Local Energy Alliance of Washington (WALEA)

Response to Washington Utilities & Transportation Commission questions on Distributed Generation: Docket UE 110667

General – Cross-Cutting Issues:

1. a) 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?

WSU has documented the number and size of installations receiving the state's cost recovery program by utility, but we aren't aware of a comprehensive record of all projects meeting the state's current definition of distributed generation, up to 5 MW. Anticipated installed capacity depends entirely on state and utility policy. The potential exists for a large volume of each utility's energy to come from distributed renewables from sources diverse in geographic location as well as diverse in technology type.

b) For each technology, what is its total technical resource potential (in contrast to the present, economically viable potential)? Is it concentrated within the state?

Utility company integrated resource plans are sometimes good at characterizing certain resources, and a good place to start.

PSE Integrated Resource Plan
http://pse.com/aboutpse/EnergySupply/Documents/IRP_2009_Appendices.pdf
Pacificorp Integrated Resource Plan
http://www.pacificorp.com/es/irp.html
http://www.pacificorp.com/es/cg.html
Avista Integrated Resource Plan
http://www.avistautilities.com/inside/resources/irp/electric/Documents/Avista%202009%20IRP.pdf

I. Distributed Solar Power has a virtually unlimited theoretical potential, but if it is reasonably limited to rooftops parking lots, and other land and surfaces which would not otherwise be productively using the sun (i.e. not over agricultural, forest, or wildlife lands) the potential is 100's of MW.
II. Distributed wind power has the technical potential for thousands of MW of installed capacity across the state in installations 5 MW and under. Iowa, Minnesota, and Ontario are already approaching these numbers in distributed wind.
III. Distributed hydrokinetic energy from run of stream projects, irrigation channel, hydro, and dam improvement projects, has a potential of 100's of MW across the state. Ocean energy is still a developing field and the viability of projects under 5 MW is still a question mark; 100s of MW of distributed ocean energy may be reasonable.

IV. Distributed Biomass projects, especially district heat and industrial heat based co-generation facilities have the potential of 100s of MW across the state.

V. Biogas, including dairy, and municipal solid waste have a potential of 100's of MW across the state.

   a. Wastewater treatment facility biogas has potential to generate over 4,000 MW of electric power within IOU service territory in Washington state. http://www.cascadepowergroup.com/upload/BW%20Feasibility%20Final%20Draft.pdf

VI. CHP/District Energy - a 2004 study funded by the U.S. Department of Energy showed a potential offset of 123 MW if a district energy system is built in the "Denny Triangle" area of downtown Seattle (not in an IOU but still a good benchmark). Similar studies funded by US DOE show more than 4,000 MW of technical potential across Washington State.

   a. 2004 U.S. Dept of Energy CHP technical potential study for Pacific Northwest http://www.chpcenternw.org/NwChpDocs/Chp_Market-Assessment_In_PNW_EEA_07_2004.pdf
   b. 2010 WSU Energy Program CHP technical potential study http://www.chpcenternw.org/NwChpDocs/WA%20CHP%20Technical%20Potential%2008%202010.pdf
   c. 2004 U.S. Dept of Energy "Denny Triangle" district energy study http://www.chpcenternw.org/NwChpDocs/EnergyDistrictForSouthLakeUnionAndDennyTriangle.Phase1FeasibilityStudyFinal.pdf

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

Currently the owners of distributed energy facilities pay the integration costs so the cost to IOUs is zero. At higher penetration rates (say 10-30 % of a local grid's capacity) some system wide improvements, such as smart grid technologies, may become necessary and will need to be borne by the utility.

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

WA Renewable Energy Production Incentives: $0.12-$1.08/kWh through 2020 depending on project type, technology type and where equipment was manufactured. Paid for by utility, but recouped in tax rebates. $5,000/year maximum incentive per recipient. The total of each utility's payments are capped at 0.5% of their previous year taxable revenue. For example, Puget Sound Energy, with revenue of $2.3 billion, can pay out approximately $11.5 million per year. They do not anticipate customer generators to tap all this incentive until at least 2015. The base rate of $0.15/kWh is multiplied by the following factors:

- For electricity produced using solar modules manufactured in Washington state: 2.4
- For electricity produced using a solar or wind generator equipped with an inverter manufactured in Washington state: 1.2
- For electricity produced using an anaerobic digester, by other solar equipment, or using a wind generator equipped with blades manufactured in Washington state: 1.0

- For all other electricity produced by wind: 0.8
- For “community” solar projects: 2

This and net metering are the most significant statewide incentives. Most other incentives offered mostly by PUDs and through BPA programs are low-interest loans (about 4.9-5.8%) to help finance the capital costs of RE investment.

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?

Yes, regulatory changes are needed to facilitate the deployment of distributed energy projects.

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

Current interconnection standards should be changed so that the cost, process, and timeline for interconnecting a distributed generation system is substantially similar to the process for connecting a similar sized load to the utility’s system. All such systems would obviously have additional standardized protective relays and disconnect switches, but otherwise the process should be no more difficult. Current interconnection for any generator other than a net metering system is inappropriately cumbersome for all but the largest and most complex distributed generation projects.

Further Changes

I. Avoided Cost Payments: California, Oregon, and many other states have avoided cost rules that specify that distributed renewable energy projects need to be paid the cost of the most expensive source of energy being used by the utility at anytime. Puget Sound Energy has voluntarily created such a rate for distributed projects, Schedule 91. These costs are estimated and projected out into time such that a standard set of prices can be set for a project at interconnection that ensures the project its pricing during the project’s financing. These avoided cost payments are and should be structured to be cost neutral to the utilities. This sort of stable fair rate for power is the base that distributed energy projects of all technologies should be able to rely on.
II. Community Net Metering: Vermont and several other states have policies that allow neighbors to share in a single distributed renewable energy system. Recently the Interstate Renewable Energy Council (IREC) developed a list of best practices for such policies: http://irecusa.org/wp-content/uploads/2010/11/IREC-Community-Renewables-Report-11-16-10_FINAL.pdf
Similar to avoided cost pricing, Community Net Metering gives distributed generation projects access to the market at no cost to the utility or to the taxpayer. WALEA recommends a policy that follows the IREC guidelines quite closely. The 2011 bill HB 1049 in most respects does this. Policy built upon this bill would be a great boon to distributed generation in that it would allow customers to choose to participate in local renewable energy projects, avoiding many NIMBY issues as all the beneficiaries of a project would be local. A community net metering policy is the best way to ensure that the economic benefits of distributed generation are realized as well as the benefits of reduced reliance on the transmission system. (system development under this policy is self limiting to local load and local participants).

III. The state's current financial incentive is a great start at being a tool to bridge the gap between fair market access (as could be provided in I and II above and through simplification of interconnection procedures) and the cost to make distributed renewable technologies competitive with what we feel are over subsidized fossil fuels. Unfortunately the current incentive has been revised piecemeal over the years with individual stakeholders and sectors of the industry adding complexity to the program without considering the policy as a whole. What we have now is an inefficient mechanism to achieving its stated goals, which have also changed over the years. Incentives are by their nature political and variable and need to be adjusted from time to time to make sure the goals of the incentives are being met.
    Once fair market access is established some technologies and scales of technologies will require further financial incentive to be competitive. The State has an interest in these technologies being competitive to encourage resource diversity, in state jobs and economic development, and higher levels of production of renewable energy.
    WALEA is initiating a process of bringing interest groups together to define what a sensible incentive program would look like. This process will include defining the goals of the incentive (Jobs, RE production, resource geographic and scale diversity) and quantifying their relative value to be able to set sensible incentive levels and incentive policy. We encourage the TEC Committee and the UTC to participate in these conversations.
    A Feed in Tariff (FIT)is the world's most effective mechanism for encouraging distributed generation. Fair market access combined with a well thought out cost recovery incentive could have the same effect of a feed in tariff. Nova Scotia's soon-to-be established Community FIT and NREL's recent report on feed in tariffs can serve as good guides:
    http://www.nrel.gov/docs/fy10osti/44849.pdf

Non Utility Policies:

I. Permitting. SHB 1081 which passed both the House and the Senate in 2011 but could not be reconciled between the two houses was an attempt to correct the woeful lack of siting rules in most counties and cities for distributed generation. Ensuring that appropriate distributed energy projects have a permitting path in all jurisdictions (where appropriate) is a key element to enabling growth of the sector.

II. Air Quality. Combustion based distributed generation such as anaerobic digestion, biomass cogeneration, and even natural gas based district heating deserve lighter regulation by air quality laws than they currently receive. These technologies often reduce emissions (digestion removes a methane and odor source) or replace multiple other sources (district heating replaces multiple unregulated heat sources). State of the art installations should not have a significant air quality compliance burden while there still should be protections against technologies of this scale that don't meet industry standards.

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

Part of the benefit of distributed energy is that high levels of aggregate integration are possible without the need for additional storage or peaking resource. Up to about 10% penetration levels of distributed energy can be seen as a 'negative load' and treated no differently than the normal variation in loads. Currently in almost all localities distributed energy is well under 1% penetration. Storage only becomes necessary when generation levels exceed local minimum load and export capabilities which would come at very high penetration levels. Integrating capacity up to 100% of a local substation's minimum load is possible without storage. The spatial, technology, and scale diversity of distributed energy allows for greater aggregate capacity interconnected without storage or other system improvements than for a single resource at a single location.

A district energy system is capable of thermal energy storage and can help to manage peak electric-loads by shedding excess generation into the thermal energy loop, or by extracting excess thermal energy and converting to electricity.

Grid-aware battery banks are coming on to the market at scales from the individual home up through multi-megawatt installations to support firming of large wind generation plants. See for example, Sunverge's Solar Energy + Storage solution that intelligently directs solar power to on-site load or grid export at the request of a utility signal. http://www.sunverge.com/ieg_br.pdf This system, which is in operation in a pilot community of new homes in Sacramento "firms" solar power, making it available as a resource for a longer portion of the day. Sunverge has orders for over 40MW of solar + storage capacity.

Pumped hydro is likely the most accessible storage technology currently. This technology can be implemented regionally at existing dams especially projects like upper and lower Baker river projects where two reservoirs are involved. On a distributed scale many municipal water systems have significant drop across their system and either existing excess high elevation storage or the capability of adding this storage. This distributed pumped hydro storage if properly valued could give our municipal water utilities additional revenue from their existing infrastructure.

Smart grid technology using dispatchable loads, including plug in vehicles, is maturing to simulate a form of storage. See for example, GridPoint, which provides several categories of solution to managing distributed generation and storage as a utility-grade resource: http://www.gridpoint.com/utility-solutions.aspx

WALEA looks forward to the day when additional storage is necessary to integrate even more distributed energy. When that day comes smart grid technology using dispatchable loads, including plug in vehicles, will have matured to simulate a form of distributed storage. However, we do not see need to plan for additional storage for distributed energy in the near or mid term. There are easier distributed generation projects that can be integrated before storage becomes a significant need.

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?

Currently ratepayers are not or are only very marginally impacted by distributed generation, additional ratepayer absorbed costs are fairly small and the scale of implementation of distributed generation is small enough that ratepayer benefits such as avoided transmission upgrades have not been substantially realized. In crafting a distributed generation future, both costs and benefits should be accounted for accurately, including costs currently externalized by industry such as the public health costs of respiratory illness and mercury pollution from fossil energy generation.

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?

Each technology and resource region has its own particular qualities in this regard:

I. Peaking: Though the northwest has a winter peak of local demand it has a summer peak of actual generation as NW utilities strive to sell as much power south as possible. It is reasonable to assume that it is of value to the utilities to offset either period where their most expensive generation technologies are being dispatched. While it is understood that the framework of the UTC is in meeting regional demand it falsely creates a single value point for capacity, midwinter evenings, when in truth the utilities highly value generation at other periods. That said the ideal of distributed generation is to meet local load making the question relevant.
   a. Distributed Solar has a diurnal cycle that closely matches the diurnal load cycle with higher loads during the day and lower loads at night. Solar electric peaks just after noon and loads tend to peak in the late afternoon early evening. Seasonally solar peaks in the summer which is counter to our regional peak winter load but it does match the summer water pumping peak load in agricultural areas in the eastern part of the state.
   b. Distributed wind in Washington does not have a strong diurnal cycle. Washington is fortunate to have its wind resources annual cycle match the area of the state where it is. On the west side of the mountains wind energy is more abundant in the winter when the major population centers are experiencing peak heating loads. On the east side of the mountains wind is abundant in the summer when water pumping loads are at a maximum.
   c. Hydro (run of stream, and irrigation) has a very flat diurnal cycle and its seasonal cycle is dependent on the source. Similar to wind irrigation canal hydro power matches irrigation pumping loads and on the west side of the mountains run of stream hydro peaks in winter with heating loads.
      Dam retrofit and improvement hydro projects may have a degree of dispatch-ability and storage.
   d. Biogas and Biomass cogeneration projects match NW heating loads quite well since they are dispatched in part due to thermal demand. They are also commonly considered a base-load resource, provided that the fuel supply is adequate to keep the plant operating.

II. Base-Load: The geographical and technological diversity of distributed generation over a service territory or the state make the aggregate output appear to have a significant base-load component. Hydro, biomass, and biogas each have base load meeting capability independently. Wind and solar have some natural load following tendency as described above.

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?

Recent rulings in CA show that the UTC has a lot of leeway, especially if the state passes a distributed generation requirement.

During rulemaking for Oregon's Solar Pilot Program at the PUC, it was discovered that Section 210 of PURPA prevents states from setting prices that utilities must pay for wholesale renewable energy at above avoided cost. Avoided cost is typically equated to the highly subsidized cost of energy from fossil fuels like natural gas and coal and is much lower than the cost of generating electricity from renewables. Only the Federal Energy Regulatory Commission can set wholesale prices for RE. This is known as the "FERC pre-emption".

The program design chosen by the PUC for the Solar Pilot Program to avoid FERC pre-emption provides a disincentive to maximize solar production. It limits the maximum size of an installation at a given location to less than the customer's annual consumption and will not pay the fixed rate above avoided cost for production in excess of consumption in order to avoid the possibility of a wholesale sale by the customer to their utility at above avoided cost. This constraint creates a perverse incentive for the customer generator to over-consume energy in order to maximize their production payment, and creates a disincentive to adopt energy efficiency measures.

SOLUTIONS:

STATE: Amend statute to include a 100% purchase guarantee.

FEDERAL: In a case brought by California's PUC, FERC recently ruled that PURPA does allow states to set wholesale prices for RE at above avoided cost, but the case was appealed by CA's utilities. An amendment to PURPA would fix the problem. Both Senator Wyden and Senator Sanders will introduce amendments this session. Senator Wyden's PURPA PLUS Act sets a project size cap of 2MW, which is too low and if the FERC decision is not upheld, would prevent the application of FITs to large wind, solar and probably wave nationwide. Twenty other states have FIT bills somewhere in the legislative pipeline and will encounter the same problems Oregon has. We need a fix that works for everyone and frees states to decide what mix of RE technologies and project sizes best fits their needs.

http://www.oregonrenewables.com/Oregons_FIT/Oregon_FIT_Critique_2011.html

http://financere.nrel.gov/finance/content/ferc-ruling-changes-course-and-assists-renewables

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?

Providing simple standard rates and interconnection procedures reduces costs by providing certainty (decreasing risk) for developers of distributed generation. If incentives are administered separately from rate making then this issue can be avoided.

Least cost related to RE and energy efficiency measures could mean the least subsidy necessary to incentivize public investment in RE, like the price point that Oregon is trying to identify. It still represents the difference between widespread buy-in and not, i.e. necessary cost of RE.

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?

The Commission's job is to ensure consumer protection, part but not all of that is avoided cost resource acquisition. Very real costs and benefits though are not currently included in our rate setting. Most notably is the cost/impact of global warming and the dire need to produce much more than 15% of our electricity from renewable resources. Another major figure not in the equation are the benefits of local economic development to be gained though distributed energy production. WALEA believes that certain benefits should be incorporated into avoided cost rates that are not currently (resource diversity/capacity, avoided transmission and distribution upgrades, avoided new fossil generation, decreased fuel price risk, these should be wrapped up in an avoided cost structure that gives distributed generators full and fair pricing for all benefits under the authority of the UTC and available to all distributed renewable technologies.

Other benefits should be paid for outside of the rate structure with a system benefit charge, our current cost recovery incentive, or another mechanism. These benefits include (greenhouse gas reduction, local economic benefit, job creation, energy security, technology development). These benefits could be compensated in a combination of incentives such as the cost recovery incentive that target desired technologies and modes of implementation but a more flexible method of targeting incentives and maximizing benefit per incentive dollar spent should also be created. The Energy Trust of Oregon is a good example of (usually) skillful deployment of incentives to meet state goals.

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?

Avoided cost should not have to do with other incentives at all if we are talking about avoided cost to the utility for the services provided by the distributed generation.

From the perspective of effectively incentivizing distributed generation these incentives should be most certainly factored in, the state should leverage federal and other dollars as much as possible to reach its goals. To that end policies should be designed to allow participants to easily access all incentives. For instance the current community solar rules make structuring community solar projects quite complicated for non utility developers adding significantly to the cost of these projects. Often a change in the structure of a program can multiply the effectiveness of the dollars in that program.

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

It depends on which incentives and subsidies for conventional resources are counted and which incentives and subsidies for distributed renewable resources are counted. Not counting the cost recovery program and assuming non cost related barriers to development of distributed energy resources are removed most technologies are in the same ballpark as simple cycle natural gas (with the exception of solar PV). This emphasizes the need for fair market access and barrier removal legislation.

It also emphasizes that incentive dollars can go quite a long way bridging the small remaining gap rather than trying to compensate for all barriers by just throwing dollars at the issue.

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)?

WALEA believes that a local energy economy is a wonderful and holistic goal for the state of Washington to take on. One that can be achieved through creating a stable and fair framework for doing business and the skillful and frugal application of incentives. Direct interconnection costs (line extensions, switch gear, meters, etc) should be borne by the distributed resource owners, this puts the proper incentive on the developer to plan projects where they most cost effectively integrate with the grid. Costs of making the distribution system ready for distributed generation (direct transfer trip relays, substation metering improvements, billing software upgrades, system switching, etc) should be socialized as part of a plan to make local generation commonplace, rather than be borne by the first generator to interconnect to a distribution system.

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.

Distributed generation is of a size that connects to a utilities distribution system, not the transmission system. The current definition of renewable resources 5 MW and under is sufficient and suitable but that number could go slightly higher, perhaps up to 10 MW, and still meet the common sense definition of distributed. For example, Coastal Community Action's 6 MW wind project in Grayland, WA should be considered distributed.

The use of 'average MW' or other ways of shoe horning distinctly non distributed projects into this category should be avoided, and those stewarding the policy should be on guard for them. Both Idaho and Oregon had otherwise great distributed generation programs ruined and abandoned by large wind farms gaming their structure to fit the incentives thus sucking up the additional benefits from the state without providing any additional benefit back to the state.
Encouraging distributed generation is precisely so the state can reap the benefits of increased economic activity and jobs, energy security, resource diversity, decreased reliance on the transmission system, and more democratic ownership of our energy infrastructure. These are not benefits provided by utility scale Wind, Solar or other mass implementation of renewables no matter how they are cut into little pieces on paper. Large scale implementation of renewables is important but different from DG and should not participate in the same programs.

As far as technology all renewable resources under 5 MW (or whatever the limit is) the current definition is good but eliminates certain types of hydro power (which can actually have the lowest impact per MWh of any technology ironically, but are caught up in water politics)

This is a central theme for WALEA; all renewable resources should be included in distributed generation policy. We recognize that different technologies have different impacts but their impacts should be addressed in legislation addressing the impact rather than excluding that technology from being renewable.

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

"Because natural disasters such as hurricanes, earthquakes, and floods commonly cause utility grid failures, particular attention is paid in this booklet to energy issues associated with these disaster types. Because it is so highly centralized and complex, the utility grid is inherently vulnerable to disruptions. Reliance on sophisticated mega plants and high-capacity transmission lines means that when outages occur, they often affect a correspondingly large geographical area. Back-up renewable power systems can serve as insurance against collapse of electrical systems. When installed in businesses, they can prevent -- or at least reduce -- business interruption losses caused by grid failure."
- The National Center for Appropriate Technology: http://www.freshstart.ncat.org/articles/enrgsyst.htm

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.

High efficiency combined heat and power (CHP) applications for renewable and non-renewable fuels should be considered for qualification. It is apparent that natural gas and other gaseous fuels will continue to be a big part of our energy supply and so an efficient use of these fuels would be prudent for the environment and the economy. Including applications that make dramatically better use of the energy available in gaseous fuels should be encouraged along with the rest of distributed energy policy through a discounted incentive, or a separate policy should be thought through.

- The US Department of Energy has identified up to 240GW of combined heat and power projects throughout the nation that can be achieved by the year 2020 under existing market conditions, and would bring the total generation mix from CHP sources from 8% (2008) up to 20%.
- The 2009 McKinsey report "Unlocking Energy Efficiency in the US Economy" has identified CHP as a way to save the nation $7.9B each year in energy costs and offset 1.4 quadrillion BTUs of energy consumption. It is represented as a "negative-cost" energy efficiency measure (meaning the climate and efficiency benefits outweight the upfront capital cost of implementation). CHP is declared a "proven" and "low-cost" energy efficiency measure.

B. Technology-Specific Issues:

WALEA recommends the state conduct an integrated resource assessment study to quantify its renewable resources, identify their approximate costs of development, and chart a path toward their implementation. A similar study was done for the Island of Kauai in 2005 for their 2008 integrated resource planning process. In 2008 the island set a goal of 50% of their energy coming from local distributed renewable energy (at the time they had 2%). Though Kauai is a special location, so is Washington and knowledge of our potential to power ourselves would lead to ambitious but realistic goals to do so. The below link is to the Kauai 2005 study.
http://www.kiuc.coop/IRP/Tariff/Appendix%20C%20Renewable.pdf

Distributed Solar

1. Not including the photovoltaic solar panels themselves, what is the cost of installation on a unit basis of solar panels in distributed energy applications? How does this compare to the per-unit cost of installation for utility scale applications?

- Most installed DG systems in the U.S. are in the range of 2 to 5 kW. The per unit cost of the installation ranges from $8-$9/watt, with $4-$5 of that being the solar panel itself. This does not include any federal or state incentives.
- "With the current rate of progress, the cost of a utility-sized photovoltaic (PV) system is likely to reach $2.20/watt by 2016, and $2.50/watt and $3.50/watt, for commercial scale and residential scale systems respectively. Reductions significantly beyond that in the next four to eight years are unlikely absent dramatically new ideas and significant investment." (USDOE)
- Although the per-unit cost of installed solar may be less for utility scale solar facilities, the distributed nature of the renewable solar energy is negated. The electricity surplus in Washington makes utility scale installations unwise, as well as line-losses associated with centralized electricity generation. As future electricity demand in WA rises, taking customers off the grid through utilization of distributed energy systems will be a more efficient way to meet that demand.

2. Is the integration of the variable output of photovoltaic power production made easier or less expensive if it is distributed versus central plant photovoltaic production?

Yes, in distributed production of PV the variability disappears within the variability of loads and existing infrastructure can handle significant levels of penetration. Sharp changes in output due to clouds passing over are entirely smoothed out on a regional basis due to geographic distribution. Even the daily distribution is flattened somewhat due to variable installation angles to the sun across multiple installations. No transmission capacity is required for distributed PV production, and costly storage expenses are avoided to remedy the fluctuations in power output. Feeder

3. Are there lessons learned from Oregon's tariff subsidies for solar installations? Is there a calculated subsidy per kWh for the Oregon program?

Oregon's feed in tariff is a pilot project, part of an inquiry into solar development, intended to allow utilities and solar providers to find the sweet spot between up-front costs and long-term payoffs to entice solar consumers. Rates were set between 55 and 65 cents per kWh. So far, the program has proven so popular that its capacity was subscribed in just 15 minutes in the first enrollment period July 1, 2010. And efforts to revise the rates downward have yet to slow traffic. Rates were reduced by 10 percent in October 2010, again filling up in under an hour. In March, rates were revised downward by another 20 percent, landing between 39.6 and 46.8 cents per kWh for the enrollment period that opened in April, with similar results.
http://sustainablebusinessoregon.com/articles/2011/05/feed-in-tarrif-changes-planned-for.html

With similar electricity prices in WA ($0.08-0.085/kWh) and OR ($0.085-0.09/kWh), we may extrapolate that a feed-in-tariff rate of $0.40/kWh is unnecessary. It is worth noting here that the Net Metering structure in WA only allows customers to recoup the value of the offset energy and are not paid if they produce more than they consume. California's SGIP also proves as a good example of state sanctioned equipment 'buy-down' programs.

4. Given the variety of tax and other financial incentives for solar manufacturers and consumers, are additional incentives needed?

Current incentive levels are sufficient or even generous. Restructuring of the current state incentive programs could make conditions more favorable for solar with the same or a lower incentive level. Particularly making the structuring community solar projects easier (such as through community net metering) would decrease costs and barriers to implementation of PV technology.

Distributed Wind

5. Is the integration of the variable output of wind power production made easier or less expensive if it is distributed throughout the service area rather than centralized from a utility-scale wind farm?

Yes, until distributed wind capacity equals or exceeds local minimum demand, distributed wind variability can be handled by the same infrastructure that compensates for change in demand. Within any one corner of the state, the instantaneous variability in the wind is smoothed out by the geographic diversity of distributed wind installations. For example, as a storm passes through it will hit one 5 MW installation a half hour before another rather than all at once as in the case of a wind farm. Across the state the seasonal variability of wind is mitigated by the strong summer resource on the east side and strong winter resource on the west side. Valleys, shores, passes, ridges, deserts, plains all have differing seasonal and diurnal wind characteristics. Distributed generation policy encourages development in all of them rather than just the one that happens to yield the absolute greatest bulk energy per MW installed capacity.

6. What is the estimated contribution of distributed wind generation to meeting a utility's peak demand?

OPALCO commissioned a study in 2004 studying the wind energy as a potential way to avoid a line upgrade to Orcas Island. Though the methods used in that study are not up to the standards of the modern wind industry, the results showed a significant reduction in peak demand on their highest use days. This study is included as an appendix. WALEA members have further shown with their own data that west side resources peak in the winter months. Heating is the main driver of peak load and heating need is driven by both low temperatures and high winds. Though the topic deserves further study, WALEA estimates a capacity contribution of west side wind of 20% to 60% of a distributed wind facilities rated capacity. East side winds have a low contribution to winter heating loads but a high contribution to summer irrigation loads since it is both wind and heat that generate irrigation demand.

7. Does current distribution capacity constrain development of distributed wind generation?

In certain high wind agricultural areas yes distribution capacity does constrain distributed wind development.

Distributed Hydroelectric

8. What is the state of the technology for generating electricity from wave, tidal, and micro-hydro technologies (maturation, market penetration, retail price of installation)?

WALEA considers, run of stream, dam improvement, and irrigation hydro technologies very mature and deserving of broader implementation. One of the world's premier providers of this scale of hydroelectric technology (50 kW to 5 MW) Canyon industries is in Demming, Washington and promotion of this technology will increase in state manufacturing. Ocean energy technologies are still in the development and demonstration phases and it remains to be seen which modes will prove economical.

9. Do these technologies pose potential negative environmental impacts?

The impacts of ocean energy technologies are not well known and currently under diligent study. Small hydro impacts are among the lowest of all technologies in terms of land use per MWh the main concern, fish impacts, are now heavily regulated. Any small hydro system that can be permitted under the current scrutiny given these projects is likely to have minimal negative impact while generating substantial positive impact in MWhs generated, often in the peak winter months.

10. Are there potential impacts from current environmental regulations for hydroelectric generation that might adversely affect the development of future distributed hydroelectric generation (in other words, should micro-hydro be treated the same as utility-scale hydroelectric generation? Are there other impacts specific to micro-hydro that ought to be considered)?

Micro-hydro deserves a streamlined permitting path similar to what we have suggested for air quality and small biogas and biomass facilities. There are certain simplified rules that can be applied to this scale of hydro development that can speed the process for the vast majority of projects that have a very small impact while still giving due scrutiny to those that may have a larger impact.
For run of stream projects some of those filters may be:

- No impoundments of water greater than 1000 square feet
- A specified percentage of flow diverted from collection structure
- Intake screening
- Intake above highest reach of anadromous fish
- Outlet above, at, or just below highest reach of anadromous fish
- Creation of artificial habitat on tailraces of projects terminating in streams containing fish species that could benefit from such habitat.

Biogas

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

Since almost any wet organic material can be converted in biogas, the technical potential for biogas in Washington State is enormous—in the hundreds of megawatts. However, there are and will be competing uses for wet organic material that limit the economic potential of biogas, as purchasing this fuel for biogas production is only feasible with high energy prices.

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)?

The main issue with the state's renewable portfolio standard is that it defines "Nonpower attributes" to includes all "avoided emissions of pollutants to the air, soil, or water, and avoided emissions of carbon dioxide and other greenhouse gases." Production of biogas often produces environmental benefits unrelated to the production of electricity; the benefits include avoided methane emissions from manure storage or landfill disposal of organic waste, improved water quality, and reduction of nutrient discharges. Most biogas projects are unable to claim credit for these benefits while also selling renewable energy that qualifies under RCW 19.285.

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?

Most of the technical potential is in biogas projects under one megawatt in size. Projects with the best economic potential may be larger than one megawatt, but few will exceed five megawatts in size.

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?

These projects use a model based on European markets where energy and disposal prices are much higher than Washington State.

C. Financial Incentives:

1. If the cost of building a distributed energy resource is not yet competitive, and a subsidy is recommended, what form of subsidy is best?

For standard subsidies a production-based incentive is best, it puts the obligation on the project owner to maximize output(s) of the generator. For innovation subsidies directed by a mission oriented nonprofit can be most effective in making sure subsidies are used as wisely as possible in meeting goals not well met by set program rules. The Energy Trust of Oregon is a good example. The State Energy Program ARRA grants are another example of directed financing for innovation.

2. What effect would the subsidy have on encouraging the building of the resource versus research and development?

Production based incentives encourage building of the resource, directed grants are better at encouraging R&D

3. Should subsidies, incentives or renewable energy credits be paid or created for power generated through distributed resources while market prices are negative?

A stable market and incentive structure is essential for growth of the industry. While distributed generation is still a small percentage of the market it should be protected from fluctuations such as negative market prices. As DG becomes established rules may need to change, but for the near future the impact of providing incentives during brief negative market periods will be negligible compared to the benefit of developing this industry. Feed in tariffs, avoided cost rates, and incentives can be structured to provide low incentive for production during periods likely to have low or negative market prices but the numbers should be pre set and predictable. Oregon's avoided cost rate has an off and on peak rate, putting some of this desirability of power during certain times into the structure of their rate.

The Commission appreciates your comments on these questions and issues. Commentors may choose to comment only on those questions for which they have expertise. If there are other topics or information you wish to share with the Commission concerning the benefits and challenges of distributed energy, please submit your additional comments.

One of WALEA's member companies, eFormative Options, has been working in conjunction with the Pacific Northwest National Laboratory and the National Renewable Energy Laboratory under a U.S. Department of Energy grant to develop a Distributed Wind Policy Comparison Tool and Guidebook to assist utilities and policymakers in evaluating variables and potential adjustments to the policy environment. The beta tool and review draft Guidebook are available by request; public versions will be posted soon at www.windpolicytool.org.