes for compliance with the 111(d) rule. From what I can tell from going through the rule, the only reference to something that might be a state level carbon tax is on page 95 of the preamble in the shareholder proposal section where they mention that 1 shareholder came to them with questions about equivalency in general and one of the specific things that they were asking was about using a price-based mechanism for equivalency. I guess given that, what, from your all take, is sort of the legal outlook for using state level carbon taxes for compliance with the 111(d) rule as it's currently proposed, and if you don't think that it's currently possible, given how it's proposed, what would need to change in the rule for that to be the case?

Jeffrey Holmstead: I think I can answer that very quickly. States have complete flexibility, so this is not a legal question, it's entirely a political question. I think that the targets will not be meetable in many states unless they have either a cap and trade program or a carbon tax. Just there's no other way to accomplish these goals without being really heavy handed and expensive. So I think many states will face the basic question, do we want to have a cap and trade program or a carbon tax, and EPA lets you have either or some other thing, so it's entirely a question of politics, not a question of law.

Benjamin Longstreth: Just to show we can agree on some things, I fully agree that states can do that. I'd also note one of the questions I've had was sort of about well, what if a state proposes something and we don't know whether it's going to work? And I think EPA has . . . I think it's every year, but you look at a 2-year period, between 2020 and 2029 to . . . sort of a progress check and required action if you're not making progress. I think that would do a lot to provide a mechanism to make sure that whatever creative approach a state takes, including the not very creative tax approach, though politically difficult, you'd ensure that the state is actually going to get to the target.

Evan Webber: Thank you.

Nathan Richardson: The folks I know that really back carbon taxes argued before this proposal came out that EPA needed to mention a carbon tax to give states the political background to be able to do it. I don't know if that prediction is right, but the lack of mention here, if they're right, might make it harder politically. But I do agree with Jeff that it's a political issue.

Jeffrey Holmstead: But I think Gina has actually mentioned that. I mean, she's publicly said that a carbon tax is an acceptable way to do it, regardless of—

Phil Sharp: The administrator.

Jeffrey Holmstead: I'm sorry, yes.

Phil Sharp: Tell us who we're talking about *[laughter]*.

Jeffrey Holmstead: The head of EPA has uttered the politically incorrect words carbon tax and said that would be an acceptable way to—and perhaps a very cost effective way to—meet the rule.

Phil Sharp: Yes.

John Weinberger: My name is John Weinberger. I'm an independent lawyer and lobbyist. Mr. Burtraw, you said that this proposed set of rules does not attempt to equalize the marginal costs of emissions reductions among states, so it attempts to sort of equalize the amount of work that each state has to do to reach its goals. Does that mean that the states will have vastly different costs for each ton of carbon dioxide reduction?

Dallas Burtraw: To be clear, that is what I said, and to be clear, what I mean is that when you look at the rule and the justification and how these building blocks are described and constructed, there's no appearance that EPA is explicitly invoking a criteria of achieving an equal marginal cost. What it appears they really are doing, for example, in the blended emission rate—the different states have very different emission rates—is equalizing the effort that different states are going to have to make. I'm imposing that on this; that is not explicitly stated by the EPA, so that's my opinion. Having said that, yes, I think it is true that there's going to be very different marginal costs, although total costs in the different states to achieve what's being asked of them are sort of similar. That leads to very different marginal costs and that leads to the opportunity and the incentive for regional coordination mechanisms that would be very important to keeping the overall costs low. There's gains from trade, gains from regional coordination, and that's that's what we're going to be talking about a lot over the next year.

Cliff Hamill: Hi, this is Cliff Hamill from Navigen Economics. I've been digging into the rule and trying to understand it from an electricity structure standpoint, which is my focus. My conclusion is that in order for this to really work, you need to have a price on carbon. If that merchant coal fired power plant gets a signal to run less, it needs to be able to see that on an hour by hour basis in how it emits. That leads me to the next question, the legal question, if EPA has the authority to put a price on carbon, why couldn't we do that more directly and more efficiently nationwide? If they don't, then what's the legal justification for adopting a rule that forces states to do something, like come up with a price on carbon, if it doesn't have that authority itself? The reason

I'm leaning to this question is it seems to me, to get the cost effectiveness that's embedded in here, we need to have states adopt some form of a price on carbon to really get the outcome that we need.

Benjamin Longstreth: I'll give that a shot. I think the basic mechanism is just written into the Clean Air Act of this cooperative federal and state approach. So EPA, under this provision, cannot itself just impose a policy nationwide, but it needs to work with states. I think as others have indicated, that there is still the opportunity for states to join together, regional levels, so that's available to states. EPA's been very clear about that and clear in its analysis of the cost effectiveness of doing that, rather than having each state go it alone.

Phil Sharp: Well, ladies and gentlemen, I'm going to have to bring this to a halt. We've gone well over our time and obviously there are many questions we might have and we and others around this country are going to be engaged in this debate and understanding. One quick reminder, there are 120 days in which people can comment on this proposal, after which the people at EPA are going to be up night after night examining millions of comments.

Jeffrey Holmstead: And the 120 days has not started yet.

Phil Sharp: Okay, not until it's published, so but that'll be in short order, I suspect, and so then the EPA will decide whether they want to rewrite this proposal as a final rule or not come next June. So stick with us and we'll be glad to stay engaged with you. Thank you very much and thanks so much to our panel.

[End of Audio]