BEFORE THE STATE OF WASHINGTON

ENERGY FACILITY SITE EVAUATION COUNCIL

In the Matter of Application No.2003-1: SAGEBRUSH POWER PARTNERS, LLC KITTITAS VALLEY WIND POWER PROJECT	EXHIBIT 43-T (RH -T)

APPLICANT'S PREFILED DIRECT TESTIMONY
WITNESS #43: RANDY HARDY

Q Please state your name and business address?

A My name is Randy Hardy., and my business address is:

Hardy Energy Consulting
719 Second Avenue, Suite 1150
Seattle, Washington 98104-1728

Q What is your occupation and profession?

A I am an energy consultant. I am the principal of Hardy Energy Consulting. I have held numerous positions in the Pacific Northwest electric industry over the last 25 years, including CEO of Seattle City Light, and the Bonneville Power Administration, the seventh largest publicly owned electric utility and largest federal Power Marketing Administration in the

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United States respectively. I have dealt extensively with wind generation, integration and transmission issues.

Q Would you please identify what has been marked for identification as Exhibit 43-1 (RH-1).

A Exhibit 43-1 (RH-1) is a résumé of my educational background and employment experience.

Q Would you please describe and explain the value of wind energy resources to the State of Washington and the Pacific Northwest.

A Wind resources, particularly in the Pacific Northwest, have several unique attributes which make them especially valuable when compared to more conventional electricity generating resources. Among these characteristics are price stability (because the fuel is free), easy integration into the Northwest's hydro-based electric system, avoidance of greenhouse gases and risk minimization for purchasing utilities. These and other advantages are discussed in more detail below.

This need for wind resources is especially relevant over the next few years (i.e. 2007 – 2011) as regional electric loads grow beyond the capability of existing generation resources. All Northwest investor owned utilities have already issued one or more requests for future resources. For publicly owned systems, the Bonneville Power Administration (BPA) has recently proposed a tiered rate system to be implemented along with offering of its new power contracts in 2011. One of BPA's principal reasons behind offering such contracts is to develop the infrastructure, (both for power resources

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and additional transmission lines), to ensure the Northwest has "an adequate energy supply in the future".

For the last 15 years nearly all resource acquisition in the Northwest has been natural gas fired combined cycle combustion turbines (CCCTs). This preference for gas fired generation has occurred for several reasons. CCCTs can be built much faster than baseload thermal plants. The price of natural gas was, for a considerable amount of time, highly competitive with alternative power plant fuels. Their emissions (compared to coal and oil fired generation) are comparatively low. And most importantly, because of the location of major gas pipelines in the region, such turbines can be located near load centers, thus minimizing the need for additional transmission line construction.

This preference for CCCTs, however, has created significant adverse consequences. First, since the price of natural gas in the mid and long term tends to track world oil prices, use of gas resources has created considerable price volatility, both for Northwest electric utilities and their ratepayers. Over the last 12 months, oil prices have fluctuated around $65 – 78/bbl and regional natural gas prices have likewise varied from $6 – 12/MM btu. The current five year forward price for natural gas is around $8/MM btu. For a new CCCT, this fuel price would produce an electricity price of roughly $65 – 70/MWh. Most new wind resources in the Northwest are below this price threshold.

The second consequence of our reliance on natural gas generated resources is a function of the unique nature of electricity itself. Electricity is markedly different from most other commodities in two major respects: (1) there is no way to store it in the sense that other

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commodities like grain can be stored, and hence the price dampening effect of regulating inventory levels does not exist; and (2) it is so intrinsically intertwined with public health and safety that we literally cannot, as a society, do without it for any substantial period of time.

Taken together, these two characteristics preclude a normal supply/demand relationship and produce an extreme degree of price volatility whenever supplies are tight. The 2000/2001 California electricity crisis, and its residual effect on Northwest retail electricity rates, is a prime example of this phenomenon.

Development of sufficient wind resources in the Northwest will directly address this price volatility. As mentioned above, wind is cost competitive with existing and projected prices of CCCTs, and, because the fuel is free, wind is not subject to the wild price fluctuations associated with gas and oil fired resources. Wind power's short construction time and ability to capture varying wind currents (because of strategic turbine positioning) within a single site also create built in hedges against the seasonal, and even daily, price fluctuations inherent in gas fired resources.

Supplying 10 – 20 percent of a utility's energy from wind (the range of most state renewable portfolio standards) will diversify away from the risks associated with reliance on traditional resources. These historical and/or emerging risks are well known: for hydro, they involve annual changes in precipitation and mandated fish protection measures; for coal, price escalation due to transportation costs and regulatory risks of

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greenhouse gas mitigation measures; and, for natural gas, the aforementioned price volatility.

The benefits of supplying a reasonable amount of a utility's load from wind are similar to those of diversifying your personal stock portfolio - - it minimizes your exposure to the price and supply risks associated with any one resource experiencing an unusual series of adverse impacts.

Despite the ongoing national and international debate over global warming and its environmental consequences, there is an emerging consensus that this phenomenon is occurring at a steadily increasing rate and that human induced greenhouse gas (GHG) emissions (primarily from automobiles and fossil fuel fired power plants) are significant contributors to it. This consensus is probably best demonstrated in the June 2006 report by the National Academy of Sciences (NAS) which states, in part, "There is sufficient evidence from tree rings, boreholes, retreating glaciers and other 'proxies' of past surface temperatures to say with a high level of confidence that the last few decades of the 20th century were warmer than any comparable period in the last 400 years." While the NAS report does not attempt to quantify the contributions of greater GHG emissions to global warming, it seems intuitive that their effect is significant. As a result, it is likely that future U.S. and state policies will seek to limit and/or tax emissions from fossil fuel plants. In fact, California, Oregon and Washington already have various carbon mitigation measures for certain types of fossil fuel resources.

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Given this probable regulatory trend, and the basic fact that fossil fuel plants produce harmful GHGs, wind is ideally positioned as a viable alternative, non-polluting, energy resource. Indeed, the proliferation of state mandated Renewable Portfolio Standards (20 states have now adopted such RPS) is driven principally by a desire to limit GHG emissions.

Roughly 50 percent of all Pacific Northwest power is generated from hydroelectricity. This predominance of hydro is unique in the United States, and it provides the ideal mechanism through which to cost effectively integrate wind resources into the Northwest electrical system. This integration capability exists because hydro dams can temporarily ramp up their output, either within the hour or for one or two hours in advance, to meet temporary variations in wind energy production. This capability allows wind to be easily "firmed up" for serving retail loads, without having to build back up resources or use more expensive CCCTs for real time load following. Therefore, because Northwest integration costs are low, it is to the region's economic advantage to maximize its available wind potential for electricity generation.

Wind can be used cost effectively to meet about 10 – 15 percent of a utility's total generation portfolio (beyond 15 percent, the intermittent nature of wind limits its ability to be integrated in a cost effective manner). This 15 percent level is in large part responsible for the 2020 goal specified in Initiative 937 for a Washington State RPS, and is also consistent with most RPS's in other states. However, some states are even going beyond this level. For example, California has established a 20 percent renewables goal by 2010, and Oregon Governor Ted Kulongoski has recently proposed a goal of 25% by

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2025 and has appointed a working group to develop legislation to implement this goal which is expected to be introduced in the 2007 legislative session.

This 10 – 15 percent level will probably allow Northwest utilities (based on the most recent Northwest Power and Conservation Council load forecast) to meet all or most of their load growth from wind (or other renewables) for at least the next 5 – 10 years. . The Integrated Resource Plans (IRP's) that have been submitted by Northwest utilities is summarized in the following table.

Utility	IRP Wind Capacity (MW)	2016 Load (aMW)	IRP Wind Energy (aMW)	Wind Contribution to Load (percent)
Avista	400	1,424	132	9.3
Idaho Power	350	2,187	116	5.3
PacifiCorp West	600	2,678	198	7.4
Portland General Electric	200	3,075	66	2.1
Puget Sound Energy	845	2,790	279	10.0
Total	2,395	12,154	790	6.5

This interim reliance on wind, while not the long term solution to our energy needs, will buy us time for several needed developments to occur. First, it should allow time for the current technical challenges facing integrated coal gasification to be resolved. Second, it will provide a period for demonstration of carbon sequestration for fossil fuel facilities. Third, it will also provide time for construction of major new transmission lines (e.g.

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from Montana or Wyoming) to transport clean coal resources to Northwest loads. By buying the region some time to develop long term generation and transmission solutions to our energy needs, wind can ensure the Northwest a reliable, cost effective energy supply for the foreseeable future while still filling its long term role as part of each utility's resources portfolio..

By November 2006, we will know if Initiative 937 will be state law. If this occurs, then Washington State public and investor owned utilities will need to acquire roughly 1500 – 1700 average megawatts (or 4500 – 5000 megawatts of wind capacity) to meet the 15 percent RPS requirement by 2020. While 937 applies to all renewable resources (e.g. biomass and geothermal), the vast majority of resources acquired to meet the standard will be wind powered.

The Kittitas Valley Wind Power Project is well suited to help Washington utilities meet this likely RPS requirement. It has a capacity factor comparable to other wind projects and is capable of interconnecting to either the Bonneville Power Administration's or Puget Sound Energy's transmission system in a cost effective manner. It is also located closer to major load centers (e.g. the Puget Sound region) than most other proposed wind project sites. Finally, it is located in a completely different area than the vast majority of likely Northwest wind projects (i.e. the Columbia Gorge) and, therefore, can provide utilities with some resource diversity relative to their likely purchases from other wind projects.

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Conclusion

All the above reasons point to maximizing the amount of cost effective wind capacity potentially available to the Washington State consumer. In so doing, we will:

- minimize future price volatility
- diversify utility resource portfolios
- minimize our exposure to the price, regulatory and technology risks inherent with fossil fuel resources, and give ourselves some time to resolve, or at least better understand and quantify, such risks before making irrevocable long term energy supply commitments.

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Wind resources are finite natural resources. They are much like rivers which have in the past provided abundant low cost electrical generation for the State of Washington. The dams that produce this electricity had to be placed where the rivers ran. Similarly, wind resources must be utilized where the wind blows. In this respect, wind will likely become a prominent future renewable resource for the Northwest, much like the historical role played by hydro in this region. Indeed, Governor Gregoire and PSE CEO Steve Reynolds made this precise analogy in their remarks at the recent dedication for the Wild Horse Wind Project.

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