Staff Report on Substitute House Bill 2773
Net metering for certain renewable energy systems
February 1999

1. Introduction

On June 11, 1998, Substitute House Bill 2773 "Net metering for certain renewable energy systems" became effective. "Net metering" allows electricity customers to offset (over a predetermined time period) their consumption of purchased electricity with electricity generated by their own small scale renewable system, without considering when the electricity is consumed or generated. Under a net metering system, the customer's small renewable energy system is connected to the utility grid, and power produced by the customer's system flows into the utility grid, spinning a bi-directional electricity meter backwards. The meter measures the difference between the electricity supplied by the electric utility, and the electricity generated by the customer that is fed back to the electric utility, over the applicable billing period. At the end of the billing period, the customer may owe the utility for the excess electricity consumed, or may receive a credit for the excess electricity generated.

2. House Bill 2773

In Section 1 of the Bill, the Legislature declared that it is in the public interest to: (1) encourage private investment in renewable energy resources; (2) stimulate the economic growth of this state; and (3) enhance the continued diversification of the energy resources used in this state.

Section 3 mandates utilities to make net metering available to eligible customer-generators on a first-come, first-served basis until the cumulative generating capacity of net metering systems equals 0.1 percent of the utility's peak demand during 1996. A "customer-generator" means a user of a net metering system. A "net metering system" is defined as a facility for the production of electrical energy that: (1) uses solar, wind, or hydro power; (2) has a generating capacity of not more than 25 kilowatts; (3) is located on the customer's premises; (4) operates in parallel with the electric utility's transmission and distribution facilities; and (5) is intended primarily to offset part or all of the customer's requirements for electricity.

The bill directs utilities to charge customer-generators a minimum monthly fee that is the same as the fee charged to other customers in the same rate class. However, the utility may charge the customer an additional standby, capacity, interconnection, or other charge or fee if the WUTC or governing body determines: (1) that the utility will incur direct costs associated with interconnecting or administering net metering systems that exceed any offsetting benefits; and (2) public policy is best served by imposing these costs on the customer-generator rather than allocating the costs among the utility's entire customer base.

The electric utility must measure the net electricity produced or consumed during the billing period using normal metering practices. If the electricity supplied by the electric utility exceeds the amount generated by the customer, the customer will be billed for the net electricity supplied by the utility. If the electricity generated by the customer exceeds the electricity supplied by the utility, the customer will be billed for other charges ordinarily on the bills of customers of the same class, and will be credited for the excess electricity on the customer's bill for the following month. At the beginning of each calendar year, any remaining unused credit accumulated during the previous year will be granted to the utility (Section 4).

Additionally, the bill mandates that net metering systems include, at the customer-generator's own expense, all equipment necessary to meet applicable safety, power quality, and interconnection requirements established by the National Electric Code, National Electrical Safety Code, Institute of Electrical and Electronic Engineers, and Underwriters Laboratories. The WUTC (for investor-owned utilities) or a governing body (for a consumer-owned utility) may adopt additional safety, power quality, and interconnection requirements (Section5).

3. Objectives of a net metering program

Net metering is a low-cost, easily administered method to encourage customer investment in renewable technologies. It allows customer-generators to use the utility grid to "bank" their energy by producing electricity at one time and consuming it at another time (Wan, 1996). Net metering is a transfer of power not a sale (Starrs, 1998).

Bill 2773 includes three renewable sources of energy as eligible for net metering: wind, solar, and hydropower:

Wind: Wind energy can be produced anywhere the wind blows with consistent force. Wind power is economical in locations where the average wind speed is at least 14 mph (Environmental Defense Fund, www.edf.org/programs/energy/green_power/d_sources). Sites with significant wind energy resources in Washington state are located along the Pacific Ocean coast, the Columbia River corridor bordering Oregon, and the Ellensburg area in Central Washington (ECONorthwest, 1998). The wind energy potential in the state is estimated at 3,740 aMW (Renewable Northwest Project, 1998).

Solar: Solar energy is an intermittent and predictable resource. The sun's radiation is used directly to produce electricity in two ways, photovoltaic (PV) systems and solar thermal systems. PV systems change sunlight directly into electricity and they are most commonly used in areas where it is cheaper than running electrical wires, such as remote rural areas. Solar thermal systems use the sun's energy to heat a fluid that produces steam, which turns a turbine and a generator (www.edf.org/programs/energy/green_power/d_sources). All parts of the Northwest, including the state of Washington, have solar radiation levels sufficient to supply cost-effective applications (Renewable Northwest Project, 1998). Washington's northern position relative to the equator assures important peak sun hours a day in the summer (i.e. 7.2 in Yakima, 6.1 in Seattle). During winter, stand alone solar electric systems need to rely on back-up generators, but even in overcast conditions, photovoltaic modules can generate some power (WSU Energy Program, 1998).

Hydropower: Water flows from high points to low points because of the force of gravity. There is energy embodied in the flow of water, and hydro-electric power systems capture some of the energy and convert it to electric power. Although the potential for small hydro-electric systems depends on the availability of suitable water flow and appropriate geography, where the resource exists it can provide cheap, clean, reliable electricity. If they are well designed, small hydro-electric systems blend with their surroundings and may have minimal negative environmental impacts. Washington State has courses of water that make small hydro power systems quite attractive.

4. Antecedents

Over time, the Washington Legislature has made findings and enacted a variety of policies encouraging the development and use of renewable resources. For example, in 1975, the Legislature found that it was the "continuing purpose of state government, consistent with other essential considerations of state policy, to foster wise and efficient energy use and to promote energy self-sufficiency through the use of indigenous and renewable energy sources, consistent with the promotion of reliable energy sources,..."

Also, in 1981, the Legislature enacted a state policy of encouraging the "development and use of a diverse array of energy resources with emphasis on renewable energy resources" (WUTC, 1998). This policy has been incorporated in the Revised Code of Washington at 80.28.024 that states that actions and incentives by the state government to promote the use of renewable resources would be of great benefit to the citizens of the state by encouraging a reliable supply of energy. Substitute House Bill 2773 contributes to such a promotion.

5. Rationale for the use of net metering

As stated above, the main reason to implement a net metering program is to encourage private investment in renewable energy resources. Several features of net metering make it most attractive for customers and utilities. First, is its simplicity, the use of a single meter for customers with small generating facilities. Second, the exchange of electricity facilitated by net metering gives self-generating customers more flexibility. They do not

have to alter their consumption or install energy storage devices to maximize the value of their generation. Third, customers gain certain latitude in sizing their generating facilities because they do not have to precisely match the load to minimize excess generation. Finally, customers who consider installing a grid-connected renewable energy facility are driven by non-economic factors, such as environmental protection and self-sufficiency, as well as by cost considerations. Net metering provides a financial incentive to those customers by lowering the economic outset for small renewable generating facilities (Wan, 1996). Because solar and wind power and, to an certain extent also hydro power, are intermittent resources, the transfer of power back and forth to the utility may save the customer generator the need to install back-up systems that would further increase the initial investment. Although net metering alone does not make home generation of renewable energy economical, it may bring it closer to the break-even point (Scientific American, 1997).

Utilities may also benefit from net metering. When customers generate electricity during high system demand periods they improve the utility's system load factor. By encouraging distributed customer generation through net metering, utilities will not significantly increase their administration costs because there is only one meter to read and accounting procedures for customers with small generating equipment will remain quite simple. Additionally, utilities that support the net metering option for renewables are likely to be perceived as being friendly to the environment and responsive to their customers' needs and concerns, a perception that can become particularly important in a competitive environment (Wan, 1996).

Because it facilitates the use of renewable energy, net metering promotes the diversification of the energy resource base. In Washington State, where so many renewable energy related industries are based, net metering programs that encourage the use of renewables will also indirectly contribute to stimulate the local economy.

6. Special requirements of a net metering program in the framework of Bill 2773

Section 5 of Bill 2773 allows the WUTC, in the case of investor-owned utilities, to adopt additional safety, power quality, and interconnection requirements and to authorize utilities to charge additional standby, capacity, interconnection or other charges or fees if the utilities incur direct costs associated with net metering or if public policy is best served. Otherwise, the bill directs utilities to charge customer-generators the same minimum monthly fee that is charged to other customers in the same rate class.

6. 1. Technical requirements

Net metering systems, like any interconnected generation system, require certain safety and other technical features in order to assure safe reliable operation of both the customer-generator's and the utility's systems. Protection relays such as over and under voltage, over and under frequency, and reverse-current flow are standard for generators operating in parallel with utility systems. The Institute of Electrical and Electronic Engineers, Inc. (IEEE), addresses these and other requirements in its "Recommended Practice of Utility Interface of Photovoltaic (PV) Systems. The IEEE Standards Coordinating Committee began developing this standard in response to photovoltaics industry requests to assure consistent utility interconnection requirements around the country. The draft standard, P929, describes the interface, functions, and requirements necessary in the interconnection of a PV power system with an electric utility. Final adoption of the standard is expected in mid 1999. The standard will apply to any inverter system intended for utility interface. As such, it will cover most, if not all, inverters used by customer-generators on their photovoltaic and wind driven renewable resource systems.

In addition to safety relay requirements that address voltage and frequency, another safety device often required for non-utility generation is a utility-interface disconnect switch. Manual, lockable, load-break disconnect switches provide a visual isolation point allowing utility workers to disconnect the customer-generator's system from the line when it is perceived as necessary for safe line work. Much work has been, and continues to be done to develop renewable-resource systems with inverters that will not be able to generate electrical energy in the absence of the utility electrical source. For such systems, when approved by the utility, separate lockable switches may not be necessary. One suggestion for residential-sized systems (those smaller than about 5 kW) where utility line workers still require a visual isolation point would be to pull the customer-generator's meter

and seal off the meter base. Larger systems may still require a separate disconnect device, depending upon local utility practice.

6. 2. Cost to customer-generators and insurance policy

The three investor-owned utilities that operate in Washington State have filed initial tariffs to implement net metering. PacificCorp had originally included a Net Metering Service Charge of $3.10 to cover the installation of new meters. The utility later withdrew this requirement when it was confirmed that no new equipment was needed. No additional condition was added. The other two utilities, Avista Corporation and Puget Sound Energy, had first included a requirement of a $2,000,000 liability insurance policy as a pre-condition to installing net metering to customer-generators. The Companies' rationale behind this request was that there are additional risks tocompany employees and third parties because of power generation on the consumer side of the meter. They claimed that their standard contracts for entities connected to their systems require minimum insurance by such entities in the event of a claim relating to injuries and damages against the utility. Each utility is self-insured for injuries and damages and carries a $2,000,000 deductibility clause. To date, the power generators interconnected to the Companies have been of sufficient size that this insurance requirement has not been an issue (Heidell, 1998; Folsom, 1998). Customer-generators have some liability requirements. Staff has proposed establishing that level at $200,000 through the requirement of a homeowners' policy.

7. Staff's opinion

Staff has analyzed these requests in the context of the technical and cost requirements imposed by Bill 2773. Additionally, Staff consulted with experts on the topic and reviewed insurance requirements adopted by other states that are offering net metering programs.

Customer-generators included in Bill 2773 will have a small generation capacity - 25 kilowatts or less. The Bill also requires that systems must include all equipment necessary to meet applicable safety, power quality, and interconnection requirements established by the national electrical code, national electric safety code, IEEE, and underwriters laboratories. As mentioned above, in the case of photovoltaic and wind systems, power from home generators runs through an inverter that converts direct current to alternating current and should power in an area fail, the inverter automatically cuts off power flow (Starrs, 1998; Scientific American, 1997; IEEE P929). An insurance policy as that requested by the utilities could cost a consumer-generator on the order of $250 to $350 per year (State Farm Insurance, 1998). The amount of electricity they would have to produce to cover that premium could be on the order of 6,700 kWh. That is approximately equivalent to what an average household consumes over a period of about 5 months, assuming a monthly usage of 1,300 kWh. Such an insurance policy will clearly represent a large financial burden to the consumer-generator, in some cases making small systems marginally cost-effective and eventually discouraging some potential customers.

Staff believes that the requirement of a liability insurance policy for $2,000,000 is excessive in view of the size of the generation capacity and of the safety requirements that customer-generators will have to comply with. Staff also believes that imposing the additional cost resulting from the premium of the insurance is against the spirit of Bill 2773.

Some states, such as California and Nevada, have established that a customer-generator whose net metering systems meet the National Electric Code, Underwriters Laboratories, Inc., and the Institute of Electrical and Electronic Engineers should not be required by utilities to comply with additional standards or requirements, perform additional tests, install additional controls, and/or purchase additional liability insurance, arising solely from his/her status as a customer-generator (State of California, AB Bill No. 1755; Public Utilities Commission of Nevada, Regulation of Public Utilities, NRS 704.766-704.775, 1997). New York and Maryland also prohibit utilities from requiring additional liability insurance and additional testing and the Idaho Public Utilities Commission has mandated companies to waive the requirement of a $1,000,000 liability insurance policy to residential and other small customers (State of New York Public Service Commission, Order on Net Metering for Residential Photovoltaic Generation, February 11, 1998; Wan and Green, 1998; Idaho Public Utility Commission, Order No. 26750; Hessing, personal communication, 1999). Washington law does not address this issue.

However, given that consumer-generators will be generating power and feeding it back to the grid, staff believes it is reasonable to impose some additional insurance coverage on those customers. A lesser insurance requirement, such as a homeowner insurance policy seems appropriate in this case. That is the strategy adopted by the New York Public Service Commission that requires a homeowner insurance policy of $100,000 from customer-generators that install photovoltaic systems of 10 kW or less (State of New York Public Service Commission, Order on Net Metering for Residential Photovoltaic Generation, February 11, 1998; Starrs, personal communication, 1998). In Washington State, Snohomish County PUD has followed a similar strategy, requesting an insurance policy of $300,000 with provisions acceptable to the District prior to the commencement of operations (Snohomish County Public Utility District No. 1, Resolution No. 4819, December 15, 1998 and Pro-Forma Net Metering Agreement). Staff believes that a homeowner insurance policy with a limit of $200,000 is a reasonable requirement. This coverage level is generally within the range of normal homeowner insurance policies and therefore should not impose any undue burden on customer-generators.

Consequently, Staff recommends that the Companies include the requirement of a $200,000 maximum homeowner insurance policy as a pre-condition to installing net metering systems to customer-generators in fulfillment of the mandate included in Bill 2773. Utilities that incur injuries or damages relating to the uncovered deductible portion of their insurance policies may file an accounting petition for recovery of costs on a deferred liability basis at the time of such loss. Following discussions with Staff, Puget Sound Energy and Avista Corporation have agreed to limit their insurance requirements to a $200,000 homeowner insurance policy.

NOTE: A table containing a Summary of State Net Metering Programs is included at:
http://www.eren.doe.gov/greenpower/netmetering/nmtable.shtml

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