Testimony in Support of HB 2745
Hearing: March 3, 2015
House Committee on Energy and Environment
Kathleen Newman, Ph.D
Oregonians for Renewable Energy Progress

Key points:

1. Diversify our energy mix to meet future stream flow and temperature conditions
2. Solar in the built environment avoids cost and environmental impact of new transmission
3. Provide disaster resiliency in the built environment
4. Provide broad ownership opportunities
5. How big is a hundred?

We live in a changing world and solar is an invaluable tool for Oregon to use in developing a clean and robust energy future. HB 2745 will extend a good pilot program, and, with a shift in emphasis to larger project sizes, move us cost-effectively toward that future.

1. Climatic trends make solar an invaluable contribution to Oregon's power mix. These climate trends tend to diminish electrical load in the winter and increase electrical load in the summer when solar is most productive.
    a. Warmer winter temperatures create more rain and less snow for mountaintop storage in snowpack. More water is becoming more available for hydropower in the winter and we will be seeing less water available for hydropower and salmon health in the summer and early fall. This year, 2015, is likely to be a case in point.
    b. Historically utilities have experienced peak load due to winter heating. Winters are not as cold as they were. In Portland, annual coldest days are on average[1] 5 degrees Fahrenheit warmer than they were 50 years ago; the temperature that only 5% of annual coldest days fall below has increased by 9 degrees.
    c. We are seeing more hot days in the summer, leading to an increase in summer air conditioning load.

    Warmer summers also create challenges for thermal-electrical plants. The temperature of cooling-water discharged from power plants is regulated. However, thermoelectric power plants throughout the country are increasingly facing:
    a. warmer intake-water temperatures that are less effective in cooling;
    b. ambient air temperature that make it difficult to cool water sufficiently to meet discharge temperature regulations; and
    c. the release of warm effluent into water bodies that are already facing intense temperature-stress because of global warming.

    These issues have caused plants to slow or shut down during heat waves or to be granted exceptions from the Federal Clean Water Act temperature allowances. The US Department of Energy report entitled *U.S. Energy Sector Vulnerabilities to Climate Change and Extreme Weather*[2] addresses all these issues and gives examples of costs that have been incurred in order to comply with existing regulations. It makes sense to diversify our warm weather energy production to technologies that do not depend on cooling waters.

[1] 25 year running average of annual coldest days in Portland, OR
[2] US Department of Energy. (July 2013) U.S. Energy Sector Vulnerabilities to Climate Change and Extreme Weather. Retrieved from http://energy.gov/sites/prod/files/2013/07/f2/20130716-Energy%20Sector%20Vulnerabilities%20Report.pdf.

2. The sun shines everywhere. This allows us to produce energy where we need it. Using existing rooftops and parking lots for solar:
    a. reduces integration costs;
    b. eliminates transmission losses (which increase on hot summer days when the lines sag and stretch thinner);
    c. eliminates lengthy transmission line planning horizons; and
    d. eliminates the negative environmental impacts of new transmission lines.

    In preparing for its 7th Power Plan, the NW Power and Conservation Council is using about a penny per kWh adder for integration and transmission where existing transmission lines exist, and about 5 cents/kWh if new transmission is needed. This latter number is based on cost estimates for the proposed Boardman-Hemingway line and may be an overstatement for projects sited in eastern Oregon closer to load, but shows that the economic value of siting solar where it is used can be very significant.

3. Self-islanding inverters, a technology developed within that last few years, allow buildings with solar arrays to have access to power during daylight hours. Such an inverter is used on the June Key Delta Community Center in North Portland. Solar power during an earthquake emergency will be invaluable for keeping medications cool and for powering communications devices. The East Coast of the United States is becoming serious about microgrid technology in the wake of Sandy and other extreme weather events. Here in Oregon we must prepare for "the big one". We can envision Earthquake Resiliency Centers throughout our communities that are powered by solar. Batteries could store some of the energy generated during the day for use in the dark hours.

4. The sun shines on all Oregonians and belongs to all of us. Allowing Oregonians to sell electricity back to the grid broadens the pool of investors in our energy generation system. The Solar Pilot Program has done just that. Now with the 2014 passage of SB1520, the Renewable Energy Cooperative bill, Oregonians can join together to own community projects collectively. Rules for the bill were filed in September and the first solar cooperative is in formation.

    The structure of the Solar Pilot Program showed itself to be excellent for financing projects on community buildings. In four years it was responsible for 2/3 of the solar ever installed on Oregon's public schools and universities. Anecdotally we also know that it was used for many churches and at least one union hall. The combination of Solar Cooperatives and the extended feed-in tariff program holds great potential. And with passage of HB 2941, Solar Gardens can use the same program structure to offer public participation in solar through subscriptions and bill credits.

    Feed-in tariffs are known for diversifying ownership of production resources. In Germany, which first developed the US-born concept widely, 46% of renewables are owned by individual citizens and farmers.

5. HB 2745 should extend the solar pilot program with a shift of capacity to larger size systems. How big is a hundred kW? Here are a few examples for reference. The convention center system in Los Vegas, is we believe, the largest rooftop system in the US.

    REI stores – **29kW** to **130kW**
    Beaverton – 3 schools @ **100kW** each (see photo of Springville School array below)
    Gladstone – 3 schools @ **100kW** each
    Walmart stores average **342kW** per store
    Intel, Hillsboro – 2 carport projects @ **400kW** each plus **100kW** on roof
    Ikea stores vary from **250kW** to **540kW** to **5MW** for MD dist. center
    Toys R US, NJ – **5.4MW**
    Las Vegas Mandalay Bay Resort Convention Center – **6.4MW**

    A 100kW system is not small but is quite an accessible size for a good-sized building and certainly for parking lot carports. Over 1 MW of solar takes a very large roof, but is not uncommon. Examples of 1+ MW rooftop systems exist the world around.[3]

[3] http://en.wikipedia.org/wiki/List_of_rooftop_photovoltaic_installations

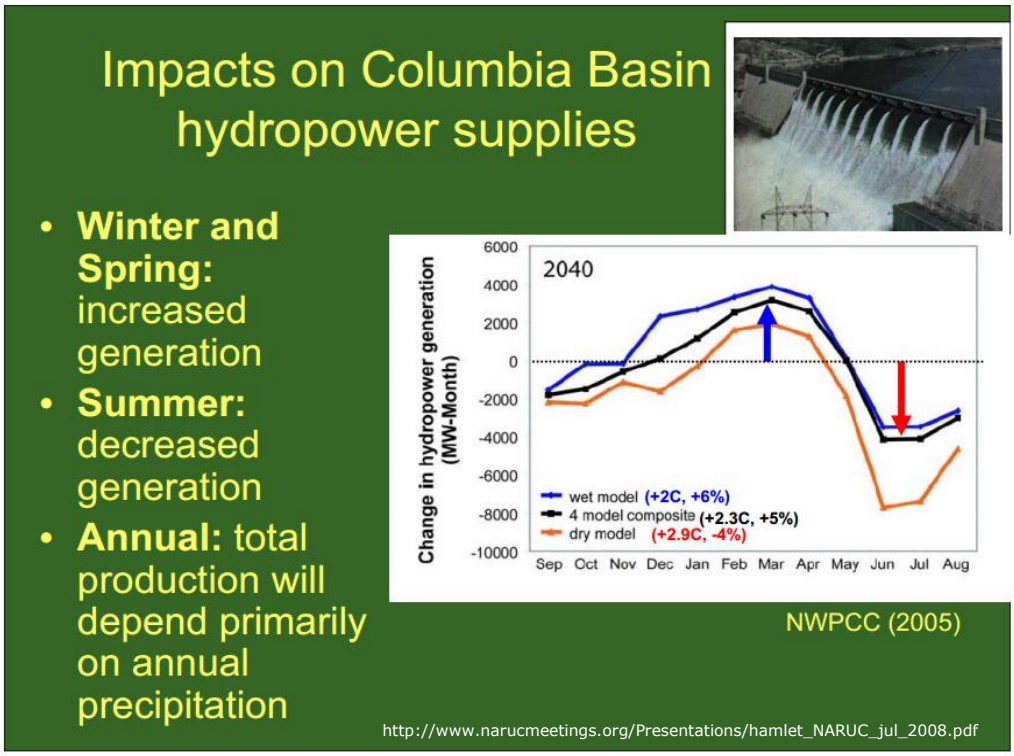
The Solar Pilot Program was a good program that taught us how to proceed with an even better program. We should build on what has been good and not squander the investments we have made in developing and implementing a program that, going forward, will support very cost-effective commercial and community solar in Oregon.

Oregonians for Renewable Energy Progress urges your support of HB 2745 and the extension of the Solar Pilot Feed-in Tariff program.

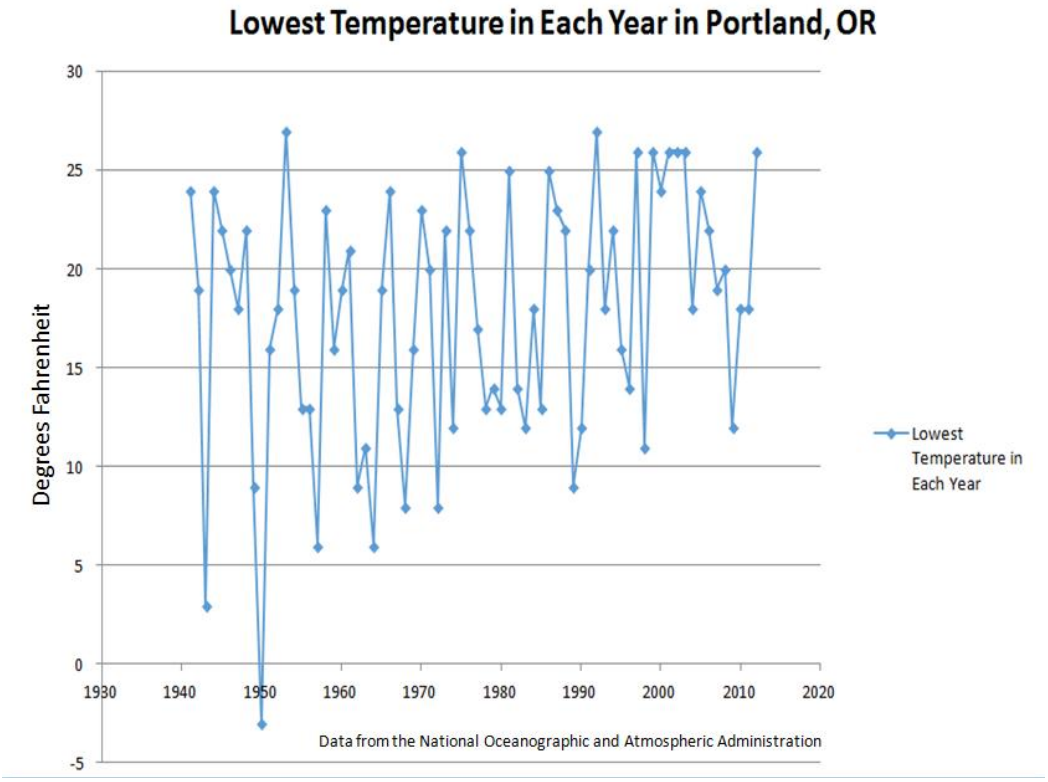
Sincerely,

Kathleen Newman,
Senior Policy Analyst,
Oregonians for Renewable Energy Progress

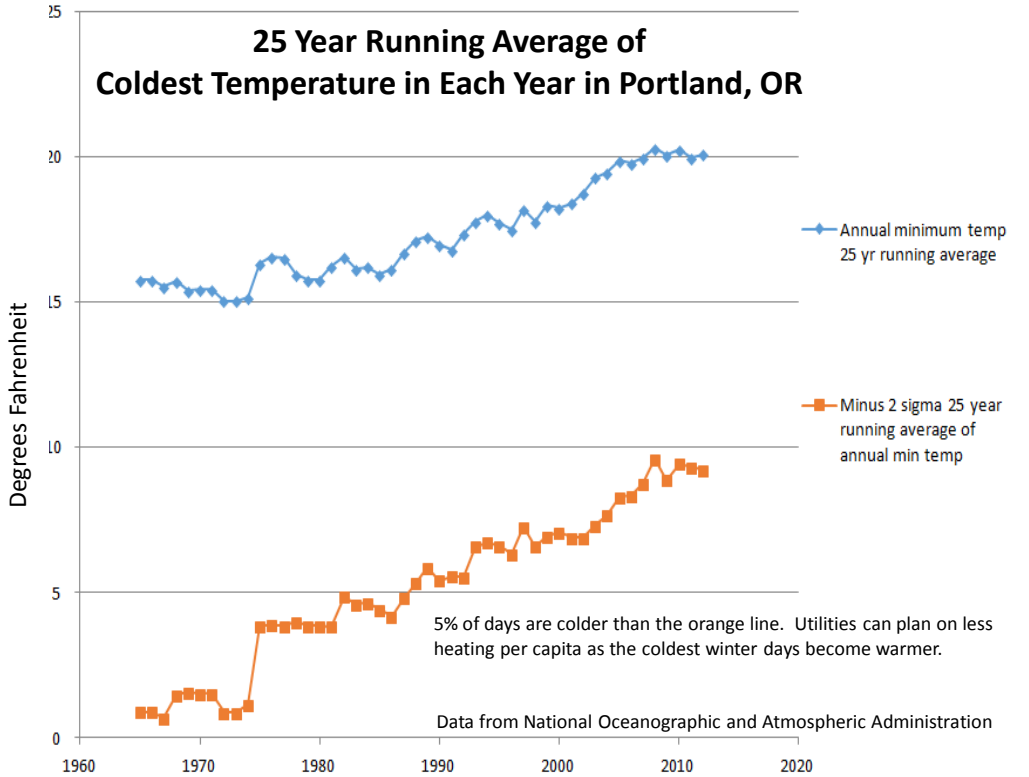
Graphics below and also in accompanying PowerPoint Presentation.



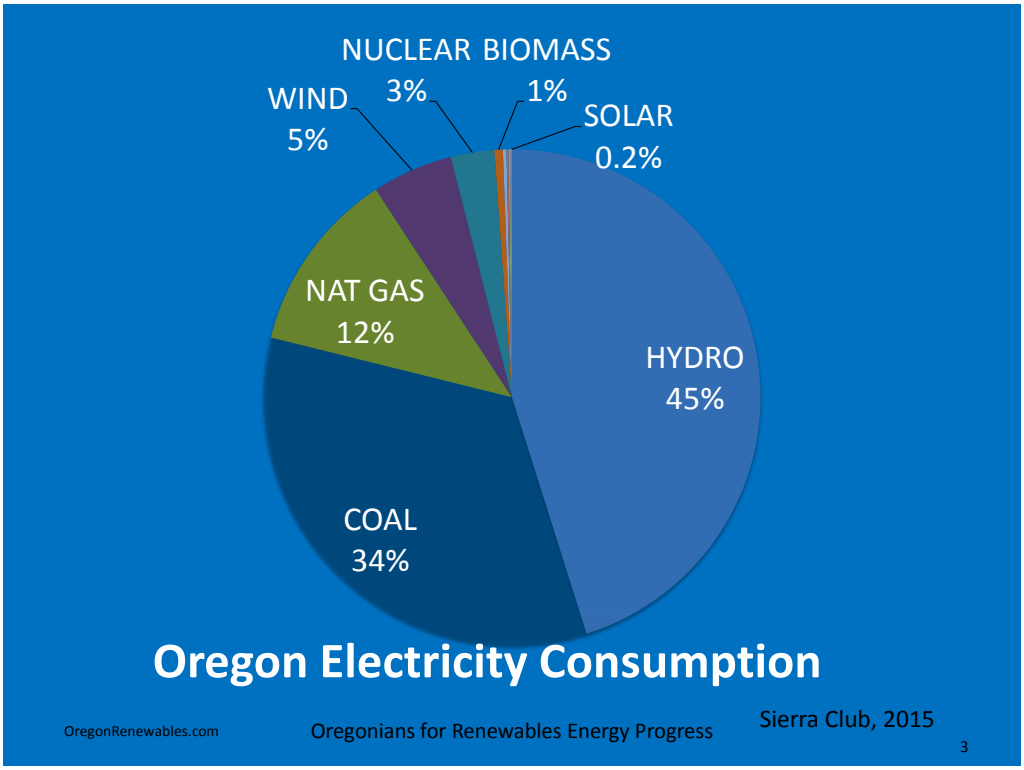
2000MW-month is equivalent to the production of about four 500MW coal plants.
Note that solar production peaks in June and July and is perfectly suited to fill the trough left by the shifting of stream flow earlier to in the year.



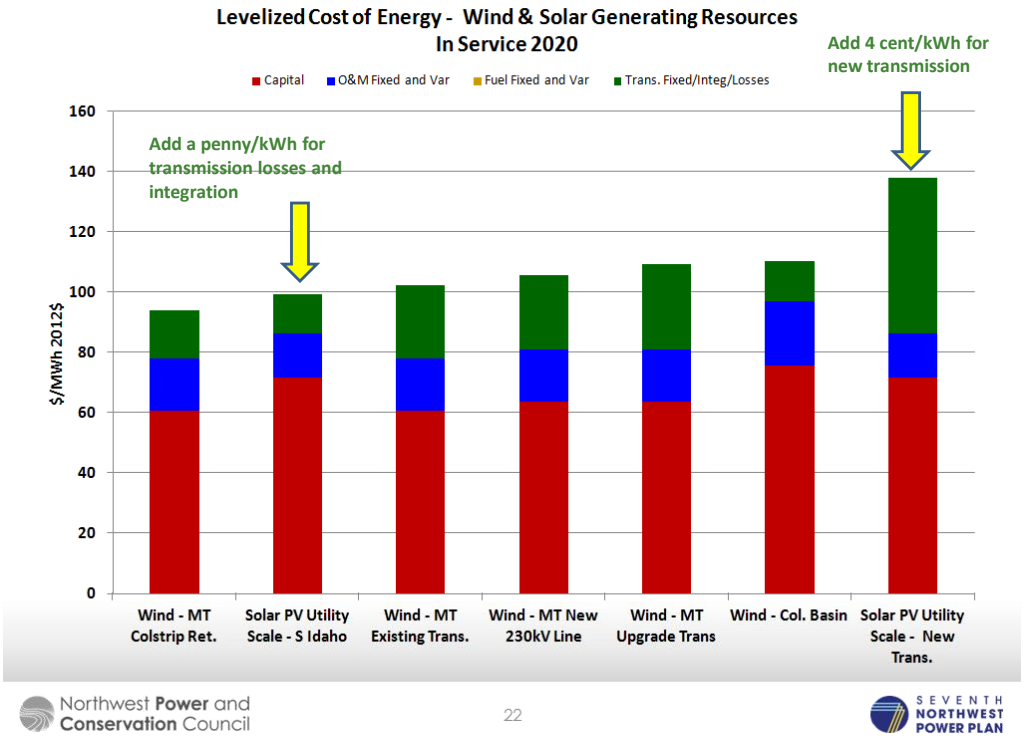
Oregon's coldest days are getting warmer.



The very coldest days are 9 degrees warmer than 50 years ago.



There currently is very little solar in Oregon's energy mix – 100MW will be reached this year.



Large-scale solar has come of age as a highly cost-effective resource.
Transmission losses and costs for new lines are very significant.

June Key Delta Community Center

On Alberta Street in North Portland.
Self-islanding inverters will keep power flowing to a dedicated circuit during a power outage.

How Big is 100kW?

REI stores – **29kW** to **130kW**

Gladstone – 3 schools @ **100kW** each

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Intel, Hillsboro – 2 carport projects @ **400kW** each plus **100kW** on roof

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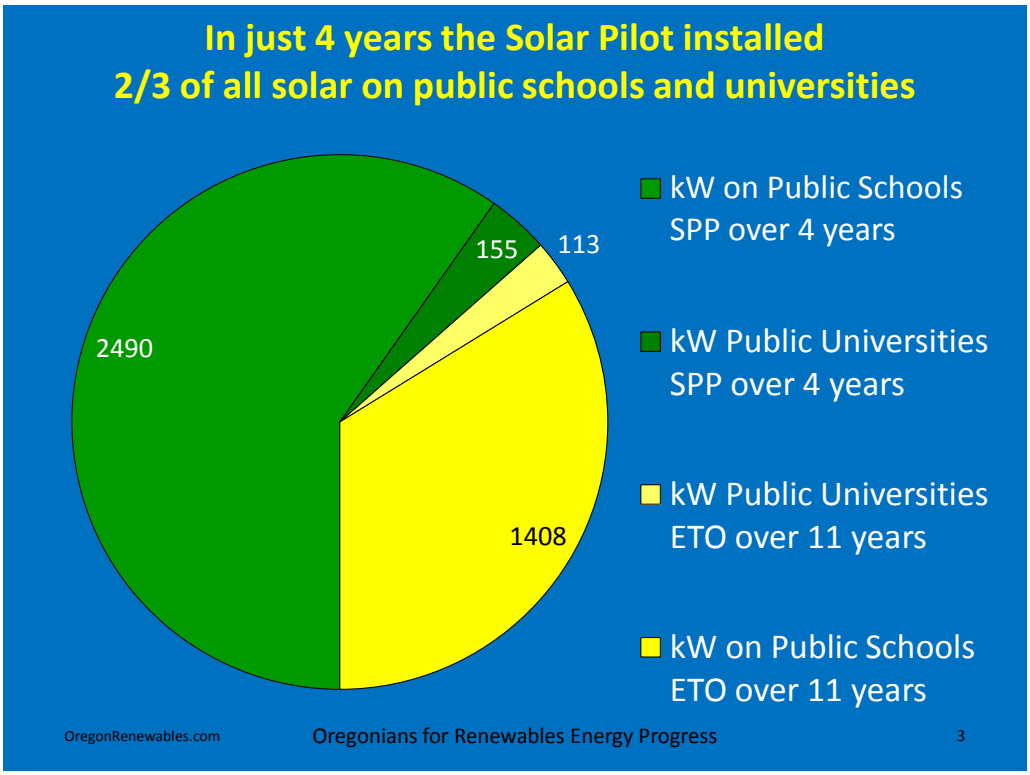
Las Vegas Mandalay Bay Resort Convention Center – **6.4MW**

This is what a 100kW of solar looks like today.



The power production payments of the program are well suited for financing community projects.