STATE OF NEW HAMPSHIRE

PUBLIC UTILITIES COMMISSION

January 25, 2022 - 12:41 p.m. DAY 1
21 South Fruit Street AFTERNOON SESSION
Suite 10 ONLY
Concord, New Hampshire

[Hearing also conducted via Webex]

RE: DE 20-170
ELECTRIC DISTRIBUTION UTILITIES
ELECTRIC VEHICLE TIME OF USE RATES

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Commissioner Pradip K. Chattopadhyay
Special Commissioner F. Anne Ross

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AFTERNOON SESSION
(Resumed at 12:41 p.m.)

CHAIRMAN GOLDNER: Okay. We'll go back on the record. And we had left off on Commissioners' questions for the panel, so we'll begin with Commissioner Ross.

COMMISSIONER ROSS: Thank you.

INTERROGATORIES BY COMMISSIONER ROSS:

Q. Good afternoon. I have questions that I think I will ask each utility to answer separately. I need just a little background on the conditions that exist today in the two utilities. So let me start with some really simple questions.

Today, if a residential customer installs an EV charger in their house, do they simply plug it into a 220 plug? How does the installation work on a residential charger? If either of the utilities can help me with that.

A. (Tebbetts) I can go first.

Q. Okay.

A. (Tebbetts) It's up to the customer how they want to charge. I can tell you as someone

who owned an EV, we had an electrician come over and put in a 220 for us, and we charged it that way. But you can charge it on a regular 110-volt plug as well. You can have a charging station in your home if you wanted to. Some companies, some electric vehicle companies do sell them. That allows you to control when you're charging, but it's not required to charge your car.

Q. Okay. So if you have a charger on a 220, you don't have any separate meter. It's just flowing through your main house meter; correct?

A. (Tebbetts) Yes.

Q. And right now, let's start with Liberty, what type of meter are you likely to have if you were a residential customer?

A. (Tebbetts) We just have a simple AMR meter that would be on a customer's home, excluding the fact they could have solar. Let's just assume for this purpose they don't have solar. So they're on a meter.

Q. Assuming they're not battery backup or solar, just a plain, vanilla residential customer.

And what does an AMR meter measure?
A. It will measure kilowatt hours.
Q. And does it record it on an hourly basis?
A. No, it would record it on a monthly basis.
Q. So you would just get total consumption for the month?
A. (Tebbetts) Yes.
Q. Okay. Now, some of the EV chargers have their own metering built in; correct?
A. (Tebbetts) Yes.
Q. Do they all?
A. (Tebbetts) I do not know.
Q. Okay. Maybe we'll save that for ChargePoint. So it's possible that you might have a number of customers with home chargers right now that you don't know about because you would be blind to that installation. You wouldn't have any notice just because they added a 220 outlet; correct?
A. (Tebbetts) Barring that they haven't called us because their usage went up and they didn't make the connection in their minds of higher usage and an electric car, yes.
Q. Okay. And for Unitil, let me ask you some of

the same questions. If you're a plain, vanilla residential customer, what type of meter are you likely to have?
A. (Carroll) All of our electric customers in New Hampshire have AMI meters.
Q. And what do they measure?
A. (Carroll) They measure kilowatt-hour usage, and they do have some capability to do that on an interval basis. My understanding is that there are four channels that can be recorded.
Q. And what interval -- sorry. What interval do those channels record if they're active?
A. I'll refer to the testimony a little bit on that one. My understanding is that it would be hourly, but that would be subject to check.
Q. Is that data stored, or is it -- can it be reported directly in real-time to Unitil?
A. (Carroll) It can be -- it's retrieved daily by the Company from those meters.
Q. Okay. All right. Beginning with -- let's move to the other customer classes now.
So, for Liberty, if I am -- and I forget

how you designate your classes, so I'll just use my layman's terminology. If I am the smaller of your two commercial and industrial user classes, what meter am I likely to have?

A. (Tebbetts) Well, you're still going to have an AMR meter. That doesn't change. If you are a lower, a smaller class, a G2, you will have a four-channel meter that records kilowatt hours and kilowatts and kilovolt amps -- kilovolt amperes.

Q. Okay. And when you're saying it records kilowatts, how often -- that is the sort of the demand component; right? It's what the total pull is at any moment by the customer's usage?

A. (Tebbetts) The meters will record at 15-minute intervals. So it will allow us to find the greatest 15-minute interval.

Q. Okay. And "kW" versus "kVA," can you help me with what the distinction is? I think of them both as demand, but there must a difference because they are two different terminologies.

A. (Tebbetts) You're going to ask me that

question and I'm not an engineer and I probably should know the answer. But I don't think I can explain it well enough as maybe someone else on the panel.

Q. Okay. We can come back to that. I think both utilities use both units, so maybe we'll get some clarity.

And that AMR data, when -- let's assume that this customer class has in its normal rate structure a demand charge. How do you calculate your demand charge?

A. (Tebbetts) Sure. We do it in one of these ways. Greatest 15 minutes over the period --

Q. And by "period," what period are you looking at?

A. (Tebbetts) The billing month.

Q. Okay.

A. (Tebbetts) And then we have -- so that's the first way we calculate it. And then we look at 90 percent of the highest kVA over that billing month, and then we also look at 80 percent of the highest demand over the last 11 months. And whatever one of those three the max demand is is what we bill the

customer for that month on demand.
Q. So your demand charge is not related to when your total system peak occurs; is that correct?
A. (Tebbetts) That is correct.
Q. It's just the customer's total -- the customer's highest usage, or highest demand I should say.
A. (Tebbetts) Correct.
Q. Okay. And for your large customer groups, your largest C&I, what type of meter would they have?
A. (Tebbetts) They have the same exact meter as that G2 customer group, and we bill in the same manner as the G2 customer group.
Q. So would those AMR meters that have the four channels that can measure the 15-minute intervals, can they generate hourly data so that you could bill different rates for different hours right now without changes?
A. (Tebbetts) No, they cannot. And this was an issue in our battery storage pilot docket because we are unable to bill on time of use and other kinds of billing structures with

the data we receive for the, what I'll call "simple AMR meters," even though they do give you a 15-minute interval demand. That was one reason why we have to use different meters to go to this kind of rate structure.

Q. And there's no add-on to that AMR meter that would enable it to do hourly, record hourly consumption and bill it?

A. (Tebbetts) There is not.

Q. Okay. So Unitil, on your mid-level C&I, your lower-level C&I, what meter do they have?

A. (Carroll) They have the AMI meters, the Gridstream TS2. You'll be able to find some of the details in the testimony. And they have AMI meters, and they are capable of interval data recording. The G2 customers are billed on kW. So demand, kilowatts at 15-minute intervals, and it's the highest demand for the billing period.

Q. For the month?

A. (Carroll) For the month.

Q. And do you also look back at the last year, the way Liberty does, and compare to see which is higher or not? When you bill for

demand, when you calculate demand for your mid-level C&I customers --

A. (Carroll) A billing ratchet? Yes, we do have a billing ratchet that looks back. So it's the highest level for the last 13 months, or the highest level -- or whatever is higher recorded during the current billing period.

Q. Okay. Can you tell me what the difference is between kW and kVA? And I apologize, but I'm just trying to get up to speed with it.

A. (Carroll) I can tell you what -- the way I understand it is not a very technical explanation. So it has to do with power factor. And the difference between the kilovolt amperage and the kilowatts is how we measure power factor. So my understanding, in very layman's terms, is the power in between those two, the difference between those two things recorded is not really useful energy. So for the large G1 class, we actually bill on kVA, not kW, to encourage those large customers to improve their power factor.

Q. Okay. And again, you're looking for your

demand charge for your -- and I'm assuming both of your C&I classes pay a demand charge; correct?

A. (Carroll) That's correct.

Q. And so when you calculate your demand charge, there's no attempt to combine it with your system peak. It's simply a customer peak.

A. (Carroll) Correct.

Q. Okay. All right. Staying with Unitil for a minute. How many EV charging stations that are separately metered, so you would know about them, I guess, do you have in your residential customer class in your New Hampshire territory?

A. (Carroll) I'm not aware that we have any separately metered residential EV charging in our service territory.

Q. How about in Massachusetts?

A. (Carroll) Same situation there. I'm not aware of any separately metered residential EV charging.

Q. Okay. Do you have any estimate of how many unmetered EV charging facilities you have in your residential system?

A. (Carroll) Only the estimate based on the data that we were able to collect from motor vehicle registration data and apply that to the cities and towns that we serve in New Hampshire. We were able to compile an estimate. And that number, as of the end of 2020, is in testimony as well. I'd have to look at it to get the exact numbers. I want to say a little over 500, but I need to verify.

Q. Okay. That's great. It at least gives us an order of magnitude.

And for your C&I, either small or large, or maybe you could break them out separately, do you have any idea how many chargers those groups have?

A. (Carroll) I don't have an understanding of how many small C&I chargers we might have behind regular G2 meters.

Q. Okay.

A. (Carroll) For large G1 -- for the large G1 class, we are aware that we have 2 DC fast-charging stations in our service territory separately metered.

Q. Oh, okay. That's your "G2 class" you call them?
A. (Carroll) G1. Sorry.
Q. Oh, G1. So that's your large class.
A. (Carroll) Large class is G1. Correct.
Q. Okay. Super.
Liberty, same set of questions, if you don't mind. Your residential customers, do you have any separately metered EV charging with your residential customers?
A. (Tebbetts) Well, we have three maybe to five that are ready and they've done the work on their end to get the meter so they can be separately metered. But we don't have meters yet. So they're ready for it, but we can't get the meters yet.
Q. Okay. And in your small commercial class?
A. (Tebbetts) No.
Q. How about your large commercial?
A. (Tebbetts) We do, but those customers are under our G1 rate. I think we have -- we have a new installation in Salem with four, a bank of four chargers, and I believe one new installation in Lebanon with a bank of four

chargers as well.
Q. Okay. So those are just running through their normal meter, which means they're paying a demand charge under your rate structure; correct?
A. (Tebbetts) Yes.
Q. All right. And you don't know whether any small commercial establishments have electric vehicle chargers because there's no way to gather the data I guess at this point.
A. (Tebbetts) I mean, if they put them behind their meter, then we wouldn't. A good example is at our Londonderry offices. We have two Level 2 chargers. There are four ports there.
Q. Yup.
A. (Tebbetts) You know, it's just behind our meter at the building. We don't have them separately metered.
Q. Okay. And I was intrigued that Unitil was able to sort of pull data from vehicle registrations. Have you tried that in your service territory to see what you might -- what might be out there behind the meter

right now?
A. (Tebbetts) I do not believe we have looked at vehicle registrations, no. I'm unaware at least.
Q. Okay. Do you have any affiliates in other states that are also looking at this issue?
A. (Tebbetts) Yes. So our affiliate, Empire District, which is in Missouri, has some new rates that they just got approved, I think maybe just a week ago, that looks at time of use. But their structure is very different because Liberty actually owns the charging stations.
Q. Ah, okay. Any others? Any in New England? I don't remember what your company has now for other subsidiaries.
A. (Tebbetts) We don't have any other electric utilities in New England.
Q. Beginning -- going with Liberty for a minute. What administrative billing or other costs do you anticipate in order to offer the EV time-of-use rate?
A. (Tebbetts) I'm actually not sure at this time. We already have the systems in place

to bill the same time-of-use rates. So as far as I understand, this should not change how that structure is. The only component is the demand. But given that it's not a time-of-use demand, my understanding is we should be able to -- we can get the data from the meters. That's demand. That's not the issue. I think we just have to do a little bit of programming to ensure that the demand charge is included when all of the information's registered from the meter and moved from that meter to our meter data management system to our billing system.

Q. So even though your meters don't -- I thought you told me earlier the AMR meters don't record an hourly consumption. But you're going to be able to bill a time-of-use rate notwithstanding that? How is that going to work?

A. (Tebbetts) I apologize. I meant under the structure in the Settlement Agreement, we will not be able to use the same meters. We are going to use different Itron meters that we're currently using for our residential EV

charging rate.
Q. Oh, you're right. I'm sorry. I did forget these are separately metered, and your people are waiting for new meters. Sorry. I forgot that.

Okay. And then for your commercial and industrial customers, they can separately meter. But they would also be waiting for new meters; correct?
A. (Tebbetts) Yes.
Q. So everyone in your program is stalled, essentially, until meters are available.
A. (Tebbetts) Yes. That's one reason why we haven't heavily promoted it.
Q. I think -- let me just go to Unitil with the same question.

What administrative or billing or other costs do you anticipate in order to offer this rate?
A. (Carroll) My understanding is that our system is capable of handling time-of-use rates now. There may be costs associated with configuration and testing when the new rates go into effect. I don't have estimates for

those costs. But they aren't significant. At least my understanding, subject to check, they're not significant changes to the system itself. It's just configuration within the system and testing of those changes.

COMMISSIONER ROSS: Okay. Thank you. That's all the questions I have for now.

CHAIRMAN GOLDNER: Commissioner Chattopadhyay.

INTERROGATORIES BY COMMISSIONER CHATTOPADHYAY:

Q. Good afternoon. So I'm going to be asking questions, not necessarily sort of going with particular witnesses in any order. I'm actually looking at the list of questions that I have, where I might jump from one witness to another, and so bear with me.

First I'm going to go to Dr. Sergici. And I have a questions about this 50 percent issue. And so can you first sort of tell me, in your original testimony, as far as the demand charge is concerned, how much of it remained with demand charge in your proposal for the different utilities?

A. (Sergici) So, Mr. Commissioner, we developed

the original testimony just purely on the basis of a time-of-use rate. And again, because of the assumption of 15 percent utilization rate --

(Court Reporter interrupts.)

A. (Sergici) So as I was saying, in our original testimony we developed a time-of-use rate for all the rate components, transmission, generation and distribution, and based on the class average load factor and peak coincidence and whatnot because of the unavailability of charging station data.

So when we did that initial analysis, we looked at some bill impacts. And we saw that around 15 percent or so utilization that this TOU rate, removing all the demand charge elements, would recover the similar amount of revenues as the original rate would. So that was the basis for our recommendation.

But through -- you have a question there, Mr. Commissioner?

Q. No, I'm going to have a series of questions. So if you -- are you -- have you wrapped up your answer?

A. (Sergici) Sure, sure. Yeah. So then, as I mentioned in my testimony, we found out that utilization levels were much lower than for 95 percent utilization level. This rate that we designed under-recovered the revenues. So, again, we set out to design this rate to minimize the cost shift. And with the parties to the settlement we found a compromise, a middle solution in which we still kept the original price signals as we designed, but then also introduced 50 percent of demand charge to make sure that this rate that we designed recovers sufficient revenues under this alternative rate.

Q. So if you had correctly used the capacity utilization number, rather than using 15 percent, let's say you had identified right at the beginning it's 5 percent, what would your recommendation be at that point? I just want to understand -- I mean, I see how to adjust the change in the capacity utilization from 15 percent to 5 percent. And keeping the revenue neutrality intact, you played with the demand charge and said,

okay, 50 percent of it would be recovered in the demand charge itself and the other 50 percent from the TOU rates.

So I want to understand, if you had correctly estimated the utilization factor to be around 5 percent right at the beginning, would you have still sort of recommended using a rate design where you have all of the, you know, demand charge being moved to TOU rates.

A. (Sergici) I think that if we had that information at the beginning, we would see that this rate, purely on the time-of-use construct, was not completely recovering the revenues. And at that point we would have decided to allocate some of the cost recovery to demand charges from the beginning and create the sort of rates from the beginning. But not all of the rate elements would be recovering, but that some of the cost recovery would be reserved for the demand charges.

But, again, given that this is a demand charge alternative rate with time-varying

rate signals, the demand-charge related recovery would still be lower, like we're suggesting right now.

Q. I know I'm sort of -- you know, it's difficult to capture what you would have done. Of course, we are talking about the settlement here. But would you have -- you know, understanding that with the capacity utilization of 5 percent you still would have -- you know, I'm trying to understand, yes, that would have told you, okay, you know what, we cannot go all the way to TOU just using all of the demand charges being reflected there. We need to go still quite a bit. Would your answer have been 50 percent, or would it have been somewhat different than 50 percent?

A. (Sergici) No, the answer would still be 50 percent because, you know, again, we [indecipherable] some of these rate designs to make sure that 50 percent gets us to the same level. And it's pretty close to 50 percent. You know, we actually went through the total process, Mr. Commissioner,

to make sure that our settlement position that we came to would be the same as we would in the first place, and we confirm that it would be the case.

Q. But you could have sort of set a different TOU rate even with having demand charge being recovered through demand charge, maybe a different percentage. I'm just trying to understand, would you have been willing to move on the TOU rates a little bit differently than what you sort of earmarked having started at 15 percent capacity utilization, and therefore right now when you're talking about the settlement numbers, you're sort of boxed in. So I'm just trying to understand would you have been sort of more flexible on the TOU then than where you are right now? And just give me a general answer. I'm just -- I don't need you to give me any numbers, but, you know, general sense.

A. (Sergici) Yeah. No, I think generally we would still be in the same ballpark, that the current peak load peak ratios that we have right now would still pretty much hold.

Maybe some of the distribution-related volumetric TOU rates would go up and down by, you know, several, you know, decimals in some magnitude. But I'm pretty confident that overall peak load peak ratios that we found would remain essentially the same.

Q. Okay. So this is again a question for you. With the high draw-demand rate design proposed in the settlement, do you think that it does eliminate the cross subsidies that you had mentioned in your original testimony sufficiently to allay the concerns about efficient use of assets? I'm talking about economically efficient use of assets. Would you say that that still is an open question because it will all depend on how the customers behave and you'll have a better sense later?

A. (Sergici) Yeah, that's a great question, Mr. Commissioner. So these rates are designed to be revenue-neutral or they're recovering the same revenues under the assumption that there would be no changes, all right. So that's the premise of revenue neutrality. You make

the assumption that under no load change assumption, are we recovering the same revenues. And the rate that we designed for the high demand-draw rate does that. But when the customer starts responding to these rates, then they should start shifting their usage from peak to off-peak periods, they achieve bill savings. They, you know, reduce -- the revenues from these customers would go down. So that could be some intermittent or transitional cost shift to some of the customers during that cost shift.

But, again, the premise is that these customers are now doing the right thing, the efficient thing. And by reducing their peak usage, they are helping to moderate the grid infrastructure investments. So then that will turn into avoided generation and capacity cost, and that will also eventually help all customers in terms of bill savings. So those will be, over time, balanced.

Q. Okay. I just want to get a sense from the settling parties. Do you believe that 50 percent of the demand charge being

recovered through volumetric charges, and therefore you still have 50 percent of the charges being recovered through demand charges, that could still create barriers for commercial EV TOU customers? And this is a question for everyone, all the settling parties. So you can choose. Maybe I'll first ask you, Dr. Sergici.

A. (Sergici) Yeah, so I think that 50 percent demand charge obviously is worse from the perspective of a charging facility compared to no demand charge, right. So they indicated several times that these demand charges are prohibitive to their business, essentially in the early days of the business, that as a result of the demand charge, just bills are getting to be pretty high.

But our perspective here is to, you know, balance a lot of rate design objectives, right. You know, cost causation is one. The other is includable -- to create includable rates. So our angle has been -- my angle has been mostly working with the

theories that, you know, we need to make sure that we meet the rate design objectives, but not necessarily use rates as a way to advance the proliferation of the charging infrastructure in New Hampshire. It would be great if the charging facilities become a lot more and that this would hopefully lead to more EV adoption. But as I indicated in my testimony, I do not believe that rate design is a way to do that, and there are other ways to promote the transportation electrification.

Q. I think one question I have is, is there an advantage sort of setting a uniform percentage across utilities for the share of demand charge being recovered through volumetric rates? You know, in this instance, it's Unitil and Liberty. They are going -- you know, they are both going with a 50 percent demand charge, based on the proposal. Is there something inherent in it, that it's worthwhile to have the same percentage for both utilities, or could we employ different percentages for the two

utilities? And because we are at a point where data is not available, we can actually exploit that kind of rate design differences to understand how customers react to different situations?

So just can you give me a sense, you know, is there sort of some sort of literature out there that says it's always better to go with the uniform rates. Keep in mind that these two -- of course, you know that these two utilities have separate jurisdictions and -- but can you just throw some light on that issue?

A. (Sergici) Well, that's a really interesting idea. So you're essentially thinking about the natural experiments in which, you know, since we are advancing these rates at this time, what if one of the utilities had 50 percent and the other had 30 percent demand charge, and do we get to see more charging infrastructure moving into that other jurisdiction with the 30 percent demand charge elements. It's definitely a very interesting idea.

I mean, from a rate design perspective, when we proposed the 50 percent, we saw that both Liberty and Unitil, mainly, that assured that revenue neutrality goal that we were looking for. But again, if we want to do -- or if the Commission wanted to see this natural experiment in play, I think there is room to move some of those demand charges. But we would need to adjust the utility rate components as well.

But on the flip side, I think if the goal is -- if the goal is to make it easier for the charging companies to come to the state of New Hampshire and sort of build their business models and processes in response to these rates, I think from their point of view, I think there is benefit to having more homogeneous rates that these new charging facilities can start working with. So I see pros and cons with both of those approaches.

Q. So just thinking about the cons, a business that is interested in creating EV facilities, if that business sees that the number in one

jurisdiction is 50 percent and it's 80 percent, it would probably have -- you know, it would be tilted towards going to the 80 percent jurisdiction, and that might create some issues. That's what you're saying.

A. (Sergici) Right. It could lead to maybe charging facilities clustered in locations instead of more evenly distributed in the state of New Hampshire. It could be one unintended consequence perhaps.

Q. Okay. I'm still sort of looking at the -- this is I think Exhibit 24, the settlement draft itself. And if you go to the last few pages, Bates Pages 20 to 22 I think. I will admit that I'm still trying to fully understand what's there, and it's just a matter of spending some time on it. I will.

But I'm just curious whether you can provide, or the parties can work on calculating what the TOU rates would be for the two utilities under assumptions of the demand charge being recovered through TOU, starting from 50 percent, let's say also get

me for 60 percent, get me for -- get another answer for 75 percent. Excuse me. I forgot to bring my water.

So will that require some sort of a record request, or can you just give me a sense how the numbers would change?

A. (Taylor) Yeah, this is John Taylor with Atrium. I think that could be done. It wouldn't be an overly difficult process. I think, you know, both with Liberty and Unitil's demand rates being very close to the $10 range, you know, this would be a movement of a dollar or two, which I don't think would have a large material impact to the economics of a particular station. You know, I think, plus or minus, $4 a kW to $6 a kW, I don't think that would sway an investor's or facility's decision too heavily. So I think that there is, from a bill impact standpoint, some implications as to how much is coming through that charge. But, you know, there is a range of reasonableness, you know, probably plus or minus 10 percent or so, that you'd be in the same results in illustrative bill

impacts.

Q. So can I request a record request here and do the calculations for 50 percent, 60 percent, and 75 percent and, of course, keeping the revenue neutrality in mind. So you're sort of using two degrees of freedom just changing the demand charge and then also changing the TOU to ensure that you have revenue neutrality. So I would like to see these three numbers being analyzed. It would be great if I can sort of see what the changes are.

COMMISSIONER ROSS: Could I just clarify your question? When you say 60 percent and 75 percent, are you saying that 75 percent of the demand charge costs will be --

COMMISSIONER CHATTOPADYHAY: Yes.

COMMISSIONER ROSS: -- in the TOU rate?

COMMISSIONER CHATTOPADYHAY: Yes. Correct. It's in that direction, yeah.

COMMISSIONER ROSS: Okay.

A. (Tebbetts) Could I add to this? So when I look at -- one of the deciding factors when

Liberty changed course and looked at these TOU rates and decided signing on to the settlement would be a good opportunity, we had taken a look at what Dr. Sergici put together for us. And if you look on Bates 22, which is her analysis for Liberty, and we look at the TOU rates with half a demand charge, okay, which is $2,005 -- and I do believe this is the annual -- the monthly cost, okay. So we took a look at that and looked at the total kilowatt hours of 4500 --

Q. Can you tell me which page you're in so that I can --

A. (Tebbetts) Sure. It's Bates 22 of the Settlement Agreement. That's okay.

Q. Okay. Sorry. So last page. Okay. And then?

A. (Tebbetts) So it's Bates 22. And I looked at, if you go down to line -- it might just be easier to find under it under Facility 1, the number 2,005; that would be their monthly bill. And if I looked at the total kilowatt hours of 4500 per month, that was based on her facility assumptions. So if you took a

look at that and said, if I'm a charging station owner, how much do I have to charge customers in order to get my money back, right, for that one month? And I looked at that. And when we had taken a look at this, what we did was we divided the $2,005 by the 4500 kilowatt hours, and that's 45 cents a kilowatt hour. You say that's a lot, but that includes the demand charges.

If I'm a Tesla owner, we'll say, and my car is going to charge 100 kilowatt hours -- let's assume it takes a whole hour -- I am paying $44.56, with the rounding, 45 bucks to charge my car. That is significantly cheaper than going to the gas station today. And so even with the demand charge, even with the high time-of-use rates at critical peak hours, the customers who are charging their vehicles are still paying significantly less than at the gas station. And this is why we looked at these numbers and decided that we thought this was actually something that would promote electric vehicle charging. Because don't forget, the station owners can

charge whatever they choose. They do not have to charge the 45 cents a kilowatt hour. They can charge 50 cents kilowatt hour. It's up to them to charge customers what they want. So they could even make money off of this and still sell it for 50 cents a kilowatt hour, and a customer is still only going to pay $50 to charge, to fully charge their car.

So these are the reasons why at least Liberty signed on to this, looking at today's dollars and cents on gasoline versus electric vehicle charging, and the rates associated with the Settlement Agreement.

Q. That is very helpful. Thank you. But my record request stays because it would be great if I could see how the numbers change.

So this is again another -- going back to Dr. Sergici. And I think you had used -- in your recommendation on the rate design, you used something called "square of the load approach." And I'm just using that term. You know what I'm talking about?

A. (Sergici) Yes.

Q. Have you analyzed other approaches, like personally?
A. (Sergici) I have at least analyzed Liberty's approach, replicated their approach, which I found also being reasonable, but significantly more complex than the squared load approach that we came up with.
Q. But other than that, you haven't looked at any other approaches.
A. (Sergici) So there are other approaches, obviously, less sophisticated ones. But for this particular task, we've only looked at the two of them.
Q. And would you agree that for different approaches, there might be different alignment between rates and costs? And so I'm very curious whether this "square of the load approach" does a reasonably good job or not of that issue, the alignment of cost and rates. And, you know, so that's almost corollary that -- and I'm going to ask why didn't you use, for example, why not a cube root? Why not the load raised to the power of 1.5? That's the nature of -- is there

anything specific about the squared load approach that you can tell me? For example, that's the one that is typically used by many other, you know, consultants, and so this has been looked at enough, that there is a lot more trust in that actually doing a pretty good job of leading to economically efficient outcomes? So that's my question for you. Can you just --

A. (Sergici) That's a great question, Commissioner. So the time-varying elements of distribution rates is relatively recent. For the longest time, time-varying rates were mostly introduced on the generation side and also, you know, sometimes on the transmission side. But there is -- more recently there is movement towards also making the distribution component of the rate time-varying.

So there is not a lot of established literature out there on how to allocate distribution costs on a time-varying basis. But the example that I know are ranging from literally looking at the cost of service today, taking X percent of the distribution

cost and allocating them to just the summer peak hours, and taking another Y percent and allocating them to the off-peak period. So that's been done in a few jurisdictions that I've been involved in.

I have settled on the squared approach because I thought it strikes a very good balance between all the hours leveraged to the distribution system, right. So all demand at all hours should contribute to the distribution system costs. But those hours where there is a lot of load on the system is really more responsible for the build out of the distribution assets and distribution system. So I thought that by taking the square of the load, we kind of strike a good balance of not too much exaggerating of the contribution of the load to the cost derivation, but at the same time emphasizing enough that those high load hours would be given the proper price signal.

And I also looked at the beginning of our rate design efforts. I compared the results from the squared load approach to the

Liberty's current load allocation approach. They were pretty similar. It wasn't completely drastic different results that we got. So then that convinced me that this approach was doing, you know, sufficiently good enough job of establishing the cost causation for distribution costs.

Q. Okay. Thank you. And one more question, as far as the settlement panel is concerned. I think can we go to, again, the same pages that I mentioned before, Bates Page 21, 22, and maybe even 20 -- Exhibit 24, the settlement. So I will admit right away that I'm still sort of looking at the numbers. But one of the things that jumped out at me -- I'm going to first sort of ask generally about something and then go into the numbers.

So typically when you have peak, mid-peak and off-peak, what do you expect? The off-peak rates to be lower than the mid-peak, and then the mid-peak rate would be lower than the peak rates; right?

A. (Sergici) That's correct.

Q. Okay. So if you look at Unitil's numbers -- and I'm not looking at the 50 percent situation. There it ends up being fine. But maybe I'm just confused. But when you look at the numbers for peak, mid-peak and then off-peak for Unitil, it's the other way around.

So let's go to Page 20, Bates Page 20. And when you have, for example, Unitil proposal -- let's look at Proposal 2. And then you talk about summer, the peak is .18, mid-peak is .008, and off-peak is .026. So I'm just confused. But the direction, the way you describe it, actually holds for Liberty. But for Unitil, it doesn't seem to be holding. That doesn't mean that with the 50 percent approach -- if you look at it, there the direction is fine. So if you look at Unitil calculation have demand and charge recovering rest of distribution revenue from TOU rates, there it's showing up to be the way it should be. So I'm confused what's going on. Can you explain? And this could be for everyone.

[Court Reporter interrupts.]

A. (Sergici) I was saying I could take the first pass at answering that question.

First of all, that rate that you're pointing to, Mr. Commissioner, that was during the settlement conference process. We looked at various different alternatives. And I think that's one of the rates that Unitil looked at to see how they would do compared to some other alternatives on the table. And, you know, there are a lot of cutting and dicing that we do here. First we define the seasons, and then we define these periods, looking at the, you know, load shapes and whatnot. And then we go ahead and allocate costs based on these methods that we describe. And I think that some of those cases -- and again, Mr. Taylor will be more qualified to answer this than I am because I think it's his data that we pulled here -- that, you know, during the allocation stage, maybe some of the peak and off-peak periods were not aligning well, or too close to each other, such that the allocation, the costs

that compiled on the off-peak turned out to be greater than the mid-peak. But it's more of a curiosity. It's not a pattern. And it only shows up in that particular case I believe. So we have the right direction in the proposed rates, the original rate of the 50 percent demand charge.

Q. Yeah, that was my point. I understand that the proposal has it right. But in the calculations for the other options, it looked odd to me. So I think I would appreciate it, because this is all happening on only the Unitil numbers, I would appreciate it if Unitil can provide an explanation. I don't mind if it's sort of a record request and provide the answer later in writing. It could be something very trivial that I'm missing, but that you could explain later.

A. (Taylor) Yeah, So Unitil and Atrium did not produce and develop this, so we'll have to look at how this exhibit was produced and the backup in Excel and see what the issue was. Again, that was part of a settlement discussion, so I'm not quite sure how it got

in here. But we will take that as a record request. You know, in fact, it's in some ways it will -- it's in alignment with your record request already, Commissioner, regarding, you know, the 50, 60, 75. This is just, you know, the next one, which is 80 percent. So we'll get that cleaned up and --

Q. Yeah, it's actually 80 percent. If you take a look at it throughout, even for the other options, it's happening except for the one that you had proposed. So I think --

A. (Sergici) Oh, oh, Mr. Commissioner, I'm sorry to interrupt. But I think I found it. I think the lines were transposed. I'm now looking at the cell references. So what's written as --

Q. Okay.

A. (Sergici) I think, Mr. Commissioner, I identified an error in that exhibit, which is a transposition of the period. So it's not the values are incorrect. It's just the reference to mid-peak should actually be off-peak, and the off-peak should mid-peak.

So that could be corrected.
Q. Yeah, that's reassuring. Can you provide the corrected pages? I know I can sort of look at it and know exactly what you're saying, but I think it would be helpful as part of the record to have it corrected.
A. (Sergici) Sure. Yes.
Q. I have a question for Liberty Utilities. So for the peak period -- and I forget. It was, I think you said, 3 p.m. to 8 p.m., the peak rates. The on-peak and off-peak was instead of -- you said something about the actual peak happens around 2 p.m. Do you recall that discussion?
A. (Tebbetts) Yes.
Q. Okay. So do you think that can lead to undesirable rates and cost alignment sort of --
A. (Tebbetts) So what I was referring to is that Liberty's peak, when we look at our distribution system, is usually in the summertime -- well, it's in the summertime around 2 p.m., so the period of 2 to 3 p.m., where we find the ISO peak is hours later.

Now, in looking at these rates and the design of them, the idea is to provide the highest rates in the periods by which we believe customers will charge the most to alleviate that congestion of charging at once. In looking at it, we thought, okay, will customers really charge between 2 and 3 p.m. all the time? They may. But we also thought a few things are happening. One, in the months, you know, the winter months, the spring months, children are in school. So maybe parents won't be trying to charge at that time because, you know, they won't be out and about, most likely. In the summertime, no school. But again, people are at work. And during the rest of the year people are at work usually between 2 and 3. I know folks are remote, but they're probably still working.

But when you look at 7 p.m. to 8 p.m., we felt the odds of a customer charging are greater than the 2 to 3 p.m. hour. So could there be an issue there? There could. And that is the purpose of section, I think it

was Section 10 in here, to say that once we get enough data, we're going to look at that cost of service data and make determinations as to whether or not the rates are appropriate for the times that we've chosen. And if they're not, we will change them. We'll change the times of when the rates are appropriate to have, you know, the peak, the mid-peak and the off-peak. But rather than trying to accommodate our distribution peak, we try to rationalize and say what are people's behaviors versus what our system might be doing.

Q. I will say this, that regardless of how customers react, one could make a point that if it costs five dollars to get something done, then the customer should be paying five dollars. If the reality is that they are all boxed into sort of having to use that service during that time, you still have the choice of not doing it as opposed to doing it.

And so my point was more about -- you know, I think your answer is very helpful. So we will -- we need more data to understand

it. But I'm just going to flag that. Just because people are sort of forced to do something, that should not necessarily be the metric when you're trying to say, okay, I'm going to set the rates that will allow me to recover the costs appropriately. So I'm just -- I wanted to mention that. But I think your answer is helping me think through that this is more about getting more data and then understanding what's going on.

A. (Tebbetts) And if I could add to that. The other concern we have, too, is that if we ended that peak rate at 7 p.m., customers would then take advantage of the 7 to 8 p.m. very low peak -- off-peak hour, and then we would find a shift in that usage, where then we may have to now look at including 7 to 8 p.m. in the future. And so we don't want that to happen either. So there was a lot of back and forth and consideration. And you're right. Until we get the data to fully understand the behaviors, we thought this was most appropriate for right now.

Q. So this next question may be appropriate for

ChargePoint because they are in the business of having the facilities. But if the utilities or anyone else -- including, of course, Dr. Sergici, you can respond as well.

I don't know much about L2, Level 2, Level 3, and then you also mention DCFC I think, if I got the abbreviation right. Can you give me a sense of how those different technologies differ, you know, in a very -- at a 20,000 feet level so that I have a good sense of what we are talking about here? Anyone? Or else I'm going to ask --

A. (Taylor) Yeah. Sorry. I thought that was -- this is John with Atrium. I can handle some of that. I thought that was pointing towards ChargePoint.

So basically the different charging ports have different capacities to push energy into the battery. So a Level 2 charger has a lower capacity, and thus it has a lower demand draw. So it's a -- you know, I don't know what ChargePoint's selling now, but let's call it like a 20 to 50 kW charger; whereas, you know, Level 3 and DCFCs are in

the 75-plus kW. So, you know, the different types of charging ports, you know, they have a different demand load associated with them. And there's also, you know, technologies related to those ports that make them smarter and intelligent, where they can respond. You can program them. You know, there's technologies where, if there's a cluster of smaller Level 2 ports, that you can turn some of them on and off to make sure that the cluster doesn't hit certain peak demand. But basically the difference is the capacity and the speed in which energy is moved from the facility into the battery.

Q. This is purely out of curiosity. So the charging stations, do they only let you just charge? And I know it can -- they are smart, you know, in the sense that you can do other things. But do they -- can they also allow somebody to, like, say, you know what, I'm going to go in the other direction. I'm going to provide something to the grid. I know it's a -- this question is sort of really hypothetical. But I'm trying to

understand is it possible in the future that devices like these can also allow the grid to benefit from stored energy or something.

A. (Sergici) I believe so, Commissioner. In the future they're talking about vehicle to grid types of capabilities. And there are pilots of this currently underway. I don't think that it's being done at this time. And again, ChargePoint, if they're on the line, can correct me. I don't think they are prepared for the EVs and the cars feeding energy back to the grid because there are a lot of requirements that needs to be figured out in terms of, you know, cyber security and electrical requirements and so on. Not at this time, but I think surely there's going to be in the future that might be possible.

Q. And is that also what you just described, it's true for even residential charging; right? I mean correct?

A. (Sergici) That is correct.

Q. Okay.

A. Yes.

Q. Okay. I think that's all I have. Thank you.

CHAIRMAN GOLDNER: Okay.
Commissioner Ross has a follow-up.
INTERROGATORIES BY COMMISSIONER ROSS:
Q. Just a question about generation and whether it can be subjected to time-of-use adjustments. And because we are de-regulated in this jurisdiction and people can choose a competitive supplier, I'm trying to understand how this works if a customer is on competitive supply. I can see how it would work if they were on default service. But what happens if they're not on default service?
A. (Tebbetts) So I can tell you, for Liberty, if a customer, in our current electric vehicle charge rate that we have for residential customers, if they are not taking default service, they do not receive time-of-use rate for their energy service provided by a competitive supplier. And we would use that same concept for commercial customers as well.
Q. Would they still have time-of-use rate as to distribution and transmission?

A. (Tebbetts) Yes.
Q. Okay. Thank you.
A. (Taylor) And I believe that's the same for Unitil. I don't know, Cindy, if you --
A. (Carroll) Yes, that's correct. If they are on third-party competitive supply, they would get a flat rate for generation, unless, of course, I think there is a possibility that if a generator wanted to, or a supplier wanted to provide supply at the same intervals as -- or the same time-of-use rate-of-use structure that we are providing the other components in, we may be able to accommodate that as well.
Q. Thank you.
CHAIRMAN GOLDNER: Okay. I just have a few questions --
MR. TAYLOR: Commissioner --
CHAIRMAN GOLDNER: Go ahead.
MR. TAYLOR: Sorry, Commissioner. This is Patrick from Unitil. I just had one clarification that I was hoping to make before we moved on.
CHAIRMAN GOLDNER: Sure.

MR. TAYLOR: Commissioner Chattopadhyay had asked a question about the modeling at Bates Page 20 of the Settlement Agreement and had pointed out some numbers for Unitil that required some clarification and issued a record request to the Company, but then Dr. Sergici I guess determined that the numbers had been transposed and explained that. And so I just wanted to get clarification. Has the record request been withdrawn, or is the Commissioner still expecting some analysis from the Company?

(Commissioners confer off the record.)

COMMISSIONER CHATTOPADYHAY: I would say that, you know, just red-line those numbers and change the numbers and provide that. Would that work as a record request better or just some other avenue?

CHAIRMAN GOLDNER: Mr. Taylor, do you have a preference if it's red-lined or a separate exhibit?

MR. TAYLOR: Oh, I have no preference. We'll provide the information. Actually, we actually did not -- Unitil did not

prepare that exhibit. That was prepared by the Department and Dr. Sergici. But I'm happy to coordinate with the Department of Energy as to how they want to prepare it. But Attorney Buckley might want to take that one.

CHAIRMAN GOLDNER: Mr. Buckley.

MR. BUCKLEY: Yeah, we could do it in whatever manner is the Commission's preference, either as a red-line of Attachment B more or less as a record request, or as an amended Exhibit 24 if that's helpful, either way.

COMMISSIONER CHATTOPADYHAY: I think the former would be fine.

CHAIRMAN GOLDNER: Okay. So the red-line as a record request.

(Commissioners confer off the record.)

CHAIRMAN GOLDNER: Okay. Just a few questions to wrap up the Commissioner portion of the session here.

INTERROGATORIES BY COMMISSIONER GOLDNER:

Q. I want to ask, in the Settlement Agreement Appendix, A, which is Bates Page 16, if the numbers in that table had been corrected in some of the prior testimony or whether those

numbers are currently represented as being correct. This was a question for Unitil.

A. (Taylor) Yeah, those numbers -- are you asking about the correction that we had to make to the rebuttal testimony?

Q. Yeah, I didn't capture that in my notes. And what I'm looking at is the off-peak period. Transmission plus distribution plus generation doesn't equal the total. And it's not a pop quiz. I think there's a decimal place that you're missing a zero in transmission. I think it should be .004, not .0408. I don't know who can address that, but it looks like there's an error in transmission.

A. (Taylor) I'm looking at that right now.

Q. Yeah, take your time. It's the same in Liberty, actually, right below, the same thing; the transmission plus distribution plus generation doesn't equal the total.

MR. TAYLOR: Commissioner, could you please provide that reference again?

CHAIRMAN GOLDNER: Sure. It's Bates Page 16. It's the two tables on residential

rates, both Unitil and Liberty. And in the off-peak periods, I believe you've made an error in your Transmission column on the off-peak. I think you're missing a zero. But I could be wrong. That's why I'm asking.

A. (Taylor) Yeah. So the off-peak, you're saying the .0408 plus the .02941 and then the .06304 does not equate to the total?

CHAIRMAN GOLDNER: Correct. It's about 13 cents, not 10 cents. I'll give you a second to calculate it. But it doesn't --

A. (Taylor) Yeah, no, I see the error. I'm not sure what's driving that, the table behind that.

Q. Yeah, both Liberty and Unitil make the same error, which is puzzling. It's only off-peak that's wrong, and it's wrong both for Unitil and Liberty.

A. (Tebbetts) Excuse me. I'm trying to understand which column. At least on Liberty, you're looking at our D12 EV rate; is that correct?

CHAIRMAN GOLDNER: D12 EV, and only off-peak. So it's .02 plus .036 plus .0357

most assuredly does not equal .07.
A. (Tebbetts) Oh, you know what? There must be -- there's a zero missing here. I didn't -- I don't believe -- I don't know if I filled this out or not. But there's just a zero missing. That's why. It should be .00213.
Q. Yup. And I believe it's the same for Unitil, if Unitil can verify. And then we'll need a red-line to this.
A. (Carroll) That appears to be the case.
Q. Okay. Because this is the settlement, so obviously we're depending on this to be correct.
A. (Taylor) Although these are illustrative rates. I think the settlement kind of defines the process in which the actual cost structures of the utilities will be used to develop the rates and ratios.
Q. Right. But if it's really 13 cents and not 9 cents, then we have a larger problem because now the three-to-one ratio is not met.
A. (Taylor) Correct.
Q. So I'm trying to figure out which direction

is wrong. Is it the Transmission that's wrong or is it the Total that's wrong?

A. (Tebbetts) For Liberty, it is the Transmission that is wrong.

A. (Taylor) Same with Unitil.

Q. Unitil's the same? Okay. Thank you. Okay. Yeah, we'll want that red-lined. I guess that would be a record request, too. But we need the Settlement Agreement to be correct, of course. Okay. Good. That was the first math questions.

Second math question is, Ms. Tebbetts, you gave us a very interesting illustration before, and I thank you for that. We were talking about $45 to fill up our new Tesla. So, thank you.

I looked up, while we were talking, the new Model Y Tesla, which gets about -- has a range of about 315 miles. So if it costs $45 to fill that up, I sort of took that as the baseline. And then I went on and bought a Honda Civic, or maybe an Accord that gets 25 miles to the gallon. I use the same amount of gas at $3, and I get a longer range. I

get 375 miles for the range. So I'm confused as to why I would buy an electric car with lower range?

A. (Tebbetts) Well, there's a lot of reasons why customers buy an electric car.

Q. But you represented that the range was better. And I'm not -- I'm just trying to make sure that we have the record correct.

A. (Tebbetts) If I represented the range was better, that's not what I was trying to represent. I was trying to represent that the cost to fill up that vehicle, 100-kilowatt-hour vehicle, is less than I would pay for a vehicle to use that same range.

Q. No. That's what I'm saying. That's not correct. And I'm just verifying the numbers. If it's $45 to go 315 miles, then any standard car would go farther.

A. (Tebbetts) We were using, like I think it was the national average at the time, $3.25, $3.30. So it was -- I think you mentioned $3.00. So it was equal to or greater than approximately how much you could go on, I

want to say it was $3.30 a gallon.
Q. Yeah, I just filled up at Irving station yesterday just out there, so I'm just using that number. But yeah, I'm getting -- let's see. I mean, if we take 315 -- so if we take 45 divided by 315... 14 times 25... If we have a car that gets 25 miles per gallon, the range is higher than a Tesla Y. But to be fair, it is less than a Tesla S. so I just want to make sure that we're doing the math right when we're putting something in the record here. I just want to -- either the range is more or it's less with an electric car. And I want to make sure we have the record straight.
A. (Tebbetts) Sure. And we were using Tesla Model S when looking at that. So that would have been a 100-kilowatt-hour vehicle, and that's what we were looking at. So --
Q. Do you know if the Y is a 100-kilowatt vehicle or something different?
A. (Tebbetts) I have not even heard of the Tesla Y, so I do not know.
Q. That's what my Google Search yielded is a Y

and an S.

Okay. I think I have what I need on this one. I'm not going to make this a record request. But I would ask in future hearings that we make sure that we've brought the math to bear when making a representation that one thing is better than another.

I want to move now to technology. My worry -- you know, I'm old enough to remember floppy disc drives, okay. So I'm not sure everyone in the room remembers floppy disc drives. But, you know, so when we implement this new technology, it will be outdated probably by the time we plug it in at the facility. And so, you know, future-proofing or making sure that the technology can work down the road is very important.

Are the meters that we're talking about here for Liberty and Unitil, are they one-way meters or two-way meters? Can you run the meters backwards, or can you understand if they're feeding back into the grid?

A. (Tebbetts) So the meters that we're using are -- they're still AMR meters. They're not

AMI. They're not bi-directional because they're not net meters. The difference is that we can do more programming with them, so that we can program these times in the time-of-use periods. That's the difference. With our AMR meters we have on your house today, we don't have the capability of programming the hours by which we need to capture the data. They're very rudimentary. And so we have to use a more sophisticated meter just so we have more periods within the data collection. But it doesn't do anything greater than collect data for those hours at intervals. But we can't do anything else with those meters. They can't talk back to us. We still have to drive by to read them if we -- actually, we can't even drive by to read them. They're read through the cellular network. So if we can't get a read, then we will go out to the meter and collect the data.

Q. And I assume you're using these meters -- it's a cost benefit trade-off. If you look at the meters that have more technology,

they're too expensive for the application. Is that the logic?

A. (Tebbetts) I don't think I understand your question, actually.

Q. Well, there's meters that are two-way. There's meters that measure every, you know, minute. There's meters with flash memory that can capture an entire month of data. So there's lots of meters out there. But you've chosen a meter, an AMR meter of some flavor, for some reason. And I'm assuming you chose that as part of a cost benefit trade-off as opposed to going for a meter that was more expensive, with more capability.

A. (Tebbetts) That's correct. So in the battery storage pilot, there was discussion of getting a meter that had 40 data points in it. They were over $1,000 apiece. And we don't need all those data points to build time-of-use rates. And so, yes, that is correct. So to use the same meters, our billing system, our MV90 meter data management system, all that's already been programmed to gather this data. And it's

just the interval data for those times. And that meter is a fraction of that cost.

Q. Okay. I would -- we can add this to the record request, and we'll put all these down tomorrow at the close of the hearing. But I would like the -- I'm sorry, Friday. You're right. Sorry. Friday, not tomorrow.

So I would like to see the physical implementation. And if it's in the record, I missed it. So you can direct me to it if I've missed it. What I mean by physical implementation is for each of these classes, each of these implementations, you know, a picture, a description, a capability would be very helpful to the Commission to understand exactly what we're approving as we move forward. Would that be a problem? I'll ask Ms. Tebbetts first.

A. (Tebbetts) I'm not sure what you want a picture of.

Q. Just the meter, what the meters looks like.

A. (Tebbetts) Oh, okay.

Q. Yeah, just the spec sheet on a meter. So it would be a physical picture. I think that

helps people understand. And for the public, too, it helps them understand what we're talking about, a description and then the capability. And again, my concern is always in future-proofing and technology and making sure that we're doing the smart thing for the long term as well as the short term.

All right. So we can -- we'll add that to the record request.

We talked a little bit before. I just want to --

COMMISSIONER ROSS: Could I just clarify? You're talking about the meters that are on order for the separate metering of the EV chargers, not the existing meters; is that correct when you ask for that?

CHAIRMAN GOLDNER: I am asking about anything that is moving forward. Any meter that's a part of this docket, in terms of moving forward. What's done is done. I'm just talking about moving forward. Would you like anything else, Commissioner, or was that --

COMMISSIONER ROSS: No, that's good.

BY CHAIRMAN GOLDNER:

Q. Okay. I just want to add on to one of Commissioner Chattopadhyay's comments before. I think we've covered it, so I won't belabor the point. But a design of experiment is a very interesting concept, meaning that unless you have different ratios applied, it's hard to know what customers appreciate or don't appreciate. The only way you'll know that is by having different options. I also understand the point made earlier by the panel that there's some element of simplification also that we need to consider. So I won't belabor the point, but I will say that that concept is very interesting, in terms of understanding the best long-term solution.

So my final question -- and I need to come back to the tables real quick. But my final question is just a baffling one. I'll ask Ms. Tebbetts first.

But if a customer is choosing to go to a time-of-use rate-of-use rate, they would only do that if they were getting a lower rate; right? They wouldn't go to a time-of-use

rate unless they were -- they figured they could modify their behavior to get a better deal you would say; correct?

A. (Tebbetts) Yeah, I would agree that the customers have opportunity to charge in the period that is cheaper than a different period.

Q. And then the logic with cost shifting is because you're moving it into another period, you're actually lowering the overall sort of Unitil cost, and thus the overall cost, as opposed to cost shifting it to another customer.

A. (Tebbetts) Well, it depends, because -- and this is where we say we don't know because we don't have the data. We don't have enough charging stations. So it depends. There could be cost shifting to other customers if customers who are using -- who are installing electric vehicle charging stations under any rate, but not our commercial rate -- let's assume these rates -- and we find that when we do a cost of service study, we compare the costs of like customers -- and when I say

"like customers," we'll say the same kind of load, although they may have a very different load shape -- we may look at it and say that the customer charges, the rates associated with distribution -- because it wouldn't be for transmission. We're going to reconcile those, and energy service will reconcile them. But the cost for distribution may show that they're not paying enough. Maybe they should be paying the 80 cents per kilowatt hour in that period. I don't know. Or maybe they should be -- maybe they're paying too much and the other customers are getting a deal.

So I don't know, and that's why we have to look and see once we get data to determine if in between customer classes there is cost shifting. And I forget the other piece of your question.

Q. I think you covered it. That's okay. Thank you. Thank you.

A. (Taylor) And if I could address that question as well?

Q. Sure.

A. (Taylor) Yeah, so I think the cost causation part of the conversation is a little bit more straightforward with the generation and transmission components, which is actually a great thing that, you know, there was alignment in the direct filings on the method, and there are an ability -- or there is an ability for system costs to be reduced based on consumers changing their behavior. And if you get through looking -- you know, once we update some of the appendices, exhibits to the settlement, you know, looking into those numbers you might see that the big difference in the time-of-use rates and the delta is being driven by time-varying, you know, the transmission and the generation components. You know, the distribution component is, of course, a part of the total bill. But you get a lot of bang for your buck from a cost causation standpoint by time-differentiating the G and T side.

Q. Very good. Thank you, Mr. Taylor.

I do have to come back, unfortunately, for one last tactical issue on the Settlement

Agreement, Bates Page 17. I am looking at -- so I'll let you get there for a second. It's a question for Liberty ultimately in the commercial rates. So Bates Page 18, the Liberty table, Rate EV-M, as in monkey. The off-peak is listed at .000. So free seems like a pretty good deal. Is there any representation that that's correct, or is that an error?

A. (Tebbetts) That is -- these rates come directly from Dr. Sergici's calculations. So I would need her to double-check that that was correct. But when I went back into her model, that is the rate that was there. And I -- yes.

Q. It's also true on the Liberty Rate EV-L below on Bates Page 18, there's another triple zero. Could be something in the fourth decimal place, I suppose. But it says zero on the sheet, which seems not right.

A. (Tebbetts) Yes. So if you see, these rates only go out three decimal points, and our rates actually go out five. So I think I'll probably have to -- when we provide the

red-line of this, we can edit that. And it probably does go out to the fourth and fifth decimal.

And you'll also note that the rates are exactly the same. And the reason for that is these rates are illustrative. We have multiple rate changes coming up prior to June 1st. And so due to those multiple rate changes, the first one happening February 1st, next one is -- a couple of them in May for transmission and other components, we have kept the same exact rates for now until we get an order approving the Settlement Agreement -- I'm assuming you do. And then we will need to go back into the model to re-calculate the rates based on the rates in effect at that time that you've approved the Settlement Agreement, based on the rates in effect at that date.

Q. Okay. Thank you. I'll just again just ask that you look carefully at that number, because based on all the other numbers on the spreadsheet, it's unlikely to be less than .00049. So that looks like an error to me.

Okay. So that was all the questions I have.

Commissioners, do you have any follow-up?

[No verbal response]

CHAIRMAN GOLDNER: Okay. Seeing none, we'll go to redirect.

Any questions for your witnesses, Liberty Utilities, Mr. Sheehan?

MR. SHEEHAN: I do not. Thank you.

CHAIRMAN GOLDNER: Okay. Mr. -- we'll go to Unitil. Mr. Taylor, any questions? Or I'm sorry. Any redirect for your witnesses?

MR. TAYLOR: Thank you, Commissioner. I do not have any redirect for my witnesses.

CHAIRMAN GOLDNER: Okay. Mr. Buckley.

MR. BUCKLEY: I do have just a few questions for the witnesses. And I think we'll start with Dr. Sergici.

REDIRECT EXAMINATION

BY MR. BUCKLEY:

Q. Dr. Sergici, you had a brief discussion with counsel for the Conservation Law Foundation

about whether the bills for customers on the high-demand draw rate, or rates, rather, proposed in this settlement would be less.

Is there any follow-up you might want to provide, a little bit more illumination of that conversation with respect to the likelihood that customers might shift their load responsive to those rates?

A. (Sergici) Yes. So I think the conversation will also revolve around making sure that sufficient revenues were collected from these customers.

But I think that another important point to discuss is that we're creating these rates -- or utilities will be creating these rates, such that those customers who think they could shift their usage from peak to off-peak periods can adopt these rates, and actually do so, do shift their charging load from peak to off-peak periods, which will then lead to bill savings for them, as well as creating value for the system.

I want to emphasize this because oftentimes we're more focused on, okay,

charging stations are great because they're going to bring a lot of load by virtue of promoting EV adoption, which I, you know, agree with in general. But we should also be careful about when that load will emerge. We don't want all of that load to emerge in the worst possible times for the system. We don't want the charging to happen during the most peaked times because that's only going to drive the costs for the system. Instead of reducing the cost for all customers, it's going to create unincludable redistribution of the costs and will have negative consequences for other ratepayers. So I wanted to highlight that and basically just emphasize the upside of proposing these time-varying rates, because if customers find ways to respond to these rates, then all customers will benefit from their response.

Q. Thank you. And there was also a discussion between yourself and counsel for Conservation Law Foundation about the likelihood of customers using direct current fast charge public charging stations, being able to shift

their demand, the price elasticity -- or, rather, non-elasticity of their demand.

Are there any -- in light of that conversation, are there any aspects of rate design that maybe take priority over customer responsiveness -- or, rather, an additional consideration to customer responsiveness when it comes to time-of-use rate design?

A. (Sergici) Right. No, that's really the cost causation. So we do hope and expect that the customers will find ways to respond to these rates. But to the extent that someone needs to use the DCFC charging station because they are on their way to somewhere else, and that's the peak time for the system, it's only fair that they pay for that higher cost of charging, because if they don't pay that higher cost for charging, then other customers will have to pay for that cost. So that's really what we also have to keep in mind. We have different goals. We have policy goals. But, you know, utmost, we're talking about rate design here, and we need to make sure that if customers can exhibit

our philosophy, that's great. But if they cannot, then they will need to pay for their fair share of using the system.

Q. Thank you. Now moving on to a question that was posed by Special Commissioner Ross to both utilities. And anybody on the panel who feels suited to answer this can feel free to answer it.

There was a question about whether the utilities know how many customers are in their service area who have battery electric vehicles. There's a provision in the Settlement Agreement relative to targeted marketing and using vendor channels.

Can you speak to the possibility of using those vendor channels to make direct contact with those customers who we already know have some type of a charger installed?

A. (Tebbetts) For Liberty, with regards to customers who already have a charger installed, I think this goes back to we don't know if the customer just plugs it into the wall or if they actually have a charging station in their garage, for example, right,

or if they called an electrician to put in, you know, a 220 in there. We don't know that answer. And I guess we could survey all our customers and ask them. Or I guess in Massachusetts they were able to pull the registrations. I don't know that -- I don't know if we can do that in New Hampshire. Maybe we can. This is something that we have to look into and determine whether or not that's viable, and I guess if it is, you know, survey our customers to find out, hey, you have an electric vehicle because we pulled your -- I'm going to be perfectly honest. Like the fact that I'd have to ask my customers and tell them I pulled your registration information to find out you have an electric vehicle, if I got a letter at my house like that, I would be calling customer service really upset. I'm not going to lie. That a utility thought it would be okay to go -- and I know it's public information, but I feel like it would be a very uncomfortable conversation to have.

But I will discuss these kinds of

information-gathering with our communications folks and see where we can go with that.
Q. Just a follow-up there. So elsewhere in this proceeding there is a proposal by Eversource to deploy a load management program for electric vehicle chargers. And I think this is even mentioned in the Sergici testimony, that in some instances those charging station manufacturer partners do partner with utilities to provide for that very, very targeted marketing avenue, not just for direct push marketing of the load control programs, but also for time-of-use rates. Is that correct? And this is anybody on the panel that feels suited to answer.
A. (Carroll) I'll weigh in, Brian. This is Cindy from Unitil. I think what you're -- I don't have the details on the Eversource proposal. But I think what the Settlement Agreement is looking to do is to encourage the companies to reach out to vendors, to charging supply equipment vendors, car dealerships, other channel partners that could give us a more direct line of sight

into which customers either have electric vehicles or are thinking about electric vehicles or are contemplating charging at home. And finally is to partner with those market actors to be a little more laser-focused on the right audience for the messaging about our EV time-of-use rates. So I think that's what we agreed to do, to seek out those channel partners and see if we can't find a way to be more targeted in our outreach efforts to customers who -- rather than, you know, polling all customers and providing information in newsletters and things like that, which is less targeted and more of a broad-brush approach to outreach. I think that's what our intention is with regard to the Settlement Agreement.

Q. Thank you. Next I'm going to turn to a question posed by Commissioner Chattopadhyay to Ms. Tebbetts. Commissioner Chattopadhyay and Ms. Tebbetts had an exchange about the actual distribution system peak being somewhere around the 2 p.m. period, but the overall peak rate here being designed to

begin at the 3 p.m. period.

Is that correct, Ms. Tebbetts?

A. (Tebbetts) Yes.

Q. And would you agree with me that a major consideration here is that we're trying to send a combined price signal that accommodates the likely peak period of the transmission, distribution and generation systems, and that the transmission and generation peaks must help guide where that peak period would occur?

A. (Tebbetts) Yes, and that's why I referred earlier to the ISO-New England peak in the past few years I think has been, like, between 4 p.m. and 5 p.m. or 3 p.m. to 4 p.m. So we're trying to capture that. And we're also trying to capture, you know, that evening where we don't want cost shifting to occur from 7 to 8 p.m. with customers taking advantage of an off-peak load rate, because then we're going to have to redesign the rate to figure out how we're going to accommodate the 7 to 8 p.m. hour.

Q. And that 2 p.m. peak you described, is that

for your distribution system more broadly?
A. (Tebbetts) Yeah, that is our total distribution system. So our distribution system peaks about one to two hours on the peak annual day earlier than the ISO-New England peak.
Q. And are you aware, Ms. Tebbetts, of the fact that the Commission recently completed a Locational Value Study that looks at substations that are likely to need capacity-related upgrades in the near future?
A. (Tebbetts) I wasn't aware the study was complete. In fact, I think we're still in the process of providing data responses to Dunsky Consulting.
Q. Is it possible that you are thinking of the Value of Distributed Energy Resources Study rather than the Locational Value Study? Lots of studies, I know.
A. (Tebbetts) Probably, yes.
Q. And would you agree with me, subject to check, and potentially with asking the Commission to take administrative notice from something that has been filed in 16-576, the

Locational Value Study, that the Locational Value Study has identified three substations that are likely to need capacity-related upgrades in the next couple of years -- those being the Vilas Bridge substation, the Mount Support Substation and the Golden Rock Substation?

A. (Tebbetts) Interestingly enough, let me -- I'm in the process of answering data requests on this. So what I'll tell you is Vilas Bridge, first of all, is not owned by Liberty Utilities; it's owned by National Grid. So if there are distribution upgrades necessary to it, they will not be the responsibility of Liberty.

With regards to Mount Support, we have much of the -- capacity needs are actually customer-driven. And so as such, we won't be doing these customer-driven projects until a named customer needs it.

And then with regards to Golden Rock, Golden Rock Substation is part of our Salem Area Study. And we actually are in the process of converting that -- or upgrading

it, I should say, so that it can accommodate our new 115KV supply line, our east and west circuits -- our west circuit is completed, our east circuit is being built -- and to connect it to our new Rockingham Substation.

So the capacity constraints associated with Golden Rock have been alleviated once we have completed all of these installations, which will be done this year. And also along with that, we've built a new feeder -- I think it's gone in service, or it's going to go in service this year -- to alleviate all of the potential congestion. And that's all due to the Tuscan Village upgrade.

So when that study was done, these -- first of all, Vilas Bridge is not owned by us -- but Golden Rock was in that process of being upgraded so that we can have it not just be a supply line substation, but we could actually have it connect from a 115 to 13.2 kV system. And as I mentioned about Mount Support, that is going to be customer-driven if we need to add additional capacity.

Q. Maybe I'll try and go about this in a different way.

Is it possible that those investments which are essentially on the margin, their load profile might be different than the profile of the overall distribution system, either later or earlier or something along those lines?

A. (Tebbetts) Well, given that -- see, here's the tough thing. Mount Support serves a great -- a very large area of our service territory, as does Golden Rock. And so -- as does Vilas. So I don't know the answer to that simply because I think there's a lot of nuances associated with making that jump to saying, yes, there could be capacity issues in the near future.

Q. And would you agree with me, at least subject to check, that of those three substations identified as potentially the marginal capacity-related investments, two of them peak after that 3 p.m. peak period kicks in and one of them peaks at 2 p.m.?

A. (Tebbetts) Subject to check, I do believe,

reviewing this information yesterday, that you're correct.

Q. Thank you, Ms. Tebbetts. I think that's it on redirect.

CHAIRMAN GOLDNER: All right. Thank you, Mr. Buckley.

Before we move to ChargePoint, I think the stenographer might appreciate a break. So let's start back up at 2:45 with swearing in of the witness, Mr. Deal and ChargePoint. So we'll come back at 2:45.

(Brief recess was taken at 2:30 p.m, and the hearing resumed at 2:41 p.m.)

CHAIRMAN GOLDNER: Please be seated. Okay. Are there any other preliminary matters before we have the next witness sworn in?

[No verbal response]

CHAIRMAN GOLDNER: Okay. So let's proceed with the witness.

Ms. Robidas, would you please swear in the ChargePoint witness.

(WHEREUPON, MATTHEW DEAL was duly sworn and cautioned by the Court Reporter.)

MATTHEW DEAL, SWORN

CHAIRMAN GOLDNER: All right the witness is now available for direct.

MR. VIJAYKAR: Thank you, Chairman.

DIRECT EXAMINATION

BY MR. VIJAYKAR:

Q. Good afternoon, Mr. Deal. Would you please identify yourself and your role with ChargePoint.

A. Certainly. Matthew Deal, and I serve as manager of utility policy here at ChargePoint.

Q. Thank you. And would you please describe your involvement in the proceeding, in the instant proceeding today.

A. On behalf of ChargePoint, I have developed comments, reviewed party testimony and comments, developed testimony, participated in multiple tech sessions, and also participated in multiple settlement conferences.

Q. Thank you, Mr. Deal. And was the testimony that you prepared filed with the Commission on October 13th of 2021?

A. Yes.

Q. Did that document include a cover page and 17 pages of questions and answers?
A. Yes.
Q. Did your testimony include any attachments?
A. Yes. I believe there were six attachments.
Q. Thank you, Mr. Deal. Is your testimony and the accompanying attachments now marked as Exhibit 7?
A. Yes.
Q. Do you have any corrections or updates that you'd like to make to that testimony at this time?
A. No.
Q. To the best of your knowledge and belief, were the answers presented in your testimony accurate at the time that the testimony was filed?
A. Yes.
Q. And do you adopt those answers as your sworn testimony in this proceeding?
A. Yes.
Q. Thank you, Mr. Deal.
MR. VIJAYKAR: Commissioners and Chairman, that's all that I have for Mr. Deal

at this time, reserving the right for redirect. And I would tender Mr. Deal for cross-examination from any parties or the Commission for any questions.

CHAIRMAN GOLDNER: Okay. Thank you. We'll move to cross-examination. Liberty.

MR. SHEEHAN: I have no questions. Thank you.

CHAIRMAN GOLDNER: Does Eversource have any questions?

MS. CHIAVARA: No, no questions for this witness. Thank you.

CHAIRMAN GOLDNER: Unitil?

MR. TAYLOR: Unitil does not have any questions for this witness. Thank you.

CHAIRMAN GOLDNER: Thank you. Clean Energy New Hampshire? Mr. Skoglund might be gone. We'll give him another chance if he comes back later.

Conservation Law Foundation.

MR. KRAKOFF: Yes, I just have a few cross-examination questions. Thank you.

[Court Reporter interrupts.]

CROSS-EXAMINATION

BY MR. KRAKOFF:

Q. Mr. Deal, I just have a few questions for you.

On Page 8 of your testimony, you were asked why are demand charges a significant barrier to public EV infrastructure deployment. Could you just explain why, in your view, demand charges are a barrier to EV charging station deployment.

A. Sure. I think, you know, filling out some of the comments that other witnesses here have said today and, you know, drawing on what I filed in testimony, public DC fast charging can have low load factors with sporadic or infrequent usage of high demand when either a single vehicle or multiple vehicles may be charging, so that one vehicle or multiple vehicles charging at the same time for potentially a short amount of time will ultimately lead to potentially high demand charges. And if in early years or in certain situations when DC fast chargers only have a few vehicles charging per day, per week, per

month, so a low kilowatt-hour drop, but yet high demand draws, it is very difficult for EV charging station operators to predict and to spread those high demand charges across kilowatt-hour consumption to appropriately recover those demand charges.

Q. So for low utilization rate, DCFC charging stations, would demand charges -- could demand charges account for a significant share of that site host's electricity cost?

A. Yes, they can. And there have been studies demonstrated -- or that have demonstrated that fact, one of which was cited in my testimony, done by RMI, previously known as Rocky Mountain Institute -- I believe they now just go by RMI -- showing that demand charges can account for up to 90 percent of energy costs across and in particular jurisdictions.

Q. And can demand charges like that make charging stations uneconomic?

A. Yes, it does have the potential to be very challenging to have positive economics and ongoing operational positiveness --

"positiveness" is a terrible word -- to operate in a positive light due to those demand charges.

Q. You also stated in your testimony, on Bates Page 7, Lines 4 through 9, you stated that TOU rates may not be a perfect application for certain EV charging use cases, such as public DCFCs. Could you just explain why you think that's the case.

A. Again, at a high level, public DCFC fast charging by design is usually only used if and when absolutely necessary. And that typically is for charger -- or electric vehicles that are traveling further than potentially their range, or for folks that don't necessarily have EV charging facilities at their own home. So what that means is those individuals or those drivers don't necessarily have the ability, if they are transiting from Point A to Point B and absolutely need a charge, they don't have the ability to react to necessarily time-of-use rates. And what I mean by that is if you pull up -- [connectivity issue]

[Court Reporter interrupts.]
CHAIRMAN GOLDNER: Excuse me, Mr. Deal. You broke up about 20 or 30 seconds ago. Can you try it again, please?
WITNESS DEAL: Apologies. The Internet connection has worked fine all day.
A. So just backing up a bit, so DC fast chargers are used primarily to get people back on the road as quickly as possible. And that does not necessarily constitute driving up to a fast charger when it's a high-priced period and sitting and waiting for three, four or five hours for an off-peak period to be triggered. Typically, folks drive in, get in and get out as quickly as possible.
Q. So those users might not have the ability to adjust their charging at different time periods?
A. Not necessarily. Sometimes it's very difficult. I won't say across the board every single person won't sit there for three hours and wait for an off-peak period. But by and large, a number of folks probably will not.

Q. Okay. Mr. Deal, have you had a chance to review the settlement proposal from DOE, Unitil, Liberty and others?
A. Yes.
Q. And what's your understanding of the demand charge alternative being proposed?
A. My understanding -- just I want to make sure I have answered your question correctly. So if I don't --
Q. Well, let me just rephrase. I'll just rephrase.
A. Okay.
Q. So am I correct that the demand charge alternative being proposed is a 50 percent demand charge reduction?
A. The demand charge component, yes, is reduced by 50 percent for Liberty and Unitil.
Q. In your view, do you think that this 50 percent demand charge reduction for Liberty and Unitil would resolve some of the problems of high demand charges being detrimental to low utilization rate public charging stations which you just described?
A. I believe that there is marginal movement and

potentially marginal improvement on the underlying economics from this 50 percent reduction. Whether or not it is sufficient to drive additional deployment on a fully economic basis I cannot say for certain.

Q. And so you don't know if this would drive EV charging station deployment?

A. I cannot say that a hundred percent of EV charging facilities would be able to take service under this rate, and if they do, that it would be, quote, economic.

Q. Now, also, last question, in the testimony of the settling parties, I believe it was Mr. Taylor, John Taylor, suggested that, you know, the demand charges are only demand charges for the distribution rate. That sort of implied that, you know, because demand charges only recover the distribution rate, that they're not that big of a concern for public charging stations. Do you agree with that?

A. I would disagree that they are not a big concern for charging stations for all the reasons I stated. Just because it is a

demand charge for the distribution component, it still has proven to be somewhat of an economic barrier for deployment in New Hampshire, at least for ChargePoint.

Q. Thank you.

MR. KRAKOFF: I have no further questions.

CHAIRMAN GOLDNER: Thank you. Does the City of Lebanon have any questions?

[No verbal response]

CHAIRMAN GOLDNER: Okay. We'll take that as a "No."

Does the Department of Environmental Services?

MS. OHLER: No. No questions. Thank you.

CHAIRMAN GOLDNER: Thank you.

The Office of Consumer Advocate?

MS. DESMET: I have nothing additional. Thank you.

CHAIRMAN GOLDNER: And the New Hampshire Department of Energy.

MR. BUCKLEY: No questions.

CHAIRMAN GOLDNER: Thank you.

We'll move to questions from Commissioners. Commissioner Ross.

INTERROGATORIES BY COMMISSIONER ROSS:

Q. Good afternoon. I just have a few questions for you about the charging equipment.

I'd kind of like to know the average cost to a residential customer for an EV charger.

A. I don't necessarily have an average [connectivity issue]. We can look at -- parties can look at public web sites, such as PlugShare, to look at residential levels of chargers. Last time I looked, they can range from, depending on functionality and power levels, in the $300 to well over $1,000. And that's for the charger itself, not necessarily for any potential installation, if that's the next question.

Q. Can you tell me, do they typically plug into a 220 outlet?

A. There's two different ways, by and large, that you could install in a residence: A Level 2 charger, that is, one plugging it into a 220; or you could have -- there are

models that you could hard-wire in.
Q. Do most chargers have any metering capacity?
A. Can you repeat that? Apologies.
Q. Can they measure the amount of energy that is coming into the charger?
A. During the break I phoned a friend on this. I'm not an expert on every single model of every single manufacturer, but I would say that a good number of Level 2 chargers are able to meter. What level of interval metering is a question. But that would --
Q. Do you know whether there are any standards that have been developed for metering on the chargers, any industry standards or testing standards?
A. Yes. And the metering requirements or the metering standards that we, as ChargePoint, manufacture our charging stations to, as well as a number of other manufacturers, are housed in NIST Handbook 44, I believe it's Section 3.4, as it relates to EV charging metering infrastructure.
Q. What was the name of the handbook again?
A. NIST, National Institute of Standards [sic]

and Technology.
Q. Is that a governmental group or a trade group?
A. I believe it is governmental, but I would have to check to confirm.
Q. And do you believe there's a standard in there for metering?
A. Yes. And the standard is metering accuracy shown by the manufacturer to be within a two percent range.
Q. Thank you.
COMMISSIONER ROSS: I don't have any further questions.
CHAIRMAN GOLDNER: Commissioner Chattopadhyay.
BY COMMISSIONER CHATTOPADHYAY:
Q. Good afternoon. So I have a few questions. First one would be, you know, just not knowing the landscape of how EV charging works, as far as the residential customers are concerned, are they all -- if they have meters, are they all sort of on L2?
A. Not necessarily. I believe that as Ms., I want to say Ms. Tebbetts, stated, some

charging -- some EV owners will choose to charge just by plugging in to their standard 110 outlet. Others will plug into a level -- to the 240 outlet. Others will choose to install a Level 2 networked or non-networked charger.

Q. So trying to differentiate between the three categories that you talked about. The second one that you mentioned, is that something that ChargePoint gets, you know, interested in or are involved in? Do you have business of that type as well, or is it all L2?

A. ChargePoint's residential solution is a networked Level 2 solution that we -- and we have either the hard-wired or the plug-in to the 240 outlet. We have two options available for residential customers.

Q. Okay. You mentioned that with the change in the demand charge with recovering 50 percent -- or rather with the demand charge associated with EV charging now recovering 50 percent of the demand charge overall, you said there would be a marginal movement in deployment. Can you explain,

like, what do you mean by that? Like would there be at least some positive movement?
A. I think what I intended to say -- and if I did not come across this, I apologize -- I think that the 50 percent reduction in demand charges represents a marginal improvement over existing rates that could lead to certain existing and/or potentially new EV site hosts to take service under that rate. That is what I intended to say, not necessarily trying to say that there will be 30 percent more deployment if this rate is approved or 10 percent more deployment if this rate is approved.
Q. Okay. Given what the proposal is, the settlement proposal is, would it be possible for you to, under those rates, conduct some analysis and give us a sense of what the payback period would be for any investment that ChargePoint sort of considers? And I don't know what the range is. You might have different facilities, you know, different ways to do it. Even with the cheapest option, I would like to get a sense of what

the payback period would be. And then is it possible for you to do that analysis in a way that it's Excel Live, so that if you are tinkering with the demand charge and it's not 50 percent now, you're going to say just 25 percent, so 75 percent goes into TOU? Or, you know, does -- you could even have an alternative where you have the same rate that's not TOU. But I'm just trying to understand, given what the proposal is, can you provide us a sense of the payback period?

A. I'm not certain that I can. Number one, I think there would have to be a lot of assumptions drawn on the underlying costs to determine that, just given the variability in each and every EV charging station deployment. I think that a payback period under these assumptions could vary drastically. I also don't know if we have a model built that is non-proprietary that could be shared as part of the record. I would have to consult, maybe after the hearing, with my attorney and others at the Company to determine if that were feasible,

unfortunately.
Q. So the question is: With the demand charge being 100 percent, you might say that the business is not viable at all, so there's no economic case for going ahead with, you know, such a model. When you go down to 50 percent, I want to get a sense of, you know, whether there is some viability. So in that sense, I was asking if I can look at the payback period, I'll get a good sense. So even though you may not have any modeling done, per se, if you have a general sense of what that move from 100 percent demand charge to 50 percent demand charge does, that will be helpful. Will you be able to provide some thoughts on that?
A. I think we could follow up with that.
Q. Okay. So that would be a record request.
A. So if I could just clarify. So the question sort of is payback period under the existing rate structure for Unitil, payback period for the existing rate structure under Liberty, and then the payback, estimated payback under the settlement proposal.

Q. Yes. And if you're going to be doing that, I would also appreciate if you go back to the previous line of questioning that I had. It would help to even go with 60 percent and 75 percent, so just to get a sense.
A. Yes, we can do our best to pull something together.
Q. Okay.
MR. VIJAYKAR: Commissioner Chattopadhyay, just to clarify again. I think I understand what you mean. Again, we're talking about 60 and 75 percent reductions in demand charge; correct?
COMMISSIONER CHATTOPADHYAY: Correct. So in that direction, right. I should have been clearer about that. Yeah.
BY COMMISSIONER CHATTOPADHYAY:
Q. So this sort of -- the next question that I have is kind of in the nature of trying to understand what capabilities do providers like ChargePoint, you know, they have. And you mentioned in your testimony that you're sort of a -- you have operations worldwide. Right? And so in terms of whatever you do,

whatever devices you have, you are actually also able to play with the prices so that you can make the business viable. So I mean, what I'm saying is in your testimony you mentioned how you can set prices and all of that as well. First of all, just confirm that's a correct understanding.

MR. VIJAYKAR: Commissioner Chattopadhyay, if I could just ask you to point maybe -- it might help if we were able to determine what part of the testimony you're talking about.

COMMISSIONER CHATTOPADHYAY: Just a moment. And that might take a little while, but let me... just a moment.

(Pause)

COMMISSIONER CHATTOPADHYAY: Yeah, I think what I'll do, I'll come back to it later.

BY COMMISSIONER CHATTOPADHYAY:

Q. But it's there in your testimony. You mentioned how it allows the ability to play with the price variable as well.

So, anyway, the real question for me is this: If there is a utility that is unable

to implement three-period time-of-use pricing, you know, volumetric charges, not knowing anything about ChargePoint technology and details, can something like that be provided by ChargePoint?

A. So ChargePoint does have the ability to work with existing or new time-of-use rates based on the utility rate schedules separate and apart from the necessary metering infrastructure. So we could use ChargePoint's embedded metering -- this may be what you're trying to get at. Embedded metering in ChargePoint's EVSE, the chargers, has the ability to implement time-of-use rates or other rate design elements on behalf of the utility or the site host without necessarily requiring an AMI meter or a separately metered drop for that charger.

Q. Have you done that in other places, other states, or even countries?

A. Yes. We participated in a number of utility programs that use our chargers as -- for billing determinants, so either time-of-use rates and/or demand response. I believe the

states that we cited -- I cited in testimony was California -- [connectivity issue]

[Court Reporter interrupts.]

A. I believe are California, Wisconsin, Minnesota and Maryland -- Maryland was the last one I was forgetting -- among others.

Q. So those examples are all from non-New England states.

A. Correct.

Q. Okay. So one more question. As part of make-ready programs, can you just -- you don't have to get into a lot of detail. Just provide some examples how incentives have been implemented to encourage EV TOU programs, both for residential and commercial customers.

A. I think I would start just by saying that make-ready programs are not necessarily tied to time-of-use rates. So they're not necessarily always correlated.

Taking it up a notch, if we talk about make-ready incentives, we've seen across the country a number of jurisdictions implement various aspects -- and it varies depending on

residential, commercial, public DCs. So there's a whole swath. But sometimes what we see is anywhere from a portion of the utilities make-ready -- so up to the meter, the customer meter, is typically called the "utility make-ready," and then everything from the meter to the charger stub is typically referred to as the "customer make-ready." We've seen some jurisdictions cover 100 percent up to the charger stub, so both utility and customer make-ready. We've seen it limited to utility-side make-ready, and we've seen a portion of both. So not trying to drill down too deep, but we've seen different variations across the country.

Q. Do you have any thoughts on what might work in New Hampshire?

A. Without potentially -- well, given that there are currently pending make-ready aspects in other dockets, I think any combination of those could work. I think from what we're seeing -- or what we would potentially recommend is 100 percent utility make-ready, with some contribution towards customer-side

make-ready. But there are a bunch of different ways we could design a make-ready program for New Hampshire.

Q. For customer-side make-ready, what kind of costs are we talking about? Like, you know, give me a range.

A. I would -- I don't necessarily have one. I can see if we have one pulled together. I don't have one off the top of my head. Again, I apologize for being -- having a vague answer, but EV charging deployments across the country, even within a utility service territory, vary dramatically. So it's always difficult to give a range that's not so broad that it's utterly -- there's so much movement within it, that it's not something that you can draw a conclusion from.

Q. So you don't have any estimate, like the range is this?

A. Not here today, no. I apologize.

Q. Okay. I'm trying to go back to the question that I had, that you said you needed some clarity. I'm not sure I remember exactly

what it was. But basically you had already answered that you do have an ability to play with the pricing variable when you discussed how you have actually deployed things like that in some cases. So I don't need further clarification. Hopefully you guys won't need to know where, what I was trying to rely on to ask you that question. So I think that's it for me.

CHAIRMAN GOLDNER: Okay. Thank you, Commissioner.

INTERROGATORIES BY CHAIRMAN GOLDNER:

Q. I just have two questions. If I go, Mr. Deal, to your testimony on Bates Page 14, Lines 15 and 16, you talk about the question of Liberty proposing to own and operate EV charging stations in direct testimony and that the ChargePoint does not recommend that. Can you elaborate a little bit on your testimony and your answer?

A. So that question, Q&A, was directed at conclusions in Data Request No. CLF/CENH 2-17, where Liberty stated that, in order to see the utilization data for other

characteristics of that charging of EVSE, that they need to own and operate, and we were attempting to draw the point out that there are ways to see charging data without the utility owning and operating a station.

Q. Okay. Thank you.

And my last question is on Bates Page 9 of your testimony, and somewhat of a follow-up to what Commissioner Chattopadhyay was asking about, but maybe a little bit of a different slant.

The question on Line 20 is, "Have other jurisdictions implemented demand charge alternatives?" And I'll ask it this way: Do you have a region, a state, a country that has implemented what you consider to be the benchmark? I know we're very interested in talking to ChargePoint because you have visibility across a broad spectrum of applications. And so we would be very interested in what you consider to be kind of the gold standard or benchmark.

A. I think there's a couple, depending on ultimate goals and objectives, that we

typically point to. One is Dominion in Virginia. They have a low load factor rate, I believe, for anything under 200 kW. And demand charges are waived. We also see other low load factor rates across the country. Madison Gas & Electric winds up being one that is often pointed to as a positive approach.

Some of the ones that we also point to, especially given New Hampshire wanting to pursue time-of-use rates, and without getting into, again, some of the concerns around public DC fast chargers being on time-of-use rates, there is Pacific Power in Oregon and Rocky Mountain Power in Utah. And I can find the exact rates. But what they do is they attempt to take individual utilization rates and pair that with the time-of-use rates so that it's essentially a sliding scale. As utilization at each individual site increases, the demand charge would come up respective with that utilization rate, and the time-of-use commodity rate would decrease, so that overall energy -- you try

to come up with an average energy rate that decreases over time.
Q. Okay. Very good. Thank you. That's all the questions I have.
CHAIRMAN GOLDNER: Any redirect for your witness?
MR. VIJAYKAR: Chairman and Commissioners, would it be okay if I took a minute off the record to confirm with my witness before deciding whether we have any redirect?
CHAIRMAN GOLDNER: Absolutely. Please take your time. We'll just wait here, though. Thank you.
MR. VIJAYKAR: Thank you. I'm going to go off video for a second here.
CHAIRMAN GOLDNER: Thank you.
(Brief recess was taken at 3:25 p.m., and the hearing resumed at 3:29 p.m..)
CHAIRMAN GOLDNER: Okay. Let's go back on the record. Please proceed.
MR. VIJAYKAR: Thank you, Commissioners and Chairman Goldner.

REDIRECT EXAMINATION

BY MR. VIJAYKAR:

Q. Mr. Deal, during the Commissioner questioning that just preceded, there was a discussion regarding metering capability within EV chargers. Do you recall that portion of the discussion?

A. Yes.

Q. Is there anything that you would like to clarify about ChargePoint chargers and embedded metering capacity in those chargers?

A. Yes. I did just want to take the opportunity to further highlight that ChargePoint's Level 2 charging station, such as Home Flex, our residential charging solution, does include an embedded metrology, or an embedded metering capability designed to meet or exceed the requirements in the "Electricity as a Motor Fuel Section" of the National Institute of Standard [sic] Technology, NIST, Handbook 44. And to confirm, that is NIST Handbook 44, Section 3.40 where those metering requirements are contained within that handbook.

Q. Thank you, Mr. Deal.
MR. VIJAYKAR: And Commissioners and Chair Goldner, no further questions for the witness from ChargePoint.
CHAIRMAN GOLDNER: Thank you. We'll release the witness.
Anything further today before we close the proceeding? Mr. Buckley.
MR. TAYLOR: Commissioner, this is Patrick Taylor from Unitil. I have a --
CHAIRMAN GOLDNER: Sorry, Mr. Taylor. Go ahead.
MR. TAYLOR: That's quite all right. So my -- I guess as a point of clarification, and it has to do with the record request that was asked by Commissioner Chattopadhyay to Mr. Deal asking for a payback analysis. Mr. Deal had indicated that there would have to be a lot of assumptions that go into that. But my understanding is that he was -- or that ChargePoint is going to provide something.
I think that if ChargePoint is going to provide something of that nature, you know, obviously the parties won't have an

opportunity to do discovery on that or cross the witness on that. I think it will be very important that there is transparency and specificity as the assumptions that are used in whatever model is provided. And I think it would also be helpful if the parties had some opportunity, even if it's a short period of time, to respond in some way to what's being put in, because if it's going to be used as a piece of evidence, I think that the other parties would need an opportunity to react to it.

(Commissioners confer off the record.)

CHAIRMAN GOLDNER: That's a question for ChargePoint now because we have a second day of hearings or Friday. So a suggestion would be, if the model can be provided in short order, then the parties could have a chance to review it and provide feedback on Friday.

MR. VIJAYKAR: Commissioners and Chair Goldner, I would confer with our witness regarding the timeline. And if that's feasible, of course we will make every effort to provide it as soon as is reasonably

possible. But just as far as counsel's question regarding assumptions, you know, we can do our best to be transparent with any assumptions that are used in the analysis and provide that as a part of our response to the request.

CHAIRMAN GOLDNER: Mr. Taylor.

MR. VIJAYKAR: Oh, and I apologize. But I just had one follow-up on your point, Chair Goldner. Unfortunately, because of a conflict that's not -- our witness will not be available to attend the hearing as scheduled on the 28th. So while I see the elegance of having the witness respond to any questions on the 28th, unfortunately, he will not be available to take the stand on that day.

CHAIRMAN GOLDNER: Okay. Thank you. Just a moment.

(Commissioners confer off the record.)

CHAIRMAN GOLDNER: Okay. So what we'd like to do is if ChargePoint can provide the model with the assumptions by the close of business this Friday -- I'll look at my calendar here. I think it's the 30 -- thank

you, the 28th -- and then the parties can have the week, the following week to take a look at it and provide any comments in their written closing, which will be -- the written closings will be on the 4th. Would that be acceptable to everyone?

MR. TAYLOR: This is Patrick. I think that sounds fine.

I am curious about the written closings. I don't know if that was noticed previously. I have no -- I'm not suggesting I have an objection to it, but I am interested in knowing the Commission's intent with that.

CHAIRMAN GOLDNER: Yeah, I think just given the complexity of the proceeding and the number of parties, our thought was to just provide -- to give some time to provide the written closings a week after the last hearing. So that was the logic. And it would accommodate this particular issue I think pretty nicely if we go this path.

MR. TAYLOR: Well, I do appreciate the opportunity to provide comments on whatever

ChargePoint puts in. Thank you.

CHAIRMAN GOLDNER: All right. Thank you.

Mr. Buckley.

MR. BUCKLEY: Yeah, I was just going to echo exactly what Mr. Taylor just chimed in with, which was an opportunity for comments might be helpful. There are certain variables within a payback assumption that are pretty objective, like the cost of the Level 2 home devices that ChargePoint provides or others provide, or the cost of other devices at other charging capacities. Or another example might be the cost of maintenance or the networking component of it as well. There are some costs related to payback, though, which are fairly open to interpretation. I think that might have been sort of the source of hesitance to provide that payback record request response. And if you look across some of the dockets we currently have here right now, I think there is in attachments to the testimony filed by Unitil here a make-ready cost of between $77,000 and $145,000 or so per charging location. And

those kind of things factor into the overall payback. If you look to, there's a similar Eversource make-ready proposal, and those numbers are still even more different. So I think that the opportunity to see what objective values there are that can be reviewed, like the actual cost of the chargers, would be helpful. We'd appreciate the opportunity to comment on that.

I would also -- with respect to the written closings, would it also be okay with the Commission if we were to allow spoken closings as well as an option for a party who might prefer it this Friday?

CHAIRMAN GOLDNER: We can confirm that our logic with the written closings was that we feel like this is a process that could speed up the feedback. I know there's some older dockets that were inherited by this particular Commission that are still getting cleaned up, and we feel like this is a docket that we could move through fairly quickly. And we felt like that was a way to speed things up. So that was the motivation. Not that we

couldn't allow -- I'd want to confer. But not that we couldn't allow oral, but that written would be preferable in terms of the speed of the feedback that we can provide in the order, the final order. So that's the -- I just want to share the logic. And perhaps we could begin the next hearing with I'll open it up again for more discussion, and that will allow us to confer as well. But if we do have written closings, I think we can speed up the final order.

MR. BUCKLEY: Understood.

CHAIRMAN GOLDNER: All right. Anything else? All right. Very good. So the next hearing in this docket is Friday morning at 9 a.m. And we are adjourned. Thank you.

(Whereupon the hearing was concluded at 3:40 p.m.)

C E R T I F I C A T E

I, Susan J. Robidas, a Licensed Shorthand Court Reporter and Notary Public of the State of New Hampshire, do hereby certify that the foregoing is a true and accurate transcript of my stenographic notes of these proceedings taken at the place and on the date hereinbefore set forth, to the best of my skill and ability under the conditions present at the time.

I further certify that I am neither attorney or counsel for, nor related to or employed by any of the parties to the action; and further, that I am not a relative or employee of any attorney or counsel employed in this case, nor am I financially interested in this action.

(ORIGINAL CERTIFICATION FILED WITH PUBLIC UTILITIES COMMISSION)

_____

Susan J. Robidas, LCR/RPR
Licensed Shorthand Court Reporter
Registered Professional Reporter
N.H. LCR No. 44 (RSA 310-A:173)

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