BEFORE THE WASHINGTON STATE UTILITIES & TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

v.

PUGET SOUND ENERGY, INC.

DOCKET NOS. UE-111048 AND UG-111049 (*consolidated*)

DIRECT TESTIMONY OF SCOTT NORWOOD (SN-1CT)

ON BEHALF OF

PUBLIC COUNSEL

AND INDUSTRIAL CUSTOMERS OF NORTHWEST UTILITIES

DECEMBER 7, 2011

REDACTED VERSION

DIRECT TESTIMONY OF SCOTT NORWOOD (SN-1CT)
DOCKET NOS. UE-111048 AND UG-111049 (*consolidated*)

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I. INTRODUCTION

Q: Please state your name and business address.

A: My name is Scott Norwood. I am President of Norwood Energy Consulting, L.L.C. My business address is 9408 Bell Mountain Drive, Austin, Texas 78730.

Q: By whom are you employed and in what capacity?

A: I am a self-employed energy consultant specializing in the areas of electric utility regulation, resource planning and energy procurement.

Q: On whose behalf are you testifying?

A**:** I am testifying on behalf of the Public Counsel Section of the Washington Attorney General's Office (Public Counsel) and the Industrial Customers of Northwest Utilities (ICNU).

Q: Please describe your professional qualifications.

A: I have over 30 years of experience in the electric utility industry. After graduating from the University of Texas in 1980 with a Bachelor of Science degree in electrical engineering, I began my career as a power plant engineer for the City of Austin's Electric Utility Department where I was responsible for electrical maintenance and design projects for the City's three gas-fired power plants. In January 1984, I joined the staff of the Public Utility Commission of Texas as Manager of Power Plant Engineering. In that capacity I was responsible for addressing resource planning, fuel and purchased power cost issues presented in regulatory filings before the Texas Commission. In 1986, I joined GDS Associates, Inc., a Marietta, Georgia-based consulting firm that specializes in electric utility regulatory consulting and resource planning. I was elected a

Principal of GDS in 1990 and directed the firm's Deregulation Services Department until January 2004, when I formed Norwood Energy Consulting, LLC. The focus of my current consulting practice is energy planning, procurement and regulation.[1]

Q: Have you previously filed testimony before the Washington Utilities & Transportation Commission?

A: Yes. I presented testimony on behalf of Public Counsel addressing various power supply issues including PSE's development plans for the Lower Snake River (LSR) wind project in WUTC Docket Nos. UE-090704/UG-09705, Puget Sound Energy's (PSE) 2009 general rate case. In addition, I filed testimony on behalf of Public Counsel in WUTC Docket No. UE-070725, involving PSE's ratemaking proposal for crediting renewable energy credit (REC) sales proceeds to customers. I have also testified on behalf of consumers, government agencies, and consumer-owned utilities in numerous past regulatory proceedings before state regulatory commissions in Arkansas, Georgia, Illinois, Iowa, Louisiana, Michigan, Missouri, New Jersey, Oklahoma, Texas, Virginia and Wisconsin.

Q: What is the purpose of your testimony?

A: The purpose of my testimony is to present my analysis and recommendations regarding the prudence of PSE's investment in the Lower Snake River Phase 1 (LSR 1) wind generation facility.

[1] See Exhibit No. SN-2 for a more detailed summary of my background and experience.

Q: What exhibits are you sponsoring in this proceeding?

A: In addition to my testimony, I am sponsoring 12 exhibits as attachments. Exhibit Nos. SN-2 through SN-13 are described in the Exhibit List at the beginning of my testimony.

II. SUMMARY OF TESTIMONY

Q: Please summarize your major findings and recommendations.

A: In this case PSE seeks to recover approximately $158 million for its $848 million discretionary investment in the LSR 1 wind generation project.[2] The LSR 1 project is not necessary to meet PSE's Renewable Portfolio Standard requirements (RPS requirements) associated with the Energy Independence Act[3] until 2018 or later and, and would produce a level of renewable energy that significantly exceeds the Company's RPS requirement through 2020. The cost of wind energy from the LSR 1 project requested in this case is approximately $139/MWh (including the Treasury Grant credit), which is approximately **[Begin Confidential]** XX **[End Confidential]** times PSE's forecasted rate year price for market energy purchases.[4]

PSE's primary justification for the project appears to be the Company's desire to take advantage of a Federal Treasury Grant that is available for wind projects that are completed by the end of 2012. However, this grant is only an advantage for early wind[5] additions such as LSR 1 if wind production tax credits

[2] Exhibit No. SN-3; PSE Response to Public Counsel Data Request No. 40.
[3] RCW 19.285 et seq.
[4] See Exhibit No. SN-4.
[5] Unless otherwise indicated by the context, the terms "early wind" or "early" should be read as meaning "before needed to meet the RPS requirements of the Energy Independence Act."

(PTCs), which have almost continuously been in effect since 1992, are terminated and not available for projects added after 2012, as the Company's analysis assumes. Moreover, as shown in Figure 1, PSE's analysis of the cost effectiveness of early wind additions indicates that early wind additions are significantly more costly than postponing wind additions until needed to meet RPS requirements in all 14 scenarios evaluated over the next 10 years and in 7 of 14 scenarios over the next 20 years.

Figure 1 - Early Wind Benefits/(Cost) vs. No Early Wind[6]
(NPV $1000s)

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As discussed in my testimony, PSE's analysis of the cost effectiveness of early wind additions as reflected in Figure 1, did not consider rate impacts on

[6] Calculations based on PSE Response to Public Counsel Data Request No. 345, Att. B.

customers, and is seriously flawed by a number of other major errors and extreme assumptions that overstate the estimated benefits of early wind additions, including:

1) PSE, by mistake, failed to use the proper market energy price forecast for all of the Business as Usual (BAU) scenarios and thereby overstated the benefit of adding renewable energy before it was necessary by approximately **[Begin Confidential]** XXXXXXX **[End Confidential]** on a present value basis;

2) PSE's failure to consider the REC banking provisions of Washington's RPS statute in its analysis of early wind additions overstated the level of renewable energy needed to meet RPS requirements, which in turn overstated the Company's estimate of early wind benefits by approximately **[Begin Confidential]** XXXXX **[End Confidential]**;

3) PSE unreasonably assumed that wind PTCs would no longer be available for new projects placed in service after 2013 in all scenarios evaluated, despite the fact that PTCs have been available almost continuously for the last 20 years. This extreme assumption overstated the benefit of the early wind addition for capacity equivalent to LSR 1 by approximately $228 million on a present value basis;

4) The Company used an outdated and overstated carbon price forecast for the analyses, thereby overstating the estimated benefits of early wind additions by approximately $99 million;

5) PSE improperly calculated and relied upon "end effects" associated with new wind energy resources in all scenarios evaluated, thereby overstating the benefits of early wind additions by approximately **[Begin Confidential]** XXXXXX **[End Confidential]**; and

6) PSE failed to evaluate REC purchases as a potential low cost alternative to constructing new wind generation in its analysis of the cost-effectiveness of early wind additions. This flaw served to overstate the estimated benefit of early wind additions by approximately **[Begin Confidential]** XXXXXX **[End Confidential]** assuming PSE could have purchased RECs to supply its projected RPS shortfalls in 2018, 2019 and 2020.

With even modest adjustments to correct the flaws in PSE's early wind analysis as noted above, the cost advantage of postponing wind additions until needed to meet RPS requirements, as compared to early wind additions, is overwhelming. Moreover, there are significant rate impacts of the LSR 1 project which do not appear to have been considered in PSE's decision process. For example, as shown below in Figure 2, over the next four years the average cost increase for all early wind scenarios evaluated by PSE was approximately **[Begin Confidential]** XXX XXXX **[End Confidential]** per year when compared to the "No Early Wind" option.

Figure 2 - Forecasted Benefit/(Cost) of Early Wind Scenarios ($1000s)[7]

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In fact, because LSR 1 represents the vast majority of the total electric rate increase requested by PSE in this case, it is likely that the increase proposed by the Company in this case could have been totally avoided if PSE had simply postponed this project until it was needed to meet RPS requirements. Such a postponement would have been prudent particularly in the tough economic climate that existed when PSE made its decision to proceed with LSR 1, and which continues to exist at this time.

For these and other reasons explained in my testimony, I believe that PSE's $848 million investment in LSR 1 was imprudent and unnecessary and that the plant will not be used and useful when placed in service early next year. Accordingly, I recommend that the revenue requirement requested by PSE in this

[7] Calculations based on PSE Response to Public Counsel Data Request No. 345, Att. B.

case for its LSR 1 investment be reduced by $55 million,**[Begin Confidential]** XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXX **[End Confidential]** and reflected in my Figure 2. While the actual cost impact on customers of PSE's LSR 1 investment is much larger than my recommended disallowance, my disallowance conservatively reflects the estimated additional cost expected to be incurred due to early wind additions based on the Company's estimates at the time the decision was made to select LSR 1. My recommendation allows PSE to recover requested operations and maintenance costs, depreciation, property taxes, insurance, and related wheeling and wind integration costs, and debt financing costs for the project, plus a modest return on equity. Although my recommendation does not fully hold PSE's customers harmless from PSE's imprudent decision to construct LSR 1 early, it does provide a more reasonable sharing of the additional near-term costs incurred as a result of the Company's imprudent decision to proceed with this discretionary and costly project.

III. LOWER SNAKE RIVER WIND PROJECT

Q: Please describe PSE's LSR 1 wind generation project.

A: The LSR 1 project is a 342.7 megawatt (MW) wind generation facility under construction by PSE near the town of Pomeroy in southeast Washington. LSR 1 will consist of 149 wind turbines, each rated at 2.3 MW. The current expected in-

service date of the LSR 1 project is mid-February 2012, with final completion estimated for mid-August 2012.[8]

Q: What is the total estimated capital cost of the LSR 1 project?

A: The total estimated capital cost of the LSR 1 facility and associated transmission costs is approximately $848 million, which equates to $2,475/kW.[9]

Q: Does the cost of the LSR 1 project represent a significant component of the overall electric rate increase requested by PSE in this case?

A: Yes. PSE is requesting a $152.9 million (8.13 percent) electric general rate increase in this case. As noted in the direct testimony of PSE's President and Chief Executive Officer, Kimberly Harris, LSR 1 is the largest single cost factor contributing to the increase in electric rates requested in this case.[10] In fact, the requested general rate revenue requirement for the LSR 1 project is approximately $158 million.[11]

Q: When did PSE initiate its planning to develop the LSR wind project?

A: PSE acquired its initial 50 percent development rights in the LSR wind project in November of 2008,[12] in the middle of the global financial crisis. The PSE Board approved the Company's acquisition of the remaining 50 percent of the LSR project development rights from RES America Developments Inc. in July of 2009.[13]

[8] PSE Response to Staff Data Request No. 156.
[9] Exhibit No. RG-1HCT , p. 74 (Garratt Direct Testimony).
[10] Exhibit No. KJH-1T, p. 5 (Harris Direct Testimony).
[11] See Exhibit No. SN-3. This amount excludes the Treasury Grant which credits which will be recovered through a separate tariff, and $33.6 million in related estimated energy savings.
[12] Exhibit No. RG-1HCT, p. 30 (Garratt Direct Testimony).
[13] Exhibit No. RG-1HCT, p. 30 (Garratt Direct Testimony).

Q: Will LSR 1 be directly interconnected with PSE's transmission system?

A: No. The LSR 1 project will be interconnected to the Bonneville Power Administration's (BPA) transmission system at the new Central Ferry 230/500 kV substation, under terms of a Large Generator Interconnection Agreement between PSE and BPA.[14] Energy produced by LSR 1 will be placed in the BPA Balancing Authority and subject to BPA's Integration Tariff, which is currently $16.26/kW per year.[15] BPA has granted PSE firm transmission rights for the first 250 MW of LSR 1, and PSE plans to purchase conditional firm transmission service for the remaining output of the project until July of 2013, when BPA is expected to have completed the necessary upgrades to provide firm transmission service for the entire output of the plant.[16]

Q: Why is PSE constructing the LSR 1 wind generation project at this time?

A: PSE indicates that its decision to construct LSR 1 at this time is in large part to meet the Washington renewable portfolio standard (RPS) which requires that the Company serve at least 9 percent of its electric load with renewable resources by 2016.[17] Although the Company has adequate renewable resources to meet RPS requirements through 2016 or later, the Company asserts that current government incentives make near-term acquisition of renewable resources a more cost-effective alternative for PSE and its customers.[18] In fact, PSE states that federal

[14] Exhibit No. RG-1HCT, p. 72 (Garratt Direct Testimony).
[15] Exhibit No. RG-1HCT, p. 74 (Garratt Direct Testimony).
[16] *Id.*
[17] Exhibit No. RG-1HCT, p. 3 (Garratt Direct Testimony).
[18] Exhibit No. RG-1HCT, p. 19 (Garratt Direct Testimony).

tax incentives are the "key driver" behind its decision to add LSR 1 at this time in order to meet its 2016 RPS requirement.[19]

Q: What was PSE's decision process supporting its selection of the LSR 1 facility?

A: PSE's decision process leading to selection and development of the LSR 1 wind project is generally described on pages 13-17 of the direct testimony of PSE witness Garratt. Essentially, the decision process began with PSE's 2009 IRP analysis, in which the Company identified a need for approximately 81 average megawatts (aMW) of new renewable generation by 2016 in order to comply with the Washington RPS requirement that the Company supply 9 percent from renewable resources by that year.[20] The Company asserts that its 2009 IRP analysis demonstrated that it would be cost effective to add 300 MW of new wind generation by 2012, plus another 300 MW of new wind generation by 2016.[21]

Based on this determination, PSE issued its 2010 Request for Proposals (RFP) on January 12, 2010, seeking approximately 1,000 MW of new electric resources, including 600 MW of new wind generation, by 2016.[22] After conducting a two-phased analysis of the economic and other attributes of wind energy proposals it received in response to the 2010 RFP, PSE staff identified LSR 1 as the lowest reasonable cost and lowest risk renewable resource option to meet its identified renewable resource need.[23] On May 5, 2010, PSE's Board of

[19] Exhibit No. RG-1HCT, p. 20 (Garratt Direct Testimony).
[20] Exhibit No. RG-1HCT, p. 12 (Garratt Direct Testimony).
[21] *Id.*
[22] *Id.*
[23] Exhibit No. RG-1HCT, p. 57 (Garratt Direct Testimony).

Directors approved PSE's Energy Management recommendation to construct the LSR 1 wind generation project.[24]

Q: What specific relief is PSE requesting for its LSR 1 investment in this case?

A: PSE is seeking a determination that its decision to construct the LSR 1 project was prudent.[25] PSE is also requesting that the Commission approve its proposed $158 million general rate revenue requirement for the LSR 1 project.[26]

Q: What are the key issues raised by PSE's LSR 1 project?

A: PSE's decision to invest $848 million for the LSR 1 wind project in the middle of a global economic crisis, years before the plant was needed to meet RPS requirements, raises a number of serious issues regarding the prudence of the investment, the extent to which the project is used and useful, and whether PSE reasonably considered alternatives to mitigate the rate impact of this discretionary project on its customers

IV. STANDARDS FOR REVIEW OF LSR 1 PROJECT

Q: What standards have you applied in evaluating PSE's request for decision to construct LSR 1?

A: I have applied the standards described by the Commission in its January 3, 2011, *Renewable Resource Policy Report*.[27] In the *Renewable Resource Policy Report*, the Commission notes that it must make two basic determinations when

[24] Exhibit No. RG-1HCT, p. 57(Garratt Direct Testimony).
[25] Exhibit No. RG-1HCT, p. 2 (Garratt Direct Testimony).
[26] Exhibit No. SN-3.
[27] *In the Matter of the Washington Utilities and Transportation Commission Inquiry on Regulatory Treatment For Renewable Energy Resources,* Report and Policy Statement Concerning Acquisition of Renewable Resources by Investor-Owned Utilities *(Renewable Resource Policy Report)*, Docket No. UE-100849, June 3, 2011.

evaluating applications for approval of utility resource acquisitions: first, whether the acquisition was "prudent," and second, whether the resource was "used and useful" as required by RCW 80.04.250.[28] In its 1994 *Puget Prudence Order*, the Commission articulated the standard it would apply in determining prudence of generating resource investments, as follows:

> The company must establish that it adequately studied the question of whether to purchase these resources and made a reasonable decision, using the data and methods that a reasonable management would have used at the time the decisions were made.[29]
>
> The prudence standard adopted in prior Commission orders is easily applied to any resource decision, whether it is to build or to purchase. The utility must first determine whether new resources are necessary. Once a need has been identified, the utility must determine how to fill that need in a cost effective manner. When a utility is considering purchase of a resource, it must evaluate that resource against the standards of what other purchases are available, and against the standard of what it would cost to build the resource itself.[30]

In the *Renewable Resource Policy Report*, the Commission describes the standard that has been applied in Washington to determine whether

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[28] *Renewable Resource Policy Report*, ¶ 26.
[29] *WUTC v. Puget Sound Power & Light*, Docket Nos. UE-920433, UE-920499, UE-921262, (consolidated), Nineteenth Supplemental Order at 10 (Sept. 27, 1994) (*Puget Prudence Order)*.
[30] *Id.* at 11.

generating resource investments are "used and useful" as follows:

> Both common sense and hornbook utility law support our conclusion that RCW 80.04.250 requires a resource to be "employed in accomplishing something … beneficial" for Washington ratepayers ("in this state"), before they can be required to pay for it. Our Order allows these benefits to be direct or indirect, tangible or intangible, as long as they are reasonably quantifiable and commensurate with their costs.[31]

> As stated by the state Supreme Court in the *POWER* case: "'Used' is defined as 'employed in accomplishing something'; 'useful' is defined as 'capable of being put to use: having utility: advantageous: producing or having the power to produce good: serviceable for a beneficial end or object.'"[32]

Q: Did the Commission provide further guidance regarding the application of the prudence and used and useful standards to renewable resource investments in its *Renewable Resource Policy Report*?

A: Yes the Commission outlined the standards it would apply in evaluating the prudence and used and usefulness of renewable resources, such as LSR 1, that: (1) are acquired by utilities in advance of the RPS deadlines established under the

[31] *Renewable Resource Policy Report*, ¶ 31, *quoting WUTC v. PacifiCorp d/b/a Pacific Power & Light Company, In the Matter of the Petition of PacifiCorp for an Order Approving Deferral of Costs Related to Declining Hydro Generation*, Order 06, Docket No. UE-050684, Order 05, Docket No. UE-050412, Order 02, Docket No. UE-060669, ¶ 27 (July 14, 2006) (footnote omitted).

[32] *Id., quoting People's Organization for Washington Energy Resources v Washington Utilities & Transp. Comm'n*, 101 Wn.2d 425, 430, 649 P.2d 425 (1984) (*POWER*), *citing Webster's Third New International Dictionary* 2524 (1976).

EIA, or (2) that supply renewable energy at levels that exceed the established RPS targets.[33]

As discussed in the following sections of my testimony, I have applied the above standards in my evaluation of the extent to which PSE's investment in the LSR 1 project was prudent and used and useful.

V. PRUDENCE OF LSR 1 ADDITION

Q: Which of the above prudence standards apply in the case of LSR 1?

A: As discussed above, the Commission's prudence standard requires that the utility demonstrate that new resources are necessary and that such resources are cost effective when compared to other available resource alternatives.

Q: What evidence has PSE presented to support the prudence of its LSR 1 acquisition?

A: PSE witnesses Garratt and Seelig are the primary witnesses that address the prudence of the Company's decision to construct the LSR 1 facility. Generally, the direct testimonies of these witnesses describe the resource planning, competitive procurement and management decision making processes which culminated in PSE's decision in May of 2010 to construct the LSR 1 facility.

Q: Does the evidence presented by PSE demonstrate that the Company's investment in LSR 1 was prudent?

A: No. As discussed in the following sections of my testimony, it was not necessary for PSE to construct LSR 1 at this time in order to meet the Company's RPS

[33] *Renewable Resource Policy Report*, ¶¶ 51-57 (in advance of need); ¶¶ 58-64 (in excess of need).

requirements, and the LSR 1 project is much more costly than other available generating resource alternatives.

A. Economic Climate and Rate Impacts.

Q: What were the economic conditions at the time PSE was conducting the analysis which led to its decision to construct the LSR 1 wind project?

A: The economic conditions at the time PSE prepared its 2009 IRP analysis reflected high unemployment, decreasing energy prices, decreasing electric demand and great economic uncertainty due to continuing effects of the global financial crisis which occurred in late 2008. This great economic uncertainty created significant challenges for PSE in deciding timing of new resource additions, as described in PSE's 2009 IRP:[34]

> Economic conditions have changed considerably since work began on this IRP in the summer of 2007. At that time, uninterrupted growth was generally forecast for the U.S. economy, and the Pacific Northwest in particular. Worldwide appetite for energy was strong and increasing. Commodity prices – including oil, natural gas, and even coal – experienced a period of demand-induced speculation that drove prices to unprecedented highs. During 2008, economic conditions changed drastically. Major global banking institutions failed and others struggled to maintain solvency even with government help. The speculative bubble in commodity prices burst, driving prices to lows that are probably not realistic over the long term. By March 2009, the forecast for U.S. GDP growth had fallen to -3.7% for 2009 and 1.5% for 2010, with unemployment projected at more than 10% for 2010. Although many forecasts point to a recovery in 2011 or 2012, there is still little evidence to indicate when conditions might improve, or what that improvement might look like.
>
> These conditions are having a variety of effects on long-term resource planning and acquisition.

[34] Exhibit No. RG-3, p. 2-2. (Emphasis in original).

> *Most immediately, uncertainty about future economic conditions affects PSE's ability to project energy demand.* How much energy customers will require in coming years depends a great deal on economic activity; factors like employment and population growth are extremely important to calculating resource need. The wide range of demand forecasts modeled for this IRP analysis reflects how much conditions have changed since mid-2007. The challenge this presents is one of timing. Resources take time to develop, and should demand increase quicker than expected, the portfolios could be exposed to a greater reliance on spot markets at a time when demand and prices are high.

Q: Did PSE adequately account for the great economic uncertainty which existed at the time it was making its decision to construct LSR 1?

A: No. As discussed later in my testimony, PSE's analysis supporting its decision to construct LSR 1 years before it was needed failed to adequately consider the economic uncertainty and its impact on key variables that impacted the cost-effectiveness of LSR 1. These key variables included the level of future energy prices, the potential for continuation of PTCs, and assumptions regarding the timing and cost of carbon regulations. Moreover, it appears that the Company virtually ignored the significant customer rate impacts of adding new wind generation early. Indeed, virtually every scenario evaluated by the Company indicated that the cost of adding new wind energy early would be significantly higher than adding wind later over the next 10 to 20 years.

Q. Is there any evidence that PSE considered the ratepayer impact of its LSR 1 proposal in reaching its decision to construct the project?

A: No. PSE President Kimberly Harris spends significant time in her direct testimony describing the actions the company has taken to mitigate the rate

increase requested in this case in light of the difficult economic conditions faced by its customers. Notably, however, the Company's testimony barely mentions that the rate increase in this case is almost entirely attributable to its decision to construct LSR 1 at least 6 years before it was needed to meet RPS requirements. For example, PSE witness Susan McClain's testimony is devoted entirely to addressing PSE's cost control measures and major factors impacting PSE's costs and leading to the rate increase requested in this case, yet fails to mention the Company's $848 million investment in the LSR 1 project and the large impact this project has on the rate increase. None of the economic analyses provided by PSE to support its decision to construct the LSR 1 project explicitly addresses the ratepayer impact of this project, or compares the rate impact of LSR 1 to other alternatives such as adding wind later when needed to meet RPS requirements.

Q: Should PSE have been aware that its customers were very concerned regarding the rate impact of the LSR 1 project before it made its decision to proceed with the project in May of 2010?

A: Yes. PSE should have been aware that its customers would be concerned about any new electric rate increases, and particularly about rate increases resulting from large discretionary capital investments such as the LSR 1 project, which offer no near-term benefits. In PSE's 2009 general rate case, the Company included information regarding its plans to construct the first 250 MW of the LSR project in 2011. In response, I filed direct testimony on behalf of Public Counsel on November 17, 2009, expressing serious concerns regarding the cost of the LSR wind project and questioning the prudence of PSE's apparent plans to add this

project before it was needed to meet RPS requirements. My testimony included the following statement:

> Wind generation projects are non-dispatchable, non-firm energy resources, and the cost of energy delivered from PSE's new wind projects is approximately 3 to 4 times the current market price of purchased energy. Given these facts, it does not appear it would be prudent for PSE to proceed with the development of any new wind generation projects until such projects are needed to meet the Company's RPS requirements, or are otherwise justified by economic benefits to customers when compared to available resource alternatives.[35]

Q: What rationale did PSE provide in the Company's 2009 rate case for its plan to add LSR 1 in 2011?

A: The Company indicated that the addition of new wind capacity at the LSR project was intended to meet PSE's corporate goal of supplying 10 percent of its system load with renewable energy by 2013.[36] It is important to note that this testimony was filed in May 8, 2009, approximately five months before PSE had conducted the rerun of its 2009 IRP to assess the cost effectiveness of early wind additions and approximately one year before the Company completed its RFP process or received final Board of Directors approval to go forward with the LSR project.

Q: Did PSE conduct economic analyses to assess the costs and benefits of adding new wind generation before it was needed to meet RPS requirements?

A: Yes. PSE conducted economic analyses in the fall of 2009 to address the cost effectiveness of adding new wind generation early.[37] As discussed later in my

[35] Exhibit No. SN-13, p. 4 (Excerpt from Direct Testimony of Scott Norwood, *WUTC v. PSE*, Docket Nos. UE-090704, UG-090705 (*PSE 2009 GRC)*, Exhibit No. SN-1T (redacted)(The excerpt contains the complete testimony section entitled "PSE's Wind Development Strategy").
[36] *PSE 2009 GRC*, Exhibit No. RG-1HCT, page 97 (Garratt Direct Testimony).
[37] Exhibit No. AS-1HCT, pp. 19-21 (Seelig Direct Testimony).

testimony, these analyses included a number of errors and extreme assumptions which unreasonably biased the results to overstate estimated benefits of early wind additions. However, as shown in my Figure 1, even with these flaws, the Company's analyses of the cost effectiveness of early wind additions, indicated that early wind additions, such as LSR 1, would be much more expensive than the "No Early Wind" alternative in all 14 scenarios evaluated over the next ten years. Early wind was also more expensive in 7 of 14 scenarios evaluated over the next 20 years. In essence, the Company's analyses indicated that the early addition of new wind projects such as LSR 1 would not benefit customers at all for the next 10 years, and likely not for the next 20 years.

The results in Figure 1 reflect the Company's "Re-run" of the 2009 IRP analysis of the cost-effectiveness of early wind additions, as recently corrected by PSE to reflect an error in the market prices used for the "2009 BAU" scenario. The nature of this Company error is discussed in more detail later in my testimony. It is important to note, however, that even before correcting this market price error, PSE's original analysis of the cost-effectiveness of early wind additions indicated that all early wind addition scenarios were significantly more costly than the No Early Wind scenario over the next five to ten years.[38]

Q: Was it prudent for PSE to ignore the fact that its own analyses indicated that early wind additions such as the LSR 1 project would not benefit customers for 20 years or more?

[38] Exhibit No. SN-5.

A: No. It is always important for utilities to consider customer benefits as a primary factor when evaluating major investments. However, given the tough economic climate, the uncertainty that existed regarding its cost/benefit analysis for new wind additions, and the discretionary nature of the $848 million LSR 1 investment, it was particularly important for PSE to consider whether the there was sufficient estimated economic benefit of early wind energy to justify its proposed LSR 1 project.

B. Need for LSR 1.

Q: What is PSE's primary rationale for constructing the LSR 1 wind project at this time?

A: PSE asserts that LSR 1 was constructed, in large part, to meet Washington RPS requirements in 2016 and to take advantage of federal grants and state sales tax exemptions.[39]

Q: What are the Washington RPS requirements?

A: The Energy Independence Act (EIA) provides that electric utilities in the state of Washington serving more than 25,000 customers shall use eligible renewable resources or acquire equivalent renewable energy credits, or a combination of

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[39] Exhibit No. RG-1HCT, pp. 3 and 18 (Garratt Direct Testimony).

both, to meet the following annual targets:

(i) At least three percent of its load by January 1, 2012, and each year thereafter through December 31, 2015;
(ii) At least nine percent of its load by January 1, 2016, and each year thereafter through December 31, 2019; and
(iii) At least fifteen percent of its load by January 1, 2020, and each year thereafter. [40]

Q: What level of new renewable resources were identified in PSE's 2009 IRP as being necessary to meet the above RPS requirement?

A: PSE's 2009 IRP identified a need for 1,000 MW of new wind generation additions by 2020, including 300 MW of wind additions by 2012, plus another 300 MW of new wind by 2016[41].

Q: Has PSE explained in detail how it determined these required levels of new wind generation reflected in its 2009 IRP?

A: No. However, as shown in Figure 3, the 2009 IRP-specified levels of new wind would produce approximately 2 to 7 times the level of renewable energy needed to meet the Company's RPS requirements through 2020.

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[40] See RCW 19.285.040 (2)(a).
[41] Exhibit No. RG-3, p. 10.

Figure 3 - PSE's 2009 IRP Wind Additions vs. RPS Renewable Energy Requirements (GWh)

Year	1 / RPS Load, GWh	RPS Target	RPS Target GWh	2 / 2009 IRP Renewable, MW	3/ Projected Renewable GWh	Projected % of Target	Projected Surplus/(Deficit)
2011	21,391	0%	-	100	1,585		1,585
2012	22,018	3%	661	300	3,699	560.0%	3,038
2013	23,186	3%	696	300	4,316	620.4%	3,620
2014	23,216	3%	696	400	4,731	679.3%	4,035
2015	23,201	3%	696	400	5,059	726.8%	4,363
2016	23,229	9%	2,091	600	5,588	267.3%	3,497
2017	23,326	9%	2,099	600	6,113	291.2%	4,014
2018	23,435	9%	2,109	800	6,635	314.6%	4,526
2019	23,521	9%	2,117	800	7,161	338.3%	5,044
2020	23,644	15%	3,547	1,000	7,690	216.8%	4,144
			14,711				

Notes: 1 / Source is PSE's response to Public Counsel Data Request No. 273.
2 / 2009 IRP Renewable MW reflects proposed new wind capacity per Seelig, Table 5.
3 / Projected renewable reflects existing, plus proposed and banked renewable generation.

Q. Was it necessary to construct LSR 1 in order to meet PSE's RPS requirements?

A: No. As shown in Figure 4, based on the load forecast PSE used for its 2009 IRP and *without* the addition of 343 MW supplied by the LSR 1 project, PSE still has approximately 4 times the amount of renewable energy required to meet its RPS target through 2015 and sufficient renewable energy to meet the Company's RPS requirement until at least 2018.

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Figure 4 - PSE Existing Renewable Energy without LSR 1 vs. RPS Energy Requirements (GWh)

Year	1 / RPS Load	RPS Target	RPS Target, GWh	2 / Existing Renewable	Existing % of Target	Surplus/ (Shortfall), GWh
2011	21,391	0%	-	1,322		1,322
2012	22,018	3%	661	2,648	400.8%	1,987
2013	23,186	3%	696	2,739	393.8%	2,043
2014	23,216	3%	696	2,891	415.2%	2,195
2015	23,201	3%	696	2,956	424.7%	2,260
2016	23,229	9%	2,091	2,960	141.6%	869
2017	23,326	9%	2,099	2,347	111.8%	248
2018	23,435	9%	2,109	1,726	81.8%	-383
2019	23,521	9%	2,117	1,478	69.8%	-639
2020	23,644	15%	3,547	1,482	41.8%	-2,065

Notes: 1 / Source is PSE's response to Public Counsel Data Request No. 273.
2 / Existing renewable reflects banked plus current year generation.

Moreover, it is likely that PSE would be able to purchase RECs to supply the relatively small renewable energy deficit that is forecasted to exist in 2018-2020. For example, based on PSE's projected REC price of approximately $8/MWh,[42] the Company could have purchased sufficient RECs to fully meet its RPS requirements through 2020 at a total cost of approximately $33 million. This amount is obviously far lower than the $158 million per year revenue requirement that PSE would otherwise incur by constructing LSR 1 as proposed in this case.

Q: How did the addition of LSR 1 impact PSE's RPS requirements?

A: As shown in Figure 5, with the addition of LSR 1, and based on the 2009 IRP load forecast, PSE was expected to have a 1.3 to 6.8 times the level of RECs needed to meet its RPS requirement, and a 34 percent excess over its 15 percent RPS requirement in 2020.

[42] Exhibit No. SN-6.

Figure 5 - PSE Renewable Energy with LSR 1 vs. RPS Energy Requirements (GWh)

Year	1 / RPS Load, GWh	RPS Target	RPS Target GWh	LSR 1 Renewable, MW	2/ Projected Renewable GWh	Projected % of Target	Projected Surplus/(Deficit)
2011	21,391	0%	-	0	1,322		1,322
2012	22,018	3%	661	343	3,323	503.1%	2,662
2013	23,186	3%	696	343	4,315	620.3%	3,619
2014	23,216	3%	696	343	4,693	673.8%	3,996
2015	23,201	3%	696	343	4,757	683.5%	4,061
2016	23,229	9%	2,091	343	4,761	227.7%	2,670
2017	23,326	9%	2,099	343	4,761	226.8%	2,662
2018	23,435	9%	2,109	343	4,757	225.6%	2,648
2019	23,521	9%	2,117	343	4,757	224.7%	2,641
2020	23,644	15%	3,547	343	4,761	134.2%	1,215
			14,711				

Notes: 1 / Source is PSE's response to Public Counsel Data Request No. 273.
2 / Projected renewable reflects existing, plus proposed and banked renewable generation.

Q: Why is the level of new renewable energy need proposed by PSE so much higher than that required under the Washington RPS?

A: PSE's forecast of its renewable energy needs failed to consider the REC banking provisions[43] under Washington's RPS statute and also appears to have ignored the 20 percent REC credit provided to renewable projects that employ apprentice workers.[44] Due to these errors, PSE significantly understated the renewable energy that could be supplied from existing resources to meet RPS requirements and, therefore, significantly overstated the new renewable energy PSE needed to meet RPS targets over the next ten years, as reflected earlier in my Figure 3.

[43] RCW 19.285.040(2)(e).
[44] Exhibit No. SN-7; RCW 19.285.040(2)(h)(i).

Q: How do the REC banking provisions of the RPS statute work?

A: The REC banking provisions allow PSE and other utilities to meet the RPS annual target requirement with RECs produced during that year, the preceding year, or the subsequent year. In other words, RECs generated in excess of the RPS requirement in any year can be used to meet RPS requirements in the following year. PSE projects it will generate a large surplus of RECs over the next several years (with or without LSR 1), which, under the banking provisions, could be used to meet a portion of the RPS requirements of the next year. The Company failed to consider these important REC banking provisions, and, thus, overstated the amount of renewable energy needed to meet its RPS requirements. This appears to have contributed to PSE's decision to acquire LSR 1 years before it was actually needed.

Q: Did the overstated forecast of renewable energy need impact the Company's analysis of the cost-effectiveness of adding new wind generation before it was necessary to meet RPS targets?

A: Yes.

Because PSE overstated its renewable energy requirements, the level of new wind generation included in the "No Early Wind" scenario was also overstated, and therefore the cost that PSE would have incurred if it did not construct new wind generation early was also overstated. This error, as well as other errors included in the Company's cost/benefit analysis, led PSE to incorrectly conclude that it would be beneficial to add LSR 1 years before it was needed to meet RPS targets. These errors are explained further in the next section of my testimony.

C. Cost Effectiveness of Early Wind Additions.

Q: What evidence has PSE presented to support its claim that the construction of LSR 1 before it was required to meet RPS requirements was cost-effective?

A: PSE witnesses Garratt and Seelig generally assert in their direct testimony that the Company's decision to construct LSR 1 early was justified by the Company's 2009 IRP analysis as presented on page 10 of witness Garrett's Exhibit No. RG-3.[45] In addition, PSE's discovery responses state that the Company conducted four analyses to demonstrate that the acquisition of LSR 1 early produces benefits that offset the cost of early acquisition:[46]

1) the 2009 Integrated Resource Plan
2) Re-run of the 2009 IRP Models
3) Discounted Cash Flow (DCF) Analysis
4) Comparative Analysis of Renewable Resources as part of PSE's 2010 RFP process

Q: Do you agree that the above analyses demonstrate that adding wind early was cost effective as the Company claims?

A: No, I do not. While PSE has provided a significant volume of documentation for the above analyses, as described further below, the underlying analysis is critically flawed and does not demonstrate that early wind additions were cost effective.

[45] Exhibit No. RG-1HCT, p. 12 (Garratt Direct Testimony), and Exhibit No. AS-1HCT, p. 19 (Seelig Direct Testimony).

[46] PSE Response to Public Counsel Data Request No. 38.

1. 2009 IRP Analysis and Re-run of 2009 IRP Analysis.

Q: Did PSE's 2009 IRP analyses and Re-run of the 2009 IRP analyses demonstrate the cost-effectiveness of adding new wind generation early?

A: No. While these analyses addressed the cost-effectiveness of adding wind generation earlier rather than later based on *generic* wind generation costs, PSE admits that "the 2009 IRP does not specifically address the Lower Snake River Phase 1 Wind Project".[47]

Q: Why did PSE re-evaluate the cost effectiveness of early wind additions in the Company's Re-run of the 2009 IRP analysis?

A: PSE indicates that its Re-run of the 2009 IRP analysis was conducted to refine the lowest cost development schedule for the LSR project, and to update its 2009 IRP analysis to reflect declines in wind turbine capital costs due to the global financial crisis, to reflect the U.S. Treasury Grant (since the 2009 IRP analysis assumed PTCs) and to reflect the extension of the Washington renewable generation sales and use tax exemption.[48] The Re-run of the 2009 IRP analysis was conducted in September and October of 2009 and was relied upon by PSE in reaching its decision to issue an RFP to acquire new wind generation in 2012. As such, the Re-run of the 2009 IRP was one of the key analyses supporting PSE's decision to add wind early.

[47] PSE Response to Public Counsel Data Request No. 38.
[48] Exhibit No. AS-1HCT, pp. 20, 24 (Seelig Direct Testimony)

Q: Did PSE's Re-run of the 2009 IRP analysis demonstrate the cost-effectiveness of early wind additions?

A: No, it did not. The Re-run of the 2009 IRP analysis suffered from at least six serious analytical flaws which led the Company to wrongly conclude that the early addition of wind generation such as LSR 1 was cost-justified. These analytical flaws include the following:

1) PSE, by mistake, failed to use the proper market energy price forecast for all of the Business as Usual (BAU) scenarios and thereby overstated the benefit of adding renewable energy before it was necessary by approximately $177 million on a present value basis;

2) As noted above, PSE's early wind analysis failed to consider the REC banking provisions of Washington's RPS statute and thus overstated the level of renewable energy needed to meet RPS requirements. ;

3) PSE unreasonably assumed that wind PTCs would no longer be available for new projects placed in service after 2012 in all scenarios evaluated, despite the fact that PTCs have been available for the last 20 years;

4) The Company used an outdated and overstated carbon price forecast for the analyses, thereby overstating estimated benefits of early wind additions;

5) PSE improperly calculated "end effects" associated with new wind energy resources in all scenarios evaluated, thereby significantly overstating the benefits of early wind additions; and

6) PSE failed to evaluate REC purchases as a potential low cost alternative to constructing new wind generation in its analysis of the cost-effectiveness of early wind additions.

I will discuss each of these analytical flaws in further detail below.

a. 2009 Business As Usual (BAU) market price Error.

Q: Please explain the problem related to PSE's use of the wrong market price forecast for analysis of wind generation under the BAU scenarios?

A: PSE evaluated the cost effectiveness of adding wind generation early under two primary scenarios. Under the "2009 Trends" scenario, PSE assumed higher market prices which reflected economic recovery and adoption of carbon regulations. Under the "2009 BAU" scenario, PSE assumed lower market prices which represented the potential for slow economic recovery and only limited future carbon regulations. The market prices for each of these scenarios are summarized in Figure 6 below.

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Figure 6 - Forecasted Market Prices for "2009 Trends" and "2009 BAU" Scenarios, $/MWH

Year	2009 Trends	2009 BAU	Difference
2012	$65	$37	($28)
2013	$67	$38	($29)
2014	$69	$38	($31)
2015	$72	$39	($33)
2016	$73	$39	($34)
2017	$77	$39	($38)
2018	$80	$40	($40)
2019	$83	$41	($42)
2020	$85	$40	($45)
2021	$89	$41	($48)

Source of Market Prices is Garratt's Exhibit No. RG-3, pages 454 and 455.

As a result of my review of PSE's analysis, I determined that PSE had used the same "2009 Trends" market price forecast (containing higher costs) in evaluating wind energy additions for both the "2009 Trends" and "2009 BAU" scenarios.

Public Counsel requested a discovery conference with the Company to inquire about this problem. In a conference call with PSE witness Aliza Seelig on November 18, 2011, the Company acknowledged that it had used the wrong market price forecast for the "2009 BAU" scenarios. In a follow-up discovery response provided on November 23, 2011, the Company formally confirmed this error, and admitted that it had made the same error in its analysis of wind energy proposals submitted in response to its 2010 RFP. As part of the data request

response, PSE provided updated models which corrected the error to reflect the proper market prices for the "2009 BAU" scenario.[49]

Q: What was the impact of these errors?

A: Generally, higher market prices favor early wind additions since the primary benefit of wind energy is its ability to displace market energy purchases. If market prices are lower, the replacement energy value of wind is lower, and in such cases there is likely to be little or no economic advantage to adding wind energy before needed to meet RPS requirements.

More specifically, PSE's use of "2009 Trend" market prices for the "2009 BAU" scenario had the effect of improperly overstating the total portfolio cost of the "No Early Wind" case by more than **[Begin Confidential]** XXXXXXXX **[End Confidential]** on a present value basis. The error also meant that the cost advantage of early wind additions over the "No Early Wind" build case was overstated by approximately **[Begin Confidential]** XXXXXXX **[End Confidential]** on a present value basis[50].

As shown in Figure 2, correction of this error also added to the estimated average cost increases over the next four years resulting from adding wind early when compared to the "No Early Wind" case. These added increases are approximately **[Begin Confidential]** XXXXXX **[End Confidential]** per year in the "2009 Trends" scenario and nearly **[Begin Confidential]** XXXXXXX **[End Confidential]** per year for the "2009 BAU" scenario. Obviously, this major error

[49] PSE Response to Public Counsel Data Request No. 345.
[50] Exhibit SN-8C.

significantly distorted the results of PSE's analysis of the cost effectiveness of adding new wind before it was needed as well as its economic analysis of LSR 1 against wind energy proposals received in response to its 2010 RFP.

b. Overstatement of renewable energy needed to meet RPS requirements.

Q: Please explain how PSE's overstatement of the amount of renewable energy needed to meet RPS requirements impacted its cost effectiveness analysis of early wind additions?

A: PSE claims that its decision to construct LSR 1 early was cost justified. However, as shown in Figure 7 below, the cost/benefit analyses conducted by PSE to support this decision included the addition of 1,000 MW of new wind generation by 2020 *in all scenarios evaluated*, including the "No Early Wind" scenario.

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Figure 7 - PSM II Model Wind Build Schedule[51]

Plan no.	Wind Build Schedule	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	LSR 7-28-09 Development Plan	0	0	250	250	0	0	250	0	0	0	250	0	0
2	Accelerated 500 MW – then IRP	0	0	500	0	0	0	100	0	200	0	200	0	0
3	2009 IRP Resource Plan	0	100	200	0	100	0	200	0	200	0	200	0	0
4	Phase 400 MW – then IRP	0	0	200	200	0	0	200	0	200	0	200	0	0
5	Phase 500 MW – then IRP	0	0	250	250	0	0	100	0	200	0	200	0	0
6	Phase 600 MW – then IRP	0	0	300	300	0	0	0	0	200	0	200	0	0
7	2009 Trends	0	100	200	0	0	0	100	0	0	0	600	0	0
8	No Early Wind	0	0	0	0	0	0	400	0	0	0	600	0	0

Because PSE failed to consider the REC banking provisions of the RPS, it incorrectly concluded that it would have to add 400 MW of new wind generation by 2016 plus another 600 MW in 2020 in the "No Early Wind" case. However, as shown in Figure 4 above, when REC banking provisions are properly considered, for the "No Early Wind" case PSE actually required no new wind generation until 2018, and only 400 MW of new wind generation in 2018 to meet its RPS requirements through 2020.

By overstating the level of new wind generation needed to meet RPS requirements in 2020 by 600 MW, and by wrongly concluding it would need to add 400 MW of new wind in 2016, two years before it was actually needed, PSE greatly overstated the cost of RPS compliance for the "No Early Wind" scenario. As I previously noted, even with these errors the "No Early Wind" scenario had a much lower cost than every early wind scenario evaluated by PSE over the first ten years.[52] However, by greatly overstating the wind requirement and cost of the

[51] Exhibit No. AS-1HCT, p. 25 (Seelig Direct Testimony, Table 5).
[52] See Figure 1.

"No Early Wind" scenario, PSE greatly understated even further the significant cost advantage that this scenario had over the early wind cases.

Q: Are you able to estimate the impact of overstating the renewable resource need on PSE's cost/benefit analysis of adding new wind generation early?

A: Yes. As I previously noted, PSE's 2009 Re-run of the IRP analysis indicated that adding new wind generation early (in 2012) increased costs for the PSE system on average by approximately **[Begin Confidential]** XXXXXX **[End Confidential]** per year over the 2012-2015 period in the "2009 Trends" scenario, and by approximately **[Begin Confidential]** XXXXXXX **[End Confidential]** per year in the "2009 BAU" scenario when compared to the "No Early Wind" case.[53] Based on the midpoint of this range (i.e., **[Begin Confidential]** XXXXX **[End Confidential]** per year), the cost advantage of the "No Early Wind" scenario over the early wind cases evaluated by PSE would be increased by approximately **[Begin Confidential]** XXXXXXXXXXXXXXXXXXXXXXXXXXXXX **[End Confidential]** if the Company had properly recognized that new wind generation was not needed until 2018 in its "No Early Wind" scenario. Correcting for this error alone would eliminate any cost advantage of early wind scenarios forecasted by PSE.

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[53] Exhibit SN-8C.

c. Assumed termination of PTCs after 2012.

Q: What is the problem with PSE's assumption that wind PTCs would not be available on projects which entered service after 2013?

A: PSE's assumption that PTCs would not be available for any new wind generation projects placed in service after 2013 was one of the primary factors contributing to the estimated economic benefit of adding new wind early. Because PSE assumed in all scenarios that wind projects placed in service after 2013 would not be eligible for PTCs, this had the effect of creating a significant capital cost advantage for early wind generation projects, such as LSR 1, when compared to wind projects that were projected to enter service after 2013. For example, the estimated advantage of this PTC expiration assumption for a project such as LSR 1 was approximately $228 million on a present value basis.[54]

Obviously, without this very substantial assumed PTC expiration benefit, PSE's estimated economic benefit of adding new wind generation such as LSR 1 early would be entirely eliminated. For example, PSE's Re-run of the 2009 IRP analysis estimated that the net present value of the "2009 IRP Resource Plan" case, which most closely compares to the LSR 1 proposal in timing of early wind additions, was only $32 million lower than the "No Early Wind" case under the "2009 Trends" scenario, and $35 million higher than the "No Early Wind" case under the "2009 BAU" scenario. These estimates include the $228 million PTC expiration benefit for the "2009 IRP Resource Plan" case and were evaluated over a 50-year period.

[54] PSE Response to Public Counsel Data Request No. 52.

However, if the assumed $228 million PTC expiration benefit was excluded, or even reduced by 50 percent to conservatively account for the possibility that wind PTCs could be extended, with no other adjustments, the modest cost advantage of the early wind scenarios forecasted by PSE would be entirely eliminated.

Q: What was the basis for PSE's assumption in all scenarios that wind PTCs would not be available for wind projects placed in service after 2013?

A: This assumption appears to have been based on the fact that at the time the 2009 IRP was being completed, existing laws provided for wind PTCs to be effective for projects placed in service no later than December 31, 2012[55]. However, wind PTCs have been in effect almost continuously for the last 20 years, and in past IRPs PSE has assumed that wind PTCs would continue over the planning horizon even when there was not legislation supporting this.[56] For example, in PSE's 2005 IRP the Company assumed that PTCs for wind would be available over the entire planning period, but would decline in value over time.

Q: Is PSE's assumption that wind PTCs would not be available for wind projects placed in service after 2013 consistent with the Company's assumptions regarding carbon taxes?

A: No. For its analysis of the cost-effectiveness of adding wind earlier than needed, PSE assumed that carbon taxes would be in effect in 2012 and remain in effect over the entire 50-year period considered by its Re-run of the 2009 IRP analysis,

[55] PSE Response to Public Counsel Data Request No. 270.
[56] PSE Response to Public Counsel Data Request No. 271.

even though there were no laws providing for carbon taxes at the time these analyses were conducted (and still are no such laws). It was inconsistent and unreasonable for PSE to assume existing laws providing for PTCs would expire after 2013 in all scenarios, while at the same time assuming carbon taxes would be in effect in all scenarios.

At minimum, in evaluating the cost-effectiveness of early wind additions, PSE should have conservatively accounted for the potential that wind PTCs could be extended beyond 2013, as it has in past IRP analyses. This would have provided a more reasonable and conservative analysis to evaluate the potential cost effectiveness of adding new wind generation before it was needed to meet RPS requirements.

The Company's failure to consider the potential for PTCs to be available for projects placed in service after 2013 was imprudent, particularly in light of the difficult economic climate that existed at the time, and the significant impact that this assumption had on the results of the early wind analysis. By ignoring the possibility of PTC extension in its early wind analysis, PSE's analysis represents an extreme and overstated estimate of the benefits of early wind to its customers.

d. Use of outdated carbon price forecast.

Q: What are your concerns regarding PSE's 2009 Trends carbon price forecast?

A: As shown in Figure 8, the forecasted carbon prices used for PSE's 2009 Trends scenario were two to three times higher than any other carbon forecast the Company has used for resource planning analyses in recent years.

Figure 8 - PSE's Base Case Carbon Price Forecasts ($/Ton)

Year	2007 IRP	2009 Trends	2010 RFP	2011 IRP
2011	$0	$0	$0	$0
2012	$7	$37	$12	$0
2013	$7	$40	$13	$18
2014	$8	$43	$14	$20
2015	$8	$46	$15	$21
2016	$9	$50	$16	$23
2017	$9	$54	$17	$25
2018	$9	$58	$18	$27
2019	$10	$62	$20	$29
2020	$10	$67	$21	$31
2021	$11	$72	$24	$33
2022	$11	$78	$27	$36
2023	$12	$84	$30	$38
2024	$13	$90	$34	$41
2025	$13	$97	$39	$44
2026	$14	$104	$48	$48
2027	$15	$112	$60	$51

Note: Sources are PSE's response to Public Counsel Data Request Nos. 45 and 280.

The extraordinarily high level of the 2009 Trends carbon price forecast had the effect of increasing market prices used for this scenario by approximately 50 percent ($20/MWh).[57] This, of course, increased the estimated benefits of adding wind energy earlier than needed to meet RPS requirements since wind energy primarily displaces market energy purchases.

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[57] PSE Response to Public Counsel Data Request No. 315.

Q: Why was PSE's 2009 Trends carbon price forecast so much higher than the carbon forecast used by PSE to evaluate wind energy proposals received in response to its 2010 RFP?

A: PSE's 2009 Trends carbon price forecast was based on a March 2008 EPA analysis of proposed carbon legislation.[58] The much lower carbon price forecast used by PSE to evaluate wind energy proposals received in response to its 2010 RFP was based on a newer EPA analysis of carbon legislation published in October of 2009.[59] PSE indicates that it used this updated carbon price forecast "because it was lower than the 2009 Integrated Resource Plan's (IRP) base carbon price forecast and more reflective of the then-current political climate for carbon regulation."[60] Notwithstanding the availability of the new October 2009 EPA analysis, PSE continued to use the older forecast with its higher carbon costs for its Re-run of the 2009 IRP analysis of the cost effectiveness of early wind additions.

Q: Was it prudent for PSE to use the outdated carbon price forecast from March of 2008 to evaluate the cost effectiveness of adding new wind generation early in the "2009 Trends" scenario?

A: No. PSE's use of the outdated carbon forecast for the "2009 Trends" scenario resulted in the unreasonable and significant overstatement of benefits of early wind additions. As it did for the 2010 RFP process, the Company should have

[58] Exhibit SN-9.
[59] Exhibit SN-9.
[60] PSE Response to Public Counsel Data Request No. 192.

used the more recent carbon price forecast based on EPA's October 2009 analysis, as the basis for evaluating the cost effectiveness of early wind additions.

Q: Have you estimated the impact of PSE's use of the outdated carbon price forecast upon the results of the Company's analysis?

A: Yes. I estimate that if PSE had used EPA's October 2009 carbon price forecast for the "2009 Trends" scenario, this would have increased costs of early wind scenarios by approximately $99 million on a present value basis when compared to the level forecasted by PSE.[61] When coupled with other adjustments I have discussed, this carbon price update would further increase the economic advantage of the "No Early Wind" scenario over early wind cases evaluated by PSE.

e. Improper calculation of end effects.

Q: What are "end effects"?

A: End effects represent the estimated remaining value of generating resources beyond the period evaluated in resource planning studies. End effects are often considered when comparing resource plans that include plant additions that occur at different times during the planning period.

Q: What are your concerns regarding PSE's calculations of end effects for its analysis of the cost effectiveness of early wind additions?

A: There were two basic problems with PSE's end effects calculations. First, the Company improperly assumed that wind resources which retired after the 20-year evaluation period would not be replaced. This error ignores the fact that PSE

[61] Exhibit SN-10.

would need to maintain approximately 1100 MW of wind generation to meet its RPS requirements after 2029 in all scenarios. By failing to replace units that retire during the end effects evaluation period, PSE's end effects calculation has improperly created a mismatch in the level of wind resources during the end-effects period. This mismatch results in a higher end effects cost for the "No Early Wind" scenarios which add wind resources later, while at the same time understating end effects costs for the early wind addition scenarios whose units are retired earlier during the end effects period.

My second major concern with PSE's inclusion of end effects estimates is that the Company's end effects calculations are inherently uncertain due to the fact that they involve forecasts of market prices, generating unit performance and generation for a period that is 20 to 50 years into the future. For this reason, and due to the flaw in PSE's end effects calculation, the Company's end effects estimates should not be relied upon as a primary component of a cost/benefit analysis for early wind additions.

Q. How do PSE's flawed end effects calculations impact the results of the Company's cost effectiveness analysis of early wind additions?

A. PSE's end effects estimates serve to overstate the benefit of early wind scenarios by approximately **[Begin Confidential]** XXXXX **[End Confidential]** on a present value basis.[62] Removing this flawed and uncertain cost component from PSE's early wind analysis further increases the economic advantage of the "No Early Wind" case over early wind scenarios.

[62] Exhibit SN-11C.

f. Failure to evaluate REC purchase alternatives.

Q: What is your concern regarding PSE's failure to consider REC purchases as an alternative in evaluating the cost- effectiveness of adding wind early?

A: PSE's economic analysis did not evaluate REC purchases as an alternative to the acquisition of new wind generation facilities as a means to supply a portion of the Company's RPS requirements. For example, as noted earlier in my testimony, PSE could have met its RPS requirements through 2020 without LSR 1, for a total cost of approximately $33 million, based on the Company's REC price forecast. This could have been achieved by purchasing RECs to meet forecasted RPS shortfalls in 2018, 2019 and 2020. The failure to consider the option of purchasing RECs, which the Company forecasts would cost approximately $8/MWh, greatly overstated the cost of RPS compliance in the "No Early Wind" scenario. This, in turn, overstated the estimated benefits of acquiring new wind energy projects, such as LSR 1, early by approximately **[Begin Confidential]** XXXXXXX **[End Confidential]**.[63]

2. DCF Analyses.

Q: Did PSE's DCF analyses address the cost-effectiveness of adding new wind generation before it was needed to meet RPS requirements?

A: No. As shown in Figure 9 below, PSE's DCF analyses only evaluated wind build scenarios which added significant amounts of new wind capacity early; i.e., before the 2016-2018 timeframe that new capacity was required to meet the RPS target. The DCF analyses did not evaluate any "No Early Wind" scenarios.

[63] Exhibit SN-12C.

Figure 9 - Wind Build Schedule for DCF Model[64]

Annual MW Development										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
LSR 7-28-09 Development Plan	0	250	250	0	0	250	0	0	0	250
Accelerated 500 Development, then IRP	0	500	0	0	0	100	0	200	0	200
IRP Development Plan	0	300	0	100	0	200	0	200	0	200
Phase 400 MW Development – then IRP	0	200	200	0	0	200	0	200	0	200
Phase 500 in 2 yrs – then IRP	0	250	250	0	0	100	0	200	0	200
Phase 600 MW Development – then IRP	0	300	300	0	0	0	0	200	0	200
Phase 800 MW Development – then IRP	0	400	400	0	0	0	0	0	0	200
Phase 1000 MW Development – then IRP	0	500	500	0	0	0	0	0	0	0
Phase 1200 MW Development – then IRP	0	600	600	0	0	0	0	0	0	0

Moreover, PSE's DCF analyses considered only the differences in *capital costs* between these early wind resource plans. In essence, the purpose of the DCF analyses was simply to identify how much new wind generation could be added before December 31, 2012.[65] These analyses did not address whether the total capital and operating costs of adding wind generation projects such as LSR 1 early were economically justified when compared to the alternative of not adding new wind generation until needed.

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[64] Exhibit No. AS-1HCT, p. 22 (Seelig Direct Testimony, Table 3).
[65] Exhibit No. AS-1HCT, pp. 21-22 (Seelig Direct Testimony). December 31, 2012 was the date PSE assumed that federal tax incentives for new wind projects would expire in all scenarios.

3. Analysis of Wind Proposals from PSE's 2010 RFP.

Q: Did PSE's analyses of wind energy proposals received in response to the Company's 2010 RFP address the cost-effectiveness of adding new wind generation early?

A: No. The comparative analyses of wind energy proposals received in response to PSE's 2010 RFP did not address whether adding new wind generation early was cost justified. These analyses simply compared the costs of LSR 1 and other wind energy proposals, all of which were anticipated to begin service in 2012. The analyses did not examine whether such proposals were cost-justified when compared to an alternative of not adding new wind generation until needed to meet PSE's RPS requirements.

4. Summary of Findings on Cost Effectiveness of Early Wind

Q: Please summarize your findings regarding PSE's analysis of the cost effectiveness of adding new wind generation such as LSR 1 before needed to meet RPS requirements?

A: PSE's analysis of the cost effectiveness of adding wind early was flawed by a number of major errors and unreasonable assumptions. As shown in Figure 1 of my testimony, the Company's flawed cost effectiveness analysis estimated no benefits from early wind additions over the next 10 years under all scenarios, and no benefits over the next 20 years in half of the scenarios evaluated. Even without correcting for the analytical flaws that I have discussed (i.e., PTC termination, excessive carbon costs, excessive wind additions, etc.) which improperly biased the economic analysis in favor of early wind additions, the

Company's own analysis indicates that *there are no forecasted benefits* of adding new wind generation early in any scenario over the next 10 years.[66] In fact, PSE's analysis forecasts an average net increase in costs for early wind scenarios over the 20-year planning horizon under its 2009 IRP early build plan when compared to delaying new wind additions until 2016. With reasonable adjustments to address the flaws in PSE's analysis that I have discussed, the cost advantage of postponing wind additions until needed over the early wind scenarios is overwhelming.

Q: Have there been any changes in market conditions since PSE completed its last analysis of the cost effectiveness of early wind additions in October of 2009 that are likely to increase the benefits associated with early wind additions such as LSR 1?

A: No. In fact, the major changes which have occurred since PSE completed its analysis of the benefits of early wind additions would reduce the level of early wind benefits estimated by the Company. For example, the revenue requirement of LSR 1 requested in this case is $22.8 million per year higher than the level assumed in PSE's economic analyses of the project in comparison to competing bids in its 2010 RFP.[67] Carbon taxes, which were a major assumed benefit of new wind energy in PSE's earlier analyses, have not been implemented. Market prices are also currently much lower than assumed by PSE in its analysis of early wind additions, which further decreases the forecasted benefits of early wind additions

[66] Exhibit No. SN-5.
[67] PSE Response to Public Counsel Data Request No. 279.

from the level estimated by PSE in justifying its decision to construct LSR 1

In addition, due to the continuing slow pace of the economic recovery, the Company's load forecast is now approximately 6 percent lower than the forecast used to evaluate the cost effectiveness of early wind additions in the "2009 Trends" scenario. As shown in Figure 10 based on PSE's 2011 load forecast, with the addition of LSR 1 and no other new wind additions, PSE's available renewable energy would be 1.4 to 7.3 times the level needed to meet RPS requirements through 2020.

Figure 10 - PSE Existing Renewable Energy Plus LSR 1 vs. 2011 Forecast of RPS Requirements (GWh)

Year	1 / RPS Load, GWh	RPS Target	RPS Target GWh	2 / LSR 1 Renewable, MW	3/ Projected Renewable GWh	Projected % of Target	Projected Surplus/(Deficit)
2011	21,391	0%	-	0	1,322		1,322
2012	21,191	3%	636	342.7	3,548	558.1%	2,912
2013	21,541	3%	646	342.7	4,540	702.5%	3,894
2014	21,620	3%	649	342.7	4,693	723.5%	4,044
2015	21,731	3%	652	342.7	4,757	729.8%	4,106
2016	21,900	9%	1,971	342.7	4,761	241.6%	2,790
2017	22,053	9%	1,985	342.7	4,761	239.9%	2,776
2018	22,124	9%	1,991	342.7	4,757	238.9%	2,766
2019	22,142	9%	1,993	342.7	4,757	238.7%	2,765
2020	22,222	15%	3,333	342.7	4,761	142.8%	1,428
			13,856				

Notes: 1 / Source is PSE's response to Public Counsel Data Request No. 273.
2 / LSR 1 Renewable MW reflects proposed LSR 1 capacity only.
3 / Projected renewable reflects existing, plus proposed and banked renewable generation.

For the above reasons, the cost increase resulting from PSE's decision to construct LSR 1 early will be far greater than estimated by the Company in its 2009 early wind cost effectiveness studies. Given the economic uncertainty and uncertainty involving carbon regulations that existed when PSE completed its early wind studies in late 2009, it is not surprising that the benefits of early wind additions have proven to be much lower than predicted by the Company at that time.

Q: What do the results of PSE's cost effectiveness analysis for LSR 1 and the revised forecast of PSE's RPS requirements in Figure 10 indicate regarding the Company's previously expressed plan to develop other phases of the LSR wind project over the next few years?

A: As shown in Figure 10, under PSE's current load forecast, the addition of LSR 1 will produce more renewable energy than is needed to meet the Company's RPS requirement through 2020. Including the Treasury Grant benefit, the cost of energy from the LSR 1 project is approximately $138/MWh, which is approximately **[Begin Confidential]** XX**[End Confidential]** times PSE's forecasted rate year price of market energy purchases. PSE has no need for additional wind energy from development of additional phases of the LSR project (or from other wind resources) for the foreseeable future. Given these facts, any plan by the Company to expand its investment in LSR wind energy resources would be imprudent at this time.

VI. USED AND USEFUL DETERMINATION

Q: What are the key issues underlying the Commission's used and useful standard as applied to new wind resources, such as LSR 1, that are added before needed to meet RPS requirements?

A: The Commission's used and useful standard for early wind resources such as

LSR 1 is described in the Commission's *Renewable Resource Policy Report* as follows:

> Early acquisition of a renewable resource is "useful" in that it will meet the RPS at some point in the future. It also needs to be "used." Therefore, the utility must show that the resource produces benefits that offset the cost of early acquisition. This could include sale of energy generated from the plant, sale of RECs from the plant, or other value to the company attributable to the acquisition.[68]

Q: Do PSE's economic analyses of LSR 1 demonstrate that the benefits of the project offset the cost of early acquisition and therefore meet the "used" standard?

A: No. As discussed earlier in my testimony, PSE's economic analysis of the early wind addition option show that the costs of adding wind early do not offset the forecasted benefits, even with the Company's extreme assumptions which unduly bias the results in favor of the early wind addition option. Moreover, as shown in Figure 5 of my testimony, the addition of the LSR 1 project will cause the Company to significantly exceed its RPS target through 2020. For wind projects that exceed the RPS, the Commission indicates that it would apply the same "used and useful" standard which it applies to any other new resource addition, which requires that an asset provide benefits to ratepayers in Washington that are reasonably quantifiable and commensurate with their costs.[69]

[68] *Renewable Resource Policy Report*, ¶ 56.
[69] *Renewable Resource Policy Report*, ¶ 63, ¶ 31.

Q: Has PSE demonstrated that LSR 1 will provide benefits to ratepayers that are commensurate with the cost of the project?

A: No. LSR 1 is not needed to meet RPS requirements at this time. The cost of the project after the Treasure Grant credit on a $/MWh basis is approximately **[Begin Confidential]** XX **[End Confidential]** times the forecasted rate year price of market purchases and 2 to 3 times the forecasted price of market purchases at the time the Company decided to construct the project.

Q: Does LSR 1 meet the Commission's used and useful standard?

A: No. The LSR 1 project is not needed to meet RPS requirements until 2018 at the earliest, and as indicated by the results in my Figure 1, is not expected to benefit customers when compared to the "No Early Wind" alternative for the next twenty years.

VII. RECOMMENDED RECOVERY OF LSR 1 COSTS

Q: What are your recommendations regarding the recovery of costs for the LSR 1 project in this case?

A: PSE has requested that it be allowed to recover approximately $158 million for its investment in LSR 1 in this case.[70] For the reasons explained earlier in my testimony, I believe that PSE's $848 million investment in LSR 1 was imprudent and unnecessary and that the plant will not be used and useful when placed in service early next year. The early addition of the unit was not cost justified.

[70] This amount excludes approximately $33.6 million in estimated power cost savings and the Treasury Grant credit which will be reflected in a separate tariff.

In light of these facts, I recommend that the LSR 1 revenue requirement requested by PSE be reduced by $55 million. This disallowance represents **[Begin Confidential]** XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXX **[End Confidential]** The "2009 IRP Resource Plan" early wind scenario most closely reflects the early wind addition associated with the proposed LSR 1 project. Although the actual cost impact on customers of PSE's LSR 1 investment is much larger than my recommended disallowance, my disallowance conservatively reflects the estimated additional cost expected to be incurred due to early wind additions based on the Company's estimates at the time the decision was made to select LSR 1.

My recommendation allows PSE to recover requested operations and maintenance costs, depreciation, property taxes, insurance, and related wheeling and wind integration costs, and debt financing costs for the project, plus a modest return on equity. In addition, under the existing PCA deadband mechanism, PSE will be able to recover additional project costs for the LSR 1 project to the extent the plant operates at a higher capacity factor, or if displacement power cost savings from the plant otherwise prove to be higher than forecasted by the Company in this case. recommendation

My recommendation is designed to mitigate the harm to ratepayers of PSE’s imprudent decision to construct LSR 1 early, by providing a a reasonable sharing of the additional near-term costs incurred as a result of the Company's

imprudent decision to proceed with this discretionary and costly project.

Q: Does that conclude your pre-filed direct testimony?

A: Yes.