# Chapter 5 – Distributed Energy

## 5.1 What is Distributed Energy and Why Is It Important?

In this Energy Strategy, the term "distributed energy" (DE) covers a wide range of technologies and applications: district heating (and cooling), combined heat and power (CHP), and distributed electricity generation (DG).[204] A key characteristic that ties these types together is the relatively compact geography of where electricity and thermal energy are produced and used. District heating is steam or hot water produced in a central plant and distributed to a single building or group of nearby buildings, e.g. Seattle Steam's downtown heating system.[205] Combined heat and power (sometimes called cogeneration) is an energy facility designed to produce both electricity and useful heat from a single energy source, e.g. a pulp and paper mill that uses waste wood products to generate electricity and produce steam for on-site materials processing or use in an adjacent district energy system. Distributed generation generally refers to the production of relatively small amounts of electricity (kilowatts or a few megawatts) at the same location where it will be used, e.g. solar panels on a commercial building.

Historically, distributed energy technologies were the original basis for an electric generating system and localized heating systems. Small power generating plants were situated in the neighborhood or town they served, hot water or steam pipes provided heating to downtown buildings, and factories produced their own electricity and thermal needs on-site. Over time, we moved away from such localized energy as larger power plants become much more efficient and transmission systems improved, driving down electricity costs and making both onsite electricity and thermal energy production systems less economically attractive. Other factors – including the environmental impacts of power production, health and safety concerns, and the geographical location of resources (e.g. hydroelectric plants located on large rivers) – contributed to the decline in local energy production.

Why then are we seeing renewed interest in distributed energy systems? The interest comes from a combination of technical, social and environmental factors. The equipment for producing energy close to loads has seen dramatic technical, economic and environmental improvements over the last several decades. Prices for new, small-scale renewable technologies continue to decline.[206] More individuals and businesses are seeking greater energy autonomy and consider solar systems, in particular, as a way to help achieve such independence. Developers see new economic development opportunities from DE technologies such as anaerobic digesters where they can address pollution issues while at the same time producing and selling "clean" energy. In addition, in a "back to the future" moment, we are once again beginning to better recognize the potential efficiency benefits of combining electricity production and the use of "waste" heat for onsite or adjacent off-site needs. The state's current fleet of standalone (non-CHP) fossil-fueled thermal power plants is about one-third efficient in converting fuel to electricity while

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[204] The term "distributed generation" typically refers to only the last of these items, namely the production of electricity located close to the particular load that it is intended to serve.

[205] See http://www.seattlesteam.com **(R0144)**

[206] For example, the Energy Information Administration's (EIA) *Annual Energy Outlook 2011, forecasts a five-fold increase in solar generating capacity by 2035 "based on a decline in the cost of photovoltaic systems over the project period and the availability of Federal tax credits through 2016."* ***(R0145)***

modern CHP systems can have combined thermal and electric efficiencies of 60 to 80 percent.[207]

This renewed interest in distributed energy does not by itself explain why it merits consideration in the Energy Strategy. There are three key reasons. First, it is timely. Washington has established incentives as well as policy mandates that encourage the development of both renewable and distributed energy systems. The House Technology, Energy and Communications Committee has an active investigation of these incentives and policies underway with the possibility of legislative proposals for the 2012 session. That investigation also included substantial work by the Washington Utilities and Transportation Commission (UTC) on distributed energy issues related to the state's investor-owned utilities.[208] Second, citizens and businesses are asking their state and utilities to help them with development of distributed energy systems. In just the last half-dozen years, the number of small photovoltaic systems in the state has increased from a few dozen installations to more than two thousand. Finally, there are those with a long-term vision of distributed energy as a significant part of Washington's energy future. California, with its goal to develop 12,000 megawatts of distributed energy facilities by 2020, is one manifestation of that vision.[209]

Yet despite this increased interest and timeliness, Washington has several characteristics that can make it challenging to develop these systems. Not all of the factors described here are unique to Washington, but they all should be considered as existing DE policies are changed or new ones added.

- **Electricity Costs** – Washington has some of the lowest retail electricity costs in the United States. For businesses, low electricity costs increase competitiveness. For Washington's citizens such low costs mean more dollars in their pockets. However, for distributed energy developers, low electricity costs make the economic case for on-site energy production less economically attractive. Low retail rates are not an issue for sales of electricity output to utilities since those rates reflect the margin avoided cost of new supplies. However, for individuals or businesses that have cheap and reliable electricity supplies, the economic value of on-site generation to displace that low-cost power can be unattractive.

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[207] Both renewable and non-renewable resources can fuel distributed energy systems. The Energy Strategy focuses predominately on renewable energy or very high efficiency fossil- fueled systems. This focus is in keeping with the guiding principle to "reduce dependence on fossil fuel energy sources through improved efficiency and development of cleaner energy sources, such a bioenergy, low-carbon energy sources, and natural gas, and leveraging the indigenous resources of the state for the production of clean energy." (RCW 43.21F,088 (1) (d)).

[208] "At the request of Washington State House of Representatives Technology, Energy and Communications Committee (TEC Committee), the Washington Utilities and Transportation Commission (Commission) is conducting a study relating to development of distributed energy in areas served by investor-owned electric utilities. Specifically, the TEC Committee has asked the Commission to provide to the Legislature background information and detailed discussion of options to encourage the development of cost-effective distributed energy in areas served by investor-owned utilities, as well as the opportunities and challenges facing investor-owned utilities and their ratepayers in developing distributed energy in this state. The UTC issued their report on the investigation, *Report on the Potential for Cost- Effective Distributed Generation in Areas Served by Investor-Owned Utilities in Washington State,* Docket UE- 110667, October 7, 2011" **(S0084)**

[209] The California Energy Commission has opened an investigation on how to integrate 12,000 MW of distributed energy generation into the state's electricity grid. http://listserver.energy.ca.gov/mobile/m_details.php?eID=1436 **(R0146)**

- **Integration of Distributed Energy Resources** — Washington has a reliable and well-developed electricity generation, transmission and distribution system based largely on centralized electricity production and centralized control. As distributed electricity systems achieve a higher penetration rate, especially of local electric distribution systems, electric utilities can face challenges in safely and effectively integrating those systems.
- **Maintaining Electric System Reliability** – Electric utilities are required to maintain a reliable electricity system and can even be subject to major federal penalties for failure to do so.[210] Independently operated generating projects connected to neighborhood distribution power lines can impact power quality, operations, voltage and frequently levels, and ultimately the reliability for all customers connected to the system.
- **Surplus Supplies** – The current recession as well as large amounts of new base load electricity development since 2000 have both dampened or eliminated overall load growth and in many instances created surplus supplies for some utilities.[211] Consequently, some utilities are "long" on resources and do not need new supplies. In addition, the downturn in demand has depressed prices in the Western electricity market making it difficult for utilities to find markets for any surplus supplies.
- **Local Opposition** – By their very nature, distributed energy systems are located near where the electricity or thermal energy is to be used rather than in remote locations. Consequently, there can sometimes be vocal, local opposition to new facilities in populated and developed locations – "not in my backyard."
- **Not All Distributed Energy is the Same** – Distributed energy can range from small photovoltaic panels on household rooftops to larger biomass-powered district heating systems in urban core areas to CHP systems at industrial facilities. In addition, distributed energy technologies can be intermittent power sources or reliable baseload facilities. Depending on the characteristics of the source, there may be concerns about the aesthetic, environmental and technical impacts of distributed energy technologies.
- **Limitations on Financial Support** – Unlike many other states that offer distributed energy incentives, Washington is constitutionally limited in its ability to provide direct funding to the private sector and the current state budget situation severely constrains the state's ability to provide additional tax incentives for distributed energy.

## 5.2 Distributed Energy Policy Package

This chapter describes and recommends ways that the state might encourage and facilitate the further development of distributed energy, while at the same time acknowledging both the challenges of integrating such systems into existing energy (electric) infrastructure with minimal technical and financial impacts. Commerce proposes two overall approaches to strike that balance.

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[210] Section 215 of the Federal Power Act (16 U.S.C. 791-828c) imposes mandatory reliability standards on electric utilities and other electric system participants.

[211] Northwest Power and Conservation Council, Memorandum, Comparison of Regional Load Forecasts, September 1, 2011 available at http://www.nwcouncil.org/news/2011/09/p2.pdf **(R0209)**

**Facilitating the Development of Distributed Energy** – These are policy actions that will encourage the development of additional distributed energy including electricity only as well as CHP and thermal systems. As these policy options are developed it is important to recognize that they may have impacts on the state and local existing electricity infrastructure and operations. Those impacts should be fully analyzed and considered as part of the policy design.

**Analyzing Current Distributed Energy Financial Incentives** – Washington has a relatively complex and often uncoordinated collection of incentives that encourage distributed energy. Nonetheless, these incentives can be important drivers of distributed energy development. This policy package does not recommend any specific changes to these incentives but rather highlights the need to examine them in light of their current financial impacts on the state and their overall effectiveness in achieving their policy objectives. This is particularly important for those incentives that are scheduled to expire within the next few years.

| | facilitating development of DE | financial incentives |
|---|---|---|
| **5.3 near-term recommendations**<br>These are mature policy concepts, or pilot projects to test newer policy concepts | **5.3.1** interconnection standards<br>**5.3.2** net metering policies<br>**5.3.3** streamlined permitting for distributed energy | |
| **5.4 long-term policy options**<br>These are candidates for long-term policy, and require piloting or additional analysis before deployment. | **5.4.1** DE-compliant power purchase agreements<br>**5.4.2** distributed energy in I-937*<br>**5.3.3** streamlined permitting for distributed energy | **5.4.3** rationalize DE incentives<br>• renewables sales tax<br>• production incentives<br>• biomass incentives<br>• distributed energy credit in I-937*<br>**6** carbon pricing |

* All policy options related to the state's Energy Independence Act (I-937; RCW 19.285) are contingent on a separate legislatively driven process toward a revision of I-937. At this time, the Energy Strategy is neither endorsing nor opposing such an effort.

The last long-term option, *carbon pricing*, is an economy-wide approach to energy system management that would provide a strong economic signal for the development of low- and no-carbon resources, including many forms of distributed energy. It is discussed separately in 5.1.

**Note on Jurisdictional Issues** – Different levels of legal authority within the electricity sector were recognized when developing the analyses and recommendations in this chapter. The operations of investor-owned utilities are subject to state regulation by the UTC while the state's consumer-owned utilities – cooperatives, municipals and public utility districts - have elected governing boards. In addition, the Federal Energy Regulatory Commission (FERC) has authority in areas such as wholesale transactions and reliability. During the further development and implementation of these recommendations, it is important to include a thorough examination of jurisdictional responsibility and authority. For example, Recommendation 5.4.1, DE-compliant power purchase agreements, will require investigations of FERC authority over power purchase agreements.

## 5.3 Near-Term Recommendations

### 5.3.1 Interconnection Standards

#### Policy Description

In 2007, the UTC and a number of the state's consumer-owned electric utilities worked closely together to develop and adopt electrical interconnection standards for on-site electricity production. The rules, adopted by the UTC for its regulated investor-owned utilities and, in turn, voluntarily adopted by the governing boards of many of the state's consumer-owned utilities, established simplified interconnection standards for systems up to 300 kilowatts of capacity. This occurred in response to HB 5101 passed in the 2006 session.[212] There seems to be general agreement that the UTC and voluntary consumer-owned utility process worked well and that it could serve as a model for future interconnection efforts.[213]

In workshops and comments to the UTC on their distributed energy proceedings, both utilities and developers noted there have been improvements in interconnection technology since the 2007 process and that it was time to reexamine the standards. Specifically, it may no longer be necessary to require an external disconnect switch with smaller DG systems, insurance requirements may be decreased or waived and the overall limitation for simple system interconnection rules might be raised from 300 kW.

#### Previous Research and Experience

An excellent summary of the provision of Washington's interconnection standards is available from the Database of State Incentives for Renewables and Efficiency (DSIRE).[214]

#### New Analysis

It is not possible to estimate the quantitative impacts of changes to Washington's interconnection standards since those impacts will depend on what specific changes ultimately

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[212] HB 5001 created a public utility tax incentive for consumer generated renewable power (RCW 82.16.130). The incentive did not take effect until "uniform standards for interconnection to the electric distribution system" were in effect for light and power businesses serving 80% of the total customer load in the state.

[213] Washington Utilities and Transportation Commission, *Report on the Potential for Cost-Effective Distributed Energy in Areas Served by Investor-Owned Utilities in Washington State,* Docket UE-110667, October 7, 2011. **(S0084)**

[214] http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=WA07R&re=1&ee=1 **(R0147)**

are adopted into state and local requirements. Overall, increases in the upper limit for simplified interconnection procedures beyond the current limit of 300 kW should result in more rapid and less expensive deployment of larger distributed energy systems, and removal of the disconnect switch requirement and lower insurance requirements should decrease the cost of interconnection.

As the UTC and other parties consider changes to the interconnection standards, two documents can provide useful direction on the range and type of issues to consider – *Freeing the Grid* and *Connecting to the Grid.*[215] The *Freeing the Grid* report, for example, notes a number of items to examine related to interconnection. Some of these items, in whole or in part, are already incorporated in interconnection standards.

- Open standards to all customer-sited generation, not simply renewable energy
- Permit systems up to 20 MW if they are sized to meet on-site loads
- Create four size categories – 10 kW, 2 MW, 10 MW (non-exporting system), 20 MW or larger
- State requirements should take less time than the Federal Energy Regulatory Commission (FERC) process
- Recommendations related to interconnection fees
- Engineering fees should be fixed, e.g. hourly rate or cost per study
- No need for external discount switch since all IEEE systems must have auto shut off capability
- Certification tied to UL 1741 and IEEE 1547
- Use the FERC standard screens
- Network interconnection allows both spot and network interconnections
- Standard agreement with friendly clauses
- No additional insurance for non-inverter system below 50 kW and inverter systems to 1 MW
- Process for dispute resolution
- Rules apply to all utilities

## Implementation

The UTC, working in close collaboration with Commerce and the WSU Energy Program, has determined that a rulemaking is in order to modify its existing interconnection rules focusing particularly on systems in the range up to two MW.[216] As in the previous process, consumer-owned utilities would be invited to actively participate and ultimately voluntarily adopt

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[215] Freeing the Grid – Best Practices in State Net Metering Policies and Interconnection Procedures, December 2010 **(R0040)** and Connecting to the Grid – A Guide for Distributed Generation Interconnection Issues, 6th Edition, 2009, **(R0148)**, are available at http://irecusa.org

[216] Subsequent to efforts on these smaller systems, we should also consider processes for systems at the 10 MW and 20 MW levels.

comparable interconnection standards as those for the UTC. The rulemaking process should examine all of the items in the *Freeing the Grid* and *Connecting to the Grid* reports. That examination should include determination of which items are most important to both developers of projects and the utility community, and attempt to strike a balance between their needs.

## 5.3.2 Net Metering Policies

### Policy Description

Washington is one of 43 states, plus Puerto Rico and the District of Columbia, with net metering laws. The law was originally adopted in 1998 with modifications in 2000, 2006 and 2007, and applies statewide.[217] Net metering is an electricity policy that allows an on-site generation system to "run the electric meter backwards" during periods when on-site electricity production exceeds load. The value to the on-site generator is two-fold; it values any excess electricity production at retail rates and obviates the need for on-site electricity storage. Although net metering can be applied to any type of DE generation including fossil fuels, most states, including Washington, limit the policy to renewable sources.[218]

Washington's net metering law is generally considered well-designed and effective. It received a B grade from the Interstate Renewable Energy Council in the 2010 and 2011 assessments of state net metering policies (*Freeing the Grid*).[219] However, there are several components that should be considered for possible changes.

### Previous Research and Experience

An excellent summary of the provision of Washington's net metering law is available from DSIRE.[220]

The state does not collect data on the total number of net-metered systems in Washington. However, the WSU Energy Program does certify small, distributed energy systems that want to claim the state's production tax credit (Figure 5.1). Seattle City Light had 325 net-metered customers in 2010 with total generation of approximately 1,032 MWh compared to total utility sales of more than 9 million MWh per year.[221]

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[217] RCW 80.60

[218] Washington's net metering law applies to solar thermal electric, photovoltaics, wind, small hydroelectric, fuel cells and CHP/cogeneration using renewable fuels.

[219] Freeing the Grid – Best Practices in State Net Metering Policies and Interconnection Procedures, December 2011, page 70. **(R0040)**

[220] http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=WA01R&re=1&ee=1 **(R0149)**

[221] Comment submitted on the State Energy Strategy by the City of Seattle, October 21, 2011 available at http://www.commerce.wa.gov/DesktopModules/CTEDPublications/CTEDPublicationsView.aspx?tabID=0&ItemID=10087&MId=863&wversion=Staging Note that many of the Seattle City Light systems may also be included in the Figure 5.1 statistics. **(S0085)**

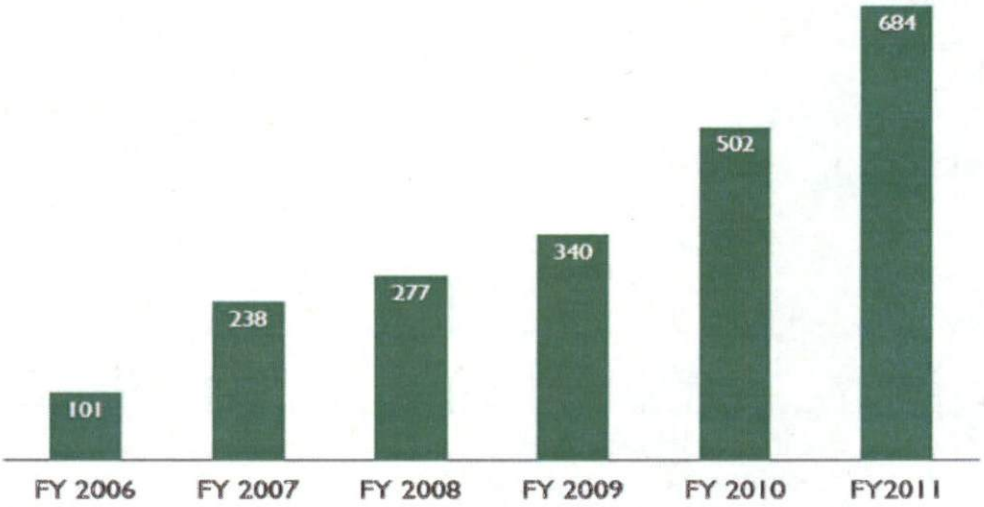


**Figure 5-1: Distributed generation systems claiming the consumer-generated power tax credit (RCW 82.16.130).[222] Of 11,442 kW of capacity in the program, 10,576 kW are photovoltaics; 416 kW are wind and 450 kW are anaerobic digesters. (S0092)**

## New Analysis

As noted above, *Freeing the Grid* sets out some best practices for state net-metering laws and Washington does well under many of those criteria. Washington's current net metering law allows monthly accumulations of net metering production to be carried forward (with an annual limit in April of each year), and it applies to all customer classes (residential, commercial, industrial) and all electric utilities statewide.

However, there are three policy areas where Washington should consider making changes to the law:

- **Modify the Overall System Size Limit** – Of the states with net metering policies, two dozen either do not limit individual system size or have some limitation that exceeds the 100 kW Washington value. An essential purpose of net metering is to allow customers to provide for their on-site energy needs while decreasing or eliminating the need for on-site backup equipment through connection to the utility system. Thus in some ways establishing a hard limit of 100 kW for net-metered systems arbitrarily limits the ability of large residential complexes, or commercial or industrial facilities to install larger systems to meet their on-site needs with the net-metered assistance of their utility. Modifications to the current limitation might best be tied to the on-site load where the net-metered system is located. As an example, limiting net-metered systems to no more than 100 percent of the total electric load at a given location would directly encourage the design of systems tied to on-site need.
- **Increase Overall Utility Systems Limit –** Currently, the overall limit imposed on total net metering systems connected to a single utility is set at 0.25 percent of a utility's 1996-peak load, increasing in 2014 to 0.50 percent of the 1996 peak load. Based upon comments and

[222] Source – WSU Energy Program, November 2011.

the literature, overall utility level limitations of net-metered systems are less of an issue than the number and size of systems on individual feeders and local distribution systems. It should be examined whether any utilities are beginning to approach their limit, and if so, how the overall limit might be raised while still accommodating local electrical distribution safety, reliability and operational concerns.

- **Allow Carry Forward of Excess Generation Beyond One Year –** Currently, Washington law allows net- metered systems to carry forward their net excess generation from month to month, but at the end of a 12-month billing period net excess generation is granted back to the utility without additional compensation to the customer.[223] Allowing net-metered customers to carry forward their net excess generation beyond 12 months but not receive payment from the utility could make DE development more attractive. If limits on individual net-metered systems are tied directly to on-site loads and utilities are not required to pay for net excess generation at the end of one year, the overall impact on utility operations should be manageable.

### Implementation

Consider legislation to raise the net-metering limit with particular focus on tying that limit to customer load, e.g. no more the 100 percent of total load rather than an absolute kilowatt value. Alternatively consider raising the limit to two megawatts. Consider raising the limit on the percentage of net-metered load required to be accommodated on a utility's existing system while at the same time recognizing the need to accommodate limitations that may occur at the distribution level. Allow net-metered systems to roll over excess generation credits beyond the current limit of one year, but do not require utilities to pay for excess credits.

## 5.3.3 Streamlining Permitting for Distributed Energy

### Policy Description

The 2011 Energy Strategy Update specifically called for an investigation of streamlined permitting for combined heat and power systems (including district energy systems).[224] In addition, the 2011 SES Update included several recommended actions that would streamline permitting for clean and advanced energy systems, including development of energy overlay

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[223] RCW 80.60.030

[224] *Energy Strategy Update and 2011 Biennial Energy Report with Indicators,* December 2010, page 10.

"Streamlined permitting of combined heat and power (CHP) projects. Various studies have indicated a large quantity of industrial waste heat available that could be used to generate electricity in combined heat and power (CHP) or 'cogeneration' installations. If the industrial entity financing the CHP installation is able to sell the resulting electricity into the grid a project often appears profitable, but permitting, regulatory or economic barriers can pose an insurmountable hurdle to implementation. Meanwhile, the U.S. EPA is developing a Waste Energy Recovery Registry according to requirements of the 2007 Energy Independence and Security Act, and Washington may benefit from preparing to respond to the CHP potentials revealed by the Registry. In this initiative, Commerce will research the barriers to CHP deployment during calendar year 2011, and recommend a set of remedies that may include programmatic, regulatory or legislative solutions to be deployed in 2012. The research will be conducted in conjunction with regulatory streamlining research described under *Streamlined Permitting for Clean and Advanced* Energy Technologies below." **(S0029)**

zones, non-project and planned action State Environmental Policy Act (SEPA) reviews, accelerated permitting of pilot projects, and energy technology test zones.[225] These latter recommendations chiefly focused on large, utility-scale projects but some of the items developed have relevance to the deployment of distributed energy systems.

## New Analysis

**Renewable Energy Siting**: Model ordinances are used by several states to provide a guideline for local governments to refer to when considering development of their own ordinances. Commerce staff reviewed and compared them for applicability in Washington. Commerce prepared a discussion brief.[226]

**Streamlined Permitting**: What opportunities exist for streamlining permitting of infill development or renewable energy facilities? Commerce staff prepared a brief report highlighting opportunities and actions local governments could take to streamline permitting for both infill and renewables, while maintaining the same level of environmental review and protection.[227]

## Implementation

Currently, local governments may opt to address renewable energy facilities in policies or development regulations; however, there is no requirement to do so. As a result, most jurisdictions have little to no mention of renewable energy facilities in plans or codes. While there does appear to be an increase in the number of local governments that are addressing renewables and, to a less extent distributed energy systems, directly, there is no specific guidance from the state on issues to consider or provision of examples. Because the State Energy Office, and the Local Government and Infrastructure Division are both in the Department of Commerce, that agency is uniquely situated to help local governments address renewable energy facilities and deployment of distributed energy in their communities.

Commerce proposed the following implementation steps related to permitting and siting:

- Commerce will develop a website with connections to tools for local governments to use in the development of local siting ordinances, best practices and models for distributed energy. An example of the type of information that might be included could be a technical brief on Energy Aware Communities that includes discussion of development and siting of small local energy generation.
- As local communities consider issues and develop codes regarding renewables and DE, they should consider type (wind, solar, geothermal), location (primary use on vacant parcels, freestanding, or as an on-building accessory use) and scale. Concerns can then be discussed in a public forum. Any mitigation measures or design standards can be

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[225] Ibid, pages 12-15 **(S0029)**

[226] Department of Commerce, *State Model Ordinances for Renewable Energy Facilities – A Report Prepared to Support the 2010/2012 State Energy Strategy*, Department of Commerce, 2011. **(S0062)**

[227] Department of Commerce, *Streamlining Local Government Project Review and Permitting of Renewable Energy Facilities and Infill Development*, Department of Commerce, 2011. **(S0063)**

determined, and codes can be written that would allow for more efficient permitting when proposed projects are designed to meet those adopted provisions.

- During the last several legislative sessions, there has been legislation proposed that would give the state broader authority to permit renewable energy facilities in instances where a local government did not have its own adequate regulations in place. Commerce should convene developers, local government, state agencies and other interested parties to review those legislative proposals, fully identify jurisdictional issues, determine permitting and siting concerns, and examine government resource limitations. Based on that effort, Commerce would consider developing state or local model processes and ordinances.
- Perhaps the greatest opportunity to streamline permitting lies with the integration of the SEPA and the Growth Management Act (GMA). Commerce is developing suggested recommendations on how this may be done. For example, a Planned Action could be developed that addresses siting, operation and mitigation of certain renewable energy facilities (by type and scale) so that future projects within the scope of the Planned Action can be permitted more quickly and efficiently. Other options include Energy Overlay Zones, development of criteria for energy facilities allowed by conditional use permit, or development regulations that allow residential scale energy facilities in new and existing neighborhoods.

## 5.4 Long-Term Policy Options

*Note: Policies discussed in Section 5.3.3 also include long-term options discussed in their primary entry above.*

### 5.4.1 DE-Compliant Power Purchase Agreements

#### Policy Description

Washington has a long and successful history in the development of combined heat and power systems, particularly in the pulp and paper industry. In fact, the existence of CHP capabilities at some of those industrial sites has been an important element in maintaining their economic viability. Currently, Washington has nearly three dozen CHP sites with a capacity of over 1,200 MWe, concentrated in the wood products, paper and petroleum refining industries.[228] However, since 2004 only 152 megawatts of new CHP systems have been built in Washington. Numerous studies over the last 10 years have pointed to the significant potential available from expansion of CHP systems in Washington and the Pacific Northwest, perhaps as much as 4,000 megawatts (electric) of additional capacity.[229]

From a policy perspective, the terms and conditions of power purchase agreements between developers and electric utilities are critical to the viability of CHP and other renewable energy projects of several megawatts or greater. Changes to power purchase agreements are a

[228] NW Clean Energy Applications Center, *State of Washington Clean Energy Opportunities: Technical Potential for CHP, August 2010.* **(R0210)**

[229] Washington State University Energy Program, *Washington Efficient Energy Roadmap,* 2011. **(S0064)**

complex and sometimes contentious process. Developers are looking for long-term, economically attractive contracts that allow them to acquire the financing needed to build while utilities must weigh such agreements against the need to maintain system reliability and integrity, meet their overall need (or lack of need) for new supply resources, and determine the potential costs and rate impacts of these new generation additions.

Because of these complexities, Commerce proposes that this work be a long-term rather than a short-term endeavor to allow sufficient time to fully research and understand the implications of any proposals.

## Previous Research and Experience

The Northwest Clean Energy Application Center[230] is an excellent source of detailed information on state and regional CHP, district heating and waste heat recovery technologies, potentials studies and projects.

## New Analysis

The WSU Energy Program is conducting an analysis and road mapping effort examining energy efficiency tied to the combined heat, power and district energy components of distributed energy. Their analyses together with work underway by the UTC will inform this process and will be available at the end of 2011.

## Next Steps

Power purchase agreements generally apply to a wide range of CHP systems (from 400 kW anaerobic digesters to 25 MW pulp and paper mills). Obviously, the larger of these systems will have a greater impact on both the technical and economic operation of utility systems. Utilities, especially those that are long on resources, have raised legitimate concerns about the costs that these systems might impose on other customers. On the other hand, developers of larger scale distributed energy systems have suggested several changes that they believe would improve the economic viability of their projects. These include:

- Adding formal consideration of thermal energy (thermal recovery, CHP) opportunities into electric utility Integrated Resource Planning (IRP) documents.
- Investigating the feasibility of setting purchase prices under power purchase agreements at the delivery point instead of the entry point, requiring calculations of and credit for line-loss savings, and offering a portion of those savings to the generator.
- Extending the term of power purchase agreements to 15 to 20 years to allow for greater investment certainty for project developers.
- Increasing the limit of basic power purchase agreements to 10 megawatts.
- Considering changes to the process for determining standby rates for CHP systems.

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[230] http://www.chpcenternw.org **(R0150)**

- Examining existing utility tariffs, such as Puget Sound Energy's Cogeneration and Small Power Production Schedule 91 and Snohomish PUDs solar incentive program, as potential models for utility tariffs or purchase agreements.

Given these differing perspectives, Commerce recommends a longer-term investigation of the impacts of current power purchase agreements on DE development and utility operations The goal of this work would be to identify specific opportunities to make power purchase agreements more streamlined and consistent throughout the state.

Much of the work in this area falls under the auspices of the UTC. Commerce and the WSU Energy program would work closely with the UTC and other interested parties on possible modifications to power purchase agreement policies and procedures. This process would also involve careful review of federal requirements under purview of the FERC.

## 5.4.2 Distributed Energy in I-937

### Policy Description

Initiative 937, the Energy Independence Act (the Act), require the state's largest electric utilities to acquire both cost-effective energy efficiency and new renewable resources.[231] The Act specifically recognizes the benefit of distributed energy by providing a double credit against utility renewable energy obligations for systems rated at five megawatts or less.[232] As a result, I-937 has increased interest in and development of new distributed generation. Since the passage of the Act by voters in 2006, there have been discussions of and efforts to amend provisions of the law. To date, none of the proposed changes has been adopted but discussions continue. Based on strong advice from the Energy Strategy Advisory Committee, this Strategy does evaluate a range of proposals for changes to the law. However, there is a separate legislative process underway to examine possible changes to I-937 either in 2012 or subsequent sessions. If that process provides an opportunity to change provisions of the law, several changes could enhance the development of additional distributed energy.

### Previous Research and Experience

Additional information on the Energy Independence Act, its associated implementation rules for consumer-owned utilities.[233] and investor-owned utilities[234], plus other background materials are available on Commerce's website.[235]

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[231] RCW 19.285

[232] RCW 19.285.040 (2) (b)

[233] WAC 194-37

[234] WAC 480-109

[235] http://www.commerce.wa.gov/site/1001/default.aspx **(S0065)**

## New Analysis

No new analysis was undertaken. During the course of previous legislative deliberations on the Energy Independence Act, much analysis was produced. If legislation is proposed for 2012 or a subsequent session, Commerce will work closely with the Governor's Office, UTC, and other public and private stakeholders to analyze the implications of any changes.

Without specific details on what changes would occur to the law, it is not possible to provide any quantitative estimate impacts of I-937 changes on distributed energy development, greenhouse gas emissions or potential price impacts

## Next Steps

Distributed energy related changes to I-937 to consider include:

- Establishing a process for prequalification of the eligibility of renewable and high-efficiency cogeneration energy technologies. The Energy Independence Act does not allow for utilities and project developers to receive absolute certainty that either the Washington State Auditor or the UTC will approve their investment in some types of renewable technologies projects.[236] Based on a recommendation from the 2011 Energy Strategy Update, Commerce, the UTC and the Auditor's office have established an advisory process to provide non-binding interpretations of I-937 eligibility. However, lack of a binding formal process as part of statutory language can limit the development of certain distributed energy technologies and projects, especially those that do not conform precisely to definitions of eligible renewables now in statute.
- Revising the definition of biomass to include additional biogenic sources. As currently written, the definition of biomass in the Act limits the ability to include power produced from high-solid biomass wastes as a "qualified renewable resource."[237] Addition of high-solids materials to such technologies as anaerobic digesters can significantly increase net energy production. Neither the UTC nor Commerce can alter that definition via rulemaking.
- Improving the definition of cogeneration technologies (combined heat and power) to clarify what systems qualify under the Act. There is general agreement that the definition of cogeneration in the Act is not sufficiently detailed to include all types of cost-effective opportunities, especially situations where electricity efficiency improvements may be small but overall energy efficiency increases, such as thermal energy savings, are significant.
- Providing clarification on the five megawatt limit for distributed energy systems. As written, it is unclear if the five megawatt limit applies to the capacity or the average annual output of a system, and whether it is for direct current or alternating current output of the system. This may create uncertainty for some CHP system projects, in particular.

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[236] There is an exception to this limitation for investor-owned utilities subject to the jurisdiction of the UTC. They may request a formal declaratory order from the UTC on a renewable technology/project. See UTC Docket UE-111016, *Policy statement regarding processes for determine whether projects are "Eligible Renewable Resources" under RCW 19.285 and WAC 480-109,* June 7, 2011 for details. **(S0066)**

[237] High-solids digesters use the organic fraction of municipal solid waste (primarily post-consumer food waste and yard waste) to produce methane.

- Considering allowing anaerobic digesters to "unbundle" their greenhouse gas emissions reduction credits (methane reduction) from their renewable energy credits to improve the economic viability of such systems.

There may be additional proposed changes to I-937 that might benefit the development of distributed resources. As proposals are being considered and evaluated, they should also be assessed in light of their potential impact on distributed energy development.

## 5.4.3 Rationalize Distributed Energy Incentives

### Policy Description

Washington has a number of tax and policy incentives that are all or in part designed to improve the economic viability of distributed energy systems. These incentives have been developed over time with only limited coordination or consideration of their overall impacts on the development of distributed energy or impacts on the existing state energy infrastructure.

If the state has a goal to support distributed energy in general, a specific technology or some combination, what are the appropriate mechanisms for that support? What are the implications of choosing such a mechanism? In addition, what are the impacts?

| Tax Type | Description | RCW | Program Adopted | Expiration Date |
|---|---|---|---|---|
| **Business and Occupation Rate Reductions** | Manufacturing of Solar Energy Systems and Components | 82.04.294 | 2005 | 6/30/14 |
| **Business and Occupation/PUT Credits** | Consumer Generated Power (PUT Credit) | 82.16.130 | 2005 | 6/30/20 |
| **Business and Occupation/PUT Exemptions/Deductions** | Business and Occupation Tax Credit for the Sale of Forest Derived Biomass Used to Produce Electricity, Steam, Heat or Biofuel | 82.04.4494 | 2009 | 6/30/15 |
| | PUT exemption for electricity generated by light and power businesses using cogeneration or renewable energy | 82.16.055 | 1980 | Applies only to facilities constructed between 1980 and 1990 |
| **Sales/Use Tax Exemptions, Deferrals** | RST Exemption for Anaerobic Digester Construction and Operation | 82.08.900, 82.12.900 | 2001 | None |
| | RST Remittance (75 percent) for Renewable Energy Production Equipment | 82.08.962, 82.08.963, 82.12.962 | 2009 | 6/30/13 |
| | RST Exemption for Hog Fuel Used to Produce Electricity, Steam, Heat or Biofuel | 82.08.956, 82.08.957, 82.12.956, 82.12.957 | 2009 | 6/30/13 |
| | RST exemption for cogeneration equipment integrated into manufacturing | 82.08.02565, 82.12.02565, | | None |
| **Property Tax** | Property/leasehold tax exemption for anaerobic digester land, buildings and equipment for six years, | 82.29A.135, 84.36.635, 84.36.640 | | 12/31/12 |
| **Energy Independence Act (non monetary)** | Double credit toward renewable targets for distributed generation of 5 megawatts or less | 19.285.040 | 2006 | None |
| **Net Metering** | See Section 5.3.2 | 80.60 | 1998 | None |

## Previous Research and Experience

See the Washington State Department of Revenue website for a detailed description of energy-related tax incentives.[238]

An excellent and up-to-date summary of most of the local incentives related to renewable energy is available at DSIRE,[239] primarily for electric utilities.

[238] http://dor.wa.gov/content/findtaxesandrates/taxincentives/incentiveprograms.aspx#Energy **(S0067)**

[239] http://www.dsireusa.org/incentives/index.cfm?getRE=1?re=undefined&ee=1&spv=0&st=0&srp=1&state=WA **(R0151)**

### New Analysis

No new analysis was undertaken for this recommendation.

### Next Steps

Conduct a review and analysis of the impacts and costs of the state's current financial incentives for distributed energy. Focus that analysis particularly on the Retail Sales and Use Tax Remittance for Renewable Energy Production Equipment, which will expire in June 2013, the Property Tax Exemption for biodigesters that expires in 2012, and the Public Utilities Tax Exemption for Consumer Produced Power. These merit particular attention because they appear to have had a significant impact on the development of new renewable and distributed energy systems while at the same time impacting overall state revenue.

## 5.5 Future Trends for Distributed Energy

As a final note in this chapter, it is important to recognize there are a number of external factors that could have a major influence on the overall deployment of distributed energy systems. A few of these key trends include:

- The development of low-cost storage systems such as inexpensive battery systems. Commerce has agreed to examine energy storage issues and policies in future work prior to and during the 2015 Strategy.
- Continuation of the relatively rapid decline in the price of photovoltaic systems.
- The success or failure of the California effort to develop up to 12,000 MW of distributed electricity generation by 2020.[240]
- Improvements in power system electronics that enhance the ability of new technology to more seamlessly and safely integrate with the electricity grid.
- Improvements in the electricity infrastructure driven by smart grid development that permits improved integration and control of increasing amounts of distributed generation into the grid.
- New developments in production and distribution technologies for combined heat and power systems and district energy systems.
- The impacts of climate change on the supply and demand for energy.

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[240] See the California Energy Commission *IEPR Committee Workshop on Distribution Infrastructure and Smart Grid Solutions to Advance 12,000 MW of DG, June 22, 2011 at* http://listserver.energy.ca.gov/mobile/m_details.php?eID=1436 **(R0146)**