BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of Application No. 2006-02

Desert Claim Wind Power Project

EXHIBIT 13

PREFILED DIRECT TESTIMONY

JAMES LITCHFIELD

Q. Please state your name and business address.

A. My name is James W. Litchfield. I am the President of the Litchfield Consulting Group, Inc. (LCG) based in Portland, Oregon. My business address is 7 Spinosa, Lake Oswego, Oregon 97035.

Q. What is your current occupation?

A. I am a consultant working for electric utilities, power producers and regional planning and regulatory bodies.

Q. What is the subject of your testimony?

A. My direct testimony is intended to address the following subjects:

1. My background and experience.

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2. An overview of electricity load and resources in the Pacific Northwest.

3. The role of new renewable generation (including wind) in the Pacific Northwest and Washington specifically.

4. Renewable portfolio standards adopted by Washington voters in initiative I-937.

5. The public policy issues surrounding utility planning and wind development

Background & Experience

Q. Please describe your background.

A. Since January 1992, I have been the President of LCG, which provides consulting services concerning energy supply planning and salmon recovery issues. LCG's clients include public and private utilities, independent power producers, industrial customers, regulatory agencies, regional planning commissions, and the States of Idaho and Montana. My professional focus, with respect to meeting the region's electric power needs, is in assisting with strategic planning, selection of new power resources, and negotiating long-term power contracts.

Before forming LCG, I was the Director of Power Planning for the Northwest Power Planning Council (now called the Northwest Power and Conservation Council) from 1981 until January 1992. In that role, I was responsible for managing the Council's technical staff, as well as for designing and implementing new planning techniques known as "Integrated Resource Planning (IRP)." As the Director of Power Planning, I led the staff in the development of IRP methods, and in the collection of data and analysis of technical, economic and environmental aspects of alternative approaches for meeting future electric power demand. My staff and I drafted the Northwest

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Conservation and Electric Power Plans and their supplements, which were produced in 1983, 1986, 1989 and 1991.

Before that, I was involved in national and regional energy planning and research at Battelle Northwest in Richland, Washington from 1973 to 1981.

I have a Masters degree in Management from MIT, and a Bachelors of Science degree in Civil Engineering from the University of Washington. A copy of my curriculum vitae is provided as **Exhibit 13.1.**

Q. Have you testified as an expert witness before the Washington Energy Facility Site Evaluation Council (EFSEC) before?

A. Yes. I have testified as an expert witness concerning power supply and energy planning issues in four EFSEC proceedings: the Northwest Regional Energy Project in 1996, the Sumas Energy 2 Project proceedings in 2001, the Wallula Generation Facility proceedings in 2002, and the BP Cherry Point Cogeneration Project proceedings in 2003.

Regional Electric Load and Generating Resources

Q. In your expert opinion, is there a need for additional electrical power generating capacity in the Pacific Northwest?

A. Yes. Demand for electric energy continues to grow in the Pacific Northwest due to both increased population and economic activity. As demand grows, additional

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power supply must be available to meet this growth or electric power system reliability will degrade. In addition, the existing resource base continues to age and uncertainty with respect to future fuel availability, price and environmental regulations make it likely that some existing resources will be retired over time.

The simplest and most straightforward way to evaluate the need for additional power supply is to compare the demand for electricity with the available supply. This is called "load-resource balance." In the Pacific Northwest, three regional entities – the Bonneville Power Administration (BPA), the Pacific Northwest Utilities Conference Committee (PNUCC) and the Northwest Power and Conservation Council (NPCC) produce comprehensive analyses of the current and future status of the region's electric power system. These analyses utilize different methods and assumptions but ultimately produce load and resource data that can be used to assess the reliability of the region's power system. These data are collected and published frequently to track the adequacy of the current and future generation system to meet forecasts of the future demand for electric power.

Q. What does the BPA's analysis indicate about the region's load-resource balance?

A. BPA publishes an annual report known as the "White Book." The most recent White Book is the "2007 Pacific Northwest Loads & Resources Study: Operating Years 2008 through 2017" published in March 2007 and updated in February 2008. The following table reports the overall regional load-resource balance estimated by BPA.

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It shows a current regional surplus of energy generation capability over projected loads of 2968 MWa. This surplus is projected to be reduced to essentially load-resource balance by 2017.

Table 4

2007 White Book
PNW Regional Firm Energy Surplus/Deficit
Using 1937-Critical Water Conditions
Annual Energy in Average Megawatts

Operating Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total Firm Loads	22,534	22,882	23,273	23,518	23,751	23,991	24,252	24,510	24,741	25,025
Net Resources	25,502	25,257	25,562	25,296	25,304	25,210	25,393	25,189	25,367	25,302
Surplus/Deficit[1]	2,968	2,375	2,289	1,778	1,553	1,218	1,142	680	626	277

Although the projections presented in the table above show a regional surplus through 2017, these projections assume that all power generated in the region by independent power producers (IPP) will be available to the region unless it is already subject to a contractual commitment elsewhere. In fact, substantial uncertainties exist with respect to fuel supply, price and availability of transmission to move IPP generation to load centers, in addition to issues with respect to the contractual rights to power produced by independent power producers.

BPA conducted a sensitivity analysis by assuming that varying amounts of IPP generation would be used to meet regional power demands in the future. The results of BPA's sensitivity analysis are shown in the following table.

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Table 5

2007 White Book
Potential Variability of Regional Firm Energy Surplus/Deficit
Utilizing Different Levels of IPP Generation Delivered to the Region
Annual Energy in Average Megawatts

Operating Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
S/D 100% PNW IPP Delivered (4,022 aMW)	2,968	2,375	2,289	1,778	1,553	1,218	1,142	680	626	277
S/D 75% PNW IPP Delivered (3,016 aMW)	1,967	1,363	1,283	772	541	206	130	-332	-380	-729
S/D 50% PNW IPP Delivered (2,011 aMW)	967	351	277	-235	-471	-806	-882	-1,344	-1,386	-1,735
S/D 25% PNW IPP Delivered (1,006 aMW)	-34	-661	-729	-1,241	-1,483	-1,818	-1,894	-2,356	-2,392	-2,741

This table illustrates the significant uncertainty the region's power system currently faces with respect to load-resource balance. In 2008, the region is currently deficit, if only 25 percent of the IPP generation is available to meet regional demand. If BPA assumes that 50% of the current IPP generation can be secured through firm contracts with regional utilities, then the region is deficit at meeting firm loads by 2011.

In a BPA press release, announcing availability of the 2007 White Book, BPA's Senior Vice President, Paul Norman said,

> "Adequate power supplies are crucial to the region's economy, as well as the safety and well-being of the people who live here," says Paul Norman, BPA senior vice president. "The population of the Northwest is growing at a rapid rate.

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> Critical decisions need to be made about where the region gets electricity and how much we will pay for it."
>
> The White Book results reinforce the need for actions already underway at BPA and many utilities, including cost-effective energy conservation and load management programs; development and acquisition of generating resources; and transmission system reinforcements. Norman said, "There is not a power supply crisis, but neither can we afford to coast."

BPA's analysis in the White Book clearly illustrates the substantial uncertainty and risks facing the region due to the large amount of gas-fired IPP generation that is currently uncommitted to meeting regional loads. Even if regional utilities purchase output from IPP plants under long term contracts, there will continue to be substantial risks due to uncertainty with future cost and availability of natural gas to fuel most of the IPP generation.

Q. What does the Pacific Northwest Regional Forecast (NRF) indicate about the need for electric power generation in the region?

A. The Pacific Northwest Utilities Conference Committee (PNUCC) prepares annual forecasts of loads and resources. The most recent is the "Northwest Regional Forecast of Power Loads and Resources: August 2009 – July 2019," published in April 2009. PNUCC is an association of the region's electric utilities, which causes it to focus on the question of when utilities will need to acquire additional resources. The Northwest Regional Forecast presents a comparison of firm utility resources

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compared to the firm loads the utilities are obligated to serve. PNUCC's planning standard requires that firm resources exceed firm loads during the 10 year planning horizon. Only when firm resources exceed firm loads is an electric power system reliable. The Northwest Regional Forecast concludes that the region's utilities need to acquire additional resources because there is currently a firm load/resource deficit. The following graph displays the Northwest Regional Forecast's regional deficit, or need for additional power supplies to maintain system reliability.

PNUCC's press release describing the results of the latest Northwest Regional Forecast recognized the short term effects of the current economic slowdown but concluded that load growth will resume when the economy rebounds. The following is from PNUCC's press release:

> "Despite the economic downturn, utilities expect load to continue to grow in the Northwest," PNUCC's deputy director Shauna McReynolds stated. "Utilities' resource plans reflect some slowdown in the near term, but the pace is projected to pick up again," she said. Overall, including expected conservation savings, loads are forecast to grow about 270 average megawatts annually."

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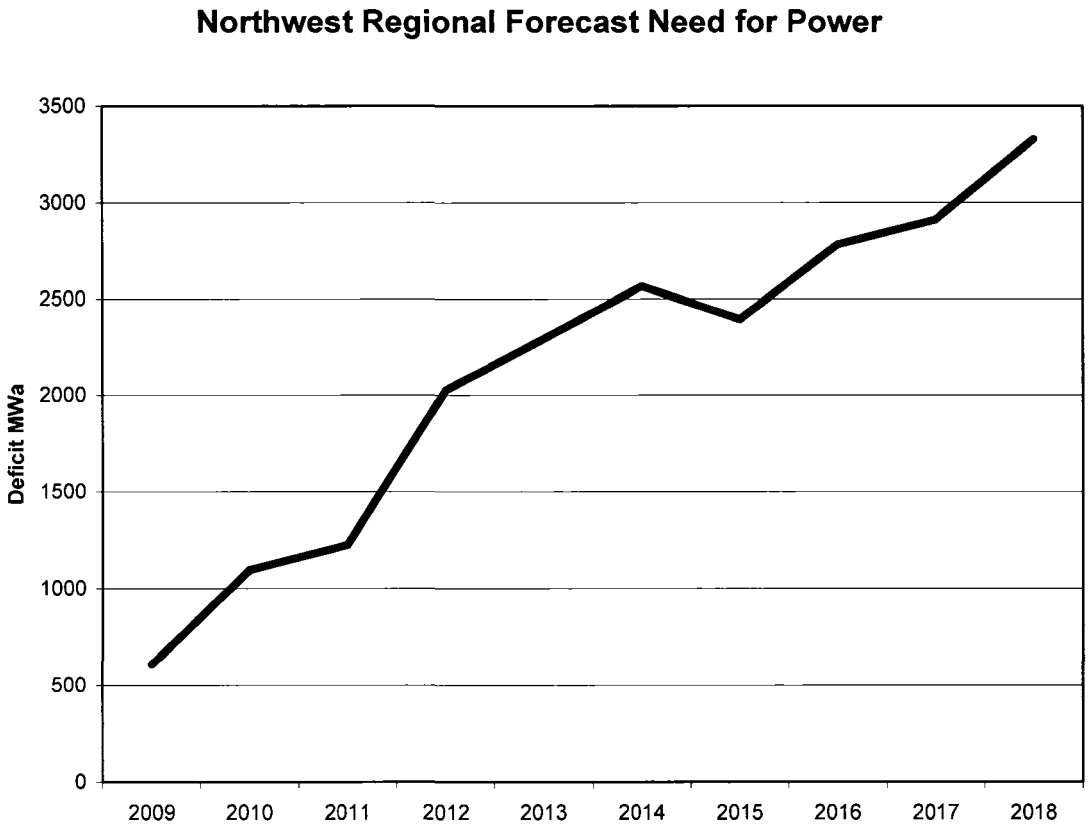

This graph shows that the region currently needs approximately 600 MWa of firm power generation to meet firm loads this year. The Northwest Regional Forecast also predicts this deficit to grow to a need of more than 3300 MWa by 2018-19. This is a large and growing need that, in order to maintain system reliability, must be met through the development of new generation, much of which will likely be renewable due to public mandates that I discuss later in this testimony.

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Q. What does the Northwest Power and Conservation Council (NPCC) project for the northwest's future power needs?

A. The NPCC develops an electric power plan for the region. The plan is required by the Northwest Power Act that was passed by Congress in 1980 and formed the NPCC to address the region's power needs and to advise the Bonneville Power Administration on the resources that it should acquire to meet the future needs of the agency's customers. The most recent power plan (Fifth Power Plan) was adopted by the NPCC in December 2004, and the NPCC is currently preparing the sixth regional power plan due to be published later this year.

In the Fifth Power Plan, the NPCC found that the region was unlikely to need new generating resources before 2010. This conclusion was entirely driven by the NPCC's decision to include the current surplus of IPP generating capacity as "available" to meet regional loads. However, the Fifth Power Plan also recognizes that the majority of the surplus IPP generation is not contractually committed to meeting firm regional loads on a long-term basis.

While the Fifth Power Plan did not call for large amounts of new generation before 2010, the Council did call for further development of wind power to fully demonstrate the technical and economic issues associated with this important source of renewable energy for the region. The Plan recommended the development of 500 MW of wind power over the first five years to provide the region with necessary experience in large scale wind development in the future.

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Q. What does the NPCC currently estimate to be the adequacy of the region's resources to maintain system reliability?

A. In 2005, the NPCC joined with BPA to form the Pacific Northwest Adequacy Forum (Forum). The purpose of the Forum was to develop a methodology for evaluating the ability of the region's generation resources to reliably meet forecasts of future loads. The NPCC was particularly concerned that the power crisis in 2000 was primarily caused by the failure to construct sufficient resources during the last half of the 1990s. In conducting this work, the NPCC utilized computer models of the region's power system to estimate the probability that actual resources might fail to meet regional loads. This analysis is called "loss of load probability" because it estimates the probability that there will be a black out due to insufficient generation to meet load.

In 2008, the NPCC adopted the first regional adequacy standard. This standard uses a five (5) percent loss of load probability (LOLP) as the appropriate risk of outage that defines an "adequate" power system. Based on this level of reliability the NPCC's estimates of the current and future levels of power system reliability are shown in the following table. The column labeled "threshold" is the level of energy surplus or capacity reserve margin that the Council finds will maintain the 5 percent LOLP.

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Table 1
Annual Energy and Sustained Period[2] Capacity Assessments for 2011 and 2013

	2011	2013	Threshold
Annual Energy	2,600 MWa	1,900 MWa	0 MWa
Winter Capacity	46 %	40 %	23 %
Summer Capacity	34 %	29 %	24 %

This table shows that the region's power system is adequate when evaluated on both an energy and capacity basis. The energy surplus estimated by the NPCC as 2600 MWa in 2011 is reduced to 1900 MWa by 2013. There is a larger winter capacity surplus than in the summer. The greatest adequacy concerns are with the summer capacity margin in 2013, which is estimated to be 29 percent, above the 24 percent threshold of concern.

Q. What does the NPCC conclude based on this analysis of the adequacy of the region's power system?

A. The NPCC's adequacy standards recognize that there are both physical and economic impacts from insufficient resources to meet loads. Far sooner than actually experiencing a blackout, the region's utilities would begin to experience periods where utility-owned resources were insufficient to meet their obligations to serve the demand. During these periods, the cost of purchasing power from the competitive market would dramatically increase. This volatility in the cost of meeting the needs of a utility's customers would create a source of economic risk for a utility and, through electric power rates, for its customers. This is why the NPCC

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developed what it called the "economic" standard. The NPCC concluded the following in the latest adequacy assessment:

> "However, the assessment against the minimum physical standard does not address economic, environmental and other factors taken into consideration when planning for new resources. For example, the current assessment compared to the implied resource development in the Council's 5th power plan indicates that the region may not have sufficient existing resources to avoid potentially high prices five years into the future. However, the current rate of investment in conservation, renewable and other types of resources appears more than adequate to achieve future price stability. Most Northwest utilities, including the Bonneville Power Administration, are actively assessing their own resource needs and are taking actions to comply with recently adopted renewable resource portfolio requirements in Oregon, Washington and Montana and to address any resource deficiencies in their systems."

Q. Is the current electricity load-resource balance in Washington similar to the regional balance described above?

A. It is not really appropriate to consider the load-resource balance at the state level. Washington State is part of an interconnected regional power system that coordinates all generation and transmission facilities to meet all loads. Electricity generated in one state is not necessarily consumed in that state because physical, not manmade, laws determine the flow of electric power. It is far more useful to compare regional

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loads and resources because this will show if there are deficits in generating capability that are likely to affect the region's power system reliability. If system reliability is in jeopardy anywhere in the region, reliability is an issue everywhere in the region.

Q. What is the current mix of electricity resources serving the region and Washington?

A. According to NPCC, approximately half (49%) of the region's electricity supply is currently produced by hydroelectric dams. Actual hydropower generation fluctuates with rainfall and snow pack but in an average water year the hydroelectric system provides approximately 16,000 MWa of energy. Assuming the worst water availability in the 50 year historical record, the hydropower system will produce approximately 12,000 MWa of energy. The NPCC estimates that the total annual energy generating capability in the region, assuming average water conditions, is about 33,000 MWa. The following graph shows the percentages of regional generation by type.

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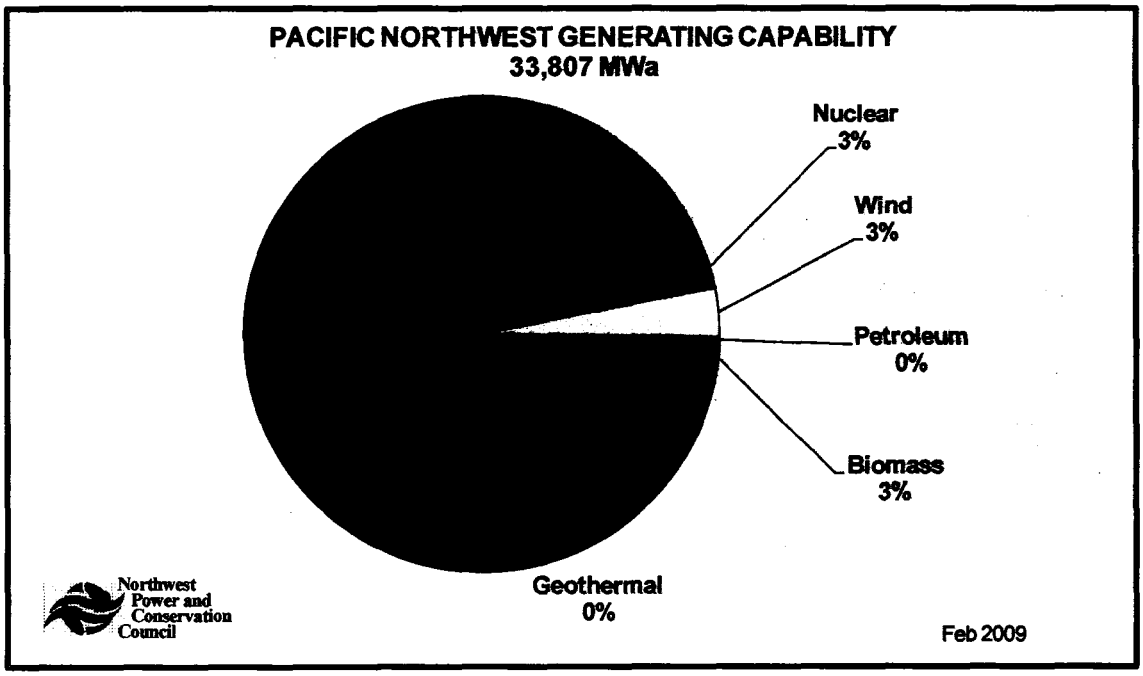

The State of Washington produces a Biennial Energy Report. The most recent version, the "2009 Biennial Energy Report with Indicators: Issues and Analysis for the Washington State Legislature and Governor" was published in December 2008. This report contains extensive information on energy consumption and production in the state. The Biennial Energy Report recognizes the difficulty with trying to account for only Washington's electric power consumption and production. For example, the state relies heavily on hydroelectric resources, but the hydropower used by Washington is dominated by the output of the Federal Columbia River Power System, which is located throughout the Pacific Northwest region and Canada. In addition, much of hydropower generation occurs when the snow pack melts or during wet periods with high precipitation, while Washington's peak need for electricity occurs in the winter.

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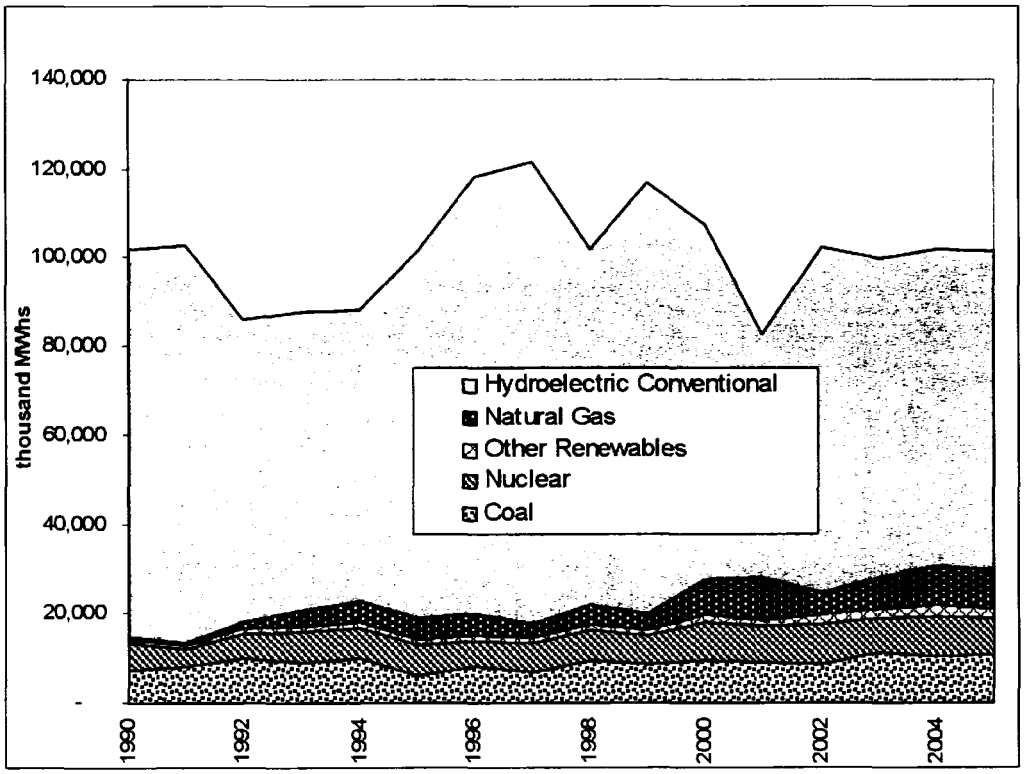
During a typical year, Washington exports excess hydropower during some time periods while during other periods the state imports electricity to meet winter power demand. The state usually exports hydropower energy but imported electricity is primarily based on coal and natural gas.

The following chart is from the 2007 Biennial Energy Report. It shows the dominance of hydropower in the mix of Washington's existing generation.



The 2009 Biennial Energy Report presented the source of all electric power used by Washington consumers. This includes imported energy in addition to the electric power generated in the State. The following graph shows the mix of electric power

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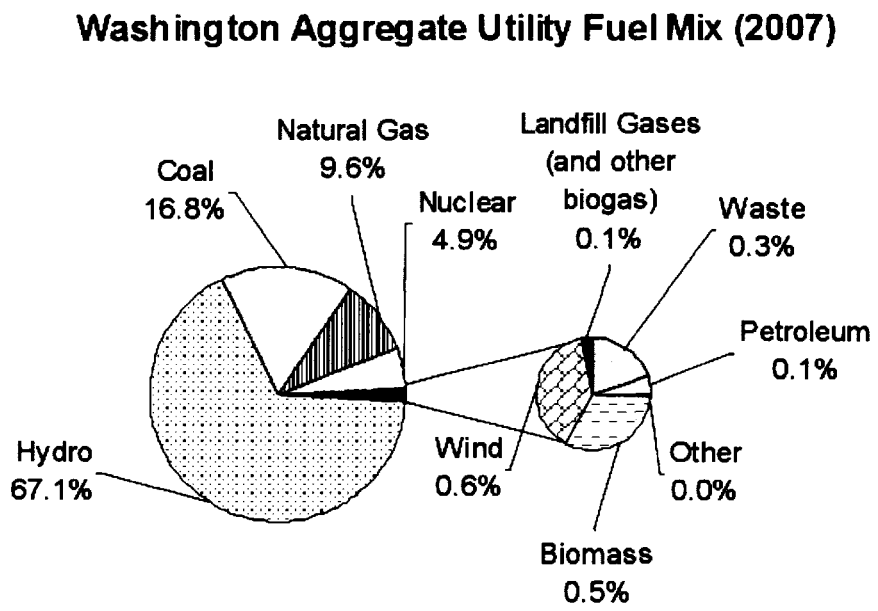
generation used by Washington which is dominated by hydropower, coal, natural gas and nuclear. The chart also shows that new renewable sources of energy are less than 2 percent of the total electric power supply in 2007.



Q. What impact will the current economic recession have on the need for new power resources?

A. Economic downturns or recessions have an impact on loads when the economy is in retraction. However, once the economy recovers consumers return to consuming power in similar ways to what was occurring before the recession. The NPCC recently estimated the long-term demand for power in this region. They showed the historical level of electricity demand from 1986 to the present and then the current forecasts of demand for the Sixth Power Plan now under development. The thing to

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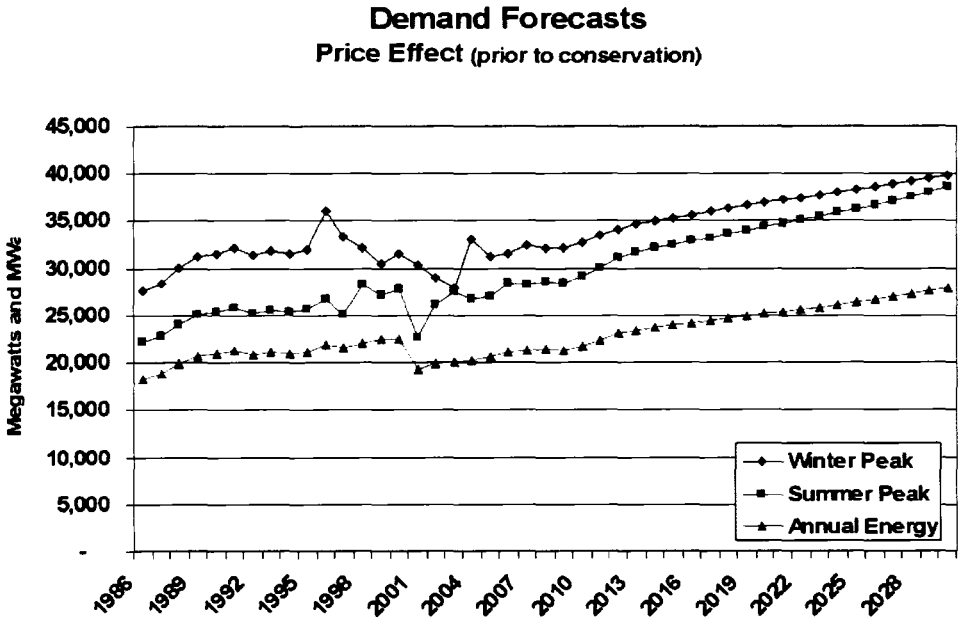
note in this chart is the effect of the economic correction in 2001 and that demand for power returned within a few years to approximately the level it was before the economic downturn even though hundreds of megawatts of aluminum company demand did not return after the West Coast Power crisis that occurred at approximately the same time. Following the relatively short drop in loads it is clear that the region resumed approximately the same level of load growth.



Role of Renewable Generation

Q. What role does renewable generation currently play in the Pacific Northwest?

A. According to NPCC, in 2009, approximately 49% of the region's electricity was generated by hydropower, 3.0% biomass, and 3.0% wind. In February 2009, the NPCC reported that 3098 MW of wind capacity has been put into operation, 473 MW are under construction and 1256 MW are in the planning stage. As of March 2009, BPA reports that they now have 1968 MW of wind capacity installed in the

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agency's control area. Wind power is currently the resource of choice to meet renewable and climate change mandates as well as future electric power demand without increasing reliance on fossil fuels.

Q. What role do you expect renewable generation to play in the region going forward?

A. I expect the reliance on renewable power to increase due to public mandates and the need to diversify utility resource portfolios. Renewable resources are currently being driven by state and national energy policies due to the increasing recognition that renewable resources will bring long-term environmental, economic and energy independence advantages over conventional fossil-fired generating resources. National and regional energy policies are now aligned on the need for rapid and dramatic changes in the energy resources that the region and nation have historically relied upon.

Q. Why do you expect greater reliance upon renewable resources in the future?

A. There are several reasons.

First, twenty-four states, including Washington, Oregon and Montana, have adopted some form of Renewable Portfolio Standard that requires greater reliance by utilities on renewable resources. The following table shows the current state RPS requirements.

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State	Amount	Year	Organization Administering RPS
Arizona	15%	2025	Arizona Corporation Commission
California	20%	2010	California Energy Commission
Colorado	20%	2020	Colorado Public Utilities Commission
Connecticut	23%	2020	Department of Public Utility Control
District of Columbia	11%	2022	DC Public Service Commission
Delaware	20%	2019	Delaware Energy Office
Hawaii	20%	2020	Hawaii Strategic Industries Division
Iowa	105 MW		Iowa Utilities Board
Illinois	25%	2025	Illinois Department of Commerce
Massachusetts	4%	2009	Massachusetts Division of Energy Resources
Maryland	9.5%	2022	Maryland Public Service Commission
Maine	10%	2017	Maine Public Utilities Commission
Minnesota	25%	2025	Minnesota Department of Commerce
Missouri*	11%	2020	Missouri Public Service Commission
Montana	15%	2015	Montana Public Service Commission
New Hampshire	16%	2025	New Hampshire Office of Energy and Planning
New Jersey	22.5%	2021	New Jersey Board of Public Utilities
New Mexico	20%	2020	New Mexico Public Regulation Commission
Nevada	20%	2015	Public Utilities Commission of Nevada
New York	24%	2013	New York Public Service Commission

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North Carolina	12.5%	2021	North Carolina Utilities Commission
Oregon	25%	2025	Oregon Energy Office
Pennsylvania	18%	2020	Pennsylvania Public Utility Commission
Rhode Island	15%	2020	Rhode Island Public Utilities Commission
Texas	5,880 MW	2015	Public Utility Commission of Texas
Utah*	20%	2025	Utah Department of Environmental Quality
Vermont*	10%	2013	Vermont Department of Public Service
Virginia*	12%	2022	Virginia Department of Mines, Minerals, and Energy
Washington	15%	2020	Washington Secretary of State
Wisconsin	10%	2015	Public Service Commission of Wisconsin

Congress is also debating various legislative proposals that would require or provide incentives for increased renewable resource development. These include proposals for a national renewable portfolio standard.

Second, the increase in wholesale power prices has made renewable resources more competitive in the market. The price of electric power in the wholesale power market is primarily driven by the marginal cost of the highest variable cost (least efficient) power plant needed to meet demand. For most of the time in the western power system, this tends to be a power plant fueled by natural gas. Since 2000, natural gas markets have been highly volatile and while prices have decreased recently, the NPCC's forecast of long range prices for natural gas (shown below) continues to increase.

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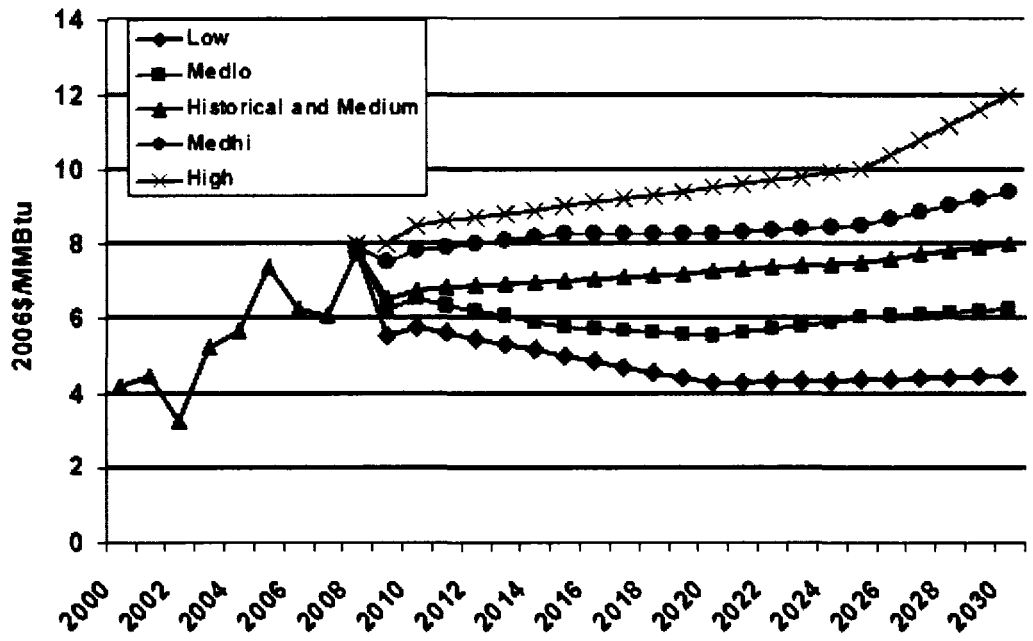

While it is not possible to precisely predict future natural gas prices, it is likely that future prices for all energy sources will continue to increase over time. This is due to increased world demand for fossil fuels that are increasingly expensive to find, extract and transport to energy markets around the world. The expectation that the cost of power generated with fossil fuels is likely to remain high and that future supplies are risky creates a clear incentive to secure available renewable resources. Power generated by wind is currently competitive with fossil fueled power plants.

Third, price volatility in recent years has encouraged utilities to diversify their resource base. The volatility in the price of natural gas makes fuel-free renewable resources especially attractive because they are effective risk management tools. When utilities purchase a fossil-fired resource, the most significant decision is how

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to best manage future fuel risk. This is because the majority of the lifecycle costs of a fossil fired power plant are embodied in the uncertain future costs of fuel. Currently, the only feasible fossil fired power resource in the region is natural gas-fired combustion turbines in either a combined-cycle or single-cycle configuration. Coal fired resources are currently unacceptable due to increasing climate change concerns and the high levels of CO_2 produced by these plants. This, in all practicality, limits the current major new generation choices for utilities to only renewable wind power or natural gas-fired power plants. Renewable wind power plants are free from fuel risk and are thereby an effective risk mitigation tool for utilities.

Fourth, state, regional and eventually national policies designed to reduce greenhouse gas emissions are likely to encourage the development of renewable generating resources. Nationwide, electricity generation accounts for more than 40 percent of CO_2 emissions. Washington now has a clear and measurable climate change goal of returning to 1990 levels of greenhouse gas emissions by 2020. Fundamental changes in the current mix of electric power generating resources are required if Washington is to achieve the CO_2 reduction goals found in the Governor's Executive Order 07-02, Washington Climate Change Challenge, and RCW chapter 70.235.

In 2007, the NPCC conducted an analysis of the, "Carbon Dioxide Footprint of the Northwest Power System." In this analysis, the NPCC estimated the historical CO_2 emissions from the power system in 1990, 2005 and projected emission levels for

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2024. The emissions estimates for 2024 were based on an assumption that the NPCC's Fifth Power Plan's recommendations for conservation and renewable resource development were fully implemented. The NPCC estimates that, in 1990, the region's emissions of CO_2 from electric power generation were 44 million tons per year. By 2005, the emission of CO_2 had grown to 57 million tons, and by 2024, the NPCC estimates that, with full implementation of the Fifth Power Plan, the emission level will be 67 million tons per year.

This growth in CO_2 emissions is due to several factors but first and foremost is that the NPCC assumes that, after conservation and some renewable development, much of the region's demand for power will be met by fossil fired power plants. For perspective, the NPCC reports that a typical 400 MW coal fired power plant produces 3 million tons of CO_2 per year. To return to 1990 levels of CO_2 emissions from the levels emitted in 2005 would require the replacement of more than 1700 MW of existing coal plants. For the region to meet Washington's goal of returning to 1990 levels by 2020 would require replacing approximately 2800 MW of existing coal plants, while at the same time not increasing the region's reliance on CO_2 emitting resources more than those assumed by the NPCC's in the Fifth Power Plan.

Achieving the climate change goal of returning to 1990 levels of greenhouse gas emissions will require a massive shift away from the region's reliance on fossil fuel fired resources toward investments in new renewable resources. This shift will involve all technically and economically feasible renewable resources. Given today's technology and economics, it can only be achieved with large scale

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development of the region's wind resources. Because wind does not provide a continuous source of energy it will require approximately three times more installed wind capacity than the amount of coal that is replaced. Therefore, to replace the energy output of 2800 MW of coal will require 8400 MW of new installed wind capacity.

Washington's Renewable Portfolio Standard

Q. How will Initiative 937 affect resource acquisitions by utilities in Washington?

A. On November 7, 2006 Washington voters passed I-937, which set targets for utilities to acquire energy conservation and renewable generation resources. This initiative applies to all utilities in Washington with more than 25,000 customers. These larger utilities must secure 15 percent of their power supply from renewable resources by 2020. In addition to the renewable acquisition mandate, these utilities must also acquire all cost-effective energy conservation starting in 2010.

I-937 requires all eligible utilities to acquire sufficient renewable resources to be able to meet specific percentage targets based on the utility's total loads. These targets are:

- 3 percent of its retail load by January 1, 2012, and each year thereafter through 2015;
- 9 percent of its retail load by January 1, 2016, and each year thereafter through 2019;
- At least 15 percent of its retail load by January 1, 2020, and each year thereafter.

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To qualify as a renewable source of electricity, the power source must be from a renewable energy resource put into operation after March 31, 1999. The resource also needs to be physically located in the Pacific Northwest or be delivered into Washington State on a real-time basis without shaping, storage or integration services. As a practical matter, that will make it very difficult for Washington utilities to use out-of-state resources to meet their renewable obligation.

Q. Will I-937 require the development of more wind power projects?

A. Yes. Washington State Department of Community Trade and Economic Development (CTED) estimates that Washington utilities will need to acquire 1185 MWa of new renewable resources to meet the requirements of I-937 in 2020. Some amount of new renewable resources will come from non-wind sources but due to technical, economic and practical limitations, I do not expect these to be substantial. Wind is the only proven renewable resource that can be developed in the quantities needed to meet the requirements of I-937.

It is important to keep in mind that wind projects only generate power when the wind blows. Assuming a 33 percent capacity factor, it would require more than 3500 MW of new wind power capacity in order to generate the 1185 MWa expected to be required by I-937. For the reasons, I explained, almost all of this will need to be sited in Washington.

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Q. There has been a lot of wind development in Washington. Does the state need another project like Desert Claim?

A. Yes. In order to comply with I-937, Washington needs to develop the available good wind sites in the state. The NPCC maintains a resource database that was updated in April 2009. This database reports that Washington currently has 1442 MW of wind capacity installed, 137 MW that are currently under construction, and 94 MW that are permitted and ready for construction. More capacity must be put into operation to satisfy I-937. The NPCC database indicates that wind projects totaling 2177 MW have been proposed and are in various stages of the permitting process. However, due to many factors only a small percentage of proposed projects ultimately succeed at getting the necessary regulatory approvals to begin construction and when completed generate useful renewable power. For Washington to be successful at meeting the renewable portfolio goals established in I-937, it will require successful completion of all of the wind projects that are currently on the drawing boards, which includes the Desert Claim project.

Q. Are Washington utilities trying to acquire additional wind power?

A. Yes. According to Puget Sound Energy's preferred resource strategy from its 2007 Integrated Resource Plan, it plans to build or acquire an additional 921 MW of wind power by 2020. This will be added to its existing resources along with 1859 MW of new gas-fired generation and 432 MW of conservation and demand side management. PSE estimates that if 90% of the I-937 requirements are met with new wind resources, the state's utilities will need to add approximately 5000 MW of new

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wind power resources. This presents PSE and all other utilities in Washington with a unique challenge. PSE describes the challenge in the Integrated Resource Plan:

> "We will have to accomplish this in an extremely crowded marketplace. California recently empowered its utilities to seek renewable resources in the region; Oregon is poised to pass ambitious renewable portfolio standards; and many other western states (including Nevada, Arizona, New Mexico, and Colorado) have also established renewable standards. Demand for suitable wind sites and other renewables will be fierce in the Northwest and the West, and PSE will need to act aggressively in the marketplace to be able to meet our obligations.
>
> All parties—utilities, developers, key vendors, transmission providers, and regulators— need to understand the size of the renewables challenge. Meeting RPS targets will require creative, coordinated efforts on a scale we have not seen before in the Northwest."

Q. What are other utilities planning for renewable resource acquisition?

A. PacifiCorp's preferred resource strategy from their 2007 Integrated Resource Plan shows planned acquisition of 2000 MW of new renewable resources by 2013, at least 700 MW of which are specifically identified as Southeast Washington and North Central Oregon. Avista's Integrated Resource Plan shows it plans to acquire 300

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MW of new wind power resources by 2017. Snohomish PUD has recent prepared an Integrated Resource Plan which indicated that the utility is planning on adding approximately 180 MW of wind to produce 60 MWa of energy by 2011. Portland General Electric is in the process of constructing three phases of the Biglow Canyon wind project, with a total generating capacity of 400-450 MW. PGE is also planning to acquire an additional 218 MWa of renewable energy through a competitive bid process to satisfy the Oregon renewable mandates for 2015.

Public Policy Implications of Wind Development

Q. From a public policy standpoint, are there advantages to development of additional wind power?

A. Yes, there are both environmental and economic advantages to wind power development. From an environmental perspective, wind power generation avoids most of the environmental impacts associated with generating power in other ways. Wind power does not result in the air pollution emissions or water use that is associated with burning fossil fuels. It does not generate radioactive waste like nuclear power, or affect fish like hydropower operations. Most of all, wind represents one of the few new commercially viable technologies for generating power without generating greenhouse gases.

From an economic perspective, additional wind power generation would help to diversify the state's and region's power resource base. Diversification provides a hedge against price volatility and shortages affecting other fuels. Heavy reliance on one fuel source has historically resulted in supply problems and high price volatility.

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An example of the problems caused by too much reliance on fossil fuels is the Power Plant and Industrial Fuel Use Act which Congress passed in 1978. This law was a direct result of the 1973 oil crisis and the natural gas supply problems during the mid 1970s. The natural gas and oil supply interruptions during the 1970s caused concerns with national energy security. The Fuel Use Act restricted construction of power plants using oil or natural gas as a primary fuel and encouraged the use of coal, nuclear energy and other alternative fuels. It also restricted the industrial use of oil and natural gas in large boilers. However, during the 1980s the demand for natural gas declined and a significant oversupply resulted. By 1987, less than 10 years following the passage of the Fuel Use Act, Congress reversed course and repealed the restrictions on the use of natural gas by industrial users and electric utilities. This change in national energy policy once again allowed the use of natural gas and oil to fuel large new electric power plants. With the repeal of the Fuel Use Act, the use of natural gas for electric generation increased dramatically from 2.6 trillion cubic feet (Tcf) in 1988 to 5.7 Tcf in 2002. Now we have seen rapid increases in natural gas prices and price volatility. The conditions in today's fossil fuel markets are reminiscent of the early 1970s.

Utilities have only three resource choices for meeting the electric power demands of their customers. These are: first, conservation, but conservation by itself cannot meet projected increases in demand for power. Second, utilities can continue to build gas-fired generation but this strategy is becoming increasingly costly and risky as gas prices increase and are now far more uncertain from both market and environmental perspectives. Third, utilities are turning to wind power because of its

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technical, economic and environmental characteristics. This is why the region's wind resource is so critical to meeting not only public policy objectives such as I-937 but also meeting the needs of consumers in Washington.

Q. Does the development of additional wind power present challenges?

A. Yes. Wind, like most renewable resources, is site specific. Wind, like hydropower, relies on nature to concentrate the resource in specific locations based on topography and metrology. For hydropower, the concentration is obvious by the structure of the river system and the surrounding terrain where geology will permit the construction of a dam. The wind resource is much like hydropower in that wind energy is concentrated in particular areas of the region based on prevailing weather patterns and local topology that concentrates the wind energy. For this reason, wind is very site specific and once the best wind power sites are developed, the remaining sites will be of lower energy potential and as a result, they will be more expensive to develop and have more potential environmental impacts.

Q. An issue that is sometimes raised regarding wind projects is the distance between project turbines and neighboring residences. Permitting agencies sometimes require minimum setbacks. In your opinion, does the distance of required setbacks have broader energy policy issues?

A. Yes. Because of the site-specific nature of good wind projects, the total supply of these sites is limited. At some point, a setback may be so large that it would make some locations unavailable or uneconomic for wind development. The costs of wind development are driven by the large capital investment needed to acquire the wind turbines, construct the site and develop the necessary transmission interconnections.

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Although some costs increase with the number of turbines, certain costs change little with the number of turbines. These costs are in effect spread out over the megawatts of electricity generated by a project. If there are fewer turbines, less electric power can be generated at that site, which increases the cost per megawatt hour. If the number of turbines is reduced enough, the site will become uneconomic and will not be developed. Of course, that means all of the environmental and economic advantages of wind power development would be lost.

Q. Short of rendering a project uneconomic, are there public policy implications of setback distances?

A. Yes. The larger the required setback, the fewer turbines can be located at a given site. From a state-wide perspective, that will either mean that less power will be generated by wind, or more wind projects will have to be developed at lower quality sites in the state in order to generate the same amount of power. If less wind power is generated, that means more of the state's and region's needs would likely be met by other traditional generating resources such as natural gas-fired generation, with their associated water use, air pollution, greenhouse gas emissions and other impacts. On the other hand, if the state needs to generate a certain amount of power from wind in order to satisfy I-937's requirements, this means that more wind project sites would have to be developed in order to produce the required amount of electricity. Although requiring greater setbacks might slightly reduce the impact of a wind project on some individuals, it would likely result in more people being affected by wind projects, because more projects would be needed to reach renewable power requirements.

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Q, Does that conclude your testimony at this time?

A. Yes.

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