Utility Efficiency Programs
Nov 10, 2011

• Efficiency Standards
  – MPG standards for vehicles
  – Lighting regulations (compact fluorescents)

• Efficiency Programs
  – History of the utility companies
  – Efficiency: A “No Regrets” Resource
3pm, Sept 14, 1882:
The “jumbo generator” at Pearl Street Station began to spin. The electricity was transmitted to the Wall Street office of J.P. Morgan and to the editorial room of the New York Times.
Edison’s Light Bulb
And his Generator
at Pearl Street Station
Pearl Street Station

and its Service Area
How to Grow an Industry?

• Edison’s Idea
  – Power plants in each area
  – DC transmission over short lines to the customers
  – Make money selling lights and other equipment

• Westinghouse’s Idea
  – Bigger power plants removed from area
  – AC transmission over longer lines to multiple customers
  – Make money selling the electricity
The AC/DC Debate
including the fear of “killer current”

• Westinghouse’s idea won out

• Samuel Insull took the lead in creating the industry we know today
Samuel Insull

The

_Empire Builder_

controlled electric service in 6,000 communities in 32 states during the 1920s.
Insull’s Empire

Insull was at the Pinnacle of success and power in 1927.
Insull’s vision of an Investor Owned Utility

- The IOU would be a vertical monopoly
  - Generation
  - Transmission
  - Distribution

- The IOU has an obligation to serve

- The price of electricity is subject to review by the state commission
The 1930s: The Decade of Federal Investment in Large Scale Hydro Power
Electric Power History

- 1882: Pearl Street Station
- AC versus DC
- The Depression & Federal Power
- Samuel Insull and the IOUs
- The Golden Years
- The Difficult Years
- Shift to Small Scale

Timeline:
- 1880s
- 1890s
- 1900s
- 1910s
- 1920s
- 1930s
- 1940s
- 1950s
- 1960s
- 1970s
- 1980s
The 1950s & 1960s:

These were the “Golden Years” for the IOUs

Demand grew at 7%/year, doubling in size every ten years.

The IOUs met their **obligation to serve**.

And they didn’t need to ask regulators for higher rates.
The Industry Moves to Larger and Larger Power Plants

But at 3,000 MW, the utilities finally exhausted the economies of scale.
Headlines During the 1970s

- *Utilities: Weak Point in the Energy Future*
- *Electric industry cutback could result in blackouts*
Utilities & Their Regulators

• Utilities ask for higher rates

• Regulators grant many rate increases, but they wonder about the consumer response

• Wouldn’t lower demand mean we would have to raise rates yet again?
This Vicious Circle Makes the Headlines

The Vicious Circle that Utilities Can’t Seem to Break: new plants are forcing rate increases, further cutting the growth in demand

The Electricity Curve Ball: declining demand and increasing rates
Another View of the Death Spiral
Lessons from the “The Difficult Years”

• Avoid long-lead time construction
  – Avoid building nuclear plants
  – Emphasize cogeneration, geothermal, wind
  – Small coal plants are better than large coal

• Even better: slow the growth in the demand for electricity
The Northwest Was a Leader in Conservation (Efficiency) in the 1980s
Figure ES-11: Regional Conservation Savings
Were These Savings Important?
(see NPCC 5th Plan, p. 2-1)

- total load 16,600 aMW in 1980
- aMW stands for an “average MW”
- 1980 to 2000: Load grew by 4,600 aMW
- 2000 load is just over 21,200 aMW
- The 2,100 aMW of savings is ~ **10% of the load**
- Growth was 4,600 aMW
- Growth would have been 4,600 + 2,100 = 6,700 aMW
- Need for new resources reduced by 2,100/6,700 ~ **one third**
DEVELOP RESOURCES NOW THAT CAN REDUCE SYSTEM COST AND RISK

Conservation

Conservation is the highest priority resource under the Northwest Power Act. The region has developed nearly 2,500 average megawatts of conservation since its passage at an average levelized cost of approximately 2.5 cents per kilowatt-hour. Despite the conservation that has already been achieved, there remains a significant amount yet to be developed, largely as a result of new efficiency technology.

Conservation has several characteristics that make it unique when compared to other resources. First, its cost is almost entirely capital, while its operating costs are minimal. This means that unlike a conventional generating unit, there are no operating costs to be avoided when demand is low. Conversely, compared to generating power plants, conservation always produces savings of some value, and

Figure ES-11: Regional Conservation Savings
Simple Illustration of a Program

• Suppose your house uses 2,000 kwh/month @ 7cents/kwh
• So your monthly bill is $140
• The utility does a retrofit to cut your demand by a 30%
• But they have to raise the electric rate by 2% to finance the retrofits.
• The new rate is 7.21 cents/kwh – this doesn’t sound good
• But your house now uses 70% of 2,000 = 1,400 kwh/month
• New bill is 1,400 kwh/month @ 7.21 cents/kwh = $101
• You save almost $40 per month, and your house is more comfortable!
• Can you see any problems with this policy?
Puget Sound Energy provides a broad array of services and incentives to help our customers save energy—and money. Why? Simply put, it makes sense. What’s more, it’s the right thing to do.

Since 1979, no other Northwest utility has helped its customer save more energy than PSE. Over that time, our energy-efficiency programs have helped PSE customers conserve more than 2 billion kilowatt-hours of electricity—enough ongoing savings to serve nearly 175,000 households.

But we’re not done. Our customers’ energy needs are growing. And one of the best, most cost-effective ways to meet their needs is to invest in programs that help people use energy as efficiently as possible—to get more with less. So, in consultation with our regulators, environmental groups, customers and other stakeholders, we’re building on our energy efficiency heritage and expanding our conservation services. Over the next two decades, we see the potential to help our customers save another 440 average-megawatts of electricity and 70 million therms of natural gas.

Our conservation programs run the gamut, from rebates on energy-efficient furnaces and appliances, to engineering consultation for commercial and industrial projects, to tailored grants for retrofits and upgrades in energy-intensive buildings. Please visit our Web pages For Your Home and For Your Business to learn more about energy-efficiency services and tools we’ve made available to you.
From the Pacific Northwest to the World

“A Cost Curve for Greenhouse Gas Reduction,”
*The McKinsey Quarterly*, #1, 2007
We Can Be the Leader Again