

Bedwell, Heidi

From: Don Marsh <don.m.marsh@hotmail.com>
Sent: Thursday, August 30, 2018 4:49 PM
To: Bedwell, Heidi
Subject: Response #2 to COB revision letter
Attachments: Response to COB revision letter 2.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Heidi,

On August 25, I sent you a letter containing two questions we would like the City to ask PSE regarding its permit application to build Energize Eastside. Today I'm sending a second letter that with two additional questions and an expanded scope for a previous question.

Thank you for considering these requests.

Sincerely,
Don Marsh

August 28, 2018

Heidi M. Bedwell
Environmental Planning Manager
City of Bellevue
Post Office Box 90012
Bellevue, Washington 98009 9012

Re: Conditional Use (File# 17-120556-LB)
Critical Areas Land Use Permit (File #17-120557-LO).
South Bellevue Segment Energize Eastside

Dear Ms. Bedwell,

On behalf of CENSE, I sent two questions regarding PSE's "Energize Eastside" project in my letter dated August 24, 2018. CENSE has three more questions we would like the City of Bellevue to ask PSE:

1. The City asked PSE for hourly records of Eastside demand for the summer of 2017. However, the applicant is required by LUC 20.20.255 to provide the following:
 - b. *Describe how the proposed electrical utility facility provides reliability to customers served;*
 - c. *Describe components of the proposed electrical utility facility that relate to system reliability;*

Information describing both summer and winter peaks is critical to assessing whether customer and system reliability is improved by the project. The FEIS at page 1-3 states the need for proposal is the "risk of power outages that typically occur in cold or hot weather as early as the summer of 2018." **Accordingly, PSE must provide hourly records for summer and winter peaks for 2008-2017 so decision makers can assess demand trends during the past decade.**

The FEIS at page 1-5 says that there is "potential for *load* shedding (forced power outages) by summer of 2018." Data for peak loads during the summer of 2018 should be provided since the peak warm period for the summer of 2018 has now passed. Since the replacement of the Lakeside substation is also part of the project, **PSE should specify the power flowing through the Lakeside substation for the periods in question.** (This expands the request in our first letter.)

2. BPA publishes records of electricity transferred between the U.S. and British Columbia over the Northern Intertie. These records show that large transfers happen occasionally. For example, on January 1, 2018, British Columbia transferred 2,244 MW to the U.S. On January 24, 2018, the U.S. transferred 1,974 MW to B.C. Under the code provisions above, **PSE is obligated to describe how much of this electricity passed through the Talbot Hill, Lakeside and Sammamish transformers in each case (north and south transfers).**
3. In the 2013 Eastside Needs Assessment, PSE/Quanta assumed that most local generation plants would be offline during an N-1-1 outage emergency. PSE has since admitted that this situation is unlikely to occur. Apparently, PSE ran a second load flow study with normal levels of local generation. PSE must describe details of this second study. **Exactly how much were loads on the**

Talbot Hill and Sammamish transformers reduced when electricity from local generators was available?

We believe that clear answers to these questions are required by LUC 20.20.225 to describe the need for Energize Eastside and the feasibility of alternatives that combine modern technologies such as demand response, electrical efficiency, distributed generation, and energy storage.

Sincerely,

Don Marsh

(sent via email)

Bedwell, Heidi

From: Don Marsh <don.m.marsh@hotmail.com>
Sent: Saturday, August 25, 2018 2:40 PM
To: Bedwell, Heidi
Subject: Response to COB revision letter
Attachments: Response to COB revision letter.pdf

Dear Heidi,

Please see the attached letter which poses two questions we would like the City to ask PSE regarding its permit application to build Energize Eastside.

Sincerely,
Don Marsh

August 24, 2018

Heidi M. Bedwell
Environmental Planning Manager
City of Bellevue
Post Office Box 90012
Bellevue, Washington 98009 9012

Re: Conditional Use (File# 17-120556-LB)
Critical Areas Land Use Permit (File #17-120557-LO).
South Bellevue Segment Energize Eastside

Dear Ms. Bedwell,

CENSE appreciates the revision letter dated August 14, 2018 from the City of Bellevue to Puget Sound Energy regarding the company's proposed "Energize Eastside" transmission project. We are especially interested in PSE's answers to questions about the load forecast.

We request the City to ask two additional questions that would further clarify the need for the project:

1. **What were *actual* summer and winter peak demand levels for the Eastside for 2008-2017?**
Since peak demand is highly correlated to temperature, this 10-year date range will help us understand the growth trend, the influence of weather, and the relative magnitude of summer and winter peaks.
2. PSE assumes regional transfers of 1,500 MW in winter and 2,850 MW in summer. **What portion of these transfers are firm commitments by PSE or BPA that cannot be curtailed during an N-1-1 outage emergency affecting the Eastside?**

Thank you for your efforts on behalf of residents and businesses in Bellevue and ratepayers throughout PSE's territory who want to be sure their funds are being invested in prudent and cost-effective infrastructure projects.

Sincerely,

Don Marsh

(sent via email)

Bedwell, Heidi

From: Bedwell, Heidi
Sent: Tuesday, September 18, 2018 7:09 AM
To: 'Frank and Julie Bosone'
Subject: RE: September 6 informational meeting notice

Mr. and Mrs. Bosone,

I am sorry to hear that the notice of the public meeting arrived at your home well after the actual public meeting date. The meeting notice was mailed two weeks in advance of the meeting therefore I am unclear why the mailing took so long to reach you in the Somerset area. I can understand how this could be frustrating. It is unfortunate to hear you were left with the impression that this was an intentional act, please be assured it was not.

I am happy however to answer any questions you may have about the permitting process which was covered during the public meeting. I would also recommend you visit, if you haven't already, the city's permit project page for additional information <https://development.bellevuewa.gov/zoning-and-land-use/public-notices-and-participation/energize-eastside-updates/>. You can also subscribe to alerts to receive email or text notification when this page is updated with pertinent information.

Sincerely,
-Heidi



Heidi M. Bedwell

Environmental Planning Manager, Land Use Division
Development Services Department
425-452-4862

www.bellevuewa.gov and www.mybuildingpermit.com

From: Frank and Julie Bosone <fbosone@comcast.net>
Sent: Thursday, September 13, 2018 4:48 PM
To: Bedwell, Heidi <HBedwell@bellevuewa.gov>
Subject: September 6 informational meeting notice

Ms Bedwell

The notice of the September 6th meeting arrived in my mail today. Take note that today is September 13th so it will be difficult for me to attend. This appears to me to be just another poorly devised effort to confuse and alienate the public. Shame on you and PSE. This project deserves to be dumped along with PSE's other ill conceived initiatives.

Frank & Julie Bosone (Bellevue residents since 1964)
4544 Somerset Drive SE
Bellevue 98006

Sent from [Mail](#) for Windows 10

Bedwell, Heidi

From: Frank and Julie Bosone <fbosone@comcast.net>
Sent: Monday, September 24, 2018 10:00 AM
To: Bedwell, Heidi
Subject: RE: September 6 informational meeting notice
Attachments: image001.png

Follow Up Flag: Follow up
Flag Status: Flagged

Ms Bidwell

Some background: We have lived at 4544 Somerset Drive for 50 years. The petroleum pipeline runs through our frontyard and the existing PSE power lines through our backyard. One half block south of us the two line are co-located a few feet apart. QUESTION? Given PSE's questionable safety record and weekly predictions by experts of a major seismic event in the future, what provisions does the city of Bellevue have in place should there be a catastrophic break in the petroleum pipeline? Is there any contingency plan if there is a construction accident? What is the plan and is it available for public review and comment?

Thanking you in advance.

Frank & Julie Bosone
E fbosone@comcast.net
C 435-246-9370

Sent from [Mail](#) for Windows 10

From: [Bedwell, Heidi](#)
Sent: Tuesday, September 18, 2018 7:11 AM
To: [Frank and Julie Bosone](#)
Subject: RE: September 6 informational meeting notice

Mr. and Mrs. Bosone,

I am sorry to hear that the notice of the public meeting arrived at your home well after the actual public meeting date. The meeting notice was mailed two weeks in advance of the meeting therefore I am unclear why the mailing took so long to reach you in the Somerset area. I can understand how this could be frustrating. It is unfortunate to hear you were left with the impression that this was an intentional act, please be assured it was not.

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Sincerely,
-Heidi



Heidi M. Bedwell

Environmental Planning Manager, Land Use Division

Development Services Department

425-452-4862

www.bellevuewa.gov and www.mybuildingpermit.com

From: Frank and Julie Bosone <fbosone@comcast.net>

Sent: Thursday, September 13, 2018 4:48 PM

To: Bedwell, Heidi <HBedwell@bellevuewa.gov>

Subject: September 6 informational meeting notice

Ms Bedwell

The notice of the September 6th meeting arrived in my mail today. Take note that today is September 13th so it will be difficult for me to attend. This appears to me to be just another poorly devised effort to confuse and alienate the public. Shame on you and PSE. This project deserves to be dumped along with PSE's other ill conceived initiatives.

Frank & Julie Bosone (Bellevue residents since 1964)

4544 Somerset Drive SE

Bellevue 98006

Sent from [Mail](#) for Windows 10

Bedwell, Heidi

From: Bedwell, Heidi
Sent: Tuesday, September 18, 2018 7:20 AM
To: Keith Watts
Subject: RE: PSE Eastside Energize Conditional Use Permit and Critical Areas Land Use Permit Comment

Mr. Watts,

Thank you for providing comments on PSE's application to construct a new transmission line and substation in the City of Bellevue. The comments are part of the city's record and will be considered as the city processes PSE's application. Because you provided comments to the city regarding this application, you will be notified of the public hearing when it is scheduled including notification of the Director's decision and recommendation on the subject permits. Please note that the Director of Development Services will make a recommendation to the city's hearing examiner on the conditional use permit and the hearing examiner will make the final decision. Appeal of the hearing examiner's decision is made to the city council.

Again, thank you for taking the time to express your interest in the project. You can subscribe to alerts and find more information about the permit and process on the city's permitting page <https://development.bellevuewa.gov/zoning-and-land-use/public-notice-and-participation/energize-eastside-updates/>



Heidi M. Bedwell

Environmental Planning Manager, Land Use Division
Development Services Department
425-452-4862

www.bellevuewa.gov and www.mybuildingpermit.com

From: Keith Watts <tango_zulu@hotmail.com>
Sent: Monday, September 17, 2018 9:21 PM
To: Bedwell, Heidi <HBedwell@bellevuewa.gov>
Subject: PSE Eastside Energize Conditional Use Permit and Critical Areas Land Use Permit Comment

To whom it may concern,

Every day PSE makes technical decisions to comply with the regulations put forth by the Washington Utilities Commission and my local government that affect safety, reliability and cost.

I do not have the expertise to second guess those decisions. I must rely on professional engineers and government representatives to determine the best course of action.

I will support whatever decision is made by the City of Bellevue Director of Development Services and the Hearing Examiner.

If reliable experts think PSE needs to upgrade the transmission line then lets give them permission to do so.

Sincerely,

Keith H. Watts

5635 178th Ave SE Bellevue, WA 98006

425-505-4057

9/17/2018

Bedwell, Heidi

From: Loretta Lopez <llopez@mstarlabs.com>
Sent: Wednesday, August 29, 2018 11:50 PM
To: Bedwell, Heidi
Cc: Karen Esayian; Stead, Elizabeth; lj.lopez@frontier.com
Subject: RE: PSE Project Revision letter/Reference to June 8, 2018 letter

Follow Up Flag: Follow up
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Hi Heidi,

Please reply all to include my frontier email. We will take our servers down tomorrow and system may not be in order for several days. I will read my frontier email while servers down.

I found the June 8, PSE letter a rather strong, almost threatening letter. PSE continues to make assertions about the system demands and what PSE must do to meet needs.

What is the basis for PSE assertions? Has PSE provided any data to the City to supports its assertions?

And if not, then it seems that the City must require more than PSE statements to meet the requirements of LUC 20.20.255 before proceeding. We can't simply believe PSE statements without evidence.

Thank you.
Loretta

From: Bedwell, Heidi [mailto:HBedwell@bellevuewa.gov]
Sent: Tuesday, August 28, 2018 10:57 AM
To: Loretta Lopez; Stead, Elizabeth
Cc: Karen Esayian
Subject: RE: PSE Project Revision letter/Reference to June 8, 2018 letter

Here you go Loretta.
-Heidi

From: Loretta Lopez <llopez@mstarlabs.com>
Sent: Saturday, August 25, 2018 12:11 AM
To: Stead, Elizabeth <estead@bellevuewa.gov>
Cc: Karen Esayian <kesayian@aol.com>; Bedwell, Heidi <HBedwell@bellevuewa.gov>
Subject: FW: PSE Project Revision letter/Reference to June 8, 2018 letter

Hi Liz,

Heidi refers to a June 8, 2018 letter from PSE to Brad Miyake in the Revision Letter. Page 1, Section Load Forecast.

We would like a copy of the June 8, 2018 letter which I assume you can send to me without a formal Public Disclosure request. Please let me know.

I would like to review the letter before the September 6 public meeting.

Thank you.

Loretta

From: Bedwell, Heidi [<mailto:HBedwell@bellevuewa.gov>]
Sent: Thursday, August 16, 2018 2:49 PM
To: Loretta Lopez
Cc: Stead, Elizabeth
Subject: RE: PSE Project Revision letter

Our web page editors are working on making the change to the webpage and uploading the document so it's not posted yet. However I have attached it for your convenience.

Heidi

Note the date on the letter is incorrect. It was sent on the 15th.

From: Loretta Lopez <llopez@mstarlabs.com>
Sent: Thursday, August 16, 2018 1:23 PM
To: Bedwell, Heidi <HBedwell@bellevuewa.gov>
Cc: Stead, Elizabeth <estead@bellevuewa.gov>
Subject: RE: PSE Project Revision letter

Hi Heidi,

I checked the website and could not find the revision letter. Since you are away tomorrow, would you send the link to me. It is not easy to navigate the PSE project on City website. Maybe I am looking in the wrong locations.

Thank you.

Loretta

From: Bedwell, Heidi [<mailto:HBedwell@bellevuewa.gov>]
Sent: Tuesday, August 14, 2018 6:20 AM
To: Loretta Lopez
Subject: RE: PSE Project Revision letter

Hi Loretta,

I will be sending the revision out this week and have it posted to the project web page. Don't know exactly which day as it's still be reviewed internally. I understand your need to inquire and I appreciate your patience.

Heidi

BTW- I will be out of the office beginning on Friday and returning the day after Labor day. In my absence Liz Stead, land use director, can respond to any inquiries.

From: Loretta Lopez <llopez@mstarlabs.com>
Sent: Monday, August 13, 2018 1:51 PM
To: Bedwell, Heidi <HBedwell@bellevuewa.gov>
Cc: KAREN Esayian <kesayian@aol.com>
Subject: PSE Project Revision letter

Hi Heidi,

I know you had to take time for family medical reasons and that you have to catch up.

I know that I keep asking you about the revision letter. I do have to be diligent so I have to ask.

In the past you have said that you do not have an estimated time of when you will issue the revision letter.

Is that still the case or do you have some idea of when you will issue the letter.

Thank you.

Loretta

Bedwell, Heidi

From: Richard Lauckhart <lauckjr@hotmail.com>
Sent: Tuesday, September 18, 2018 12:22 AM
To: Bedwell, Heidi; tharaj@newcastlewa.gov; jding@rentonwa.gov
Subject: Additional Comments on PSE Application for a CUP for Energize Eastside
Attachments: Lauckhart Expert Report re NEED.pdf; Lauckhart Expert Report re ALTERNATIVES.pdf; Lauckhart Expert Report re Energize Eastside Final EIS.pdf

Heidi, Thara, and Jill-

Please file this email and its attachments in your respective city files of comments on the PSE CUP Application for Energize Eastside.

I have previously filed identical comments with each of you separately on this matter. Those comments were filed along with 17 Supporting Documents. Those should already be in your files.

The dates they were filed were:

- 1) City of Bellevue...December 11, 2017
- 2) City of Newcastle...March 13, 2018
- 3) City of Renton...June 14, 2018.

I note that none of your three cities have scheduled hearings on the Application in your city. That makes perfect sense to me given that PSE has chosen not to move forward with applications for North Bellevue and cities further north of Bellevue where permits will be needed in order to construct the Energize Eastside project. It would be a complete waste of everyone's time, effort and money to hold hearings on building half of a line. That would not be in the public interest.

Having said that, I have put together further comments on the PSE Application that I would like to have you file in your respective city files on the PSE CUP Application for Energize Eastside. I have attached those additional comments to this email.

These comments individually and collectively make it clear that Energize Eastside is not needed now or anytime soon. If your city moves forward with a hearing on PSE's CUP Application for Energize Eastside, that Application should be denied by your city.

Please file this email and its attachments in your respective city files of comments on the PSE CUP Application for Energize Eastside.

Please contact me if you have questions about this email or its contents.

Richard Lauckhart
Energy Consultant
44475 Clubhouse Drive
Davis, California 95618
lauckjr@hotmail.com

This statement is wrong. PSE can compel SCL to use its line to serve a new 230/115 KV transformer by making a FERC Order 888 request (under the FERC OATT) for such transmission service. If SCL refuses, FERC will compel them to do so. FERC uses its "reciprocity" ruling to compel SCL. If SCL refuses, FERC will refuse to let SCL use any transmission lines that are under direct FERC jurisdiction. SCL could not meaningfully its service obligations to its own customers without using the transmission lines of FERC directly jurisdictional utilities.

Fifth Sentence:

"Even if compelled use of the corridor were allowed, the negotiations would likely prove lengthy, and would likely preclude completion of the project within the required timeline to meet project objectives."

The FERC OATT has tight timelines for dealing with requests for transmission service. FERC intentionally put in these tight timelines to prohibit a utility like SCL from denying service by delaying service. Further, PSE currently is not saying when it thinks it needs a new 230/115 KV transformer to be in service at Lakeside. Any needed construction on the existing SCL line will take considerably less time than permitting and building EE. Further, according to the only reasonable load flow study done regarding serving the east side (the Lauckhart-Schiffman Load Flow study), there is plenty of time before any new 230/115 KV transformer is needed at Lakeside.

Thank you for the opportunity to clarify how this SCL Transmission Line option would work.

Sincerely,

Richard Lauckhart
Energy Consultant
Davis, California
530-759-9390
lauckjr@hotmail.com

Expert Report

Richard Lauckhart

My Qualifications are included in the Lauckhart-Schiffman report at its Appendix H

Alternatives to Energize Eastside

Executive Summary:

While all indications are that nothing is needed to be built on the Eastside now or in the near future in order to provide reliable service, it is important to keep in mind that there are several other likely better alternatives to Energize Eastside should a legitimate reliability problem be identified. The alternatives identified in this paper have not been appropriately analyzed by PSE. It is my opinion that a prudent utility would properly analyze all these alternatives in a load flow study before any decision would be made to build Energize Eastside. PSE has failed to properly analyze these alternatives to date. But they need not be analyzed until there is a legitimate finding of a reliability problem on the Eastside.

The PSE Application for a Conditional Use Permit for the Energize Eastside project should be rejected. PSE has not proven the need for the project and has not properly looked at alternatives to Energize Eastside.

I. Background and PSE failure to appropriately look at alternatives:

Puget Sound Energy (PSE) claims that the Energize Eastside project is needed in order to maintain reliability on the Eastside of Lake Washington. I have performed a load flow study (*the Lauckhart-Schiffman load flow study included in my "needs" report in this proceeding*) that demonstrates there is no need for Energize Eastside. This "alternatives" report explains that PSE has many alternatives to Energize Eastside that need to be properly analyzed if there is ever deemed to be a legitimate reliability problem on the Eastside of Lake Washington.

As I describe in my "needs" report, a reliability problem on the grid can only be identified with a load flow study. As I further describe in that report, if the load flow study points the utility to areas that need to be fixed on the transmission system, there can be many alternative approaches to fix any identified problems on the grid. The load flow modeling is then used to examine each of these alternatives that might be able to fix the problem. The best alternative solution will best balance the cost and environmental impact of any fixes that can solve the indicated reliability problem.

PSE not only failed to properly run its load flow studies in which they attempted to demonstrate the need for Energize Eastside, PSE also failed to properly identify and analyze alternatives to Energize Eastside if a legitimate reliability problem is identified.

The Energize Eastside Final Environmental Impact Statement also fails to properly discuss alternatives to Energize Eastside. The details on the many alternatives I describe in this paper are not reflected in the Final EIS in Appendix J (Section J-1) where alternatives in the EIS are discussed. The Final EIS is woefully inadequate in its discussion of alternatives.

I have previously written a paper on alternatives to Energize Eastside. That paper is attached to this document as *Attachment 1*.

II. The Redispatch Alternative:

The first and most rational alternative to solving an identified reliability problem is to check to see if generation re-dispatch can solve the problem. There is considerably more generation available to the grid than is needed to meet load on any hour. In part this excess supply of generation is caused by diversity in peak load times between utilities. Most utilities have a requirement to have a certain margin of more generation under their control than is needed to meet their own peak. This surplus margin is needed for reliability purposes. But some utilities are summer peaking utilities and others are winter peaking utilities. So there is always more generation available to the grid than is needed for any peak load season. In the case of PSE, they are a winter peaking utility. So during their winter peak, there are many surplus power supplies located in other areas of the Western Interconnected Systems that are summer peaking. So it is possible for PSE to attempt to meet its peak load by using the excess generation in the summer peaking areas rather than using their own resources. But if a load flow study finds a reliability problem when PSE attempts to use these non-PSE generating plants, then the first thing to check is to see if the reliability problem goes away if PSE uses its own generating resources rather than the surplus generating resources of others. PSE has failed to do this by not attempting to solve their identified reliability problem by simply running their own resources located in the Puget Sound Area.

There are other legitimate alternatives to Energize Eastside that PSE has not properly identified and studied with proper load flow studies. These alternatives can be categorized as “wired” alternatives and “non-wired alternatives.

III. “Wired” alternatives that PSE has not properly studied:

As discussed further in Attachment 1, there are several wired alternatives to Energize Eastside that would likely be better solutions to any identified reliability problem on the Eastside. These include:

- a. PSE should look at the alternative of building a 230/115 KV transformer at Lake Tradition. The plan to install a new 230/115 KV transformer at Lake Tradition has been on Puget's list for several years. The existing Lake Tradition substation does not have a 230/115 KV transformer, but it does have 115 KV line connections that serve the Eastside. The Bonneville Power Administration has a 230 KV line that passes very close to the Lake Tradition substation. It is common practice for PSE to connect to BPA lines to meet PSE reliability needs. PSE should have looked at connecting to the existing BPA 230 KV transmission line next to the Lake Tradition station and installing a new 230/115 KV transformer at Lake Tradition. PSE did not consider this alternative in their Eastside Needs Assessment.
- b. Another solution would be for PSE to simply add a third 230/115 KV transformer at Talbot Hill or replace the existing two 230/115 KV transformers with larger 230/115 KV transformers so that if one fails the other has more capacity to pick up the load. PSE did not consider these alternatives in their Eastside Needs Assessment.

- c. Seattle City Light has a double circuit 230 KV line that runs parallel and very close to the proposed 18 mile Energize Eastside line. Another solution would be to install the 230/115 KV transformer at the Lakeside substation, but rather than building 18 miles of new double circuit 230 KV alongside the Olympic pipeline, PSE would get Seattle City Light to loop their existing 230 KV line through the Lakeside substation. PSE says they did not pursue this alternative because SCL told them they preferred not to do this. The PSE website on Energize Eastside discusses this matter. See <https://energizeeastside.com/faqs>

One Q&A on that website is as follows:

Q. “Why can’t PSE use the Seattle City Light corridor that runs from Redmond to Renton?”

A. “PSE looked into using the Seattle City Light corridor and yes, if rebuilt, the corridor could work to meet the Eastside’s energy needs. However, PSE has been told by Seattle City Light that this corridor is a key component of their transmission system and [is not available for our use.](#)”

But PSE never made a proper request to Seattle for use of the Seattle City Light line using the request procedures described in the FERC Open Access Transmission Tariff. Seattle City Light has recently provided a letter saying that if the appropriate request was made, they would proceed as required by the FERC Open Access Transmission Tariff. See *Attachment 2*. I have previously provided a written paper demonstrating this Seattle City Light option is a legitimate and better alternative to Energize Eastside if PSE would use the procedures of the FERC Open Access Transmission Tariff that are available to PSE. See *Attachment 3*. So PSE admits the Seattle City Light line option could work to meet the Eastside’s energy needs, but that would only happen if PSE makes a proper formal request. PSE has wrongly chosen not to make that request.

IV. “Non-Wired” alternatives that PSE has not properly studied:

As discussed further in Attachment 1, there are several non-wired alternatives to Energize Eastside that would likely be better solutions to any identified reliability problem on the Eastside. These include:

- a. Implementation of targeted and enhanced Demand Side Management (DSM) programs. Such programs were identified by EQL Energy in their February 15, 2016 report titled “Alternatives to Energize Eastside.”
- b. Installation of appropriately located battery banks of the type that Tesla is installing for many utilities. See <https://www.greentechmedia.com/articles/read/tesla-plans-to-triple-battery-deployments-in-2018#gs.KcNMVNw>
- c. Installation of a properly located small peaker plant. A small peaker plant is a type of generator that is sold by several vendors. These plants are generally located strategically

on the grid so they can inject power into the grid at that location. These generators come in different sizes and technology depending on the specific need and generally require little land. These generators would be expected to operate only a few hours during any year and only during years when there are low probability stresses occurring on the system. They would not be expected to operate at all in most years. The technology is a generator powered by either (1) a turbine engine similar to an airplane jet engine, or (2) an internal combustion reciprocating engine like those used in large trucks. They are generally fueled by either natural gas or oil. Their contribution to global warming and other emissions is very small because of their design and because of the fact that they almost never run. The appropriate design and location will be driven by the nature of the emergency that it will ultimately be determined needs to be protected against. This alternative would burn very little fuel because it would almost never run, so among other benefits it would not make any material contribution to global warming.

These three non-wired alternatives would not only likely be better solutions to meeting any future reliability need on the Eastside, but they would have the dual benefit of helping PSE meet its Total System Peak load.

PSE has not adequately studied any of these alternatives to Energize Eastside to see which alternative would be the best solution when balancing cost and environmental impact. But it seems likely that they would all be better than building Energize Eastside.

V. Conclusion:

While all indications are that nothing is needed to be built on the Eastside now or in the near future in order to provide reliable service, it is important to keep in mind that there are several other likely better alternatives to Energize Eastside should a legitimate reliability problem be identified. The alternatives identified in this paper have not been appropriately analyzed by PSE. It is my opinion that a prudent utility would properly analyze all these alternatives in a load flow study before any decision would be made to build Energize Eastside. PSE has failed to properly analyze these alternatives to date. But they need not be analyzed until there is a legitimate finding of a reliability problem on the Eastside.

The PSE Application for a Conditional Use Permit for the Energize Eastside project should be rejected. PSE has not proven the need for the project and has not properly looked at alternatives to Energize Eastside.

ATTACHMENT 1

Alternatives to Energize Eastside...

From: Richard Lauckhart (lauckjr@hotmail.com)

Mon 8/14/2017 8:47 AM

To:

records@utc.wa.gov

Attachment:

Comment on Phase 2 Draft EIS Section 2.2.1 Seattle City Light Transmission Line option.pdf66 KB

Dear Records-

Please file this email and its attachment as comments under PSE IRP Docket No. UE-160918.

I have previously filed the Lauckhart-Schiffman load flow study that demonstrates there is no need for Energize Eastside.

A. The best alternative for PSE to solve any possible future reliability problem on the east side is for PSE to run all of its Puget Sound Area generation. PSE did not consider this alternative in their Eastside Needs Assessment.

B. The next best alternative for PSE to solve any possible future reliability problem on the east side is for PSE to implement enhanced DSM programs including the possible installation of battery banks on the east side. These programs have been discussed in the Energize Eastside EIS. These programs have the added benefit of helping PSE meet its Total System Peak deficiency. PSE did not consider these alternatives in their Eastside Needs Assessment.

C. If any work **on the transmission grid** is needed to provide reliable service to the greater Bellevue area, then a clear alternative that should be studied is looping the Seattle City Light line through Lakeside substation. PSE has rejected this alternative because they claim SCL will not allow them to do that. But PSE never made a formal request to have SCL loop their line through Lakeside. If PSE would make that formal request, SCL is required under FERC Order 890 to respond in accordance with the FERC Proforma Open Access Transmission Tariff (OATT). See Attachment to this email. Only when PSE gets that response can they determine if the SCL line option is the best alternative for providing reliable service to the east side. PSE did not properly consider this alternative in their Eastside Needs Assessment.

D. Further, PSE should look at the alternative of building a 230/115 KV transformer at Lake Tradition. The plan to install a new 230/115 KV transformer at Lake Tradition has been on Puget's list for several years. PSE did not consider this alternative in their Eastside Needs Assessment.

E. There is another alternative to Energize Eastside that many utilities are using today. They are building small peaker plants in the vicinity of power constrained areas. This is a particularly good option if the constraint would be expected to come in to play only very rarely as is the case in the greater Bellevue area. That constraint only comes in to play when the temperature reaches 23 degrees or below during peak load hours and when at the same time two major 230/115 KV transformers on the east side fail. The small peaker plant is low cost and takes little space and likely could be located at the Lakeside substation. It would almost never run and if needed would run for only a short period of time. This alternative has the added benefit helping PSE meet its Total System Peak deficiency. PSE did not consider this alternative in their Eastside Needs Assessment.

In their draft IRP report coming out in a few months, PSE needs to describe these alternatives and why they are not being analyzed in the IRP as alternatives to Energize Eastside.

Rich Lauckhart
Energy Consultant
Davis, California

On behalf of a large number of citizens that are concerned about transmission matters in the greater Bellevue area.

ATTACHMENT 2

April 25, 2017 letter from Seattle City Light to Larry Johnson



700 5th Ave. | P.O. Box 34023 | Seattle WA 98124-4023
TEL (206) 684-3000 TTY/TDD (206) 684-3225 FAX (206) 625-3709

seattle.gov/light

twitter.com/SEACityLight facebook.com/SeattleCityLight

April 25, 2017

Mr. Larry Johnson
Attorney at Law
Citizens for Sane Eastside Energy (CSEE)
8505 129th AVE SE
NEWCASTLE, WA 98056

Re: PSE's Energize Eastside Project

Dear Mr. Johnson,

This letter responds to your letter dated March 20, 2017 to our General Manager, Larry Weis. We appreciate your interest in the regional energy issues and are aware of your concerns regarding Puget Sound Energy's ("PSE") Energize Eastside Project. As your letter mentions, although PSE and Seattle City Light have had limited discussions about PSE's Energize Eastside Project, PSE has never formally requested transmission service on Seattle City Light's Eastside transmission lines.

Obviously, if PSE would make a formal request for transmission service on Seattle City Light's Eastside lines, Seattle City Light would respond appropriately. Likewise, Seattle City Light remains willing to discuss options with PSE regarding the potential use of Seattle's Eastside lines. However, as PSE's project located entirely within its own service territory, PSE's project remains within PSE's discretion.

In addition, the Energize Eastside Project is not subject to the Order No. 1000 regional approval process because it is located completely within Puget Sound's service territory, it was included in Puget Sound's local transmission plan to meet Puget Sound's reliability needs, and neither Puget Sound, nor any other eligible party, requested to have the project selected in the regional transmission plan for purposes of cost allocation.

We trust that this resolves the concerns expressed in your March 20th letter with respect to Seattle City Light.

Sincerely,

A handwritten signature in blue ink, appearing to read 'S. Hamilton'.

Saphir Hamilton
Engineering and Technology Innovation Officer
Seattle City Light

cc: Larry Weis, General Manager, Seattle City Light

ATTACHMENT 3

May 10, 2017

Heidi Bedwell
City of Bellevue Development Services Department
450 110th Avenue NE
Bellevue, WA 98004

Re: Comment for Energize Eastside Phase 2 Draft EIS

Dear Ms. Bedwell:

I am writing to submit comment on the Energize Eastside Phase 2 Draft EIS.

This comment relates to page 2-52 of the Phase 2 Draft EIS. In particular section 2.2.1 "Seattle City Light Transmission Line" option.

In order to understand how this option works, one needs to be familiar with FERC's ProForma Open Access Transmission Tariff that Seattle City Light needs to comply with. It is a very long document that utilities need to make available to folks who want to use their lines. That FERC ProForma Open Access Transmission Tariff (OATT) can be found at:
<https://www.ferc.gov/industries/electric/indus-act/oatt-reform/order-890-B/pro-forma-open-access.pdf>

Section 6 of the OATT discusses "Reciprocity". If SCL uses the lines of one or more FERC directly regulated utility, then SCL will have agreed to these terms when they use those lines. Meaning under reciprocity, SCL agrees to also deal with requests for use of their transmission grid under the FERC OATT approach.

Other sections of interest to this SCL Transmission Line option are:

Section 15. Service Availability

Section 16. Transmission Customer Responsibility

Section 17. Procedures for arranging for Firm Point to Point transmission service

[This section is particularly relevant to how PSE needs to ask SCL for use of its line to serve a new 230/115 KV transformer at Lakeside. There is a requirement to make a formal application in the format that is described in the OATT. PSE has never made such an application. An informal request does not meet the required format for making a request to use the SCL line. PSE needs to make this formal request to SCL].

Section 19. Additional studies procedures for Firm Transmission

With an understanding of how FERC's OATT works, it is clear that just about every sentence in the discussion of the SCL option is wrong...meaning these sentences are not consistent with the OATT.

First sentence:

"SCL has indicated to the City of Bellevue that they expect to need the corridor for their own purposes and are not interested in sharing the corridor with PSE (SCL, 2014)."

The EIS staff should already be aware that FERC does not allow a utility like SCL to "hoard" its transmission capability. Further, the FERC OATT requires a utility like SCL to increase the rating of its infrastructure (with needed construction) if that is what it takes to honor a request for transmission and the requesting utility agrees to pay what FERC requires them to pay. No one has performed a System Impact Study (as required by the OATT) to see what it would take to honor a PSE request to use the SCL line to serve a new 230/115 KV transformer at Lakeside.

Second sentence:

"The existing SCL line would have to be rebuilt to provide a feasible solution for the Energize Eastside project, because the current rating of the SCL line is insufficient to meet PSE's needs (Strauch, personal communication, 2015)."

If it can be shown that the existing SCL line would need to be rebuilt to provide a feasible solution for the Energize Eastside project, then that is what the FERC OATT would require be done as long as PSE agrees to pay what FERC would require them to pay for that construction. Until a study is done, one cannot tell for sure what the rebuild cost would be. But it certainly would be less than the cost of EE. Further, it should be clear that the request to use the SCL line is only for purposes of serving a new 230/115 KV transformer at Lakeside. **The study to determine what this cost must not include a requirement to deliver 1,500 MW to Canada** unless BPA makes that request and BPA would pay the bulk of the needed cost if the SCL line is also being used to increase the ability of BPA to deliver power to Canada.

Third Sentence:

"PSE has estimated that rebuilding the SCL line would provide sufficient capacity for a period of less than 10 years, which does not comply with PSE's electrical criteria (as described in Section 2.2.1 of the Phase 1 Draft EIS) to meet performance criteria for 10 years or more after construction."

Under the FERC OATT rules that SCL needs to comply with, SCL does not get to stop serving Lakeside after ten years even if SCL has a legitimate need for more use of its SCL line at that time. The FERC OATT has clear rules on how a utility like PSE can assure its transmission service from SCL can be retained even after SCL decides it needs the line for its own use. The FERC OATT protects a utility like PSE from SCL stopping to provide them transmission service.

Fourth Sentence:

"Neither the City nor PSE can compel SCL to allow the use of this corridor; therefore, this option is not feasible and was not carried forward."

This statement is wrong. PSE can compel SCL to use its line to serve a new 230/115 KV transformer by making a FERC Order 888 request (under the FERC OATT) for such transmission service. If SCL refuses, FERC will compel them to do so. FERC uses its "reciprocity" ruling to compel SCL. If SCL refuses, FERC will refuse to let SCL use any transmission lines that are under direct FERC jurisdiction. SCL could not meaningfully its service obligations to its own customers without using the transmission lines of FERC directly jurisdictional utilities.

Fifth Sentence:

"Even if compelled use of the corridor were allowed, the negotiations would likely prove lengthy, and would likely preclude completion of the project within the required timeline to meet project objectives."

The FERC OATT has tight timelines for dealing with requests for transmission service. FERC intentionally put in these tight timelines to prohibit a utility like SCL from denying service by delaying service. Further, PSE currently is not saying when it thinks it needs a new 230/115 KV transformer to be in service at Lakeside. Any needed construction on the existing SCL line will take considerably less time than permitting and building EE. Further, according to the only reasonable load flow study done regarding serving the east side (the Lauckhart-Schiffman Load Flow study), there is plenty of time before any new 230/115 KV transformer is needed at Lakeside.

Thank you for the opportunity to clarify how this SCL Transmission Line option would work.

Sincerely,

Richard Lauckhart
Energy Consultant
Davis, California
530-759-9390
lauckjr@hotmail.com

Expert Report

Richard Lauckhart

My Qualifications are included in the Lauckhart-Schiffman report at its Appendix H

Problems with Energize Eastside Final EIS re Need and No Action

Executive Summary:

The Final EIS makes erroneous statements that are not supported by the record. The Final EIS does not properly acknowledge the many comments I made on the draft EIS and makes erroneous conclusions about the need for Energize Eastside and the environmental impacts of the “no action” alternative.

This Final EIS, as written, should not be given any weight on the question of whether or not the Conditional Use Permit Application for Energize Eastside should be approved. The Final EIS should acknowledge the fact that there are no adverse environmental effects under the “no action” alternative.

I. Background and PSE failure to appropriately look at alternatives:

Puget Sound Energy (PSE) claims that the Energize Eastside project is needed in order to maintain reliability on the Eastside of Lake Washington. I have written a report that demonstrates there is no need for Energize Eastside. I provided evidence in my comments on the Draft Energize Eastside EIS that Energize Eastside is not needed and that there will be no adverse environmental impacts if the “no action” alternative is selected. Volumes 3 and 4 of the Final Energize Eastside EIS include the evidence I provided in the EIS process. However, Volume 1 of the Final Energize Eastside EIS does not reflect the truth in the evidence I have provided. And Volume 2 of the Final Energize Eastside EIS (which allegedly responds to comments filed on the Draft EIS) does not respond to the bulk of the comments I provided on the Draft EIS.

II. Proper method to analyze the possible need for Energize Eastside:

The need for a project like Energize Eastside can only be assessed in a proper load flow study.

But what is a load flow study?

Transmission grids are a complex spider web of interconnected transmission lines. Attached to these lines are substations that take power out of the grid in order to serve load. Also attached to these lines are generating plants that are capable of injecting power into the grid in order to serve the loads. These load and generation substations are connected to the grid in a very large number of locations. The grid itself distributes the sources of power across the transmission lines in accordance with the laws of physics to the load serving substations. Because there is resistance in the grid lines, there is voltage drop and losses that occur when moving the power over the grid. Vendors have developed very sophisticated computer models that are used to determine how the grid will behave under specific conditions. It is the extreme conditions that need to be studied in order to determine the reliability of

the grid. If the grid can operate reliably under these extreme conditions, then the grid will be able to operate reliably under the many other conditions that will exist that are not extreme.

NERC/FERC have established reliability criteria to be used in Transmission Planning. Those reliability criteria are described in Reliability Standard TPL-001-4. It can be found at:

<http://www.nerc.com/ layouts/PrintStandard.aspx?standardnumber=TPL-001-4&title=Transmission%20System%20Planning%20Performance%20Requirements&jurisdiction=United%20States>

As indicated in TPL-001-4, each utility needs to maintain system models within its respective area for performing the studies needed to complete its Planning Assessment.

These models need to be provided extensive data in order to perform their calculations. TPL-001-4 also describes the data that needs to be input into these models. The input data include:

1.1.1. Existing Facilities

1.1.2. Known outage(s) of generation or Transmission Facility(ies) with a duration of at least six months.

1.1.3. New planned Facilities and changes to existing Facilities

1.1.4. Real and reactive Load forecasts

1.1.5. Known commitments for Firm Transmission Service and Interchange

1.1.6. Resources (supply or demand side) required for Load

When the load flow computer model is run with appropriate data the model provides a large amount of “result” data. Such data includes (a) the loading on each line in the interconnected grid, (b) an indication if any lines are overloaded and (c) an indication if voltages get too low in some areas of the grid as a result of voltage drop caused by current flows through the resistance in the lines. These indications point the utility to areas that need to be fixed on the transmission system. There can be many alternative approaches to fix any identified problems on the grid. The load flow modeling is then used to examine each of these alternatives that might be able to fix the problem. The best alternative solution will balance the cost and environmental impact of any fixes that can solve the indicated reliability problem.

FERC requires each utility to build and maintain Base Case data that can be used in the load flow computer models and to make Base Case runs and file those with FERC. Then third parties can request that FERC provide those Base Case studies to them so they can perform their own studies of the reliability of the grid. See

<http://www.ferc.gov/docs-filing/forms/form-715/overview.asp>

PSE has filed its Base Cases with FERC and I have asked FERC to provide them to me and FERC has provided them to me.

III. Problems with load flow studies PSE provided to show the need for Energize Eastside in the EIS process:

As I state in the comments I filed on the Draft Energize Eastside EIS, PSE took the unusual step of hiring an outside consultant, Quanta Technology, to run the load flow models in an attempt to justify the need for Energize Eastside, rather than using the PSE in-house transmission planning experts who normally make these kinds of load flow runs.

The Quanta load flow study work has been described in several written reports. But those written reports raise red flags that suggest the load flow studies done by Quanta were flawed. For me there were initially three red flags as follows:

- (a) They erroneously assumed that the proposed Energize Eastside project must increase the ability of BPA to move large amounts of power to and from the Canadian border during extremely cold temperatures in the Puget Sound region (*yet there is no Firm Requirement to move power to and from the Canadian Border...See Lauckhart-Schiffman load flow study report at its Appendix D*), and
- (b) They erroneously assumed that essentially all of the PSE owned/controlled power plants located in the Puget Sound region would not be operating during this extremely cold event (*yet PSE could not meet its Total System Peak load obligation if these power plants were not operating during an extremely cold event*)¹, and
- (c) With their scenario PSE ignores the Puget Sound Area **voltage collapse** problem that I first talked about in the Puget 1992 IRP (aka Least Cost Plan). (*See page 36 of the transcript from the May 26, 1992 public hearing on that plan Docket No. UE-910151 that can be found on the Washington Utilities and Transportation Commission website.*) Clearly the PSE/Quanta load flow analysis must have found this **voltage collapse** problem. This is likely the reason that PSE refuses to provide me the details of the Quanta load flow studies.

As I stated in my comments on the Draft Energize Eastside EIS, I was interested in seeing the actual load flow input and output data from the Quanta load flow studies to see what other data input assumptions might not be correct and to see how Quanta might have been able to avoid the voltage collapse problem or whether they simply ignored the voltage collapse problem.

PSE refused to let me see the inputs and outputs of load flow studies performed by Quanta. As I stated in my comments on the Draft EIS, the City of Bellevue should refuse to consider the need for Energize Eastside until PSE provides that information for inspection by interested parties. The Final Energize Eastside EIS does not even respond to that comment.

IV. Fixing the problems in the PSE/Quanta load flow studies they provided in the EIS process:

¹ According to PSE's IRP, PSE needs 6,500 MW of supply to meet its System Peak plus reserve requirements in the winter of 2018. According to PSE's IRP, PSE is "short" by about 2100 MW of having sufficient generation to cover this need. While that is a very large "shortage", it gets even larger (nearly 3,400 MW) under the Quanta load flow model assumptions...an untenable shortage.

As I stated in my comments on the Draft EIS, since PSE refused to provide the data in its load flow studies, the only way to fix the problems in the PSE/Quanta load flow studies is to get the Base Case data that PSE filed with FERC and use that data in a standard load flow model to study the need for Energize Eastside. Roger Schiffman and I did that. I provided the Lauckhart-Schiffman load flow study report in my comments on the Draft EIS. In my comments on the Draft EIS I also provided a large number of documents that support the input assumptions I used in the Lauckhart-Schiffman load flow study. The Final EIS does not respond to those documents that supported the assumptions used in the Lauckhart-Schiffman load flow study.

I filed the Lauckhart-Schiffman Load Flow study in my comments on the Draft EIS. It is the only Load Flow study on the record in the EIS proceeding that uses the load forecast PSE gave to the Western Electricity Coordinating Council, correct inter-regional flows, appropriate generation dispatch, and avoids the voltage collapse problem. That study concludes that Energize Eastside is not needed now or any time soon.

V. Errors in the Energize Eastside Final EIS Volume 1:

Volume I of the Final EIS makes the following statement:

“PSE indicates that it has a responsibility for planning its system according to NERC, WECC, and ColumbiaGrid requirements. The Lauckhart/Schiffman Load Flow Study makes a number of assumptions that are not consistent with WECC and ColumbiaGrid model assumptions. Even using their assumptions, the City of Bellevue’s independent analysis found that at least one transformer would exceed capacity. No change in Final EIS. See Key Theme OBJ-3 in Appendix J-1.”

This statement is incorrect and inexplicably ignores the many comments I made that dispute what is said in this statement. This statement appears to be based in part on the Booga Gilbertson criticisms of the Lauckhart-Schiffman study that were made on March 23, 2016. But the statement completely ignores the rebuttal I made to the Booga Gilbertson criticisms on March 28, 2016. I filed my rebuttal to the Booga Gilbertson criticisms in my comments on the Draft EIS. But the Final EIS does not acknowledge this rebuttal. It is as if my rebuttal comments were never filed in the EIS process. That is wrong.

This finding also appears to be based on comments made by PSE and Stantec in the Comment Summary Report in the Phase I Draft EIS. But I also provided a rebuttal to these comments in my April 29, 2016 email to the EnergizeEastsideEIS staff titled **“Rebuttal to the criticisms of the Lauckhart-Schiffman report that are included in the Phase 1 Draft EIS Comment Summary Report April 14, 2016”**.² The Final EIS also does not acknowledge this rebuttal. It is as if these April 2016 rebuttal comments were never filed in the EIS process. That is wrong.

² On April 29, 2016 I provided comments on the Phase I EIS titled **Rebuttal to the criticisms of the Lauckhart-Schiffman report that are included in the Phase 1 Draft EIS Comment Summary Report April 14, 2016**. [See Attachment 1]

Volume I of the Final EIS also makes the following statement:

“Significant adverse impacts to utilities (e.g., rolling blackouts) could occur under the No Action Alternative if capacity increases are not implemented, as described in the Phase 1 Draft EIS.”

This statement is incorrect and is also not supported by the record. For example, it ignores the extensive comment I made in the comments I provided on the Draft Energize Eastside EIS that were titled **“Setting the Record Straight on Energize Eastside’s Technical Facts.”** In that document I specifically point out the flaws in the PSE technical analysis and state **“Therefore, the No Action alternative will not result in any blackouts caused by load shedding on the Eastside or elsewhere on the grid and the December 21, 2016 statement by EIS staff is incorrect.”**

The Final EIS did not respond to the technical facts I provide in this document and the Final EIS ignores this crucial fix they need to make to the Energize Eastside Final EIS.

VI. Errors in the Energize Eastside Final EIS Volume 2:

Volume 2 is supposed to include responses to all comments made by myself and others. But Volume 2 attempts to simplify comments by dumping many comments into “Key Themes”. In the case of my comments, they all appear to have been dumped into the “Key Theme” that Volume 2 calls **“Key Theme OBJ-3: Lauckhart/Schiffman Load Flow Study suggests project is not needed.”**

In their “Key Theme OBJ-3”, Volume 2 states as follows:

“Commenters pointed to five main findings of the Lauckhart/Schiffman study. Each of these main findings is listed in bold below, followed by a response intended to clarify the issue presented. The responses were developed by the EIS Consultant Team after review of the Lauckhart/Schiffman analysis by Stantec and requests for additional information from PSE regarding its planning assumptions and results.”

The Final EIS response/clarifications to the Lauckhart/Schiffman five main findings is woefully inadequate by ignoring most of my comments that refute the Final EIS responses on these five main findings. For example, as mentioned above, on April 29, 2016 I provided an email to the EnergizeEastsideEIS staff which included a document titled **“Rebuttal to the criticisms of the Lauckhart-Schiffman report that are included in the Phase 1 Draft EIS Comment Summary Report April 14, 2016”**. This document rebuts each of these five main points that the Final EIS attempt to “clarify.” But the Final EIS clarifications do not acknowledge this April 2016 document I provided on these 5 main topics. It is as if these April 2016 rebuttal comments were never filed in the EIS process. That is wrong because the April 2016 rebuttal I provided to the EIS discredits each of these 5 “clarifications” included in the Final EIS.

The Chain of events in this EIS went as follows:

1. I read the PSE/Quanta Reports on the load flow studies they ran to justify EE
2. I observed the reports provided information on key inputs to the studies, which key input assumptions were flawed
3. I requested that PSE give me the entire data set of input and output assumptions so I could see what other errors PSE/Quanta may have made and to allow me to re-run their load flow studies with fixed input assumptions.
4. PSE refused to show me the load flow data set.
5. I asked FERC to send me the Base Case data set that PSE had provided to FERC. FERC provided me that data set.
6. I observed that the PSE Base Case included better assumptions than what was used by PSE/Quanta in their attempt to justify the need for EE.
7. I recruited a colleague, Roger Schiffman, to license the GE-PSLF load flow model from General Electric and we studied the need for EE with the PSE Base Case data set. We found that EE is not needed now or anytime soon if proper input assumptions are made in the load flow modeling.
8. Roger Schiffman and I wrote the report titled "Load Flow Modeling for Energize Eastside" dated February 18, 2016 and provided it to the Energize Eastside EIS staff.
9. On March 23, 2016 Booga Gilbertson of PSE wrote comments criticizing the Lauckhart-Schiffman load flow study report.
10. On March 28, 2016 I wrote a rebuttal to the March 23, 2016 Booga Gilbertson criticisms and sent that to the Energize Eastside staff. In that March 28, 2016 rebuttal I pointed out the main areas of disagreement with the PSE/Quanta load flow studies and the Booga Gilbertson criticisms of it. I posed 7 key questions/challenges for PSE to respond to. PSE never responded. The EIS staff did not require PSE to respond.
11. The Energize Eastside EIS provided a compendium of all comments provided in the Phase I EIS. I observed that PSE and Stantec had commented again on the Lauckhart-Schiffman report. I observed that once again these new PSE and Stantec comments were flawed. So on April 29, 2016 I provided an email to the Energize Eastside staff that included an attachment titled "**Rebuttal to the criticisms of the Lauckhart-Schiffman report that are included in the Phase 1 Draft EIS Comment Summary Report April 14, 2016.**"
12. In the Final Energize Eastside EIS the EIS staff quoted extensively from the PSE and Stantec criticisms listed above but did not quote from (a) the Lauckhart-Schiffman report or (b) my March 28, 2016 rebuttal or (c) my April 2016 rebuttal.

The detailed findings in the Volume 2 "**Key Theme OBJ-3: Lauckhart/Schiffman Load Flow Study suggests project is not needed**" are provided below. I first provide in italics the Volume 2 EIS staff "Finding" on the Lauckhart-Schiffman report. Then I provide the EIS staff "clarification" of that finding. Then I provide my response to that "clarification" in which I point out the problems with the EIS staff "clarifications" and the fact that the EIS staff ignored the rebuttal documents I provided as indicated above.

I. The First Main Finding:

Lauckhart/Schiffman study finding #1 listed in Volume 2 of the FEIS: *PSE modified data to increase transmission of electricity to Canada from 500 megawatts (MW) to 1,500 MW, which during winter peak*

loads creates instability in the regional grid. (The Lauckhart/Schiffman study authors assert this is an unrealistic level of electricity transmitted to Canada.)

- **EIS staff “clarification” of the finding #1:** PSE did modify the Western Electricity Coordinating Council (WECC) model to reflect this amount of peak energy flow to Canada. According to Stantec, modification of the WECC model is a commonly accepted practice, where an individual utility provider uses the model to evaluate its specific system. PSE confirmed that the value for the energy flow to Canada (over the Northern Intertie) that is in the base case was set at 500 MW by WECC, as a starting place for planning studies. Planners are expected to adjust that value to reflect firm transmission commitments, as required by North American Electric Reliability Corporation (NERC) planning standard TPL-001-4 R1. PSE used the value set in its agreements with the regional planning authorities, specifically from the ColumbiaGrid Biennial Plan. Neither the 500 MW nor the 1,500 MW numbers reflect the maximum flows that actually occur over the Northern Intertie during winter conditions. BPA data show that the maximum flow exceeds 2,000 MW at times. The 1,500 MW value is considered reasonable by ColumbiaGrid in its Biennial Plan for planning for heavy winter conditions, which is PSE’s justification for making this modification in the model. According to Stantec, this is the type of adjustment that utility providers are expected to make when using the WECC model for system planning. Furthermore, of the energy flowing over the Northern Intertie, only a small portion flows through the Eastside. The EIS Consultant Team asked PSE to clarify how much of the Northern Intertie flow was flowing through the substations on the Eastside where the capacity deficiency has been identified. PSE clarified that between 1 and 2 percent (15 and 30 MW) of the 1,500 MW flowing north over the Northern Intertie in the heavy winter model currently flows through the substations on the Eastside. The lower value is the amount of flow that would be expected under normal conditions (with all regional grid systems functioning). Stantec confirmed that this was consistent with their expectations, given the presence of higher capacity lines in the region that would have lower resistance than PSE’s existing 115 kV lines, and therefore would be more likely to carry the load flowing north over the Intertie. If the Energize Eastside project were built, PSE indicated that according to the model, this flow would increase to 45 MW under normal conditions. PSE also clarified that the direction and strength of the flow of power can determine which substation would feed the Eastside (Sammamish or Talbot Hill). Under conditions where other portions of the regional grid are not fully functioning, the flow on the proposed lines could rise to as much as 120 MW. Stantec again confirmed that this was a reasonably expected outcome, because the new lines would have lower resistance than the existing lines. While increased flow through the Eastside to the Northern Intertie is an expected result of the upgraded capacity on the Eastside, the increase is not one of PSE’s objectives for the Energize Eastside project, but simply a byproduct of the capacity increase.
- **This Final EIS “Clarification” of the Lauckhart/Schiffman study finding #1 is woefully inadequate. For example**
 1. It ignores the extensive comments I made on March 28, 2016 in which I rebut the PSE criticisms of the Lauckhart-Schiffman report and provide 7 key questions and challenges to PSE related to their criticisms of the Lauckhart-Schiffman report. PSE has never responded to these 7 key questions and challenges. [This March 28, 2016 rebuttal document was filed as a comment on the Energize Eastside EIS, but the Final EIS does not address these comments. It](#)

also ignores my criticism of the PSE and Stantec comments in the Phase I EIS of the Lauckhart-Schiffman report.

2. It also ignores the criticisms I made of Stantec in the Lauckhart-Schiffman load flow study report.

3. Further, by claiming the Lauckhart/Schiffman study uses a WECC Base Case (presuming this is not also the PSE Base Case), this Final EIS Response to Lauckhart/Schiffman study ignores Appendix B “Choice of Basecase” in the Lauckhart/Schiffman study which states clearly that the PSE Base Case is the same as the WECC Base Case.

4. In its Energize Eastside studies, PSE did not just modify the WECC Base Case, the fact is PSE modified its own Base Case... because use of its own Base Case would not be able to demonstrate the need for Energize Eastside.

5. And while this Final EIS response points out that “Neither the 500 MW nor the 1,500 MW numbers reflect the maximum flows that actually occur over the Northern Intertie during winter conditions” this statement fails to recognize that I have pointed out in my March 28, 2016 rebuttal document that the problem arises during heavy winter conditions.

6. One of the Key Questions/Challenges in that rebuttal document was for PSE to provide examples when 1,500 MW was transferred to Canada when temperatures in the Puget Sound region were lower than 23 degrees Fahrenheit as stipulated in PSE’s Energize Eastside Needs Assessment. PSE never responded to this question/challenge and the EIS staff apparently did not require them to do so.

II. The Second Main Finding:

Lauckhart/Schiffman study finding #2 listed in Volume 2 of the FEIS: *PSE assumed that six local generation plants were out of service, adding 1,400 MW of demand for transmission. This assumption also causes problems for the regional grid. (The Lauckhart/Schiffman study authors questioned PSE’s rationale for this assumption.)*

- **EIS staff “clarification” of the finding #2:** It is acknowledged that failure of components of PSE's system simultaneously with a high demand period due to high or low temperatures is not a common event. As noted in the Phase 1 Draft EIS, however, having one component of its system down for planned maintenance is relatively common throughout the year. While the exact probability of such an event is not of concern under SEPA, it is acknowledged that it is possible that in any given year, it might not occur. NERC standards require PSE models to “stress the system” to ensure that PSE’s system would operate without damaging other parts of the grid when such stresses occur. PSE ran the model with a group of plants “out of service” for the “low generation scenario” in testing its system. PSE also ran a “low-average generation” scenario with 1,000 MW of generation turned on, to determine if running generation would relieve the overloads seen with the low generation scenario. PSE found that, while the transmission line overloads seen with the low generation scenario were relieved by running generation, the transformer overloads were not relieved for the full 10-year planning period. In the “winter scenarios,” adding 1,000 MW of Puget Sound area generation resulted in 15 MW of change in loading at the Talbot Hill substation, which is not enough to address the increased demand over the 10-year planning period. Having these plants out of service was not the only stress that was modeled. PSE indicated that its studies identified up to 40 different contingencies that violated

the NERC standards over the 5- to 10- year study period. In other words, while having the Puget Sound area generation plants out of service was one scenario that contributes to the transmission capacity deficiency PSE has identified, there are others that also could result in violations of the reliability standards, regardless of whether these generators were considered to be “on” or not. Stantec reviewed the results showing there were cases in which, even with these plants set as “on” in the model, there were still overloads in the Eastside, indicating that those overloads are a problem local to the Eastside (Stantec, 2015).

- **This Final EIS “Clarification” of the Lauckhart/Schiffman study finding #2 is woefully inadequate. For example**

1. It ignores the extensive comments I made on March 28, 2016 in which I rebut the PSE criticisms of the Lauckhart-Schiffman report and provide 7 key questions and challenges to PSE related to their criticisms of the Lauckhart-Schiffman report. PSE has never responded to these 7 key questions and challenges.
2. One of those key questions/challenges was for PSE to cite standards that require them to turn off 6 local generation plants at the same time they are serving peak demand under N-1-1 contingency conditions. PSE never responded to this question/challenge and the EIS staff apparently did not require them to do so.
3. Further, it is both standard practice and prudent utility practice to not schedule maintenance on generation facilities during those times of the year when annual peak load can occur. For example, PSE does not schedule maintenance on its gas fired generation in the Puget Sound area during the winter months when temperatures can get below 23 degrees Fahrenheit during peak hours.
4. This March 28, 2016 rebuttal document was filed as a comment on the Energize Eastside EIS, but the Final EIS does not address these comments.
5. The Final EIS response also ignores my criticism of Stantec in the Lauckhart-Schiffman report and other criticisms I have made of Stantec. See Footnote 2 above.
6. Two of the Key questions in the March 28, 2016 rebuttal document ask PSE to (1) point to specific language in the NERC standards that require PSE to stress the system by requiring 1,500 MW to Flow to Canada and (2) provide a copy of any contract that evidences the existence of a firm commitment to move Treaty power to Canada. PSE has never responded to these questions and for some reason the EIS staff did not ask or require PSE to respond to these questions. The EIS staff appears to simply be taking PSE’s words for it.

III. The Third Main Finding:

Lauckhart/Schiffman study finding #3 listed in Volume 2 of the FEIS: *The study authors assert that even if the regional grid could sustain the level of demand under the condition set up by the first two findings, it is unlikely that regional grid coordinators would continue to deliver 1,500 MW to Canada while emergency conditions were occurring on the Eastside.*

- **EIS staff “clarification” of the finding #3:** PSE indicates that it has a responsibility for planning its system according to NERC requirements. Operation of the system as it relates to the flows on the Northern Intertie is up to BPA and not within PSE’s control. PSE used the load levels that

were in the WECC model because those are the conditions that utility operators in the region agree that each utility's system should be capable of accommodating. Furthermore, less than 5 percent of the northward flow over the Intertie flows through the Eastside. Therefore, to use curtailments over the Intertie as a means to address congestion on the Eastside as suggested in the comment, flows over the Intertie would have to be reduced by approximately 20 times the amount of the deficit being experienced on the Eastside transmission system.

- **This Final EIS “Clarification” of the Lauckhart/Schiffman study finding #3 is woefully inadequate. For example:**
 1. It ignores the extensive comments I made on March 28, 2016 in which I rebut the PSE criticisms of the Lauckhart-Schiffman report and provide 7 key questions and challenges to PSE related to their criticisms of the Lauckhart-Schiffman report. PSE has never responded to these 7 key questions and challenges.
 2. This March 28, 2016 rebuttal document was filed as a comment on the Energize Eastside EIS, but the Final EIS does not address these comments.
 3. It also ignores the discussion in the Lauckhart-Schiffman report about the low voltage (aka Voltage Collapse) problem that would occur under the PSE problematic scenario.
 4. One of the Key questions in the March 28, 2016 rebuttal document asks PSE to answer how they dealt with this problem. PSE has never responded to this question and for some reason the EIS staff did not ask or require PSE to respond to this question. The EIS staff appears to simply be taking PSE's words for it.

IV. The Fourth Main Finding:

Lauckhart/Schiffman study finding #4 listed in Volume 2 of the FEIS: *The WECC base case contains a default assumption that PSE may not have corrected. The ratings for critical transformers are based on “summer normal” conditions, but the simulation should use significantly higher “winter emergency” ratings. The study authors suggest the default value could cause PSE to underestimate system capacity and overstate urgency to build the project.*

- **EIS staff “clarification” of the finding #4:** PSE used multiple WECC base cases for different study years and seasons, as confirmed by Stantec. PSE has confirmed that they used all the correct ratings in the model, including adjusting for summer, winter, and emergency conditions as required for each scenario evaluated. Stantec confirmed that results are consistent with such adjustments being made, although they did not independently verify all settings in PSE's model. To do so would require extensive analysis, including verifying the capacity of every piece of equipment that PSE operates, and evaluating past and expected trends in energy usage by PSE customers, which was not considered necessary for purposes of SEPA review.
- **This Final EIS “Clarification” of the Lauckhart/Schiffman study finding #4 is woefully inadequate. For example**
 1. it acknowledges that Stantec did not independently verify the settings in PSE's model. Why not? As I have commented in the EIS process, Stantec needs to verify these setting by looking at the model inputs.

2. Stantecs defense that it would require extensive analysis to verify these settings is not sufficient. I have indicated in my comments on the EIS that there should be no finding of “need” unless and until PSE makes its load flow models available for inspection. The EIS staff has ignored these comments.

V. The Fifth Main Finding:

Lauckhart/Schiffman study finding #5 listed in Volume 2 of the FEIS: *The base case shows a demand growth rate of 0.5 percent per year for the Eastside. This is much lower than the 2.4 percent growth rate that PSE cites as motivation for Energize Eastside.*

- **EIS staff “clarification” of the finding #5:** WECC base cases are based on each utility’s latest load forecast for the specific years being modeled. The WECC base case in 2012 did not have a specific growth rate from PSE for the Eastside because PSE only performed a system-wide forecast for 2012. The 0.5 percent growth rate cited by the Lauckhart/Schiffman report for the Eastside reflected average growth for PSE’s entire system. The WECC base case did not include a specific rate for the Eastside. PSE subsequently determined that the load for the Eastside area studied in the Phase 1 Draft EIS is expected to grow at a faster rate than the rest of the PSE system. As described in the Phase 1 Draft EIS, PSE’s analysis of growth expected for the Eastside was 2.4 percent. PSE used regional planning employment and population projections provided by the Puget Sound Regional Council and accounted for known growth expectations of its major customers. PSE’s Eastside Needs Assessment Report prepared by PSE, the Supplemental Eastside Needs Assessment Report prepared by Quanta Technology and PSE, and the Independent Technical Analysis prepared by Utility System Efficiencies, Inc. for the City of Bellevue confirms the project need. Stantec reviewed the analyses and found them to be in accord with standard industry practice for electrical system planning. PSE also provided specific comments on the Energize Eastside Phase 1 Draft EIS (March 14, 2016), which are posted on the Partner Cities’ project website at www.EnergizeEastsideEIS.org, as well as in this appendix (following the response to comment narrative).
- **This Final EIS “Clarification” of the Lauckhart/Schiffman study finding #5 is woefully inadequate. For example**
 1. It ignores the extensive comments I made on March 28, 2016 in which I rebut the PSE criticisms of the Lauckhart-Schiffman report and provide 7 key questions and challenges to PSE related to their criticisms of the Lauckhart-Schiffman report. PSE has never responded to these 7 key questions and challenges.
 2. One of the key questions/challenges made to PSE in this rebuttal documents was a challenged to PSE to explain their methodology leading to a 2.4% growth rate. PSE has never responded to this key question and apparently the EIS staff did not require them to do so.
 3. Further, this Final EIS response suggest that the 0.5% was an older forecast that needed to be updated. But it is clear from the most recent Base Case that PSE filed with FERC that the 0.5% is still being used. And that 0.5 % number better reflects what other fast-growing utilities are including in their forecasts of substation increased peak demand.

4. Further, this Final EIS “clarification” states that Utility Systems Efficiencies confirms the need for the project. But this statement ignores the following statement that is included in my March 28, 2016 rebuttal to the Booga Gilbertson criticisms:

“PSE likes to quote the conclusion of the study performed by Utility System Efficiencies, while ignoring the most stunning finding of the USE report. On page 65 of that report, USE found that 4 of the 5 overloads on PSE’s system disappear if electricity exports to Canada are reduced. The remaining overload is so minor that it could easily be remedied with a relatively inexpensive upgrade to a single transformer or simply by turning on more Puget Sound Area generation.”

5. This March 28, 2016 rebuttal document was filed as a comment on the Energize Eastside EIS, but the Final EIS does not address these comments.

6. The FEIS “clarification” also ignores my criticism of the USE study and the Stantec writings in the Lauckhart-Schiffman report.

VII. Conclusion:

The Final EIS makes erroneous statements that are not supported by the record. The Final EIS does not properly acknowledge the many comments I made on the draft EIS and makes erroneous conclusions about the need for Energize Eastside and the environmental impacts of the “no action” alternative.

This Final EIS, as written, should not be given any weight on the question of whether or not the Conditional Use Permit Application for Energize Eastside should be approved. The Final EIS should acknowledge the fact that there are no adverse environmental effects under the “no action” alternative.

Attachment 1

Lauckhart comment to clarify issues for The Energize Eastside Phase 2 Scoping

Richard

Fri 4/29/2016, 6:57 PM

info@**EnergizeEastside**EIS.org (info@**energizeeastside**eis.org);

JStokes@bellevuewa.gov (jstokes@bellevuewa.gov);

jhelminiak@bellevuewa.gov;

+7 more

Sent Items

Rebuttal to the criticisms of the L-S with attachment.pdf

2 MB

Chronology of Lauckhart CEII requests to PSE.pdf

333 KB

Email to: info@EnergizeEastsideEIS.org

Re: Clarification of key issues

My name is Richard Lauckhart. As you know, I co-authored the Lauckhart-Schiffman "Load Flow Modeling for Energize Eastside" report dated February 18, 2016 which was submitted as part of the EIS record. This report has been repeatedly criticized by the PSE and Stantec. Yet, neither Stantec nor PSE have provided factual and reasonable explanations for such criticism. By way of this letter, I would like to, on record:

.....Reiterate key facts regarding my credentials and background; and

.....Convey to you what I consider to be key points of concern which I recommend that you give particular attention.

My credentials and background

I am a nationally recognized expert in Pacific Northwest power and transmission planning. I spent more than 20 years in working for Puget Power (PSE's predecessor) holding numerous positions including transmission and power planning until 1996, including Vice President of power planning. In large part because of my expertise with power and transmission matters in the Pacific Northwest, I was hired by energy consulting firms headquartered in California including Black & Veatch, a global leader in energy consulting, where I worked until 2011. For all of these California based consulting firms I lead their WECC Power Market advisory service which included advice on what was happening in the Pacific Northwest. Since ending my employment with Black & Veatch I have provided independent consulting services to various organizations, including CENSE. As an expert in this field, I am fully up to date on all regional and federal rules and requirements (such as NERC). I am also one of the very few people remaining in the power industry who is intimately familiar with all aspects of the Columbia River treaty

and its implications. Moreover, the project which is proposed by PSE (Energize Eastside) utilizes the same concepts and technologies as the dozens of projects I oversaw in my career as Vice President of power planning for Puget Power.

Continued lack of reliability of PSE's load flow study

As you are aware, the Lauckhart-Schiffman load flow study raised several serious questions and concerns about how PSE conducted its load flow study. Perhaps realizing the seriousness of issues with its load flow study, PSE and Stantec continue to criticize the Lauckhart-Schiffman load flow study without providing factual support for their arguments. This type of criticism is unsettling given what is at stake for Bellevue and other communities if the ill-conceived Energize Eastside project is built but also, on a personal note, given what appears to be an intentional campaign of misinformation concerning my credentials and expertise. I continue to stand by the integrity and professionalism of the Lauckhart-Schiffman study. To provide further detail and clarification, **I have attached document provides an updated response to Stantec and PSE criticisms.**

I cannot stress this point enough: a reliable load flow study must be the foundation to the entire project. Without verifiable proof that the need for the project truly exists, the City is potentially wasting valuable time, resources and energy. Concerns about PSE's load flow study could easily be put to rest if PSE were willing to work with me (as the representative of CENSE) in a cooperative manner. To accomplish this, PSE would only have to share data, which, given the magnitude of the EIS process, seems like a simple solution. However, to this date, PSE has continuously refused to produce answers to basic and reasonable questions (please note that I possess all the necessary governmental security clearances). For your records, **I have attached a chronology of my attempts at obtaining the data** from them that would answer these critical questions.

The attached chronology shows that the only hope to start a factual and data driven dialog between PSE and CENSE concerning load flow studies is your involvement. I trust that you will consider this matter and help foster this dialog.

Thank you for your time and consideration of this information. I am happy to answer any and all questions you may have for me.

Kind regards,

Richard Lauckhart
Energy Consultant
Davis, California
916-769-6704

**Rebuttal to the criticisms of the Lauckhart-Schiffman report that are included in the Phase 1
Draft EIS Comment Summary Report April 14, 2016.**

The Phase 1 Draft EIS Comment Summary Report criticizes the Lauckhart-Schiffman study in five areas. These criticisms are unfounded and baseless and it is imperative that the record reflect Lauckhart and Schiffman's responses.

The following indicates in italics the Lauckhart-Schiffman finding number, followed by a summary of the Stantec criticism of that finding and Lauckhart's response to the Stantec criticism.

Lauckhart/Schiffman study finding #1: PSE modified data to increase transmission of electricity to Canada from 500 megawatts (MW) to 1,500 MW, which during winter peak loads creates instability in the regional grid. (The Lauckhart/Schiffman study authors assert this is an unrealistic level of electricity transmitted to Canada.)

Stantec criticized finding #1 by first acknowledging that the WECC and PSE Base Cases for winter 2018 do in fact have only 500 MW flowing to Canada. But Stantec then goes on to say that this number should be expected to change in order to reflect firm transmission commitments as required by North American Electric Reliability Corporation (NERC) planning standard TPL-001-4 R1.

This criticism fails due to the fact that there is no evidence that there is a firm transmissions commitment to deliver 1,500 MW to Canada. We challenge Stantec or the EIS team to produce a contract that includes a firm commitment to deliver 1,500 MW to Canada. This is the same challenge that was posed to PSE, ColumbiaGrid and BPA in a March 28, 2016 letter from me to Bellevue Mayor Stokes and Council members. So far no such evidence has been provided.

Stantec also criticizes finding #1 by stating that "Neither the 500 MW nor the 1,500 MW numbers reflect the maximum flows that actually occur over the Northern Intertie during winter conditions. BPA data shows that the maximum flow exceeds 2,000 MW at times." **This statement by Stantec demonstrates that Stantec is confused about what causes transmission congestion.** The power flows generally originate in the Columbia River area. But the power must cross the Cascade Mountains to reach the Puget Sound area, and the eleven transmission lines crossing the Cascade Mountains have limitations.

For example, if loads in the Puget Sound area are light (e.g. on a winter day at 2 a.m. when the temperature is 50 degrees Fahrenheit), these lines have low load and can accommodate lots of power flowing to Canada. However, on an extremely cold winter day when loads are high (e.g. at 6 p.m. on a weekday when the temperature is 23 degrees Fahrenheit), these same eleven lines crossing the Cascade Mountains are heavily loaded just to serve load in the Puget Sound area. There is no ability to add another 1,500 MW to these lines to deliver to Canada. We challenge Stantec to provide examples of when the temperature was 23 degrees Fahrenheit at 6 p.m. on a weekday and simultaneously, lots of power is being delivered to Canada. This is the same challenge that was posed to PSE in a March 28, 2016 letter from Mr. Lauckhart to Bellevue Mayor Stokes and Council members. **So far no such example has been provided.**

Lastly on this point, the DEIS Comment Summary report stated that only small amounts of power flow through the Eastside when 1,500 MW flows to Canada. This criticism is based on PSE's statements (not demonstrated) and Stantec's subjective view that this *theoretically* would be the case. But these statements and views are not borne out by the USE load flow models (which showed that 4 of the 5 overloaded facilities are no longer overloaded if the 1,500 MW to Canada is removed) and the **Lauckhart-Schiffman study shows that 1,500 MW flow to Canada during extreme cold events cannot even occur without causing blackouts in the Puget Sound area due to limitations on the eleven lines crossing the Cascades.** We ask Stantec to show that 1,500 MW can flow to Canada during extreme cold events by showing us a load flow study that demonstrates that to be true. This is the same challenge that was posed to PSE in a March 28, 2016 letter from Mr. Lauckhart to Bellevue Mayor Stokes and Council members. So far no such example has been provided and PSE continues to resist showing us their load flow files. If Stantec has made a load flow study of this case, we ask them to provide that information to us also.

Lauckhart/Schiffman study finding #2: *PSE assumed that six local generation plants were out of service, adding 1,400 MW of demand for transmission. This assumption also causes problems for the regional grid. (The Lauckhart/Schiffman study authors questioned PSE's rationale for this assumption.)*

Criticism of this finding was based on a statement in the DEIS Summary Report that "NERC standards require PSE models to 'stress the system' to ensure that PSE's system would operate without damaging other parts of the grid when such stresses occur." **There is no NERC standard that requires a planning study to assume that six local generators have failed at the same time as two transformers have failed and at the same time the system is experiencing a peak load event.** We ask the EIS staff to cite to the NERC reliability criteria that requires a scenario such as six local generators to be offline under these conditions or that any other similar 'stress' is required by NERC Reliability Criteria. This is the same request that was asked of PSE in a March 28, 2016 letter from me to Bellevue Mayor Stokes and Council members. **So far no such citation has been provided.**

Lauckhart/Schiffman study finding #3: *The study authors assert that even if the regional grid could sustain the level of demand under the condition set up by the first two findings, it is unlikely that regional grid coordinators would continue to deliver 1,500 MW to Canada while emergency conditions were occurring on the Eastside.*

The criticism of this finding appears to be based on the fact that PSE does not have control over what BPA would do under these conditions. But the fact remains that both BPA and the Northwest Reliability Coordinator have a FERC/NERC based responsibility to assure that operation of the system is done in a reliable fashion. If they do not operate in a prudent manner (which requires assuring reliability above all else) and the result is a blackout (which is what would happen under the PSE load flow assumptions), then both FERC and BPA would be subjected to large penalties for having failed in their obligations.

Lauckhart/Schiffman study finding #4: The WECC base case contains a default assumption that PSE may not have corrected. The capability ratings for critical transformers are based on “summer normal” conditions, but any load flow study conducted by PSE should use significantly higher “winter emergency” ratings. Lauckhart-Schiffman suggest the default “summer normal” value could cause PSE to underestimate system capacity and overstate the urgency to build the project.

In the draft EIS summary report, Stantec dismissed our finding by stating that they asked PSE if they used the correct rating, and PSE stated they did. However, Stantec did not ask to see the ratings PSE used and simply took PSE’s response at face value. This is a significant point that needs to be independently verified because even if the load growth forecast is indeed 2.4 percent, the year in which the “customer demand” outpaces “electricity” in the “Eastside Customer Demand Forecast” graph which is the image PSE uses as the basis for the whole project would be pushed out past the year 2025. PSE needs to provide its load flow data files so stakeholders can see for themselves what PSE used. The fact that PSE continues to refuse to share the files associated with their Energize Eastside load flow study is indication that PSE may well be aware that there are problems in it.

Lauckhart/Schiffman study finding #5: *The WECC base case shows a demand growth rate of 0.5 percent per year for the Eastside. This is much lower than the 2.4 percent demand growth rate that PSE cites as motivation for Energize Eastside.*

The criticism of this Lauckhart-Schiffmann finding appears to be based on the fact that loads (and the accompanying demand growth rates) in the WECC Base Cases were developed in the year 2012 and PSE has since updated their load forecast. **However, these same loads and demand growth rates (0.5%) were included in the 2014 and 2015 Base Cases that were filed with FERC. Therefore, they are the same loads and demand growth rates in the most recent Base Cases that WECC utilities are using to study the adequacy of the grid.** The criticism indicates that a new load forecast for the Eastside will show 2.4% demand growth rate. But no independent consultant has verified the accuracy of PSE’s projections and furthermore, no one has studied the load on each substation on the Eastside. One needs to know what the load is on each substation in order to run a load flow study. We ask the EIS staff to explain the methodology leading to a 2.4 percent demand growth rate. This is the same challenge that was posed to PSE in a March 28, 2016 letter from me to Bellevue Mayor Stokes and Council members. So far no such explanation has been provided and PSE has not provided information on what individual substation loading will be under this forecast.

For completeness, I am attaching the March 28, 2016 letter from myself to Bellevue Mayor Stokes and Council members that are referenced in the responses above.

Expert Report

Richard Lauckhart

My Qualifications are included in Attachment 3 to this report at its Appendix H

No Need for Energize Eastside

Executive Summary:

It is clear that the PSE/Quanta load flow studies used in an attempt to demonstrate the need for Energize Eastside are flawed. They are modeling large flows to Canada that are not required. They are shutting down Puget Sound area located generating plants in an extreme cold weather event that are needed for PSE to meet its Total System peak load in such a cold event. In performing their stress test of the system, PSE and Quanta are well beyond NERC/FERC reliability requirements and beyond prudent utility practice. And well beyond what the transmission grid in the Northwest can handle, with or without Energize Eastside. PSE refuses to provide me the details of the Quanta load flow studies. It is my opinion that the reason that PSE refuses to provide the details of the Quanta load flow studies is because I will be able to point to additional specific flaws in their studies including the fact that they ignored the Voltage Collapse problem in the Puget Sound Area under their problematic scenario.

The Lauckhart-Schiffman load flow study is the only one provided in this proceeding that uses the load forecast PSE gave to the Western Electricity Coordinating Council, correct inter-regional flows, and appropriate generation dispatch. That study concludes that Energize Eastside is not needed now or any time soon.

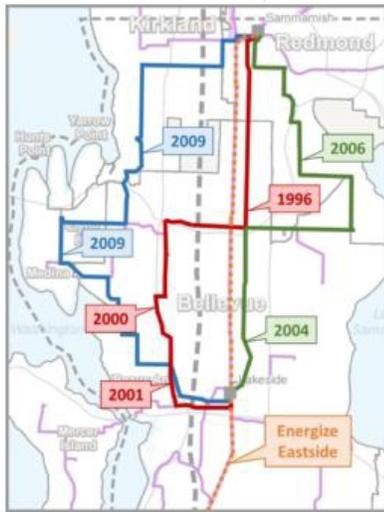
The PSE Application for a Conditional Use Permit for the Energize Eastside project should be rejected. PSE has not proven the need for the project. The Lauckhart-Schiffman load flow study demonstrates the project is not needed now or any time soon.

I. Background and PSE attempt to demonstrate a Need for Energize Eastside:

Puget Sound Energy (PSE) claims that the Energize Eastside project is needed in order to maintain reliability on the Eastside of Lake Washington. PSE attempts to demonstrate this need in two different approaches. Both of those approaches are flawed.

a. PSE approach one: The simple PSE approach to demonstrating the need for Energize Eastside is their claim that nothing has been done to the transmission grid on the eastside in the last 50 years while load has grown substantially in those 50 years. PSE says their proposed Energize Eastside project is the only improvement to the Eastside transmission grid that they have pursued to meet growing loads in the Eastside in the last 50 years. But this PSE claim is false. The graphic below shows the new transmission lines that were built in the greater Bellevue area in recent years.

New 115 KV lines built in the eastside in recent years...
no longer a “backbone”, now a “network”!



1

Further, it is important to understand that transmission reliability problems can only be identified by the use of a load flow study (aka power flow study). It is not sufficient to simply say the system is old. And the needed load flow study will reflect the existence of all these 115 KV transmission lines that have been built on the Eastside over time.

So, the PSE statement that nothing has been done to the transmission system on the Eastside is not only insufficient to show the need for Energize Eastside, that statement is also wrong. The need for Energize Eastside needs to be demonstrated with a load flow study.

b. PSE approach two: PSE actually uses the load flow approach in its Eastside Needs Assessment.

But what is a load flow study?

Transmission grids are a complex spider web of interconnected transmission lines and transformers. Attached to these lines are substations that take power out of the grid in order to serve load. Also attached to these lines are generating plants that are capable of injecting power into the grid in order to serve the loads. These load and generation substations are connected to the grid in a very large number of diverse locations. The grid itself distributes the sources of power across the transmission lines and transformers in accordance with the laws of physics to the load serving substations. Because there is resistance in the grid lines and transformers, there is voltage drop and there are losses that occur when moving the power over the grid. Vendors have developed very sophisticated computer models that are used to determine how the grid will behave under specific conditions. It is the extreme conditions that need to be studied in order to determine the reliability of the grid. If the grid can operate reliably under these extreme conditions, then the grid will be able to operate reliably under the many other conditions that will exist that are not extreme.

NERC/FERC have established reliability criteria to be used in Transmission Planning. Those reliability criteria are described in Reliability Standard TPL-001-4.¹

As indicated in TPL-001-4, each utility needs to maintain system models within its respective area for performing the studies needed to complete its Planning Assessment.

These models need to be provided extensive data in order to perform their calculations. TPL-001-4 also describes the data that needs to be input into these models. The input data include:

1.1.1. Existing Facilities

1.1.2. Known outage(s) of generation or Transmission Facility(ies) with a duration of at least six months.

1.1.3. New planned Facilities and changes to existing Facilities

1.1.4. Real and reactive Load forecasts

1.1.5. Known commitments for Firm Transmission Service and Interchange

1.1.6. Resources (supply or demand side) required for Load

When the load flow computer model is run with appropriate data the model provides a large amount of “result” data. Such data includes (a) the loading on each line and transformer in the interconnected grid, (b) an indication if any lines or transformers are overloaded and (c) an indication if voltages get too low in some areas of the grid as a result of voltage drop caused by current flows through the resistance in the lines. These indications point the utility to areas that need to be fixed on the transmission system. There can be many alternative approaches to fix any identified problems on the grid. The load flow modeling is then used to examine each of these alternatives that might be able to fix the problem. The best alternative solution will best balance the cost and environmental impact of any fixes that can solve the indicated reliability problem.

FERC requires each utility to build and maintain Base Case data that can be used in the load flow computer models and to make Base Case runs and file those with FERC. Then third parties, such as myself, can request that FERC provide those Base Case studies to them so they can perform their own studies of the reliability of the grid. See

<http://www.ferc.gov/docs-filing/forms/form-715/overview.asp>

PSE has filed its Base Cases with FERC and I have asked FERC to provide them to me and FERC has provided them to me.

PSE took the unusual step of hiring an outside consultant, Quanta Technology, to run the load flow models in an attempt to justify the need for Energize Eastside, rather than using the PSE in-house transmission planning experts who normally make these kinds of load flow runs.

¹ (<http://www.nerc.com/pa/Stand/ReliabilityStandards/TPL-001-4.pdf>)

The Quanta load flow study work has been described in several written reports. But those written reports raise red flags that suggest the load flow studies done by Quanta were flawed. For me there were initially three red flags as follows:

- (a) They erroneously assumed that the proposed Energize Eastside project must increase the ability of BPA to move large amounts of power to and from the Canadian border during extremely cold temperatures in the Puget Sound region (*yet there is no Firm Requirement to move power to and from the Canadian Border...See Attachment 1 to this report*), and
- (b) They erroneously assumed that essentially all of the PSE owned/controlled power plants located in the Puget Sound region would not be operating during this extremely cold event (*yet PSE could not meet its Total System Peak load obligation if these power plants were not operating during an extremely cold event*)², and
- (c) With their scenario PSE ignores the Puget Sound Area **voltage collapse** problem that I first talked about in the Puget 1992 IRP (aka Least Cost Plan). (*See page 36 of the transcript from the May 26, 1992 public hearing on that plan Docket No. UE-910151 that can be found on the Washington Utilities and Transportation Commission website.*) Clearly the PSE/Quanta load flow analysis must have found this **voltage collapse** problem. This is likely the reason that PSE refuses to provide me the details of the Quanta load flow studies.

I documented the first two of these concerns in an August 21, 2017 email to the WUTC. See Attachment 2 to this report.

I was interested in seeing the actual load flow input and output data from the Quanta load flow studies to see what other data input assumptions might not be correct and to see how Quanta might have been able to avoid the voltage collapse problem or whether they simply ignored the voltage collapse problem.

PSE refused to let me see the inputs and outputs of load flow studies performed by Quanta. In my opinion, by refusing to make this information available for inspection, PSE has not demonstrated the need for Energize Eastside.

The Energize Eastside Final EIS at page J1-15 states that NERC standards require PSE models to “stress the system” to ensure that PSE’s system would operate without damaging other parts of the grid when such stresses occur. The footnote on page 23 of the Conditional Use Narrative in the CUP Application states that the relevant NERC standard is TPL-001-4. But what does "stress the system" mean when it comes to Transmission Planning Reliability Requirements? That answer is given to us in NERC standard TPL-001-4. (See footnote 1 above). This reliability criteria gives very detailed direction on what “stress the system” means. It does not say that the utility needs to test the system with all local generation

² According to PSE’s IRP, PSE needs 6,500 MW of supply to meet its System Peak plus reserve requirements in the winter of 2018.

According to PSE’s IRP, PSE is “short” by about 2100 MW of having sufficient generation to cover this need. While that is a very large “shortage”, it gets even larger (nearly 3,400 MW) under the Quanta load flow model assumptions...an untenable shortage.

turned off. It does not say that the system should be stressed with 1,500 MW of interregional flows when no Firm Commitment for those flows exists. It does not say that you cannot have loss of load or Corrective Action Plans under contingency outages. (See the allowed actions on pages 8 and 9 of TPL-001-4).

PSE stressed the system by starting with a winter heavy peak load (*that would be expected to occur only one hour in every four years*) and then assumed simultaneously, first, the failure of a 230/115 KV transformer at Sammamish followed immediately by, second, the failure of a 230/115 KV transformer at Talbot Hill. This is termed a “N-1-1” event. This is a stressed system as indicated in Category P6 on page 9 of TPL-001-4. This is obviously a low probability event. Note, as indicated in this Category P6, interruption of Firm Transmission Service and non-consequential load loss are allowed if this N-1-1 event occurs. There is nothing in TPL-001-4 that says that on top of this stress you need to shut down all local generation and require 1,500 MW of interregional flow to Canada. Yet PSE/Quanta have inappropriately piled on these other large stresses. This PSE/Quanta scenario has, for all practical purposes, a zero probability of occurring.³ PSE is going well beyond NERC/FERC Transmission Planning reliability requirements in the PSE/Quanta load flow studies. These NERC/FERC reliability requirements were set, in part, in order to be sure that we do not overbuild the system simply to address very low probability events. The PSE/Quanta load flow modeling has stressed the system so much that they cause voltage collapse in the Puget Sound Region. This voltage collapse would shut down power to a very large number of customers of all utilities in the Puget Sound Area. PSE has not explained how their load flow modeling addressed that problem or whether they simply ignored it.

When PSE says they need to “stress the system” under NERC Reliability Criteria, they are not being truthful about what they did versus what NERC/FERC Transmission Planning reliability criteria say needs to be done. They are well beyond NERC/FERC requirements and well beyond prudent utility practice. And well beyond what the transmission grid in the Northwest can handle, with or without Energize Eastside.

II. The Lauckhart-Schiffman Load Flow studies

With my three red flag concerns and being stymied by PSE’s refusal to provide the inputs and outputs of the Quanta load flow studies that allegedly demonstrate the Need for Energize Eastside, I looked for other ways to examine the need for Energize Eastside.

My first action was to get the PSE Base Case load flow model run which, as I describe above, I was able to get from FERC. I obtained the necessary Critical Energy Infrastructure Information (CEII) clearance from FERC and FERC provided me the Base Case load flow studies that PSE had provided to FERC. I observed that the PSE Base Case studies had more appropriate input assumptions for flows to Canada and Puget Sound Area generation operation during extreme cold events in the Puget Sound Area. This observation raised another red flag to me on the appropriateness of the Quanta load flow studies.

³ Before any overloads would occur on equipment on the eastside, there would be low voltage caused blackouts all over the Puget Sound Area.

Next, I recruited a colleague of mine, Roger Schiffman, to obtain one of the industry standard load flow models (GE PSLF) from General Electric on a monthly subscription basis and we performed our own study of the need for Energize Eastside. We found that Energize Eastside is not needed now or any time soon if proper input assumptions are made in the load flow modeling. The Lauckhart-Schiffman study performed the N-1-1 stress on the system and still found no need for Energize Eastside now or anytime soon. See Attachment 3 to this report.

On March 23, 2016 Booga Gilbertson of PSE provided criticisms of the Lauckhart-Schiffman load flow study report. Three days later, on March 26, 2016 I provided a rebuttal of the Booga Gilbertson criticisms. In that rebuttal I provided seven key questions and challenges for PSE to respond to in regards to their criticisms of the Lauckhart-Schiffman report. See Attachment 4 to this report. As of the date of this report, over 2 years later, PSE has still not responded to those seven key questions and challenges.

III. The FERC Order on the CENSE complaint about load flow studies

PSE claims that the FERC denial of the CENSE Complaint somehow sends a message that FERC believes the Energize Eastside line should be built. Nothing could be further from the truth. The FERC Order denied CENSE's request that FERC use their authorities under FERC Order 1000 to require ColumbiaGrid to run correct load flow studies on the need for Energize Eastside in an open and transparent manner with stakeholder input. *See Application copy of FERC Order in Conditional Use Narrative at paragraph 5.* FERC did not say the Energize Eastside project should be built. FERC denied this CENSE complaint/request because FERC pointed out that “...neither Puget Sound, nor any other eligible party, requested to have the project selected in the regional transmission plan...” *See Application copy of FERC Order in Conditional Use Narrative at paragraph 62.* That being the case, FERC stated it does not have jurisdiction to require ColumbiaGrid to do the CENSE requested load flow studies with stakeholder input. That is why FERC denied the CENSE complaint. FERC stated that its only jurisdiction in the Energize Eastside matter was its requirement that PSE have ColumbiaGrid demonstrate that this transmission project, which is being built solely for local reliability purposes, does not adversely impact neighboring utilities. FERC acknowledged in their Order denying the CENSE complaint that ColumbiaGrid did make that finding. But the writing in the PSE/Quanta reports states that the studies were intended to find a solution for the East Side that enhanced BPA's ability to move power to and from Canada. So, who would expect that the Energize Eastside project would have an adverse impact on BPA? Since, as FERC has stated, Energize Eastside is not a part of a Regional Plan, then it is wrong to require the Energize Eastside load flow studies to enhance BPA's ability to move power to and from Canada. The PSE/Quanta load flow studies should have been redone to remove this requirement. The Lauckhart-Schiffman load flow studies removed that inappropriate requirement. *See Attachment 3 to this report at its Appendix D.*

IV. PSE's Motive for building Energize Eastside.

Why would PSE want to build Energize Eastside if it is not needed? That answer lies in the motive PSE has to build Energize Eastside. That motive seems clearly to be a desire to increase the PSE ratebase so

the WUTC will allow PSE to raise the rates it charges its retail customers which will result in more profit for PSE's owner – Macquarie. See Attachment 5 to this report.

V. Conclusion.

It is clear that the PSE/Quanta load flow studies used in an attempt to demonstrate the need for Energize Eastside are flawed. They are modeling large flows to Canada that are not required. They are shutting down Puget Sound area located generating plants in an extreme cold weather event that are needed for PSE to meet its Total System peak load in such a cold event. In performing their stress test of the system, PSE and Quanta are well beyond NERC/FERC reliability requirements and beyond prudent utility practice. And well beyond what the transmission grid in the Northwest can handle, with or without Energize Eastside. PSE refuses to provide me the details of the Quanta load flow studies. It is my opinion that the reason that PSE refuses to provide the details of the Quanta load flow studies is because I will be able to point to additional specific flaws in their studies including the fact that they ignored the Voltage Collapse problem in the Puget Sound Area under their problematic scenario.

The Lauckhart-Schiffman load flow study is the only one provided in this proceeding that uses the load forecast PSE gave to the Western Electricity Coordinating Council, correct inter-regional flows, and appropriate generation dispatch. That study concludes that Energize Eastside is not needed now or any time soon.

The PSE Application for a Conditional Use Permit for the Energize Eastside project should be rejected. PSE has not proven the need for the project. The Lauckhart-Schiffman load flow study demonstrates the project is not needed now or any time soon.

Attachment 1

Additional comments on **Columbia** **Grid** Draft 2017 System Assessment

Richard

Mon 7/24/2017, 11:01 PM

paul@columbiagrid.org;

Don Marsh (don.m.marsh@hotmail.com);

Christina Aron-Sycz (aronsycz@gmail.com);

March 1999 amendment_Columbia River Treaty Agree
Copy.pdf
1 MB

Disposal Agreement re Canadian
Entitlement.pdf
2 MB

2 attachments (3 MB)

Dear ColumbiaGrid/Paul-

Last Friday June 21, 2017 I sent you an email with attached letter providing comments/questions on the ColumbiaGrid Draft 2017 System Assessment. By this email and its attachments, I am supplementing those comments. Please additionally include this email with its attachments in the formal comments on the ColumbiaGrid Draft 2017 System Assessment.

In my June 21, 2017 delivery on this matter at my point number five I pointed out that our research cannot find that there is a Firm Commitment on the part of BPA or anyone else in the United States to deliver Canadian Entitlement power to the Canada border. I asked that you provide any evidence that ColumbiaGrid has that there is a Firm Commitment to deliver Canadian Entitlement power to the Canadian border. To date you have provided no such evidence.

By this email and its attachments, I point out that there is clear evidence that there is **no** Firm Commitment to deliver Canadian Entitlement (e.g. 1,350 MW) to Canada. That evidence is contained in the attached COLUMBIA RIVER TREATY **ENTITY AGREEMENT** on ASPECTS OF THE DELIVERY OF THE CANADIAN ENTITLEMENT for APRIL 1, 1998 THROUGH SEPTEMBER 15, 2024 BETWEEN THE CANADIAN ENTITY AND THE UNITED STATES ENTITY DATED MARCH 29, 1999. I have highlighted the relevant sections of this Agreement.

As can be seen in this document, the original plan (in the 1960's) for delivering Entitlement Power to Canada was for those deliveries to be made at Oliver, British Columbia. That plan

which would have required the building of transmission lines from two directions to Oliver, BC was put on hold for 30 years when Canada sold its share of Canadian Entitlement power for 30 years to entities in the United States. This Oliver delivery point plan would have required BPA to build new 500 KV transmission from near Grand Coulee Dam north to Oliver, BC. BC Hydro would need to build 500 KV from Oliver, BC to the vicinity of Vancouver, BC. Building these lines would have been a major and expensive undertaking.

When those 30-year sales of Canadian Entitlement power to US entities was about to expire in the last 1990's, once again the parties were faced with building Transmission lines to Oliver, BC. This 1999 Entity Agreement eliminated the obligation of both parties to build those lines. This 1999 Entity agreement refers to the similarly dated 1999 **Disposal Agreement** (also attached to this email). The Disposal Agreement allows for Canada to sell its share of Treaty power within the United States on a short-term basis (i.e. having that power delivered from the generating points on the Columbia River to delivery points in the United States where Canada [i.e. BC Hydro] has made arrangements from day to day to sell the power to a U.S. entity). This power never needs to be delivered to the Canadian border.

The Entity Agreement states that if Canada would like the power to be delivered to the Canadian border at any particular point in time (rather to some US located entity), then since the lines to Oliver have not been built, the power would be delivered to existing connections points at Blaine and Nelway, **but only if there is available transmission capacity to those points**. See paragraph 3 in the Entity Agreement...note in particular the paragraph starting with "Subject to paragraphs 8 through 11..." Note paragraph 9 states that if the United States Entity is not able to purchase Firm Transmission to Blaine and Nelway, then it may be that the power cannot be delivered to those points because of transmission constraints. Under paragraph 9 (b), if Canada decides later that it wants Firm Transmission to the Canadian border, then Canada would need to request that the US entity procure the needed delivery capability (e.g. through construction or otherwise) and if Canada is willing to pay certain amounts for the US procuring the capability, then the Deliveries could be made under a Firm Commitment to Canada. Canada never made such a request. BPA responded in to a Public Record Act request that they never received such a request from Canada. Therefore, the treaty documents provide clear evidence that the deliveries to Blaine and Nelway are not Firm Commitments. Meaning that deliveries of Canadian Entitlement power cannot be made to these points under all weather and contingency conditions.

BPA has known since at least 1999 (when the treaty was amended) that it would not be able to deliver Canada's share of downstream benefits to Canada under all weather and contingency conditions. In 2009, Puget Sound Area Study Group members developed a draft report entitled "Assessment of Puget Sound Area/Northern Intertie Curtailment Risk." That study describes certain system operating plans that could reduce the Curtailment Risk in the south-to-north direction on the tie to Canada.

If there had been in place a Firm Commitment in 1999 to deliver Canadian Entitlement power to the Canada border on a Firm Basis, then studies would have been done back in 1999 (or

before) to determine what construction would be necessary to provide that Firm Commitment. Facilities would have been built long ago. Canada would have insisted on it. No one would have waited until PSE had some local needs in the year 2018 or later.

Please correct the erroneous language in your Draft 2017 System Assessment to make it clear that there is no Firm Commitment to deliver 1,350 MW of Canadian Entitlement power to the Canadian border.

I would be happy to meet with you to discuss these matters or have a discussion over the phone if you wish to have a discussion about this evidence.

Richard Lauckhart

Energy Consultant

Davis, California

Commenting on behalf of a large number of interest citizens in the Puget Sound Area.

Attachment 2

August 21, 2017

To: The Washington Utilities and Transportation Commission

Docket UE-160918

submitted by email to records@utc.wa.gov

Re: Documents that PSE erroneously claims prove the need for Energize Eastside

Dear WUTC:

By this letter I am attaching two documents that are relevant to PSE's Integrated Resource Plan ("IRP") currently under scrutiny by the WUTC. These are the documents that PSE claims prove the need for Energize Eastside. The first attached document is the "Eastside Transmission Solutions Report" Updated February 2014. The second attached document is the "Eastside Needs Assessment Report Transmission System - Executive Summary" dated December 2013. I believe these documents should be on the record in Docket UE-160918 for purposes of examining what is in them.

There are clear problems with each of these PSE documents.

1. The February 2014 "Eastside Transmission Solutions Report"

The February 2014 "Eastside Transmission Solutions Report" refers to load flow studies, each of which load flow study has a fatal flaw. That fatal flaw is that each load flow study includes a requirement that the PSE local transmission system must support a new ability of BPA to move 1,500 MW of power (or more) to or from the Canadian border under all weather and contingency conditions. **See Table 3-1 in the report. These assumptions cause massive flows through the Puget Sound area for power imported from or exported to Canada, depending on the season. I say massive because there are no firm commitments to move anywhere near that amount of inter-regional power by or for anyone. In some cases, this transmitted electricity is five times larger than peak Eastside demand. Non-firm transmission of this magnitude cannot be used to justify a project that is claimed to address only local needs. The northwest grid as a whole was not designed to move this amount of inter-regional power under all weather and contingency conditions. The load flow work performed for the Lauckhart-Schiffman study makes it clear that these massive inter-regional flows being forced on the grid cause significant problems not only on the PSE local system but also on other parts of the grid that would also need to be dealt with. The 2013 ColumbiaGrid "Stressed Load Flow Case" found the same thing.** PSE has been asked how they dealt with these other problems but PSE has not answered. There is no reason that a study of the needs on PSE's local system should reflect these massive inter-regional flows to or from Canada. As a result, all of the load flow studies performed in this February 2014 "Eastside Transmission Solutions Report" are of no use in determining what is needed to provide reliable power to the greater Bellevue area. These studies show overloads on the PSE local system (and other grid problems) that are caused by these massive non-required inter-regional flows to or from Canada. These to/from Canada flow assumptions need to be eliminated for purposes of assessing the transmission needs in the greater Bellevue area. All these load flow studies need to be rerun without these massive inter-regional flows.

The February 2014 “Eastside Transmission Solutions Report” also has a fatal flaw when it assumes during heavy winter load conditions that PSE and SCL generation west of the Cascades was adjusted to fully off. **See paragraph 3.2.9 in the report.** Clearly PSE would not be able to meet its total system peak in the winter if its generation west of the Cascades was fully off. According to PSE’s IRP, PSE is “short” by about 2100 MW of having sufficient generation to cover its total system peak load. While that is a very large “shortage”, it gets even larger (more than 3,500 MW short) under the assumption that PSE’s west of Cascades generation is fully off.

While PSE claims to have modeled an alternative that has more conservation and an alternative to build a “peaker generating plant” in this February 2014 “Eastside Transmission Solutions Report”, the major problems created by their faulty modeling [*of (a) flows to and from Canada and (b) fully turning off PSE’s generation located west of the Cascades*] swamps the impact of these other alternatives and makes all of the studies done for this report of no value.

1. The “Eastside Needs Assessment Report - Transmission System - Executive Summary” dated December 2013.

I provide this document for the record in UE-160918 because it appears to provide an alternative basis for PSE claiming there is a need for their Energize Eastside project. The graphic on page 2 of this document provides what PSE calls “The Problem.” But this graphic is flawed. The “System Capacity” line is the “summer normal” rating of the two remaining 230/115 KV transformers at Talbot Hill and Sammamish after the other two 230/115 KV transformers fail in the N-1-1 Scenario. It should have been the “winter emergency” rating. Also, the load line does not reflect the actual loads on these remaining transformers from the load flow study for this N-1-1 contingency event. In the Lauckhart-Schiffman report I provide the appropriate graphic which is based on load flow study analysis. The Lauckhart-Schiffman corrected graphic shows the Problem would not occur until many years into the future.

Corrected load flow analysis of the Need for Energize Eastside-

PSE has been aware for some time that it should not have required the flows to and from Canada in their load flow studies. Further, PSE is fully aware that they cannot meet their winter peak loads with their west of Cascades generation fully off. Despite this awareness on the part of PSE, they inexplicably decided not to rerun their load flow models to fix these faulty assumptions.

But there is evidence on the record in UE-160918 as to what would happen if these faulty assumptions are fixed. That evidence is contained in the Lauckhart-Schiffman load flow study report that is included in the record. While PSE has criticized the Lauckhart-Schiffman load flow study report, there is also evidence on the record in the March 28, 2016 “rebuttal letter” that these PSE criticisms are incorrect. The March 28, 2016 rebuttal of the PSE criticisms of the Lauckhart-Schiffman report (included in the record for Docket UE-160918) also develops questions and challenges for PSE to respond to regarding my rebuttal of their criticisms. PSE has never responded to those questions and challenges.

It is clear from the Lauckhart-Schiffman load flow studies that Energize Eastside is not needed in 2018 in order for reliable service to be provided to the greater Bellevue area. If a reliability issue arises after 2018, then the alternatives I described in my August 14, 2017 “Alternatives to Energize Eastside” submittal in Docket No. UE-160918 would need to be analyzed. These alternatives would clearly be better than building Energize Eastside.

Sincerely,

Richard Lauckhart

Energy Consultant

Davis, California

On behalf of a large number of citizens that are concerned about transmission matters in the greater Bellevue area.

cc: IRP Advisory Group members

Attachment 3

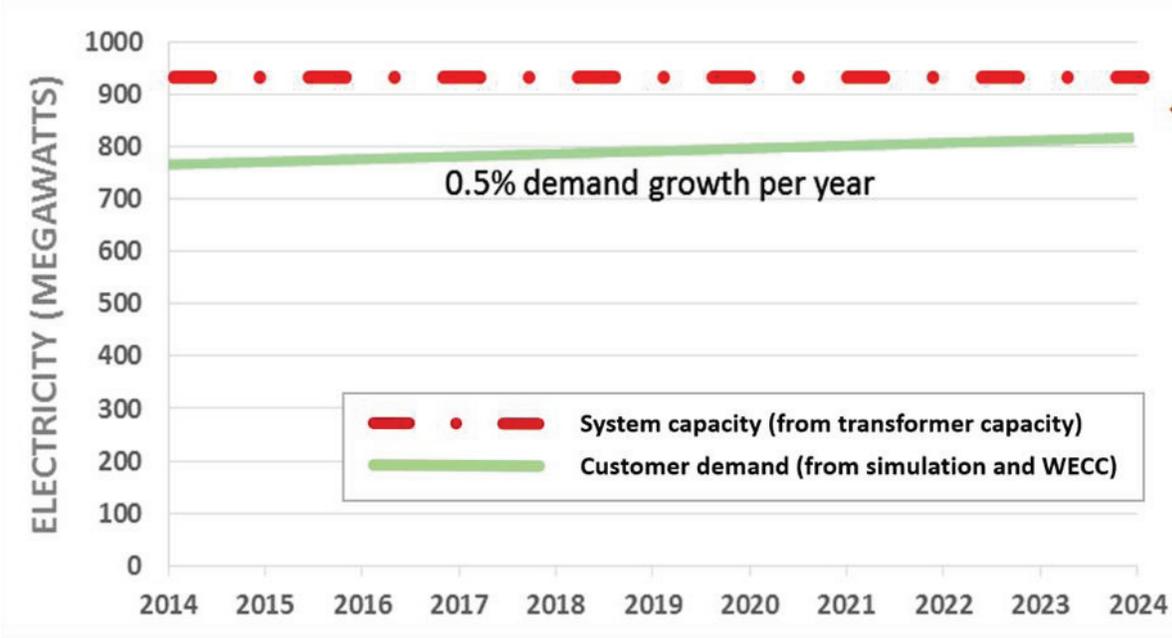
Load Flow modeling for “Energize Eastside”

Richard Lauckhart

Roger Schiffman

February 18, 2016

LAUCKHART-SCHIFFMAN DEMAND FORECAST



Load Flow modeling for "Energize Eastside"

Richard Lauckhart

Roger Schiffman

February 18, 2016

Executive Summary

In November 2015, the citizen group CENSE asked Richard Lauckhart and Roger Schiffman to study the scenario that motivates Puget Sound Energy's transmission project known as "Energize Eastside." We (Lauckhart and Schiffman) are nationally recognized power and transmission planners with specific knowledge of the Northwest power grid.

It is standard industry practice to use a "load flow model" to determine the need for a transmission project like Energize Eastside. In order to assess the reliability of the grid, analysts use specialized computer software to simulate failure of one or two major components while serving peak load conditions. For Energize Eastside, PSE simulates the failure of two major transformers during a peak winter usage scenario (temperature below 23° F and peak hours between 7–10 AM and 5–8 PM).

We ran our own load flow simulations based on data that PSE provided to the Western Electricity Coordinating Council (WECC). We used a "Base Case" for winter peak load projected for 2017–2018. PSE confirms this is the same data used as the basis for the company's "Eastside Needs Assessment."

Our findings differ from PSE's as follows:

1. PSE modified the Base Case to increase transmission of electricity to Canada from 500 MW to 1,500 MW. This level of energy transfer occurring simultaneously with winter peak loads creates instability in the regional grid. Transmission lines connecting the Puget Sound area to sources in central Washington do not have enough capacity to maintain this level of demand.
2. PSE assumed that six local generation plants were out of service, adding 1,400 MW of demand for transmission. This assumption also causes problems for the regional grid.
3. Even if the regional grid could sustain this level of demand, it is unlikely that regional grid coordinators would continue to deliver 1,500 MW to Canada while emergency conditions were occurring on the Eastside.
4. We found that the WECC Base Case contains a default assumption that PSE may not have corrected. The ratings for critical transformers are based on "summer normal" conditions, but the simulation should use significantly higher "winter emergency" ratings. The default value could cause PSE to underestimate System Capacity and overstate urgency to build the project.
5. The Base Case shows a demand growth rate of 0.5% per year for the Eastside. This is much lower than the 2.4% growth rate that PSE cites as motivation for Energize Eastside.

Our study finds critical transformers operating at only 85% of their winter emergency rating, providing enough capacity margin to serve growth on the Eastside for 20 to 40 years.

Qualifications

Richard Lauckhart served as a high level decision maker at Puget Sound Power & Light (the predecessor of Puget Sound Energy). His employment with the company spanned 22 years as a financial and transmission planner as well as power planning. He served as the company's Vice President of Power Planning for four years.

Richard took a voluntary leave package when Puget Power merged with Washington Energy Company in 1997. He provided additional contract services to PSE for more than a year following the merger. After leaving PSE, Richard worked as an energy consultant, providing extensive testimony on transmission system load flow modeling before the California Public Utility Commission.

Roger Schiffman has 23 years of energy industry experience covering utility resource planning, electricity market evaluation, market assessment and simulation modeling, regulatory policy development, economic and financial analysis, and contract evaluation. Roger has led a large number of consulting engagements for many clients. He has extensive knowledge of industry standard modeling software used for power market analysis and transmission planning.

We are well acquainted with the physical layout and function of the Northwest power grid and the tools used to analyze its performance. Our resumes can be found in Appendix H.

Richard has provided pro bono consultation to CENSE since April 2015. He has received no financial compensation other than reimbursement of travel expenses. Roger had no relationship with CENSE prior to this report.

Methodology

The power grid is a complex interconnected system with behaviors that cannot be easily understood without computer modeling software. We acquired a license to run the industry standard simulation software known as “GE PSLF”¹ to perform our studies.

The PSLF software uses a database that is supplied by the operator. We had hoped to use the same database that PSE used in its studies, but PSE refused to share it after months of negotiations. Instead, we received clearance from the Federal Energy Regulatory Commission (FERC) to access the database PSE submitted to the Western Electricity Coordinating Council (WECC). FERC determined that we presented no security threat and had a legitimate need to access the database (see FERC’s letter in Appendix A).

We used the WECC Base Case for the winter of 2017–18, which PSE confirms is the database the company used for that time period. We and PSE have made subsequent changes to the Base Case model in order to incorporate various assumptions. We don’t know exactly what changes PSE made to the database, but we will be explicit about the changes we made.

N-0 base scenario

To ensure that everything was set up correctly, we ran a simulation using the unmodified Base Case and checked to see if the results aligned with those reported by WECC. This is referred to as an “N-0” scenario, meaning that zero major components of the grid are offline and the system is operating normally. The outputs of this simulation matched reported results.

The WECC Base Case assumes that the Energize Eastside project has been built. In order to determine the need for the project, we needed to study the performance of the grid without it. We reset the transmission configuration using parameters from an earlier WECC case that did not include the project.

N-1-1 contingency scenario

An “N-1-1” scenario models what would happen if two major grid components fail in quick succession. Utilities are generally required

¹ <http://www.geenergyconsulting.com/pslf-re-envisioned>

to serve electricity without overloads or outages in this scenario to meet federal reliability standards.

PSE determined that the two most critical parts of the Eastside grid are two large transformers that convert electricity at 230,000 volts to 115,000 volts, the voltage used by all existing transmission lines within the Eastside. To simulate the N-1-1 scenario, the Base Case is modified to remove these two transformers from service.

PSE apparently made two additional modifications to the WECC Base Case. First, the amount of electricity flowing to Canada was increased from 500 MW to 1,500 MW. Next, the company reduced the amount of power being produced by local generation plants from 1,654 MW to 259 MW. The rationale behind these modifications isn't obvious, and we were concerned how the regional grid (not just the Eastside) would perform with these assumptions in place.

To our surprise, simply increasing the flow to Canada to 1,500 MW while also serving peak winter power demand in the Puget Sound region was enough to create problems for the regional grid. The simulation software could not resolve these problems (Appendix E describes the problems in greater detail). While it's possible that PSE and Utility System Efficiencies found ways to work around these challenges by making additional changes to the Base Case, we do not know what these changes were. We are confident that prudent grid operators would reduce flows to Canada if an N-1-1 contingency occurs on the Eastside during heavy winter consumption. PSE would turn on every local generation plant. These responses resolve the problems. This is the more realistic scenario we modeled in our N-1-1 simulation.

The WECC Base Case uses default values for transformer capacity ratings that correspond to a "summer normal" scenario. The summer rating is reduced in order to protect transformers from overheating during hot summer weather. The "winter emergency" rating would be consistent with best engineering practice for equipment outages during very cold conditions (less than 23° F) that produce peak winter demand. We used this higher rating in our simulation.

Results

N-0 results

To compare the N-1-1 results with normal operation of the grid serving peak winter demand, we ran an N-0 study using the WECC Base Case for winter 2017-18 with the following modifications:

1. Energize Eastside transmission lines are reverted to present capacity.
2. Flow to Canada is reduced from 500 MW to 0 MW.
3. Transformers run at “winter normal” capacity.

Figure 1 shows load as a percentage of “winter normal” capacity on each of the four transformers.

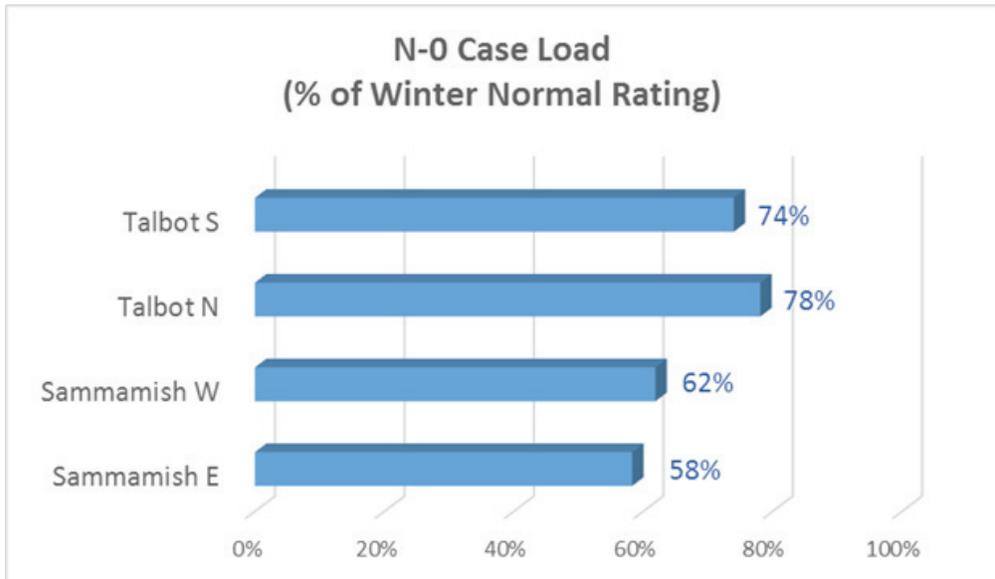


Figure 1: With all transformers in service, winter peak load causes no overloads.

N-1-1 results

The N-1-1 results are based on the WECC Base Case for winter 2017-18 with the following modifications:

1. Two transformers are out of service.
2. Energize Eastside transmission lines are reverted to present capacity.
3. Flow to Canada is reduced from 500 MW to 0 MW.
4. Transformers run at “winter emergency” capacity.

Figure 2 shows that the remaining two transformers, Talbot N and Sammamish W, remain within “winter emergency” capacity ratings.

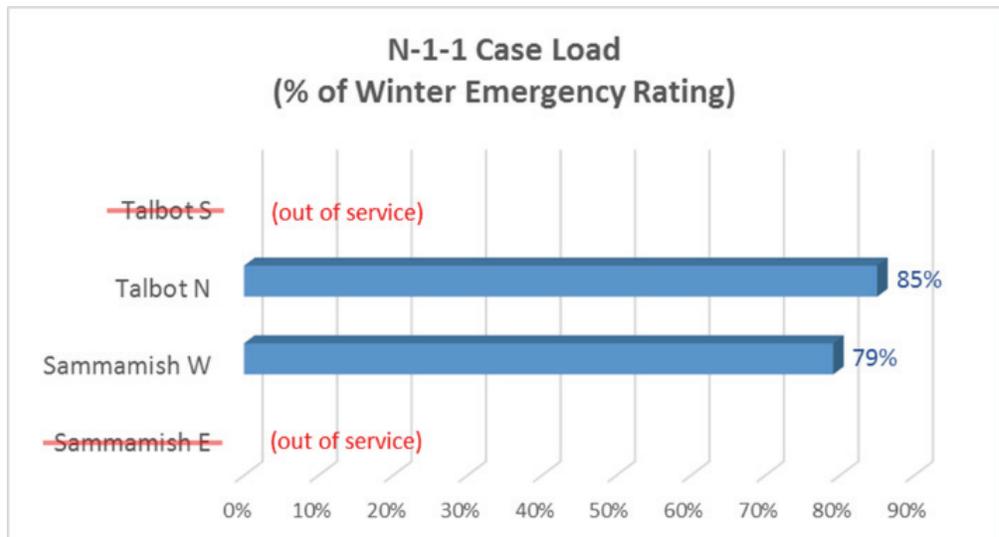


Figure 2: Loads on two remaining transformers are in a safe range.

Analysis

We carefully analyzed the results of the N-1-1 simulation to get a broader view of how the grid is behaving in this scenario. Electricity is served by a combination of high-voltage transformers (transforming 230,000 volts to 115,000 volts) and low-voltage transformers (115,000 volts to 12,500 volts).

When we simulated failure of two high-voltage transformers located at Sammamish and Talbot Hill, as PSE did, we discovered that some of the load is redistributed to other high-voltage transformers in the Puget Sound area (see Figure 3). This is a natural adaptation of the networked grid that occurs without active management by PSE or other utilities. The regional grid has enough redundant capacity to balance the load without causing overloads on any transformer or transmission line in the region.

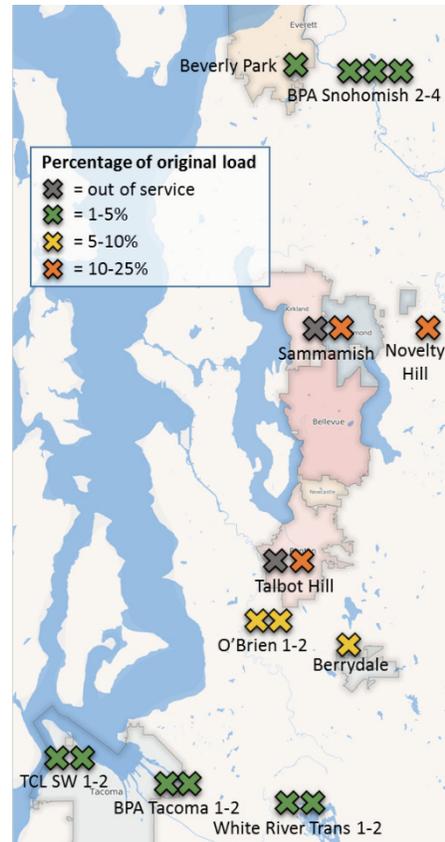


Figure 3: Load is distributed among other transformers after two transformers fail.

We conclude that the grid is capable of meeting demand in emergency circumstances in the winter of 2017–18. How soon after that will system capacity become strained?

Concerns about future capacity are illustrated in Figure 5, PSE’s demand forecast graph.² This graph raises several questions. For example, it’s not clear how PSE determined the “System capacity range” of approximately 700 MW. If this value is derived from the transformer capacities listed in the WECC Base Case, these capacities are set to default values corresponding to “summer normal” conditions.

PSE’s graph shows Customer Demand growing at an average rate of 2.7% per year. However, data submitted by PSE to WECC shows a growth rate of only 0.5% per year. An explanation of this discrepancy is necessary to understand this graph.

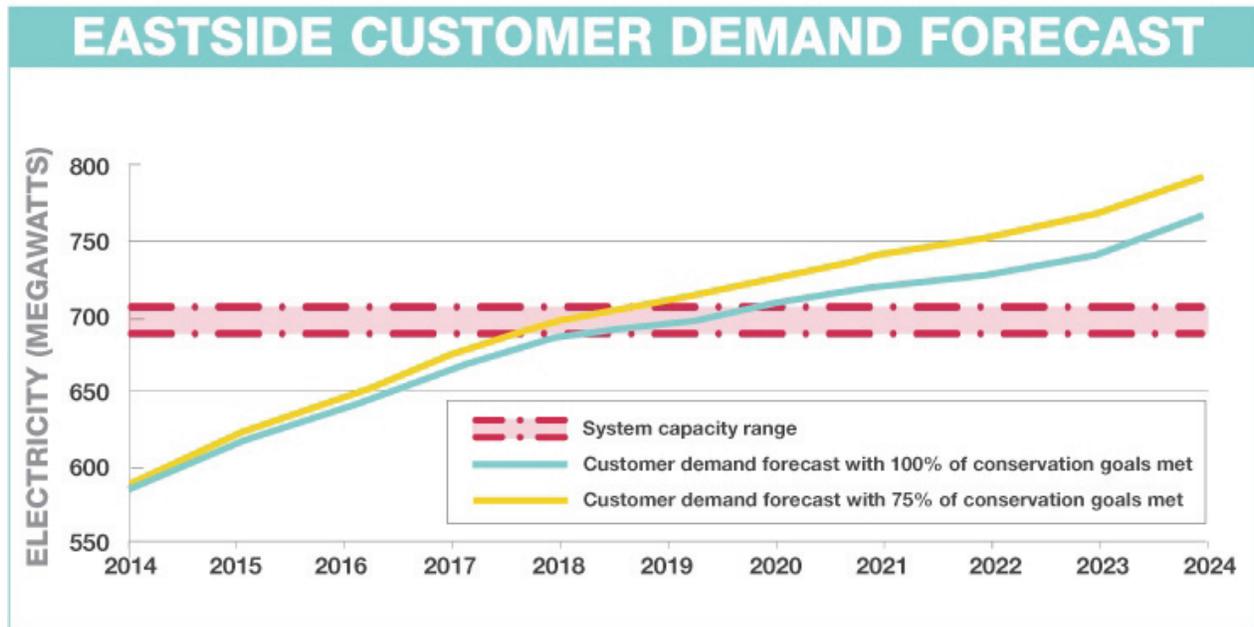


Figure 4: PSE’s graph shows customer demand exceeding system capacity in 2018.²

² <http://www.energizeeastside.com/need>

Although we don't have enough information to create a graph suitable for long-term planning, we feel Figure 5 is a better approximation of system capacity and demand growth on the Eastside.

The "System capacity" is based on "winter emergency" transformer ratings, which are more appropriate than summer ratings for this scenario. The higher ratings raise the overall capacity to approximately 930 MW.

The "Customer demand" line shown in Figure 5 is based on loads reported in the load flow simulation for the two remaining Eastside transformers. The 2014 value is higher than in PSE's graph, because these transformers serve loads outside the Eastside area. The growth rate matches the 0.5% rate observed in WECC Base Cases.

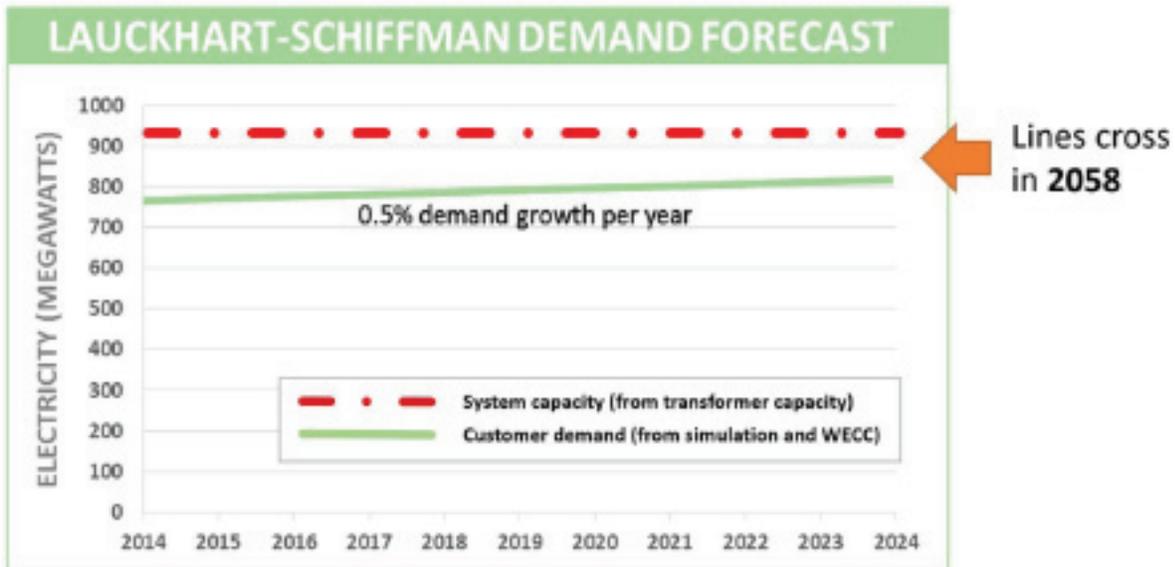


Figure 5: Alternative Demand Forecast shows slower demand growth and higher system capacity (based on "winter emergency" transformer ratings).

Comparison with other studies

The conclusions of the Lauckhart–Schiffman study differ from previous studies. We stand by our conclusions and will share our models and results with anyone who has clearance from FERC.

Here we review the other studies and explain why their conclusions might differ from ours.

PSE/Quanta

Two different load flow simulations were performed by PSE and Quanta, a consultant employed by PSE. We have the following concerns with both studies:

1. An unrealistic level of electricity is transmitted to Canada.
2. Nearly all of the local generation plants are turned off.
3. The appropriate seasonal ratings for the critical transformers were not used.
4. It's not clear how the customer demand forecast was developed, but there is an unexplained discrepancy between the forecast used for Energize Eastside (2.4% annual growth) and the forecast reported to WECC (0.5% annual growth).

The first two assumptions cause regional reliability problems for the WECC Base Case that must have required additional adjustments by PSE/Quanta. We don't know what those adjustments were.

Utility System Efficiencies

The City of Bellevue hired an independent analyst, Utility System Efficiencies (USE), to validate the need for Energize Eastside. USE ran one load flow simulation that stopped electricity flow to Canada. According to USE, 4 of the 5 overloads described in the PSE/Quanta studies were eliminated, and the remaining overload was minor.

Our load flow simulation studied the same scenario (N–1–1 contingency with no flow to Canada and local generators running), but we did not find any overloads. We believe three assumptions explain the different outcomes:

1. USE does not specify what level of generation was assumed for local generation plants. In verbal testimony before the Bellevue

City Council, USE consultants said that they did not assume all of the capability of local generation was operating. Our study assumes these plants will run at their normal capacity.

2. USE says emergency ratings were used for the critical transformers, but it isn't clear if USE used "winter emergency" ratings. Our study assumes winter emergency ratings.
3. USE does not independently evaluate the customer demand forecast (2.4% annual growth is assumed). Our study assumes the load growth forecast that PSE provided to WECC.

We believe our assumptions more accurately reflect the actual conditions that would occur in this scenario.

Stantec Consulting Services

In July 2015, the independent consulting firm Stantec was asked to review the studies done by PSE and USE. Stantec issued its professional opinion without performing any independent analysis or load flow simulations. Stantec says PSE's methodology was "thorough" and "industry standard." However, Stantec does not address the shortcomings we have identified with previous studies.

Appendix A

Clearance from FERC

Federal Energy Regulatory Commission
Washington, DC 20426

SEP 01 2015

Letter of Release,
Re: CEII No. CE15-130

VIA CERTIFIED MAIL

Richard Lauckhart



Dear Mr. Lauckhart:

This is in response to the July 15, 2015 request you submitted under the Federal Energy Regulatory Commission's (Commission or FERC) Critical Energy Infrastructure Information (CEII) regulations at 18 C.F.R. § 388.113(d)(4) (2015). Specifically, you requested a copy of the Puget Sound Energy, Inc. FERC Form No. 715, *Annual Transmission Planning and Evaluation Report*.

By letter dated August 21, 2015, the Commission issued a finding that you are a legitimate requester with a need for the information. In accordance with 18 C.F.R. § 388.112(e), the enclosed DVD contains the information requested and is being released to you subject to the non-disclosure agreement executed by you concerning this matter.

As provided by 18 C.F.R. § 388.113(d)(4)(iv) of the Commission's regulations, you may appeal this determination pursuant to 18 C.F.R. § 388.110. Any appeal from this determination must be filed within 45 days of the date of this letter. The appeal must be in writing, addressed to David L. Morenoff, General Counsel, Federal Energy Regulatory Commission, 888 First Street, NE, Washington, DC 20426. Please include a copy to Charles A. Beamon, Associate General Counsel, General and Administrative Law, at the same address.

Sincerely,

A handwritten signature in black ink that reads "Leonard M. Tao".

Leonard M. Tao
Director
Office of External Affairs

Enclosure

Appendix B

Choice of Base Case

To perform a load flow study, one needs a database reflecting the physical characteristics of the power grid. FERC has recognized that stakeholders need to have access to a Base Case that reflects the system. Each utility or a designated agent is required to file power flow base cases with FERC on an annual basis.³ WECC acts as a designated agent for most of the utilities operating in the western U.S. In an email dated November 19, 2015 Jens Nedrud, the Senior Program Manager for Energize Eastside, confirmed that PSE uses Base Cases filed by WECC as its Base Cases.

For the purposes of this study, Lauckhart and Schiffman obtained the 2014 WECC Base Cases from FERC.⁴ These included 13 Base Case runs, four of which are Heavy Winter scenarios. In order to evaluate the need for the EE project, the heavy winter 2017–18 Base Case was modified so that the Energize Eastside project was not included.⁵

We do not know if this modified 2017–18 Base Case is identical to the one used by PSE to justify the project, because PSE has refused to share their 2017–18 Base Cases for independent review. The WECC Base Case assumes 500 MW is transmitted to Canada. PSE apparently increased that amount to 1,500 MW. The WECC Base Case assumes local generation in the Puget Sound Area is running at normal capacity. PSE appears to have reduced those contributions by 1,395 MW. Our PSLF modeling suggests that PSE’s modifications are not feasible and grid operators would not allow these conditions to occur on a heavy winter load day.⁶

Load data from the WECC Heavy Winter Load 2017–18 Base Case is chosen as the basis for this study. This is the latest data provided by FERC/WECC for the winter of 2018. PSE was involved in the development of this Base Case along with other utilities including BPA and Seattle City Light (SCL). All utilities use these Base Cases to determine if the grid is capable of moving power from sources to loads. Further, it is the only data available in which there are identified loads on specific substations.

The loads on the main Eastside substations in the WECC Heavy Winter 2013–14 and 2017–18 Base Cases have been examined and analyzed. All of the Eastside substations were included:

Medina	Overlake	South Bellevue
Clyde Hill	Lochleven	Factoria
Bridle Trails	North Bellevue	College
Evergreen	Center	Phantom Lake
Ardmore	Midlakes	Eastgate
Kenilworth	Lake Hills	Somerset

The total load on these substations in the 2013–14 Base Case was 394.6 MW. The total load on these substations in the 2017–18 Base Case was 402.4 MW. This is a peak load growth of 2.0% over the 4 year period (an average increase of 0.5% per year). This is in line with predicted growth of energy and peak in King County.

PSE and USE appear to be extrapolating the higher growth rate of a few substations due to “block loads” and applying it uniformly to 600 MW of existing substation load. This simplification overestimates the overall growth rate. Furthermore, the total load on the substations listed above is only 400 MW. It is not clear how PSE arrived at a 600 MW load.

³ <http://www.ferc.gov/docs-filing/forms/form-715/instructions.asp#General%20Instructions>

⁴ On July 9, 2015 FERC provided Lauckhart the most recent WECC Base Cases that it had available to send to requesters. Those Base Cases were ones filed in 2014 by WECC.

⁵ On Dec. 4, 2015 Lauckhart also received from FERC a copy of the 2015 WECC FERC Form 715 filing. In that filing there was no Base Case filed for the winter of 2018. However, there was a Base Case filed for the winter of 2020. A review of that 2020 Base Case showed very little growth on the Eastside from the 2018 Base Case. It also showed that the rest of the Northwest actually reduced their load forecast for the year 2020 over their forecast for 2018. In total, the loading on the eastside 230/115 KV transformers in the 2020 case were lower than the loading on the Eastside 230/115 KV transformers in the 2018 case. The trend is that the situation is not getting worse since the load forecasts for the northwest are dropping overall which also reduces loading on the Eastside 230/115 KV transformers.

⁶ With no other changes to the WECC Base Case for the winter of 2018, increasing PNW to BC transfers to 1,500 causes the system to need to import more power across the Cascades from Central Washington. This causes the PSLF model run to fail to find a solution. When we say no solution, we mean the voltage in the Puget Sound region gets too low and the model cannot find a way to correct that.

Appendix C

Generation pattern used

PSE's gas-fired generation plants located in the Puget Sound area have a total rated capacity of 1,654 MW. How much of this capacity should be used to serve peak demand during a heavy winter load event? There are three choices:

1. The Eastside Needs Assessment prepared for PSE by Quanta assumed generation of only 259 MW, without explaining why such a low level was used.
2. The load flow study performed by USE also ran the plants at a reduced rate, but the study did not specify the exact amount.
3. Three of the four WECC heavy winter Base Cases assume the plants are running at their rated capacity of 1,654 MW. One of the Base Cases turns off one plant for reasons that are not clear, resulting in a lower level of generation at 1,414 MW.

The 1,654 MW capacity used by WECC in 3 of its 4 heavy winter Base Cases is a prudent choice for several reasons. First, PSE built and/or acquired these plants for the explicit purpose of meeting its load obligations during cold winter events. Second, PSE has a well-documented shortfall of generation capacity to serve peak demand, and it will be less risky and less expensive to run these plants than to buy power on the spot market. Third, because these plants generate electricity at 115 kV, the strain on PSE's overloaded 230/115 kV transformers would be reduced by increasing the supply of 115 kV electricity.

Appendix D

Exports to Canada

PSE and USE assume that 1,500 MW of power must be delivered to Canada, even if PSE is experiencing failure of two critical system components (an N-1-1 contingency) during heavy winter load conditions (temperatures less than 23° F in the Puget Sound region).

The WECC Base Cases assume otherwise. In the WECC Base Case for heavy winter 2013-14, 500 MW of power is flowing south from Canada to the U.S. In the WECC Base Case for heavy winter 2017-18, with the Energize Eastside project in place, 500 MW of power is flowing north to Canada, not 1,500 MW.

PSE and USE imply that it is the Columbia River Treaty that provides a Firm Commitment to deliver 1,500 MW of power to Canada. It is clear from reading numerous Treaty documents (e.g. the original treaty, the amendment to the treaty in 1999, and related documents) that the Treaty itself imposes no obligation on the United States to deliver Treaty Power to Canada. To the contrary, Canada has stated they do not want the Treaty Power delivered to Canada. Instead, PowerEx takes delivery of Canada's share of Treaty Power at the point of generation in the U.S. and delivers it for sale to U.S. entities. Canada finds it preferable to receive money for their share of Treaty Power rather than having the power delivered to Canada.

The reasonable assumption for this study is that no power will flow from the U.S. to Canada during a major winter weather event and simultaneous facility outages in the Eastside.

Appendix E

Regional grid capacity limitations

Most of the electrical generation facilities that serve the Puget Sound region are located east of the Cascade Mountains. The electricity they produce is transmitted to customers in the Puget Sound area through eleven major transmission lines known collectively as the “West of Cascades – North” (WOCN) transmission path.

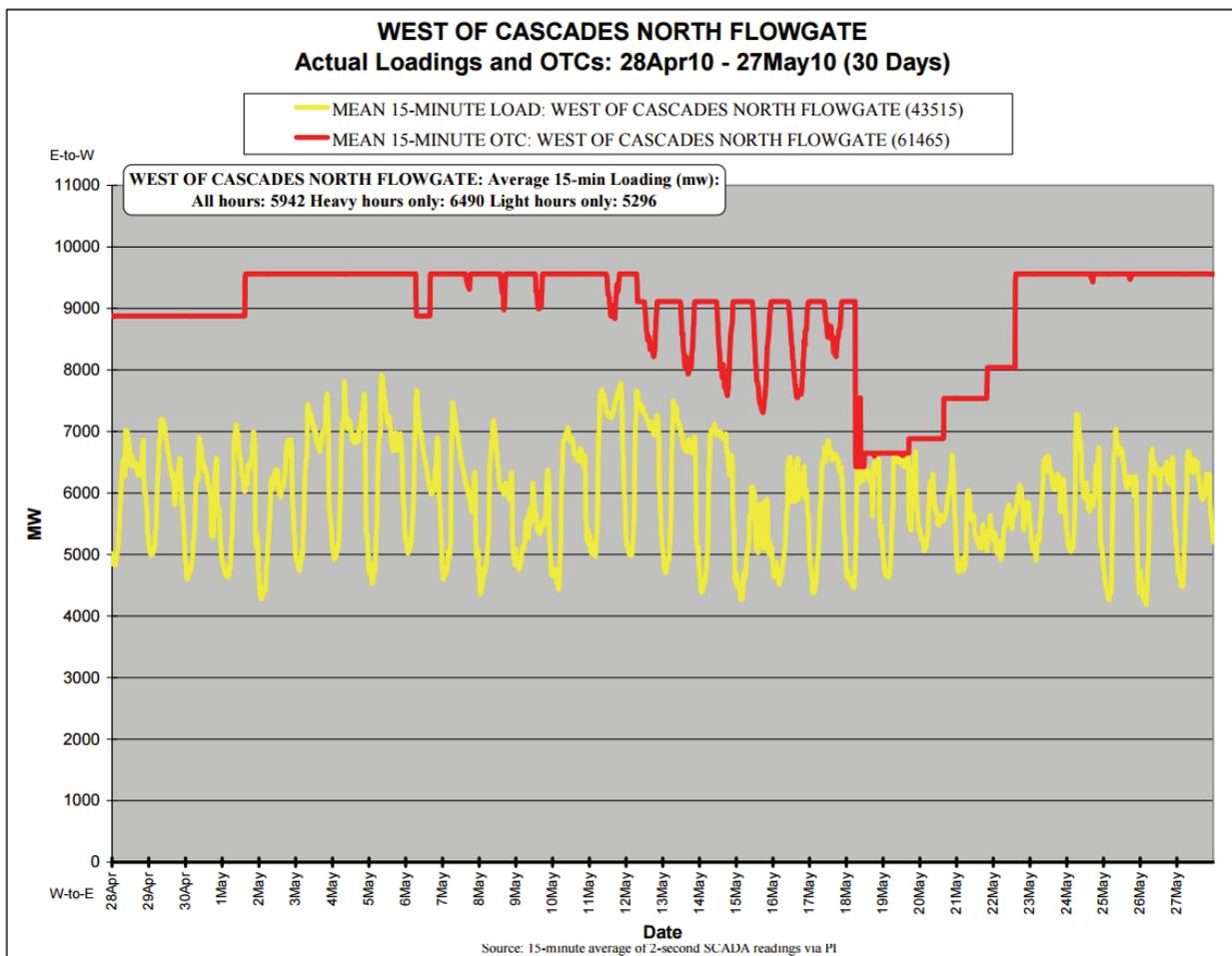


Figure 6: Chart from BPA shows load (in yellow) and maximum capacity (in red) for the WOCN path.

The exact transmission capacity of the WOCN path is confidential information which cannot be discussed in detail here. However, there is a report available on the web from the Bonneville Power Administration that discusses a problem that occurred on the WOCN path in May 2010.⁷ On page 31, the report includes a chart showing loads and capacities

of the WOCN path over a 30-day period. The load (shown in yellow) varies from 5000–7000 MW and the path capacity (in red) varies from 7000–9000 MW.

During a heavy winter usage scenario, the loads are likely to be higher than during relatively mild weather conditions in May. PSE’s assumptions for Energize Eastside would further increase the load. To deliver 1,500 MW to Canada, loads on the WOCN path would need to increase by approximately 1,000 MW. To make up for the loss of electricity that could have been generated by six local generation plants, an additional 1,400 MW must be transmitted on the WOCN path. In total, loads would increase by approximately 2,400 MW.

If the increased load exceeds the capacity of the WOCN path, grid operators and utilities would have to make adjustments like they did in May 2010. Some of these steps and consequences are described on page 40 of the BPA report:

“Many customers (e.g., TransAlta, Calpine, PSE, PGE) were not able to use low cost power purchases, and instead had to operate higher cost thermal projects that otherwise were idled or were out or planned for maintenance. Although there were multiple complaints regarding the ability to serve load, the basis for the complaints appeared to be economic or financial impacts.”

We feel that WOCN path capacity limits explain why the simulation software could not find a way to maintain voltage levels in the Eastside given PSE’s assumptions. We conclude that it is not reasonable to build local infrastructure to support these conditions if regional infrastructure cannot reliably serve the implied loads.

⁷ <http://pnucc.org/sites/default/files/BPAWOCNLessonsLearned.pdf>

Appendix F

Equipment ratings

Ambient temperature affects the capacity of electrical transmission facilities. Colder temperatures help avoid overheating. For this reason, it is industry standard practice to provide different ratings for summer and winter seasons.

It is also industry standard practice to allow higher loading of equipment, including transformers, during emergency events due to the fact that emergencies do not last long. Utilities can take advantage of the fact that transformers can safely handle brief over-peak conditions to reduce installation costs and maintain system reliability.

The WECC Data Preparation Manual requires transmission owners to provide the following ratings for its transformers:

- Summer Normal Rating
- Summer Emergency Rating
- Winter Normal Rating
- Winter Emergency Rating

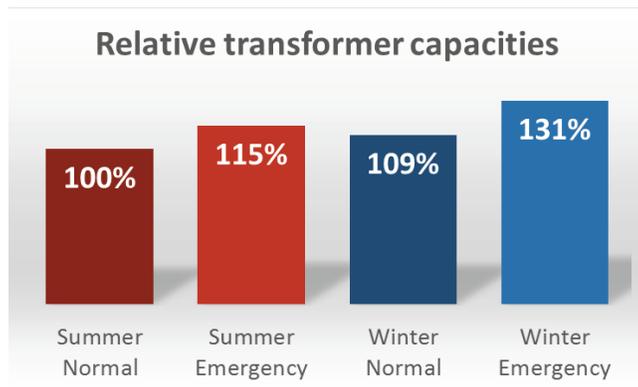


Figure 7: Ratings for different scenarios, normalized to Summer Normal rating.

PSE has indicated that the rating on the Sammamish and Talbot Hill transformers are approximately 352 MVA (Mega-volt amperes). According to the data that PSE provided to WECC, this is the Summer Normal Rating of these transformers. PSE has advised WECC that (a) its Winter Normal ratings are about 9% higher than Summer Normal, and (b) Winter Emergency Ratings are about 21% higher than Winter Normal Ratings.

When running the PSLF model, the run parameters must be set to point to the correct rating that has been provided in the data base. ⁸

In the N-0 analysis, our load flow studies used the winter normal rating which is 9% higher than the 352 MVA summer normal rating.

In the N-1-1 analysis, our load flow studies used the winter emergency rating that is 21% higher than the winter normal rating.

Appendix G

Summer load scenario

Most of the load flow modeling done by PSE and USE to justify Energize Eastside has been focused on a winter peak load scenario. Recently, PSE has mentioned reliability concerns in the summer to provide additional motivation to build Energize Eastside. So far, PSE has refused to provide input data and results for both winter and summer scenarios.

We briefly reviewed the WECC Base Case for heavy summer demand in 2019. The peak load on Eastside substations is 281 MW in this scenario. This is 30% lower than the total load for heavy winter demand in 2017–18 (402 MW). The drop in transformer ratings due to summer heat is only 9%, so this scenario should be significantly less stressful on PSE's infrastructure than the winter scenario. Rapid growth in air conditioning is a concern, but if there is a summer need, then rooftop solar in Bellevue and other cities will be helpful and should be encouraged. Further study is warranted.

Appendix H

Resumes

J. Richard Lauckhart **Energy Consulting**

J. Richard Lauckhart has 40 years of experience in power supply planning, electricity price forecasting and asset valuation. He began his career as a distribution engineer with Pacific Gas & Electric Co., and held various positions at Puget Sound Power & Light Co. (now Puget Sound Energy) in power supply planning, culminating as vice president of power planning.

For the last 12 years Mr. Lauckhart has performed consulting assignments related to power market analyses, price forecasting services, asset market valuation, integrated resource planning, transmission line congestion analysis, and management of strategic consulting engagements for clients in North America, including investor-owned and municipal utilities, independent power producers, and lenders.

Mr. Lauckhart received a bachelor of science degree in electrical engineering from Washington State University in 1971 and a masters degree in business administration from the University of Washington in 1975

Representative Project Experience

Black & Veatch ***September 2008 to October 2011*** ***Managing Director***

Mr. Lauckhart oversees wholesale electricity price forecasting, project revenue analysis, consults regarding wind integration matters electric interconnection and transmission arrangements for new power projects, and other related matters in the electric power industry. In addition, he heads Black & Veatch's WECC regional power markets analysis team.

WECC Power Market Analysis and Transmission Analysis, Henwood/Global Energy Decisions/Ventyx ***2000 - 2008*** ***Senior Executive***

Mr. Lauckhart oversaw wholesale electricity price forecasting, project revenue analysis, consulted regarding electric interconnection and transmission arrangements for new power projects, and other related matters in the electric power industry. In addition, he headed Global Energy's WECC regional power markets analysis team.

Lauckhart Consulting, Inc. ***1996 – 2000*** ***President***

Primary client - Puget Sound Energy (formerly Puget Sound Power & Light Company): Involved in power contract restructuring, market power analysis, FERC 888 transmission tariffs, and other matters. Testified at FERC regarding Puget's 888 tariff. Testified for Puget in June, 1999 arbitration with BPA regarding transmission capability on the Northern Intertie.

Northwest IPP

Under retainer with IPP from July 1996 through December 31, 1999. Involved primarily in merchant power plant development activities including permitting activity, owner's engineer identification, environmental consultant identification, water supply

arrangement, transmission interconnection and wheeling arrangements, gas pipeline arrangements, economic analysis, forward price forecasting, marketing, and related issues.

Levitan & Associates (Boston)

Participated in teams involved in electric system acquisition activities. Performed preliminary analysis for a major retail corporation regarding possible participation as an aggregator in the California deregulated electric market. Involved in the evolving discussions about deregulation in the state of Washington including participant in HB 2831 report and ESSB 6560 report.

Member of advisory task force for Northwest Power Planning Council study of generation reliability in the Pacific Northwest. Participating writer in a newsletter advocating electric deregulation in the state of Washington.

Puget Sound Power & Light Company

1991 – 1996

Vice President, Power Planning

Involved in all aspects of a \$700 million per year power supply for a hydro/thermal utility with a 4,600 MW peak and 2,200 aMW energy retail electric load. Included responsibility for a 22 person department involved in power scheduling (for both retail and wholesale power activity), power and transmission contract negotiation and administration, regulatory and NERC compliance, forward price forecasting, power cost accounting, and retail rate activity related to power costs. Activity included matters related to 650 MW of existing gas-fired, simple cycle combustion turbines. In addition, 660 MW of combined cycle cogeneration “qualifying facilities” were developed by others for Puget during this time frame. Detailed understandings of the projects were developed both for initial contractual needs and later for economic restructuring negotiations. Mr. Lauckhart was the primary person involved in developing Puget’s Open Access transmission tariff in accordance with FERC Order 888.

Puget Sound Power & Light Company

1986 – 1991

Manager, Power Planning

The company’s key person in developing (1) a WUTC approved competitive bidding process for administering PURPA obligations, and (2) a WUTC approved regulatory mechanism for recovery of power costs called the Periodic Rate Adjustment Mechanism (PRAM).

Puget Sound Power & Light Company

1981 – 1986

Director, Power Planning

The company’s key person in developing a power cost forecasting model that was customized to take into account the unique nature of the hydro generation system that exists in the Pacific Northwest.

Puget Sound Power & Light Company

1979 – 1981

Manager, Corporate Planning

Responsible for administering the corporate goals and objectives program.

Puget Sound Power & Light Company

1976 – 1979

Financial Planning

Improved and ran a computerized corporate financial forecasting model for the company that was used by the CFO.

Puget Sound Power & Light Company

1974 – 1976

Transmission Planner

Performed transmission engineering to assure a reliable transmission system.

Pacific Gas & Electric Company

1971 – 1974

Distribution Engineer

Performed distribution engineering to assure a reliable distribution system.

Other Relevant Experience

- Expert testimony for Montana Independent Renewable Generators related to avoided cost regulations and pricing filed February 2009 at the Montana PSC
- Expert Testimony for LS Power in the SDG&E Sunrise Proceeding regarding economics of in-area generation vs. the cost of transmission and imported power Spring 2007
- Expert Testimony for BC Hydro in the Long Term Resource Plan, February 2009 dealing with natural gas price forecasts and REC price forecasting
- Expert Testimony for John Deere Wind in a proceeding in Texas in November 2008 related to avoided costs and wind effective load carrying capability
- Expert Testimony for Two Dot Wind before the Montana commission regarding wind integration costs Spring 2008
- Expert Testimony in the BC Hydro Integrated Electricity Plan proceeding regarding WECC Power Markets. November 2006.
- Expert Testimony for Colstrip Energy Limited Partnership before Montana PUC regarding administration of QF contract prices. July 2006.
- Expert Testimony for Pacific Gas & Electric regarding current PURPA implementation in each of the 50 states. January 2006.
- Expert Testimony in CPUC proceeding regarding modeling procedures and methodologies to justify new transmission based on reduction of congestion costs (Transmission Economic Analysis Methodology – TEAM). Summer 2006.
- Expert Testimony for BC Hydro regarding the expected operation of the proposed Duke Point Power Project on Vancouver Island, January 2005
- Expert Testimony for PG&E regarding the cost alternative generation to the proposed replacement of steam generators for Diablo Canyon, Summer of 2004.
- Expert Testimony in an arbitration over a dispute about failure to deliver power under a Power Purchase Agreement, Fall 2004.
- Integrated Resource Plan Development. For a large investor-owned utility in the Pacific Northwest, Global Energy provided advanced analytics support for the development of a risk-adjusted integrated resource plan using RISKSYSM to provide a stochastic analysis of the real cost of alternative portfolios.
- Expert Testimony for SDG&E, Southern California Edison, and PG&E regarding IRPs, WECC markets and LOLP matters before the California PUC, 2003.

- Miguel-Mission Transmission Market Analysis-San Diego Gas & Electric. San Diego Gas & Electric retained Global Energy to oversee an analysis of the economic benefits associated with building the Mission-Miguel transmission line and the Imperial Valley transformer. Global Energy performed an analysis of the economic benefits of the Mission-Miguel line, prepared a report, sponsored testimony at the CPUC, and testified at the CPUC regarding the report.
- Valley-Rainbow Transmission Market Analysis-San Diego Gas & Electric. San Diego Gas & Electric also engaged Global Energy to analyze the economic benefits associated with building the Valley-Rainbow transmission line and to respond to the CPUC scoping memo that “SDG&E should describe its assessment of how a 500 kV interconnect, like Valley-Rainbow, will impact electricity markets locally, regionally, and statewide.” Global Energy analyzed the economic benefits of the Valley-Rainbow line, prepared a report, sponsored testimony at the CPUC, and testified at the CPUC regarding the report.
- Damages Assessment Litigation Support. Global Energy was engaged by Stoel Rives to provide damages analysis, expert testimony and litigation support in for its client in a power contract damages lawsuit. Global Energy quantified the range of potential damages, assessed power market conditions at the time, and provided expert testimony to enable Stoel Rives’ client to prevail in a jury trial.
- Expert Testimony, Concerning the Economic Benefits Associated with Transmission Line Expansion. Testimony prepared on behalf of San Diego Gas & Electric Company, September 2001.
- Expert Testimony, Concerning market price forecast in support of Pacific Gas and Electric hydro divestiture case, December 2000.
- Expert Testimony, Prepared on behalf of AES Pacific regarding value of sale for Mohave Coal project to AES Pacific for Southern California Edison, December 2000.
- Expert Testimony, Prepared on behalf of a coalition of 12 entities regarding the impact of Direct Access of utility costs in California. June 2002.

Mr. Lauckhart was Puget’s primary witness on power supply matters in eight different proceedings before the Washington Utilities and Transportation Commission.

Mr. Lauckhart was Puget’s chief witness at FERC in hearings involving Puget’s Open Access Transmission Tariff and testified for Puget in BPA rate case and court proceedings.

ROGER SCHIFFMAN

SUMMARY OF QUALIFICATIONS

Mr. Schiffman has 23 years of energy industry experience covering utility resource planning, electricity market evaluation, market assessment and simulation modeling; regulatory policy development; economic and financial analysis, and contract evaluation. Mr. Schiffman has worked with public and private utility companies on resource planning decisions, power plant retirement decisions, avoided cost determinations, and on power supply procurement activity. Mr. Schiffman has worked extensively with electric utility staff, power plant developers, regulatory personnel, investment bankers and other industry participants in both consulting and regulatory environments. Mr. Schiffman possesses extensive financial analysis skills, supported by thorough knowledge of financial, economic and accounting principles. He has a strong technical understanding of the electric utility industry and excellent analytical problem-solving skills, including quantitative analysis and computer modeling techniques.

EXPERIENCE

Principal, Black and Veatch Corporation, Inc., Sacramento, CA, March 2009 to October, 2015

- Initiated Integrated Resource Plan for the Virgin Islands Water & Power Authority. This project is a multi-faceted IRP, where detailed planning and potential siting impacts must be considered in the overall planning, due to geographic and topology limitations on the islands. Mr. Schiffman directed the analysis and playing the lead analytic role in assessing resource needs. This included directing the data gathering efforts, taking technical lead in completing production cost and financial modeling, and managing Black & Veatch's team of technical experts. Mr. Schiffman also developed a stakeholder process and gave multiple presentations before stakeholder and customer groups.
- Completed nodal market simulation and congestion study for a concentrating solar plant in Northern Nevada. This engagement includes a review of transmission system impact studies, power flow data and development of a PROMOD nodal simulation database to assess congestion likelihood for the project.
- Completed economic assessment of a large pumped storage project in Southern California, including development of energy market arbitrage, capacity market and ancillary services market revenue forecasts. Developed pro forma financial statements examining economics of project under different ownership and off-take agreement structures.
- Completed Integrated Resource Plan for Azusa Light & Water, a municipal utility in southern California. This project involved using Black & Veatch's EMP database and price forecast, specifying thermal and renewable resource options, and completing detailed market simulation and financial modeling to determine a preferred power supply plan for Azusa. A key focus of the study is to identify resource options to replace output from the San Juan 3 coal plant, which is scheduled to retire.
- Completed Integrated Resource Plan for Pasadena Water & Power, a municipal utility in southern California. This project involved using Black & Veatch's EMP database and price forecast, specifying thermal and renewable resource options, and completing detailed market simulation and financial modeling to determine a preferred power supply plan for Pasadena. The project also included reflection of key stakeholder input, and testing stakeholder driven

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EMAIL: ROGER_SCHIFFMAN@YAHOO.COM

policy proposals for advancing renewable resource procurement beyond state-mandated RPS levels. A key focus of the study is to identify resource options to replace output from the Intermountain coal plant, which is scheduled to retire.

- Completed generation reliability study for the Brownsville Public Utility Board. This study included directing the completion of detailed reliability modeling using GE-MARS, and evaluating loss-of-load probabilities for BPUB based on its existing system and based on the addition of a 200 MW ownership share in the combined cycle power plant being developed in Brownsville by Tenaska. The study also included detailed pro forma modeling of partial ownership of the combined cycle plant, and a financial and risk assessment presented to BPUB's Board of Directors, and also used to address rating agency questions about credit impacts of the new power plant. On behalf of Southern California Edison, completed nodal power price forecast and assessment of high voltage transmission upgrades and additions in Southern California. This project included an assessment of congestion, locational marginal pricing, transmission system losses, and economic impacts of adding new transmission facilities in WECC, with particular focus on Southern California. PROMOD IV was used to complete the nodal market analysis, and PROMOD simulation results were translated into GE-PSLF for more detailed transmission system modeling of power flow cases under a variety of supply and demand conditions throughout the year.
- Completed four projects focused on nodal market modeling in California, Arizona and Southern Nevada. These studies were used to assess congestion risk faced by solar and wind generation projects at the sites where each is being developed. Completed PROMOD IV dispatch and nodal analyses for each project, and developed risk assessments for generation curtailment risk. Also developed analyses of transmission system congestion along delivery paths for each project, and on key economic transmission paths in Northern and Southern California, transmission import paths into Southern California, and transmission paths in Southern Nevada.
- Completed resource and power supply planning/procurement project for confidential SPP energy supplier. Completed a competitiveness assessment of major electricity supplier in Nebraska, examining cost structure, net resource position, generation asset characteristics, transmission access and delivery options, and overall competitive positioning of SPP, MISO and MRO entities that have potential to provide wholesale electricity service in Nebraska. Worked collaboratively with client and a wholesale customer task force
- Completed due diligence analysis of portfolio of power supply assets to support bid development. The generators being sold were located in SPP, WECC, and the Northeast. The WECC asset is a qualifying facility, which required detailed representation and modeling of the California PUC Short-Run Avoided Cost tariff and pricing formula. One of the SPP assets is also a qualifying facility, which required detailed analysis of the steam load and interaction between joint power and steam production. Completed modeling analysis and risk assessment of power supply agreements, developed revenue forecasts for each power plant, and completed merchant plant analysis of plant operations after PPA expiration.
- On behalf of a municipal utility client, developed database of renewable energy resource bids solicited through an RFP process, developed assessment of delivery terms and transmission tariffs associated with power delivery from distant resources, and completed bid screening analysis of 240 separate bids/pricing options.
- Completed PROMOD IV dispatch analysis and economic assessment of 6,000 MW portfolio of coal and natural gas-fueled resources operating in the Midwest ISO market region. Developed expected operations, cost, market sales and revenue forecasts for portfolio assets,

under several market scenarios. Prepared Independent Market Report for potential use in Offering Memorandum.

- Completed detailed review of California ISO ancillary services markets, and opportunity for renewable energy and energy storage markets to participate in those markets. Analysis included assessment of day-ahead, hour-ahead, and real-time market operation.
- Completed dispatch modeling and power supply planning study examining construction of a pumped storage hydro project in Hawaii. The evaluation included assessments of project revenue in energy, ancillary services, and capacity markets in Hawaii, expected dispatch and operation of the pumped storage project, and comparison of long-term power supply plans with and without addition of the pumped storage project.
- Completed deliverability and congestion analysis of wind energy resources being located in California. Developed nodal market simulations, and examined locational marginal price differences, congestion components, and transmission line loadings of facilities impacted by the wind assets being studied.
- Completed detailed financial and dispatch modeling (deterministic and stochastic) of energy storage project being developed in Southern California, to create dispatch profile and estimated long-term project value of the facility. The evaluation included assessments of project revenue in energy, ancillary services, and capacity markets in Southern California.
- Completed dispatch analysis and financial modeling of pumped storage hydro project in Colorado, for use in regulatory proceedings. The evaluation included assessments of project revenue in energy, ancillary services, and capacity markets in Colorado.
- Completed nodal power price forecast and assessment of high voltage transmission upgrades and additions in Southern California. This project included an assessment of congestion, locational marginal pricing, transmission system losses, and economic impacts of adding new transmission facilities in WECC, with particular focus on Southern California. PROMOD IV was used to complete the nodal market analysis, and PROMOD simulation results were translated into GE-PSLF for more detailed transmission system modeling of power flow cases under a variety of supply and demand conditions throughout the year.
- Completed PROMOD IV dispatch and economic analysis of Lodi Energy Center, with focus upon expected dispatch of the project, and its fit into the overall power supply portfolio of a Southern California Municipal Utility.
- Completed PROMOD IV dispatch analysis of a 100 MW biomass project in Florida, with focus upon expected dispatch and market revenue for the project in Florida wholesale power markets. Prepared Independent Market Report for use in financing construction of this project.
- Completed PROMOD IV market price forecasts and detailed analyses of power markets in all North American regions, including hourly energy price forecasts, annual capacity price forecasts, and detailed assessment of supply/demand conditions and generator dispatch. The assessments included forecasts of renewable energy development in each region/submarket, forecast greenhouse gas regulation, and economic assessment of fossil and renewable energy technologies.

Vice President, Ventyx, Inc., Sacramento, CA, June 2007 to March 2009

- Managed project and led analysis for consortium of upper Midwest utilities focused on developing plans for long-term transmission expansion to ensure reliability in the region and to accommodate economic transfer of large-scale wind-based electricity generation. This project examined congestion, reliability and economic benefits associated with large-scale wind generation expansion in the upper Midwest, and accompanying needs for transmission system expansion. Evaluation was completed on both nodal and zonal basis.
- Assisted investor-owned utility in the upper Midwest in completing an economic transmission planning study consistent with FERC requirements. Provided guidance to client in establishing study framework, and in completing detailed technical evaluation of transmission upgrade projects. Provided assistance with stakeholder group interactions and debriefing.
- Conducted study for Western Area Power Administration examining economic impacts of wind project integration from new wind projects located on Native American lands. Worked with multi-party stakeholder group in completing study. Specific focus was upon power system modeling and economic evaluation of long-term costs and benefits of wind energy integration into the WAPA system.
- Developed projections of expected dispatch, revenue, and operating costs for new combined-cycle power plant under development in Southern California. Prepared financial projections under merchant plant and other likely economic scenarios. Completed evaluation of tolling agreement terms and conditions.
- Assisted Southern California energy supplier in completing due diligence analysis for investment and development of 300-500 MW wind generation project located in Central/Southern California. Reviewed due diligence documents and completed economic evaluation of expected revenue, operating costs and investment cash flows for the project at a range of capacities varying from 100 MW to 500 MW.

Director, Navigant Consulting, Inc., Sacramento, CA, April, 2000 to June, 2007

- Responsible for managing the price forecasting subpractice within Navigant Consulting's Energy Market Assessment group. Responsibilities included a wide variety of engagements focused on evaluating wholesale power market conditions. Completed market assessment and simulation studies of all North American regional power markets, including Canada and Mexico.
- Created and Developed NCI's PROSYM market simulation practice and capabilities in modeling WECC and Eastern Interconnected markets. Completed numerous market simulation and assessment engagements throughout the U.S. covering all North American market regions.
- With a team of consultants, assisting the California Energy Commission in defining and evaluating scenarios for its 2007 Integrated Energy Plan. Reviewing market simulation results from each of the scenarios and completing analysis of industry and consumer risks likely to be faced in California over the next decade (ongoing).
- Directed NCI's market simulation efforts as independent consultant to the State of California Department of Water Resources, leading to the successful underwriting of \$11 billion in bond financing and supporting the execution of power supply agreements aggregating to over 13,000 MW.

- Developed projections of lost revenue and operating profits due to construction delays at a large combined-cycle project in the Desert Southwest. Prepared evaluation of WECC power market conditions during the construction period for this project, and completed power market simulations used to measure likely dispatch, revenue and operating profits of the project during the construction delay period. Successfully presented and defended those estimates before an Arbitration Panel, resulting in a significant financial award for our client.
- Completed PJM Market simulations and led analytical support for recent financing of a large coal plant in PJM-West. Worked closely with investment banks and rating agencies in identifying and assessing cash flow risks to the project.
- Prepared carbon regulation risk assessment of a new coal plant being developed in Nevada, to evaluate long-term potential impacts on project costs. Evaluated ratepayer risks associated with this new project.
- Developed and maintained power market simulations to evaluate likely dispatch, costs, and spot market purchases and sales associated with the California Department of Water Resources purchased power contract portfolio. Results from these simulations have been used in each of the last five years to support CDWR's annual revenue requirement filing before the California Public Utilities Commission. Provide ongoing regulatory support to CDWR, including consultation and limited training of CPUC staff in power market modeling.
- Directed a number of nationwide market simulation and valuation engagements examining current market value of power plant portfolios owned by Calpine, Mirant, NRG and other independent power producers. Worked with bond investors to develop refined valuation estimates for subsets of each portfolio.
- Served on WECC's Power Simulation Task Force which was formed to assess available options for the WECC to procure, maintain and use a power market simulation database and model in its generation and transmission planning efforts. Participated in task force meetings where criteria were developed for selecting a simulation database and model, and assisted in evaluating proposals submitted to the WECC task force
- Performed power market simulations of Mexico, using NewEnergy Associates' MarketPower simulation model. Developed market price forecast and dispatch analysis of the Altamira II project under a variety of projected fuel market conditions. Results from these analyses were used by Senior Lenders to evaluate ongoing feasibility of the project under its financing terms. Annual updates were provided to the lenders.
- Assisted a California investor-owned utility in conducting RFP and in evaluating bids received for short-term and medium-term power supply contracts. Developed cost rankings, economic screening, risk assessment and preferred bid evaluations, and assisted the utility's planning and bid evaluation staff in presenting results to the company's senior management.
- Developed WECC market simulations and assessment of investment conditions for numerous clients used in feasibility analysis and financing support of new generation projects being developed in WECC markets. These analyses included separate evaluation of power market conditions in California, Mexico (Baja), Arizona, Colorado, Nevada, Oregon, Washington, British Columbia, and Alberta.
- Reviewed and verified long-term resource plans of a major investor-owned utility located in the Desert Southwest region. Conducted power market simulations of preferred and competing resource plans and developed relative ranking of results.

Senior Consultant, Henwood Energy Services, Inc., Sacramento, CA, 1998 to 2000

- Prepared numerous forecasts of wholesale market electricity prices using Henwood's proprietary market simulation tools. Drafted reports presenting price forecasts to consulting clients. Worked closely with clients and sponsors of new merchant power plants to provide customized market price forecasts and to serve individual client needs. Presented study results to clients and their constituents.
- Directed project evaluation and revenue forecast for major merchant power plant in Texas. Presented revenue forecast to investment bankers, and to several potential equity investors. Advised and worked with project developer to successfully obtain debt and equity financing for the project, which is currently under construction.
- Conducted economic study of market rules and entry barriers faced by developers of new merchant power plants in domestic electricity markets. Applied study results to specific conditions in Texas. Met with a variety of industry representatives in Texas including project developers, transmission service providers, power marketers, utility regulators and environmental regulators to gather market intelligence and develop study conclusions.
- Advised and worked with PricewaterhouseCoopers to perform economic evaluation and market simulations of proposed Purchase Power Arrangements under development in Alberta, Canada. The Power Purchase Arrangements are to be sold at auction in coming months. Prepared economic study of market power held by incumbent electricity suppliers in Alberta.
- Developed software and modeling tools to estimate investment cash flows and pro forma financial results for new merchant power plants. Developed Henwood approach for evaluating profitability of new market entrants and incorporating equilibrium amounts of new entry in its market studies.

Senior Financial Analyst, Public Service Commission of Wisconsin, Madison, WI, 1990 to 1998

- Developed policy proposals for restructuring wholesale and retail electricity markets. Evaluated competing policy proposals for impacts upon consumers and upon electrical system operation. Drafted formal electricity industry restructuring policy adopted by the Wisconsin Commission.
- Developed policies for addressing wholesale and retail market power in Primergy and Interstate Energy Corporation merger cases. Evaluated feasibility and corporate finance implications of asset divestiture and spin-off options for mitigating market power.
- Presented evaluation of proposed electric utility merger legislation to subcommittee of Wisconsin legislature. Advised individual legislators on merger policy.
- Developed policy proposal and draft legislation for reforming power plant siting law and for allowing development of new merchant power plants in Wisconsin.
- Directed industry-wide efforts to revise the PSCW generation competitive bidding procedures. Conducted workshops on proposed revisions for utility and other industry participants. Drafted policy reforms adopted by the Wisconsin Commission.
- Conducted primary economic and engineering analysis of power plant proposals submitted in generation competitive bidding cases. Prepared financial analyses of key contract terms and risks. Evaluated economic and engineering characteristics of bid proposals using production

cost and system expansion computer modeling. Recommended preferred projects to Wisconsin Commission.

- Completed numerous financial analyses of new stock and bond issuances by Wisconsin investor-owned utilities to evaluate investment risks and impacts upon the corporation. Drafted formal administrative orders authorizing each issuance.

Research Assistant, University of Wisconsin, Madison, WI, 1989-1990

- Co-authored and provided research support for study of consolidation and mergers in the electric utility industry.

EDUCATION

University of Wisconsin-Madison

- Graduate Studies toward MS-Finance, September 1988 - May 1990.
- Bachelor of Business Administration, Finance, Investment and Banking, May 1988.
- Curriculum concentrated heavily upon financial economics, with additional emphasis upon economics, mathematics, and accounting.

PUBLICATIONS

Electric Utility Mergers and Regulatory Policy, Ray, Stevenson, Schiffman, Thompson. National Regulatory Research Institute, 1992.

The Future of Wisconsin's Electric Power Industry: Environmental Impact Statement, co-author, Public Service Commission of Wisconsin, October 1995, Docket 05-EI-114.

Report to the Governor on Electric Reliability, co-author, Public Service Commission of Wisconsin, Summer 1997.

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Public Service Commission of Wisconsin, Docket 6630-UR-104, Wisconsin Electric Power Company Rate Case, 1990, "Rate of Return on Equity, Cost of Capital and Financial Condition."

Public Service Commission of Wisconsin, Docket 6690-UR-106, Wisconsin Public Service Corporation Rate Case, 1991, "Rate of Return on Equity, Cost of Capital and Financial Condition."

Public Service Commission of Wisconsin, Docket 4220-UR-105, Northern States Power Company (Wisconsin) Rate Case, 1991, "Rate of Return on Equity, Cost of Capital and Financial Condition."

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Public Service Commission of Wisconsin, Docket 05-EI-112, Investigation on the Commission's Own Motion Into Barriers to Contracts Between Electric Utilities and Non-Utility Cogenerators and Certain Related Policy Issues, 1992, "Contract Risk in Long-Term Purchase Power Arrangements."

Public Service Commission of Wisconsin, Docket 3270-UR-106, Madison Gas and Electric Company Rate Case, 1993, "Rate of Return on Equity, Cost of Capital and Financial Condition."

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Public Service Commission of Wisconsin, Docket 6680-UR-108, Wisconsin Power & Light Company Rate Case, 1993, "Rate of Return on Equity, Cost of Capital and Financial Condition."

Public Service Commission of Wisconsin, Docket 4220-UR-107, Northern States Power Company (Wisconsin) Rate Case, 1993, "Rate of Return on Equity, Cost of Capital and Financial Condition."

Public Service Commission of Wisconsin, Docket 6630-CE-202, Wisconsin Electric Power Company Auburn to Butternut Transmission Line Case, 1994, "Economic Cost Comparison of Transmission Upgrade and Distributed Generation Wind Turbine Project."

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Public Service Commission of Wisconsin, Docket 6630-UM-100/4220-UM-101, Wisconsin Electric Power Company/Northern States Power Company Merger Case, 1996, "Market Power Remedies; State/Federal Jurisdictional Issues."

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North Dakota Public Service Commission, Docket No. PU-399-01-186, Montana-Dakota Utilities Co., 2000 Electric Operations Annual Report (Commission Investigation of Excess Earnings), February, 2002, "Wholesale power market conditions in the upper midwest, and the impact on the level and profitability of off-system sales for Montana-Dakota Utilities Co."

California Public Utilities Commission, Rulemaking 02-01-011 Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-0. June, 2002. "Rebuttal Testimony of Roger Schiffman on behalf of the California Department of Water Resources: Market modeling issues."

Washington DC Arbitration Panel, "Estimate of lost energy sales and lost revenue due to construction delay" for two new combined cycle projects that were built in Michigan and Arizona markets, January-February, 2006.

Attachment 4

March 26, 2016

Bellevue City Council
450 110th Ave. NE
P.O. Box 90012
Bellevue, WA 98009

Dear Mayor Stokes and Councilmembers,

On March 23, PSE sent you a letter criticizing the Lauckhart-Schiffman Load Flow Study and making other inaccurate statements regarding needs and requirements for the company's Energize Eastside project. As the author of the Lauckhart-Schiffman report and a 22-year veteran of Puget Power, the citizen group CENSE asked me to respond.

There are three main areas of disagreement:

1. We disagree that PSE is required to support the export of 1,500 MW to Canada.
2. We disagree with the characterization of the project as upgrading the "backbone of the Eastside."
3. We disagree that other studies have sufficiently addressed the need for the project.

I will cover these points and some of the other lesser disagreements below. I have highlighted and numbered specific questions for PSE that we ask PSE to answer.

Where does the requirement to export 1,500 MW to Canada originate?

PSE's letter states, "Flows to and from Canada for planning purposes are set by the regional planning authority (ColumbiaGrid) in conjunction with other regional utilities."

This statement is incorrect for the following reasons:

- ColumbiaGrid does not have the authority to require exports of this magnitude at all times of year and under all operating conditions. While ColumbiaGrid has written that NERC Reliability Standards require 1,500 MW to flow to Canada, there is no evidence that such a requirement exists in the NERC Reliability Criteria. There is also no requirement in ColumbiaGrid's Planning and Expansion Functional Agreement.

1. We challenge PSE or ColumbiaGrid to cite a specific requirement to transmit 1,500 MW to Canada in the NERC Reliability Criteria or PEFA.

- CENSE asked FERC to require ColumbiaGrid to run PSE's load flow studies in a transparent fashion with stakeholder input. FERC rejected this request, because PSE did not submit the project as a part of a Regional Transmission Plan, therefore FERC does not have jurisdiction over it. If FERC does not have jurisdiction, neither does ColumbiaGrid. Neither of these organizations can require PSE ratepayers to pay for a line that supports delivery of 1,500 MW to Canada, when smaller and less expensive solutions are possible without this export requirement.
- Any "Firm Commitment" to move 1,500 MW of power to Canada requires a written contract. PSE has refused to show any contract demonstrating such a requirement exists, but instead

referred us to BPA. BPA is the only utility in Washington State that has power lines that can transmit power to Canada. In response to a Freedom of Information Act request, BPA has stated it has no such contract.

2. We challenge PSE, ColumbiaGrid, or BPA to produce a contract showing a Firm Commitment to deliver 1,500 MW to Canada.

- The Western Electricity Coordinating Council (WECC) provides Base Cases for utilities and stakeholders to use for load flow studies. The WECC Base Case for heavy winter consumption in 2018 specifies only 500 MW flowing to Canada. PSE does not dispute this fact. PSE has stated that it uses WECC Base Cases as the basis for its studies. If PSE ran a load flow study for the winter of 2018 that had 1,500 MW flowing to Canada, then engineers running the simulation must have increased the flow to Canada by 1,000 MW.

3. We challenge PSE to prove that they did not increase flow to Canada relative to the WECC Base Case.

- Lauckhart and Schiffman tried to duplicate PSE’s work by starting with the WECC Base Case for heavy winter consumption in 2018. We modified the Base Case by increasing flow to Canada from 500 MW to 1,500 MW. The simulation identified a problem with lines that carry electricity across the Cascade mountain range from central Washington to the Puget Sound region. Unless PSE has a specific solution to this problem, it invalidates the assumptions that underlie the Energize Eastside project.

4. We challenge PSE to explain how they solved issues that arise from their scenario with the electrical limits of the “West of Cascades-North” transmission lines.

- We have asked for PSE’s study data so we can determine whether PSE solved this problem or simply ignored it. PSE has refused to share the data. **Until PSE provides these files, PSE’s load flow studies should not be considered adequately vetted for purposes of approving or permitting the Energize Eastside project.**

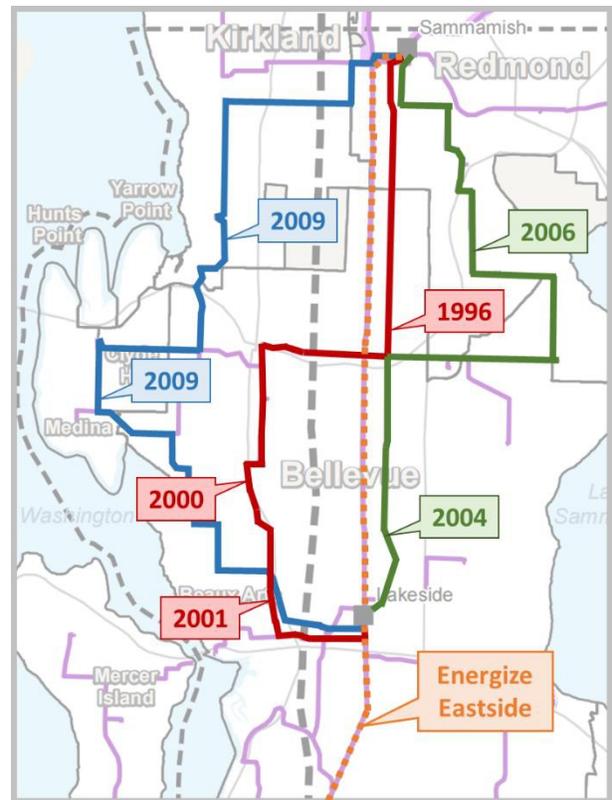
Is the project needed to upgrade the “backbone of the Eastside?”

PSE describes the Energize Eastside transmission lines as the “backbone of the Eastside” that hasn’t been upgraded for 60 years. This is a marketing ploy that distorts the truth. These transmission lines might have been a backbone some decades ago when they were the only north-south transmission lines through Bellevue. However, it is my understanding that in the last 20 years, PSE has constructed numerous transmission line segments, completing three additional north-south transmission lines through Bellevue. These are shown with dates of completion in the map shown here that was included in the Draft EIS.

The red transmission line between the Lakeside and Sammamish substations was completed in 2001. The green line was completed in 2006, and the blue line was completed in 2009. This represents a 250% increase in north-south capacity during the last 15 years. PSE has not been sitting on its hands, as its public statements imply.

These new lines provide enough capacity and redundancy that PSE says the two Energize Eastside lines could be removed for 9 months of the year with no impact on system reliability. In fact, I believe they could be removed entirely if they weren’t needed to transmit regional electricity during periods of high local demand.

The transmission of regional electricity is primarily an economic transaction, not a reliability requirement. These transactions benefit BPA, which receives income from such transfers. To the extent that this project benefits regional transmission capacity, BPA should be contributing funds to the project. The burden should not be placed solely on PSE’s ratepayers.



Did Lauckhart-Schiffman study stresses correctly?

PSE faults Lauckhart-Schiffman for reviewing “only limited N-0 and N-1-1 contingencies” rather than “variations of N-0, N-1, N-1-1, and N-2.” This statement is incorrect. Our analysis evaluated N-0, N-1 and N-1-1 contingencies. For this type of study an N-2 contingency is the same as an N-1-1 contingency. Further, these contingencies are irrelevant until we address the fundamental questions of whether 1,500 MW must be exported to Canada and whether the regional grid can handle that.

Did Lauckhart-Schiffman use correct growth projections?

PSE is vague about how they calculate a 2.4% annual rate of demand growth based on significantly lower rates of population and economic growth for the Eastside. PSE frequently makes the case they repeat in their letter, “Projections ... show a 2.4% growth rate for the Eastside – growth you can see

when you look out your window or walk down the streets of Bellevue.” PSE is using a qualitative argument, when we want quantitative confirmation. No independent consultant has independently verified the accuracy of PSE’s projections.

Lauckhart and Schiffman calculated the rate of growth from data PSE provided to WECC. By comparing the numbers PSE provided for loads on Eastside substations in the 2014, 2018, and 2020 WECC Base Cases, we calculated a growth rate of 0.5%.

5. We challenge PSE to explain their methodology leading to a 2.4% growth rate. We further challenge PSE to dispute the methodology used by Lauckhart-Schiffman to estimate future growth. Both methods should be reviewed by qualified experts.

Did Lauckhart-Schiffman study local generation plants correctly?

PSE’s letter says, “It doesn’t matter which generators are turned on or off when analyzing problems with the Eastside transmission delivery system.” We disagree. These generators might not directly serve Eastside load, but turning them off forces more power to flow through the transformers that PSE says are overloading in its scenario. If the generators don’t matter, PSE shouldn’t object that we turned them on in the Lauckhart-Schiffman study (just like was done in the WECC Base Case).

One fact is beyond dispute. Turning off 1,400 MW of generation in the Puget Sound area would require that amount of electricity to be imported from central Washington (since PSE insists that it can’t come from Canada). We believe that the transmission lines carrying electricity from central Washington do not have sufficient capacity to deliver that additional power along with 1,500 MW to Canada. Once again, this is an unrealistic scenario.

6. We challenge PSE to cite standards that require them to turn off 6 local generation plants at the same time they are serving peak demand with an N-1-1 contingency.

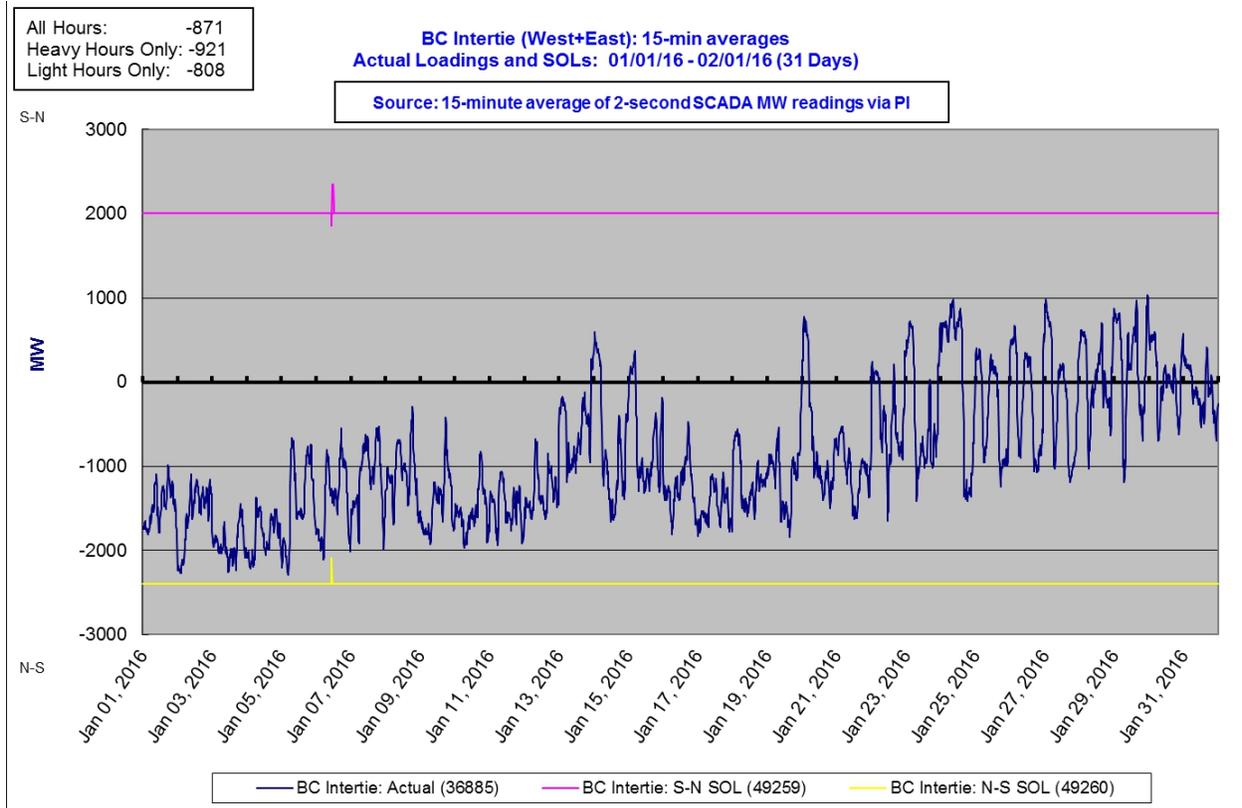
What criteria should be used in planning?

PSE says, “Lauckhart and Schiffman are making an observation regarding how an electric system operator may potentially operate the system in an emergency situation, which is irrelevant to planning.” This misstates our objection. We say that the system cannot be operated in the scenario PSE is proposing without causing blackouts in the Puget Sound Region. It is reasonable and prudent to consider how grid operators would respond in that scenario. PSE argues that it is acceptable to justify their plan for the Eastside using a scenario that would cause blackouts elsewhere in the region.

Do other studies prove the need for Energize Eastside?

PSE likes to quote the conclusion of the study performed by Utility System Efficiencies, while ignoring the most stunning finding of the USE report. On page 65 of that report, USE found that 4 of the 5 overloads on PSE’s system disappear if electricity exports to Canada are reduced. The remaining overload is so minor that it could easily be remedied with a relatively inexpensive upgrade to a single transformer or simply by turning on more Puget Sound Area generation.

PSE will argue that reducing power flow to Canada is not an option. Let's test that theory. In January 2016, the Puget Sound region had a couple of weeks of very cold weather. Was BPA transmitting 1,500 MW to Canada during this time? We can check a publicly available website maintained by BPA to find out:



The dark blue line shows energy transfers between the Puget Sound and British Columbia updated every 15 minutes during the month of January 2016. When the line is below the axis, electricity is flowing from Canada to the US, as it did for most of the first three weeks in January. As temperatures warmed, electricity began flowing back and forth between the two countries (but still mostly southward).

This graph is significant, because energy flowing from Canada reduces stress on the transformers that PSE says are vulnerable to overloads during heavy winter peak demand. There is no evidence during the past decade that large amounts of electricity flow northward during very cold winter weather. If PSE says there is a contractual obligation to transmit large amounts of electricity to Canada at all times and under all conditions, why wasn't this done in January 2016?

7. We challenge PSE or BPA to provide examples of when 1,500 MW was transferred to Canada when temperatures in the Puget Sound region were lower than 23° F, as stipulated in PSE's *Energize Eastside Needs Assessment*.

Summary

We repeat our questions and challenges here to provide a clear record of what we're asking:

1. We challenge PSE or ColumbiaGrid to cite a specific requirement to transmit 1,500 MW to Canada in the NERC Reliability Criteria or PEFA.
2. We challenge PSE, ColumbiaGrid, or BPA to produce a contract showing a Firm Commitment to deliver 1,500 MW to Canada.
3. We challenge PSE to prove that they did not increase flow to Canada relative to the WECC Base Case.
4. We challenge PSE to explain how they solved issues that arise from their scenario with the electrical limits of the "West of Cascades-North" transmission lines.
5. We challenge PSE to explain their methodology leading to a 2.4% growth rate. We further challenge PSE to dispute the methodology used by Lauckhart-Schiffman to estimate future growth. Both methods should be reviewed by qualified experts.
6. We challenge PSE to cite standards that require them to turn off 6 local generation plants at the same time they are serving peak demand with an N-1-1 contingency.
7. We challenge PSE or BPA to provide examples of when 1,500 MW was transferred to Canada when temperatures in the Puget Sound region were lower than 23° F, as stipulated in PSE's *Energize Eastside Needs Assessment*.

Sincerely,

Richard Lauckhart
CENSE consultant

Cc: Booga Gilbertson, PSE
Brad Miyake
Kate Berens

Attachment 5

The backstory: What is truly motivating PSE to try to build Energize Eastside?

To: City staff and council

From: Rich Lauckhart

Introduction

As you may already know, I am an energy consultant who spent the bulk of my career working for Puget Power (PSE's predecessor) as vice president of Power Planning. It was my job to oversee the permitting and construction of many kinds of projects in the Puget Sound region including high voltage transmission lines and nuclear power plants.

What you may not know is that I also hold an M.B.A. in Finance. During my time at Puget Power as well as at other firms, I had great exposure to not only the technical side of power planning, but also to the business side of each project. I know that most customers assume that a company that provides a basic necessity such as electricity is just "trying to keep the lights on" and that there is a lot of inherent trust in power companies. However, both from my long experience in the industry and the multitude of news articles from across the country, it's no secret that privately-held, for profit power companies function just like any other for-profit business. They seek to turn a profit. This is not in and of itself a bad thing.

However, there are too many recent examples of when power companies across the U.S. have attempted to get an unnecessary project built in order to get the guaranteed profit from the state, and I feel that PSE's Energize Eastside is yet another example of this. In the case of Energize Eastside, it is the "perfect storm" for this type of attempt for four reasons. One, Washington state has very outdated regulations compared to other states that incentivize power companies to build big transmission projects rather than invest in smarter technologies currently being used across the U.S. Two, there is remarkably little oversight to PSE's major projects before they get built. In the case of Energize Eastside, this billion-dollar, eighteen-mile project has the potential to be built without any prior vetting or review by any state regulators - only a permit from four city councils. The project gets approved into the rate base after it is built. Three, Washington offers a generous rate of return of 9.8% on the lifetime of the project. In the case of Energize Eastside, that means over \$1 billion for PSE's Canadian and Australian investors. This is a huge incentive. Lastly, both myself and CENSE.org have provided compelling evidence that Energize Eastside is not needed. Yet Puget Sound Energy (PSE) continues to push to build the project. Why would PSE want to build the Energize Eastside project if it is not needed?

This paper discusses these points.

Background

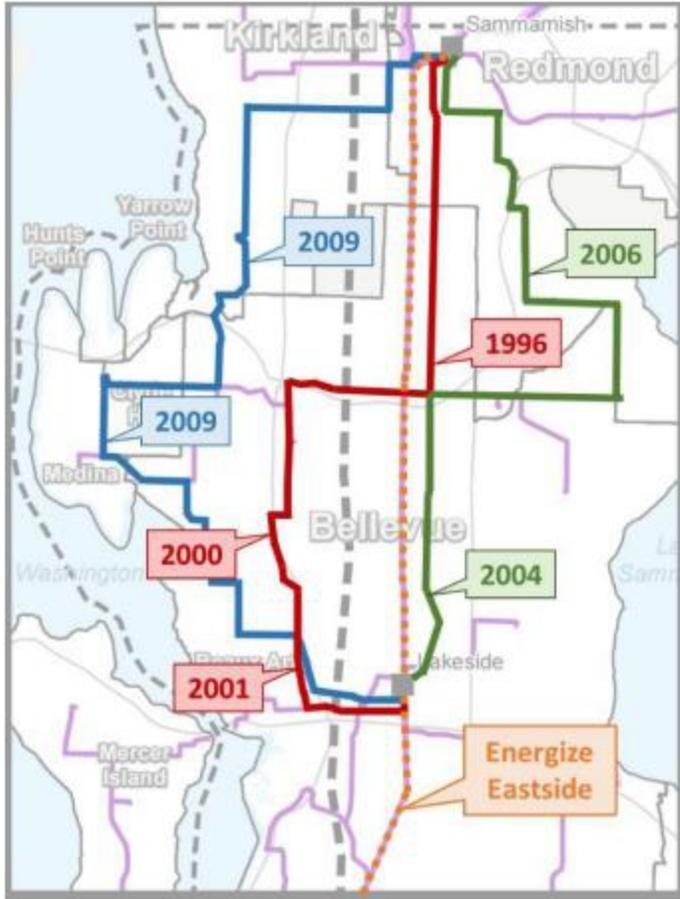
For most of its history, Puget Sound Energy (PSE) had publicly traded common stock. Shareholders elected representatives to serve on PSE's Board of Directors. The board members hired a CEO to run the company, and relied on the CEO to make day-to-day decisions. In this way, PSE was accountable to its shareholders, many of whom lived in PSE's service territory.

This all changed in 2009, when an Australian investment bank named Macquarie purchased all of the company's common stock. The total cost of the acquisition was \$7.4 billion. It was and still is highly unusual for a foreign-owned company to own a U.S. utility. Upon purchase, Macquarie stated its intention was to invest an additional \$5 billion in the company by building new infrastructure. In so doing, Macquarie planned to collect the guaranteed 9.8% rate of return on infrastructure investments that is allowed by PSE's regulator, the Washington Utilities and Transportation Commission (WUTC).

However, several unforeseen developments thwarted Macquarie's plans. First, shortly after the acquisition was announced in 2007, the recession reversed the trend of increasing energy consumption. Second, new technology and more focused conservation efforts continued to reduce electricity and natural gas consumption even as population growth and economic activity rebounded in the Puget Sound region. Third, a portion of PSE's service territory was converted to Public Utility District (PUD) ownership and service.

Like any profit driven corporation, Macquarie likely pondered what projects they could pursue to bolster PSE's sagging revenues. The 18-mile double circuit 230 kV transmission line running through the Eastside probably looked like a good candidate. For a number of years PSE had considered installing a new 230kV to 115 kV transformer at the Lakeside substation, which would have required building new 230kV lines between Talbot Hill and Lakeside and between Sammamish and Lakeside. However, every time this was studied it was determined that other less costly infrastructure projects were preferable to meet the growing loads on the Eastside.

But when Macquarie was looking for high cost new infrastructure projects, it appears that this older plan was picked up off the shelf and dusted off. The original two 115 kV lines were built almost 50 years ago, and I believe that PSE felt it would be easy to convince local city councils to support the new 230 kV plan by making it sound like a simple "upgrade" to an "old line" which is exactly the language they have chosen in their ads. The "Energize Eastside" project was born, ignoring the reality that the original twin eighteen-mile 115 kV lines had been augmented with many new 115 kV lines in recent years (see figure below). In essence, the original twin 115 kV "backbone" lines have been turned into a robust "network" of 115 kV lines. The eighteen-mile twin 115 kV line that follows the proposed path of Energize Eastside ceased being a "backbone" decades ago.



Normally, the technical need for a transmission line would be studied by PSE’s in-house transmission experts. In my many years at Puget Power, we only used our own in-house transmission experts since they knew our area’s grid the best. However, PSE instead hired Quanta, a consulting firm based in North Carolina. I could not find any basis that Quanta has prior experience with the Northwest power grid, but they have done quite a bit of work for Macquarie in other areas of the country where Macquarie had made investments.

As I describe in detail in my other paper, “Setting the Record Straight on Energize Eastside’s Technical Facts”, I believe that in order to make the project data work in PSE’s favor, Quanta made several changes to the core data that PSE reports to federal energy agencies and made a number of questionable assumptions that go beyond normal industry practice. As I also explained in my other paper, when I tried to duplicate Quanta’s results and implement those same changes to the core data, I found that the Quanta’s assumptions caused significant problems for the entire power grid, not just the Eastside. When asked about these problems, PSE refused to provide any data or technical explanation to refute my findings.

In the two decades that I worked for the company, PSE worked closely with the communities and did a good job of supplying reliable power to their customers. I never witnessed a project that put forth without a solid, demonstrated need. However, based on the facts surrounding PSE’s highly questionable load flow

study and the overall obvious lack of demonstrated technical need for this project, I believe that PSE's main goal with Energize Eastside is to increasing profits for its Australian and Canadian investors. There is simply no evidence of a technical need for this project. Energize Eastside will be extremely expensive for all of PSE's 1.1 million customers, it won't measurably increase reliability, and it will damage the environment. Again, as I mentioned at the outset of this paper, this is unfortunately not an unusual or isolated example in the present-day U.S. power grid.

Until PSE provides real, technical evidence in the form of the load flow data that shows why Energize Eastside is necessary, I must conclude that it is not.

New Ownership of PSE in 2009

In 2009 a consortium formed by Macquarie Infrastructure, the Canada Pension Plan Investment Board, the British Columbia Investment Management Corp. purchased all of the common stock of PSE.⁴

Who makes the decisions for PSE after this purchase?

That answer can be found in a filing made in 2007 with the Washington Utilities and Transportation Commission (WUTC) and in a filing made in 2016 with the Federal Energy Regulatory Commission (FERC).

- In the December 2007 filing with the WUTC, the ownership and control of PSE under Macquarie's coordinated purchase of PSE stock, a very complicated picture of ownership and control of PSE was presented. See attachment 1. However, for all practical purposes, it is Macquarie who makes decisions for PSE.
- In the 2016 filing with FERC, Macquarie Energy stated that Macquarie Group Limited ("MGL") maintains ownership and control of PSE.⁵

The important result of the 2009 change in ownership and control of PSE is that for all practical purposes, since 2009, Macquarie makes the decisions on PSE matters.

Why did Macquarie (and partner investment firms) want to purchase all of the stock of PSE?

That answer can be found in a statement made by Christopher Leslie, chief executive of Macquarie Infrastructure Partners. He stated:

*"We don't have employees. We're not the neighboring utility. Combining work forces and eliminating redundancies is not the story. **Our interest is to grow the business.**"⁶*

These investors have access to significant funding that they planned on using to "grow PSE's business." In fact, the investors stated they were committed to investing \$5 billion in new PSE infrastructure. This is no small amount given that the total price paid by the investment group to purchase PSE was \$7.4 billion

⁴ <http://www.pugetenergy.com/pages/news/011609.html>

⁵ See July 14, 2016 filing at FERC made by Macquarie Energy in Docket No. ER16-2198

⁶ <http://www.mi-reporter.com/news/35017809.html>

dollars.⁷

In this paper I will use the term “Macquarie” to indicate the entity that has ownership and control of PSE.

Why would this investment group want to invest \$5 billion in new infrastructure in PSE’s system?

It is standard practice that investment firms like Macquarie are trying to find investments that give them a good rate of return. In the case of PSE, the WUTC grants a 9.8% return on new investments. This 9.8% return is a very attractive rate of return compared to the return that the investment firms could get elsewhere. So, investing \$5 billion at a 9.8% rate of return is a great investment opportunity. The only catch is that investors only get this return if they can find infrastructure projects that can be shown needed to meet reliability criteria. This determination is made by the WUTC after the project is built.

But what if there is no justification for making \$5 billion of new investment in PSE?

As mentioned earlier in this document, there is ample evidence of utilities across the U.S. attempting to build infrastructure projects that, in the end, cannot be justified. Time and time again, the ultimate goal was to get the generous rate of return offered by the state. They will often go to great lengths to get their projects justified.

Why are transmission lines the most lucrative form of investment for PSE?

Washington State has regulations for utilities that offer the 9.8% rate of return on large scale transmission projects. By contrast, new investments in generation (new power plants) or Demand Side Management (DSM, which are programs that reduce the load and/or increase conservation at the customer level) are somewhat problematic for Macquarie’s and PSE’s goal of achieving a guaranteed profit. This is because the WUTC competitive bidding rule requires PSE to go out for competitive bids for third party entities that can provide the needed generation or DSM for PSE. The WUTC closely monitors this competitive bid activity to be sure that PSE selects the cheapest option. If a third-party entity is chosen, then that party makes the investments needed and PSE will generally pay the third party an ongoing fee. By doing this, PSE is not allowed to include these new projects in the PSE rate base and there is no ability to make the desired 9.8% return on investment. However, there is no competitive bidding process for new transmission and distribution projects.

Another reason why Macquarie and PSE are so focused on building transmission lines is that Washington’s regulations have not been updated much since the 1960s and do not provide anywhere near as generous of an incentive for smarter, 21st century technologies. Many other states, including Oregon, California, Texas, and New York have updated their regulations to incentivize utilities to invest in smarter technologies such as demand side management, more aggressive conservation, and efficiency. Washington is lagging behind the times in this respect.

⁷ <http://www.pugetenergy.com/pages/news/011609.html>

As a result, Macquarie and PSE closely monitor their service territory to see what investments may make sense. Does this mean that every new, major transmission project is unfounded? Not necessarily. But it does mean that from a business perspective, PSE's first choice is a project that will achieve the greatest rate of return and enhance the profitability of their investment fund. It's simple business math.

How and when did Energize Eastside come to be?

Approximately 4 years ago (2013), Macquarie decided to see if a new, double circuit 230kV transmission line and substation (i.e. Energize Eastside) "EE" could be justified on the Eastside. Such a project would contribute significantly to Macquarie's goal of making \$5 billion of new investment in PSE.

Who did Macquarie choose to investigate to see if Energize Eastside could be justified?

Macquarie decided not have PSE's internal transmission planning employees do the analysis. Instead, Macquarie decided to have the load flow work performed by an outside company (Quanta Technologies) rather than by PSE's in-house load flow experts. Quanta does a lot of work for Macquarie in areas outside of the Pacific Northwest. Quanta Technology, LLC is headquartered in Raleigh, NC with offices in Boston, MA; Chicago, IL; Oakland, CA; Toronto, Ontario and Ecuador in South America. There is no evidence that Quanta Technology has expertise in Northwest transmission and power supply matters.

A load flow study is the critical study used in the industry to test the reliability of the power grid. A load flow study is also used to justify the need for a new transmission project. The Federal Energy Regulatory Commission (FERC)/NERC also require each utility to develop a Base Case load flow study to show there is at least one mix of load, generation and transmission infrastructure that can be shown to reliably serve load in a future year. Generally, utilities provide FERC with several Base Cases reflecting peak loading periods of several different years in the future. FERC then requires utilities such as PSE to file Base Case studies each year so that third parties (such as myself) can utilize the database in each of these Base Case load flow studies to perform our own load flow studies to investigate whether a project proposed by a utility is really needed or not. PSE filed their Base Case studies with FERC and I obtained PSE's base case from FERC to perform my load flow study, with written permission from FERC.

Did Quanta use the FERC Base Case to perform its load flow study?

No. Macquarie did not have Quanta do its load flow study using the same assumptions in the Base Cases PSE filed with FERC. Instead, Macquarie asked Quanta to make significant changes to that Base Case. For example, Quanta was told to assume a 1,500 MW flow to Canada (rather than the 500 MW included in PSE's Base Case) and to assume that 1,400 MW of gas fired generators in the Puget Sound area would not be running during an extreme cold winter peak day (rather than the assumption in PSE's Base Case that all these generators would be running during a winter peak day).

Was I able to modify the PSE Base Case in this manner?

When I, along with transmission expert Roger Schiffman, performed my own load flow study (see paper entitled "Setting the Record Straight on Energize Eastside's Technical Facts" for more details), I obtained PSE's Base Cases from FERC. I then tested these non-standard assumptions as described above. The

Lauckhart-Schiffman load flow study demonstrates that making these two major changes to the PSE Base Case will result in the model failing to find a solution. The problem is that the lines carrying power across the Cascades from the Columbia River region to the Puget Sound region and then north to Canada are not capable of moving all this power without causing unacceptably low voltage on the grid in the greater Puget Sound area. Yet Quanta failed to disclose this problem.

Was Quanta able to resolve this cross-Cascades problem?

It is unclear how Quanta resolved this problem because PSE has refused to share the load flow study. It is also unclear why Quanta decided to make these major changes to the PSE Base Cases. One can only assume that Macquarie gave Quanta the directive to make these changes to the Base Case in order to produce a load flow study that justified the need for Energize Eastside. Macquarie and PSE have refused to make public the load flow studies that Quanta performed and which PSE claims justify the Energize Eastside line. I must therefore conclude, based on the above, that the load flow study that Macquarie/PSE/Quanta have performed in an attempt to justify the need for Energize Eastside has been artificially/inappropriately adjusted. I believe that if Macquarie/PSE had utilized their own internal transmission experts to run this load flow study, the project would have never progressed to its current status because their internal transmission experts would know that these changes to the Base Case are senseless and incorrect.

Conclusion

My goal in writing this paper was to illustrate that when it comes to utilities and profits, and PSE in particular, there is more going on than meets the eye. It appears that Macquarie and PSE, like some other utilities across the U.S., are pushing heavily for a project with no real basis in order to enhance their profits. The factual basis for this project simply does not add up.

PSE will likely respond by saying that I do not understand or that things are different now compared to when I worked for Puget Power. That is not the case. The burden of proof lies on them, not me. They are not being transparent and have not furnished sufficient material evidence that justifies the need for this project. Instead, they hope to gain permitting of a billion-dollar project through the vote of city councils. Furthermore, Macquarie has a history of transactions that were deceptive in nature (see attachment 2).

Attachment 1 to Attachment 5

WUTC Proceedings⁸

WUTC PROCEEDINGS: On December 17, 2007 Puget Holdings LLC (Puget Holdings) and Puget Sound Energy, Inc. (PSE or Company) filed with the Washington Utilities and Transportation Commission (Commission) a joint application for an order authorizing the proposed transfer of ownership and control of Puget Energy, Inc. (Puget Energy), and its wholly owned subsidiary, PSE, to Puget Holdings. Puget Holdings is a Delaware limited liability company, with its principal offices in New York, formed expressly for the purpose of acquiring, through wholly owned subsidiaries, all of the outstanding shares of common stock issued by Puget Energy. The proposed transfer of ownership is one step in a financial transaction that would ultimately result in Puget Energy no longer being a publicly traded company. Puget Energy and PSE would be privately owned by Puget Holdings, which is an “Investor Consortium” (Consortium) comprised of several private equity investment companies and several government pension fund managers, all of which maintain portfolios of investments, including infrastructure investments, in the U.S., Canada, and several other nations.

December 30, 2008 WUTC Order Synopsis: The Washington Utilities and Transportation Commission, approving and adopting subject to conditions a Settlement Stipulation proposed by all parties except Public Counsel, authorizes Puget Holdings LLC (Puget Holdings) to acquire Puget Energy, Inc. (Puget Energy), and its wholly-owned subsidiary Puget Sound Energy, Inc. (PSE).

The WUTC Order included a number of statements about the sale of Puget Sound Energy

Decision Making for PSE under the new ownership arrangement:

The proposed change in Puget Energy and PSE’s ownership would mean that Puget Energy would no longer be a publicly traded company. Thus, the numerous investors who currently benefit from the utility’s success and bear the risks of any lack of success will no longer have direct voting rights on matters that must be approved by shareholders. Instead, decision making power will be exercised by the members of the Consortium. Therefore, in evaluating the merits of this transaction it is important to consider carefully the nature of these investors, their plans as owners of Puget Energy and PSE, and the governance structure of their holding company, Puget Holdings.

Puget Holdings is a consortium of six primary investors who own the following percentages:

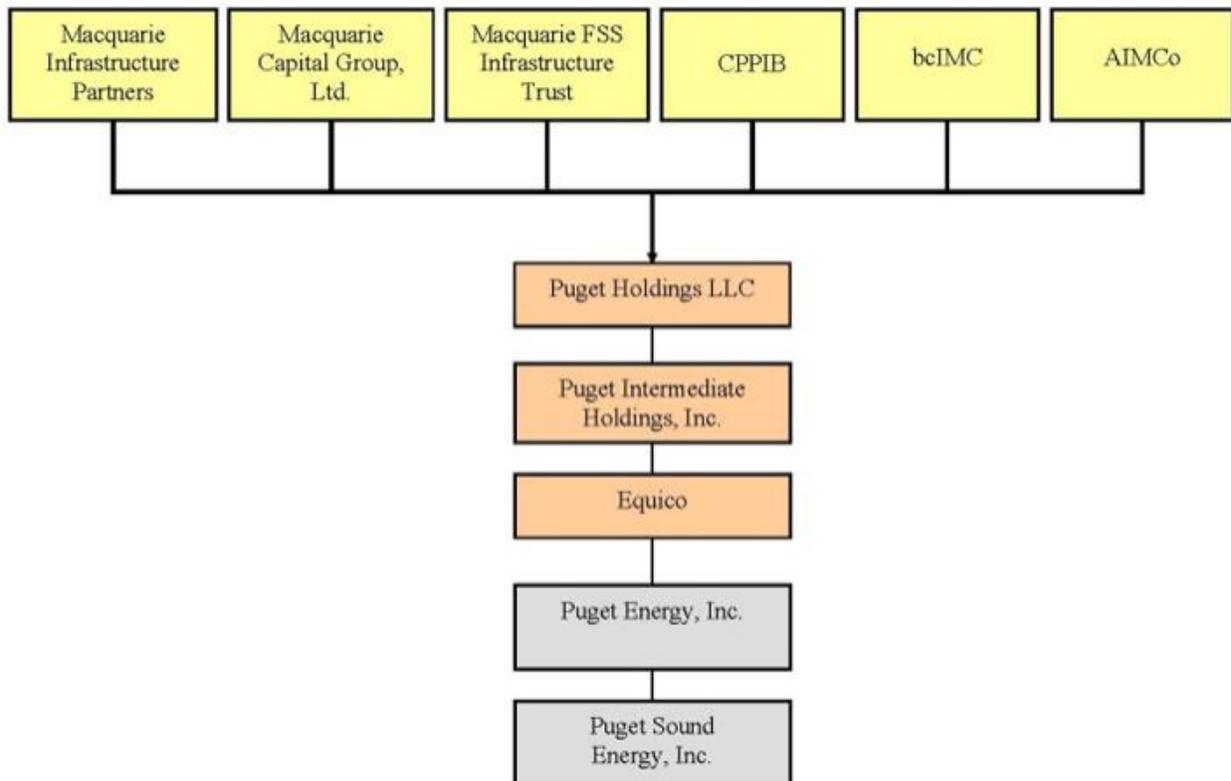
- Macquarie Infrastructure Partners, which is comprised of three limited partnerships (i.e., Macquarie Infrastructure Partners A, L.P.; Macquarie Infrastructure Partners International, L.P.; and Macquarie Infrastructure Partners Canada, L.P.) who will indirectly invest in Puget Holdings, holds the largest single minority ownership interest at 31.8 percent.

⁸ <https://www.sec.gov/Archives/edgar/data/81100/000119312509000402/dex991.htm>

- Canada Pension Plan Investment Board holds 28.1 percent.
- Macquarie Capital Group Ltd holds 15.9 percent.
- British Columbia Investment Management Corporation holds 14.1 percent.
- Alberta Investment Management holds 6.3 percent.
- Macquarie-FSS Infrastructure Trust holds 3.7 percent.

Although the three Macquarie entities collectively own 51.4 percent of Puget Holdings, this is not a controlling share under Puget Holdings’ governance structure, which requires a vote of 55 percent of the shares to support any action and a vote of 80 percent or more of the shares for certain significant corporate decisions.

Organizational Chart governing Puget Sound Energy (PSE):



Macquarie Infrastructure Partners. Macquarie Infrastructure Partners is a diversified, unlisted investment fund that is headquartered in New York. It focuses on infrastructure investments in the United States and Canada. The majority of its investors are US and Canadian institutions such as government pension funds, corporate pension funds, endowments, foundations and labor unions. Macquarie

Infrastructure Partners currently has eleven infrastructure investments in the utility, toll road, ports and communications sectors

Macquarie Capital Group Ltd. Macquarie Capital Group Ltd. is a wholly owned subsidiary of the Australian-listed Macquarie Group Limited and the operating company for Macquarie Group Limited's non-banking operations. Macquarie Capital Group Ltd. often invests alongside Macquarie Group-managed funds in investments of this kind in an underwriting capacity. This is the case for Puget Holdings, and Macquarie Capital Group Ltd. expects to sell down its minority position to other Macquarie Group-managed funds or other like-minded third-party investors prior to financial close or shortly thereafter.

Macquarie-FSS Infrastructure Trust. Macquarie-FSS Infrastructure Trust is an unlisted Australian infrastructure trust managed by Macquarie Specialized Asset Management Limited. The investment objective of Macquarie-FSS Infrastructure Trust is to make investments in a diversified range of infrastructure and related assets. It currently holds interests in five assets across sectors including communications infrastructure, vehicle inspection, utilities, and water infrastructure in three countries: The United States, Spain, and the U.K.

CPPIB -The Canada Plan Pension Investment Board (CPPIB)

bcIMC - British Columbia Investment Management Corporation (bcIMC)

AIMCo - The Alberta Investment Management Corporation (AIMCo)

Equico - following closing of the Proposed Transaction, all of the common stock of Puget Energy will be owned by "Equico," which will be a new Washington limited liability company. "Equico" will be a wholly-owned subsidiary of Puget Intermediate. "Equico" is expected to be established as a bankruptcy-remote special purpose entity, and shall not have debt.

Puget Holdings, which is an "Investor Consortium" (Consortium) comprised of several private equity investment companies and several government pension fund managers, all of which maintain portfolios of investments, including infrastructure investments, in the U.S., Canada, and several other nations.

Puget Intermediate Holdings - PSE's customers will be held harmless from the liabilities of any non-regulated activity of PSE or Puget Holdings. In any proceeding before the Commission involving rates of PSE, the fair rate of return for PSE will be determined without regard to any adverse consequences that are demonstrated to be attributable to the non-regulated activities. Any new non-regulated subsidiary will be established as a subsidiary of either Puget Holdings or Puget Intermediate Holdings Inc., rather than as a subsidiary of PSE.

Attachment 2 to Attachment 5

Examples of other transactions involving Macquarie that were deceptive

1. According to a Wikipedia write up on the Macquarie Group,⁹ “Macquarie Group through its subsidiary Macquarie Equipment Rentals has allegedly been perpetrating a Telco finance scam. Macquarie Equipment Rentals has sued over 300 victims of the scam which involves bundling a finance equipment contract with a contract from a small telecommunications company, often obscuring that the finance contract exists. The scam involves the telecommunications company promising free equipment such as Plasma TVs, while offering a lower cost phone deal that offsets the cost of the equipment. The victim is then tricked into signing two contracts with the true costs often hidden, whilst being verbally promised that they will be free. The telecommunications company is paid an upfront fee by the finance company, and sometime later disappears. The victim is then left with an inflated finance company lease that requires the victim to pay often tens of thousands of dollars for equipment that in reality costs a fraction of the price.”
2. Macquarie Capital was the lead underwriter on a secondary public stock offering in 2010 by Puda Coal, which traded on the New York Stock Exchange at the time and purported to own a coal company in the People’s Republic of China (PRC). In the offering documents, Puda Coal falsely told investors that it held a 90-percent ownership stake in the Chinese coal company. Macquarie Capital repeated those statements in its marketing materials for the offering despite obtaining a report from Kroll showing that Puda Coal did not own any part of the coal company.¹⁰

⁹ https://en.wikipedia.org/wiki/Macquarie_Group#Criticism

¹⁰ <https://www.sec.gov/news/pressrelease/2015-51.html>