The Role of Efficiency In Meeting PNW Energy Needs

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Energy Efficiency As A Resource
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Today’s Topics

- Energy Efficiency’s Role in the PNW Power System
  - Historical Impacts
  - Projected Impacts of Future Energy Efficiency and Renewable Resource Development

- Can and Should More Be Done?
  - The Draft 6th Northwest Power & Conservation Plan’s Assessment of the Remaining Energy Efficiency Potential and Regional Conservation Targets
The Evolution of Energy Policy

April 18, 1977 –
Conservation means a cold dark house

President Carter announces we are engaged in the moral equivalent of war (MEOW)

December 5, 1980 -
Conservation declared a resource equivalent to generation

President Carter signs Northwest Power and Conservation Act
For Those of You From Illinois, One Other Event Happened in 1980

Yea See, We’re On A Mission from God.
Northwest Power and Conservation Planning Act of 1980 (PL96-501)

- Authorized States of ID, OR, MT and WA to form an “interstate compact” (aka, “The Council”)

- Directed the Council to develop 20-year load forecast and resource plan (“The Plan”) and update it every 5 – years

  - “The Plan” shall call for the development of the least cost mix of resources

  - “The Plan” shall consider conservation (energy efficiency) its highest priority resource equivalent to generation with a 10% cost advantage over power generating resources

- Mandated public involvement in Council’s planning process.
Power Act Priorities Served As Precedent for California’s “Loading Order”

Northwest Power Act Enacted - December 1980

Priority shall be given:
- First, to conservation;
- Second, to renewable resources;
- Third, to generating resources utilizing waste heat or generating resources of high fuel conversion efficiency; and
- Fourth, to all other resources.

California Energy Action Plan Adopted - April/May 2003

The Action Plan envisions a “loading order” of energy resources
- First, conservation and energy efficiency;
- Second, renewable energy resources and distributed generation; and
- Third, clean fossil fuel, central-station generation.

23 Years Later
How Has It Worked?
Utility Reaction to Council’s First Plan Was “Mixed”
Three Decades of Utility Conservation
Acquisitions
(aka “Mr. Toad’s Wild Ride”* for the PNW’s Energy Efficiency Industry)

See: http://en.wikipedia.org/wiki/Mr._Toad's_Wild_Ride
Nevertheless
Since the Late 70s

We’ve Accomplished “Mass Quantities”
So What’s 35,000 GWH/Year?

- It’s enough electricity to serve more than the **entire state of Idaho** and **all of Western Montana**
- It saved the region’s consumers nearly $1.8 billion in 2008
- It lowered 2008 PNW carbon emissions by an estimated **15 million** tons.
Since 1980 Energy Efficiency Resources Met Half of Regional Load Growth
Utility Acquired Energy Efficiency Has Been A **BARGAIN!**
Energy Efficiency Is The Region’s Third Largest Resource

We’ve Saved The Equivalent of Two Grand Coulee Dams
So What’s Next?
How Much Efficiency Should We Develop?
The Region Has Exceeded the 5th Plan’s Targets Every Year

Annual Savings (GWH/Year)

- 2005
- 2006
- 2007
- 2008 - Preliminary
- 2009 - Projected

5th Plan Goals
Actual Savings
Energy Efficiency is Still the Cheapest Option

Assumptions:
- Efficiency Cost = Average Cost of All Conservation in Draft 6th Power Plan Under $100 MWh
- Transmission cost & losses to point of LSE wholesale delivery
- Baseload operation (CC - 85% CF, Nuclear 87.5% CF, SCPC 85%)
- Medium NG and coal price forecast (6th Plan draft)
- 6th Plan draft mean value CO2 cost (escalating, $8 in 2012 to $47 in 2029)
There’s Still “Mass Quantities”
6th Plan Technically Achievable Conservation Potential by Sector

![Chart showing technically achievable conservation potential by sector with different costs and energy use categories.](chart.png)
Two Methods for Setting Efficiency Goals

- **Integrated Resource Planning (IRP)**
  - Systematic evaluation of the least cost/least risk portfolio of resource choices where energy efficiency is treated equivalent to generating resources

- **Energy Efficiency Resource Portfolio Standards**
  - Mandated minimum share of energy efficiency resources
Council Uses “Gump” IRP Model

The Future’s Like A Box of Chocolates.
You Never Know What You’re Gonna Get.
Council IRP Analysis => **Test Lots of Chocolates**

**Portfolio Analysis Model**
All Plans Along the “Efficient Frontier” Acquire Virtually the Same Amount of Energy Efficiency
Generic coal, gas and nuclear units are shown at typical project sizes - more units could be built at comparable cost.
Energy Efficiency’s Role Does Not Depend on Climate Policy Assumptions

- Current Policy
- No Climate Policy
- No RPS
- Retire Coal
- $100 Carbon
- $20 Carbon
- $0-$50 Carbon

Savings (GWH/Year by 2030)
Draft 6th Plan Calls for A Doubling of Annual Energy Efficiency Savings Over Next Decade

With a goal of doubling the region’s energy saving in the next 20 years, Northwest businesses and homeowners are urged to find …

The power in CONSERVATION

<table>
<thead>
<tr>
<th>Energy efficiency</th>
<th>Monthly Investment cost on the average homeowner’s utility bill</th>
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<tbody>
<tr>
<td>Energy efficiency*</td>
<td>$32</td>
</tr>
<tr>
<td>Natural gas plant w/o carbon charge</td>
<td>66</td>
</tr>
<tr>
<td>Advanced coal w/o carbon charge</td>
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<tr>
<td>Geothermal</td>
<td>69</td>
</tr>
<tr>
<td>Columbia Basin wind</td>
<td>89</td>
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Draft 6th Plan Goal 1: Meet 90% of Load Growth with Conservation

- PNW Load w/o Conservation
- PNW Loads w/Conservation
Draft 6th Plan Goal 2: Meet 28% of Load Growth with Wind & Other Renewable Resources

- PNW Load w/o Conservation
- PNW Loads w/Conservation
- PNW "Loads" w/Wind & Other Renewables
What?

You Can’t Meet More Than 100% of Load Growth!
Why We Must:
Meeting more than 100% of load growth with energy efficiency and renewable resources displaces existing carbon-based generation.
Meeting Our Goals Drops Carbon Emissions 15% Below 1990 Levels by 2020

- **Draft 6th Plan Average Emissions**
- **1990 Emissions**
Meeting Our Goals Will Require 2X – 3x Our Current Investments in Energy Efficiency

Regional Utility/SBC Investment (Million 2006$)

- 2009: $0
- 2010: $300
- 2011: $500
- 2012: $700
- 2013: $900
- 2014: $1,000

2009 2010 2011 2012 2013 2014
Meeting Our Goals Will Reduce Reliance on More Expensive Resources

Regional Revenue Requirement (Million 2006$)

- Cumulative Conservation Cost/Expenses
- Cumulative Cost of Equivalent Market Purchases

2010 2011 2012 2013 2014
In Fact, Meeting Our Goals Will Reduce Regional Revenue Requirements Below Today’s Within Four Years
Accelerating Energy Efficiency Increases Rates But Decreases Consumers’ Bills

Slide 35

$\$/MWh and $/Month (2006$)

Draft Plan Rates
Low Conservation Case Rates
Draft Plan Bills
Low Conservation Case Bills

2010 2015 2020 2025
Accomplishing the 6th Plan’s Conservation Goals Will “Stretch” the Columbia River

In 20 years, we will have added the equivalent of 50% to the “output” of all hydroelectric resources in the PNW...and reduced the power systems carbon-footprint 15% below 1990 levels.
Conservation – Cheap, But Worth It?

Any Questions?
Thanks for Listening
Impact of Conservation on Regional Load Growth

PNW Loads (Average Megawatt)

- PNW Frozen Efficiency Load w/o Conservation
- PNW Frozen Efficiency Load minus "Baseline" Conservation
- PNW Load w/"Baseline Conservation minus Incremental 6th Plan Conservation
Conservation’s Cumulative Impact on Load Growth

- Share of Cumulative Load Growth Met w/Baseline Conservation & 6th Plan
- Share of Cumulative Load Growth Met w/Baseline Conservation