U.S. DEPARTMENT OF ENERGY
Northwest Clean Energy Application Center

Promoting CHP, District Energy, and Waste Heat Recovery
ALASKA • IDAHO • MONTANA • OREGON • WASHINGTON

July 15, 2011

Docket UE-110667

Introduction - On June 24, 2011, the Washington Utilities and Transportation Commission opened Docket UE-110667: Study of the Potential for Distributed energy in Washington State. The following responses are made (Note: Some of the responses use statewide data. It would take additional analysis to separate the data to a county/utility level:

Initial comments:

The best utility commission study in the Northwest and perhaps the nation was done by the Oregon Public Utility Commission (OPUC) titled Distributed Generation in Oregon: Overview, Regulatory Barriers and Recommendations. See http://www.northwestcleanenergy.org/NwChpDocs/DistGenInOregon_Overview_RegBarriers_Reccomendations.pdf . Following this study, the OPUC methodically worked to reduce their barriers to standby rates, PURPA implementation, expanded net metering, improved interconnection (Washington gets an IREC "D" grade while Oregon gets a "B"), and Integrated Resource Planning. See attachment one for more specific information.

At the national level the U.S. Department of Energy is very strongly supportive of further implementation of Combined Heat and Power (CHP) technologies. The report titled A Decade of Progress: Combined Heat and Power, A Vision for the Future http://www1.eere.energy.gov/industry/distributedenergy/pdfs/chp_accomplishments_booklet.pdf points out that by adopting high deployment policies, the US could move from 85 GW in 2006 to 241 GW in 2030 and thereby save 5.3 quads of energy and 848 MMT of greenhouse gas reductions (equivalent to taking 154 million cars off the road). In this scenario CHP accounts for 20% of electricity generation (similar to many European countries today). This report is backed by a technical Oakridge National Laboratory report titled Combined Heat and Power: Effective Energy Solutions for a Sustainable Future http://www1.eere.energy.gov/industry/distributedenergy/pdfs/chp_report_12-08.pdf. The Washington Utility and Transportation Commission is encouraged to its remove its barriers to distributed generation. There are some (see below). In addition, where current state law provides a barrier, providing specific amendment language would be very helpful.

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Cooperating agencies: Washington State University Extension Energy Program, U.S. Department of Energy, Alaska Energy Authority, Idaho Department of Water Resources Energy Division, Montana Department of Environmental Quality Energy Program and Oregon Department of Energy

Issues and Questions

A. General – Cross-Cutting Issues:

1. What is the scope of current and anticipated distributed energy in the service territories of Washington's investor-owned utilities, including technology type, size and capacity; distribution across service territory; application of feed-in tariffs or net-metering; and any other relevant information? For each technology, what is its total technical resource potential (in contrast to the present, economically viable potential)? Is it concentrated within the state?

Answer technologies: A wide range of distributed technologies are emerging in this state (steam and natural gas turbines, microturbines, stirling engines, stationary fuel cells, northern climate digesters with up to 9 revenue streams (dairies for example), high solids digesters (food processors and compost facilities), wood biomass CHP systems (forest products and pulp & paper mills), organic rankine cycle /waste heat to power systems (natural gas compressor stations, metal smelting and other industrial facilities with high thermal requirements). For a history of publically available information on CHP development efforts in Washington since 2004 see attachment two. This on-going document series is useful for identifying barriers to CHP. It a project dies or is held up. Analysis of the "why" is very useful.

Answer technical market potential: ICF International (including EEA) is one of the best firms in the country to analyze the technical and economic potential for CHP. The developed a very detailed analysis for the state of Washington and other northwest states. See http://www.northwestcleanenergy.org/NwChpDocs/Chp_Market-Assessment_In_PNW_EEA_08_2004.pdf. This report was supplemented with information on non-natural gas feedstocks (biogas, wood waste, waste heat to power) by the Northwest Clean Energy Application Center. The total technical market potential for CHP including all technologies statewide is over 3,000 MW. This is too large a figure to be ignored. See attachment three.

Answer economic market potential: Determining, in a mature fashion, the economic potential based on the technical potential would require significant analysis. It has not been done. Increasing electricity prices with much lower natural gas prices and opportunity fuels (biogas and wood waste) provide a shifting and improving landscape for adoption of distributed generation technologies. Industrial prices above 8 cents/kWh are certainly of interest.

2. What is, or what is anticipated to be, the overall cost of integrating distributed energy resources to investor-owned utilities?

Answer: CHP is baseload, not intermittent power. It is located next to end user loads and thermal needs. This takes pressure off the transmission and distribution lines (a societal benefit). This is especially true in Western Washington. While the costs of interconnection need to be recognized, the broader societal benefits such as transmission and distribution improvements should also be recognized in a balanced way.

3. Describe the incentives paid by or through investor owned utilities. How much is paid annually for each technology?

Answer: This question is best answered by each utility. The support of Puget Sound Energy is especially appreciated with dairy and wastewater treatment facility digesters, biogas stirling engines, and microturbines.

4. Are there changes in state statutes or rules that would encourage technology-neutral development of distributed energy generally, such as changes to financial incentives? For example,

- Would current interconnection standards need to be changed to accommodate more distributed energy or to accommodate different distributed energy technologies? Why?

Answer: The definitions of bioenergy in RCW 19.285.030 (18) exclude high solids digesters (food processors and compost facilities) block at least 20 MW to technical market potential. Food waste and green waste should be added to the list of renewable energy. RCW 19.285.030 (13) regarding "nonpower attributes" should be limited to electrical generation. The shutdown of dairy manure lagoons is a methane reduction pathway for sale of greenhouse gases. Washington state law should recognize this as does Oregon and California. Washington law encourages recycling of materials. There is one exception: Recycling of spent pulp and paper liquor. See RCW 19.285.030 (18). The wood lignin is burned to recover the chemicals. Spent liquor should be added to the list renewable energy. This has impacted Longview Fibre's major rebuild and repowering of its facility. See I-937 Technical working Group response http://www.commerce.wa.gov/DesktopModules/CTEDPublications/CTEDPublicationsView.aspx?tabID=0&ItemID=9632&MId=863&wversion=Staging . Net metering should be increased to 2 MW similar to Oregon OPUC action. This will benefit commercial and small industrial customers

5. What storage options exist that could be used to help integrate distributed energy into the electric grid?

6. Do distributed energy technologies impact investor-owned utility rates currently? If so, please describe how and whether rate impacts affect certain customer classes more than others. How might future rates be impacted?

7. Do distributed energy technologies meet winter peaking needs for investor-owned utilities? Can distributed energy technologies serve baseload capacity? Which distributed energy technologies serve primarily as an hour-ahead or day-ahead energy supply? How can each of the distributed energy technologies and fuel sources contribute to meeting utility peak load needs?

Answer: The range of CHP technologies provide baseload power including capacity and, as such, support winter peaking needs. Capacity factors exceed 85 to 90 percent.

8. If rates or incentives are established at the state level, would it violate or conflict with the federal law provisions in PURPA and the Federal Power Act? For example, if the

Commission interprets PURPA to establish a feed-in tariff at the state level, is the Commission obligated by federal law to establish a rate that does not exceed avoided cost?

Answer: There are several ways to fix PURPA and Power Purchase Agreements (PPA) in Washington. PURPA based PPAs should be for up to 20 years and up to 10 MW. A number of projects are inhibited by Washington's approach to PURPA /PPA implementation (limits as low as 1 MW and for only 5 years). This limited approach kills good distributed energy projects in dairies, forest products and food processing facilities). These are projects in the 1 to 10 MW range. One cannot get long term financing on a 5 year Power Purchase Agreement. Both the Oregon and Idaho utility commissions have superior approaches. In Oregon see:

- Docket UM 1129 established long-term contracts (up to 20 years) for all Qualifying Facilities (QFs), standard contract forms for QFs up to 10 MW, and standard avoided cost rates for up to 15 years for QFs no larger than 10 MW (with the option of partially fixed rates in years 16-20), among other provisions. *See* http://apps.puc.state.or.us/edockets/docket.asp?DocketID=11114 (Order Nos. 05-584, 06-538, 06-586, 07-360 and 07-407).

Idaho has gone through recent changes in its PURPA rules. Baseload CHP systems such as larger dairy digesters sized in the 1 to 4 MW range benefit from the up to 10 MW and up to 15 year PPA ground rules.

This is a core problem for distributed generation in Washington. It is within the purview of the WUTC to make major improvements.

9. Certain statutes and Commission rules require the UTC to review resource acquisition pursuant to least-cost planning. Would pursuing distributed energy conflict with those rules due to the nascent state of technology development and current cost to implement? How far, if at all, should the state depart from least-cost planning principles and rules?

Distributed generation resource costs vary in a number of ways: 1) Some technologies are in early in their commercial life span, and others, such as CHP, more mature. The thermal benefit of CHP projects should be recognized (a cost allocation standard based on the ASHRAE energy allocation between power and heat, for example); and 2) Project location has least cost impacts. Projects located at the electrical and thermal load needs in Western Washington should have a location benefit.

10. If the Commission were to change the avoided cost methodology for certain types of renewable resources, what criteria should we take into account as we do this? Should there be a total cap on the amount of resources to be acquired in this manner, and, if so, state-wide or by utility? Should there be a carve-out for certain technologies that are in a more nascent stage of development now, or should commercially available and emerging technologies be treated equally?

11. Other policy incentives, both at the state and federal level, already exist for certain types of renewable resources, such as federal grants and state or federal tax benefits. How should these incentives be considered in to the calculation of avoided cost?

Answer: They should be included in the analysis. They should not be treated as though they don't exist.

12. For both capacity and energy, how does the current cost of building distributed energy technology compare with other available resources?

Answer: Costs and capacity vary widely by type of technology. An analysis should distinguish between baseload resources and intermittent.

13. What marginal costs are associated with the interconnection requirements for the connection of distributed energy systems? Are those costs material, and how should the costs be recovered (socialized or born by customer-owners of distributed resources)?

Answer: See question two above.

14. Should the current statutory restrictions on the size of distributed energy resources be changed? If so, please explain the reasons for the suggested change.

Answer: The net metering law should be raised to 2 MW to benefit commercial and small industrial customers.

15. Can each distributed energy resource be used to support emergency management practices in addition to electricity generation?

Answer: A hard lesson learned can be taken from Hurricane Katrina. Those hospitals with CHP systems that could be islanded continued to function. Those that lacked these systems failed and required major rebuilding due to mold. For further information contact Dan Bullock at the U.S. Department of Energy Gulf Coast Clean energy Application Center at (281) 364-6087. It is essential that utility interconnection agreements enable islanding for emergency facilities.

16. Are there other technologies we should consider in addition to wind, solar, hydrokinetic, biomass, and biogas? If so, please identify the technology, the state of development and likelihood of adoption.

Answer: The following list is provided:

1) Fuel Cells – Commercial, price is declining but still expensive, repowering the molten carbonate fuel cell at the Renton Wastewater Treatment Plant is blocked by an older interconnection agreement with Puget Sound Energy limiting it to research purposes only. The fuel cell stacks at this facility need to be replaced;
2) High solids digesters – European technology is expensive; Washington State University (WSU) technology is much cheaper and ready for the first commercial pilot scale digester to be built;
3) Northern climate dairy digesters – Mature, the WSU low cost nutrient recovery system is now commercial (see Vander Haak Dairy for an example). This adds nitrogen and phosphorous fertilizers to the revenue streams;
4) Biogas stirling engines – Early commercial, the wastewater treatment facility in Helena, MT has 3 in operation. Lakehaven utility has one under development in cooperation with Puget Sound Energy
5) Microturbines – Mature commercial, however, there is only one project under development in Washington – Juanita High school in cooperation with Puget Sound Energy
6) Combustion and steam turbines are mature technologies;

7) Wood waste CHP systems are part of the Washington Department of Natural Resources pilot/demonstration system. For example, the Nippon Industries paper mill in Port Angeles has a 20 MW wood waste CHP system under construction. A statewide wood waste supply study is at the halfway point and should be finished by late fall; and

8) Organic Rankine Cycle/waste heat recovery – Mature technology, however, none have been built in Washington. See Nucor Steel issue below at biogas number 13.

B. Technology-Specific Issues:

Biogas

11. What is the generation capacity and energy production potential from biogas fuels located in Washington State?

Answer: See attachment three

12. How are fuel mixtures accounted for, and are there fuel mixes with fuel components that do not qualify under the state renewable portfolio standard (RCW 19.285)?

Answer: Food processing waste, yard waste and spent liquors from pulp & paper mills are excluded. See cross-cutting question 4 above

13. What is the range of project capacity sizes for biogas generation resources and how does that compare to the capacity sizes for projects that qualify for published PURPA rates?

Answer: The following list is provided:

1) Dairy digesters generally range from 450 kW capacity to 5 MW capacity. Larger systems are possible with multi-dairies in cooperation up to 30 MW. An improved WUTC framework would enable larger systems to move forward;

2) Food processor high solids digesters can range in size from 1 to 5 MW;

3) Forest product wood waste CHP system can range in size from 1 to 20 MW;

4) Pulp & paper mill wood waste CHP systems can range in size from 20 to 60 MW;

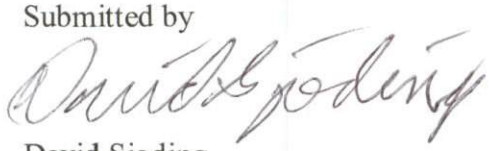
5) Wastewater treatment plant biogas/natural gas CHP systems can range in size from 1 to 10 MW;

6) Organic rankine cycle/waste heat to power generally range in size from 1 to 10 MW or larger depending on heat source. Nucor Steel has a proposed project of 2.5 MW but has difficulty obtaining pre-construction approval from the State Auditor due to risk for Seattle City Light's grant support; and

7) Natural gas based CHP runs a wide range of sizes for 60 kW at Juanita High School to 738 MW at the BP Oil Refinery at Cherry Point

14. What is the status of municipal green stream digester development, including the status of the eligibility of those projects or potential projects under RCW 19.285?

Submitted by



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ATTACHMENT ONE

Oregon Public Utility Commission
Actions to Remove Regulatory Barriers to Distributed Generation

Assess barriers and recommend solutions

- February 2005 staff report at http://www.oregon.gov/PUC/electric_gas/dg_report.pdf

Revise standby rates

- *Portland General Electric.* The Commission investigated PGE's standby rates and adopted a new rate structure in July 2004 for partial requirements service — Schedules 75 (firm) and 76R (interruptible) for customers buying energy from PGE; Schedules 575 (firm) and 576R (interruptible) for customers buying energy from an alternative supplier. *See* Docket UE 158 at http://apps.puc.state.or.us/edockets/docket.asp?DocketID=11044. Further improvements were made in a subsequent PGE rate case. *See* UE 180 at http://apps.puc.state.or.us/edockets/docket.asp?DocketID=13199. Rate schedules (75, 76R and 575) at http://www.portlandgeneral.com/our_company/corporate_info/regulatory_documents/tariff/rate_schedules.aspx.
- *PacifiCorp.* Standby rates were revamped in the company's 2005 rate case. See UE 170 at http://apps.puc.state.or.us/edockets/docket.asp?DocketID=11708. Rate schedules (47, 76R, 247, 276R, 747 and 776R) at http://www.pacificpower.net/about/rr/ori.html.

Update terms and conditions for utility purchases under PURPA

- Docket UM 1129 established long-term contracts (up to 20 years) for all Qualifying Facilities (QFs), standard contract forms for QFs up to 10 MW, and standard avoided cost rates for up to 15 years for QFs no larger than 10 MW (with the option of partially fixed rates in years 16-20), among other provisions. *See* http://apps.puc.state.or.us/edockets/docket.asp?DocketID=11114 (Order Nos. 05-584, 06-538, 06-586, 07-360 and 07-407).

Expand net metering

- The Commission proposed SB 84 in the 2005 Legislative Session to: 1) add biomass as a qualifying resource and 2) allow the Commission to set through a rulemaking a higher eligible facility capacity for PGE and PacifiCorp. In 2007, the Commission adopted rules to increase the eligible facility size to 2 MW, establish interconnection standards for net metering, and allow net excess generation to carry forward as kilowatt-hour credits during the billing year, among other things. *See* Order No. 07-319 in Docket AR 515 at http://apps.puc.state.or.us/edockets/docket.asp?DocketID=13965.

Develop uniform interconnection standards, procedures and agreements

- Adopted in 2009 for jurisdictional facilities up to 10 MW. *See* Docket AR 521 (Order No. 09-016) at http://apps.puc.state.or.us/edockets/docket.asp?DocketID=14256.
- Under investigation in Docket UM 1401 for larger facilities. *See* http://apps.puc.state.or.us/edockets/docket.asp?DocketID=15163.

Consider return on investment in distributed generation regardless of ownership

- *Upon utility request.* In its distributed generation report, staff recommended the Commission consider approval of a utility's request for accounting treatment that would allow a return on capital investments in new customer-sited generation, regardless of ownership.

Remove utility disincentives

- The Commission adopted decoupling for PGE in Docket UE 197 (rate case). *See* Order No. 09-020 at http://apps.puc.state.or.us/orders/2009ords/09-020.pdf.

Treat distributed generation on a par with other options in integrated resource planning

- In 2007, the Commission adopted the following guideline for treatment of distributed generation in integrated resource planning (IRP), among other updated IRP guidelines: *Electric utilities should evaluate distributed generation technologies on par with other supply-side resources and should consider, and quantify where possible, the additional benefits of distributed generation. See* Docket UM 1056 (Order No. 07-002, corrected by Order No. 07-047) at http://apps.puc.state.or.us/edockets/docket.asp?DocketID=10081.

– *Updated Feb. 9, 2010, by Lisa Schwartz, Regulatory Assistance Project, lschwartz@raponline.org*

Appendix two and three submitted under separate cover