

Performance-Based Regulation: The Power of Outcomes (Part 1)

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Webinar Panelists

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Katie

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 One.

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 a box on the right side will display the telephone number and audio PIN you should choose to dial in. If anyone is having any technical difficulties with the webinar you may contact the GoToWebinar's helpdesk at (888)259-3826 for assistance.

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Finally, one important note of mention before we begin 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 from our guest panelists, David Littell and Camille Kadoch, who have joined us to discuss the performance-based regulation. So Regulatory Assistance Project, or RAP, is an independent, non-partisan, non-governmental organization with teens in the US, Europe, China, and India, that's dedicated to accelerating the transition to a clear, clean, reliable, and efficient energy future. Before we jump into the presentations I'll provide a quick overview of the Clean Energy Solutions Center. Then following the presentation we will have a question and answer session, where the panelists will address questions submitted by the audience. At the end of the webinar you'll be automatically prompted to fill out a brief survey, so thank you in advance for taking a moment for time to respond.

The Solutions Center was launched in 2011 under the Clean Energy Ministerial. The Clean Energy Ministerial is a high-level global forum to promote policies and programs that advance clean energy technology, and to share lessons learned and best practices and to encourage the transition to a global clean energy economy. Twenty-four countries and the European Commission are members, and covering 90-percent of clean energy investment and 75-percent of global greenhouse gas emissions.

This webinar is provided by the Clean Energy Solutions Center, which focuses on helping the government policymakers design and adopt policies and programs that support the deployment of clean energy technologies. This is accomplished through the support in crafting and implementing policies relating 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 with the government of Mexico.

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 trainings on a variety of clean energy topics, partnership building with the development agencies and 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 energy policymakers and analysts from governments and technical organizations in all countries, but we also strive to engage with private sector, NGOs, and civil society.

The Solutions Center is an international initiative that works with more than 35 international partners across a suite of different programs. Several of the partners are listed above and include research organizations like IRENA and the IEA and programs like SEforALL and regional focused entities such as EcoWatch, Center for Renewable Energy and Energy Efficiency.

A marquee feature that the Solutions Center provides is a no-cost expert policy assistance known as Ask an Expert. The Ask an Expert service matches policymakers with more than 60 global experts selected as authoritative leaders on specific clean energy 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 Empower Caribbean Communities serving as one of our experts. If you're in the need of policy assistance in utility and electricity markets or any other clean energy sector we encourage you to use this valuable service. Again, the 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 your networks and organizations.

Now I'd like to provide brief introductions for today's panelists. RAP principal David Littell is a lead author of the paper "Next Generation Performance-Based Regulations: Emphasizing Utility Performance to Unleash Power Sector Innovations." David has broad regulatory experience in both energy and environmental arenas, leading the Maine Department of Environmental Protection, and more recently serving as a member of the Maine Public Utilities Commission, where he participated in the resolution of roughly 2,000 cases involving energy efficiency, distributed generation, rate-making, rate design, and consumer protection issues. At RAP David provides advice to state officials, public utility commissions, environmental regulators on complex energy, pollution, and economic issues.

Camille Kadoch is a co-author of this new Performance-Based Regulation paper and has contributed throughout publications on energy efficiency obligations, coordinating balancing areas, and no-regrets planning. As RAP publications manager Camille has contributed to the research, writing, and editing of numerous publications.

And with those brief introductions I am very excited to welcome David and Camille to the webinar.

David

Thank you, Katie. And thank you, Emily. And I also want to note our thanks and appreciation to the Clean Energy Solutions Center and NREL, who are coauthors on the recent paper on which this seminar series is based. So with that initially I want to note that both Camille and I are from the Regulatory Assistance Project. We advise state and national energy officials on topics like this, which is what we do.

In this webinar we're going to spend about the first third describing what performance-based regulation is why it's important in the 21st Century. And then we're going to talk about for-examples across the world of how it's being done, in particular from France, the US, and different international jurisdictions. So with that we're going to move to what PBR is, what performance-based regulation is. And that would be the next slide.

And first it's important, before we go into what PBR is, to understand the current regulatory system, what is the status quo with how it works. And that's traditional cost of service regulation. There are very strong incentives

built into traditional cost of service regulation that may or may not align with what the current needs of the power sector are. Among those are a very strong incentive to build and to own what's called rate-based transmission generation distribution infrastructure. That's because revenues are based on rate base times the rate of return, so the incentive to get as high rate of return as one can if you're a utility and to get as high a capital base as you can. That's sometimes referred to as capital bias. It's a good thing if you want a lot of things built; it's not so good if you're in an era where you don't want to build a lot of things.

And the second very strong incentive is to increase sales or electricity usage, particularly in between rate cases. That enhances utility revenue and enhances profits. That's known as a throughput incentive. And again, that's a good thing if you want to grow sales, but if you're in an area where you want to conserve and not use as much energy it may not be such a good thing.

The third strong incentive is to avoid disallowances of cost. That's a good thing, obviously, if you want utilities to invest cautiously and make decisions cautiously. It may be less of a good thing if you're in a time period where you want utilities to consider certain types of innovations. So with all these incentives you want to ask what are good things that are strongly operable for the utility, what are good things that may not be things that we want that are strongly unprofitable for the utility. In other words, what might we want them to do that they won't make money doing, and that's oftentimes investments on the customer side of the meter, because that actually reduces their sales and can reduce their rate base. What are bad things that might happen that are very profitable and that would be investments, as an example, in large infrastructure, that we may not be necessary. And what are good things that are not getting done, perhaps due to a lack of interest or motivation in the current regulatory system? And in this context that might be something like examination of changes to integrate electrical vehicle infrastructure renewal.

So that's the current regulatory status quo. From that we move to what is PBR and how would it change the regulatory status quo. What PBR does is it provides a regulatory framework to connect goals, targets, and measures of utility performance to actual revenue for the utility or to executive compensation if you're talking about a state-owned enterprise. A subset of PBR is called PIM, for Performance Incentive Mechanism. So those are very discrete incentive mechanisms that usually are in the form of a specific performance metric or target, that will affect a very specific desired outcome, and they can be very specific items that that increase or decrease revenues or earnings around an authorized rate of return or designed to strengthen performance in a very particular way. And oftentimes a PIM can be added right on top of traditional cost of service regulation without a broader restructuring, which is often called performance-based regulation writ large. So well designed PBR can encourage more efficient operations. It can also encourage a longer-term view towards innovations and it can benefit customers by doing that, and that's really the goal of most jurisdictions that are looking at a PBR regime. So that's the overview.

Where do you start? Well, you start with PBR by looking at what you want your guiding goals to be. A guiding goal is a very high-level guiding incentive, sometimes we refer to it as, usually set by the public policy priorities of the jurisdiction, so that can be a legislative act, it can be a chief executive act that would set forth a very specific item, such as reducing rate-payers' bills or reducing overall rates. Oftentimes these are built around energy efficiency incentives, renewables, or reducing a system loss, to give three examples. So that's a very high-level goal.

Again, from that high-level goal you want to stop and ask what is the status quo once you've identified your goal. Do I want to identify and articulate and prioritize exactly what the goals are and then ask how does the existing regulatory system encourage or discourage achievement of those goals and assess the incentives that you're considering in light of the goals? So for the three examples I gave for energy efficiency you might ask does the system support achievement of cost-effective energy efficiency, or for renewables does it achieve a certain renewable level or particular type of renewable integration onto the system. Or for system losses, are levels of system loss currently acceptable? Are they efficient? And after you ask those questions, that helps inform the next step, which is take your guiding goal and take them down to what we call a directional incentive, which is a specific measurable performance criteria, which we will define in a second, utilizes measurable goals and metrics to focus the direction of the utility.

So for instance, if the guiding goal is to reduce system peak, the directional incentive could be to deploy energy efficiency, demand response, and distributed resources to reduce that peak. Or if the directional incentive is to increase energy efficiency savings the directional goal could be to achieve energy efficiency savings of two-percent of overall annual sales by 2019 and to increase that to three-percent of overall sales by 2022. You take the more general guiding principle or goal and reduce it to a specific directional incentive.

And from directional incentives, sometimes you need to stop and say, "Do we need any associated operational incentives to hem up the banks or the walls," so to speak, "to ensure that we don't lose something on the system?" And what that means is you might be going in interaction that there would be some concern about reliability on the system or that you might want to ensure that you're actually achieving higher levels of reliability, if that's part of your goal. So an operational incentive can be positive and improve system reliability, or it can be negative, that you just don't want to reduce reliability by a certain amount. Oftentimes an operational incentive is an important check or lever to ensure that the utility system continues to operate in a certain way as you look at tweaking it to operate in a different way. And we'll provide some specific examples when we get down to cost containment measures.

So once you have your directional incentives and your operational incentives dictated by your goals, you want to think a little bit about your metrics. How are you actually going to achieve a quantified measure of how this incentive

operates? A metric can be a specific standard power system measure or it can be focused on consumer impacts. So for energy efficiency, for example, you could measure energy efficiency as a percentage of system sales or you could measure it as a percentage of customer impact bill reductions. Again, it's a different perspective where you measure slightly different metrics of the same general phenomenon. You might want to do both. Metrics are often expressed in terms of energy capacity, megawatts, or sometimes energy, megawatt hours or kilowatt hours. If you're talking about reliability it would often be a satiety or safety-type measure. System losses also could be done as a percentage of overall system at any load, or could be as a percentage of system losses at peak load, which would be different. And the metric that you adopt, you want to think about how does it actually achieve the goal and the directional incentive. Because measuring the same thing in a slightly different way in a different direction for how you assess whether the goals and the incentives are met.

From there, once you have your metric informed—or information on your metric, you want to express the incentive in what we call a measurable performance criteria, which is expressed as a standard metric if you can do that. That would be a best practice, to use a standard type metric. So to go back to energy efficiency as a measurable performance criteria could be a megawatt hour, a peak reduction, or it could be overall megawatt hours of reduction across the system, again, depending on where you want to focus. That will determine exactly how you set the measurable performance criteria. For renewables it could be overall renewables not in the system, or it could be a percentage of emissions that are displaced by lower or non-emitting resources. It could also—it should also be set forward as a straightforward measure that allows you to take an assessment of whether your guiding principles, your directional and your operational incentives are achieved.

So to step back for a second, we're going to talk about different variations or different degradations of how you implement these measures. One we might call "PBR light," which is particularly if you're in an area that hasn't been regulated and doesn't have good data to establish a baseline goals. You might want to just do a public reporting metric to make sure that you're measuring the right thing in the right way first. And that's a good practice if you're just getting involved in an area and don't have good data. So there are examples of some jurisdictions that have done this from Hawaii with renewable energy metrics, to Puerto Rico with customer service satisfaction metrics.

On the next level up of this would be to take a public metric and not associate an incentive with it yet, but just to rank utilities so that that rank is available to the public in the utilities among utilities. Whether utility likes that or not, well, obviously if they come out on top they tend to like it; if they're in the bottom they would tend not to like it. Some examples of that are Denmark's distribution system operator efficiency ranking, and REIO in the UK, which we'll talk about, has some aspects of this.

And then the final strong version of PBR would be to take those metrics and associate financial incentives or disincentives with them. An example of that

is a New York REV process, which is underway, and REIO writ large in the UK. So again, you can do different levels of PBR depending on your confidence in your data and your confidence in measuring the right thing the right way for where you want to go. And what you end up with is you end up with certain outputs and outcomes. The outputs are specific utility actions often measured in terms of measurable performance criteria. The outcome, closely related, is how that affects ratepayers or society at large, by and large. So for instance, if an output is achievement of a certain level of safety or satiety, the outcome would be reliable service. If the outcome—I should say if the output is a certain level of call responsiveness from the call center the outcome for rate payers is responsive customer service. If an output is disconnections kept below a certain level per month the outcome could be a version of universal service in that jurisdiction, or furtherance of that objective. And if the utility output is interconnections processed at a certain amount each month, the outcome would be supporting customer-connected generation.

So with that overview of PBR terminology we are now going to talk about—Camille is going to talk about why PBR is important in the 21st Century.

Camille

Thanks, David. PBR is important for us because it works with existing regulatory structure to reform a 100-year-old regulatory paradigm. It used to be the case that building large centralized generating stations was the norm and that economic growth resulted from this. Now we're in a period of technology innovation that is challenging the old utility paradigm. This means we need a new approach, and PBR is the mechanism that can help us with this challenge.

Removing from large centralized power plants to increasing amounts of distributed generation and options on the customer side of the meter. And 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 air of regulation that featured those big centralized power plants has _____ to new technologies and policies that we see emerging in the power sector. So in other words, the old structure and the old system is not conducive to distributed generation when incorporating advancements, particularly on the customer side of the meter. If done right, PBR allows us to learn interests of utilities, regulators, and customers better.

PBR helps regulators think purposely of the goals they want to achieve and the performances they want to see. Some of the innovative PBR mechanisms identified in the paper include the ones that you see in the slide. They range from incentives for solar distributed generation to water savings to EV rate education. As David mentioned earlier, PBR prompts regulators and other stakeholders to ask questions about what they want to achieve, and it provides a framework for achieving goals that are otherwise unprofitable or not of interest to the utility, or conversely, to correct an existing incentive that is not in the public interest.

This slide shows unpredictable trends can be, as experts didn't foresee the rapid evolution of the TV and telecom systems. We cannot predict the precise evolution or the power systems of the future, but we are able to identify _____. Now with the same ticket, we do not know at what pace and how each specific trend will develop. But we want to design a regulatory structure to accommodate future outcomes that are consistent with a wide variety of future scenarios, all of which are plausible. PBR acts by specifying expectations of utility performance and outcomes for consumers, but the mechanism itself stays agnostic as the exact means of delivery. So in a sense it's a form of regulation that harnesses disruption.

In addition, PBR is versatile. There are a lot of different utility structures out there with a wide variety of ownership structures. This means that you first must understand the incentives that are embedded in the current ownership structure of a regulated entity; you need to understand the financial and management structure, and how each structure maximizes its revenue and profit. Once you understand that you can design a PBR structure that works for all these different circumstances.

Next, David is going to talk about what can be achieved through PBR.

David

PBR can achieve an awful lot of things. It's a very flexible mechanism. Oftentimes now we're looking at multiple jurisdictions, at removing disincentives that exist in current regulation for say behind the meter resources, making the utility neutral on whether those are installed or not based on efficiency of overall operations. Historically and in many jurisdictions they may use PBR to encourage energy efficiency or renewable generation. In Mexico PBR is used to incentivize reductions in overall systems losses. In Denmark PBR is used to encourage efficient utility operations between different distribution system operators. And in many jurisdictions PBR is used to achieve overall cost-effective operations or cost control. And we'll talk about that specifically.

When you're talking PBR it's important to recognize that while you're focusing more on the outputs and outcomes and less on the inputs—inputs would be your cost going into the system, capital costs and expenses—you're still starting from a traditional regulatory base. So the traditional analysis and basics for cost-of-service regulation are still there and provide a basis, a solid foundation to move forward and apply PBR to. But you don't move away from that and you don't move away from the need to have expertise and confidence in that on behalf of the regulatory staff and the utilities. But you can avoid and reduce the costs of that perhaps.

As noted before, PIM often adds onto traditional regulation in a very discrete way; what's called performance-based regulation writ large can take a much broader approach to modify the incentives that exist in traditional regulation. We'll talk about how REIO is doing that. When we're designing the incentives we want to focus on creating good incentives and removing the bad incentives that exist in the current system. To do that there are a couple of best practices—more than a couple that we want to apply. One is to do very clear goal setting. If the goal isn't clearly set out initially it's very likely that

incentives, the metrics, and the outputs will likewise not be clear and that can lead to an unsuccessful mechanism. If you're designing them, identification of clear and measurable metrics is also critical. A metric should be able to be clearly identified with measurable data that provide objective information so that subjective judgments are not necessary in awarding incentives or penalties.

Transparency is very important at each step of the process, both for the utilities, for the ratepayers, and for the interested stakeholders. And each step in the process means initial development of the goals, the incentives, the direction, the metrics, and that often improves the quality of the final goals and the implementation of the system, if there's transparency and buy-in initially by all stakeholders. When the incentives are awarded there's usually a lot less controversy. The advantage of transparency I it also makes the value clear to the public for what they're paying for. And if the public understands the benefit of what they're paying for they're a lot more likely to accept a higher rate of return if a utility exhibits exemplary performance than be unhappy with paying higher rates.

You also want to align your rewards and benefits. If they're closely aligned then usually the utility performance is a lot easier to assess and you'll get the outcome or the output that you desire. And learning from experience; modifying a PBR regime or a performance incentive to address operational observations is a good management practice. And lastly, simple designs are good. They minimize the risk of gaming and that simple design is a best _____ to ensure a clear and well-defined incentive and metric.

And so with that, Camille is going to talk about how they do this in the UK.

Camille

I think we're going to pause for some clarifying questions, to see if there's any questions that can be clarified on what we said, not questions necessarily on content.

Katie

Wonderful. Thank you for pausing, David and Camille. Just I want to take this moment to remind attendees to please submit questions using the question pane at any time throughout the webinar. We have had a couple of questions come in.

For David, how do you balance impacts if you have more than one metric for the same thing?

David

That is a great question. It depends on the nature of the metric and the goal. If the metrics—the question seems to assume that they go in different directions, and if they do you want to think that through ahead of time, ideally with existing data from the system, and if not, with modeling to show how any tension between the metrics might be related. But doing that isn't necessarily a bad thing. For instance, if you're doing cost containment, which we'll talk about specifically later, you do want to ensure that cost containment mechanisms don't provide a perverse incentive to reduce customer service or reduce reliability. That's a bad thing that's happened in some systems, so that's why you commonly have customer service operational metrics

associated with cost control regimes as well, to ensure that customer service is retained and the reliability is maintained, if not improved. So tension is not a bad thing, as long as you think it through. In fact, it might be essential to ensuring that overall operations continue to provide better customer service than they did before.

Katie Great. Thank you, David. We have another one. What can be done to avoid unintended consequences of PBR?

David One measure that you can take is what I mentioned briefly before, if you're in a new area where you're concerned that you might have unintended consequences you can start out by just doing a public reporting mechanism and then see whether you're measuring the right thing correctly, and whether by measuring it you see the possibility that the utility behavior would go in a direction that you don't anticipate. And then once you implement with an actual incentive mechanism it was very important to assess it in current time, and as I said, make operational adjustments if it's not working properly. The paper that we've just published has a number of examples where that was done, where initial mechanisms were either tweaked, but didn't work as intended or were in some cases abandoned if they were deemed to be operating ineffectively.

Katie Great. Thank you so much. We'll do one more for right now. Do cost reduction metrics potentially or typically include reduction in utility rate revenue?

David Oftentimes they include enhancements to utility revenue, the idea being that we want the utility to be motivated to actually reduce its costs. So again, we'll talk about this—we have very specific examples later for how this is done, but a multiyear rate cap is how you traditionally do it, and that usually involves a mechanism where the utility gets to share in some of the cost savings that are achieved.

Katie Wonderful. Thank you, David. Again, I just want to remind attendees to please submit questions using the question pane at any time as we continue through the webinar. And we will have a longer question and answer session towards the end of the webinar, so you'll have time to submit those.

So wonderful. Camille, are we going to you or back to David?

Camille It's with me.

Katie Wonderful. Thank you.

Camille And I'm going to start by talking about—thank you. I'm going to start by talking for our examples about REIO, Revenues Equals Incentives Plus Innovation and Outputs, is kind of a point of departure when we're talking about PBR, especially when we're talking about next generation performance regulation. And the goal of REIO was to have a sustainable energy sector at lower cost to consumers than would've been the case under existing regimes.

So the context of the UK at the time when they developed this was that they were facing more distributed generation, more consumer involvement, and they wanted to focus on sustainability. And the system prior to REIO didn't address this, so REIO was created as a mechanism to more fully address those goals. And REIO's innovative and why we talk about it is because it focuses on outcomes and customer satisfaction. REIO put into place incentives that deliver outputs rather than focusing on the inherent incentives for utilities to increase capital expenditures and build new infrastructure. The output areas that REIO focused on were customer satisfaction, network safety, network reliability, new connection, environmental impact, and social obligations. It also works over a longer time horizon and it currently operates for eight years, which is a reflection of what they felt was the long-term nature of investments necessary for a low-carbon transmission. There is now some discussion of changing this to five years so that there's more opportunity for course correction.

So this slide is very detailed, but what it's trying to show is the consumer engagement that the regulator has engaged in. And the UK regulator really saw the value of engaging consumers, and they wanted a better understanding of the consumer perspective. So the PBR mechanism itself encourages utilities to engage in a stakeholder process, and this has led to REIO's notable innovation, which is utility benchmarking and scorecards, which are these public metrics that David talked about earlier to identify utilities that excel and lag. And the regulator publishes annual reports on the performance of all the network companies, and that includes a table that compares performance on the output areas for these companies, which is what you see here. The result has been customer satisfaction under REIO has increased greatly.

Next David is going to talk about cost control.

David

Cost and utility cost control, which is generally most people would agree a good thing, has actually been implemented for decades in the form of a PBR regime known as multiyear rate plans. Multiyear rate plans, the basic idea in one of these plans is to set rates over a longer time period so utility knows what rate it's operating under. The rate might be a formula, so it can be a little bit sophisticated—and I'm happy to talk about that, if there are questions on how you set the formula. But basically the utility knows what rate of return it will get and if it operates efficiently, given what is anticipated in its rate plan, it gets to keep some or all the savings, depending on the particular jurisdiction's multiyear rate plan. So either they would keep some or save some with the ratepayers and give some back, either over the short-term or the long-term.

Now this concept was first used in California and New York and the New England states in the US, but now it's common in Australia, UK, Germany, New Zealand, and Canada. And it has been adopted widely across these different jurisdictions. What it does from a regulator point of view, and why regulators often are the initial ones to propose it is it reduces the frequency of rate cases, it frees up commission and regulatory time to focus on other regulatory matters. Rate cases are very large proceedings, as any regulator

knows, and they could take up an awful lot of focus. It also frees up utility management time from having to deal with rate cases, so that the utility management and senior people there can focus on recovering—can focus on operating the utility efficiently, rather than recovering certain amounts of revenue each year in the form of rate cases. And it's thought, therefore, to strengthen the incentives for utilities to perform better and achieve superior utility operations over time.

Even though utilities often have not been the ones to propose it, utility executives have found that under multiyear rate plans it enables them to focus more on their utility business and less on the need to go to regulators and ask for additional rate increases. And the idea that improved performance of the business can become a new profit center for the utility. And again, regulators like it because it allows them to focus more on other issues if it's implemented successfully. And for multijurisdictional utilities it can be particularly beneficial.

What is the operational experience with these rate cases over time? Well, now that we have decades of experience, multiyear rate plans have been well studied and have been shown to generally result in more productive utility operations. In other words, the productivity growth in the utilities that have them in place is usually superior to utilities by and large. The graph that you're looking at here shows a multifactor productivity analysis of a utility in Maine, where I was a public utility commissioner of our largest electrical distribution utility, CMP. Had a multiyear rate plan in effect for over two decades. And you can see from this graph that its productivity growth over that time period was superior to electrical utility regulations by and large across the utility sector. So again, very successful mechanism, a lot of details in how it set, and a lot of good learning, given the experience in implementing it.

So with that we're now going to go across the Atlantic, to France, with Camille.

Camille

Thank you. So as David mentioned at the start, PBR can help you establish guiding goals. And the background for this example was that European law requires the implementation of intelligent metering systems that assist the participation of customers in the electricity supply market. That's a European regulation that France then implemented and they implemented a smart meter rollout to accomplish that. And they did it through a PBR mechanism, and this kind of mechanism, smart meter deployment, is generally a mechanism that's fairly straightforward to implement and it offers broad benefits. And here the goal was to deploy 35 million smart meters over a six-year period and the incentive was structured such that there were 300 basis points that could be awarded to the utility and it was split into two parts based on the goals of the mechanism.

So the first part focused on the deployment time schedule. They really wanted to keep it on time and in the six-year period. So the first part of this the utility could earn 200 basis points and it focused on controlling investment costs, cause they don't want to overrun their budget, and also being on time. So they

tracked the number of meters that were installed and able to communicate and the utility could incur penalties if they were not on schedule, but they could also receive incentives if they had successful install rates.

And this graphic shows the goal of the system as a whole. They wanted to install the smart meters to enable the consumer to participate in the energy market. So the second part of the incentive focused on let's make the system operational and ready to be able to be used. The utility would be able to earn 100 basis points if the performance of the system met the objectives of the project. So for this they tracked the number of meter readings, the availability of the customer portal, and different things like that to ensure that the mechanism would be able to deliver as advertised.

Next David is going to talk about other examples of distributed energy resources.

David

Now distributed energy resources, which is obviously anything that's distributed outside a central power plant is what we generally mean by that. It really illustrates that there are no cookbook approaches to PBR; they can just be taken off the shelf and implemented, particularly because it's a very challenging area, I'll discuss why. And what we can find is a lot of diversity in the way that jurisdictions are thinking about DERs, but applying PBR to it is particularly challenging, and this is why. First of all, DER is—let me go to the next slide—measuring it is easy in one regard, and I'll give some metrics that are traditional for measuring DER. But it's very hard to measure or assess how it will be deploying in the future and how we expect it to be deploying in the future. Nonetheless, it's right for an application of PBR if we can get the incentives right.

So why is it challenging? Well, it's challenging because we're in the middle of a transition from a centralized power system—this is the same slide that you saw earlier—to a modern power system. And a modern power system includes a lot of distributed resources, including the example here on the right, is the house with combined heat and power that would generate onto the grid. But what we don't know is what the deployment timeframe will be for these resources. Since they're new, they're innovative, some of them are disruptive, we don't know to what extent they're going to deploy and not. So that would be the next slide. In other words, ordinarily for PBR it's good to have a data baseline, either historic data, or to have a model baseline, so that you understand how the particular technology that you're looking to build incentives around would act in a competitive market. But in this case we do know that DERs can provide some efficiencies to the system. Exactly where those efficiencies are and how they should be incorporated and integrated is an active area of examination across multiple jurisdictions right now. So we can't project out what the efficient or best baseline for deployment would be across these jurisdictions.

To the extent we're also trying to answer what's the right system cost, is it actually beneficial to the system? Is it actually a cost to the system to incorporate at several levels? And obviously that depends on the details of how you do it. It can be done well and be beneficial or it can be done poorly

and just impose costs on the system. So what is the right and efficient level in how should it be done and what type of behavior do you want to encourage is all a little bit under examination, which makes setting the baseline hard. That said, how you measure basic DER deployment is well understood. Typically we would measure it in terms of overall installed capacity or the amount of energy that's produced from DER units. It may be a measurement behind the meter, a total, or it may be just a measure of what's put out onto the grid. Another way to measure it is total number of units that are deployed, energy or capacity. So those basic measurements we understand.

Knowing that there are these difficulties, New York has taken an innovative approach, which is to recognize that we can set the baseline. I'll also talk in the next slide about the difficulties with interconnection. So they have endeavored in New York to assess an incentive, to put an incentive—it's assessed based on a very sophisticated survey instrument that's still under development with stakeholders, so a very transparent process, to ask both customers and DER providers how the utility is doing in terms of working with them to efficiently assess what DER should be attached to which points in the system and how they are doing that analysis. So where it should go and how it's done. The beauty of this approach is that it avoids baselining. It also avoids awarding incentives based on factors that are exogenous, that have nothing to do with how the utility is performing, such as the level of DER provider activity in that jurisdiction may be a lot different than other jurisdictions.

So you avoid that if—in other words you avoid giving out incentives or penalties by this approach and you avoid the—next slide—detailed interconnection review, or at least assessing—go to the next slide—whether interconnection is being done appropriately. And the advantage of that is that interconnection is a very hard area to _____. We want to go back we have the interconnection side. Interconnection review can be difficult because any one interconnection review requires you to look at whether the interconnection is justified or not, the quality of the review. So just putting a number on the number of interconnections that will be processed each month or each year doesn't tell you anything about whether they're being done properly, whether they're being done in an efficient manner or not. And you avoid the need—you create both the need to count gross numbers and also a perverse incentive to encourage just a bean-counting approach to pumping interconnection reviews through the system if you adopt the survey instrument. The difficulty with the survey instrument is obviously the baselining. Without a baseline it is challenging, and again, it is an innovative approach you're taking in New York.

So with that, that would be, if we just attached this one incentive mechanism it would operate as what we call a performance incentive mechanism, on top of existing regulation, to assess an additional return on the utility investment in this area. But New York is doing it in a writ large, which is shown on the next slide. New York is taking all of these and assessing what's shown in orange, the earnings adjustment mechanism that will provide additional earnings to the regulated utilities if they perform positively on multiple

measures, only one of which I described, the DER set of measures. On the thought process here, which is over time—this is meant to be as a percentage of 100 on the vertical axis—the traditional revenue from cost of service regulation will decrease and the utilities will make an increasing percentage of their revenue based on how they perform in all of these innovative areas, of which adjusted earning mechanisms are just one, and there are other earning mechanisms as well. And that's the New York vision writ large. So very innovative approach to PBR to over time have the utilities recover a much larger percentage of their revenue through PBR mechanisms.

So with that, the important overall lessons or takeaways from PBR are, one, that it aligns utilities, regulators, and customer interests together if done ideally. When incentives are out of alignment it is not good for anyone. PBR in the form of cost cap regulation is proven across multiple jurisdictions to provide cost incentives that work for utilities. And even in the incentive mechanisms where there's no direct cost sharing with rate payers, the concept is, and has been proven that over time it reduces overall utility costs and rate payers see the benefit of that. And that can be designed into a formula if ratepayers decide to do that.

So even where there's on controversy around guiding directional incentives, getting the incentive right over time takes time. Experimentation is important, and allowing room to do that, but get the data right, get the metric right, and assessing it right takes trial and error. So over time performance regulation many believe can be part of the answer to the larger question, which is what is the role of the utility in next-generation utility regulation and moving the power sector into the 21st Century and moving from traditional assessment of generation, transmission, and distribution of facilities into areas like platform services, describing New York REV or distribution system operator services, described in multiple European PBR systems.

With that we look forward to further discussion with you and your questions.

Katie

Thank you so much to both David and Camille for that outstanding presentation. As we shift to the question and answer session I just want to remind our attendees to please submit the questions using the question pane at any time. We will also keep up several links on the screen throughout for a quick reference that points to where you find information on either upcoming webinars or previously held webinars and how to take advantage of the ask-an-expert program. We had some great questions from the audience, we'll use the remaining time to answer and discuss with David and Camille.

So the first question is are there examples of PBR being implemented from electric utilities that operate on a non-profit basis?

David

Yes. Yeah, there are. In the report—and, Camille, you may want to add to this—we talk about not just investor-owned utilities, but also PBR applied to state-owned enterprises and co-ops, and they certainly exist. So for example, in China the two very powerful incentives are, one, executives usually can either, and managers, promote up the utility, or to larger utilities based on their individual reviews. And a new system is being put in place in China to

actually rank utilities. How it's performing, since it's just being put in place, we don't know. So those are two examples for state-owned enterprises.

We also talk about some examples from other continents. Camille, do you want to talk about UDAY from India?

Camille Sure. UDAY is a program in India that is really quite innovative. It's tying energy efficiency investments to the financial security of the distribution utilities, they call it the DISCOM. And there's a unique balance in India between the federal and the state regulatory systems, and the incentive mechanism tracks the energy efficiency investments of the DISCOMs and requires those types of investments in exchange for some financial stability mechanisms that they have that they've rolled out for the DISCOMs in India. And the paper goes in to much more detail about this and shows more facts and figures on that as well. But as David said, there's a lot of state-owned entity examples and co-op examples in the paper as well.

Katie Wonderful. Thank you, Camille. The next question, do you think that a PBR approach in the UK might deliver better results for consumers in the system?

Camille Could you repeat that please?

David I missed a little—yeah, go ahead.

Katie Oh, I'm sorry. Once again, the question was do you think that a PBR approach in the UK might deliver better results for consumers and the system?

Camille REIO is a PBR approach that is trying to reform the system and assess different satisfaction—or different metrics looking at customer satisfaction and a number of others. David, would you be able to speak more to that?

David Yeah, just to add a little bit of detail—I could tell Camille and I had the same response. We're trying to figure out what that question means. So to give a little bit more context to Camille's answer, before REIO was put in place, only relatively a few years ago, there was a prior cost cap system in place in the UK. And that cost cap system had been successful, but there was concern that it was really focused—microfocused on what the costs were that were going in and wasn't focused enough on what value was being delivered to rate-payers over the long-term, particularly in the European and UK context of clean energy and emission-reduction type operations, but also more generally want to see more of a focus on customer satisfaction from the utilities, rather than just cost control. So without it, it wasn't a strong disapproval of the prior regime, but it significant operational experience with cost cap moving to what in the UK they think of as perhaps the next step.

And right now they're undertaking a very active view of REIO, looking at how to improve it or modify it, with some specifics, for instance, whether the cost cap modified by the incentives that Camille talked about its set at the right time period. It's currently set at eight years, and one of the things they're looking at is whether that eight-year period is too long in the area of rapid

energy innovation and whether that should be reduced, but that evaluation is underway with a lot of vigorous discussion in the UK.

Katie

Great. Thank you for sorting through that question. The next question is can you address any disadvantages of the multiyear rate plans?

David

Oh sure. Yeah. As a regulator one disadvantage is that you don't get the formula right. So I mean that's sort of where to start. A simple plan would just set a rate. Most plans set a given increase factor in the formula for the rate of inflation or cost growth, and that's a positive adder to cost. And then there's a negative reduction for what's called a productivity factor, because the concept is the utility should operate more efficiently, and we're going to expect that by setting it. And the ones that—a lot of the plans that I'm familiar with the negative factor is greater than the increase factor, so over time it's built in that you're going to expect more efficient operations as a result of the multiyear rate plan. But getting that right is important, but for the utility, so they can earn a good rate of return, and for the rate pairs, so they see the benefits of a multiyear rate plan. So that's the first thing that you need to get right or it will go wrong.

There are some examples of utilities being set up with very simple multiyear rate plans going very badly, where they didn't look at the operational metrics to ensure adequate customer service or their reliabilities maintained, because there can be two perverse incentives; one is that you cut customer service, and one utility actually did that and turned their number into a 900-number for customer service and had quite long wait times. So they turned customer service into a profit center, where they charged customers for very poor service. That did not go over well, but it is an example of a bad design. And that's sort of on the obvious thing; I don't think anyone in this day and age would make that mistake.

And a third area that you really want to think about is you need to look at the amount of capital investment that's necessary in the system and think about that, because it's more challenging to do a multiyear rate plan in the context of very large capital investments, where you don't have very good data that would be represented in your test year, if you use a test year approach. You need to make sure you get that capital investment actor properly influenced. If you don't, if you just have a straight cost cap, you can also—you want to have something to keep your eye on the ball of capital investment, because it can create a perverse incentive to not invest appropriately in long-term capital, the utility would see a large part of those savings in shareholder returns, if you follow me. So you want to think through how long-term capital investment is related to the overall capital costs, and perhaps have some metrics to track that at a minimum.

Those are at least three areas I can think of that you want to keep your eye on the ball if you're doing a multiyear rate plan.

Katie

Great. Thank you. What is the difference between a cost cap, a revenue cap, and a rate cap?

David

So a cost cap is what most people refer to as just what we've been talking about, a multiyear rate plan with a cost cap. A revenue cap, it can be added to it or a part of that. And these terms aren't all used consistently across jurisdictions, so I'm giving an overall answer that may vary depending on the practice and individual jurisdiction. So again, cost—a multiyear rate plans with a cost cap is generally what we've been referring to. A revenue cap can put an overall amount of revenue cap on what the utility can recover. So if you create a whole series of incentives where there's some concern, the utility might do very well. You may want to put an overall revenue cap on how much the utility can recover in revenue and the rest of any savings would go to ratepayers, the concept.

And a rate cap would be just that, it would be a top rate. So if you have a series—if you have a number of adders, such as they do in New York or with REIO in the UK, six or eight different potential adders, you might put a top limit with all of them added together for how much the total rate can be, even for exemplary performance in a utility.

Did I miss anything, Camille?

Camille

I don't believe so.

David

Okay.

Katie

Great. Thank you. And with bringing up New York, our next question is what are some example questions in the New York REV survey for assessing DER performance?

David

That is a great question. The survey is still under development, so that is a question that a lot of people are focused on. There's stakeholder efforts in New York to work on that survey instrument, so that would be—I can throw out some examples of what they might look like, and I will. But that's not to speak for New York or their stakeholders there, to be very clear.

One would be New York has a SIRI, that's S-I-R with an I on the end, I think—process for it. That's how they do their interconnections, the interconnection standards. And generally that sets the base threshold for how interconnections are to be processed. But there's a great deal of interest above that in how the utility is interacting with the DER providers to both look at the hosting capacity of the circuit and whether that's being done efficiently, you know, effectively and in a timely manner. And two, look at integrating certain resources and address issues as they're hit, depending on the particular areas—particular issues they'd hit with a surrogate. So if they have an issue with being close to a limit there are many ways that you can look at incorporating a particular resource with operational or technology addition. So those are the types of issues that would be queried in the survey on the particular interconnection issue. Both from a customer point of view, but also the DER provider's point of view, because they look at slightly different looks and views on the same process.

Katie Great. Thank you. David, can you expand a bit on how PBR differs from vertically integrated and competitive states?

David Yeah, vertically integrated—well, let me start out with competitive states. PBR has been implemented in a lot of restructured states, where you have competitive restructured markets. But not exclusively; there's no reason that it needs to be limited to those areas. In fact, it can be used very effectively in a vertically integrated context. So there is no reason in theory why it can't and shouldn't apply across that. I think the practical reason why we may see more application in restructured states to use—this is US terminology, for those tuning in from Europe and Asia—that means—restructured states means we have competitive electricity supply or surge generators. I would speculate probably a lot of—or more of a sense where you do integrated resource planning that these issues may be picked up and addressed in the context of an IRP and integrated utility operations and may or may not accept _____ incentives necessary. But that just may be a sense; that's only qualitative. Regulators in vertically integrated states would see many of the same benefits to encouraging operations, and we have examples in the paper from jurisdictions that are vertically integrated, including when Washington was—Washington still is, Washington state in the US and Hawaii, and the state-owned enterprises in China, India, and I'm thinking through—the UK is a version of restructured. France I believe is more vertically integrated.

Katie Okay. Thank you. The next question is could you describe the difference between PBR and PIMs and could you offer some examples of a few examples of PIMs for us?

David Sure. So again, PBR is more of a wholesale restructuring of the way incentives operate, so in a system that wants to do a full PBR redesign that one looks a lot more like REIO, that Camille summarized and addressed in her presentation. And REIO often comes to mind as an example of sort of full-fledged PBR. New York REV as well. Which doesn't mean you don't have a base rate of return, but it means a larger percentage of the utility return would be determined by how utility ranks and does on each of the incentive mechanisms. So for instance, in REIO I believe it's up to 50-percent of the return actually can be based on how they do on the mechanisms. The percentage in New York is lower, but still not insubstantial.

A PIM, a Performance Incentive Mechanism, by contrast could operate very discretely for say an energy efficiency program. A certain type of PIM which is common in the energy efficiency world is to say just for the cost of implementing the efficiency program a utility might get an add, or if it hits certain energy efficiency savings goals. So a certain percentage of its costs at a certain level, a higher percentage of its costs at another level. A better way to do it for energy efficiency rather than focusing on the cost, because that still has sort of a cost input bias that I talked about before, would be to award the same PIM, but based on percentage of savings, and assess those savings on a shared basis between customers and the utilities. So if customers save say half a percent of overall system sales over time, that a quarter of that or a half to the same means a quarter overall would go to utility and a quarter

would go to the rate payers, so they'd share on a 50-50 basis. That's an example of a PIM; it can be much more discrete and be focused on particular cost factors for the measure, doesn't have to be, or a PIM could be based on an overall increase in the rate of return of the utility if the operations are system wide, such as reducing system wide losses. That may be appropriate to give an additional adder of say 100 basis points if cost savings across the system are achieved as a result of reducing system losses.

Keep _____.

Katie Thank you for clarifying. Oh, I'm sorry; go ahead, David.

David No, I was just going to say we can provide more examples if the audience is interested.

Katie Okay, great. Thank you for clarifying that. The next question is how does a utility earn platform service revenue?

David That question is focused on New York, I believe. New York is experimenting with that. And that's another—New York REF is a very large initiative. Another area that they're focused on—the concept behind platform services, the distribution's utility actually would coordinate, even in a restructured environment, would coordinate the distributed resources across the system. So in an area where load is getting near the ability of a particular circuit to handle it, they might deploy a series of distributed energy resources to actually absorb part of that load. So it could be a series of hot water heaters or EV batteries to absorb part of the load. Whenever the load or frequency is too low they can deploy the same resources to adjust the frequency or the load onto the system to maintain certain system minimums, if that was an issue, to track in real time the amount of solar that's on the system could be another purpose to move ancillary services, which are voltage and frequency up and down, as well as overall energy usage to maintain that circuit and that part of the system within a particular balance. That job traditionally has not been done on a very discrete circuit-by-circuit basis, and the concept is that the distribution utility would take on that role, even in areas like New York, where they're restructured and supply is competitive, and would receive compensation for those services.

Another income stream would be income from each of the DER providers for that service. So each DER provider would pay certain subscription services or certain rates to the utility for the benefit of having their resources be utilized or dispatched in that type of local system operational context. Again, with things becoming more dynamic at the distribution level, the concept is the utilities, even when they've gotten out of the business of dispatching, competitive supply system wide would balance those issues and receive income for doing so.

Katie Thank you, David. The next question is are there examples of PBR mechanisms that focus on customer builds as opposed to utility rates?

David Yeah, there are. I actually referred to them. I'm trying to think of solid examples right now off the top of my head, and I'm not thinking of any. But the example I referred to in my presentation would be measuring energy efficiency savings as a percentage of customer bills, as well as system wide. And that is done by energy efficiency administrators. I'm trying to think of a specific PBR regime where that occurs, and I've been party to a lot of discussions in that regard, where it's being assessed and analyzed off the top of my head, but it's probably just my inability to recall; I can't recall any performance regimes where that's put in place.

Camille I believe that is something that is tracked under REIO. And part of being able to track and show the different customer satisfaction ratings as well as the utility performance metrics allows customers to see how utilities perform on these very viewpoints, which also enables customers to switch utilities at certain points. And I believe energy bills is a function of that; I'm not sure to what extent.

Katie Thank you, Camille and David. David, this is referencing one of your slides. How did you measure productivity growth for CNP?

David Good, we could—I don't know if can go back to that slide or not. That slide is actually taken from a paper by Mark Lowery and a number of other folks, that it's called a multifactor productivity formula and it is not mine. It's applied by the office of the paper in analyzing multiyear rate plans. Mark is an independent consultant not generally associated with utilities, so in other words the analysis is not something that comes out of the utility side; it comes out of analysis that's more typically done by Mark working for commissions or other folks. So it has the advantage of having the credibility you get with an independent review.

But as the particular formula, I would have to refer back to the papers that are involved there, and we can get out—to the individual questioners we can get out references to Mark's papers, which are multiple on that topic, including one that was just published this last summer.

Katie Okay. Thank you for clarifying that and referring back to that slide. The next question is do you have a sense, at least in the United States, whether PBR can be done entirely through regulators or does it require some action from legislators?

David Yeah. Good question. That depends on the individual jurisdiction, both in the US and internationally. Small forms of PBR, such as reporting individual metrics or incentive-sharing mechanisms oftentimes can be implemented under existing utility authority that a commission would have. On the other hand, multiyear rate plans may have to be specifically legislatively authorized. Some commissions operate under mandates to do rate cases every single year. Actually the example I'm thinking of is Canadian, but I know their parliament and one of the provinces got upset with them in the amount of utility rates and ordered regular rate cases. So if you're operating in that type of context then you obviously would need to go back to your parliament or your legislature to get authorization to do a multiyear rate plan for of PBR.

So part of the answer depends on existing authority, part of it depends on the particular type of PBR that you're looking at and considering.

Katie

Okay, great. And just a follow-up question to that. Has PBR been implemented voluntarily by a commission or has the driver always been a legislative mandate?

David

No. Oftentimes the driver is actually from the regulators, from the commission; they would see the potential benefit of doing less rate cases, both for their time and for the utility time. As a former commissioner, you know, I can tell you that the view is palpable with you sit through multiple rate cases at the utility and senior management, who usually manage and put a lot of time and effort into the expert testimony, which takes years to develop, that, you know, clearly the focus of the utility executives is, as it should be, on the regulatory process to maximize the rate of return and their authorized rate base. That's how they do well if they're an investor-owned utility. So if regulators see that they often say, "Is there a better way to do this?" and that is often the way that it happens.

Utilities may or may not be interested, often are concerned that it will be a negative for them if they're doing well, and in other words it will reduce their authorized guaranteed rate of return in a traditional cost of service context to something they need to earn, and that can be a scary thing for utility managers who can be conservative and used to the way the old system works, which can also be a positive inertia why people are comfortable with the way the system works currently, and may focus more on the downside of it changing than the upside. So in some cases the utilities have had to be brought to the table initially, but once they've operated under a number of years utilities can become very comfortable with a regime, particularly once they learn how to maximize their productivity and their rate of return.

And so for instance, in REIO I believe in the last round many of the utilities, if not all of them, achieved close to the maximized authorized rate of return, which wasn't a foregone conclusion going into it. So that's an example of where the utilities seem to be meeting the high standards set by the regulator. And again, they'll be looking at that in the re-evaluation, the current evaluation that's underway in the UK.

Katie

Okay. Thank you. We're getting close to the end of the webinar but we still have great questions coming in. The next question is do you have an example of how incentives are calculated, in particular whether they're linked to expected benefit, for example, from the reduction in fossil fuel use or increases in reliability?

David

Yes. Yes. All the above. Again, you have to start with asking what you want to achieve. So if what you want to achieve is a reduction in fossil fuel use you can incentivize that. There are at least public reporting metrics that focus on that element or, you know, perhaps another way of getting at a similar thing is to look at increased lower non-emitting resources on the system, either writ large or at times of peak, when depending on the configuration of the system, you may have a lot of the older fossil units that come online to meet peak. So

many ways to measure that. So again, the way that you set that up for the incentive and the metric would depend on what you're trying to achieve.

For reliability it's much more—we've got, even though SAFI and SATI is defined differently across some different jurisdictions, the basic concepts are well understood, so implementing those is fairly common. And that also illustrates something we didn't talk about because it's sort of an advanced concept, but when you're setting incentives the nature of the goal and the incentive and the metric may tell you a lot about whether you want it to be a positive incentive that increases utility rate of return if they're doing something that you would associate with exemplary performance versus a negative incentive that would actually penalize them, and oftentimes system reliability falling below a certain level of SAFI or SATI for a system interruption measurement of duration or frequency, which is SATI or SAFI on the _____, those that aren't familiar with that measure. Those are often negative, so if you fall below them then that would reduce your rate of return, the concept being that there's a baseline of operations to which the utilities should operate under.

Let me flip that for a second and say that if the desire is to actually increase reliability you may want to turn reliability into a positive metric, where you start with a well-established baseline and ratchet up the level and create a positive incentive if higher levels of reliability are achieved. When you might want to do that? If you have a lot of issues under ordinary weather-normalized conditions with reliability and you think it's appropriate to incentivize utility in that way, rather than through large-scale capital investment, particularly that might be appropriate if you believe that operational-type investments, such as increased tree clearing, that aren't capital in nature, would increase reliability, as opposed to increasing more and harder—harder system and grid improvements.

Katie Thank you, David. Our next question is are you aware of any utility incentives that focus on improving load factors?

David Yes. Improving load factor is very much a focus of New York REV, the concept being to a more appropriately utilize their existing resources, so to have more generation and load using greater hours in the day to try to spread out the peak, so that you're not ultra-focused on the top 10 minutes or top 20 minutes, but can get both users and generators to use the grid more efficiently. And that is a focus of New York REV. We didn't talk about it here; we focused on the DER aspect of it.

Katie Thank you. The next question is focused on the customer. If a customer choice is a goal, what is a good PBR?

David Customer choice is a focus of the Illinois Commission, and Illinois regime where they mandated certain aspects related to their smart meter deployments in Illinois. So Illinois does track customer choice, the number of customers that are opting in to time of use-type rates across its various utilities. That is a reporting, what we call a reporting-only metric at this point in Illinois, so it's what we might call PBR light; there are not particular incentives that the

utility gets one way or the other, but that the number of customers opting into retail choice is tracked, and that is one way to do it.

Katie Thank you so much.

David I can extrapolate. Go ahead.

Katie Oh, okay. Thank you. The next question is the environmental—can you talk a little bit more, expand upon the environmental for outcomes of using a PBR? And could this be implemented into a state SIP?

David Okay, state—let me just clarify, the last part of the question is can it be implemented to a state; I assume that means State Implementation Plan under the Clean Air Act in the United States. The questioner can clarify if that's not the case. So environmental outcomes can be tracked. It's very possible, and our paper talks about that, to have an overall reporting metric for reduction in emissions, and emissions can be defined as carbon, where a lot of people focus, or less glamorously but just as important, reductions in nitrogen oxides, NOX, SO2, or particulate matter or any combination thereof. So it's very possible to sculpt either a reporting metric and a series of measures around emissions reductions and to do sophisticated modeling to set basis for where those should be.

It's also possible, I should note, to do it in the water context, where you could have water usage as a percentage of fleet, as a percentage of megawatt hours tracked, or as a total gross in reduction in water usage through cooling, a thermal facilities measure. Or total net consumptive uses, in other words the amount of water that doesn't get put back into a stream, river, lake, or pond, or the ocean.

And so could those then be used—the next level of the question is in the state implementation plan. They certainly could be. WRAP has actually done a good bit of thinking on using energy efficiency, a slightly different measure for how to measure it and incorporate it into state implementation plans and incorporating these other metrics would be a variation on that. No state has done it outside efforts to incorporate energy efficiency, whether it's been good initial work done by the US states of Massachusetts and Maryland in incorporating energy efficiency in the state implementation plans. The basic threshold is if you did any of this you would need to do the modeling and present it to the US EPA so they became comfortable with and able to accept that they would receive certain emission reductions that were solid enough to include as reductions under the Clean Air Act.

Katie Thank you, David. Our next question is to what extent do PBR strategies affect the consumer-paid price of electricity?

David What was the first part of the question? I heard the "affect the consumer price" part of electricity, but I missed that—

Katie To what extent—yeah, I'm sorry, David. To what extent does PBR strategies affect the consumer-paid price of electricity?

David

Let's see, a couple different answers. The answer to the question to what extent PBR would affect the consumer-paid price of electricity is different in fully-integrated utility structure than it is in a restructured area where you're regulated utility doesn't have direct control over the generation. So in the context of fully integrated utilities the effect could be quite direct. If you design a series of mechanisms, particularly around cost control, again, it's been shown in a formula you can actually calculate through the price reductions as a result of certain utility actions if you were in a cost containment multiyear rate plan context. And that same answer would hold true in a restructured environment. So in both of those areas you could see direct correlation in tracing through. If the intent of the PBR system is more indirect, to say reduce the growth of peak, so you reduce the new investments that need to be made in meeting increasing level of peaks, you need to look at modeled investments or planned investments out a number of years, the new generation transmission and distribution plan, to see what you're saving out over those years. And in that context those proceeding can oftentimes be contested as parties use different projections and different assumptions for what the investments would be, as well as, you know, energy savings.

So anyway, to take it back to a clear, concise answer, for jurisdictions that are focused on cost control with multiyear rate plans, you can trace the consumer savings through fairly directly. Other types of systems designed for other purposes you might have to do more analysis to reach certain conclusions on how much consumers save from what they otherwise would pay.

Katie

Wonderful, David. Thank you. In our final question within our final minute or two can you just briefly discuss how the jurisdictions are set?

David

The question is can I briefly discuss how the jurisdictions are set.

Katie

Yes, in a PBR jurisdiction how does that resource planning or how is that done or how is that set?

David

I'm not sure I understand the question. The PBR typically, again, you'd have to—the question is how you're setting up your PBR. You would go back and look at what you're doing already. So if you're in a resource jurisdiction that does integrated resource planning you might have a plethora of data on what you're doing already for cost data to base your analysis from. And if you're not in that type of jurisdiction it would depend on the particular studies you had from the regional entities, the individual sub-national entities or states in the US context for their existing modeling and energy system data. And then you take that data and the best modeling and projects you have and you use that to move forward with whatever your specific goals, directional incentives and operational incentives where you want to incent. But taking a good look at that's your data and understanding your systems is a crucial part of deciding where you want to take off from, if I understood the question properly.

Katie

Great. Thank you for clarifying that, David, and throwing that question out. And thank you again to both David and Camille for this great question and answer session. We had so many questions that unfortunately we didn't have time to get to. We will connect with those attendees offline after the webinar. And thank you again to both the panelists for the great presentation.

On behalf of the Clean Energy Solutions Center I'd like to extend a thank you to all of our attendees for participating in today's webinar. We very much appreciate your time and hope in return that there are some valuable insights that we can take back to your ministries, departments, or organizations. We also invite you to inform your colleagues and those in your networks about Solutions Center resources and services, including no-cost policy support through our Ask-An-Expert service. We 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. Also, check the Solutions Center website about the announcements for the upcoming part two of this webinar, "Performance-Based Regulation: The Power of Outcomes." I invite you to check the Solutions Center website if you'd like to view the slides and listen to today's recording presentation, 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 YouTube channel](#). Please allow about a week for those recordings to be posted.

And finally, I would like to kindly ask you to take a moment to complete a short survey that will appear when we conclude the webinar. Please enjoy the rest of your day, and we hope to see you again in future Clean Energy Solutions Center events. And this concludes our webinar.