CLEAN ENERGY SOLUTIONS CENTER
ASSISTING COUNTRIES WITH CLEAN ENERGY POLICY

# Performance-Based Regulation: The Power of Outcomes (Part 2)

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Webinar Panelists


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| **David Littell** | Regulatory Assistance Project (RAP) |
| **Camille Kadoch** | RAP |
| **Jan Rosenow** | RAP |


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**Speaker**

Stephanie: ...and welcome to today's webinar, which is hosted by the Solutions Center in partnership with the Regulatory Assistance Project. Today's webinar is focused on the Performance Based Regulation—The Power of Outcomes, part two. Before we begin, I'll quickly go over some of the webinar features. For audio, you have two options. You may either listen through your computer or over the telephone.

If you choose to listen through your computer, please select the "Mic and speakers" option in the audio pane. Doing so will eliminate the possibility of feedback and echo. If you choose to dial in by phone, please select the "Telephone" option and the box on the right side will display the telephone number and audio pin you should use to dial in. If anyone is having any technical difficulties with the webinar, you may contact the Go-To-Webinar's help desk at 888-259-3826 for assistance. If you'd like to ask a question, we ask that you use the "Questions" pane where you may type it in.

Also, the audio recording and presentations will be posted the Solutions Center's training page within a few days of the broadcast and will be added to the Solutions Center's YouTube channel where you'll find other informative webinars as well as video interviews with thought leaders on clean energy policy topics. Finally, one important note to mention before we begin is that our presentation is that the Clean Energy Solutions Center does not endorse or recommend specific products or services. Information provided in this webinar is featured in the Solutions Center's resource library as one of many best practices resources reviewed and selected by technical experts. Today's

webinar agenda is centered around the presentations from our guest panelists David Littell, Camille Kadoch, and Jan Rosenow who have joined us to discuss performance based regulation. The Regulatory Assistance Project—or RAP—is an independent, non-partisan, non-government organization with teams in the US, Europe, China, and India that's dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Before we jump into the presentation, I will provide a quick overview of the Clean Energy Solutions Center, then following the panelists' presentation, we'll have a question and answer session where the panelists will address questions submitted by the audience. At the end of the webinar, you will automatically be prompted to fill out a brief survey as well—so, thank you, in advance, for taking the time to respond. The Solutions Center was launched in April of 2011under the Clean Energy Ministerial. The Clean Energy Ministerial's a high-level, global forum to promote policies and programs that advance clean energy technology, to share lessons learn and best practices, and to encourage the transition to a global, clean energy economy. 24 countries and the European Commission are members covering 90 percent of the clean energy [Inaudible due to someone coughing] and 75 percent of the global greenhouse gas emissions.

This webinar is provided by the Clean Energy Solutions Center, which focuses on helping government policy makers design and adopt policies and programs that support the deployment of clean energy technologies. This is accomplished with the support in crafting and implementing policies related to energy access, no cost expert policy assistance, and peer to peer learning and training tools, such as this webinar. The Clean Energy Solutions Center is co-sponsored by the governments of Australia, Sweden, and the United States, with in kind support from the government of Chile. The Solutions Center provides several clean energy policy programs and services, including a team of over 60 global experts that can provide remote and in-person technical assistance to governments and government supported institutions, no cost virtual webinar training on a variety of clean energy topics, partnership building with the development agencies in regional and global organizations to deliver support, and an online library containing over 5,500 clean energy policy related publications, tools, videos, and other resources. Our primary audience is made up of clean energy policy makers and analysts from government and technical organizations in all countries, but we also strive to engage with private sectors, NGOs, and civil society.

The Solutions Center is an international initiative that works with more than 35 international partners across its suite of different programs. Several of the partners are listed above—include resource organizations like Irena the IEA and programs like SEforall, and regional focused entities such as ECOWAS Center for Renewable Energy and Energy Efficiency. A marquee feature of the Solutions Center provides the no-cost expert policy assistance known as Ask an Expert. The Ask an Expert service matches policy makers with more than 60 global experts selected as authoritative leaders on specific clean energy finance and policy topics. For example, in the area of utility and electricity markets, we

are very pleased to have Gary Jackson, senior energy consultant at emPowered Caribbean Communities serving as one of our experts.

If you have a need for policy assistance in utility and electricity markets, or any other clean energy sector, we encourage you to use this valuable service. Again, this assistance is provided free of charge. If you have a question for our experts, please submit it through our simple online form at cleanenergysolutions.org/expert. We also invite you to spread the word about this service to those in your networks and organizations. Now I'd like to provide brief introductions for today's panelists.

Leading our presentation today will be RAP principal David Littell, who is the lead author of the paper Next Generation Performance Based Regulation Emphasizing Utility Performance to Unleash Power Sector Innovation. David has a broad regulatory experience in both energy and environmental arenas. Leading the main department of environment protection and more recently serving as a member of the Maine Public Utilities Commission, where he participated in the resolution of nearly 2,000 cases involving energy efficiency, distributed generation, rates making, rate design, and consumer protection issues. At RAP, David provides advice to state officials, public utility commissions, and environmental regulators on complex energy solutions and economic issues. Joining David for this presentation will be Camille Kadoch, who is the co-author of this new performance based regulation paper, and has contributed to RAP publications on energy efficiency obligations, coordinating balancing areas and no-regrets planning.

As RAP's publication managers, Camille has contributed to the research and writing and editing of numerous publications. And we will also be hearing from Jan Rosenow, who has more than 13 years of experience in energy and climate change policy. He is an energy efficiency expert, and has advised the International Energy Agency, international donor agencies, the European Commission, the European Parliament government department, think tanks, trade bodies, and the energy industry in local authorities. In addition to his background in consulting, Jan has also a strong track record in energy research.

He has held research appointments at leading institutions in the UK, Germany, and the United States, and is currently a senior research fellow at the Science Policy Research Unit Sussex University, and an honorary research associate at Oxford University's Environmental Change Institution. And with those very brief introductions, I'd like to welcome David to the webinar. David?

**David** Thank you, Stephanie. And thank you to NREL and the Clean Energy Ministerial for helping us co-author the paper Next Generation Energy Regulation that this webinar came out of and for setting up this webinar. What we're gonna do today is present you with some examples of how PBR is done not so well, and then how it's done very well in some leading states. But first, we're gonna briefly review what we did in the first webinar—this is the second of two webinars on PBR basics—and only brief touch on these basics. So, the first point that we always make came from a former chair of the Maine Public Utilities Commission and the US _____ Regulatory Commission, Peter Bradford, who was fond of saying that all regulation is incentive regulation.

What that means is that even traditional regulation in its form that it was in for 100 years called Cost of Service Regulation had some very powerful incentives built in, some of which do not align well with the current needs of the grid and modern grid transformation. It's important to understand the status quo. It's important to understand what good things that are strongly profitable to a utility and whether those are good or bad. It's important to understand what is strongly un-profitable, but that policy makers and commissions may want to happen and it's good to understand what may be not getting done just for lack of interest or motivation. The incentives of traditional cost of service regulation are one—a very strong incentive to build and own a large rate base.

What that—that comes from the basic utility formula, which dictates the revenue is based on the rate of return times rate base. So, the larger the rate base, the larger the revenue is for the utility. Growth can be predicated, traditionally, on the growth of rate base. It's also a built-in incentive to have volume of sales and electricity usage increase—in particular, between rate cases, because that will directly increase revenue to the utility as well. The cost between what's recovered are usually broken down into operational cost and expenses and capital cost and expenses. And again—between rate cases, there's a very strong incentive to cut non-capital costs, because that will also increase the profits that the utility receives if it is an investor owned utility.

And there's a strong incentive to allow it to avoid disallowances, and that's usually healthy, because we don't want utilities doing things that are deemed imprudent. But in the context of a modern grid transformation, it may provide an inadvertent incentive to be very reluctant to innovate and try things that may later be deemed to be imprudent. So, those are four very strong incentives. What performance based regulation does is it look at setting up a different type of structure—either on top of or moving to something in place of traditional cost of service regulation. At a high level, you set a goal—and this is a lofty goal here, as you can see—and that goal, then, will be connected to targets, measurable performance incentives, that can relate directly to executive compensation or utility performance.

And that overall goal could be something like increasing energy efficiency of end users. It could be increasing the efficiency of the grid itself. It could be to increase renewables on the grid, or it could be to implement cost control. Those are all examples of what PBR has been used for. So, PBR, in short, I've already defined as the system that defines goals and targets and measures.

There's a less ambitious form of PBR that's very popular, in particular, in the United States, and that's to add a performance incentive on top of the traditional regulation, whatever that traditional regulation is. That performance incentive can be a very specific metric and incentive, and it can be easily overlaid on top of traditional cost of service regulations. The elements of PBR are first—to always understand your status quo—not just the basic features that I talked about for cost of service regulation, but also to understand what your specific jurisdictions and whatever utilities you regulate have for built-in incentives to really understand what the existing system incentivizes. And then, from there, to consider what guiding goals you would want to move that

system. And from there, once you have your guiding goals define, to define directional goals, which are more specific.

So, if your overall goal is to increase energy efficiency, your directional goal might be to increase it to 2 percent of sales by 2020 and 3 percent of sales by 2025—the same for renewables. It may also be advisable to adopt operational incentives—usually is—to maintain or mitigate the effects of other goals on, say, customer service or reliability with a SAIDI or safety measure. And from there, you would take those general incentives and adopt measurable performance criteria that are just that. Ideally, they're measurable with objective data. And those are then defined down to metrics.

They're specifically used for reporting an assessment. And, at the end of the process, when you're assessing performance, you would have the utility outputs that might be a particular SAIDI or safety objective. If you're looking at reliability, those are measures of whether a system goes down and for how long. Or, it might be achievement of particular levels of energy efficiency. The outcomes is the broader impact on consumers' rate payers in society, which would be a reliable system or a more efficient system.

So, those are the basic elements of PBR, and with that, I'm gonna turn it over to my colleague, Camille, who is going to talk about why PBR is particularly important in the 21st century.

**Camille**

Thank you. PBR is important for the smart transformation of the power sector. We're moving from an era of large, centralized power plants to increasing amounts of distributed generation and options on the customer side of the meter. This is hard for utilities, because under the old regulatory paradigm, energy efficiency and distributed generation hurt utility sales and revenue. Every piece of regulation ever written has incentives built into it, and the incentives for the era of regulation that featured big centralized power plants has inherent barriers to new technologies and policies.

The old system does not encourage distributed generation or other advances, particularly on the customer side of the meter. But, if done right, PBR allows us to align the interests of utilities, regulators and customers better. PBR promised regulators and other stakeholders to ask questions about what they want to achieve. It provides a framework to achieve goals that are otherwise unprofitable or not of interest to the utility or to correct an existing incentive that is not in the public interest. PBR just helps regulators think purposely of the goals they want to achieve and the performance they want to see.

This slide shows a few of the examples in our paper and the goals that the mechanisms are trying to achieve. As you can see, these range from incentives for solar distributed generation to water savings to EV rate education. Now, we're gonna take a quick look at what not to do when designing PBR mechanisms. PBR has a long history and we've been able to learn from past mistakes. Please note that more details about the examples we cover today are in the paper.

So, one point to keep firmly in mind as we go through these good and bad examples is that incentives work. Stakeholders respond to incentives, and we see it again and again. But it is important to avoid pitfalls to make sure that what you create doesn't have unintended consequences. The first point we want to emphasize here is that focus on input is problematic. Inputs—and particularly those focused on how much is spent—really tell very little about whether a successful outcome or savings are achieved.

Next—focusing on exogenous factors can produce disproportionate rewards or penalties and unintended results. Third—lack of clarity and uncertainty leads to a host of problems, and you're going to see some of those in our examples. And finally—reacting to utility failures with a penalty, fine, or other superficial response rather than thoroughly considering the utility motivations usually compounds the problem. Remember—incentives work, and this example highlights how not thinking out the parameters of the incentive can backfire. 1980, a Washington consumer group convinced the Washington legislature to draft a 2 percent increase to return on equity for energy efficiency investments—which is great, but the utilities quickly figured out that the incentive structure encouraged them to spend as much as possible on measures that actually saved as little as necessary.

So, this had the benefit of maximizing the incentive for the utility, while also minimizing the lost revenue that they experienced through energy efficiency. So, this is an example of focusing on inputs—i.e. the amount spent—and poor operational incentives and metrics. PBR isn't only used in the energy sphere. This example comes from telecom, but it's applicable to energy as well. The following example shows what happens when you don't set operational incentives and good metrics.

In 1986, Pacific Northwest Bell negotiated alternative form of regulation that includes a 5-year rate freeze. And they also included carte blanche to engage in cost-cutting measures with no restrictions on the cost-cutting methods. So, as a result, the utility severely cut customer service quality. They turned the customer service phone number into a 1-900 number, which generated $0.25 a minute in revenue while people were on hold. This had the effect of turning poor customer service into a profit center.

So, this unintended incentive was fixed and led to the implementation of customer service quality index mechanisms. In this example from 1990, Washington enacted a conservation incentive mechanism for Puget Sound Power and Light Company that provided a 2-part incentive. The first part was based on how much energy efficiency was achieved, and the second part was on how cheaply it was achieved. The utility fell short on targets in 9 of 10 topical areas and they over-performed in only one area, which was for high efficiency shower heads and faucets aerators. In spite of this, the utility earned a sizeable incentive, even though commercial, industrial, and low-income programs produced little savings.

The Washington Commission terminated the program after one year, due to vulnerability to gaming. The lesson learned here is not to focus on inputs, and emphasizes the need for operational incentives and metrics. I'm gonna turn it over to David, who will provide a few more additional examples.

**David**

So, in the early days of PBR, California wanted to assess this rate payer customer satisfaction, which is a good sediment; that's very typical these days. But the way they did it was problematic—the performance criteria and the metric in the way it was assessed. California specified a less-than-specific question. They simply wanted customers to rank their satisfaction on a one to five scale—there were a series of scales—and they used utility customer service representatives to conduct these surveys. The customer service representatives were under a lot of pressure to produce good results from their manager, so, what played out was the customer service representatives actually going door to door actually offered gifts that were completely unauthorized to achieve good rankings, and then, ultimately falsified some of the results coming back.

When this all came to light as a result of a commission investigation, the measures were later modified to be more objective in terms of what was asked, and to require third-party evaluation and not evaluation by utility representatives. Another example of how an energy efficiency PBR can go wrong is the Save-a-watt program from the Southeastern portion of the United States. This was an energy efficiency program by a utility undertaken, and the problem was that the baseline and the incentive were set very high. They were set not just to achieve energy efficiency savings and to share those between the utility and the rate payers, but to actually compensate the utility for its rate base that it would have billed were it were not for the energy efficiency program. So, in fact, there were no savings to rate payers.

This was deemed the most expensive energy efficiency program in the US, and was repealed by the North Carolina Commission because it was perceived as paying excessive incentives for energy efficiency measures. And our last example of PBR not well-designed is from the Federal Energy Regulatory Commission in the US. It's incentive-based treatment for transmission projects was established in FERC order 679, which awards transmission utilities a high rate of return on equity for new transmission investments and large-scale transmission. The problem is that this incentive focuses on the input—how much is spent—rather than the output, and it has no output metrics to connect the actual benefits of the transmission projects to what's paid. So, what it is does is result in very strong incentives for utilities to spend as much as possible—far in excess of their budgeted amounts because they receive the incentive on the full amount—and not to assess the actual benefits of these projects at all.

So, in the six New England states, for instance, it alone has resulted in hundreds of millions of dollars of additional charges which are reflected end of charge for delivered energy. Much of these projects—in fact, most of these projects—probably would have been built anyway, so no additional bills. So, those are some examples for how not to do PBR. We're now going to go

through some leading examples of how PBR is being done innovatively, and our first example is a report-only metric in the area. Actually, I'll talk about the way to do it right first, which is to create good incentives; to remove bad incentives after you understand the system; to create clear goals—specific goals not clearly stated—the metrics, the incentives, and the outputs likewise will not be clear and can lead to an unsuccessful mechanism.

Clear and measurable metrics are key, because if they're identified, measurable data can be used to objectively inform whether they are met or not. And transparency at each step in the process—including the development of the goals, the metrics, and the incentives—is absolutely key to make the value to the public clear. Aligning the benefits, the rewards, or the penalties with actual utility performance and time and specificity is important to make that relationship clear. And learning from experience—modify a system if it's not working well. Simple designs, lastly, are very important. They minimize the opportunity for manipulation and gaming, and they are the best _____ work to a clear and operating system.

So, our first example is a report-only metric in a new area. And in new areas, sometimes it's advisable where you don't have good data on what your baseline historical situation is to figure out what you're dealing with. In the US state of Illinois, they installed smart meters, and as part of that act, wanted to encourage rate payers to adopt time of use or time variant rates, though legislature and the policy makers were very supportive of that. So, they established reporting metrics so that Commonwealth Edison—their utility—would report on the number of residential rate payers that adopt time of use rates for those who take supply from competitive suppliers. They would receive data on those who request monthly data interchange for interval data, which means that they're taking the data that were used in the time of use product, and they're require those both for residential and commercial rate payers.

This is how Illinois has adopted this and other US states are very interested in this. In fact, Puerto Rico, before the hurricane, was interested in this, and when they deal with hurricane recovery, they may get back to considering refined utility areas like this. The next area of a successful mechanism comes from again, the early days of PBR in California. The Diablo Canyon Nuclear Plant was built and came in substantially over cost, so there's a good deal of unhappiness with this. And the California Commission, rather than putting the entire cost into rate base, decided to reject that, but adopted a compliance mechanism that was performance based so that what rate payers paid for these plants and the electricity was based on the actual capacity and performance, the availability of the plants over time.

As a result, the utility operated the unit—nuclear units at the Diablo Canyon plant—at a very high capacity factor and high level of availability, so the utility was held accountable for making these units operationally available, even though they were expensive, and the utility also avoided a disallowance by operating to meet its performance criteria. Now, we're next gonna move to the East Coast of the United States to New York City. This is a picture of the

Brooklyn Bridge—the Brooklyn-Queens Demand Management Project. New York and other jurisdictions are recognizing now that advanced distributed technologies may, in fact, be able to provide lower cost achievement of traditional utility objectives. By focusing in an area that has a very expensive new substation requirements in the Brooklyn and Queen boroughs of New York City, the New York regulators and the utilities utilized EERs in this high-cost area where their short-term marginal cost for system improvements were based on the very expensive—over $1 billion substation—and other set of distribution upgrades.

And they assessed whether they could meet that need for both reliability of service and additional distribution facilities with a suite of DERs instead. So, the utility savings in this project were calculated based on the short-run marginal cost of the distribution and electricity supply in this area, and the structure was structured as a shared savings mechanism, where the shared savings were between the rate payers—who avoided the cost of expensive distribution upgrades—and the utility that received full compensation for the suite of DERs that was acquired as well as receiving an ROE adder for successful implementation of a competitive bid process to acquire those. So, to use economic terms, the savings can be expressed a short-run marginal cost—or avoided cost of a major substation upgrade. In theory, the price of any good or service should be equal to its short run marginal cost under conditions of competition. In the New York project, the New York Commission utility used this project to demonstrate that the short run marginal cost of avoided distribution system upgrades can, in fact, be defined as the cost of acquiring a suite of DERs.

So, to incent this cost-effective solution, the utility was allowed to recover its DER acquisition cost and an additional ROE adder if it was successful in implementing a competitive bid process to acquire the resources that reduced peak in this area and met all the _____ objectives. Picking up on this example, the California Commission, this last December, specified that all of its utilities shall, for any large, significant, distribution system upgrade, solicit proposals to meet that requirement to a portfolio of distributed resources. The submitted proposals are to be evaluated on a technology-neutral basis, and if the best value proposition is a suite of DERs rather than a traditional distribution system upgrade, the utility will be allowed to recover its full cost for acquiring those DERs, again, through a competitive process and be entitled to a four-percent return on the annual contract value of that. So, what we have is two commissions on different sides of the US facilitating competition of DER products in a facilitated competitive bid environment to recognize that it's possible that in certain parts of the distribution system, the most cost-effective solution actually may be a very non-traditional DER solution. They're adjusting for a changed market conditions in advanced technologies, which means the entire conditions of competition that commissions regulate have changed and are changing substantially.

For some purposes, advanced distributed technologies can provide safe, reliable, and low-cost service, and the lowest cost service. So, the question facing utilities is how to stimulate competitive markets and to promote this

type of service recognizing that there may be monopoly barriers that impede competition if they just use a traditional cost of service model where utilities build out plant and recover for those plants. New York and California used a similar regulated competition model [Break in Audio] full cost recovery, for the cost of DERs, plus an ROE adder in New York and a contract recovery percentage in California to achieve a competitive model. So, those are both examples of what we might call a performance incentive mechanism—very specific mechanisms added on top of an existing regulatory structure. Now, I'm gonna talk about how New York is taking it to a new level from what we might call a PIM to a full PBR regime.

New York has implemented the Reforming the Energy Vision initiative—a very significant initiative—to establish metrics to integrate markets, new markets, customers, and to DER developers as well as traditional utility regulation. This adopts outcome based incentives to encourage innovation by the utilities, allowing the utilities to determine the most effective strategy to achieve policy objectives, but also, rewarding utilities based on how well they do on that. New York REV uses what are called Earnings Adjustment Mechanisms—or EAMs, which are on the next slide. Those are specific incentives, but a variety of them, if the utility meets a whole series of the performance metrics—of operational performance criteria—that are adopted in each rate case, not system-wide, but in each rate case—because following general specification from the commission in New York, they recognize that each utility jurisdiction and operational area has very specific areas. So, the EAMs are set in the context of a utility-specific rate case to achieve specific levels of DER customer satisfaction, or DER surveys that we talked about in the first webinar.

With this model, New York expects to move more towards a model where utilities receive a larger percent of their compensation in incentives and a smaller percentage of their compensation in traditional cost of service regulation, and that's shown on this graphic, which the vertical axis is meant to represent 100 percent of utility revenue. And over time, what you can see is traditional cost of service regulation is anticipated to go down, and the incentives, which are the EAMs here, are intended to increase, as well as revenues from non-wire alternatives. And ultimately, this system is envisioned to move towards more of a platform service revenue model, where utilities actually receive revenues from DER providers and customers for the services they provide to facilitating a modern grid, and that becomes a substantial part of the utility return over time. And that, is a transition to a substantial PBR model.

So, with that, we are now going to move farther East—across the Atlantic Ocean—where my colleague Jan is going to talk about the successful PBR regimes in Europe.

**Jan**

Good morning, everyone. So, we've seen a lot of really good examples of PBR in the US, but there are also some excellent cases from Europe that I'm going to show you in a few seconds, and many of those have actually inspired performance based regulation in the US. For example, David mentioned the

New York REV process, which has been heavily influenced by the UK's RIIO model which I will present shortly. I want to start by showing you how PBR is done in Denmark, first, and then I will turn to the UK to briefly explain the RIIO model and how that is working. So, Denmark is a really interesting example of good PBR, and there's lots of [Break in Audio] intel in the report.

In Denmark, the network companies are subject to a benchmarking model, which is used as part of the revenue setting mechanism in Denmark. And there's two interesting parts to this benchmarking model. One is that the benchmarking model includes criteria to compare distribution companies regarding the quality of supply and also the number of outages. And this is through this incentivized utility outages and improve network reliability. And the other part of the benchmarking model focuses on the efficiency of delivery.

How is this measured? Let me answer this for both the quality of supply metric and the efficiency metric in turn. So, on my next slides, I will explain how the first metric—the one that refers to outages—works. So, the Danish regulator uses two indexes for this metric. One is the System Average Interruption Frequency Index—SAIFI—and the System Average Interruption Duration Index—SAIDI—and both of those sides nationally recognize metrics which can also be relatively easily measured.

So, this is a concrete example of how this works in Denmark. So, in this example, we have five network companies A, B, C, D, and E, and on the Y axis, you can see the SAIFI index representing the outages. And you can see that in this case, company A has the lowest index, indicating that it's the company with the fewest outages. And company E is the worst performing company in this comparison. And the network companies are penalized if they have a higher weighted SAIDI or SAIFI than a benchmark set of higher performing network companies.

So, in this example, if you look at the graph at the top right, you can see that company E has the highest SAIFI and is penalized with an up to one percent reduction in their allowed revenue, and this has significant implications on their bottom line. So, this is how the first metric works, and I want to turn to the second metric—the efficiency metric—that is used in Denmark. So, the goal of this metric is to encourage efficient delivery of services. And in Denmark, this is called a Net Volume Efficiency Model, and the aim is to encourage the most efficient network companies to become even more efficient and the most inefficient network companies, to become as efficient as the top 10 percent of companies within a 4-year period. And the measured outcome of the Net Volume Model is an efficiency index comparing the actual cost that is incurred by network companies in operating its grid with the cost incurred by an average network company.

This is then used in revenue setting and provides incentives for network companies to become more efficient. And there's more information on how exactly this works in the paper itself. Let us now look at the RIIO model in the UK, which I mentioned briefly in my introduction. So, RIIO is considered as one of the cutting edge PBR mechanisms around the world, and the UK energy regulator, Ofgem, decided in 2010 to change the existing price control

mechanism and implement a very new approach, which they called RIIO. Before RIIO, revenue was largely based on capital costs, to some extent operational cost.

As a result, network companies operated following what some people have called a predict and provide mentality. But they didn't deliver the sorts of outcomes that Ofgem expected them to deliver in future years. Because of the rapidly increase, distributed generation and the still vast, untapped potential for demand response and more consumers becoming prosumers, Ofgem recognized that the old model was not fit for purpose anymore. And, I just want to introduce some of the key changes that Ofgem have made. The first change was that they changed the price in revenue control mechanism to remove any bias that would normally exist between capital expenses—what is called CAPEX, in Europe, and operational expenses—called OPEX.

And they introduced a new approach, which doesn't differentiate between CAPEX and OPEX in the same way, and it's they called TOTEX. So, there's incentive for companies to spend at least as much on operation expenses as on CAPEX. The second change was that Ofgem decided to move from a previous five-year control term to eight years, as a reflection of the long-term nature of investments in the energy industry. This is currently under discussion. We may well go back to five years, because eight years also meant that you don't have that more flexibility.

The third change was that Ofgem added six output areas—and David touched on this early on in his presentation. So, in the UK, those output areas on which the energy distribution companies have to deliver include customer satisfaction, network safety, network reliability, new connections for new energy, environmental impact, and social obligations. And the extent to which network companies deliver on all those outputs forms part of the revenue setting mechanism. And for each output, Ofgem then defines deliverables and metrics, which clearly measure whether the companies are on track. And finally, Ofgem also put in place a number of innovation for new technologies—for example, for better monitoring equipment, and demand response to encourage companies to drive forward the innovation process.

Let me now show you what this actually looks like in the UK. So, on the next slide, you can see the output of the reporting process to Ofgem. So, network companies have to report annually to the regulator how they do on each of the deliverables. And then, Ofgem goes away and does a benchmarking process, benchmarks all the companies, and publishes the information in a report. And the best performing companies can get a higher revenue.

So, this slide shows you an example from the last annual report—in this case, it's the electricity distribution companies—and you can see the different outcomes that I mentioned before on the left-hand side of the graph, and then the metrics are also mentioned on this slide. And each company is measured against a defined output areas, and you can see how the different companies have performed in the last year. And the regulator also reports on how this then translate into consumers' energy bills, which you see in the small gray box on the right-hand side.

So, this is how Ofgem reports on this. There's lots more detail, but this is a summary of the last year's benchmarking process. So, you can see there's some really good examples of PBR also in Europe, and I now hand over back to David to wrap up.

**David** Thank you, Jan. So, the takeaway here is that given unprecedented change that's underway in the electricity sector, in particular, the circumstances of competition are changing dramatically. Performance based regulation is a powerful tool in the broader tool box as we transition to a more flexible regulatory and market structure as commissions look at that and consider that. PBR has the potential to realign utility, investor, shareholder, and consumer incentives and to entirely align them, if done well, and to mitigate the challenges to the utility business model that are emerging with low-growth energy efficiency, energy conservation and distributor resources. We look forward to the discussion in the questions that you are submitting.

**Stephanie** Thank you to each of the panelists for the outstanding presentation. As we shift to the question and answer session, I would just like to remind our attendees to please submit the questions using the "Question" pane at any time. We'll also keep several links on the screen throughout for quick reference that point to where you can find information about other upcoming and previously held webinars, and how to take advantage of the Ask an Expert program. So, now, I'd like to welcome Camille to the presentation. She will be moderating the question and answer session for today. Camille?

**Camille** All right. Thanks. It looks like we have a lot of questions, and I'd encourage you to submit some more as well. Our first question—"David, you had earlier mentioned that a simple design is good for PBR. Can you give an example of a PBR mechanism that is often too complicated and should be avoided?"

**David** Hmm. Well, I think there's an active debate going on in the UK right now around RIIO that I might have Jan talk about if he feels right to address that. That is certainly the most extensive PBR mechanism that exists. New York is also developing a complicated mechanism. Whether it's too complicated or not is an issue, and I would say the factors to assess on that is "too complicated" is far too broad of a stroke.

The question is whether the metrics are so detailed that stakeholders outside the utility and the regulator might lose track of assessing performance adequately, and the public really would lose an assessment for whether it's getting its value out of the increased incentives that it would be paying to utilities. So, off the top of my head, I can't think of one that was too complicated. What I can think of is that there are some that use very complicated models to establish the baseline, and that can be problematic. If the model itself is so hard that only an expert who's trained in econometrics can understand it, that can be very hard for stakeholders and others in the public to assess the basis for setting the incentives and the baseline. So, I'm trying to focus down on individual elements rather than broad stroke in answering that question. And Jan, I don't know if you have anything to have from the European perspective.

**Jan** You mentioned RIIO, David, and I think RIIO is certainly complex. I wouldn't say it's too complicated. I think there's an ongoing discussion whether the incentives are strong enough to really change behavior of the network companies, and I think we will see changes in RIIO that reflect that discussion, but I wouldn't say that RIIO's too complicated. I think any ambitious framework for regulation has to have some degree of complexity. One example of, perhaps, a system in Europe that is perhaps too complicated or not very well understood is the polish case on energy efficiency.

Poland tried to encourage the companies to deliver energy efficiency measures and they really struggle to set up a framework that was well understood by market participants, and they ended up getting a 96 percent shortfall on what they planned in terms of delivery—mainly a result of really complex monitoring and verification requirements that were not very easy to understand.

**Camille** All right. The next question is, "How can PBR be used to support beneficial electrification in conjunction with carbon reduction and what outputs might be of most use?"

**David** Okay. That's a three-part question here. So, let me try to address each part and we'll come to it with a question for my colleagues if you think we haven't addressed each of them. PBR is very well-suited to support beneficial electrification in general. Beneficial electrification is defined, usually, as moving from other fuels to electrical, for both transportation usage and heating usage where it's cost effective to do so, and where it's cleaner to do so.

And it is, often, with modern grid technology. That's not always been the case. 20 years ago, the economics pushed towards other fossil fuels, but in most jurisdictions now, if you do a full societal based cost analysis, moving from transportation and heating over to very new efficient heat pumps for heating and to electrical vehicles is usually cost effective in and of itself. And if you include the cost of avoided pollution, the public health benefits, the environmental benefits and the climate benefits, it's far beneficial. So, yes, PBR can be used very effectively for that, and you can track it.

You can track those based on metrics or specifically focused on emissions. You could track it based on metrics that are specifically focused on the economics, and ideally, you would do all of those. But I skipped past setting the directional incentives. It would be important to set up a number of directional incentives that work in sync to do that. And there are jurisdictions that are doing that.

We're advising the Rhode Island Division of Utilities and Carriers that's looking very carefully at that type of structure in the US. So, I think that was also—the second part of it was how it might work in sync with climate, and I tried to weave that into my answer for the first item. It's also possible to have specific climate reporting metrics for things that are not directly related to climate such as DER distribution. A utility can be asked to track the emissions outputs, both for CO2 and for other air pollutants—nitrogen oxides and sulfur dioxides that impact public health. They result from a transition to any variety of beneficial uses, whether the distributed usage transportation emissions can

be quite directly calculated as you move over to electricity or to simply decrease truck rolls that result from, say, deployment of smart meters.

I've seen utilities track that metric on their own initiative—not being required to, but because they wanted to report it because it's beneficial and it looks good for them. And so, on the outputs, as distinct from the outcomes, the output could be reduced transportation miles—reduce transportation miles on fossil fuels or increase miles on kilowatt hours. Those metrics, again, fairly easy to calculate. It can be reduced truck rolls in the instance where you're implementing a technology that actually results in less use of utility infrastructure, and the outputs can be direct emission reductions. Those require some attention to make sure they're being done accurately and ideally would use an accurate marginal emission rate for that jurisdiction, which are not available in all jurisdictions.

They are available in the New England states in the US that has good marginal emission rate on an interval basis where I believe it's hourly—maybe sub-hourly at this point. So, for instance, if you're reducing emissions in the middle of the day when you're on peak, when the natural gas units are on the margin, your emission reductions would be—if you're entirely eliminating approximately for carbon, one tone per megawatt hour. If you're reducing emissions in the middle of the night when the wind is blowing, you might not actually reduce any emissions if you have enough wind on your system, as they do in some utility systems. And if you're reducing emissions in the middle of the day when solar is on the margin in California or Hawaii, you end up with a different result. Ideally, you'd be able to track things at that level of specificity. Jan, do you have anything to add?

**Jan** Yeah. I could add something from the UK's perspective. One of the outcome areas of RIIO actually focuses on connecting distributed generation, and particularly, one area is solarification of heat. So, heat pumps are a big topic in the UK because of the climate, of course, but also, the connection of charging points for electric vehicles. So, there is already something in RIIO that encourages distribution companies to deliver on that, and that will certainly be _____ from, I think in the next phase of RIIO.

**David** And let me ask—I think as I was thinking through my answer, my terminology was confused, but it's a good point. In the middle of the day, when solar is on the margin, I shouldn't have spoken of reduced emissions, because, of course, you wouldn't be reducing emissions by reducing energy use; you should be reducing energy. But that points in, in some advanced systems, where you do have a lot of variable renewables on the system, there's actually a benefit on the other side to increasing distributed load. You might want to be able to turn on hot water heaters at that particularly time in the day, as opposed to when fossil units are on the margin. And you may want to be able to charge electrical vehicles and turn on and off charge.

So, energy usage and the relationship to emissions—my point is—should be tracked, because on an advanced grid, it will change with your hours of the day when you have a lot of variable renewables on the system, and when your mix moves from coal to gas to a variety of renewables.

**Camille** Our next question is, "If poor performing utilities receive lower revenues, how do you ensure that they don't get even worse?" So, basically, how do you avoid a death spiral?

**David** The question is—if poor utilities aren't doing well anyway, how do you prevent it from getting worse? The supposition is that they can't perform. That does put you in a difficult situation, I think the way the question's phrased, because in a competitive market, a poor performing company goes out of business, and there's an argument that that's what regulated structure should provide, if the supposition of the question is that the utility's already poor performing and can't perform better. That said, I can think of one example where you do have some financially poor performing utilities due to the structure of their systems, because they're more set up to be responsive to the political demand for low cost energy—state owned or provincial owned utilities—and that's in India—the Uday example—and I'm tempted to ask the moderator, who I know is our expert on that, to address that example. But, in that case, the central government has put in place a series of incentives to provide a reason for those utilities to try to get their financial houses in order, recognizing that they have very strong built-in incentives in a very different environment than an investor owned utility to provide inexpensive energy over time, which is resulting in poor financial performance.

Camille, do you think I've accurately characterized that?

**Camille** You have. The Uday example is discussed more in the paper, but it's recognizing the kind of interrelatedness of the central government in India, and the role with the distribution companies, which are usually in the states. And it really tied energy efficiency performance of the distribution companies—called DISCOMs—with an exchange for basically financial incentives and support from the central government on these areas. And they were measured against metrics—metrics and targets—and then they had an improvement barometer that measured each DISCOM's performance against those improvements that they made on energy efficiency, which then enabled them to receive the financial reward, which basically helps with their business case.

**David** Yeah. Go ahead, Camille. I didn't mean to cut you off.

**Camille** That's it.

**David** I was just going to note—at the end of paper is the next generation performance based regulation paper which is on—comes out of the 21st century Power Partnership, which the National Renewable Energy Laboratory runs, and that's on both their website and it's on the regulatory assistance projects knowledge center site that you can get to by Googling "RAP" and "Knowledge Center" with a fuller description of that.

**Camille** All right. Our next question says, "In meeting performance objectives that may be more out of the utilities control and subject to greater risks, how do regulators address risk management between utilities and customers with whom energy savings are shared?"

**David** Yeah, no—that is a very astute question. So, I'm tempted to talk about something outside the parameters of the question than talk about how one of the leading jurisdictions is trying to grapple with that issue. So, the question observes that how a utility performs often times has things completely outside its control, and that's what Camille meant when we were presenting by trying to exclude rewards based on exogenous factors. So, for instance, a utility can't control the weather, and if it's a cold winter, usage of electricity will go up for heating, typically. Generation will certainly go up.

Emissions may go up as well. So, you want to have factors that recognize that, and that's fairly typical. You also can have an economic recession, which can very much affect economic activity and electricity usage, and there are well-known examples of a failure to control for those, and how those have resulted in inappropriate incentives being passed on to utilities in the context of cost-cap regulation, which, as we talked about on the first webinar, is one of the first and most widely used forms of performance based regulation. So, typically, in a cost-cap regime, you would have adjustment factors to recognize that those are beyond either exclusions if certain events occur—such as storm costs over a certain amount might not be included in the overall recoverable amount; you might have a kick out based on the extent of the storm, the number of rate payers that lose electricity for having those costs be recovered outside, the PBR cap. Now, moving forward from a cost regime to sort of a modern regime, where that phenomenon occurs then is really challenging modern grid planners is with distributed energy resources.

The technologies are new. There are projections that have been consistently wrong over the last several years for how distributed resources, including solar, will be adopted—what the uptake rates will be and how much will be adopted by end users. So, the challenge is in setting a baseline where you have a new phenomenon that doesn't have a historic track record and is based on model projections. And what the New York Commission is doing to address that—we discussed it some length in the first webinar—is instead of trying to establish a baseline, recognizing that whatever they did; it may well be far off, they're trying to use a very sophisticated survey mechanism that is built on a California experience. It'll have objective criteria so to try to avoid subjective criteria.

They're stakeholder grouping the development of that survey, so it's very detailed, and the survey would go out to both DER providers and to customers to assess whether the utility accurately meets very specific criteria for a deployment of distributed resources, et cetera. So, on the other hand, it's trying to use objective survey instruments to avoid the reality that objective criteria for actual deployment of DER resources can't be set in that area, because it's such a new phenomenon. So, again, they're a sophisticated survey mechanism using objective questions and appropriate amount of third-party evaluation, building on California's early experience is how that New York Commission is addressing that. Did I fully—Jan, do you have anything to add? Or Camille?

**Jan** Yeah, I could add just two minor points, David, to what you just said, and one is that risk is often also contracted out, I think, when third-parties are involved in delivering on those performance targets. So, the risk is then shared between

the utility and third parties. I think that's another point to consider. And the other one is that the total potential impact is often limited. If you don't perform on your performance incentives, it doesn't mean that you get zero, it just means that you get a reduced revenue and make less profit.

But you can hedge that, I think, by just setting clear boundaries of the portion of the revenue that is subject to performance incentives and the portion that is—looks like more like traditional regulation.

**David** Yeah. Good. Those are good, basic, points.

**Camille** David, we've got a follow-up question on the California example. "On the California nuclear PBR example, it seems like that example only recognizes the capacity value and reliability of the power plant. Is that true? And is that good or bad?"

**David** Yes, that is true. And that example does just recognize that. There was a lot—and probably still is to this day—a lot of controversy around those plants in California. Of course, nuclear can be a controversial resource in and of itself, and there was controversy from a consumer protection point of view. Some of the consumer interest believe that the cost should simply be disallowed, the utilities should—shouldn't be able to recover them period.

And that line of thinking would go further—that it's entirely appropriate to require a high level of capacity, whether cost overruns or passed through to consumers under any context or not. So, I think from a consumer protection point of view, there's certainly a perspective that those cost shouldn't have been recoverable at all, even given good operation of the plants to achieve a very high capacity factor and high availability throughout their lives.

**Camille** "Utilities often want to consider trackers as a PBR tool. Any comments on the use of trackers?"

**David** I'm not sure whether that means trackers with an incentive or not. Trackers in and of themselves, without an incentive—those can be very simple and are very good mechanisms if you're dealing with an innovative area to assess data and whether you're asking the right questions and collecting the data in the right way—in concert with the utility and stakeholders that would be involved. So, I don't know if we have any more specificity on the type of trackers that the questioner is envisioning. If it's a tracker with an incentive, that can become a little bit more dicey. It depends on obviously, if the tracker allows—if the tracker occurs in the context of a rate cap or a cost cap that's put in place and allows an indirect way for more revenue to come in.

That has to be looked at, recognizing that it creates a hole for additional revenue to come in, whether you're under traditional cost of service regulation or a cost cap regime. So, I don't know if you have more specificity. I was tempted to speculate on what type of trackers were intended, but I think I'll adjure—

**Camille** Clarification—it was trackers with incentives.

**David** So, if it's trackers with incentives, what a tracker can involve—traditionally, a fuel rider is something that's use to _____ cost of service regulation, because the cost of fuel can be variable. So, the concept is to pass fuel riders, to pass fuel costs through directly to rate payers. That's something that's beyond the utility control. That's the basic concept. What was recognized—which, from a utility point of view, makes them neutral to those costs if they can just pass them neutral to those costs if they can just pass them through to rate payers—what that was recognized to do over some time period was to create a perverse incentive for the utilities not to manage those costs appropriately, either as a cost factor or to manage them for emissions if the jurisdiction is interested in that.

So, over time, those rider mechanisms or trackers with incentives—you could characterize them as that—have been modified to have additional directional criteria and performance criteria to affect cost management of those fuel sources as well over time—and in particular, the example I'm thinking of is a natural gas example. But natural gas supplies are infamously volatile. So, for natural gas utilities, you can build incentives to accurately manage not just your cost of natural gas supply, but also, the hedging of the supply to recognize whether the utility's doing that effectively over time to save rate payers money, or doing it very ineffectively and passing on costs and risk to rate payers, which is not what you want. So, there's a lot of thinking that has occurred traditionally around fuel riders in the form of trackers and how to incentivize utilities to do that right. I would add on additional point to fuel riders.

Hawaii had a series of fuel riders in place. Hawaii is a largely diesel fuel oriented system right now, but transitioning very quickly to renewable—or, I should say, has been, using the past tense. In that context, there was some recognition with the large amount of renewables that were coming onto the system that the need to ramp their fossil fuel units more could result in less efficient operation. So, they did have some efficiency requirements built into their fuel riders—very forward thinking—but actually granted some modifications to those in recognition that utilities were being asked to ramp more, which would reduce the overall efficiency of some of those fossil fuel units and achieving high levels of efficiency.

**Camille** Our next question is a little bit broader. "What should legislatures know about PBR when working with regulators?"

**David** I'd say legislatures are parliament and I'll turn it over to Jan. My view would be that legislators are very good at setting overall policy goals and that that is not a small task of directing direction for everything from amount of renewables that are desired to be achieved—there are a variety of mechanisms to do that on the system—to whether cost savings are important—they're always important—to other climate related or emissions related goals. And legislators are very good to set forward both the general goals of the system, but also, the structures under which those are achieved, to the extent that legislation gets more specific to specify exact details—that may be a harder process to get to. Because the legislative process is usually driven by a variety of interest groups who have a strong interest in specifying outcomes that benefit them, and

legislators may not be best equipped to assess the validity of certain metrics that are put forward and how those might result in windfalls to particular interests or not.

Commissions and commission staffs who are experts who work for decades in these areas and can conduct detailed adjudicatory proceedings that are better at ferreting out the details of very complex issues may be better suited to actually set the performance criteria, the metrics, and perhaps, even the directional incentives, given broad policy direction from legislatures. Jan, do you have more to add to that from your perspective?

**Jan** I think that sums it up pretty well. I think the difference, perhaps, to Europe may be that the role of parliament is perhaps slightly different than it is in the US. And in the past, there have been instances where I think politicians and members of the public have asked the regulator to regulate on certain things, but the regulators tend to stick to the regulatory framework that is in the legal framework, and so, they're not always necessarily so responsive as politicians would like to be. And usually, it takes many years to change regulatory framework, whereas in other policy areas, the pace change may be much, much faster. But otherwise, I think I can't add very much to what David has said.

**Camille** And I'll just chime in that legislatures and parliament might want to consider PBRs a mechanism to reform the existing regulatory system and to implement some of the goals that they wish to see in the current environment. The next question is gonna take—

**David** Often times—Camille, can I just add to that? For large scale PBR, often times, statutory changes would be necessary, whereas small, discreet, perform incentive mechanisms sometimes can be added through regulatory authority, typical of rate authority. So, the scale in which PBR is to be achieved and considered is very much a legislative and parliamentary measure/consideration, I think. Sorry. I know we've got another question.

**Camille** This one is actually gonna take both of you to answer, because it requires translating on both sides of the ocean here. So, the question is, "Can a TOTEX regime—as employed in RIIO—be effectively implemented in the US, given the existing accounting and reporting the requirements under GAAP and SCC regulations?"

**David** I'm assimilating the question. So, the question, I think, reduces down to the account, as I understand, _____ SCC reporting requirement. And I don't see those as the biggest impediments. I think if there's a desire to do a TOTEX type regime that can be effective. I think the barriers are different than the accounting and security and exchange requirement regulations.

Those may present particular challenges for some aspects of it, but I don't see them as the primary barriers. Nor do I—I mean, outside New York, the prospects of US states, we are advising some states right now who are interested in RIIO, and RIIO's always an interesting part of departure, but whether any US state would go in that direction, I think, is a very open

proposition. And so, Jan, how much do you think I got that right or do you want to add to it?

**Jan** There's also a question—to what extent the TOTEX approach has actually changed behavior by the distribution companies. I think that's an open-ended question. We don't have, I think, sufficient evidence to say either it has changed everything radically or it has had very little change. So, that's currently being looked at by the regulator. But, my suspicion will be that these things take a long time to actually filter through the actual investment behavior of these companies, because they tend to be, at least in Europe, relatively slow when it comes to changing their existing business model.

**David** Yeah. And I have seen very funny results from very specific gap reporting requirements, so, I mean, certainly there can be challenges when you get down to very specific areas to consider how to report or not that can really be dis-incentives to utility management to go in certain directions.

**Camille** Okay. We have a number of good questions still remaining, but I think we'll end with this next one. "How do multi-year rate plans work as incentives?"

**David** Multi-year rate plan—go head.

**Camille** I was just clarifying my language there. You're good.

**David** Okay. So, a multi-year rate plan is typically a plan with some type of cost cap or revenue cap. In our first webinar, we talked about that as one of the examples, so very commonly used initially in the Northeastern US states and California, but now, adopted in Canada, New Zealand, a number of European countries. What those do is set a certain rate of recovery over a number of years to avoid a necessity—both from the regulators point of view and the utility of frequent rate cases—and then set up a savings mechanism so that the utility that operates more efficiently during that time period can either keep all the savings or share in those savings with rate payers. So, the basic mechanics are that.

What experience has shown over time is that you need to have adjustments. Adjustments are typically a _____ factor that would increase the cost that can be recovered, but also a productivity factor that decreases it based on the assumption the utility will get productive over time. The nets, traditionally, have been negative between those two factors, so the expectation is productivity would go up higher than inflation. In that new environment, I know that some utilities are challenging whether that's accurate or not. And it's also been deemed absolutely critical with that type of regime to have controls in place to track the operational—the directive incentives that we talked about initially to ensure that customer service is not cut.

The example that Camille presented showed a utility that was allowed to keep its savings over time and made decisions that I think no one would have foreseen to actually cut customer service severely and charge customers for customer service. So, it's not a theoretical risk. It can happen. And reliability—the same thing. Reliability is often driven in a lot of jurisdictions by tree-

trimming policies and avoiding limbs and trees that, with snow and ice, can fall into distribution and even bulk transmission lines.

And those are operational costs, so there's a very strong incentive if you don't put in a reliability directive with a cost cap regime to cut those expenses. The utility saves the money, and then, when you get a bad storm, there's very severe outages—that is what happened in a bad storm that hit the Northeastern section of the US a number of years ago just before Halloween—an early storm with very severe outages—and it result in the resignation of some utility CEOs when it became clear that that's the behavior they had taken over a number of years—large portions of states out of service. So, that's the basics of an overall cost cap. Jan and Camille—anything to add?

**Jan**

No–not other than what I said before—that having a really long framework may also pose a challenge for the regulator to then change that framework perhaps when they realize halfway through that it's not fit for purpose and doesn't deliver what they intended it to deliver. I think that's the discussion in the UK right now—whether we should have really long frameworks or slightly shorter.

**Stephanie**

All right. Thank you to the panelists for that informative question and answer session. For any questions that we didn't get to—and we've got a lot of questions today—we'll connect with those attendees offline after the webinar. And on behalf of the Clean Energy Solutions Center, I'd like to extend a "Thank you" to all of our expert panelists and our attendees for participating in today's webinar. We very much appreciate your time and hope, in return, that you had some valuable insights that you can take back to your ministries, departments, or organizations. We also invite you to inform your colleagues and those in your networks about the Solutions Center's resources and services, including the no-cost policy support through our Ask an Expert service. We, again, encourage you to follow the link at the top of the slide for the performance based regulation paper that we discussed in today's webinar, and I invite you to check the Solutions Center website if you'd like to view the slides and listen to the recording of today's presentations, as well as previously held webinars. Additionally, you'll find information on upcoming webinars and other training events. We are also now posting webinar recordings to the Clean Energy Solutions Center's YouTube channel. Please allow about a week for the audio recording to be posted. And finally, I'd like to kindly ask you to take a moment to complete a short survey that will appear when we conclude the webinar. I hope everyone enjoys the rest of their day and we hope to see you again at future Clean Energy Solutions Center. This concludes our webinar.