

Community Q&A Session Summary

9/5/14

Community Q&A Session

Monday, July 7, 2014

6:00 to 9:00 p.m.

Redmond Marriott Town Center, 7401 164th Ave NE, Redmond WA 98052

Session Purpose and Overview

After a well-attended community question and answer session in Renton on April 21, Puget Sound Energy decided to host another session on July 7 in Redmond. The meeting included brief introductory remarks, a review of the procedures for participation at the session, a brief project overview, and time for Q&A with a panel including a representative from PSE and national utility experts.

Q&A Session Moderator and Panelists

Moderator

Susan Hayman is a certified professional facilitator and public participation practitioner for EnviroIssues. She has invested over 25 years in successfully enabling others to bring their passions, interests, and expertise to the table to develop solutions to challenging public issues.

Panelists

Gretchen Aliabadi leads the communications and public engagement strategies for major company initiatives at Puget Sound Energy. Gretchen has a unique background in law, government affairs, public relations and issues management, and has worked on more than 100 electric and natural gas infrastructure projects at PSE.

Lowell Rogers, P.E., is a senior project manager at POWER Engineers. Lowell manages and designs underground and overhead transmission line projects, and has experience in the siting, permitting, design, procurement and construction of high-voltage transmission lines throughout the U.S.

Drew Thatcher is a board-certified health physicist with more than 20 years of experience providing a wide range of radiofrequency services including on-site radiofrequency exposure evaluations and predictive modeling reports. Drew is a Clinical Associate Professor at Vanderbilt University, and a consultant at the American Conference of Industrial Hygienists.

Mark Williamson served as executive vice president and chief strategic officer for Madison Gas & Electric Co. based in Madison, Wis., where he was responsible for electric transmission engineering and operations. Mark also served as vice president of major projects for American Transmission Company based in Pewaukee, Wis. Currently, he consults on transmission project development and construction.

Note: Jens Nedrud, Senior Project Manager at PSE, was scheduled to be on the panel but was unable to attend.

Community Q&A Session Summary

Welcome and meeting overview

Susan Hayman welcomed attendees to the Q&A session. She explained her role as moderator and the goal of the meeting, noting that this meeting would be slightly different from the Q&A in April. The first Q&A was primarily intended to answer questions; at this meeting, both comments and questions would be welcomed and responded to by the panel.

Susan then discussed the ground rules for the evening and how to participate, with the goal of the evening being to make sure everyone who would like to speak would have that chance. Attendees were welcome to sign up to speak or submit a written question to the panel.

Panel introduction and project update

Susan Hayman provided a brief introduction to the panelists. Lowell Rogers then provided a safety moment for the meeting. He reminded people, particularly families with small children, to practice caution around electricity in the home as well as outdoors under power lines. He noted that items like balloons or kites can be dangerous if they come into contact with power lines.

Gretchen Aliabadi then gave a short introductory presentation about the project. Gretchen also pointed out some Puget Sound Energy staff in the room, and encouraged members of the public to reach out to them should they have any questions, comments, or requests.

Questions and answers

Note: The below notes are a summary of the questions and answers during the Q&A session and are not intended to be a verbatim transcript. When appropriate, responses by multiple panelists were combined into a single response. Reproduction below of statements, viewpoints and opinions offered by attendees is provided to maintain full disclosure and transparency. Their inclusion indicates neither concurrence nor disagreement by PSE with such statements, viewpoints and opinions.

Please refer to the following key for the following summary of questions and answers.

Key

- Q: Question from a participant*
- C: Comment from a participant*
- A: Answer/response from a panelist*
- A1/A2: Separate panelist answers/responses, if necessary.*

- Q: *Why aren't there solar panels on every roof in the country?*
- A1: In some places, solar panels don't make sense, and energy efficiency can be a better solution for some areas. Solar panels don't work 24 hours a day because they only generate energy when the sun is up. The Eastside needs the most energy on cold winter mornings, when the sun isn't out at all or isn't as bright. Some roofs are shaded too much for solar panels to be worth installing. Installing solar panels is a personal choice, and up to the resident.
- A2: PSE has a net metering¹ program. One factor to be aware of with solar panels is the cost—it can cost a homeowner on average \$15,000 to \$25,000 to install solar panels. PSE provides different incentives that can help, but it is still a lot of money to pay upfront. Additionally, if your roof is not oriented in the right direction where it will receive the most sunlight, installing solar panels won't likely be worth the cost. Some houses, especially older homes, cannot support solar panels and need the roof to be structurally reinforced before installation.
- Q: *If you're going to conserve energy, every electron my solar panels on my roof produce is one less electron your line has to carry. I have a battery system, so if the sun isn't out I still have plenty of electricity from the batteries. My understanding is that unless the utilities and government cooperate, the grid can't handle the extra power coming from people like me who produce extra energy. Why aren't utilities working to solve this problem?*
- A: The smart grid² issue is being talked about in the industry, and every utility is facing this issue. There is a lot of research going into it, but currently there is no commercially viable solution, possibly even for the next decade.
- Q: *There was recently a lawsuit regarding harm to cows from stray voltage. Is this a concern for humans?*
- A: Stray voltage is mostly a distribution-level phenomenon. When you have stray voltage, it is because the grounding system is not adequate, or because the lines returning to the substation don't have the capacity to carry the return voltage. That phenomenon is completely different from what you see on transmission lines, because transmission lines don't carry return voltage. Stray voltage is a different situation than the project we are talking about here.
- Q: *I think the customer demand graph is misleading because the peak usage shown is a level of use that only occurs for a few hours a year. Is that correct?*
- A: No. PSE currently operates the Eastside's transmission system using a corrective action plan (CAP), which takes care of load problems in real time. In addition to stress during peak times, the system is already operating with a CAP in place. In certain situations, the CAP isolates certain lines so that they don't overload, but it leaves them without a backup, putting customers at risk for a large-scale outage. You don't want to have to operate with CAPs, which is why the need on the Eastside is a much bigger problem than just a few hours during peak use.

¹ [Net metering](#) is a PSE program for customers who generate at least a portion of the electricity they use through qualifying renewable energy generating systems. When the customer's system generates more electricity than the home needs, a credit is issued to the customer's account for the extra power.

² The smart grid is a way to improve electric system reliability and service and provide customers with tools to become more energy-efficient. Smart grid technologies use data to manage the flow of electricity and to provide consumers information about their real-time energy use.

- Q: *The system is only stressed during peak times?*
- A: Not necessarily just on the peak times; the system is already running on stressed capacity. Furthermore, the customer demand graph shows capacity with an expectation of meeting 100 percent of the Eastside's conservation goals. If those goals fall short, the problem will be much broader and there is an increased risk of failure earlier than the 2017/2018 timeframe.
- Q: *The graph uses data from 2012-2013. Are the customer demand data shown actual measures or forecasted values?*
- A: I'm not sure if the graph was updated when the actual data was released; the projected and actual values were very close.
- C: *I would love to see real data on this.*
- A: That may be something we can get back to you on.³
- Q: *The Washington Utilities and Transportation Commission (UTC) was critical of the growth projections in the 2013 Integrated Resource Plan (IRP). The growth projections you're using here are more than twice as high as what the City of Bellevue presented in 2012. Can you confirm that the graph is using the right rate of growth?*
- A: The growth projections for the Eastside were created using distribution modeling for Bellevue. The City of Bellevue's 2012 numbers were generated using a different model. The numbers we used in our Eastside growth predictions are solid. The UTC's comment you speak of is related to a different growth model; it's like comparing apples to oranges. The bottom line is that the Eastside is growing faster than predicted.
- Q: *Where is the Lakeside substation located? I couldn't find it on the website.*
- A: The Lakeside substation is located directly north of the transit waste station in Bellevue, near the school.
- Q: *I'm just finding out about the project. Can you describe more what these lines will look like and how high they will be?*
- A: The displayed slide is an example of a typical structure, which could be between 80 and 135 feet tall, depending on the area and design chosen.
- Q: *How do plans for the light rail on the Eastside impact this project?*
- A: We have met with Sound Transit representatives about co-locating the light rail facilities with this project. We are discussing together what co-location might mean for constructing the line, such as building the pole structures on either side of the tracks. When it comes time to design for our project, we will work closely with Sound Transit to coordinate on a solution that works.
- Q: *How will the homeowners who will be affected be notified of the final decision?*
- A: There will be a lot of notifications over the next several years. PSE is doing preliminary outreach through the end of this year to gather input from the public about the route the project should take. By the end of 2014 or early 2015, we will have selected a preliminary route, which will go through environmental review under the State Environmental Policy Act (SEPA) and a formal

³ PSE connected with this attendee via email to further explain the data used for the demand graph.

permitting process. During the permitting process, agencies use their own notification and outreach processes. The SEPA process has specific requirements for who is notified (i.e., stakeholders within so many feet of the line receive notice). The permitting process is expected to go through 2015 or 2016. A good way to ensure you are informed throughout all stages of the project is to sign up on our website.

Q: *Many of our neighbors are still recovering from the economic recession. Now we are potentially going to have 125-foot poles through our neighborhood, lowering property values. Is there money in the project budget to compensate people for these changes?*

A: If you are interested in having PSE come out to your property and walk through what may or may not be built if the segment chosen is near your neighborhood, that may be helpful. As far as compensation for property values, if PSE has to purchase easements, the company would compensate you for any structures placed on or above your property. PSE does not compensate for claims of lowered property values due to proximity to the line.

Q: *The needs assessment report contains a heat map representing the most densely populated areas. Can you clarify what this map shows, in detail, and how it was generated?*

A: The map was created based on the load data from electric load measurements on meters at the household level. What this map shows is that the electric load is higher where more people live. Bellevue is shown as red on the map because there are homes and businesses there, and lots of people using power outlets for their phones, Xboxes, etc. We only have four of the large substations that step down power from 230 kV to 115 kV serving this area. When those transformers are having problems, that's when our planners say we need to do something. We know based on history that we have a certain amount of time to fix it.

Q: *How was the electric load data turned into a color on the map?*

A: I am not sure. We would have to follow up with you about that.⁴

Q: *What will the cell towers at 135th or 136th Ave and NE 40th St look like?*

A: I'm not familiar with those cell towers specifically, but transmission towers can accommodate cell communications equipment, though such cell equipment is not generally put on 230 kV structures. If the route comes through where those towers are, part of the conversation with the cell provider will be whether to relocate the structure or accommodate its equipment. There is an array of options.

Q: *I want to know how the cell tower is going to improve. Right now it's ugly and it's attached to the transmission poles. I'd like to know because I live across the street and I look at it. What will you do to accommodate it?*

A: I'm not sure what would happen with that cell tower in particular. PSE would have a discussion with the cell provider about whether or not they want to keep it. The cell provider would need to relocate its equipment off of the pole, but I'm not sure what would be done to accommodate it. That would be determined in the detailed design phase.

⁴ PSE connected with this attendee via email to further explain how the heat map was created.

- Q: *I'm a professional engineer living in Bellevue, and I appreciate how much expertise it takes to run a utility. I'm looking at the line on the demand graph, and it looks like it's a shortfall of 70 MW or so. I'm curious why there is such a big line for what seems like a small shortfall?*
- A1: The first part is that the shortfall grows over time as the load grows. When you're sizing for an upgrade to the transmission system, you want to plan not just for today but for the future so the line has some longevity. Second, the system as a whole is designed at different voltages depending on what region you're in. The system in the Pacific Northwest runs at 115 kV and 230 kV, so the next step up from 115 kV is 230 kV. At this point, we cannot continue providing reliable power to the Eastside with the current 115 kV lines, so we need to upgrade to 230 kV. We are unable to install a line with a voltage in between 115 kV and 230 kV because it wouldn't be able to connect to the larger system. Additionally, there are different sizes of conductor (line). When you look at conductor size, you need to select a conductor size that can provide enough capacity to continue serving customers even during extreme contingencies. A small difference in size can provide much more capacity.
- A2: The incremental jump in voltage is 115 kV to 230 kV, and the physical size of the transmission structure is driven by voltage, not current. It's the increase in voltage that requires the larger structure, driving the height and width of the transmission line. Additionally, you have to maintain certain code clearances, and that impacts the size. Current drives the size of the conductor, but voltage drives the size of the line.
- C: *I've been building computer facilities such as data centers that use tons of power the last few years. Over the last 20 years, there has been a movement to build data centers where power is very cheap. I can personally identify about 100 megawatts worth of business that will be leaving the area due to the high cost of power. I would like you to take this information back to your planners. If your planners aren't capturing the migration of large data centers, they should.*
- A: Thank you; we had some discussions about that trend. We did factor the movement of data centers into the predictions used by our planners, but you bring up a good point and we can take another look at the issue.
- Q: *I'm a resident of Bellevue, and I was living in Ontario during the ice storm of '98. The storm caused catastrophic power loss that lasted as long as a month for some people because of downed lines, both transmission and distribution lines. That could happen here. I'm curious about safety with these tall towers running through neighborhoods. If these lines go down with houses nearby, that's a big concern.*
- A: We design transmission lines for inclement weather. When we design transmission lines our plan accounts for a certain amount of ice and wind speed. Industry standards are about balancing safety and reliability. For example, we don't want to over-design a transmission pole with a 30-foot diameter just so that it can withstand winds that you would never see in the Pacific Northwest. It is very rare for a transmission line to fail from a straight wind or ice event when you look at the number of failures per mile of transmission line. I understand your concern, and in very extreme weather events transmission lines can fail, but looking at statistics and the design that goes into it, these failures happen very rarely. More often it is distribution lines that are downed.
- Q: *I live in the Somerset neighborhood, where we have beautiful west views of the lake, Bellevue, downtown Seattle, the Olympic mountains. I've lived there for 20 years. A year and a half ago, I moved to a different house in the neighborhood to improve my view, which could now be blocked by these poles. I am upset, as you may imagine. Is there an underground alternative to these towers going through the neighborhoods?*

A: Undergrounding is feasible, and it is on the table from PSE’s standpoint if the community is willing to invest in it. That is how we are regulated. If there is a way we can build a transmission line overhead, then that cost will be shared by all PSE ratepayers. The difference between the cost⁵ of overhead and underground transmission lines has to be paid for by the local community requesting it. The definition of the local community has to be self-determined—it can be a neighborhood, a city jurisdiction, a taxing district, or another group. We’ve done a few walking tours in Somerset; we’ve walked around and talked about options for undergrounding there and where it could be done. We also did a tour through a Newcastle neighborhood. So far we have not had anyone say, “We want to take the next steps and are willing to organize and invest in undergrounding.”

C: *It doesn’t seem fair that one neighborhood has to pay for undergrounding or be impacted by overhead lines.*

A: There are some people that don’t agree with undergrounding either, because undergrounding also has undesirable impacts. There is no way to do this project without impacts. But the decision to incur additional cost to underground at a given community’s request is not something PSE, as a regulated utility, can pass down to all its ratepayers.

Q: *Could some of the project budget be spent on supplementing demand response programs instead of transmission facilities?*

A1: PSE’s conservation goals are some of the best in the country. PSE hired E3 (Energy + Environmental Economics, an independent energy consulting firm) to investigate if demand response could be used as a solution to the project need. The answer was no, there is not even a theoretical ability.

A2: To clarify for those in the audience who may not know, demand response programs are incentive programs used by utilities to limit energy use during peak hours by turning off certain appliances for small increments of time. For example, in areas where electricity is used to power water heaters, a utility could turn off a water heater for a short amount of time during peak hours if the homeowner was participating in the program. In hot places like Arizona, the high-energy usage devices the utility goes after are air conditioners. The utility turns some people’s air conditioners off for 15 minutes, staggering different segments of people, in order to limit peak power usage. The utility directly manages the power usage of the customers. These pilot programs can successfully reduce energy use, primarily in hot climates. Demand response has not been as successful in colder places. PSE tried a pilot project for demand response on Bainbridge Island, and while it was valuable from a learning perspective, it was not considered to be successful.

Q: *Is the Colstrip power plant going to be kept in operations? I’ve heard rumors that it might be closing. What is PSE going to do for power generation should this plant be closed, and how is this going to affect the transmission project?*

A: Puget Sound Energy’s generation supply is solid for the next increment of time we are looking at for this project. There is no immediate need to look at generation sources. When there is need for more generation, the upgraded transmission system will need to be in place in order to transport that additional capacity. I don’t know about the Colstrip plant specifically.

⁵ The construction costs for all overhead transmission lines are estimated to be \$3 million to \$4 million per mile, while underground construction is expected to cost \$20 million to \$28 million per mile.

C: *If the Colstrip plant does close, the effects on consumers from the transmission project will be nothing compared to the impacts of Colstrip closing.*

Break taken at 7:25 p.m.

Q: *How does PSE define the boundaries of the Eastside area that will benefit from this project, and what is the current population in that area?*

A: The project area goes from Talbot Hill Substation in the south to Sammamish substation in the north. It is bordered by Lake Washington and stretches east about half of the distance to Lake Sammamish. The population is about 350,000.

Q: *I'm an urban planner with the City of Redmond and a participant on the Community Advisory Group for Energize Eastside. I'm here tonight to hear what the community is saying. The City of Redmond is interested in alternative technology when it makes sense. You mentioned a pilot project on Bainbridge, the demand response system. I actually lived on Bainbridge when this project rolled out. I thought it was innovative, but I also thought, in the winter, do I really want the utility turning my power off? Can you help me understand how a project like that works?*

A1: I've had some experience on the opposite side of the spectrum: in central Wisconsin it gets pretty hot in the summer, so we ran an aggressive marketing effort for a demand response program aimed mostly at air conditioning. We paid the customers about \$8 for every 15 minutes we turned the power off, which we did for about 15 to 20 minutes at a time. During those intervals, the change in house temperatures was small, but we had a high attrition rate. I think it was about perception as much as anything; people quit for psychological reasons. We did measurements to see if most participants' home temperatures actually increased and learned that the temperature changes were pretty negligible, but people felt like their houses were getting hotter and would turn their air conditioners back on. It is a science and an art to sustain a program like that. E3 looked into those kinds of programs as one of the alternatives to new transmission infrastructure on the Eastside, but the energy savings weren't enough to make a significant impact for this area, and were not enough to address the needs in the Eastside area.

A2: The Bainbridge Island project was voluntary - people had to opt in. We were about 30 participants short of the number of participants needed to operate the program. It was successful in that PSE collected some data about the demand response program. Like the pilot program in Wisconsin, we also provided an override option so that people could turn their power back on, which they did. We also had an issue with a few of the thermometers not working. That's how new this technology is for winter peaking.

Q: *Bainbridge Island is such a green-minded community, so I'm surprised that not enough people signed up for this type of project. Do you think it was a challenge with marketing?*

A: We learned that people just don't want a utility unilaterally controlling their houses and their comfort levels. To determine whether marketing shortfalls played a role would require additional research, which PSE is not looking into at this time.

Q: *What are the specific requirements that dictate such tall pole heights as the range you're suggesting for this project? National Electric Safety Code (NESC) states a 23-foot minimum vertical clearance requirement, with 5-foot 3-inch clearance between wires.*

A: When you design a transmission line, you get into the details much further on in the process. At this point, we're not into the detailed design phase of the project so we have built in a cushion

around the design parameters so that is greater than the code minimum requirements. We've added some buffers into the clearance because when we get into the detailed design phase, we don't want to tell residents that we are looking at a maximum structure height of 90 feet and then have to install a pole that is 120 feet. We don't want to mislead people. What we're doing is giving a buffer to the ground clearance and phase to phase clearance. A 5-foot 3-inch phase clearance is the absolute minimum. Conductors don't stay fixed in place, they move. In addition to the code minimum, we have to account for the movement of the conductors (for example, during wind), sag, and maintenance factors.

Q: *Can 230 kV transmission lines run on a horizontal configuration instead of vertical? I'd much rather look at one thing instead of three things.*

A: Just as 115 kV transmission lines have a certain amount of required clearance, 230 kV lines have more. When you look at the easements available, then add up the required clearances between wires, the space between structures, the swing of the conductor, and the additional electrical clearance, there is just physically not enough room to go with a horizontal configuration along the majority of the route options for this project. For the vast majority of the line, a horizontal configuration wouldn't be possible.

Q: *Once the Energize Eastside project is completed, what will the new system capacity be? I would like to see a line showing projected capacity after the project's completion added to the customer demand graph.*

A: Initially the project will bring about a 25 percent capacity increase to the system. We are essentially adding a fifth transformer to the four transformers already serving the Eastside.

C: *I read an article describing a time-of-use program from PSE in 2001 that sounded like it would be applicable today. Paraphrasing from the article, the time of day program was about trying to change electrical usage patterns by offering lower electricity rates during non-peak hours and raising rates during peak hours. The author of the article quoted a PSE representative who said the program worked, customers understood the need, and were willing to change their behavior. Through this program, customers shifted 13 kilowatt hours off of peak-usage times and reduced 25 megawatts of peak demands. I think that Puget Sound Energy has an incentive to do this program again. We should use time use programs as an alternative to building the Energize Eastside project. We only have to shift a little bit of energy use off of peak times. If we were able to delay this project for four years, PSE would save \$40 million, and we could see how battery storage and other alternative technologies develop.*

A: I was one of those customers who participated in PSE's program in 2001. PSE learned some things from that project, but ultimately, the program didn't work and the UTC shut it down. Time-of-use programs are a behavioral way to solve problems. Can they be a piece of the solution in the future? Maybe. We are looking into what financial incentives have the potential to change people's behaviors. Solving the problem we have here on the Eastside is a bigger task. This is a line that brings power to 350,000 people. It is a major backbone of the power system. It would be a huge risk to assume that behavioral changes will fix the Eastside needs. Can we change enough people's behaviors by 2017 or 2018? What if the program doesn't work? It would not be just our homes that would be in danger of power outages; it's our employers, our schools, our hospitals. With PSE's moral and legal duty to provide power to its customers, it's too big of a risk to rely on behavior change to fix this problem.

- C: *PSE was surprised that there was a 1 to 2 percent conservation rate during the time-of-use project. Right now, there is no incentive for me not to charge my electric car whenever I want, for example, but if there was a little incentive for me to change my behavior, I might do it. I think incentives would be a significant contributor to usage behaviors.*
- A: Another driver of the electricity demand on the Eastside is electric vehicles. I have some experience in California with demand response during about the same time period as PSE's time-of-use project. The California utility stopped the program because it was vastly unpopular, especially with seniors living on a fixed income. The only part of the program they kept was a voluntary opt-in, and even then the participation was very low.
- Q: *You said previously that stray voltage does not occur on transmission lines, is that correct? So there is no effect on anybody or anything? Because when I do an internet search, I find sources that link stray voltage and transmission lines*
- A: Stray voltage is a distribution phenomenon from grounding issues. That is how it's known in the utility business. It's just not a transmission line phenomenon. Perhaps what you're finding could be a problem with the definition of transmission lines.
- Q: *Does PSE own the maintenance equipment to access lines on poles that are over 125 feet tall?*
- A: PSE contracts with a service provider for our line crews. Potelco is the company; they are based out of Sumner, WA. Maintaining 125-foot structures is not a challenge in the utility business. PSE's contractor is quite capable of maintaining that type of structure.
- Q: *With the light rail coming to Bellevue, how much of the electricity needs from that project is contributing to the problem?*
- A1: The light rail does not contribute a very large electricity need. Each station is equivalent to about a 10- or 12-story building.
- A2: [A PSE representative speaking from the audience] I'm working with Sound Transit on light rail coming to Bellevue. PSE doesn't need any transmission improvements to meet Sound Transit's electricity needs. For that project, the need is a matter of distribution.
- Q: *Why has the Community Advisory Group been limiting its scope and not open to looking at other options?*
- A: We promised to dedicate 2014 as a year of robust community outreach. We know there is no good spot to put a power line, and we thought we needed to talk to our neighbors before making any decisions. The Community Advisory Group is one tool we are using to conduct outreach for this project. The Community Advisory Group is charged with looking at where the overhead wires might be located. There have been conversations about undergrounding in that group, but if a community wants underground, the request has to come from the community itself, not the Community Advisory Group. The route selection process with an advisory group is a conversation we have had in several jurisdictions with other projects. For example, the Sammamish-Juanita transmission line project in the Redmond/Kirkland area went through a similar process.
- Q: *What about other options, such as battery storage and the Lake Tradition to Lakeside route option that was taken off the table two years ago?*
- A: Batteries were looked at. The technology is too immature at this time for this type of project. Our decision as a company was to have a conversation about what we know works. We've continued to offer to sit down and talk more in-depth about batteries. In regard to the Lake Tradition route, one of the potential solutions we studied was building a line from Issaquah into central Bellevue.

The bottom line was that it didn't work. The study that looked at this found that the 230 kV system that runs from Novelty Hill to Lake Sammamish doesn't have many other 230 kV inputs, and a line routed from Lake Tradition to Lakeside caused more problems than it fixed. The strong sources for a 230 kV input are at Lake Sammamish and Talbot Hill.

Q: *How does PSE justify the continuation of using private property for free for their own profit from easements acquired 80 years ago?*

A: Like any other property owner, PSE purchased a property right when it acquired the easement, just like purchasing an easement to put in a driveway on a neighbor's property. It doesn't make sense to pay again for a property right one has already purchased.

C: *The new need is not in the same location as the proposed line.*

Q: The Eastside 230 kV effort is about growth and how growth all around us affects us all. Our job at PSE is to make sure when a new business or new home wants to have power, the lights go on. We don't manage where development goes or who gets to plug in five plasma TVs. Our job is to make sure that when you flip that switch, everything goes on. This line serves everyone. This isn't a neighborhood line; it's the line that serves everyone.

Q: *Can PSE provide life-cycle costs for above ground versus underground lines? Not just the initial installation cost, but including ongoing maintenance.*

A: Maintenance costs are pretty comparable between the two. Underground lines might be slightly lower because you don't trim vegetation. However, most of these lines are installed in existing corridors, so there's already vegetation expense. Once installed, the ongoing costs are on par with each other. There is a perception that weather will knock down 230 kV lines as often as distribution lines. The 230 kV lines are very reliable and their maintenance needs are incremental. It's not like fixing a local distribution line; 230 kV lines are above tree branches, making tree trimming requirements less than with a 115 kV line.

Q: *That didn't quite answer my full question: I'm asking for the life-cycle cost data. Can you provide that?*

A1: POWER Engineers could provide data based on other experiences around the country. PSE does not have underground 230 kV lines, so the maintenance data for underground lines from PSE just doesn't exist. It's something we'd have to discuss. It's not just something we can pull off the shelf. PSE doesn't have underground transmission lines; PSE has underground distribution lines, which are very different.

A2: I spoke to the Community Advisory Group and discussed comparable projects and one of the main points made was how variable underground 230 kV lines are. They are each tremendously unique depending on region and environmental setting. Utilities don't provide maintenance data regularly and it is difficult to gather that information.

C: *If I was running a business I'd like to know the maintenance costs. I find it hard to believe the data is not available.*

A: It is difficult to give you existing underground data numbers. PSE has that information for overhead lines, but we don't have the facilities to gather that data for underground. PSE asks firms like POWER Engineers to gather that information.

Q: *How will you manage loads when you take down lines and establish new ones during construction?*

A: In short, very carefully. We look at peak loads and take certain segments out at a time. A lot of it depends on phasing the construction. You don't want to create multiple contingencies all at once; you want to keep enough redundancy to carry load under foreseeable circumstances.

Q: *The blue pole at NE 24th and Bel-Red Road is an eyesore. How can PSE justify this installation?*

A: Part of the requirement from Redmond for the installation that you're referring to was that it had to have an artistic design component, and part of this art is the pole color. PSE's response was that as long as it's safe and operable, we can incorporate the art into the design. Like any other art piece, beauty is in the eye of the beholder.

C: *It isn't really about the color; it's about the whole installation there. You've taken a really nice intersection and turned it into an eyesore with that infrastructure, and now you want to put up more poles and wires.*

A: Infrastructure is what we use every day. Infrastructure keeps the lights on. If the community is interested in changing that, they can have a community discussion about it. For example, there's a community in Anaheim that paid to put a substation underground. If the community wants to invest in that, it can. It's a question you have to ask your community. I don't think anyone wants to live in a place where PSE says, "We're going to underground everything for all communities, and our rates are going to increase by a lot." Some communities make that decision for themselves. In Medina, there was a referendum a few years ago asking the citizens to create a taxing district to underground all the distribution lines. It was voted down. If a given community wants to have this discussion, they can. PSE is willing and able to put the project underground, but it's not the company's decision to force that cost onto a given community.

Q: *Are you aware of any human health studies on corona from transmission lines?*

A: As a backdrop, I'll give you some more information. Certainly a line can generate corona, but the new lines should contribute very little, if any corona, given advances in design. There are a few studies that talk about interactions with air particles creating a carcinogenic effect or difference in air quality near the line or elsewhere. I've reviewed a few of those studies and most of them are more on the theory side of things. A lot of the time the authors form a conjecture that there could be interaction with radon particles. Really I haven't seen any studies that have nailed that all down. The few studies I've seen are preliminary and they haven't taken it beyond that. I don't think this would be a large impact.

Q: *Are you familiar with the Draper study done in the UK?*

A: Yes. Back in 2005, the authors of the Draper study were looking at different lines, closer to 350 or 400 kV. They looked at childhood cancer as a result of proximity to lines. That was one of the limitations; they didn't do magnetic field measurements. They used distance as a proxy, and found a greater effect at 600 feet. At 600 feet away from a transmission line, you're just looking at background effects, virtually zero effect from the lines themselves. They followed up in 2010 with some measurements and the limited effects they found went away. There was really a flaw in the study itself. There was a whole lot of follow up to this study on how they drew the controls; the uncertainties are too large to draw any inferences from this study. There were not enough people at these exposure levels for the study to be meaningful. There was a great study from Pederson that was published this year; it was better performed and showed no effect at all.

Q: *I don't believe that study was measuring EMF; it was talking a little more about ionized particles floating much farther than they anticipated.*

- A: The study was in the 350 to 400 kV range which will create far more corona particles than 230 kV; we won't expect anywhere near that corona level in this project.
- Q: *So the science is not quite there yet, but there is an effect?*
- A: I would disagree with that statement. It's like saying people with glasses are smart; you're trying to show a cause and effect from a correlation. You can find correlation in many things that don't mean causation. You can think of it as a three-legged bar stool. The first leg is epidemiology. In epidemiology, two times background effects is really weak. They can't control all the uncertainties. The two other legs are animal studies and cellular studies, and in those studies you can determine direct effects. There aren't carcinogens known to affect humans that don't also affect animals. You can control all the exposure in laboratory studies, and in those studies it's really clear that it's not EMF causing cancer.
- Q: *Are they doing ionization studies on animals?*
- A: Ionizing radiation is a whole separate ballgame. X-rays are known carcinogens, and we are talking about billions of levels of difference in energy. When you look at studies for biological response, it's in the 200 to 500 milligauss range, and we don't see those numbers in our normal life.
- Q: *How many 230 kV circuits are needed to solely meet the Eastside growth demand for the next 30 years?*
- A1: The study data shows that we need one 230 kV circuit. It needs to run from Sammamish to Talbot Hill with a substation in between. Some might consider that two circuits. That gets us into the 2030s, and then as the load growth matures, other options might become available as newer technologies emerge and mature. Something else may need to be done in the mid-to-late 2030s to upgrade the system, possibly adding another circuit.
- A2: The answer depends on where this project goes. If the existing 115 kV corridor is chosen, the 115 kV line needs to be updated, resulting in a 230 kV circuit and an improved 115 kV circuit. This means you would see either two side-by-side poles each with three wires, or one pole with six wires. The 115 kV circuit would be built to 230 kV standards, so we could further increase capacity in the system without needing to site the project again. If the existing corridor is not chosen, we'll need to install one 230 kV circuit, or three wires. It will either look like three wires or six wires, but it will still be 230 kV. There would probably also be static protection wires at the top, which would be two little wires.
- Q: *I feel like PSE is swimming against the tide of history on the battery issues. PSE says the technology is not quite there yet. The UTC criticized PSE for its lack of evolution of battery alternatives, using 2010 data for a 2013 Integrated Resource Plan (IRP). We need a better analysis of why batteries are maturing in other places but not here.*
- A: Batteries are being used in other places because utilities are being required to study batteries in the context of energy storage for load shifting. The specific goal of these battery projects around the country is to take renewable power from one part of the load curve and move that generation capability to another. Our project is about transmission – not generation. Battery storage doesn't work to solve the problem on the Eastside. We're not trying to store energy through the night to supply at another time; our level of need is on the transmission system, not the generation system.

- C: *According to the E3 study, if we could find 70 megawatts we could delay this project for four years.*
- A: One of the risks is that 70 megawatts is what's needed for year one provided that we meet our aggressive conservation goals. These battery projects are still in beta test mode. The problem we have is that need grows over time, and already the system is operating under corrective action plans. Utilities normally don't let corrective action plans solve their problems. PSE is not being as aggressive about this as other companies. You're asking PSE to put 350,000 customers at risk to try an immature battery technology. They'd be taking a big risk on an emergent technology and no prudent regulatory body would support that.
- C: *Barclays put out a report a couple of weeks ago which downgraded all their utility projects because of solar generation and battery storage. Over the next few years, a confluence of declining cost trends and increasing resident storage is disrupting the status quo, and is already competitive with utility grid power in Hawaii. There are near-term and long-term risks of falling behind this curve. We don't have the solar panels to address this problem. We could put in residential batteries to flatten out those peak demands. Take the \$150 million and buy 15,000 batteries to take the peaks off. That will happen, and when it does happen and we're looking at these new poles we bought, we'll wonder why we didn't try harder to find an alternative. We should be looking at batteries at the grid level and at the residential level.*
- Q: *What is PSE's return on investment for the Energize Eastside project at three months, six months, and two years?*
- A: I might not be able to answer exactly, but I'll give you a general answer. We're a regulated utility, not a normal business. We invest our money in paying for capital improvement. Whatever improvement that is – a wind farm, a transmission line, a battery project, it doesn't matter, they're all capital projects. We pay for capital projects upfront, and when they are installed and running, we go to the UTC and show them what we spent. They look over our books and allow or disallow what we put on the books to be passed down to our rate payers over time. Our allowed rate of return is just under 10 percent, but I don't know if we've ever earned that. Last year, it was maybe around 7 percent, the year before it was maybe 4 percent. The assets depreciate over a certain number of years.
- A: In most jurisdictions the depreciation time is 35 to 42 years for lines and less for transformers. The rate of return is applied to the depreciated balance, and that's what you get for that year. It's spread out pretty linearly with a little more in year one. There's no differential rate; battery, conservation, anything we can prudently invest in gets the same rate of return. There is no incentive to do one thing or another.
- C: *I want to share something about the battery. I just came back from a trip to Germany. I visited an area near Salzburg where they use batteries and it is a gorgeous area. We also live in a beautiful area. Having poles everywhere is going to ruin everything. You need to look into these batteries they use in Europe.*
- A: Thank you for your comment.

Meeting adjourned at 9:00 p.m.