Northwest **Power** and **Conservation** Council

January 4, 2017

MEMORANDUM

TO: **Council Members**

FROM: **Energy Efficiency Team**

SUBJECT: **Primer on Energy Efficiency**

BACKGROUND:

Presenter: Kevin Smit, Tina Jayaweera

Summary: The Northwest Power Act identifies conservation as the priority resource for meeting the region's power needs. The Act defines conservation as "[1] any reduction in electric power consumption [2] as a result of increases in the efficiency of energy use, production, or distribution." To develop conservation supply curves, staff ensures that each measure included meets this two part definition. As new demand side opportunities emerge, it is important to understand whether those opportunities are considered conservation under the Act. To provide a foundation for that determination, staff will review the definition, discuss key concepts that support assessment of potential opportunities, and provide examples of conservation measures determined to meet the Act's definition.

Relevance: New demand side opportunities can fall into a grey area of whether or not that opportunity meets the definition of conservation defined under the Act. In the coming months, staff plan to debrief the Council on various emerging conservation opportunities, and a strong foundation of this definition will support those discussions.

Workplan: C.1. Prepare for 8th Plan, Conservation

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Energy Efficiency Primer

January 10, 2017

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Overview

- **Context:** Why are we taking time today to give this primer?
- **Definition:** How is conservation defined under the Act?
- **Examples:** What have we included in our supply curves

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Context for Today's Primer

- Take this time between Plans to remind us of the foundational concepts that guide our work
- Each measure in the conservation supply curve is reviewed to ensure it meets the definition as defined by the Act
- This concept will be important to keep in mind as staff consider new demand side opportunities and work towards developing supply curves
- Questions we will likely need to tackle:
  - Is a specific emerging technology or opportunity considered "conservation" as defined by the Act?
  - For technologies that provide both conservation and demand response, how do we tease out the respective components based on the Act definition?

Definition Under the Act

"Conservation" means any reduction in electric power consumption as a result of increases in the efficiency of energy use, production, or distribution.

1. Does the opportunity reduce electric power consumption?

and

2. Is the reduction in electric power consumption the result of an increase in efficiency of energy use, production, or distribution?

Two Useful Concepts

Unit of Service Provided

- Defining the unit of service helps to inform

1. Is there less electricity being used for that unit of service?
2. Is this a result of a more efficient use of energy, production, or distribution for that unit

Persistence of Savings

- Understanding of the electricity reductions persist is a way to inform whether the reduced electricity is due to:

1. Efficient use of energy for a specific unit

OR

2. Curtailment of use of electricity

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ENERGY STAR Refrigerator

A high efficiency refrigerator is a simple example:

1. It reduces the electricity used for providing refrigeration service to a household
2. This reduction is due to an increase in the efficiency of energy use for that refrigerator

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LED Lighting

LED lighting is another straightforward example of conservation:

1. LED lights reduce the electricity used to light a room *(the "unit of service")*
2. This reduction is due to an increase in the efficiency of each lamp in that room

Conservation May Result in an Increase of Total Energy Use

Example: An industrial plant installs efficient motors in its equipment. The plant uses/spends less for electricity per unit produced and thus is able to produce more units

1. For each unit of the product, there is a reduction in electricity
2. This is a result of a more efficient use of energy for building each unit

Note: The ability to produce more units may result in an increase in total energy, but each unit is produced more efficiently with less energy

Controls Used as Conservation

- Controls are tricky and need to be looked at specifically to determine if they meet the definition of conservation
- Example: Occupancy Sensor:

1. Occupancy sensors reduce electricity by turning off lights for a room when the space is not occupied
2. This reduction in electricity is a result of more efficiently lighting the room by lighting the room when in use only

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Controls Not Used as Conservation

- Not all types of controlling lighting meet the definition of conservation
- Example: Turning off lights while in a room

1. Sitting in a dark room does use less electricity than sitting in a lighted room
2. BUT, this reduction is not the result of more efficiently lighting that room while in use, but rather due to curtailment – the unit of service (useful light) has been reduced

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Another Controls Example

Conservation

Setting back a thermostat while you are away

1. Reduces electricity by using less heating energy
2. Still getting the same unit of service – using heat more efficiently

Not Conservation

Sitting in a cold room

1. Reduces electricity by using less heating energy
2. BUT there is a reduction in service – not enough heat to be comfortable, no efficiency gain

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Conclusions

- To qualify as conservation under the Act, the measure must meet both parts of the definition
- Staff will continue to apply this test to demand side opportunities as they arise to determine whether they are indeed "conservation" and should be included in the supply curves
- The concepts of "unit of service" and "persistence of electricity reduction" can help to parse out trickier examples

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