PUGET SOUND ENERGY

Webinar #6: Portfolio Sensitivities Q&A

8/12/2020

Overview

On August 11, 2020 Puget Sound Energy hosted an online meeting with stakeholders to discuss portfolio sensitivities, CETA assumptions and Distributed Energy Resources (DERs). Additionally, participants were able to ask questions and make comments using a chat box provided by the Go2Meeting platform.

Below is a report of the questions submitted to the chat box. Answers to the questions were provided verbally by IRP staff during the webinar. Please note that questions were answered in order of relevance to the topic currently being discussed. Questions regarding other topics were answered at the end of the webinar session.

To view a recording of the webinar and to hear responses from staff, please visit the project website at pse-irp.participate.online.

Attendees

A total of 58 stakeholders and PSE staff attended the webinar, plus another 11 attendees who called into the meeting and did not identify themselves (69 people total).

Attendees included: Anne Newcomb, Ashton Davis, Bill Pascoe, Bob Stolarski, Brad Tuffley, Brandon Houskeeper, Brett Rendina, Brian Grunkemeyer, Brian Robertson, Brian Tyson, Charlie Black, Cody Duncan, Colin O'Brien, Corina Pfeil, Michael Corrigan, Dan Kirschner, David Perk, Don Marsh, Fred Heutte, Glenn Blackmon, Harrison Matherne, James Adcock, Jenny Lybeck, Joni Bosh, Kassie Markos, Kate Maracas, Katie Ware, Kevin Jones, Cathy Koch, Kyle Frankiewich, Lorin Molander, Leslie Almond, Marcus Sellers-Vaughn, Margaret Miller, Devin McGreal, Michael Laurie, Mike Elenbaas, Mike Hopkins, Nancy Esteb, Peter Sawicki, Peter Tassani, Rachel Brombaugh, Rahul Venkatesh, Sarah Vorpahl, Sheri Maynard, Stephanie Chase, Stephanie Imamovic, Steve Greenleaf, Susan Christensen Wimer, Ted Drennan, Thomas Cameron, Tom Flynn, Virginia Lohr, Vlad Gutman-Britten, Willard Westre, Elyette Weinstein and Zac Yanez.

Questions Received

Questions from attendees are posted in the order in which they were received. The webinar began at 8:30 AM PDT and ended at 12:48 PM PDT.

Name	Time Sent	Comment
Alison Peters	**8:22 AM**	Good morning, all. Nice to see you this morning.
Virginia Lohr	**8:35 AM**	How do we know the level of public participation before the meeting starts?
Alison Peters	**8:38 AM**	Hi Virginia, the levels are labeled in the PowerPoint deck that was posted a week prior to this webinar. Thanks for asking.
Kevin Jones	**8:43 AM**	Slide 10: What criteria does PSE use to select the “reference portfolio”?
Kevin Jones	**8:44 AM**	Slide 10: Not sure I understand this slide. PSE selects a “reference portfolio”, then makes changes to that portfolio “for each portfolio comparison”. Is PSE saying that changes made to the “reference portfolio” will allow PSE to evaluate the impacts of these changes on all the other portfolios (each portfolio comparison)?
Kevin Jones	**8:45 AM**	Slide 10: Are the “changes” listed on this slide actually a list of the parameters that are varied to create different sensitivities?
Joni Bosh	**8:47 AM**	Slide 10 – what criteria do you use to select the refernce portfolio?
James Adcock	**8:47 AM**	Hand Raise Slide 9
Kevin Jones	**8:48 AM**	Participants - Go To Meeting default is set so your chat messages go only to EnviroIssues. You can change that setting to "everyone" to receive your chat messages in the pulldown menu next to the chat "To" line. Please do that.
Kevin Jones	**8:48 AM**	Slide 10: Not sure I understand this slide. PSE selects a “reference portfolio”, then makes changes to that portfolio “for each portfolio comparison”. Is PSE saying that changes made to the “reference portfolio” will allow PSE to evaluate the impacts of these changes on all the other portfolios (each portfolio comparison)?
Kevin Jones	**8:48 AM**	Slide 10: Are the “changes” listed on this slide actually a list of the parameters that are varied to create different sensitivities?
Alison Peters	**8:49 AM**	Thanks Kevin. I see you’ve shared your question with everyone now.
Fred Heutte	**8:49 AM**	slide 9: "The purpose of a scenario is to create a 20-year electric price forecast" -- isn't the purpose of a scenario to create a resource portfolio that includes a price forecast and other factors?
Fred Heutte	**8:51 AM**	Slide 13: what is meant by “themes”
Kyle Frankiewich	**8:57 AM**	Slide 9/10: I am also confused by the distinction between scenarios and forecasts. Are "scenarios" model runs where something outside of PSE changes, and "sensitivites" runs where PSE's resource choices are altered?
Joni Bosh	**8:59 AM**	Slide 14 – just to clarify, are you saying the items on this slide are themes?
Don Marsh	**9:00 AM**	On slide 14, I think a key issue is the increasing capacity and decreasing costs of technologies like solar panels, batteries, smart grid, etc. Given the considerable impact on the industry, these developments qualify as a "key issue."
James Adcock	**9:00 AM**	Slide 14 -- where does availability / CETA applicability of RECs fit in here?
Corina Pfeil	**9:00 AM**	When would that happen

Michael Laurie	**9:03 AM**	On slide 10 you have chosen conservation as one of the changes that you may include. I strongly suggest that you include it because if significant conservation is achieved it will reduce the need for additional power plants including peaker plants. And most conservation is cheaper than new power plants and does not face a risk that natural gas plants face of being outlawed by future legislation at the state and federal level. So it will help PSE to stay consistent with providing energy at lowest cost to their customers. And with some many laws having been passed at the state level that will increase conservation and uncertainty of how much conservation they will achieve PSE should include different scenarios of high, medium, and low conservation being achieved by these laws. And absoluteluy support increase the ramp rate to 6 years.
Willard Westre	**9:04 AM**	Raise Hand S-16
Alison Peters	**9:05 AM**	Hi Corina. Could you send your question to “Everyone” and clarify what you meant? THank you.
Kyle Frankiewich	**9:05 AM**	Slide 16: really like this slide. Have a bunch of Qs but will save them for later when we get into the details.
Michael Laurie	**9:06 AM**	Is PSE looking at a sensitivity related to a much more wholistic approach to conservation including approaches that make wholistic conservation easier to achieve?
James Adcock	**9:06 AM**	Slide 16 -- what do you mean by "renewable overgeneration?" If you have too much reneable capacity just don't run all of it. How is this different than having too much NG Peaker capacity at a given point in time? If you don't need that NG Peaker capacity just don't run it. So I don't understand what you are saying here?
Virginia Lohr	**9:07 AM**	What is the range of the number of sensitivities you anticipate being able to run? I'm wondering about how many might need to be dropped. For example, do you anticipate only 1 or 2 being left under a "theme" or "issue"?
Vlad Gutman-Britten	**9:08 AM**	80% clean delivered to load?
Charlie Black	**9:08 AM**	I strongly encourage PSE to place a high priority on analyzing the SCC as an environmental externality. The SCC should be included as a variable cost of dispatch. This approach is the most consistent implmentation of the CETA requirements to include the SCC in IRP.
Joni Bosh	**9:10 AM**	Back on RECs – why can’t the model sell the over generation with its RECs?
Anne Newcomb	**9:14 AM**	On slide 16 under Emissions Reductions: What do you think about adding Hydrogen as well as biodiesel?
James Adcock	**9:17 AM**	+1 Charlie
David Perk	**9:17 AM**	Agree with Charlie Black’s comment re SCC.
Joni Bosh	**9:19 AM**	+1 Charlie
Don Marsh	**9:19 AM**	Did Elizabeth have a response to Charlie’s suggestion?
Corina Pfeil	**9:21 AM**	agreed
David Perk	**9:22 AM**	Absolutely agree with Charlie
Don Marsh	**9:22 AM**	Also agree.
David Perk	**9:22 AM**	PSE needs to get SCC right, from the start

Elyette Weinstein	**9:22 AM**	Penny's method causes confusion and inhibits transparency.
Kate Maracas	**9:23 AM**	Stakeholders: I suggest that you frame your comments as questions so that they can be addressed.
Virginia Lohr	**9:24 AM**	Does over generation consider using it to make renewable hydrogen?
Kyle Frankiewich	**9:24 AM**	Slide 18: I'd like to better understand what is going into the low-growth scenario, as this economic downturn could last longer than we'd hope, and the changes in energy use (substantial work from home, lower office energy use, etc) could well become permanent.
Willard Westre	**9:24 AM**	S18- Agree with Charlie
James Adcock	**9:24 AM**	Agree with Charlie that I not including SCC in all aspects of IRP and REC modeling of dispatch [as opposed to PSE's approach of modeling it [incorrect] as a "fixed cost] is a "fatal error" which destroys any value to PSE's entire IRP and RFP efforts, including analysis of DR and Conservation.
Willard Westre	**9:24 AM**	Agree with Charlie
Elyette Weinstein	**9:25 AM**	Where do questions end and statements begin? Observations logically include statements which cause the questions? Is Penny serving as a PSE advocate or partial judge? She should be a neutral party that is impartial.
Charlie Black	**9:24 AM**	Thanks, Kate. I was just thinking the same thing.
Elyette Weinstein	**9:26 AM**	I agree with Charlie.
Don Marsh	**9:27 AM**	When meeting efficiency is valued more than honest inquiry and conversation, the process needs to be rethought. I encourage meeting organizers to do some soul searching regarding the fairness of this process.
James Adcock	**9:27 AM**	Slide 18 Raise Hand.
Michael Laurie	**9:27 AM**	Is it true that PSE is considering selling some of their transmission lines from Montana? If so why sell transmission when that could allow transmission of wind resources with a high capacity factor?
Elyette Weinstein	**9:27 AM**	Thank you Don!
Kyle Frankiewich	**9:28 AM**	slide 19: Market reliance presumes a) availability of sellers at Mid-C, and b) functioning Tx that can move that power to load. I understand that this will be modeling a). Are these sensitivities and scenarios stochastic in nature? Do they get an idea of what PSE's risks are in relying on key infrastructure, ie, the 1500 MW Tx backbone into MidC? I'm generally puzzled about when stochastic modeling and the mixing and matching of load shapes vs renewable generation shapes gets analyzed.
Vlad Gutman-Britten	**9:30 AM**	Support the use of hydrogen as long term storage, but hydrogen also is a commodity with independent market value. It would be good to model both potential dispositions of hydrogen--as a marketable product to financially benefit customers and as a system resource, including how it may support compliance with CETA.
Anne Newcomb	**9:30 AM**	If you have an excess of Renewable energy before 2045, can it be used rather than any fossil fuels that may be in the mix at the moment?
Corina Pfeil	**9:31 AM**	Yes

Willard Westre	**9:34 AM**	Hand Raised S-20
Fred Heutte	**9:35 AM**	responding to comment by Elizabeth: renewables can be held as reserves, there is nothing preventing that and as costs continue to fall it will become reasonable to do so
Fred Heutte	**9:35 AM**	That allows renewables to be used for both incs and decs
James Adcock	**9:36 AM**	Slide 20 raise hand.
Fred Heutte	**9:36 AM**	in addition renewables and other inverter based resources with power electronics respond to dispatch signals much faster and with more fidelity than thermal
Kate Maracas	**9:37 AM**	+1 to Fred
Don Marsh	**9:37 AM**	Fred, lots of good comments. Maybe you need to ask a question?
Fred Heutte	**9:38 AM**	that was a comment not a question
Don Marsh	**9:39 AM**	Not necessary for PSE to address in this meeting? I think an answer might clarify a few things, but it's up to you.
Virgina Lohr	**9:41 AM**	I agree with Bill Westre
Michael Laurie	**9:41 AM**	I also agree with Bill Westre. I think it is a key element because of the options for renewables and storage in Montana.
Bill Pascoe	**9:43 AM**	Raise Hand Slide #20
Don Marsh	**9:44 AM**	PSE says it needs to build new transmission capacity to handle renewables. I don't understand how selling the Montana lines is a benefit to PSE's ratepayers. I'd really like to understand the econmic benefits of that sale.
James Adcock	**9:44 AM**	In terms of "comments" vs. "questions" PSE's lawyer in the cover letter to PSE's current RFP draft claims that PSE's IRPs include "discussion" which PSE seems to be clearly actively *preventing* by not responding to comments -- only to questions.
Vlad Gutman-Britten	**9:45 AM**	With conservation and other DERs, are you evaluating any equity metrics consistent with CETA? Distributional impacts/benefits, etc?
Michael Laurie	**9:45 AM**	Slide 21 could you also include here the idea of a more wholistic approach to conservation as I mentioned earlier?
Corina Pfeil	**9:45 AM**	Ramp Rate - nomaly also indicates systemic rate increses to customers - are you intending to make rate increase over the next year ?
James Adcock	**9:46 AM**	Slide 21 Raise Hand.
Corina Pfeil	**9:46 AM**	Considering the COVID Pandimic - most agencies are freezing customer increases over the year -
Willard Westre	**9:48 AM**	S-21 Will the 2.5% cost of financing be applied to generation assets as well?
Don Marsh	**9:48 AM**	Elizabeth says if you increase the conservation ramp rate, PSE will do less conservation later. However, the 10-year ramp rate has been used in several IRPs, and I see no reduction of conservation on the horizon. Does this really work the way Elizabeth is describing?
Corina Pfeil	**9:48 AM**	Low income, Seniors, and Disabled, along with Race
Corina Pfeil	**9:48 AM**	Thank you Vlad
David Perk	**9:48 AM**	+1 Vlad's comment re deeper work on equity
David Perk	**9:48 AM**	Particularly in the current economic environment

Michael Laurie	**9:51 AM**	The answer of thank you to my suggestion about looking at a wholistic approach does not tell me whether you will look at it or not. Do you plan to look at it? or not? Or are you unsure?
Kyle Frankiewich	**9:53 AM**	slide 21: I'm still trying to make sense of the value stream of DR. I think one of the bigger values of DR might be its ability to hedge against the risk of super-peak events, which might not be immediately visible in a determinative model run. Can PSE identify other scenarios and sensitivities that are more likely to miss some hard-to-see risks or benefits?
Fred Heutte	**9:54 AM**	slide 22 hand raise: NWEC supports the use of AR5 for sensitivity 21. Will PSE also run a separate sensitivity for an updated emissions rate for upstream emissions, for example the EDF Low rate as we have suggested?
Don Marsh	**9:55 AM**	Kyle's question is good. DR provides reliability and resiliency benefits that might not be fully captured in the economic model. I worry about that. Reliability is very valuable to residents and businesses.
Vlad Gutman-Britten	**9:56 AM**	It would be very helpful to model SCC in absense of 2030 and 2045 portfolio requirements to better understand the impact of modeling SCC on dispatch and post dispatch. I'm reading these SCC sensitivities as being in context of the portfolio requirements which your previous models have shown to yield little impact for SCC.
James Adcock	**9:57 AM**	Slide 22 Raise Hand.
Michael Laurie	**9:58 AM**	What is the economic reasoning for using a fixed cost of carbon at dispatch when the amount of carbon based energy that is used at dispatch will be a variable demand that is not possible to predict ahead of time. A fixed cost for a variable activity is hard to understand.
Virginia Lohr	**9:58 AM**	Raise Hand: Slide 23, Sensitivity 22
Joni Bosh	**10:00 AM**	+1 kyle
Michael Laurie	**10:01 AM**	What is the reasoning for using the very low federal tax of $15/ton. If it were to come to pass it would likely come to pass if the federal government is controlled by Democrats and in that scenario there will be strong pressure to have a much higher tax.
Vlad Gutman-Britten	**10:02 AM**	Support Fred's recommendation for a sensitivity estimating high leakage rates for NG.
Virginia Lohr	**10:03 AM**	I also strongly support what Fred Heutte is saying.
Joni Bosh	**10:04 AM**	Clarification on #23 - is this one modeled like 19 or 20?
Kyle Frankiewich	**10:05 AM**	Q for Jim Adcock: Are you looking for a layered scenario that includes both SCC at dispatch and with various tweaks to conservation ramp rates?
Vlad Gutman-Britten	**10:05 AM**	Hand raised on SCC.
Charlie Black	**10:06 AM**	Raise hand on SCC
Michale Laurie	**10:10 AM**	Agree with Virginia Lohr on using a higher federal tax in the analysis.

James Adcock	**10:10 AM**	Answer to Kyles question posed to me: I read CETA as *requiring* Puget to always include social cost of carbon in *all* aspects of IRP and RFP *all of the time* up to and including actual purchase of resources including DR and Conservation, as such I believe Puget is *required* to include SCC as a variable dispatch cost in *all* of their modeling efforts re IRP and RFP, not just the "base case." So from my point of view its not a question of which "portfolios" or "schenarios" should include SCC in dispatch, because I believe Puget is *required* by CETA to include SCC in dispatch in *all* of them.
David Perk	**10:12 AM**	Agree with Charlie Black's SCC comments.
James Adcock	**10:13 AM**	...in comparison if Puget for a private business analysis reason *not* part of the IRP or the RFP wants to *not* include SCC in that private business modeling that would be Puget's business, not ours.
David Perk	**10:13 AM**	Important to get SCC right, from the beginning
Charlie Black	**10:14 AM**	Raise hand
Joni Bosh	**10:14 AM**	Agree with Charlie Black's request.
Virginia Lohr	**10:17 AM**	SCC is a variable cost and should NOT be run as a fixed cost.
Kyle Frankiewich	**10:18 AM**	+1 on Vlad's suggestion - will provide a an interesting perspective on the impact of SCC compared to other CETA reqs
Virginia Lohr	**10:19 AM**	Raise Hand: Slide 24, Sensitivity 25.
Don Marsh	**10:19 AM**	Slide 24, sensitivity 24: Stakeholders are concerned that PSE is using prices for batteries that are too high. During the transmission constraints webinar, PSE showed exorbitant costs for connecting batteries which made no sense to us. Have these issues been corrected?
Elyette Weinstein	**10:20 AM**	I agree that SCC is a variable cost and should NOT be run as a fixed cost.
Don Marsh	**10:22 AM**	Thanks for the correction on battery interconnection costs. But are you still modeling 5 miles of transmission to connect batteries? That also made no sense. Batteries are typically sited close to existing transmission. Was that corrected?
Don Marsh	**10:23 AM**	Also, what is the basis of PSE's cost for the batteries themselves? We have seen significantly lower prices used by Portland General Electric. Maybe PacifiCorp too.
Michael Laurie	**10:23 AM**	Agree with Virginia Lohr's point that since there are limitations on what can be limited it is better to model hydrogen instead of biodiesel.
Kevin Jones	**10:23 AM**	raise hand slide 24

James Adcock	**10:24 AM**	Re batteries, in RFP Puget dismissed my concerns that transmission costs which are 1600% too high, in part because it appears PSE assumes a 5 mile interconnect cost, but in my aerial photographic review of recent actual "state of the art" battery storage systems, the actual connection length is only about 0.1 miles -- because battery systems can be sited "anywhere" -- and so real peer utlities of Puget are siting them "as close as possible" to existing infrastructure -- no additional stub line required -- next to either an existing solar or wind facility, or next to an existing substation -- so that transmission interconnect costs are minimized. In addition Puget was estimating Battery Storage cost for the base facility 53% higher than NREL estimates. These estimates seem to be so extremely high as to prohibit any fair modeling of Battery Storage [as competition to NG Peakers] at at all.
James Adcock	**10:25 AM**	Raise Hand “Transmission Interconnect Costs.”
Don Marsh	**10:26 AM**	Thanks for actual data on battery costs, James Adcock. Very useful. I encourage PSE to correct the exaggerated assumptions that seem to be skewing the models against batteries.
Don Marsh	**10:27 AM**	Many utilities are finding batteries are much more practical than PSE is. For example, PacifiCorp and Portland. PSE must fix the skewed analysis.
Don Marsh	**10:28 AM**	We look forward to clarity on those battery costs. Thanks for looking into it!
Dan Kirschner	**10:28 AM**	Raise Hand Slide 25
Vlad Gutman-Britten	**10:28 AM**	Hand raised on sensitivity 30
Charlie Black	**10:29 AM**	Raise hand on process for responding to requests by stakeholders.
Don Marsh	**10:29 AM**	Sensitivity 31: Does the sensitivity also include higher temperatures reducing winter peak?
Michael Laurie	**10:29 AM**	Is PSE looking at other Demand adjustments like control of hot water tanks, conservation, using batteries to reduce peak demand and more?
Virginia Lohr	**10:30 AM**	Please give us more detail on how you will be doing your temperature sensitivity. What you have is too vague to mean anything.
Don Marsh	**10:31 AM**	In sensitivity 31, is the temperature trend based on the last 10-15 years of rising temperatures? PSE has been using much longer trends that reduce the impact of recent climate trends.
James Adcock	**10:32 AM**	Slide 25 Raise Hand.
Fred Heutte	**10:34 AM**	On #31, the NW Council is finalizing an important assessment of climate change effects on regional temperature, precipitation, demand and hydro runoff.
Fred Heutte	**10:36 AM**	See for example the presentation at the Council's Power Committee yesterday: https://www.nwcouncil.org/sites/default/files/2020_08_p3.pdf
Virginia Lohr	**10:37 AM**	I’m glad to see consideration of a summer peak.
Fred Heutte	**10:37 AM**	The Council staff assessment now shows that climate effects are already observed in the historical record and will continue through the 2020s and beyond.

Don Marsh	**10:37 AM**	Is PSE anticipating any V2G development in the near future? That could dramatically change the amount of battery resource available during the next decade.
Fred Heutte	**10:38 AM**	A significant result is the upward shift in late summer demand peak and somewhat reduced hydro runoff.
Don Marsh	**10:39 AM**	+1 on specificity on temperature trends
Kyle Frankiewich	**10:41 AM**	Slide 25: What might help is for PSE to provide PSE's current weather baseline so that folks can provide substantive input on #31. Would that be feasible?
Michael Laurie	**10:42 AM**	Agree with Don about looking at vehicle batteries as a major demand management resource.
Anne Newcomb	**10:44 AM**	Great job Everyone!!! :-) Thank You!
Vlad Gutman-Britten	**10:45 AM**	Thanks everyone.
Charlie Black	**10:48 AM**	Re-raising my hand on process for PSE following up on requests by stakeholders.
Fred Heutte	**10:56 AM**	raise hand for upstream emissions factor
Don Marsh	**10:57 AM**	We could do some research to see what other utilities are doing regarding V2G. I don't know now whether it's a sensitivity, but by ignoring the possibility, PSE might be creating a significant blind spot for future planning.
Joni Bosh	**10:57 AM**	Question on Excel sheet - can we submit suggestions later, as we have time to look at the corrected version.
James Adcock	**10:58 AM**	For the record: I would "want" to have SCC modeled as a variable cost of dispatch, not a fixed cost, in every one of these Portfolio Analysis conditions, because that is what I understand as being required by the CETA law.
Virginia Lohr	**10:58 AM**	Are you entering what we have already requested today?
Don Marsh	**10:58 AM**	Does PSE's demand response portfolio include time-of-day pricing? Until energy costs are better reflected in retail prices, we are ignoring the significant effects of market forces. With history as our guide, it's not smart to do that.
Michael Laurie	**10:59 AM**	Raising my hand to include a sensitivity to include a Wholistic approach to conservation. Basically assuming most conservation efforts carry out the majority of possible and cost effective conservation in each building instead of the piecemeal limited measures approach which has been the case for most PSE and other utility efforts.
Don Marsh	**11:02 AM**	During PSE time-of-day trial 20 years ago, PSE discovered an unexpected conservation effect in addition to peak shifting. That would be beneficial for the environment as well as ratepayer wallets.
Vlad Gutman-Britten	**11:02 AM**	Two sensitives--SCC as adder and in dispatch in absence of portfolio requirements.
Alison Peters	**11:03 AM**	Replying to all re: Joni's question: Yes, please submit suggestions via the Feedback Form online by August 18.
Joni Bosh	**11:03 AM**	Thanks
James Adcock	**11:04 AM**	Raise Hand.
Michael Laurie	**11:04 AM**	I agree that time of day pricing should be looked at. Without it demnd responses options will be underutilitized.
Michael Laurie	**11:06 AM**	Agree with using higher and rising cost for federal carbon tax.

Don Marsh	**11:07 AM**	I like this spreadsheet exercise. It feels like our suggestions are considered. Thank you.
Joni Bosh	**11:11 AM**	I believe Charlie's clarification is correct.
Don Marsh	**11:14 AM**	Raised hand
Kyle Frankiewich	**11:14 AM**	raised hand
Vlad Gutman-Britten	**11:15 AM**	Thanks Elizabeth for including EIA in the SCC-only sensitivities. That is correct.
Vlad Gutman-Britten	**11:15 AM**	(or whoever is typing)
Charlie Black	**11:16 AM**	Raise hand
Michael Laurie	**11:17 AM**	I agree with Don to start out looking early on at using a variable social cost of carbon. And use that result to guide further modeling of a variable social cost of carbon especially at Dispatch.
Willard Westre	**11:20 AM**	Agree with Charlie
Elyette Weinstein	**11:20 AM**	I agree with Charlie
James Adcock	**11:21 AM**	Raise Hand.
Charlie Black	**11:21 AM**	Raisew hand
Don Marsh	**11:22 AM**	PSE's diligence, fairness, and transparency on the analysis of these sensitivities is SO important for all of us. I am hoping that we will all agree in the end that PSE earned an A+ grade on this. If the results seem opaque or skewed in some way, it is going to damage relationships that need healing at this point. Please do a great job!
Charlie Black	**11:23 AM**	Agree with Joni – 2019 analysis treat SCC as a tax, not as an externality.
Vlad Gutman-Britten	**11:23 AM**	They did it both ways.
Charlie Black	**11:24 AM**	Raise hand
Michael Laurie	**11:24 AM**	How could raising the price of a resource at dispatch, using a variable social cost of carbon at dispatch, not reduce the demand for that resource and increase the demand for competitive resources which are now cheaper in comparison because they don't have that social cost of carbon?
Vlad Gutman-Britten	**11:25 AM**	Because the implicit carbon price of CETA is higher than SCC.
Don Marsh	**11:25 AM**	Raise hand
James Adcock	**11:26 AM**	+1 Charlie's Comments
Kyle Frankiewich	**11:29 AM**	raised hand
Virginia Lohr	**11:29 AM**	Pleaseask Maichael Laurie's question
Kyle Frankiewich	**11:31 AM**	oh, never mind - I see that a copy of the spreadsheet Elizabeth is sharing with us is also posted online. I'll populate a copy of that spreadsheet and add to it, then include it with staff's comments
Michael Laurie	**11:32 AM**	Don is making a major point about the importance of including time of day rates to properly analyze demand management options. Without time of day rates many demand management options will be undervalued and underutilitzed.

James Adcock	**11:35 AM**	When you decrease the dispatch of an *emitting* plant then you are increasing the use of *non-emitting* plants, conservation, and dispatch -- which is the whole point of the CETA law and the detailed *requirements* of that law, including its requirements about how PSE performs their IRP and RFP analysis.
James Adcock	**11:43 AM**	For the record: It appears PSE is skipping presentation of slides 30 to 36 due to "time constaints."
Fred Heutte	**11:45 AM**	hand raise for a question on slide 43
Penny Mabie	**11:46 AM**	Yes, James, PSE is skipping slides 30 to 36 today. Those slides will be included in the September 1 webinar.
James Adcock	**11:47 AM**	Thank you!
Brian Grunkemeyer	**11:48 AM**	To integrate DER's, are you considering a technique like dynamic price forecasts to tell DER's when to operate and/or shift load?
James Adcock	**11:52 AM**	Raise Hand.
Michael Laurie	**11:56 AM**	Thanks for working on and planning to propose a community solar program. This gives those who don't have good solar access to invest in solar and it gives communities more options.
Charlie Black	**11:58 AM**	Specific requests regarding PSE's side-by-side modeling of SCC as a variable cost of dispatch and as an annual fixed cost:
Don Marsh	**11:58 AM**	Slide 48: Is PSE doing any experiments with "Virtual Power Plants" (coordinated small batteries to provide reliability and resilience)?
Michael Laurie	**11:59 AM**	How are installed costs looking when comparing utility batteries versus batteries in customer buildings? And what costs are included in that analysis?
Kevin Jones	**12:00 PM**	To what extent are the solar projects you mentioned PSE owned versus "publicly" owned by the community members? To what extent does PSE promote and encourage public ownership of these types of resourcs?
Charlie Black	**12:01 PM**	1. In the SCC as a variable cost of dispatch sensitivity, dispatch a GHG-emitting resource when the Mid-C spot market price exceeds the sum of the resource's variable cost plus the SCC
Michael Laurie	**12:01 PM**	Thanks for saying that you are looking at how can the grid respond these battery storage options.
Charlie Black	**12:02 PM**	2. In the SCC as fixed cost, dispatch a GHG-emitting resources when the Mid-C spot market price exceeds the resource's variable operating cost.
Don Marsh	**12:03 PM**	Jens said DERs and NWAs are now becoming lower cost than transmission lines. Totally agree. When was that analysis last updated for PSE's "Energize Eastside" project, which will cost ratepayers hundreds of millions of dollars?
Charlie Black	**12:05 PM**	3. In the modeling results for each sensitivity, track and report the quantity of power generated by each type of GHG-emitting resource. Provide a comparison of the quantities of generation for each type of GHG-emitting resource in the two sensitivities.
Charlie Black	**12:12 PM**	4. In the results from the side-by-side senstivities, also provide the amounts and timing of additions of any new GHG-emitting generating resources to PSE's resource portfolio.
Don Marsh	**12:16 PM**	Would ADMS be able to coordinate many small residential batteries? Or do you need additional software to implement a VPP?

Michael Laurie	**12:17 PM**	Are you considering customer based software.thermostat systems that allow the customer to input which of their resources can be temporarily or permanently shifted to off-peak hours and compares that to PSE's peak demand times and then makes choices to shift customer loads to off-peak times?
Anne Newcomb	**12:18 PM**	What ADMS software platform will you be using?
Fred Heutte	**12:19 PM**	raise hand on slide 54 concerning hosting capacity analysis
Michael Laurie	**12:20 PM**	To add to my question about customer based software/thermostat systems to guide customer based peak demand reduction; I understand that there may not be any such systems out there now but with work by some of the techies around here such systems could likely be developed.
Willard Westre	**12:21 PM**	S-53 does AMI allow for Dr control features
James Adcock	**12:23 PM**	Comment: To state it again, PSE needs to figure out how to appropriately apportion the costs of these modernization efforts as being "directly related" to CETA or not, in particular in regards to the CETA 2% offramp. There are modernization efforts, including for example the ability to "remotely disconnect" a customer, which might be things that a utility might want to have, and might even claim is cost-effective -- but which would not be "directly related" to CETA requirements.
Fred Heutte	**12:27 PM**	here's the 2017 IREC reference on hosting capacity analysis: https://irecusa.org/publications/optimizing-the-grid-regulators-guide-to-hosting-capacity-analyses-for-distributed-energy-resources/ plus a more recent article and research paper: https://pv-magazine-usa.com/2020/06/16/solar-hosting-capacity-maps-must-be-accurate-to-be-useful/
Kyle Frankiewich	**12:28 PM**	i'm able to stay on for a bit longer
Don Marsh	**12:28 PM**	I can stay.
Michael Laurie	**12:28 PM**	I am happy to stay longer.
David Perk	**12:29 PM**	there's no where I'd rather be ;-)
Fred Heutte	**12:34 PM**	Hand raise for question about slide 57
Joni Bosh	**12:34 PM**	Slide 55 – do you consider the BI batteries part of a microgrid?
Don Marsh	**12:35 PM**	We love your solution on Bainbridge. So sad that you didn't use the same solution in Bellevue, where PSE decided to cut down 300 beloved community trees to connect two substations, the opposite of what the company did in Bainbridge. We hope not to see that again.
Kyle Frankiewich	**12:35 PM**	would like to hear more about that 20 MW heuristic for NWAs
Kyle Frankiewich	**12:37 PM**	slide 58: to clarify, PSE knows that some projects will select NWAs, and that those NWAs will involve DERs. So, some resources are included in the portfolio as must-take to reflect that cost-effective NWAs will be taken, and are likely to contribute to the company's resource stack. Is that right?
Michael Laurie	**12:39 PM**	Agree with Fred's point. Since the new law requires all hot water tanks to have a communication port to allow controlling them.
James Adcock	**12:42 PM**	Slide 60 Raise Hand.