Energy Choices
for
A Balanced Utility System

Three Choices
For A State-Wide Energy Trilemma

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Why Does This Matter So Much?

- Because, if you care about the conservation of nature, the energy sector is the most important source of GHG, mercury, SO2, particulate, nuclear waste, with massive water and land impacts

- Because the largest and most lasting societal decisions are “still” made about heavily centralized massive infrastructure investments in electric wires and power plants expected to be used for 30-50 years of use or more

What can we do in < 20 Minutes?

- note some cases filed before a utility commission
- identify the "Trilemma" of 1) Economics, 2) Reliability, and 3) Environment applied to every energy decision when I was on the bench for 14 years as Chairman or General Counsel of the Vermont Public Service Board.
- look at how statutes, hearings, and decisions in one U.S. state – Vermont -- lead to lower cost, higher reliability, and lower emissions

Vermont's Energy Status

- Vermont is a north-eastern U.S. state, half in rough mountains and half in fertile valleys; with a highly severe and seasonal climate

- In terms of resources, it is heavily forested, surrounded by rivers and lakes, without coal, oil, natural gas or uranium, and

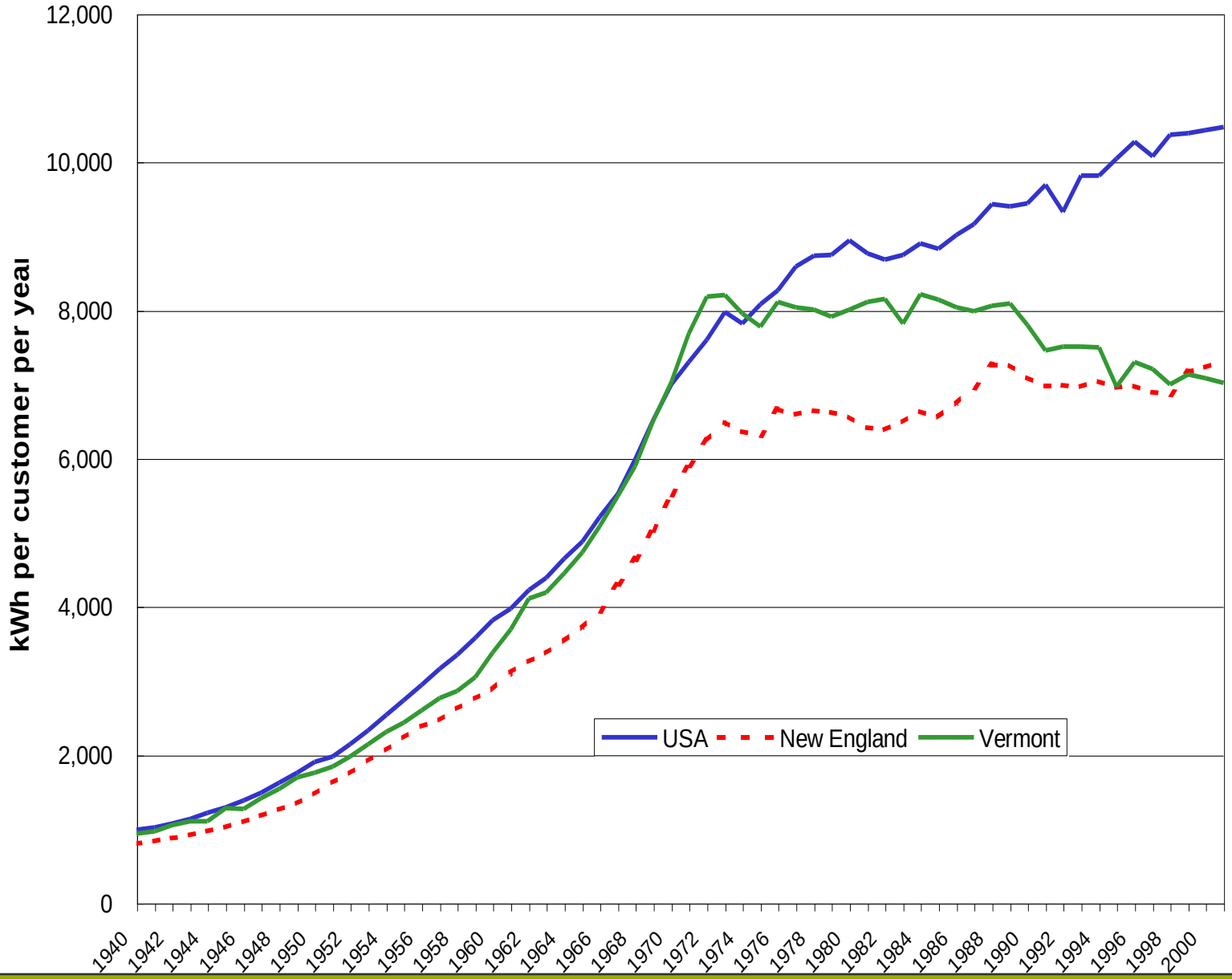
- Bordered by New York (18mm people), five other New England states (16mm) and Quebec (8 mm)

Why Look at Vermont?

- ***Structure of demand for electricity is typical*** of that US overall, and of much of world:
  - about 1/3 industrial (IBM, General Electric, heavy quarrying)
  - 1/3 commercial (suburban retail and distributed offices), and
  - 1/3 residential (mixed income, with significant low income rental)

Indeed for decades, Vermont kWh demand moved like that in other states; then it changed, and the reasons for the change are important (next slide)

Residential Electricity Use
kWh per customer per year, 1940-2001



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How is Vermont Doing In Terms of Our Energy Trilemma ?

Vermont's electricity system has:

1) carbon-neutrality
2) the lowest kWh prices in the northeast U.S.
3) a very high reliability index.

How Did We Do this?

As of 2012, the State of Vermont obtained about:

- one-third of its electricity from large hydro electric sites in Quebec, Canada,
- one-third from nuclear generation (now less than 10%),
- one-sixth from mid-sized hydro in or adjacent to the state, and
- One-sixth from in-state forest products.
- We can draw on –and sell to-- the six-state New England power system for daily market purchases and roughly similar sales.
- Rate-funded investments in energy-efficiency have reduced electricity demand to 10% below otherwise expected.

Who's Decisions Lead To This?

- The State Legislature, by statute, requires public utilities to prepare and enact long range plans for energy investments.
- The law requires utilities to submit those plans to a state agency, the Public Service Board for review
- Specific investments, contracts and retail rates are also subject to PSB review.
- The Board has three members, appointed like judges, for fixed staggered six-year terms, removable only "for cause" i.e., felonies. It uses trial like procedures.

Key Power Decisions.

- In 1990, the Board ordered 24 electricity utilities to invest in reducing customers' demand for *electricity if, and only if, that would be* ***cheaper*** than investing in new power sources.
- In 1991, the Board approved about ***half*** of a utility request to buy 1/3 of the state's power from Hydro-Quebec for 30 years
- In 2000 the Board created a single, state-wide provider for energy efficiency; "Efficiency Vermont" now provides equivalent of 10% of all otherwise expected kWh
- In 2002 the Board approved a ten year contract to continuing buying one-third of Vermont's electricity from a nuclear plant ***but*** ordered utilities to prepare to end that by 2012.

What Tools Did the Board Use?

- Three Key Statutes:

- 30 VSA Sec 9: Court-of-record powers
- 30 VSA Sec 218c: Least Cost Plans
- 30 VSA Sec 248 Prior Review of major energy investments or builds.

Leading Criteria for Decision

- (b) Before the public service board issues a certificate of public good as required under subsection (a) of this section, it shall find that the purchase, investment or construction:
- (1) …
- (2) is **required to meet the need for present and future demand** for service **which could not otherwise be provided in a more cost effective manner through energy conservation programs and measures and energy-efficiency** and load management …
- (3) will not adversely affect system stability and **reliability**
- (4) will result in an **economic benefit** to the state and its residents

Leading Criteria for Decision

- (5) with respect to ***an in-state facility, will not have an undue adverse effect on esthetics, historic sites, air and water purity, the natural environment,*** the use of natural resources, and the public health and safety,
- (6) with respect to purchases, investments, or construction by a company, is **consistent with the principles for resource selection expressed in that company's approved least cost integrated plan**;
- .....
- ((And specific subsections for nuclear natural gas and small renewables. And exemptions for emergency construction))

How Would ***You*** Rule On Choice 1?

- *30 year contract for mandatory purchase of 450 megawatts per hour from Hydo Quebec at start price of 5cents per kwH, adjusted annually for future consumer price index.*
- 10 year contract for mandatory purchase of 340 MW of power from nuclear plant in Vermont at start price of 4 cents per kwh, escalating annually one tenth of way to 6 cents per kWh
- Three year contract, renewable to six years, five per cent surcharge on electricity rates to go to energy efficiency pool, awarded to competitive bidder that would be paid up-front capital cost for verified reductions in otherwise-expected electricity demand, audited annually by state public advocate.
- Do you REALLY think that saying 'none of the above'

will be 'sustainable? … in State Supreme Court or legis ?

Let's apply these criteria and ….

- See how YOU would decide the three key decisions of the last few decades:

Choice 1 Quebec Hydro: what does the statute say we should consider?

What Did Vermont's Public Service Board say about the Quebec Hydro proposal?

On environmental text of the statue, because the generating sources were out of state, the Board reviewed environmental effects on Vt, (such as migratory wild fowl and GHG emissions) but not environmental effects elsewhere.

But, on economic and reliability grounds, when comparing the purchase to investin in energy efficiency, the PSB cut the proposed purchase from 450 MW to 208 MW, all provided from pre-existing dams.

How Would ***You*** Rule On Choice 2?

- 30 year contract for mandatory purchase of 450 megawatts per hour from Hydo Quebec at start price of 5cents per kwH, adjusted annually for future consumer price index.
- *10 year contract for mandatory purchase of 340 MW of power from nuclear plant in Vermont at start price of 4 cents per kwh, escalating annually one tenth of way to 6 cents per kWh*
- Three year contract, renewable to six years, five per cent surcharge on electricity rates to go to energy efficiency pool, awarded to competitive bidder that would be paid up-front capital cost for verified reductions in otherwise-expected electricity demand, audited annually by state public advocate
- Do the Sec 248 criteria conflict with each other here?

Vermont Yankee Nuclear Plant
1972 - ??

Breach of VY's non-radioactive cooling water

Transformer fire at Vt Yankee

What Did Vermont's Public Service Board say about the nuclear proposal?

*Approved the sale of the plant to new owner with more assets and operating experience.

*Approved a ten year contract for purchase of the power by Vermont utilities, also requiring development of 10 year plan for renewables and efficiency to wean state off need for it. Since then, Vt utilities have ended all purchases from this nuclear plant, but do have roughly 10% purchases from nuclear plant in nearby state

*Approved an agreement that the plant would shut down in ten years if VT did not authorize extension. Plant operator is currently seeking to have federal courts over-rule its 2002 commitment.

How Would ***You*** Decide Choice 3?

- 30 year contract for mandatory purchase of 450 megawatts per hour from Hydo Quebec at start price of 5cents per kwH, adjusted annually for future consumer price index.
- 10 year contract for mandatory purchase of 340 MW of power from nuclear plant in Vermont at start price of 4 cents per kwh, escalating annually one tenth of way to 6 cents per kWh
- *Three year contract, renewable to six years, five per cent surcharge on electricity rates to go to energy efficiency pool, awarded to competitive bidder that would be paid up-front capital cost for verified reductions in otherwise-expected electricity demand, audited annually by state public advocate.*

- What would low income users, or large industrial customers say about a 5 % surcharge ?

Poor buildings waste energy

Poor buildings are curable

What did PSB decide about statewide surcharge to spend on efficiency of demand?

- Approved a five year rise from 2% surcharge to 5% surcharge to pay for more insulation, better lighting, advanced motors, and customer appliance improvements; renewed it twice since then
- As to reliability, PSB called efficiency more reliable than Hydro or nuclear.
- As to environment, PSB predicted emissions and land use reductions
- As to cost, PSB higher price per kWh, but lower usage and, thus, lower bills per customer

How is it working?

Kennedy School of Government named "Efficiency Vermont" one of 5 best governmental programs in the US in 2003

In 2003, new Governor, elected with large industrial support was *unable* to reverse efficiency policy. The quasi-judicial status and staggered terms of PSB members meant that only one PSB member was up for reappointment per gubernatorial term

- Since 2006, the state legislature, court and

Governor have all been strongly supportive.

Can We Afford Energy Efficiency?

When Vermont committed itself to strong energy efficiency programs between 1999 and 2005, it ***lowered the burden of electric costs for VT residents & businesses:***

- In 1999, Vermont had 2nd-highest electric rates of seven north-eastern states; by 2005 we had the lowest such rates.
- More importantly than rates, the ***burden*** went down.
  - Commercial & Industrial electric costs dropped from 1.9% of Gross State Product to less than 1.6%.
  - Residential electric bills dropped from 3.9% of disposable personal income to 3.3%.

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Query: Are there answers to our Energy Trilemma ?

Answer: Spotting the key sectors (ones that matter and can be most readily influenced) is essential.

A good statute, a good process, some first-rate litigators, and a bit of "gumption" can move a whole state a long way down some better paths.

Questions?

Comments? And

My thanks to you

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