Factors That Made Energy Efficiency the Northwest’s Second Largest Resource

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Let’s Start With A Review of the Facts

Just the facts, mam
Utility and BPA Programs, Energy Codes and Federal Efficiency Standards Are Now Producing Almost 50,000 GWH/year in Savings
Efficiency Has Met Nearly 62% of PNW Load Growth Since 1980
Northwest Electric Loads Haven’t Grown for a Decade

Because Energy Efficiency Savings Have Offset the Equivalent of 1.1% Annual Load Growth Since 2006!
As A Result, Energy Efficiency Has Been The Northwest’s Second Largest Resource Since 2012

- Hydropower: 46%
- Coal: 12%
- Energy Efficiency: 17%
- Nuclear: 4%
- Wind: 6%
- Biomass: 1%
- Natural Gas: 7%
- Geothermal: <1%

Based on 2012 Actual Generation Resource Dispatch and Cumulative Efficiency Savings
It Started with a Triangle: Nature’s Most Basic and Stable Building Block

- Build Capacity
- Maintain Momentum
- Start Simple
However, What Was Planned Did Not Always Happen
As A Result Northwest Efficiency Development Has Passed Through Many Phases

The Result Has Been Mr. Toad’s Wild Ride!

 Enlightenment?
Despite this “storied” history, we succeeded by treating energy efficiency as a resource by following three principles:

- **Equality** in cost-effectiveness analysis
- **Symmetry** in resource acquisition
- **Parity** in resource planning
Things You Shouldn’t Hear From Your Resource Planners

“We examined three market penetration scenarios for energy efficiency measures (20%, 50%, 80%). Incentives for energy efficiency ranged from 20% of measure incremental cost in the low case, 35% in the medium case, and 50% in the high case”*

One might reasonably ask: “How many combustion turbines or coal plants should we plan on if we are only willing to pay half their cost?”

*Direct quote from consultant report for large rural cooperative in the Southeast.
Parity in Planning: Three Requirements

1. *Assessments* of cost and availability of energy efficiency resources are developed with the *same rigor* as cost and performance estimates for new generation.

2. *Forecasts* of the “realistically achievable potential” for energy efficiency resources are not limited by utilities’ “willingness-to-pay”.

3. *Acquisition targets* for energy efficiency are based on cost-effectiveness (TRC) and are not “budget constrained” (e.g., limited by “public benefits charges” or “rate impacts”), or “quota” driven (e.g., minimum/maximum share of resource portfolio).
Following these Principles Efficiency Development Varies Little Across All Scenarios Analyzed for the Council’s 7th Plan
Even Under Sustained Low Gas Prices or Increased RPS, Development is Reduced by Under 15 Percent
Regardless of how one looks at a question, the answer is the same.

Finding - In all scenarios tested, the least cost resource strategies rely heavily on energy efficiency to meet both winter capacity and annual energy needs.
(Almost) Draft 7th Plan Resource Portfolio

Cumulative Resource Development (GWH/year)

- Natural Gas
- Solar
- Wind
- Energy Efficiency

Year:
- 2015
- 2020
- 2025
- 2030
- 2035
Council’s Draft 7th Plan Found It Was **Realistically Achievable** and **Cost-Effective** to Meet 100% of Load Growth with Energy Efficiency in Over 90% of the Futures Tested

*Even limiting energy efficiency acquisition costs to below *short run wholesale market prices*, there was sufficient cost-effective achievable potential to meet all load growth through 2030!
Things You Shouldn’t Hear From Your Resource Planners

“The cost-effectiveness screen applied in this study (to energy efficiency) is a variation of the Participant Test, which compares the incremental cost to a consumer of an efficient technology relative to its baseline option, and the bill savings expected from that technology over its useful life.”*

OK, this is just wrong!

Does any utility determine generating resource cost-effectiveness based on customer economics?

*Direct quote from report done by an electric utility research institute.
Equality in Cost-Effectiveness Analysis: Three Requirements

1. Consider all costs and benefits for all resources, including their non-energy costs and risks

2. Equity tests, while important, should not be substituted for measures of economic efficiency or risk

3. Just because it’s energy efficient, doesn’t make it cost-effective
**Equality** in Cost-Effectiveness Analysis Compares Energy Efficiency Directly With Generation Options

Generic gas, solar PV and wind units are shown at typical project sizes - more units could be built at comparable cost.
**Equality** in Cost-Effectiveness Analysis: Compares all resources based on their *total* costs and benefits

Yes (Marty) — This can be a burden, but to do less discriminates against efficiency by ignoring its full value.
It Must Also Include Risks and Non-Energy Benefits

- Non-Energy Benefits
- Risks (220 volt circuit!)
Example:
Consideration on Future CO2 Costs & Risks Increases the Amount Energy Efficiency Found “Cost-Effective”

Social Cost of Carbon - High

Social Cost of Carbon - Mid-Range

Existing Policy - No Cost Carbon Risk

Renewable Portfolio Standard at 35%

Cost-Effective Energy Efficiency Development by 2035 (GWH/yr)

Note: With highest SCC cost-effective EE only increases 10%
“Total Resource Cost Test was calculated by taking the ratio of net benefits over net costs, including both participant and utility costs”*

Total means “all”, it cannot be “net” of anything, unless it’s a subtotal. Not the same as “program cost-efficiency”

Power system loads (i.e., need for new generation) and CO2 emissions are both reduced by free-rider savings, hence they provide equal benefits.

*Direct quote from consultant report for large gas utility in the Southwest
“Free Ridership” assumes that the energy efficiency action taken by “free riders” would have been equally available and equivalently priced in that “parallel universe” that is identical to ours in every way except for the billions of ratepayer dollars invested in energy efficiency over the past 30 years.”
Equality in Cost-Effectiveness Analysis Ignores Equity Impacts

1. We do not judge the cost-effectiveness of new generating resources by gauging their cost impacts on one segment of consumers compared to another.

2. Equity is important, but it is not a measure of economic efficiency or risk.

3. Cost-Effectiveness metrics are used to determine the lowest cost resources to acquire. Equity considerations can then determine how the costs of those resource acquisitions are distributed.
Equality in Cost-Effectiveness Analysis: Also Means Avoiding Reverse Resource Discrimination

Embedding savings from existing programs without testing cost-effectiveness unfairly favors energy efficiency.

Just because we’re already doing it, doesn’t automatically make it a cost-effective resource going forward.
Symmetry in Resource Acquisition: Three Requirements

1. Utilities don’t ask generating resource developers to “cost-share”, so we should not require “EE developers” to cost share.

2. Consumer payments for cost-effective measures are legitimate resource acquisition purchases so don’t refer to them as financial incentives or worse yet - subsidies!

3. Acquisition payments can exceed a consumer’s cost when the cost of savings are below avoided cost.
   - That’s OK, because some generating resource developers make a profit.
   - Parsimonious acquisition payments attract larger shares of those who are most likely to take action, therefore low incentives produce high “free-ridership”, resulting in lower program cost-efficiency (but not TRC cost-effectiveness).
AGAIN - Things You Shouldn’t Hear From Your Resource Planners

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Securing Equal Treatment of Efficiency

- Discrimination is subtle and pervasive
- Correcting it requires changing planning, implementation and evaluation practices and assumptions
- Does not mean “special treatment”
- Requires vigilance
The Northwest’s Lowest Cost and Risk Resource Strategy Delays the Opportunity to Make Bad Choices

Three Decades With No Load Growth After Energy Efficiency
No! Try not. Do, or do not. There is no try.

--YODA, Star Wars Episode V: The Empire Strikes Back
Backup Slides
Annual Average CO2 Emissions for Least Cost Resource Strategies Are Below EPA’s Clean Power Plan [111(b) & 111(d)] Emission Limits At the Regional Level
What Really Made It Happen?

- It was “the law” – Northwest Electric Power Planning and Conservation Act of 1980
  - Defined EE as a Resource
  - Required acquisition of “least cost” resources
  - Made EE development first priority (23.33 years before CA “loading order”)
  - Required public involvement in planning
- The Council was as persistent as gravity in

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

California Energy Action Plan
Adopted - April/May 2003

23 Years Later

- 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.

- 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.