STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

PUBLIC UTILITIES COMMISSION

STAKEHOLDERS

REVIEW OF ELECTRIC RATE ISSUES
IN ANTICIPATION OF 2015
RATE DESIGN REVIEW

DOCKET NO. 4545

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MARCH 26, 2015
10:00 A.M.

89 JEFFERSON BOULEVARD
WARWICK, RHODE ISLAND

IN ATTENDANCE:

HERBERT J. DeSIMONE, COMMISSIONER
CYNTHIA WILSON-FRIAS, LEGAL COUNSEL
TODD BIANCO, POLICY ASSOCIATE
ALAN NAULT, RATE ANALYST

CHARITY PENNOCK	JERRY ELMER, ESQ.
DANIEL MUSHER	MARION GOLD
SETH HANDY, ESQ.	CHRISTOPHER KEARNS
CELIA O'BRIEN, ESQ.	PETER ZSCHOKKE
TIMOTHY ROUGHAN	KAREN LYONS, ESQ.
STEPHEN SCIALABBA	MARK LeBEL, ESQ.
LESLIE MALONE	

(COMMENCED AT 10:07 A.M.)

MS. WILSON-FRIAS: Good morning, everybody. Thank you all for coming. I know it was a little bit dictorial in here's the dates, but I'm glad that you were able to come.

Because of that, because the schedule was kind of set for everybody, we are taking everything down through a transcript, so if we can just remember that each person can only speak one at a time, and that way anybody who can't come has access to the full discussion, and so if there are questions that come up after, they look at it, people can certainly filter them through me and I'll make sure that we get some answers.

So what I thought would be helpful is it's not usual that we have just a pure rate design case, we usually get the revenue requirement and by the time we get to rate design everybody is exhausted and the rates get allocated the way they're going to be.

This is really going to be a good policy discussion, what are rates supposed to do, what do we want rates to do, that sort of thing. So I thought this would be a good way to start this, and National Grid kindly offered to talk about what's in their current rates and -- how their current rates are designed, rather, and what -- sort of what the rate design is supposed to do and what sorts of behaviors the current rates may incentivize and what different kind of rates do. For example, if you have everything be a volumetric charge like it has been, then, you know, we all know we got to shut the lights off when we leave a room in order to reduce costs whereas if you had -- you just always get a monthly bill of $10, you would have no incentive to turn the lights off as a really extreme example.

The other thing that at some point, and maybe not today, that we will need to talk about is that there's the -- the docket will be opening. The law that applies to that talks about minimum monthly charges and those sorts of things whereas the Decoupling Act talks about moving away from fixed charges and more towards volumetric charges. So we're going to need to figure out how to resolve any potential conflict there. We don't need to figure it out today. I just wanted to raise it as I had noticed that recently.

So I'm Cindy Wilson-Frias, Commission legal counsel, and we have Commissioner DeSimone here with us today, Todd Bianco, our policy associate, Alan Nault, one of our rate analysts, and Karen, if you want to just start.

MS. LYONS: Karen Lyons with the Attorney General's office for the Division.

MR. SCIALABBA: Stephen Scialabba with the Division.

MS. PENNOCK: Charity Pennock with the New England Clean Energy Council.

MS. O'BRIEN: Celia O'Brien, legal counsel for National Grid.

MR. ZSCHOKKE: Peter Zschokke, Director of Regulatory Strategy for National

Grid.

MR. ROUGHAN: Tim Roughan of the Regulatory Group, National Grid.

MR. ELMER: Jerry Elmer, Conservation Law Foundation.

MR. HANDY: Seth Handy from Handy Law.

MR. MUSHER: Danny Musher, Office of Energy Resources.

MS. GOLD: Marion Gold, Commissioner of the Office of Energy Resources.

MR. LeBEL: Mark LeBel, Arcadia Center.

MS. MALONE: Leslie Malone, Arcadia Center.

MS. WILSON-FRIAS: So Celia?

MS. O'BRIEN: Thank you very much, Cindy. Good morning, everyone, Commissioner DeSimone and everybody, Commissioner Gold. Thank you for coming today and giving us the opportunity to lead off the discussion with some basics of rate design and allocated cost of service. We did prepare, as Cindy mentioned, an outline that's a little more detailed than the notice of memorandum that Cindy prepared, but I think it's a helpful way for the discussion that we'll be having as well as some handouts that we will -- some slides that Peter will take us through. So again, thank you for this opportunity and I'll now turn it over to Peter.

MR. ZSCHOKKE: Good morning. Thank you, everyone. First, let me apologize. I'm having my annual winter cough that lasts a couple weeks, so feel free to interrupt me because it will give my voice a break and -- but if I do cough, I will turn my head.

My cheat sheet is I have taken the outline off and gone straight to the presentation. So the outline -- the presentation kind of walks through the outline with some examples. The outline is kind of a cheat sheet to keep everybody on track and for you to use, what are the different ideas we talk about here.

So the first slide, from generation to your doorstep, this is how our rates have been designed. It's been designed assuming generation flows through transmission, comes down through distribution to the customers' premises.

The world is changing. It's going to be a different world in the future with more and more distributed generation, but it's important to note at the beginning that the way we have been designing rates for decades has been under this general premise of the need that everyone is connected, everyone needs service, everyone takes service and the amount of distributed generation has been minimal on the system. So this is a -- you need to reflect on that as we're moving forward to a more distributed world and thinking about what is needed for the distribution utility to serve that distributed world which will be different than what is needed in this world.

Right now the engineers assume -- worry about voltage as it goes down the line. Now they -- in a distributed world they need to worry about voltage that may come back from the line. So there's two different concerns that they have now as opposed to simply worrying about whether or not the person at the end of the line has enough voltage to serve their needs. And I use the term voltage because even though we do a lot of billing in kilowatts and kilowatt hours, if an engineers talks or if an engineer writes a paper, what they talk about is voltage and amps. They don't really talk about watts which is always a revealing fact when you think about how our engineers do things and what they need to think about. And feel free at any time to interrupt.

So I want to start first with a very old text but one that everybody uses, NARUC uses, NRRI. I would love to get the 1962 version of the Principles of Public Utility Rates by James Bonbright, the original version, but unfortunately I can't find it; I can only get to the 1988 version and further that were edited by Danielson and some other guy.

However, Bonbright set out his principles for rate design which people have used forever in the industry since that text to understand what we should be considering when we're doing it. We've only really, I won't say violated, but when we went to restructuring we really didn't pay attention to some of these because restructuring was a complete change in the industry. However, these attributes are something that people have always considered in rate cases or rate changes when you're trying to design rates for service to customers.

So these eight attributes are simplicity, understandability, public acceptability, feasibility of application and interpretation. So if nobody can understand it, and some of the California utilities, if you look at some of their tariffs, I mean, I was trying to see how they did decoupling in California and I found a decoupling provider and I was stunned at the equation they put in there. I was, like -- it would take me a half an hour to figure out what's in that equation, never mind a customer, and I do rates for a living. But these rate attributes are important and I think we followed it well in Rhode Island trying to keep things simple for customers, easy to understand and yet at the same time allowing the utility to cover enough revenues to deliver service to customers.

And then, of course, is the second attribute which is its effectiveness. The rates have to be effective in yielding the revenue requirements that the Commission allows the utility to recover. And part of that issue with the revenue requirement is obviously the stability of cash flow. We don't -- there's no spike, right, so whenever there's strong economic growth, utilities don't overinvest in that period of time. Utilities maintain a level -- kind of a level standard. They'll invest to meet new customer needs and stuff, but really, they're maintaining a level cash flow, of expenditures and investments and so we're flat like this while the economy dips and swoons like that because the revenue is stable over time, the rates are very stable. They only change when approved by the Commission.

So the stability of rates. This is very important, actually, because although not as -- it didn't affect Rhode Island as much when it came to restructuring, in Massachusetts it did because we really changed the demand charge for a lot of customers in Massachusetts. Customers want to be able to make investment decisions today based upon rates they will see in the future. So they want to be -- so stability is an important consideration. You want to establish a rate you can be confident will actually be useful in the future for customers, that you won't be changing it dramatically. So part of that goes into how you consider rates, that they need to recover the cost to serve based upon how the costs are incurred by the utility to deliver that service to customers.

And then, of course, there's fairness, right? Customer A shouldn't have to pay for Customer B's cost. It's unfair for Customer A to do so. Customer A should be able to pay for the cost they need to be served. Customer B should be able to pay for their costs that they need to be serve. It's only fair to all customers.

The next to the last principle is the avoidance of undue discrimination, and that is that similarly -- let me say that, similarly situated customers should be treated similarly. So that's why we have a residential class and commercial/industrial classes because we -- if you look at the load shapes of those customers, they tend to be similar. Commercial load shapes can be much more various, but we take care of that through, factors such as demand charges, things like that. Commercial/industrial customers can also be served at different levels of the system, and we take care of that through for example, credits for high voltage metering and things like that where customers are actually at a higher voltage level than the average customer on that rate class.

And finally, you want to use rates for efficiency. You want to delivery an efficient system, you want to make the system efficient, you want to make the customers consider their own efficiency as it allows them to save money on their bill which, hopefully, if designed appropriately, will allow the system to save money to pay for those savings that the customer is getting on the bill. You've probably heard a lot about people talking about time varying rates and that whole idea of driving efficiency in the system by telling customers when the expensive periods are on the system so that they can decide not to consume or pay the cost of that consumption and use it when it's cheap like over night. And that will improve the efficiency because in the end -- I did pull out another presentation. It's not in this presentation because I was trying to minimize the number of slides we were using. I do have a load duration curve if anybody wants to see it.

But usually the issue with New England, the issue with utilities that has been ongoing has never changed, it has gotten worse in New England, is that the ratio of average load to peak load is very important because we're a fixed cost system, and the lower that ratio is, the higher the average usage cost is for customers because the more we have -- we have very heavily fixed costs with capital investments and, therefore, that fixed cost is spread over fewer and fewer kilowatt hours if you're recovering costs on a kilowatt hour basis. Very important consideration when you're talking about rates.

And I always -- I was at a conference -- where's Abigail. There you are. So they wanted -- at the end, Abigail -- Arcadia Center was holding this conference, you know, well, what do we need to do for next steps for promoting this stuff. I said you have to get the national discussion away from cost per kilowatt hour and towards average bills because the average bill in New England is actually a lot less in Texas because we don't have any air conditioning like they have in Texas. So for residential customers, they actually pay a lot less for electricity, and I know because my neighbors are from Texas and they jumped with joy when they realized their bill would be $1,000 less than what it was in Texas. But it's because we don't have the air conditioning. So they may have low average costs per kilowatt hour in Texas but that's because they can spread those unit costs over a whole lot more hours of air conditioning than we have in New England because we have four seasons. So it's -- but if you talk about average bills, the New England states always sit in the middle of the pack. We're not at the top of the peak. Now, your southern states, you love to talk about cost of kilowatt hours but not average bills. So it's an important consideration. Any questions? No?

MS. GOLD: Is that true for industrial customers as well or not so much?

MR. ZSCHOKKE: Well, outside of New England, other regions have -- you know, Texas. What's in Texas? Petro chemical firms, huge, huge 50 megawatt, 1,600 megawatt plants. So when you look at industrial rates and try to do the average, you've got a 100 megawatt petro chemical plant averaged with a two megawatt store. So they're getting a really good deal and the two megawatt may be paying a whole lot more so you can't really tell.

Same thing with large automotive factories. I remember in the mid '90s, people -- so the Detroit Edison and Consumers' Power in Michigan, they had offered a discount to the auto manufacturers in their service territory. So the first year discount was a five percent discount. The first year discount was $36 million, or was it ten percent? No I think it was ten percent because there was $360 million of annual revenue just from the automotive manufacturers alone.

Our largest customer in Massachusetts, even if I aggregated all of their facilities in the State of Massachusetts was $12 million in annual revenue. So outside of New England the industrial base is considerably different. The auto manufacturers left New England, went to wide open spaces and built massive plants for efficiencies. So we don't have those large industrial loads, and I think probably one of largest is here in Rhode Island, Quonset Point.

MR. ROUGHAN: Yes.

MR. ZSCHOKKE: So you can't really compare commercial/industrial here to there.

MS. GOLD: I figured that. It's interesting.

MR. ZSCHOKKE: Most people don't understand that. Like air separation plants. I think most of them have moved out of New England because of other reasons because it's kilowatt hour based; they want to go to a demand base. Air separation plants are very high load factor, like 95 percent, and they deliver the products to hospitals and things like that. But they want a demand charge, not an energy charge. So if you move things to energy charge, they'll actually leave a region and go somewhere else.

Moving to Slide 3, I have talked to a lot of customers in my career. The whole concept of the rate case, and as Cindy mentioned, by the time you get to rate design, you are fatigued because you've battled over the revenue requirement. The important thing in a rate case is obviously how much revenue does the company need to provide service to customers. But the whole process through which you determine that revenue requirement, you then determine who pays for it, how they pay for it is very important, and those are the three big steps, right? How much is needed? What's in the bucket to recover? What classes are responsible for it? And then once you get to a class, what tools do you have available to you to reflect the right decisions you want the customers to make while at the same time trying to meet Bonbright's principle of creating stability of revenues and the ability to recover the revenue requirement.

So as you see here if you start at the top left side, determine the cost of service which we call total revenue requirement and we should actually have the word approved because, obviously, it's not what we file. We file something that looks just like this, but then the Commission approves something, and that is what's actually billed to customers. We go through a cost allocation process which determines what type of costs are they, how should they be allocated and then by determining those two things you will then determine what classes will pick up what portion of those costs and then it gets allocated residential, commercial/industrial and, of course, we don't have streetlights here, but streetlights will get a portion and then you design rates and that's where the -- you know, does the rates yield the revenue requirement necessary to serve -- to deliver the revenues that's necessary to serve the customers.

And this obviously is, like I said, based upon the tools. The meters in place. And the meters we have in place have been traditionally -- we have put them in place because many years ago we did a determination on a cost benefit study that if you put a certain type of meter in, customers would generate enough savings to justify the cost of the meter. Demand meters, time varying rate meters are more expensive than kilowatt hour meters. So you see our larger customers have those kinds of meters whereas residential, smaller customers have just kilowatt hour meters. That does not mean that you can't use other types of meters. Arizona, for example, although the solar industry doesn't like Arizona as an example, they've been doing demand rates for years because of the air conditioning load and obviously Arizona is a hot state. They really want customers to manage their demand because as people who know the area, it can be very hot during the day and then very cool at night. So how you actually manage your air conditioning load through different forms of air conditioning types can be very important in the decision -- in the rate design to drive that decision for customers.

MS. WILSON-FRIAS: So what sort of -- do we have a similar sort of challenge in Rhode Island? You mentioned that we're a four season state so we don't have the Texas or Arizona situation. Do we have any situations or examples where that would be something for the Commission to consider?

MR. ZSCHOKKE: Well, New England actually has a particularly difficult challenge which is it's load factor has been falling for decades in the ISO New England which means that the average load is falling relative to the peak load and, again, higher fixed costs. That means your average costs are increasing to serve customers. So --

and that's being driven I think because we've become tremendously summer peaking.

When I started in the industry in New England a few decades ago, New England would bounce; some years would be a winter peak, some years would be a summer peak. It's gone. I mean, summer is 4,000 megawatts higher than winter peak demand on a really cold day. And people -- we're doing a critical peak pricing pilot and smart grid in Worcester and people are, like, should we call something in the winter? I'm, like, no, because all of the days are in the summer. And we have been -- we're moving to a central AC world, and we have been over the last 30 years. I think that's a particular problem because it's driving capacity costs in the summertime that are not compensated throughout the year whereas in the '80s we had a bit of a balance, winter/summer. Now summer is really our -- if you want to think about efficiency, we really need to drive efficiency in the summer with air conditioning load and whatever else is happening in the summertime because that's what's driving the costs in the system and that's what is driving the need for capacity.

MR. SCIALABBA: Has there been a reduction over the past couple of decades of demand response programs that have contributed?

MR. ZSCHOKKE: Yes. Obviously with restructuring we moved -- the utilities moved out of the demand response business because the suppliers would provide, right? So we stepped away from that. So it was up to the market to provide demand response products and some like EnerNOC came forward and designed products. For whatever reason we're not getting the demand response that we need at the time of peak or the load is growing so fast relative to the demand response we're getting -- that those marketers are getting that we're not seeing the results in the summertime that we need.

MR. SCIALABBA: I remember the days

when multiple utilities did have robust demand response programs.

MR. ROUGHAN: There was a place where, as Peter said, prior to restructuring we ran our own interruptible type rates, and then restructuring came along. The ISO New England had both economic and emergency programs which we would administer on their behalf if customers wanted us to, but the third-party suppliers could as well and so we ran those programs for a long time.

When the forward capacity market began in 2010 all that went away and now they actually procure demand response resources through those capacity auctions they hold every year. So it's become much more complicated for the regular day-to-day customer to participate versus when the ISO -- pre-1998 we had our own interruptible rates and post-98 the ISO ran programs and those were relatively successful, frankly. We could get people into the economic programs when there was no penalty and we felt the training wheels in demand response and they could migrate to emergency programs. But when the forward capacity market came along, those all went away and it's just much more complicated and we are working on localized -- we've had localized programs in Rhode Island, believe it or not, in the 2000s in this footprint actually here, a localized demand response program to manage load in the area because we were having some construction delays at a major substation projet and we were nervous about that following summer's peak load. Fortunately, everything worked out and the substation was completed on time. We never had to call it.

So that's the type of program that we piloted in various states over the last ten years or so. But those are separate from the market in the forward capacity market, how they administer those programs.

MR. ZSCHOKKE: Tim, nobody has come forward with a replacement like a controlled water heater program, controlled pool pumps.

MR. ROUGHAN: They tried to market

things like direct load control on air conditioning and put in tens of megawatts of control and unfortunately lost all their financial insurance because they couldn't deliver those programs. Because at the time the value was relatively -- was very low compared to today.

The Southeast Mass. zone just recently -- Rhode Island zone just jumped in capacity value in this past auction in February. So now that the value which is to be delivered in power year 2017 and 2018 has gone up, now potentially you could have some opportunities for those entities to try this again.

MR. BIANCO: We'll see how long it lasts.

MR. ROUGHAN: Yes.

MS. WILSON-FRIAS: Mark, did you have a question?

MR. LeBEL: I know we're definitely seeing the changing ratio of peak kilowatts versus the number of kilowatts across the region. For transmission and capacity you definitely see that. Do you see that phenomenon playing out the same way at the distribution level? Maybe it's a lot different across circuits or how do you see it at the more local distribution level.

MR. ZSCHOKKE: Well, I mean, it's certainly in the newer neighborhood where all the houses are central AC you're going to see summer peaks. I don't know if there's any -- my guess is that most of the distribution, although don't quote me, it's going to flow downhill, right? Look at the first slide. It flows downhill. The customers are using the stuff from a demand perspective in the summertime.

MR. ROUGHAN: I think our challenge is a latency -- the latent air conditioning load that pops up day three and four of a heat wave where people pull out the old dusty air conditioners from their garage that they haven't put in their windows for a while because they don't have to pay the higher electric bill or higher electric bill, and all of a sudden it's that home that may have had one window unit now has three or five. You go to Home Depot and buy them for $79 each. You see homes with air conditioners in every bedroom now and so now that customer that was maybe a three kilowatt peak load on a hot summer afternoon or actually summer evening, now is an eight kilowatt load and that's very prevalent at the distribution level.

Residential neighborhoods throughout New England, their peaks really do extend into the 9:00 p.m. timeframe because none of us like to sleep in a hot humid bedroom. That's what happens. So the peaks have actually -- besides the peak load going up over average, the time of peak is moving later in the day, and that can be seen clearly through the ISO peak loads and even what we've seen on our system.

MR. ZSCHOKKE: But if I look at my house as an example, builders are finding that putting more cheap central AC units in a house is cheaper than running a lot of sheet metal in the house. I have two systems in my house, both of which can serve my house because the builder when they built the house said, "I don't want to hire somebody to put sheet metal everywhere. I'll just put in this $5,000 unit and run sheet metal in a very small area in the attic." And yes, I did have ice dams because, obviously, having a unit that heats my house in the attic is a dumb place for it to be. But I don't have the sheet metal to send the heat all the way throughout the house upstairs and downstairs to the basement. But that was the builder's choice to do that because it was his low cost. So new construction energy efficiency, if we can get that taken care of, and they didn't put in the most efficient system. Trust me. But also having a unit -- so now think about a hot summer day. If both of those units are cranking at the same time, that's two units of -- I don't know. What's the kilowatt rating of a central AC per house?

MR. ROUGHAN: Four-and-a-half kilowatts.

MR. ZSCHOKKE: So there's eight, nine kilowatts of electricity that I could be consuming instantaneously if I crank on at the same time. So that's an unfortunate situation based upon the builder's choice, and for me to rip out all the walls and put in sheet metal would be very expensive. But that's what's been happening. And I think you have to add to that the loss of manufacturing. So we're moving to healthcare, innovation, economy, less manufacturing, more new economy stuff and we don't have the automotive plants. We don't have the big manufacturers. We used to have much higher load factors. They've left the region. So that's really impacting the load factor in the region.

The other thing I want to point out is when I first started doing this work, in the summertime, as Tim mentioned, the peak was very spiky and it would be, like, four hours in the summertime. You would be, okay, I see that happening. But when I first -- when we first started talking about doing the smart grid pilot in Worcester we were doing an analysis on the load. The first time they delivered me the ISO New England loads, I looked at them. I was, like, holy smoley. It's a completely different world. It's a hump. The whole day it's a hump. It's a 12-hour hump. And it's no longer the clearly defined spike that I used to see back in the '80s and '90s. It is a hump. The load shape has completely changed in the summer primarily because people have put in central air or these more service oriented firms, the offices, are turning things on and leaving it on throughout the day for whatever reason, lack of demand response programs, running of AC, whatever, and there's no spike that -- you know, short period of time that you're trying to actually get a peak in the summertime. So it's a much more difficult situation to figure out how I do demand response for that 12-hour period over a period of customers because nobody wants to take 12-hours. You can't do it. All have tried. It was a bad idea. Anyway, that was a fun conversation.

So let's pick up the pace. On Slide 4, this just takes you through a little bit more about what an allocated cost of service study does. I mean, the inputs really are the rate base return and utility expense, the cost of service and revenue requirements. We functionalized that, quote, unquote, put it into it's functions of production, transmission, distribution or general, like human resources would be general. But our inputs are what are the load and class -- customer class characteristics. That's how many customers do we have? How many bills do we send? How many meters do we have? How many kilowatt hours do we deliver? How much load is there from the customer classes on the system? So we use the load and customer class characteristics as we go down and classify our costs into demand, energy, customer or direct assignment to do the allocations to the different rate classes using demand, energy or numbers of customers as an allocator. So for example, meter costs and billing costs would be allocated by -- you know, the number of customers you have. So it's very simple. Service drops allocated by the number of customers. Whereas your primary and secondary distribution investment and operating expenses are allocated by non-coincident peak demands of the classes.

So we determine what the individual non-coincident peak is of each customer, add it all up and then we use it as a -- by rate class and then we use it as an allocator across the rate classes to allocate the distribution investment and operation costs. And that ends up obviously determining how much revenue we need to recover from each customer class.

MS. WILSON-FRIAS: What would be an example of a direct assignment?

MR. ZSCHOKKE: A direct assignment. Streetlights. Street lighting is -- that's the easiest one.

MS. WILSON-FRIAS: So like a Walmart with its own parking lot with streetlights?

MR. ZSCHOKKE: Yeah. They would be on a street lighting rate. All the streetlights would be bundled together and directly assigned to the street lighting class.

MS. O'BRIEN: Could you explain what non-coincident peak demand is?

MR. ZSCHOKKE: Okay. There's a number of ways of calculating demand.

MS. O'BRIEN: Is this a complicated one?

MR. ZSCHOKKE: Well, some people refer to non-coincident peak differently than others. So I look at -- there's three types of demand measures. One is coincident peak. Usually coincident peak means you measure the customer's load at the time of some determined system peak, right? So you're coincident with a sytem peak. It could be at the distribution level. It could be at the system level. Then there's what I call the class maximum demand which is you look at each class and their hourly loads as a sum and then you determine what is the individual peak of the class and that takes into consideration the diversity of the customers within the class and how they used the energy, the kilowatts.

And then there's non-coincident peak which does not consider -- well, it considers diversity of customers a little bit differently, but what it does is it adds the individual peak of each individual customer across all customers to determine what is -- so it doesn't regard what it looks like when it's summed up. It just uses every individual peak to determine what the responsibility is for that class.

Now, I have to be careful because some people will say non-coincident peak and really mean class maximum. So whenever somebody says it, make sure you have them define the term because sometimes they are loosely thrown about and they seem something different.

MR. ELMER: But is it fair to say that non-coincident peak could be -- could also be the coincident peak time?

MR. ZSCHOKKE: It could. Probably not because you would assume -- if there is diversity of load among customers, my air conditioner kicks on at two o'clock and Tim's kicks on at three o'clock, you're going to see non-coincident peak being much greater than the coincident peak.

MR. ELMER: Okay.

MR. ZSCHOKKE: Okay? And just as a general point, as you go from the system in ISO New England and travel down the system, the diversity capability of the system is -- reduces, so on a given feeder, my feeders are serving primarily residential or commercial/industrial. You go down this street. The feeders serving this street are serving primarily commercial/industrial. Go to your home. The feeder on that street is serving homes. And most classes have -- everybody has a similar pattern. Think about residential getting up in the morning, getting ready for work, leaving for work, coming home at night and so the feeder, the customer will be very consistent. The diversity on the feeder will be much less on the distribution level. However, when you look at it as New England, diversity will be much greater because obviously they have what's happening in Maine versus what's happening in Connecticut, et cetera.

MS. WILSON-FRIAS: So what happens in one of those mixed use places where you might have commercial all on the bottom and then residences on top? You know, some of those newer developments that are sort of planned for those conveniences? Does that change the analysis?

MR. ZSCHOKKE: That's an interesting question. I have not seen a load curve for those buildings, although I'd love to, because I would assume the load factor would go up for them, but I haven't -- everybody's individually metered so -- but that's down to a very specific example. I could use that specific example everywhere. It's a question of how do you want to design rates.

Now we use postage stamp rates, very general classes. Part of rate design is do we determine different classes based upon characteristics such as that. If you build a commercial/residential mixed use and we determine the load factor to be different, how would you design a rate for that building and all its uses to get a benefit, or do we maintain different rates? But then you come into questions like that where who's paying the bill among all those customers and what are they charging the customers in the building. So that's a -- and are they regulated by the Public Utility Commission as a for sale for resale.

MS. WILSON-FRIAS: I guess what I was thinking about more was your feeder example. I was being way more basic than you assumed. But I guess I was still assuming they were all individually metered and everybody was still receiving their distribution service from National Grid.

But in terms of something where you might have a grocery store and several restaurants or some retail shops which would probably be open from, say, 7:00 to 10:00 or 11:00 and then above them have condo units, for example, that would be residential.

MR. ZSCHOKKE: Right.

MS. WILSON-FRIAS: And so that was sort of where I was coming from. I wasn't getting quite as deep as you did.

MR. ZSCHOKKE: Sorry.

MS. WILSON-FRIAS: But it raises a good point because you could theoretically rate design down to every individual customer. We don't. And so one of the things probably open for discussion in this docket will be where is that happy medium.

MR. ZSCHOKKE: It will be one of things we do discuss, right. So some jurisdictions, for example, you may have seen that Solar City is suing Salt River Project which is actually a cooperative. It's a muni/regional cooperative in Utah, I believe.

MR. ROUGHAN: Arizona.

MS. ZSCHOKKE: Because they just came out, the Board said $50 customer charges for everybody who has PV and so Solar City is upset and they're suing them for antitrust violations. So it will be interesting to see where that suit goes.

But part of it was they've chosen to charge a specific charge to a specific class of customers. Should we have a rate class for those customers with PV alone or is that undue discrimination? Should they be considered differently? How do we design that? So that will be something to consider as we go forward.

MS. WILSON-FRIAS: I think that's particularly true in light of the fact that the legislation specifically refers to net metering customers in terms of one of the things that the Commission is supposed to be looking at.

MR. ROUGHAN: And I think the issue with Salt River Project is they were driving their electric bill to zero so they weren't contributing to the system cost and then the allocation that that class had originally so, therefore, a new class was invented to provide the proper allocation.

MR. ZSCHOKKE: And part of that, I do encourage everyone, anybody who has it, and everywhere I go, and I probably have said this, to read the EPA integrated grid paper. It's on their website. It's free. I can provide a copy to anybody who wants it. It's a very good description of what's the value that the grid provides to solar, anybody with DG. It's easy to put solar on your roof when you have a strong backbone with the system, and there's five different characteristics that the system provides. I won't go into it here. But it also talks about Germany and what happened there, a lot of issues that happened with solar penetration without a plan around it. They just drove it in. And it then talks about what are the products that could be provided to the grid from distributed generation. So it's a really balanced approach that I think really helps people frame the discussion when you're talking about the value of the grid. And one of the things we will talk about over the next 10, 20 years, maybe not me, but one of the things that will be talked about is what is required of the grid in a distributed world? But that's far more than what we need for today. Sorry. It will be a fascinating discussion, though.

MS. O'BRIEN: You mentioned PV. Could you just explain what PV is?

MR. ZSCHOKKE: Photovoltaic electric. I have to confess in 1978 in the geography class in college, yes, I am that old, I did write a paper named Dreaming of Solar on Every Rooftop.

MR. ROUGHAN: Now it comes out.

MR. ZSCHOKKE: Now it comes out. So I'm not as bad as Abigail thinks I am. So unit charges. So we already talked about this. Customer demand and kilowatt hours. These three charges are obviously the standard. There are -- the demand can be per kilowatt, it can be per kVa. Like I said earlier, the engineers talk about kilovolt amperes, they don't talk about kilowatt hours.

MS. WILSON-FRIAS: So Peter, I get what the concept of demand charges are, but struggle with how they're set, what they do. I mean, I understand their purpose, but kind of -- how does it work? If I'm a customer who has a demand charge, how do you explain that to me?

MR. ZSCHOKKE: I explain that we build a system outside your door to serve you. If you're five megawatts, I know I need to have five megawatts when you need it. I have to have five megawatts when everybody else is using power, assuming some level of diversity and that's how I design the system.

MS. WILSON-FRIAS: So what are you designing? Are you designing five or are you designing ten?

MR. ZSCHOKKE: Well, a 13 kV line will hold what? Ten megawatts?

MR. ROUGHAN: About ten.

MR. ZSCHOKKE: Ten megawatts. So, like, I once was talking to a car crusher in Lawrence, Mass. about their demand which is five megawatts. They didn't use it a whole lot because they're a car crusher. He turns on the machine, crushes a car. They're done. And it's a massive unit, obviously, five megawatts, but they're taking up half the load on that line. Five megawatts. Now, depending upon how they use it, you could obviously schedule other things in and get them to use it when load is light, but that's a question of whether or not the customer wants to make that agreement. But when you're talking about cost of service and I have to recover that five megawatts from this customer because they need it, then obviously you'd want them to be paying five megawatts every month for -- whether or not they use it because they're half the load on the line potentially. So that's a real world case.

If I've got fixed assets out there, they have to be ready when you flip that switch and that motor runs and it spikes and then it levels off at five megawatts. So I have to have capacity there to serve you. And so that's the real question. It doesn't change if you don't use it on Saturday. It's still there. It doesn't change if you don't use it six days out of the week. If you use it one day, it's got to be there for you along with serving all the other customers on this line.

So that's what you need to -- it's not like, you know, you choose to buy capacity from Amazon so you'll pay the charge for the capacity that day and it gets delivered to your house. It's going to be there all the time as you are connected to the grid. Does that help?

MS. WILSON-FRIAS: It does. Is there any reason why you couldn't charge residential customers on a demand basis?

MR. ZSCHOKKE: No. It's really just a cost of the meter. Do we justify the cost of the meter through the efficiencies we could gain by having demand meters and having customers think about it. And if there's a large take up in PVs, I would recommend it. I think you'd find some interesting things. Because you'd want customers to manage the whole load in their house.

Right now my water pump, water conditioning systems, my AC works overnight in the wintertime, that's probably my peak load right there even though that's -- excuse me -- in the summertime. Summertime. That's probably my peak load right there because everything is running all the time and it runs from midnight to 5:00. But I don't know because I don't have a demand rate so I can't I don't have a time -- I want to have one of those smart meters so I can see my load.

MR. BIANCO: Would you need a smart meter to do it, though? I mean, smart meter, that's an IP address, right? You just need something that collects the data and logs it.

MR. ZSCHOKKE: You could have the

old load research meters that you get --

MR. BIANCO: How often does the meter read?

MR. ROUGHAN: What you need is an interval meter. That's an hourly, whatever interval it is, whether it's an hour interval. Is it a five-minute interval? So you need that. And then typically in order to provide useful data you want to be able to deliver it quickly to a customer so you need a meter reading system that then can then take the data and do something.

MR. BIANCO: If you wanted to have, like, time of use or behavioral type rates, but if you just wanted to have a demand charge like you do now, it's just an interval meter, right?

MR. ZSCHOKKE: It's two registers. One will register the maximum demand, one will --

MR. ROUGHAN: Well, there's two different ways. An interval meter can give you the hourly, daily data. A demand meter can be a meter that doesn't necessarily read at intervals. So you can have a maximum demand with another lower cost meter but you won't know when that occurs. You just know it occurred. I set the number to zero today and now when I looked at it 30 days later it was at six. So my peak was six, but I don't know when. You need the interval meter to tell you when that six happened.

MR. LeBEL: So if you have just a demand meter that tells you the maximum, you're only getting that customer's maximum demand. You're not necessarily getting a system peak or a local peak which could be what's driving the costs. So the interval meter gets you more information and you can do it based on different peaks, a number of which Peter discussed earlier.

MR. ROUGHAN: Well, we have that -- we have interval metering at our feeders, at our substations so we know what the feeder does as well. So we know when it peaks.

MR. BIANCO: You have to do that. ISO requires that.

MR. ROUGHAN: For our planning

groups to understand it, to design the system, yes, we have that, but we don't have the granularity in the system except for the customers over 200 kilowatts you get an interval meter because it's a demand energy rate and it's also got a time of use component so you need to know when you're using power. So any customer that's on this street that's over 200 kilowatts will have an interval meter and they can know when they hit their peak and how long it occurred.

MR. BIANCO: How often do the current AMRs that are out there, how often do they output data?

MR. ROUGHAN: They're always outputting.

MR. ZSCHOKKE: They're always communicating.

MR. ROUGHAN: When the van drives by, it captures the data.

MR. BIANCO: Why can't that be read, like, it's a radio transmitted? Why can't my phone just read that, collect that data?

MR. ROUGHAN: There are some vendors out there selling licensed itron radio technology and developed what they call ERT readers. So those are some of the wifi thermostats that we're doing pilots in Rhode Island right now in the Tiverton area, actually have an ERT reader built in and it can provide that data to the customer. But again, the challenge with that is you don't have -- the only path back to the system is the customer's broadband. The challenge there is the, A, the cyber security of that connection, right, the accuracy of the data. Can someone hack in and change the data? Plus customers change wifi providers or their router pickups. So now you lose some -- if you want to use that for us to bill on, it becomes very problematic. But for a single customer to see what they're doing, we've done pilots around that and tested it and we see they work. There's really no vendors really making those commercially.

MR. BIANCO: So nothing that you

could own that's just a data logger that just sits right next to the EMR, just logs that data?

MR. ROUGHAN: We won't be able to capture it with a van driving by. That communication system couldn't capture all those data points. It can only capture a single meter reading it sees when it drives by. It doesn't have the capacity to capture 720 data points -- 720 hours a month data points and download those to the system.

MR. ZSCHOKKE: And what the meter is communicating out right now is the total use from the last time it was read. So it's -- well, actually, it's actually the total use on the meter and then what happens is -- it tracks when it comes into the building. So you'd have to do the subtraction also.

MR. SCIALABBA: Could you just spend a minute and talk about minimum demand ratchets and what they are and why you include those in the rates?

MR. ZSCHOKKE: Why don't we go to the next slide. So this is a slide we wanted to set up an example of a similar customer of a similar size or customers with different load profiles. The easiest way, let's go back to my five megawatt example.

Let's assume I have two customers on the line, both five megawatts. One uses it 25 percent of the time. One uses it 100 percent of the time. Air separation plant, car crusher -- actually, a car crusher would probably be ten percent of the time. The -- so I've got two loads, same megawatts, line is full. So when I go and do a design on a demand, if I'm not using a ratchet, I'm going to charge the car crusher when they use it. Let's say they use it only in the summertime. And I'll charge the other customer for five megawatts every month. Well, obviously, if I'm -- if my total cost of service is based upon that one line, the customer who's using it every month is going to pay a lot more when I design the rate than the customer who only uses it in the summertime. Or you can think about, for example, ski areas in the wintertime.

So the reality is now we go back to the fairness. Is it fair for the customer using it all the time to pay a majority of cost or should we actually have a customer -- the other customer because they are 50 percent of the line, that's why we built it there. So what's the fairness for the other customer? So a demand ratchet actually tries to address that fairness issue of customers who use it all the time with a consistency as opposed to customers who are much more sporadic with their usage in terms of when they use it and how much they use it so that it doesn't burden the customer who's using it all the time with all the costs but it actually fairly allocates the cost of the distribution system or anything else as appropriate to those customers who are incurring -- who are causing us to incur the cost when necessary. Is that a healthy explanation?

MR. SCIALABBA: Right. So if I have a car crusher, or in Rhode Island we call them body disposal units, I run it for

15 minutes and I -- you know, I create my peak demand, right? If I don't run it again, that's going to set my demand for the year basically, isn't it?

MR. ROUGHAN: A percentage.

MR. ZSCHOKKE: I think the rate is 75 percent of the maximum demand, yep. But that's to reflect the fact that that capacity has to be reserved there for you in some sense. We have to factor that in when we look at the customers on the line when we're doing -- when we're doing our designs of the system.

Now I compare that, for example, to second feeder service rates which we have. We have since the late '90s had customers say I want a main service and then I want to have a dedicated second service that automatically comes on when the first service goes out. They're paying a full distribution charge on that, demand charge on that based upon the amount that they've asked to reserve. And what we do in planning is we assume four megawatts -- we assume that four megawatts is committed to that customer on that other line. So when we're doing our planning we say okay, do we need capacity in an area? Well, if that four megawatts is committed, even though it's not being used all the time, we don't consider that as available capacity for system planning.

MR. BIANCO: Are utilities the only industry that still look at this balance? It seems like every other industry has moved to subscription based rates for, like, car taxes, cable, telephone, exercise clubs. I mean it's all -- nobody pays or people don't seem to prefer to pay for how much they use. Is this the last industry that really worries about usage variance?

MR. ZSCHOKKE: Well, I think even the phone industry worries about my usage. They just don't tell you about it.

MR. BIANCO: That's what I mean, right? They find a way that they can convince customers it is an equitable rate, and I don't watch most of the channels I get on cable, but I pay a certain rate because to get IFC, I have to get that package and I live with it.

MR. ZSCHOKKE: But you asked a great question because in my mind, having done rates for all these years, I think that's the future. So the future to me is more of an insurance. What do you want from the system? How much capacity do you want? That's what I'm going to give you and -- but you need to be mindful, I'm not going to give you any more than that.

MR. BIANCO: But we can always create more services for you to subscribe to.

MR. ZSCHOKKE: I can obviously charge you a buck 50 a minute when you overuse the amount you agreed to. I could have some higher -- a much higher charge that will make you think twice about using it. Mark?

MR. LeBEL: I think you find that the vast majority of things you buy every day are not on a subscription basis. Buy a can of coke. You could buy bigger bulk, but you pay for your lunch, you pay for all sorts of things on a per unit basis. I mean, I think you just defined the universe in an overly narrow way.

MR. BIANCO: I guess in a services industry, right.

MR. LeBEL: Lots of things you buy on a per unit basis.

Ms. ANTHONY: I think I was reading an article, but it might have been somebody else who was saying what they're finding is these subscription services, the health club is there, but people kind of hate it and when given the option to switch, like a punch card where you pay per visit, they would prefer to use that unless they are a heavy user. So --

COMMISSIONER DeSIMONE: That depends how much the monthly fee is.

MS. ANTHONY: Right. If it makes economic sense for you.

Commissioner DeSIMONE: And Planet Fitness is $10 a month.

MS. ANTHONY: That's a good deal.

COMMISSIONER DeSIMONE: To bring up today's point, I mean, Cox, anyone who has Cox is paying for a landline which they're probably not even using.

MR. BIANCO: I don't have a phone.

COMMISSIONER DeSIMONE: Every month.

MR. ZSCHOKKE: So as you see, we can have a healthy debate as we debate what the distribution company will be required to do in the future and how we recover the cost of that and in what format. I think it's going to be a portion of on demand, it's going to be a portion of subscription based. I look at it as insurance. What do you need out there for us to serve you? That way it will be much clearer to us what we need to reserve for you and we need to design.

MR. ROUGHAN: But it really boils down on the allocation, right? Once you've set the revenue requirement number, now you've got to decide the allocation. Is it a fixed fee by customer size just like cable? Pay $135 a month whether you watch one second of it or whether you watch 120 hours. Do we go that dramatic in allocating costs or do we continue -- I mean, that's really the debate here is the allocation of those costs just like the ratchet. If you get rid of the ratchet on demand charge, what does that really mean? It means that you'll have an incrementally higher demand charge to recover those costs that you already recovered. So that's the balance really.

MR. ZSCHOKKE: And it's a perfect -- the subscription model and what Netflix is doing with House of Cards and other things, will people continue with the subscription or will they go direct to a provider and avoid all the other stuff and just pay for the cable which will be a subscription -- or the internet, I should say, which will be a subscription.

Again, it's a heavy fixed cost business so they have a lot of investment and they want to sort of guarantee their revenue stream to pay off that investment. So they look at these subscription models as a way of recovering the cost in a competitive industry, and that should certainly be considered here for either one class or many classes.

MR. LeBEL: Netflix and gyms are not considered a public service that impacts a whole range of other policy areas. You have to think about if you go to a subscription model, we lose a major part of our incentive for energy efficiency and things like that. The regulated utility industry has a much different consideration than a Planet Fitness or Netflix.

MS. WILSON-FRIAS: I think, too, though, there's a debate whether the internet is a necessary service right now, and there's questions about whether or not people should be able to pay more for faster service and somebody else gets slowed down. And so there's the debate of which services are actually becoming necessary services in order to get a job. Cellphones. Several years ago cellphones were a luxury and now they're subsidized through the lifeline program for certain classes of customers. And those are packaged services and subscription services. And so I think that the debate is not inappropriate, particularly where, as I mentioned earlier, we've got two laws that have two ways of getting to presumably kind of the same thing.

MR. ZSCHOKKE: I think, Mark, you're assuming that if it's a subscription service with a fixed fee, there's no incentive for energy efficiency, but in reality it depends how you design it and it depends on the requirements to ensure that the value of energy efficiency completed is shown in the customer's bill. Anything can be designed and figured out. The billing people will hate me for this, but I've never allowed billing get in the way of doing the right things for customers.

So I think we shouldn't step away from it, thinking it will end energy efficiency as we know it because one of the things I considered in doing this is how does it incent continual energy efficiency. But I also want to point out that New England's problem is I think we're really good at energy efficiency but we now have to get a little bit better at demand management because that's what's driving the heavy costs in the system.

MS. WILSON-FRIAS: Have you ever seen, like, block rates? Like on the gas side we've got a certain rate for a certain amount of usage and then it changes as you go to a different amount of usage. Have you seen that on the electric side?

MR. ZSCHOKKE: Oh, my favorite clause when I came to NEES in the old days was, "Notwithstanding, the following shall apply." It took me, like, six months. What the hell does this mean? Everything is before the tariff. This is what you have to charge.

Yeah. California has inclining block rates and they're now having a debate about it because they've had legislation that actually said all the adjustments for decoupling have to be applied on the tail block of the rate which meant that as people put solar on their roofs, they avoided the tail block; they weren't getting the revenue from the adjustments. So now they have legislation that says we'll reconsider that and allow recovery of revenues over much more. But -- so that's basically charging customers for more usage the higher the usage.

The problem with that rate is what if I put in an electric vehicle? And I buy an electric vehicle and my usage goes sky high and I go into the tail block rates. I'm paying $.30 a kilowatt hour. Well, I'm not going to buy an electric vehicle. There's other reasons why I won't buy an electric vehicle. But the reality is you want to design a rate that reflects the cost in the system. It doesn't reflect the cost in the system.

Block rates came about because as

the industry grew in the '20s, '30s, '40s, '50s, '60s, the more people used, the next generation plant was cheaper, the next transmission line was cheaper. So the average costs were following with innovation in the industry and so you were reflecting that in the declining block rate. Now that we don't have that decline in costs anymore, you really want to reflect the time varying element, if you're going to reflect anything, so that customers will use it at different times. Of course, understanding that if you actually come to a flat load profile policy, the cost will be the same 24/7.

MR. ROUGHAN: The important fact in Massachusetts, both the residential and the small commercial/industrial rates are inclining blocks. So a certain bunch of them, the first 600 kilowatt hours, the residential rate costs you $.05 a kilowatt hour; everything over that costs you $.07. And the same with the C&I.

MR. ZSCHOKKE: We're trying to get

rid of that.

MR. ROUGHAN: Exactly, but to Peter's point about the net metering, it's actually causing people to get paid more the more they actually self generate, so it's a perverse -- it was put in place to promote efficiency, but in point of fact it's been perverted by the net metering structure in Massachusetts that actually pays people when they generate much more than they would normally, so that would be a challenge for block rates in general.

MR. MUSHER: Peter, you may be trying to prove a different point, but earlier you mentioned that the peak is -- it used to be peak year and now it's more hump year. You just talked about we're trying to -- the big problem is demand management. We're able to make a flatter line that's better. I mean, aren't there some benefits to make it a hump year than less spiky?

MR. SCIALABBA: I think you were saying it's more peak for a longer period.

MR. ZSCHOKKE: The problem is a few

years ago Baltimore Gas & Electric offered a demand management program to customers for their air conditioning and they paid customers 250 bucks to set up this program which allowed Baltimore Gas & Electric to control their air conditioner up to 12 hours a day. And then it went to 100 degrees a couple summers ago for many days and they did and it was a bad idea.

MR. BIANCO: Pete, can I ask, but in this case -- because I have an interesting point. Was the control just on or off or could they control the temperature?

MR. ZSCHOKKE: The control was on or off.

MR. BIANCO: So that's good for handling a peak, but if you have a hump, perhaps a better demand response opportunity is to just deal with a couple of degrees of temperature from a wide range of people rather than an on/off situation.

MR. ZSCHOKKE: If you have a hump, what you need to do is dispatch. So you're dispatching X amount of air conditioners this period of time and then another same amount so you flatten the load. So you need a whole bunch of air conditioners so they can control their usage when they come on the system. That's the way I would see it.

COMMISSIONER DeSIMONE: What happened in Baltimore?

MR. ZSCHOKKE: If you would like to see the curve, I have it here. This is the hump. It starts growing at about eight o'clock, ten o'clock in the morning and it goes all the way out to ten o'clock at night. So if anybody wants to see the curve, it's a -- the hump exists. This is from '08 through '10.

MR. ROUGHAN: I think what Dan is talking about is the peakiness versus the hump is still on those hottest days. It's not every day of the year. Today is a perfect day where there's no -- the loads are probably --

MR. SCIALABBA: I think the question was why haven't you portrayed the hump as a negative, and Danny said well, why isn't that beneficial, then, because I think you're saying the peak has been reduced, right?

MR. MUSHER: The spikiness.

(BRIEF PAUSE)

MR. MUSHER: I mean, I know that you're talking about -- there's many different things that drive costs and many different types of costs, but if it's a -- having a very spiky peak drive costs, then I would assume we're trying to level that peak, and even if it's higher -- the overall level.

MR. ZSCHOKKE: So I have another curve right before this curve on the same slide presentation that actually shows the load duration curve for the same years. So I have a hump for the days that are peak, but when I look at the load duration curve which sorts loads from highest to lowest, I still am only looking at 100 to 300 hours a year of load of 5,000 megawatts of requirements in New England. So I'm using

5,000 megawatts out of a 26, 27,000 megawatt peak system for 300 hours a year, a really hot summer. That's it. That's -- when I talk about reducing the peak, that's what I'm talking about.

Now, to do so I have to take the hump and lower the whole thing. Because if I only get six hours of the hump, I still have -- I've got to worry about recovery for customers during the period. I have to worry about -- you have to worry about -- and are you going to create a new peak because of that. You have to worry about do you actually get it. So I have this running debate with Ahmad Faruqui of Brattle Group, and anybody who knows him, he's like the TVR angel. He'll sell it left and right.

I say, "Ahmad, I understand that customers will save money on a time varying rate. Has anybody done the study to say that when they do that we actually save money in the system?" And I thought he would say yes but he said no. I'm, like, "Well, wait a minute. So did it work?" And

I had this debate in the smart grid pilot because my fellow utilities were like, "Well, we're just going to calculate the savings to customers." How do you monetize it to the back end of the envelope? Did you reduce the capacity requirements? Did you reduce the high cost of energy during those times? Did you save any money? Because that's what's going to pay for the meters, pay for the infrastructure to actually do this stuff. You save money on the system. But that was a bit stunning to me. He said Baltimore Gas & Electric is the only utility because they have a requirement by the Maryland Commission to calculate the actual savings before they'll get cost recovery for their metering system. And I haven't seen a finished study yet. That was a bit stunning to me that nobody has done the after forecast to say did we actually get what we thought we were going to get in terms of savings.

But when I look at it, I want to see the savings. I'm not going to do it just for giggles to give customers a new product. You're doing it so when the customer saves, the system saves and you create greater efficiency in the system. If I just reduce some of the hours in the peak but I still have a peak at the same level, well, I'm just going to make the load factor worse. So that's the challenge that we face in this industry given that it's a hump, but we're still only talking -- we were talking 300 hours in 1986. Now we're just talking about 300 hours a year in 30 days in the summertime. So that's the difficulty that we have. That's a lot of history.

MR. BIANCO: It's very interesting. So was the problem in Baltimore that some air conditioners were dispatched for 12 hours and your peak dispatch would have been the same if you had a narrow hop-in of usage but, in fact, it was this hump so some folks ended up being dispatched for longer than they could tolerate?

MR. ZSCHOKKE: Right, and they didn't go to the mall. I think it impacted the elderly more than anyone else because they didn't have the mobility. But it was not a pleasant summer for them.

MR. BIANCO: So we've had in Rhode Island programs with the NEST thermostat already offered by Grid and there are other smart, I guess if you want to call them, thermostats where the control of the temperature would not be on/off but would -- what I was getting at was a few degrees. Are you aware of another place where that type of dispatch has been a little more successful for dealing with the hump rather than -- because the on/off dispatch, I mean, while it can work, it's obviously -- you need a fewer number of people to subscribe for you reach a tolerance more quickly.

MR. ZSCHOKKE: I haven't, and nobody has done the studies. Did you save anything on the supply side? So I've seen no studies with respect to anything that is more effective at it or whether or not they've actually done it. So we hope to do it as part of this -- we won't be doing the dispatch. And I asked about that. And everybody involved in establishing a pilot told me they would shoot me if I said we would dispatch customers. So we won't do it as part of the smart grid, but we'll at least have a lot of information about how it affects how long we call the price, the high prices, what customers do and then what happens when we stop calling the high prices and the customer returns. And so we'll have some good data after this summer and then the following summer from that study.

MR. ROUGHAN: The Little Compton pilot does cycle their energy. We have a central AC and window control and this summer is the summer we expect to really call events. Last summer we tested it a couple times, but we really didn't call events, if you will. But it is a cycling thing. The customer fatigue -- because the other problem is when Peter talks dispatch he means you need a group of customers that are your noon to 2:00 p.m. customers that you're going to dispatch and you need a separate group that's 2:00 to 4:00 in order to reduce that customer fatigue piece. And it has to cycle. You're talking about raising temperatures a couple of degrees.

But you run into conditions, and Southern Cal. Edison ran into the same problem. They had emergencies, lost a major substation transformer. They had no choice but to actually shut people off to keep the lights on in the area, otherwise, there would have been a huge outage. And shortly thereafter everyone canceled their subscription to be part of the program because they said that was unacceptable. They still had lights. They could still get the internet. They were just sitting in their underwear in their house it was so hot. But the point was so even when you use the control for an emergency to keep the lights on for people, you still lost the ability, the future ability to use it because of customer fatigue. So that's another piece that has to be sorted out with the pilots. What are customers -- what's acceptable and where -- you can't propose a program that no one will sign up for. And that's the other challenge. We'll get into that at a future meeting. I just wanted to make clear that in here Rhode Island that's the plan.

MR. ZSCHOKKE: Having a large enough customer base to have diversity of demand response is very important to us. Some customers will do it some days and other customers won't do it other days. So it's always the fatigue issue.

MS. WILSON-FRIAS: Before we get into some examples, why don't we take a ten-minute break and come back at 11:30?

MR. ZSCHOKKE: Sure.

(RECESS)

MS. WILSON-FRIAS: I think our goal is to try to be done by one o'clock, and I really want us to try to get to sort of the discussion -- I really want to get to the part of the discussion on the goals that can be encouraged through different rate designs, customer behavior, that sort of thing. So as you're working through the examples, if we could talk about sort of what behaviors and the examples might incentivize or what goals could be met through the different rates or different rate designs and that would give the opportunity for the other participants to sort of talk about things they might be thinking of in terms of the goals and behaviors. Okay?

MR. ZSCHOKKE: And everybody, as before, feel free to chime in whenever you so wish. So first off, we wanted to talk about different rates for commercial, industrial and residential. Very simple. The two load profiles we have here, Customer 1, Customer 2. This is for a demand based rate and we wanted to show the difference of charging them kilowatt hours versus demand charges.

Using the prior thought, you know, obviously, there's a large customer with spikier peak and there's another customer with a high load factor that has a very low peak but they use a lot of energy. And the amount of energy, if you turn to Slide 7, 20,000 kilowatt hours. You have one customer that has a 46 -- I don't know how Jeanne came up with .1 kilowatt demand, but she did. And another customer who has a demand that's almost three times the size of that but uses the same amount of kilowatt hours. So again, their load factor is much lower than the other customer's so -- and keep in mind we build to serve the capacity needs on this grid. We don't -- the energy gets delivered as it gets delivered through the system. The variable cost there is the amount you need to run the generator, what it costs to run the generator. It's not like solar. Once you build it, you get the free kilowatt hours after you put it in there. So the variable cost there is zero. Coal would be different, nuclear would be different, et cetera, and the market prices will be different based upon natural gas prices.

So when you look at these two

customers, we did a kilowatt charge of $5 and we said so your total revenue requirement is $4,000. So we said okay, well, how will we recover the costs from these customers. They both use 20,000 kilowatt hours. So the smaller customer pays 1,760 a month for their bill. The larger customer pays $2,200. I mean, the larger customer is paying more. Certainly it's not more relative to their size. If you do the ratio of 147 to 46, you obviously would not get a -- there's not a three to one bill, however, they are paying more on a demand charge but they still have to pay a bit on energy.

So if you're talking about -- in this situation if you're talking about trying to incent the customer to lower that demand, you want to have more -- and increase their load factor, spread that load out, you would want to have a higher -- a demand charge that would actually flatten that demand out so they would actually think about that.

Demand charges do work. I mean, back when we had demand charges much higher than they are today in Massachusetts, we had customers -- they would actually start at 6:00 in the morning because it was a non-peak demand charge and the on peak period started at an 8:00 a.m. So they would turn all their machines on at 6:00, incur a spike in demand so now their load would be flat because all the machines were on for their industrial processes and they brought all their staff in to do that at that hour of the day and that way they saved money to stay in business in Massachusetts by converting how they did that. You go back to Bonbright's principles. They wanted to have that rate in effect all the time because they had changed -- they had made an investment in their systems to do that. When restructuring came along and that demand charge became much lower, they were not as happy with the results.

MR. ROUGHAN: Just a point to mention. We saw a dramatic change in customer behavior upon restructuring when demand charges went from the 10 to $12 numbers we had in Mass. and Rhode Island down to 3, 4, $5 we have now. There was a significant change in customer behavior due to that significant decrease in demand charges.

MS. WILSON-FRIAS: So do you think the demand charge was sending an appropriate price signal to those customers?

MR. ZSCHOKKE: Yes, I do.

MR. LeBEL: Was that because the demand charge also included transmission or capacity charges, or was that just distribution?

MR. ROUGHAN: Just distribution.

MR. ZSCHOKKE: Before restructuring it was designed based upon a combination of the three, yes. However, it doesn't mean that generation couldn't still be charged on demand. It's just not how the wholesale market works.

But yes, when you think about the system efficiency and the fact that, as I stated earlier, that load factor in the New England system has been falling for over a decade since restructuring and therefore the unit costs are going up, the amount generators have to charge goes up to get -- recover their fixed costs for their plants. Then you really want customers to think hard about how much demand they put on the system that needs to be served as opposed to how many kilowatt hours. You really want to have the high -- and that's always been a concern of the industry. If you want high capacity utilization on the assets so that you can have fewer assets in service to serve the system, then you really want customers to think hard about how they manage their demand to lower it as much as possible while being as efficient as possible every other hour. So yes, I think it's -- for this industry it definitely is a perfect price signal that is appropriate.

MS. WILSON-FRIAS: Now, are there other customers who maybe couldn't manage their demand as well? For example -- or a time of use rate wouldn't necessarily work for them? I'm thinking -- Dunkin Donuts may not be the best because I don't know where the peaks are, but they're selling coffee between probably mostly between 6:00 and 10:00 and then they probably have --

MR. ZSCHOKKE: The car crusher. So the car crusher is a real example. It was an Italian family, owned a car crusher in Lawrence, Mass., and they would run the crusher on the weekends because they didn't want to pay the $10 demand charge because it was five megawatts. It was a $50,000 bill. I don't know what was special about this, but a group of Japanese came to see it and actually agreed with the Italian family to pay the demand charge because they wanted to see it run. So I don't know what was so special about this, but I did park far away.

MR. BIANCO: Where did you say it was?

MR. ZSCHOKKE: Lawrence, Mass. Tamburello Salvage. They're a really nice family. So we went in there. They're, like, "We want to do something." And we had just gotten the realtime pricing rate approved and it was four price structures. All the demand was energy based and it was really focussed on two price periods. You know, price went up to $.84, hourly prices.

We go to talk them and they're, like, "Oh, all these numbers. All these numbers. I don't know if we can do this." And I'm, like, "Look. It's very simple. For 32 days in the summer we're going to call price time one and two, the highest prices. Don't use it. For all the other days we'll call three and four and on those days you use as much as you want." "Oh, okay." So they actually increased their usage by a factor of ten because we moved their load to the lower load days and so therefore we made room in the system. They could use their five megawatts on those days. When we set the high prices, they weren't thinking about the $.84. They would be, like, Type 1 and Type 2 days. They just didn't run their system. Told everybody do something else. And you think they didn't pay attention. Well, they increased their usage by about ten times. And when we -- sometimes when we called Type 1 or 2 days, they actually called up and said, "You sure you can't make it a Type 3."

COMMISSIONER DeSIMONE: They must have had an urgent customer request.

MR. ZSCHOKKE: Body disposal unit needed to be operated quickly. So -- but they're really nice people and it was really an example of a complex rate being explained simply for the customer to take advantage of. And they got it. They used it and then we went to restructuring and it went away. So they weren't really happy about that.

But the reality is, I say this a lot, but we all think customers are big blobs in these groups of residential, commercial, industrial. The reality is we all drive different cars. We're all wearing different colored shirts. We all live different lives. And we need to consider that when we're designing rates and when we're talking to customers about rates, what can work for a customer and yet does recover the cost for the system? But that was a perfect example of somebody on a demand charge who wouldn't use it and was paying attention to it and would actually benefit from being on something like a realtime pricing rate.

Now, the opposite example is, you know, a firm, high tech military contractor firm who -- the facility manager doesn't run the shop but actually the engineers do with a 15 megawatt heater to test components, and they looked at me with those $.84 and said, "No way. I need a flat cost per kilowatt hour. I'm not doing this because I don't control anything in this building." Or an extrusion plant, plastic extrusion or water cleaner -- water purifier plant continual running processes. They can't shut them in the middle. Our friends down at Quonset Point, continually running processes. They can't shut. They all said no.

So the type and design you can use

for a customer, those customers want a demand charge because they want to manage their demand and then let their high load factor run through because if you give them a kilowatt hour charge, they're moving out of state because it's too expensive for them to stay at such a high load factor unless their delivery cost is so expensive that it outweighs where they're located. So you have to balance the mix of design with the types of customers you have.

MR. ROUGHAN: But there are customers who are purely demand charge, are more weighted to demand charges. This building here, right? You can't really move the air conditioning load on a hot summer day any other time. However, if you work a series of programs that are available in the state through efficiencies and all the rest of it and move toward more to a peak load management, as Peter talked about, thought process and you did some work in the building like this, so you could at least level out your air conditioning load, then you could then -- because you would turn yourself into a higher load factor customer than you otherwise would be. A customer -- whatever the AC is, it is. And at the end of the month they go, "Oh, my God. They've gone crazy." Whereas if they actively worked with efficiency programs and actively worked to manage their demands, which only a high demand charge will do, that's when you can get those customers to change their behavior.

MS. WILSON-FRIAS: This could be a really crazy question. Could you create a rate that itself would incent customers to do energy efficiency? So what I mean is if you had some sort of rate structure where if a customer did a -- spent a certain amount on energy efficiency over here or entered into certain programs, they could actually see a financial benefit on the bill, not just this assumed life savings type --

MR. SCIALABBA: They're already getting the benefit through the results of the program.

MS. WILSON-FRIAS: I know, but --

MR. SCIALABBA: It would be double.

MS. WILSON-FRIAS: I was trying to think -- something you just said, and I can't pinpoint the word you just said. What you just said that made that come into my head.

MR. ROUGHAN: Demand manager. And we did have a number of years ago I think, Peter, in your days down here the ice storage rate.

MR. ZSCHOKKE: IES.

MR. ROUGHAN: Where we had thermal storage rates that would charge people at night to make ice, and in theory, it was really, really interesting. It really works. In practice it was always difficult to make happen because you never got enough of a footprint for the massive amounts of ice storage you really needed. There was always an argument with the architect engineering firm, because I ran a bunch of these programs myself over the late '80s. They'd always fight you over the last tank you needed. And the worse part about it, that day you needed that last tank, all your savings evaporated because now your air conditioning came on during the peak that the ice storage was designed to prevent. So that was our challenge with those. So we did pilots down here. We did them in Mass. at the time. And unfortunately, in virtually every case we didn't have enough storage at the end of the day because the end use customer wouldn't give you the room in the building. It didn't work.

Now better engineered systems are available today for that type of allocation. I mean, for example, they make a ten ton unit that will take up two parking spaces outside this building here that could air condition probably a small part of this building, probably use all 50 tons in this building. But what I'm saying is that it would be -- that higher demand charge would incent people to look at those opportunities. And if we had an opportunity where the efficiency programs actually had a much higher value stream toward peak load reduction or management and still value the energy savings over time, the combination of the rate and those programs would really work well with a concerted effort to get customers to move to that over time.

MR. BIANCO: In the previous example and in this example you had said that some of these plants, for example, need to run at a steady load for a certain amount of time, and the idea is I don't control anything in that plant.

MR. ZSCHOKKE: That's --

MR. BIANCO: That's a certain kind of customer and this is sort of the same thing to me where actually they might not be able to -- it's not interruptible but there could be an investment opportunity to put in more efficient equipment that would have lower demand. What they're trying to tell you is I see better places to spend my money. And even if you could work it out, I always worry that it's hard to get those dollars in there anyway. We have it in every single thing we're doing in this industry. It's like the last dollar people want to invest goes to this industry.

MR. ZSCHOKKE: We have to recognize customers make their own decisions. Abigail hosted a wonderful event in the first two days and I was -- it was hilarious because the toaster was -- not only was the conversation the highlight, but also the toaster was the highlight because I never realized I needed to have an elevator in my toaster, but there it was. Instead of a mechanical lever, somebody put an electric motor in there so the toaster would just go down and come back up when it was done. I was, like, seriously? But it's a real world example of even though the foundation is concerned about sustainability and, you know, the environment, things like that, here we had a new electrical toy using more electricity. Disgust. Did we need this? I needed it at that time because it was the only toaster available. But the reality is we do have to keep in mind that customers will make decisions on their own. That somehow what we do -- we may have the best of intentions. I talked to a lot of customers. Many said no, some said yes on interruptible credits and realtime pricing and things like that. It makes it difficult. We never had 100 percent takeup of anything on that stuff.

MR. BIANCO: But I'm saying so it's not just designing rates that incents something, but that incents it in a way that it's more attractive than other places to invest your money.

MR. ZSCHOKKE: As technology changes and we can make it more invisible for the customer, like we talk about the air conditioners --

MR. MUSHER: Make more what? What invisible?

MR. ZSCHOKKE: Demand impact, whatever control happens at their facility, whether it's commercial/industrial so that they can continue going about their business in the comfort and convenience that they want, then you will be able to spread it to more and more customers. Because then it's no longer a question of shut everything off. It's a question of how do we manage this all the way through in a way that you maintain your services that you want and we get what we want which is more management of the load across the whole system or across the feeder. So my dream is that we do contracts with customers and we then use the control mechanisms to dispatch what they do in their house and their business to flatten out the load as much as possible. But that's a dream.

MS. GOLD: What was that?

MR. ZSCHOKKE: Imagine. So what would be a convenience to customers? Customers want to know what their bill is every month. They want the same bill. Every commercial/industrial customer, give me a budget. Residentials all want a budget. They only come and complain to us when the budget -- costs go really high. So you sit there and say it's 200 bucks a month every month, or 100 bucks a month, whatever it is based on the customer's usage, residential. But you have to agree that I will put in a control in your HVAC and I'll agree that it won't go any higher than three degrees above your favorite temperature and it won't go any lower than three degrees cooler than your favorite temperature summer/winter and I manage that demand all the way throughout the year and you agree that we will do that.

But what do I need? I need a risk arbitrage mechanism in the back office. I need -- to manage market risks, to manage what's happening on a daily basis and I need a whole lot of customers to make this -- give it the volume that will allow me to manage all these customers across a footprint. That's my dream.

MS. GOLD: It's good to know.

MR. ZSCHOKKE: When you buy bread, that's what happens. The bread manufacturers, they think about the wholesale price of wheat and oats and they figure out what they need to buy -- to make bread. You never talk about the short-term price for wheat, oats in the Chicago trade.

MS. GOLD: Sometimes I do.

MR. ZSCHOKKE: You buy bread.

MR. BIANCO: So is your dream model, then, a little bit different than, like, I have a smart refrigerator that's earning me money while I'm out at work? Are you trading power and energy for me on the system?

MR. ZSCHOKKE: It's consistent with it. It's a question of whether or not the customer does it or whether a third party does it for the customer. It's all invisible. The customer will get whatever value that is in a lower bill or some fixed price or whatever. But I always question whether or not there's enough margin in the business for somebody to build all that infrastructure to do that. So that's a different issue. Sorry. I digress.

MR. ELMER: It seems to me, though, that this issue of visibility to the customer versus invisibility may come up later in this rate design docket, and I'm quite curious about your goal or idea of making it more invisible to the customer rather than more transparent to the customer. Can you say more about that? It sounds counterintuitive to me.

MR. ZSCHOKKE: Well, it becomes transparent to the customer in terms of here's what I'm going to charge you. Now that you've said okay, here's the keys to my electric usage. Here's my services and convenience. Because think about it. When we talk about -- we don't open the refrigerator and when it kicks on we -- the circuit closes -- a circuit opens and you're using more electricity. No. You just get a beer, right? You get a glass of water. You get a glass of milk. You don't even think about the fact that it's a refrigerator. And same thing with air conditioning. I want to be cooler. I want to be warmer. I want to watch the TV. Nobody is thinking about the circuits and how they work.

They're thinking about the services.

So if you write a contract for services which is what customers want and you say these are the services I'll guarantee. The more services you want, the higher you pay. But they say -- but -- if they're willing to do more, they get a lower price and it's fixed.

Now, I, the seller, have the risk. I've got the risk that if you use 100 watt incandescent bulbs everywhere, I'm going to be paying a huge cost and I'm not going to make my money. So I want to put in the energy efficiency. I want them to agree that they'll use energy efficient bulbs. I'll go to their house and I'll replace their energy efficiency bulbs with new ones because I want to make sure I can make as much as possible on this hundred bucks or two hundred bucks a month. The hilarity is that's what we did at the beginning of the business. It was $.10 a light. We charged by the usage. We didn't have meters.

MR. ROUGHAN: There's another part

of the transparency and that's -- my mother is in a smart grid footprint in Worcester and I said, "Oh, cool, ma. You got a cool new meter. You can do this, dah, dah, dah." She just looked at me and said, "Timothy, I want nothing to do with that." I said, "Well, what if we manage your use for you, your services for you and you never saw it and you stayed cool and warm and all the rest? And at the end of the month you saw some notation that said because I did this, I'm this or I'm that." She said, "Oh, that's great." So when you talk transparency, it's also for those customers who would prefer a passive approach who aren't interested in playing with their smart phone all day long, because in order for all these savings Peter is talking about to happen we can't just have a handful of customers participate in this sort of thing. We need 50, 60, 70 percent of the customer base to be doing something on those peak days. Whether they know they're doing it or not is separate. But in order to really drive the savings that have yet to be identified in these future costs of electricity, the commodity side, you need massive chunks of load. You need the 1,900 megawatt hour peak load in Rhode Island to be 1,650, 1,400, not to go from 1,900 to 1,892. You're not going to see any change in pricing with this small incremental change. You have to see a 3- or 400 megawatt drop on those days. That's potentially where the savings are much more realizable.

MR. ZSCHOKKE: I go back to my salvage company example. You weren't talking to people who had Bachelor's, Master's or PhD's. They were salvage people. We take cars and we crush them and we sell the stuff off. So it's very -- but they were crafty enough that if you gave them a simple example, they would understand what to do. And we took something which most -- we would claim as more sophisticated customers, people with the Bachelor's, Master's and PhD's said no to and said think about it differently and they took it and they ran with it. So it's a -- when I think about that example, I think about how do you get to each and every customer in a way that will make them provide the opportunity that we're trying to get? And that's really what it's about.

MS. PENNOCK: So you kind of mentioned your ice storage example, that technology now is different than it was in the '80s, and so perhaps this is a -- whether this particular technology or others, so how as we look at rate design, how could you/does it impact what technologies are available or could be available to make these things work in terms of transparency, in terms of customer choice and all of those types of things? Does that factor into your thinking, or is it mostly that we talked about before peak load management process is one lens to look at rate design?

MR. ZSCHOKKE: It depends on your goals. You want to design rates to make the system more efficient so that the costs are lower for customers than they would otherwise have been. So in our case that means you want to lower the per unit cost. You want to lower the capital costs necessary in the future to serve customers. So you'd want to focus on demand management. You'd want to focus on, you know, those elements that are creating the spike, that 300 hours that we have, the capacity requirements in a year and lower that down.

It doesn't mean that you don't want to focus on energy efficiency and other hours, but it's a balance. So you've got to balance in the equation of how to lower the demand at the peak time and then how to continue to get people to change light bulbs at night and be more efficient in the wintertime so that you can use those hours for other things.

MR. MUSHER: So if you said -- I'm just trying to figure out how this example -- and it sounded to me like a subscription model example to me that you said -- if National Grid came to me and said, "We will guarantee that you will pay $100 on your bill every month. That will be your plan. We have to put in the necessary controls and you have a -- you can choose a two degree maximum above or below or five degree maximum above or below and that will give you a cheaper plan or more expensive plan. And as part of this you have to change -- you have to do all this direct install stuff like putting in high efficiency light bulbs." That makes sense to me, and maybe that would be compelling. Maybe I want to sign up.

But how does it work -- I can see how it would apply to the distribution part of the bill, but would that relate -- how does it relate to the competitive -- if I'm going to a third-party supplier? Maybe I'm getting into too many details right now, but I'm trying to sort out how that would work.

MR. ZSCHOKKE: Well, you asked the question who should do it, the distribution utility or the supplier and that's -- that question I don't have an answer for right now because we are in a competitive market so no supplier has stepped up to do that, but they could.

MR. MUSHER: But there's not a competitive market for the distribution part of the bill.

MR. ZSCHOKKE: Right, but -- be that as it may, no one stepped up to even -- no one has called us to say, "Hey, can I make a deal with you guys to do something?"

MR. ROUGHAN: You also have to remember that the bill is -- right now it's, obviously, 60 percent commodity. And so you still have that variable. You still use that. So there could be -- the rate could be changed where you still need the meter data. So you can have a commodity, if you will, but have components of the bill be fixed components potentially like 100 a meter. Remember, when you talk about the wires and the stuff that's outside the door here? You're really only talking about 20 percent of the bill because even on the distribution side of the bill you've got a lot of other programs that are paid for through that, right?

MR. MUSHER: That answered my question. The example wouldn't pertain to the distribution part of the bill.

MR. ZSCHOKKE: The problem is there's not enough margin in most parts of bill for somebody to bill what is necessary in the back office to run this.

Think about oil trading. You're talking about something like that that needs technical expertise and some -- and lots of computing power, lots of meters and stuff, lots of information to be able to manage these risks and to understand what you need when you need it. All realtime capabilities. My dream doesn't happen because we don't have the infrastructure, it could be considered too expensive, and you don't have the back office created to actually drive this forward.

So it's -- I told this story at a conference I was at earlier. I went to a pricing conference many years ago that was not a utility pricing conference and I didn't hear cost of service at all through the three days. It was all about value, what your competitors are doing, how you want your customers to value a product. If you want them to value a luxury item, you're not going to charge a buck for it. There was everything about cost of service. They didn't talk about cost of service.

So the world works that way, but they build these models in the back of their -- they're charging a value and competition, but they build these models to manage their risks and their business in the back office and I -- the reason why it hasn't come to this industry I think is because really there's very little margin. If you talk to a retailer, a supply company, they'll tell you that there's not a whole lot of margin in their business to serve customers. What they're making, two to three percent at most. So they can't necessarily invest in greater infrastructure to do something like this because it will take a lot of infrastructure.

MR. HANDY: We haven't really talked about streetlights much in this context, but streetlights have been managed that way since they started basically, that there's a flat fee on a streetlight basically. Isn't that right? So how does that match? We were concerned about the fact that LED lights were never allowed to be under the tariff to be integrated in streetlights. So there was never the structure provided in that management system to provide better management of demand and the flexibility in the tariff to dark night. I guess the question is why weren't those more progressively implemented? What was the -- why wasn't the incentive structure more -- better aligned?

MR. ZSCHOKKE: Well, LEDs are relatively new and I haven't given a lot of thought to streetlights, but you can certainly think of different things, a lot of questions that go into that. But streetlights are certainly somewhat -- a usage that you can see and, you know, what the hours of usage are and there are other factors that go into the equation of streetlights, one of which is liability, that determine the fact that it's kind of a must run unit from our perspective through the dark hours. So that the lights are on in case somebody does get hurt or can avoid being hurt. So no, we haven't thought of that, but to do anything like that would take infrastructure and that infrastructure costs money. And the question is do customers want to pay for that additional infrastructure cost while maintaining the service necessary and keeping in mind other considerations.

MR. HANDY: I guess the question is now we're trying to -- we're evolving toward that being more of a customer decision because they didn't allow you to make those decisions under the previous tariff. They didn't have the ability to implement LED because they would still pay the same charge for their lights because LED wasn't integrated.

MR. ZSCHOKKE: The charge of the light is really the cost of the light. So if an LED costs X, that would be the charge. LED lights tend to be more expensive than the other lights. And then the next question is how much usage. You get the same as the energy.

MR. HANDY: That's right. And that wasn't integrated in the tariff so there was a disincentive to do that basically. There wasn't a lower -- there wasn't the usage profile for an LED light in the tariff. So if they switched to an LED light, they would still be charged on --

MR. ZSCHOKKE: Right. We weren't offering LED lights. Okay.

MR. HANDY: And then the issue of dimming and --

MR. ZSCHOKKE: There would be -- well, maybe if the light was not -- if the light we were replacing was not fully recovered, obviously, there could be some additional cost that would need to be recovered. But that's almost a -- the advent of lighting technology is a very interesting thought process of how we would use that going forward and whether or not we should be doing that or whether or not we should just be delivering the kilowatt hours based upon the infrastructure. But that's a debate that's already in front of the Commission and we're doing a pilot with the municipalities.

MR. HANDY: I was just thinking about it from a -- as part your dream and the whole -- that flat cost structure.

MR. ZSCHOKKE: Again, my dream is easier when everybody -- the average usage is like Texas of 1,300 kilowatt hours a month for customers, but it's a lot harder in New England where it's 660 because, obviously, more usage means more revenue and I'm allocating the fixed costs over more -- spreading them over more units. And that, of course, will be a lot of costs that will have to be incurred. That's always the challenge. What do you do based upon trying to deliver services to customers as well at low cost?

MS. WILSON-FRIAS: We have your customer -- your smaller demand customers pays a lower bill because of the demand charge. So on the next page it looks like you have no demand charge.

MR. ZSCHOKKE: We have no demand charge.

MS. WILSON-FRIAS: And both customers, despite the fact that they're two different sizes --

MR. ZSCHOKKE: Pay the same amount. So from a distribution perspective, a small customer is paying for some of the large customer's needs. And even in the prior example, the small customer was paying for some of it, but now they're paying an equal amount even though I'm going to build the system to reflect the large customer and the smaller customer together.

MS. WILSON-FRIAS: So does this go to the principle of fairness?

MR. ZSCHOKKE: This does go to the principle of fairness. Obviously, I build less -- if I add together -- what I need to build is the sum of the two loads. Obviously, the 46 kilowatts should pay their 46 kilowatt share and the 142 should pay their 142 share, but the result in both of these is that does not happen. This one is more extreme than the other one. But that's what a demand charge will get you. A demand charge will get you something for more fair for those customers based on their size.

MS. WILSON-FRIAS: So under this example your car crusher would have had no incentive to change their time of operation.

MR. ZSCHOKKE: It depends upon the design. It doesn't preclude the idea -- a demand charge doesn't preclude the idea that you would actually consider a deal with the car crusher or a rate where they could use it when you knew you had capacity available. So the demand charge in Massachusetts at the time was actually only applied 8:00 a.m. to 8:00 p.m. weekdays, excluding week holidays, 8:00 to 9:00. So they used it outside that period and it was primarily weekends. And then I created an opportunity for them to use it during the week when we had the capacity available. And they used more so they delivered more revenues. So you can do different things to ensure that the customer is not on when you don't want them on.

MS. WILSON-FRIAS: So in Massachusetts did you have special contract rates separate from your general tariff rate?

MR. ZSCHOKKE: It was a general tariff rate on realtime pricing. We did have one special contract.

MR. ROUGHAN: Again, that's all pre-restructuring.

MR. ZSCHOKKE: That's all pre-restructuring, yes, but it is an example of what you can do with customers to give them an opportunity to save money on the demand charge by moving their demand to periods when you have capacity, when you're more comfortable with them using the system.

MR. HANDY: I don't want to break up the progression here, but in the beginning page you showed us the illustration and you said this is changing, the distributed generation, the whole model is changing. So if you had a more powerful demand charge, would you -- could you conceivably structure it in a way that when there's a reduced demand because of generation, on-site generation, would that mean they would receive some benefit?

MR. ZSCHOKKE: Well, they would -- they would save the benefits as long as their demand didn't occur during the periods when we were applying the demand charge.

MR. ROUGHAN: But it comes back to load management. Your loads are in the building and you use your generation to try to be coincident with your peak times. And by default, if you can do that, you do reduce your load. If you just let it run willy nilly and just use your energy willy nilly, you're going to get what you're going to get. If you can actively manage energy and demand, you can absolutely reduce -- even under today's rate structure, reduce demand charges with on-site generation. Unfortunately, very few people actually do those two things. They just let them go. They don't really have that. We did -- back in the $10 kilowatt demand days, a lot of pre-energy efficiency days, we did lots of load management projects with customers to reduce their real demand. This is pre-energy efficiency. That was the late '80s, early '90s timeframe where customers were really -- believe it or not, customers in that period actively managed their load much more aggressively than they do today.

MR. ZSCHOKKE: Well, the energy efficiency programs were called conservation load management programs back then.

MR. LeBEL: I think it's worth emphasizing that the simpler versions of demand charges don't have any incentive to shift your time of use. Often it's just customer based peak demand. It doesn't matter whether it's at midnight or 6:00 p.m.

on the hottest day of the year. Simpler versions of demand charges don't care about that. You can get to more complex demand charges that are based on local, regional or system peaks depending on which part of that you think is the cost driver and then you could switch to more time of use rates that have per kilowatt hour charges at those higher times. So there's a progression of demand charges depending on which level of cost you really care about controlling.

MR. ROUGHAN: We have those in Rhode Island. Our medium C&I rate is a non-time of use, it's a demand energy rate, and just as Mark said, whenever you hit that demand in a 30-day billing period, that's your peak demand. It's got a relatively low cost electric meter there, too, and you don't know when it happens. You just know when it occurred.

When you get into the G-32 rate which is time of use rate, that's where you have to interval because we need to know when the power was used. That's when customers can sort out their -- their demand charges are technically assigned on the weekends and the off-peak. So that can happen. Those structures are already out there. It is only for the demand component. The commodity market hasn't embraced this world and they're, again, as you said, 60 percent of the bill here so that's a whole separate challenge we have here. But you're right, there's different types here. As we go to additional or look at other metering options, that's when you can get into more of the time varying rates. That's where folks can work this much more effectively.

MR. BIANCO: Can I just -- I mean, it is the most simple and it doesn't incent unless actually the -- depending on the configuration a user has on-site generation to set the point. If you have on-site generation and you understand when you're generating, you can lower your demand charge. You can use the simple demand charge and just cut your -- so you can have a simple demand charge with something on your roof and actually if you just understand how your system works and your usage, too, do it yourself and it is incented. What I was wondering is are systems configured? Are all the systems for DG configured for that, for demand offsets? Like, all net metering systems, for example, are, right? You're using that on-site generation, but even the ones that are net metered.

MR. ZSCHOKKE: I do want to apply these rates to the future. Again, we started this by saying this is based upon what the past was like. In a DG world -- and if you read the EPRI integrated grid paper, you'll understand. When I talked to the engineers, like, I said they talk about volt amperes, they don't talk about kilowatts. They talk about stability of the system. They talk about frequency. And that's what they're concerned about when they're running the system. And so there's other products that we sell that we don't -- we're living with the legacy of the sales based metering structure because the meter was come in to promote electricity usage way back when. And now that we go to the future, there's different products that could be provided and measured and there's different products that by us or to us and when people have their own generation. So it's a much more complex world of products that people have to be considering.

Like I said at the beginning, one of the things our distribution engineers worry about now is voltage was one way, right? It would fall as you went further away from a substation, as you went further down. So they had to worry about raising voltage as you went down the line to maintain it within the standards. Now they have to worry about voltage coming back when somebody is over-producing in their solar PV system and they may have an over-voltage system on the tail end of the line that may be impacting other customers.

So those are things -- so how we evolve pricing will be an interesting discussion because of those issues, and at the same time there's the PV folks the want to be paid for services they provide to the grid. We have to have that structure in place for them to either recognize the savings they can get by doing certain things one way or what we would pay them if they were actually designing themselves to produce on a basis that we would -- when we call and ask them to do something. So the future, we will evolve into different pricing mechanisms. We're talking about the immediate, what we have today and what we're accustomed to and what we can do today affects customers, but let's not assume that that is something that will sustain itself over the long term.

MR. BIANCO: I just meant, though, we do have today meters in parallel which are designed to run certain programs and we have bidirectional meters. The parallel metering, I mean, is that real net metering or is that virtual? Does the power that -- certainly the energy is simple to offset.

The power that gets generated on somebody's roof in parallel configuration offsets the power that they're --

MR. ROUGHAN: In terms of the proposed renewable energy growth program or the old net metering? Net metering is a single meter. Which one were you --

MR. BIANCO: Like a parallel metering where there's a meter and a wire for --

MR. ROUGHAN: The generation only.

MR. BIANCO: For the generation and there's a meter and a wire for the load. I actually don't know how the system connects to your distribution from there, if they then join at a single spot and so --

MR. ROUGHAN: So what would happen in that case, Todd, the customer gets the net metering -- the residential. Let's start with residential because that's default net metering for that customer. So they get the full effect and value of net metering on their load side, right, as per the net metering tariff. And then they'll

-- and whatever -- so if that value is worth $.15, we'll call it, but the performance based incentive was worth $.25, they would then get the value of the $.15 on their electric bill, we'd apply the credit on their electric bill and then cut them a check for $.10 extra for energy that they produced that month. So they are getting --

MR. BIANCO: I'm more interested in the physics.

MR. ROUGHAN: The physics are, yes, you're reducing the on-site load, the coincident -- hourly coincident generation at that point in the system. So yes, you are doing it. The challenge that I've been talking about all along here is no one -- people don't appear from what we've seen to be actively managing their electric loads and/or actively managing their generation. So when you combine the two, that's where the savings really are. The challenge is how do you incent customers to do that. And one of the ways is I think with some sort of rate design.

MR. HANDY: Let me just dig down on that because in the net metering context, there obviously is an incentive to match the production to the load because if you go over your load, you're going to be -- I just wanted to drill down on that a little bit because in net metering there is an incentive generally to produce what you're consuming because if you over-produce what you're consuming, you get a lesser rate.

MR. BIANCO: You're talking about energy now.

MR. ROUGHAN: You're talking about annual perspective, yes.

MR. HANDY: So that this is a time issue. You're talking about on a daily basis or --

MR. ROUGHAN: Yes. This is actually managing. There are building management systems that customers use for fire and life safety, but for some reason don't use the parts of the system that are available for managing their energy use. That's the challenge we really have.

MR. HANDY: How fine do they have to manage? Do they have to manage in five-minute increments that their production meets their consumption or in 24-hour increments or in monthly increments? What's required?

MR. ZSCHOKKE: It depends on the rate structure and the metering that's available. If they've got just energy metering over a month and they don't have hourly intervals, then they manage it over that month. If they do have hourly metering, then they have to manage on an hourly basis.

MR. HANDY: We're going back and forth between the monetary incentive and the physics. Is the rate design to accommodate some physics of the system or is it -- do you understand what I'm saying?

MR. ZSCHOKKE: It will in the future. If you want to really make the system efficient, it will have to because -- so the systems are designed now to -- they may be matching usage to the usage at the home or the business or they may actually just be putting as much as they can on it and try to make as much money from net metering as they can. Either way they haven't done anything to manage the voltage necessarily. They haven't turned it into a direction where we may actually need it for peak. So they're not reducing the peak demand on the system by the full maximum capacity, but they may be reducing it a little bit but it's four, five o'clock in the afternoon. It's obviously going to be less than if it's noon. They may be over-producing too much voltage because we don't measure voltage particularly at the residential level. They may be producing too much so voltage has to be managed on the system. So now we have the voltage management charge which we have on the G-30 rate. We have a kVa charge for customers who need more voltage than their kilowatt usage. We will charge them a premium for that extra service that they use. Now you bring it down to people with production facilities at the residential level. They may actually be creating an issue because that's something that we have to worry about. Because if there's too much voltage on the system, as someone described to me that's happening in their home, a planning engineer, light bulbs pop and -- or TVs pop or things break. If there's too little, things don't work. So those things have to be managed. That's what the engineers are worried about. They're worried about the voltage, the amps and the frequency, make sure the system remains stable and doesn't do any damage or can provide the service necessary to customers.

MR. HANDY: It seems like the question is how do we provide that kind of transparency to the customer to know what they need to do, and also how do we make the physics match the rate, basically. I mean, how do we make the rates --

MR. ZSCHOKKE: That is the long-term question. That's not something we're going to solve today.

MR. ROUGHAN: When you net energy over a month, you're not addressing the physics of what's really happening. The excess production going on the system causing an increase of voltage at one o'clock in the afternoon when the customer has no minimal on-site usage at their house versus -- so then the meter is turned backwards. And then at nine o'clock at night when they want to run their air conditioner, their generator is obviously running solar, so now their meter is going to run forward. So that's the challenge, the net metering construct throughout the country. It doesn't really match the physics of what the system needs in order to be more efficient that Peter is talking about.

MR. ZSCHOKKE: The EPRI paper is a really good exposition of what a customer would have to do to island themselves and what the value would be connected to a strong backbone is between instantaneous power, the ability to sell your excess out without any worry. So you don't have to worry about over-generation in your own facility, the ability to have power supplied to you overnight.

There's five different project goals. Managing the frequency, you don't have to manage your frequency. You don't have to manage your voltage. So when you start to ask customers to do that -- I go back to my Cumberland Farms example which is the Mass. Clean Energy Center had a -- how do we make gas stations resilient, day or metering, and everybody was, like, let's put solar PV everywhere and we'll carve out the neighborhood and everybody will supply the gas station. Well, they didn't discuss whether or not the customers want to supply themselves first. But the reality is the guy from Cumberland Farm was there. It was great that he was there because everybody was looking at a bill that was of 40 kilowatts. We need 40 kilowatts of PV. The guy, he said, "Well, actually I can kind of survive on 100 kilowatts but I really want

175." And everybody in the room was, "Oh, what do you mean 175? I don't understand." Well, every pump, every air conditioner, every motor that kicks on. So what happens when a motor kicks on is it's called instantaneous power. They need a lot of voltage to get themselves started. So you get this huge spike and then it falls and it averages out. And it's instantaneous. It only happens for whatever, you're more of an engineer than I am.

MR. ROUGHAN: 10 to 30 cycles, about a half a second.

MR. ZSCHOKKE: So if you had three people at a gas pump and an air conditioner kicks on, he has three motors that are going to spike at the same time. He's got to have the capability. So when they go and they think about restoring power to a gas station, they want four times the capability built of their average demand because we measure it over 15 minutes. So that's what most people don't understand is that the system is still providing that capability.

And what the EPRI paper goes through is for residential, if you have central AC, more than likely when your central AC kicks on or my two units, my nine kilowatts, it could very well overwhelm the output of your PV. So you're going to take instantaneous demand from the system while at the same time you're generating PV into your home. So even though you may look like you're going to zero, you're still using the system while your PV is actually operating based on the requirements of your home. So it's an interesting conundrum of how do we reflect that value to customers who have PV. But that's something that our engineers have to be worried about and it's something that -- when they think about designing the right kind of PV system that will help the system. Does it make more efficient sense to design on it the customer side or design it on the distribution side? What does it mean?

MR. ROUGHAN: What would happen in that same situation, if he wasn't connected to the backbone of the utility system, the air conditioner kicked on, the PV, being a soft source, would actually trip offline. It couldn't handle the required current that an air conditioner compressor needed. It would just say I'm done and trip. So that's why whenever we run a new line extension, people living off the grid for years, they jump for joy because they don't have to worry about all the batteries they used to have to worry about with solar and all the other stuff kind of goes away. That's a reality. They love being connected so they don't have to worry about that. Because that's really a challenge. The PV in itself is an inverter based system. It's a really soft source. If you try to pull too much from it, it will trip. It won't keep running.

MR. BIANCO: My car has the same problem when I start it up. I want to get my fly wheel spinning, I don't build a crazy sized engine. It's not like we have rates that incent batteries for net metering or DG.

MR. ZSCHOKKE: That's the question. Is it more economic to buy the battery or is it more economic to remain connected to the grid, and usually the battery is too expensive relative to --

MR. BIANCO: Even in that case where this gas station is, like, yeah, I'm going to need 175 kilowatts.

MR. ROUGHAN: I need a --

MR. BIANCO: What would be -- battery cost, as I understand it, is not just the size of the battery but how long you're going to need it. If you're only going to need it for half a second, that would be a lot cheaper.

MR. ROUGHAN: There's also capacitors, there's fly wheels, there's other devices that you can use instead of that, but it is an engineered solution. It's not just let's buy them at Home Depot and plug them in.

MR. BIANCO: Not like my car battery.

MR. ROUGHAN: Your car battery is.

You can buy it wherever you want because it's so mature versus this relatively new industry.

MS. WILSON-FRIAS: I think Todd's point is a good one in the context of this discussion because the question is what kind of customer behavior are we trying to incent. And does it make more sense to try to incent behavior to put in a battery or to have the distribution system be sized much larger in order to support that distributed generation.

So I think what I'd like to do, because it sounds like we're starting to finally head that way, is sort of go off of the Power Point at this point because I think the rest of the slides are fairly self-explanatory and explore that a little more and really give others an opportunity to kind of talk about this provision of the statute. A lot of people around this table were involved in the development of this statute and particularly this provision and I'm kind of interested -- I'm really interested in what the thoughts were from those who were involved in the legislative process, you know, what were you all looking for? What were the -- what were the thoughts? Obviously, National Grid wants to recover its costs and there's also the current situation, are net metering customers potentially being subsidized by other customers which is what I take from this, but what were people thinking? What were they thinking the scope of this was going to be? What sort of customer behavior were they looking to incent? What types of rates maybe were they thinking about because, clearly, we don't know. So --

MR. HANDY: Except to the extent that it does state some actual --

MS. WILSON-FRIAS: To the extent it does state some actual, but there's a lot of room in here. There's a lot of stuff the Commission can consider. The Commission wasn't at the table. So what were people thinking about when this provision was negotiated? And I'm sure that there were --

as we heard from the first meeting, there were a lot of different ideas, but I think this is a really -- I think Todd's question really gave us a good segue into that discussion. So that's what I'd like to do now, because we've only got about 25 minutes left.

MR. ELMER: It may have been a little bit less sophisticated and nuanced than you're accounting for, Cindy. The etiology of that section, I think it's 24 in the statute, was Ron sitting in the room representing the utility saying that it was important to have a rate design proceeding that accounted for what Peter is referring to as the backbone, that backbone of the distribution system even in the new world where there is tremendous incentive for distributed generation and net metering.

And the other people in the room who did not work for the utility saying yeah, but there was a very, very bad exemplar in Arizona. We want to avoid that. And when we do a rate design proceeding, sure, Ron, it's fair to account for the value and the benefit of the distribution system even to those net metering people, but don't forget the benefits to the distribution system from the DG, don't forget the environmental benefits, the carbon emission benefits, the NOX and the SOX, the reliability benefits. You need to achieve something of a balance there. And when Paul Roberti complains, as he often does, that these statutes are getting very, very prescriptive and more prescriptive and taking away administrative discretion, he is, in fact, largely correct, that that's the etiology of that Section 24.

MS. WILSON-FRIAS: I'd like to add another one and something we started talking about in the electric ISR case which was do we want to incentivize locational benefits of distributed generation as well. So one of the things we started talking about was right now there's -- the policies that have developed have kind of developed with the idea that net metering and distributed generation are good things, which they are, but there was really no requirement that a study or anything be done to say where's the best place for these on the distribution system. So I'm wondering if this is the appropriate place to start having that discussion as well in addition to the system planning.

MR. ELMER: The answer to your question is the calculation for the locational benefits of distributed generation was not contemplated by the drafters in this Section 24 but was very much contemplated by the drafters in the other section that gives the --

MR. HANDY: Incentive.

MR. ELMER: -- one-way ratchet, the incentives that the distribution company can propose and the Commission needs to approve to increase the compensation for DG and, of course, what we all had in mind was Tiverton and that's what was being thought of. So you are correct that the locational benefits were contemplated when the statute was being drafted, but it wasn't foremost in our minds when we were doing Section 24.

MR. BIANCO: What about the temporal benefits? Because most of what we talked about today, and when you talk about the backbone system and the benefits, the benefits are very small unless they're timed right. So is that what we're considering here that not in another part?

MR. ELMER: That can be considered here. As Peter said earlier, I think correctly, there is the hurdle to overcome of the realtime meters, and I mean, I was going to ask, and I can ask Peter later, but under the standard rate design principles of fairness, how do we allocate the incremental additional cost of those realtime meters when it seems that the benefit to be derived from them goes partly to the ratepayer who has the meter and has the DG on her home but also partly inures to the benefit of the entire system in terms of peak shaving and saving some of those large infrastructure build-out costs.

So I think that -- I think the answer to your question, Todd, is yes, we can consider temporal benefits, but then the derivative question is how do we allocate the cost of those realtime meters that potentiate that consideration in the rate design.

MR. BIANCO: When we consider that it seems like what we heard from Tim earlier, though, when I think about 160 perfectly timed, it still might not be enough to provide benefits that can be -- that are useful. I mean, that's a paraphrase, I'm paraphrasing, but you remember. You mentioned something like 300 megawatts.

MR. HANDY: 160 megawatts isn't all there is.

MR. BIANCO: That's what I'm asking. So we have to consider --

MR. MUSHER: The Tiverton/Little Compton, there's different system levels that we're talking about. We're trying to figure out if we can defer one megawatt in

Tiverton/Little Compton so that would save a few million dollars for ratepayers.

MR. BIANCO: What if the customer wants that, though, right?

MR. ROUGHAN: That's the flip side. So the challenge is that even though you may not actually get to reduced peak load in Rhode Island, you may be able to accumulate more customers with more loads with the same system you have today.

MR. ZSCHOKKE: And improve the efficiency of the investment plan.

MR. BIANCO: So are we looking at the benefits, though, aggregate in the system or do we -- was it contemplated that it would be ratepayer-by-ratepayer benefits?

MR. ELMER: No. The way that Section 24 is written is that the Commission is obligated in significant part to look at the benefits large of the DG and net metering build-out. That's why issues like system reliability, carbon emissions, environmental benefits were so carefully written in is that you're not only going --

rate design principles talk about fair allocation, so ratepayer by ratepayer I think has to be an aspect of it, but it doesn't end there. You're looking at the benefits -- the system reliability benefits as well.

MR. HANDY: I would just follow-up on what Jerry said about the fact that this specific section of the statute doesn't contemplate location incentives doesn't mean that that couldn't be a relevant consideration in this proceeding because I think the list isn't inclusive. It says consider these things among others. So to the extent that this group feels or the Commission feels that that's a worthy consideration, I think it should be.

MR. ROUGHAN: The thing that has to be looked at with the least cost procurement law that invented the system reliability plan, that was the tool we were using to value this, right, to try to sort it out, and that's why the pilot is going into its fourth summer. That's the process by which we're trying to get a sense of what the value equation really is on the system to then further help people understand what we can do with things like rate design and all the rest. So that's part and parcel of why we did that. We just have to remember what we're doing already and the fact that we made -- tried to simply target efficiency dollars was a huge change on how we allocate efficiency dollars. It was always peanut butter. Everyone got the same. Now we're saying, no, we're going to take a bucket of it and we're going to put it here. That's a very different construct than we had prior to this. So we need to keep building up what we've been doing. We can't forget that we've got things in play that we can continue to work on and get feedback when we have those hearings.

MR. BIANCO: Is there a consultant in America that's prepared to support that broad of a look in a docket like this?

MR. ZSCHOKKE: Let's be honest. We're at the dawn of new age, okay? It sounds so dramatic. Seriously, we're talking about a whole different premise which was the last slide which was the integrated grid which doesn't exist today, and how it operates and what we would ask of customers with DG and without DG to make this grid as efficient as possible we will learn about. I mean, there's a whole lot of stuff we have to learn. We're making a lot of statements about benefits and this and that and we don't really know. We have a solar phase two project to see what happens, how we can use them on the distributed grid, different types of conditions. But right now under net metering what's happening is people are just putting the systems on the maximum kilowatt hours and we already know that there are things happening?

You look at Hawaii and the fact that they're being overwhelmed on their systems and they're now going out to requisition very fast backup generation because they need something that goes on when the clouds come in the afternoon because there's so much PV in certain areas of their system.

If you look at Germany where they've got so much renewable that they're running the coal plants in a different way on certain days and they're actually -- my understanding is they're actually producing more carbon than they did before which is counter-intuitive, but it's because of the way they're running the power plants. So we don't want to end up like Hawaii or Germany and have the law of unintended consequences. We want to be able to be do it in a way that makes sense for solar developers, for customers on the system and recognizes the fact that we're going to become UPS. You deliver the packages to customers, but when the packages want to be returned by the customer, you got to send it back. So it's going to be two ways and how you charge for that and how you -- and what's the fair compensation for services provided to UPS is going to be something we have to debate and deliver.

But we are right at the beginning of this new age and so to say there's definite benefits, I mean, we had this discussion in New York because New York wanted to replicate, or PSU wanted to replicate the ISO tariffs at the retail level because of the concerns about the -- complaints of Order 745. When you look at what the ISO requires from generators, I can't see a customer with generation following any of those rules. You got to be ready, you got to be instantaneous, you got to be doing, all of those requirements for certainty of provision of service. And so how we take what the engineers who run the system need to do and transform that into something where the customers can deliver something that we can use on average, knowing that some customers will deliver it some days and some customers won't, that's going to be the challenge as we go forward here as we try to make the system more efficient.

But let's not assume that we're

creating efficiencies right now automatically without actually doing the research, getting the numbers, figuring out how to work it. That's what the pilot in Tiverton is about with solar and customer demand. That's what the solar phase two is, smart grid projects. That's what we're trying to do is get the information to really make a good assessment for customers, all customers, those with DG and those without because they all use the system in different ways. And I go back to what I said earlier about the time varying rates. The Brattle Group, customers say if you go through all the different pilots and now the customers say no one has done the assessment whether or not the system has saved any money.

MS. WILSON-FRIAS: And so this has been -- I'm cutting you off.

MR. ZSCHOKKE: I know.

MS. WILSON-FRIAS: I've heard, too, this referred to as a grid modernization docket. I think what this discussion has made clear is that this is really sort of more of a rate restructuring docket because as I've done research since our last meeting, I almost wonder if we're at this -- if this is the right time for this. Obviously, we need to do it, we're required to do it, we're going to do it, but in the revenue neutral context and with the redesign of rates where we're in the -- there's no -- you look at even the New England Clean Energy Council's paper which was very helpful and a couple of others that I've looked at, there's an assumption that there's certain kinds of investments that are going to happen and certain capital investments and lots of changes so that ultimately the utility becomes like ISO at the local level if you take this all the way out to its logical conclusion.

And so I guess what I'm wondering and what I think -- I think this has been a really good discussion because what's sort of jelling for me because -- I got into that research place where you get completely lost and you don't know which end is up, and I said well, what are we really going to accomplish here? And I think today's been clear what we're not going to accomplish through this process. And so I'm still trying to figure out what we're trying to accomplish through this rate design process. What is the Commission's ultimate -- what is our ultimate responsibility and what is the ultimate goal of these rates given the current system structure, given the current program structure where -- and we've been going around and around in lots of dockets over the past couple of months. For those of you who have been here know we keep asking all of the same questions over and over again, where's the planning document, where's the planning tool. It's great that all these programs are out there, but at the end of the day the Commission still needs to set just and reasonable rates. And how do we know we're doing that if we're setting them in dockets that happen every few months as opposed to really looking at whether the rates are set appropriately and doing what they're supposed to do with all of those programs. Where's the infrastructure planning document? Where's the document that encourages those efficiencies? How do we set rates to encourages those efficiencies? And again, we're one piece of it just on the distribution side and in a revenue neutral way, and I think this needs to be more than an academic exercise as well.

So I guess I keep coming back to what are we doing to modernize in quotes, rates where it's revenue neutral and, personally, when I think revenue neutral I'm thinking looking at distribution and ISR together. So it's not that we're going to have revenue neutral based on just the distribution rates and then ISR is going to grow over here in order to support whatever we do in that docket, because at that point it needs to be a full revenue requirement case and that's what -- I'm going to tell you that would be my recommendation to the

Commission.

And so that's the challenge I think we're facing is how do we make this more than an academic exercise of just sort of tweaking how rates are and really trying to get to what kinds of behaviors are people trying to encourage and how to make sure all these programs are working together to encourage those behaviors through the rate design. I think we've had a really good discussion about what could happen in the future and I think what we've heard is a lot of that would require some capital investment and that was why a few minutes ago I asked what were people thinking? What do they want? Is there a new rate you're thinking about? Are you thinking about an electric vehicle tariff? Are you thinking about time of use rates? Are you thinking about rates that would encourage batteries with distributed generation projects as opposed to upgrades that may need to be done to the system? So that's kind where I was trying to get to and maybe I think this was a good first start, maybe there needs to be more thought and another meeting, but --

MR. ELMER: Cindy, it may also help you to consider -- a few minutes ago Peter was saying it's the dawning of a new age, and to the extent that that is correct, the new rates that get designed in this docket don't have to be the be all and end all for all time. This can be -- under Section 24, this can be an iterative process in which the Commission says in this docket yeah, you know, we've got to balance the legitimate needs of the distribution utility to keep that backbone intact in the new world where everybody is net metering and has distributed generation. We've got to balance that with not eviscerating the economic incentives to do net metering and distributed generation. We're going to make a step in the right direction without prejudice to reconsidering the rate design five or seven years later and taking the next iterative step. To the extent that it is a new creation coming into being, you know, Rome wasn't built in a day.

MS. WILSON-FRIAS: That's right, but each step costs a lot of money for the utility, for the ratepayers, for everybody involved.

MR. ELMER: Yes.

MS. WILSON-FRIAS: What are we doing in this docket? What rate structure are we setting now and is there any way to set rates to encourage behavior going forward? Are there -- you made the comments earlier. Lots of new legislation, lots of very prescriptive things. Now the Commission needs to put it into place and make sure there's just and reasonable rates all over. Other utility commissions do these things that the General Assembly has seen fit to do through statute. They have the ability to look at those larger pictures and say where is the future going? We've got a bunch of laws with a bunch of charges on the bill to support all of those things that aren't all -- I'm not clear on the whole pie at this point.

MS. GOLD: Can I --

MS. WILSON-FRIAS: Sure.

MS. GOLD: I know we have five more minutes, but I think your point is really well taken as is yours and I think what you've kind of done is lay the groundwork for this group to work together to say okay, here's what's going on in New York. We can't do that. We're not big enough. We don't have enough money. What's going on in Massachusetts? We can learn from that. So what is it that we can do in our small state with its not very good economy with some really terrific programs. I think it's kind of a challenge for us all to think what is it that we need to take the next step, and I think we're all very pleased and we're learning from what's going on in Little Compton and Tiverton, and as Dan was the first to say, it hasn't been obvious. We've been kind of feeling our way along, but it's been a good partnership and maybe the next time, I'm not sure, but we just need to say okay, building on what Jerry said, here's what we can do this year and here's maybe what we'll try next year and start to identify some discrete steps that would move us forward working with you.

MR. ZSCHOKKE: What we're talking about, and we've mentioned it before, is moving to demand based rates or -- in lieu of demand capability -- reading demand capability moving to size based rates based upon the total usage of a facility, whether it be a home or apartment or a business for those non-demand customers and therefore maintaining the incentive to conserve by lowering your usage in the house with and without -- not considering generation just the total usage because you don't want the generation to mask the need for more efficiency but at the same time fairly allocating the cost of the system because larger customers cost more than smaller customers, right? So therefore for residential in particular not doing what, for example, Madison Gas & Electric and/or Salt River project did. It's 68 bucks for

Madison and it's $50 for Salt River project for everybody but actually saying, you know, it's $5.50 for really small customers, it's ten bucks for intermediate. I'll see an inclining customer charge example in the charge. But actually reflecting the larger size of customers and the needs of those customers because the facilities necessary to serve them are not -- they're not shared with as many customers. So a 3,000 kilowatt hour customer should not be paying the same facility charge as a 250 kilowatt hour customer because I can put a transformer in to serve a lot of 250 kilowatt hours customers. I'm going to be only able to serve maybe one or two or three 3,000 kilowatt hour customers in a neighborhood. So reflecting that size differential, so that's what we're contemplating as part of that and yet at the same time designing it and establishing it in such a way that if they -- if they can reduce the consumption in their whole house below a certain level, they would drop to the lower level.

MS. WILSON-FRIAS: So are you considering new classes of customers?

MR. ZSCHOKKE: No. And that goes down to -- we don't want to discriminate against anybody. We don't want to do something special for PV that is unfair to them. We want to maintain -- everybody is going to use the system. Everybody is going to have a capacity need and the system is going to be designed to manage everything. That doesn't say that you would create different types of credits or discounts or something else for services provided. I don't have any data yet to tell me what those are. We're working on the solar phase two, but certainly I can talk to our engineers and see what they can craft up. But that's another option that can be considered in this docket.

MS. GOLD: I don't want to get out in front of everybody, but I know the specific thing you mentioned, Jerry, was that Ron Gerwatowski said we need to find a way of recovering cost for maintenance from

DG or local generation projects, and maybe a useful thing would be to have a discussion where we drill down on that whole controversy over fixed charges versus minimum charges, and I was trying to remember what that was and there seems to be at least in some of the renewable energy side I think there's a sense that a minimum charge might be better than a fixed charge. Does that resonate with you? Have you guys talked about that? Because that was the first thing that was considered and then a bunch of other things got added to the legislation.

MR. ELMER: Charity, I think New England Clean Energy Council has some specific thoughts and research on that.

MS. PENNOCK: I would say we haven't come to any conclusions and I wouldn't say that any one is necessarily the perspective of the industry at this point so we're still working on all the options.

MS. GOLD: Is there a logical way for us -- Cindy, to take advantage of this group to move us forward collectively? I'd just like to know more about that.

MS. PENNOCK: I think we've done work, Grid's done work, Arcadia has done work and I think we can come together and perhaps drill down on more specific options the next time we come together.

MR. ELMER: That would be very helpful.

MS. GOLD: That would be helpful for me and that does get to when you look at the long laundry list of things that you've been asked to consider, that is one that's at the top of the list.

MR. HANDY: This is interesting because I agree, I think the context was there was concern about in particular net metering and the impact on stranded costs basically and taking people off the grid and not paying fees to maintain the grid. And my sense is that some of that -- and there was an interest in establishing a charge to eliminate that. And my sense is that some of that came from Massachusetts where there's a totally different net metering policy than there is in Rhode Island. We do have restrictions on the capacity in net metering in Rhode Island. If you're an industry, you have to match load on-site. If you're a municipality, you have to match -- you effectively have to match the load of your municipal infrastructure, and if you go over, you get the wholesale rate. You're getting a much reduced rate. So there is significant incentive not to over-produce in the context of net metering and I think it's important to be mindful of that as we design a rate structure that is suited to Rhode Island because it may be different than what's required in Massachusetts.

MR. ELMER: And it's also I think important when you were talking earlier, Peter, about the multi-faceted requirements that the ISO puts into place for generation assets is that those are requirements for generation assets that cleared in auction and acquire a CSO. The net meter guy who has PV on his roof doesn't play in the capacity market, doesn't acquire a CSO and it's a significantly different kettle of fish.

MR. ZSCHOKKE: It is, but keep in mind that an event that happens on the distribution grid that impacts customers, we will get the call. So that the question is if people want to be paid for services paid to the grid, you have to provide the services that the grid needs, not take services that the grid doesn't need or create issues that the grid now needs to manage. So it's a balancing act and we need to learn more about what those services can be provided. Whether or not there's enough money in the pot for people to actually think about turning your solar units westward, putting in an advance inverter so you can constrain your output but you manage your voltage and do other things that the engineers really want. And I can't speak to all that stuff, but that's what has to come forward. And we want to see that. I mean, our engineers are yeah, you could use solar in different areas, but it's a question of are you going to maintain the stability of the system and it's a question of are we saving costs going forward because the costs we have today are the costs that are in service. Everybody that net meters under decoupling, if you're net metering and we have less revenue this year, we'll recover it next year, but it's going to be lower kilowatt hours. We're going to continue to have this process. We can't net meter ourselves to where there's no revenues whatsoever. If the solar industry is successful and you want it to be successful, we eventually have to address the question of what do you want the grid to do and how are you going to pay for it, everybody, not just the load customers. So -- and this is the beginning of the process. That's what we see this as, the beginning of the process of crafting that future solution and it's not a one-year issue, it's a ten, maybe even longer issue.

MR. ROUGHAN: I think it also helps

us to understand what sort of additional infrastructure needs do we want. Maybe you can slowly bring in advance meters to some customer classes that it makes after some time when we under makes sense to do so. And there will be some -- a lot more information coming out of this stimulus project that were done for advanced metering. There's not a lot of data showing the value yet, as Peter said, about time of use rates. So it is probably best to wait a little while to see if those numbers shake out nationally before we here in Rhode Island say yeah, let's go ahead and do that but there may be segments of the population that it may not be a bad idea to try and I think that's where the phased in approach works very well.

COMMISSIONER DeSIMONE: So it looks like we have a lot to digest. I think we'll see you all in April then.

(ADJOURNED AT 1:06 P.M.)

C E R T I F I C A T E

I hereby certify that the foregoing is a true and accurate transcript of the hearing taken before the Rhode Island Public Utilities Commission, on March 26, 2015, at 10:00 a.m.

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JO ANNE M. SUTCLIFFE, RPR/CSR
Notary Public, State of Rhode Island

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