COMPARISON OF SUPPLY-SIDE RESOURCES TO ENERGY EFFICIENCY -- CASE STUDIES



NARUC Energy Regulatory Partnership Program

The Energy Regulatory Commission of the Republic of Macedonia and The Vermont Public Service Board

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Vermont Public Service Board

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Approval of Supply-Side Resources

- 30 V.S.A. § 248 requires Public Service Board approval for:
 - Long-term power-supply contracts
 - Construction of electric generation and transmission facilities
 - Construction of natural gas facilities
- Before issuing approval, Board must find that the proposal:
 - complies with 10 specified criteria, and
 - promotes the general good of the state
- Energy-efficiency alternatives reviewed under certain of the criteria



Section 248 Criterion b(2)

Sefore approving a proposal, the Public Service Board must find that it "is required to meet the 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 measures "



Section 248 Criterion b(6)

Service Board must find that it "is consistent with the principles for resource selection expressed in that company's approved least cost integrated plan."



Case Study 1: Hydro-Quebec Contract (Docket No. 5330)

- Proposed by all Vermont electric utilities, filed with Board for approval in 1989
- Contract to purchase up to 450 MW from Hydro-Quebec over 30 years, from 1990 -2020
 - Designed to replace other expiring power contracts; Vermont utilities were faced with losing ½ of their supply resources over a ten-year period
 - Utilities projected 25 to 33 % increase in demand by 2000



Docket No. 5330 – Process

- Application filed April 4, 1989
- ✤ 36 Parties:
 - Utilities
 - State Agencies
 - Advocacy Groups
- * 4 Public Hearings
- 30 Days of Evidentiary Hearings
- Final Order issued October 12, 1990



Docket No. 5330 – Analysis of DSM alternatives

- Utilities projected that demand-side management ("DSM") could reduce total energy use by 3 to 6.5 % by 2000
- DPS initially projected that DSM could reduce total energy use by 13 %
- At PSB request, DPS analyzed intensified DSM, projected to reduce energy use by 20 %
- Intervenor argued that DSM could reduce energy use by 30 to 70 %



- DPS evaluated specific, new cost-effective DSM programs; considered economic and environmental costs
- "Strong DSM"
 - \$115 million in cost-effective DSM expenditures over ten years
 - In the year 2000, would reduce energy requirements by 13% and peak demand by 21 %
- "Intensified DSM"
 - \$313 million in cost-effective DSM expenditures over ten years (up to 5 % of utilities' total revenue requirement)
 - In the year 2000, would reduce energy requirements by 20% and peak demand by 27 %



Docket No. 5330 – Board Decision (1 of 5)

- General Observations on DSM
 - Cost-effective DSM is preferable to supply-side options for a number of reasons
 - ♦ Reduced environmental impacts
 - ♦ Increased reliability
 - ◆ Positive local economic benefits
 - At that time, Vermont utilities had not begun significant DSM activities
 - Thus, difficult to determine cost and magnitude of DSM resources in Vermont



Docket No. 5330 – Board Decision (2 of 5)

- To compare the supply-side HQ Contract with DSM alternatives, Board focused on two questions:
 - Is HQ part of least-cost resource portfolio after obtaining all cost-effective DSM?
 - Would HQ contract constrain future DSM efforts?



Docket No. 5330 – Board Decision (3 of 5)

- Is HQ part of least-cost resource portfolio after obtaining all cost-effective DSM?
 - Even with Intensified DSM, the minimum HQ purchase of 340 MW would be cost-effective
 - ◆ Net present value benefit of over \$100 million
 - ◆ \$200 million if include environmental benefits
 - Minimum 340 MW purchase remained costeffective unless DSM could achieve at least 30 % reduction in energy use
 - Evidence did not support such a high level of costeffective DSM savings



Docket No. 5330 – Board Decision (4 of 5)

- Would HQ contract constrain future DSM efforts?
 - Concern that the large fixed costs under the contract might displace DSM that would be less expensive that the total cost of power under the contract
 - Board found no conflict with DSM unless:
 - Actual, achievable cost-effective DSM exceeds 30 percent of expected energy needs
 - Fuel prices are lower than expected
 - ◆ Resales of excess HQ power are below contract price



Docket No. 5330 – Board Decision (5 of 5)

- Approved the HQ Contract, but only the minimum of 340 MW
- * Imposed condition requiring each utility to "develop and implement measures to acquire all resources available from cost-effective acquisition of energy efficiency."



Case Study 2: VELCO NRP (Docket No. 6860)

- VELCO is Vermont's transmission utility
- * NRP is the Northwest Reliability Project:
 - Designed to address reliability issues with the bulk transmission system serving northwest Vermont
 - Major NRP components:
 - ◆ 68 miles of new or upgraded transmission lines
 - ◆ Upgrades or reconstruction of 11 substations
 - One new substation



Docket No. 6860 -- Process

- Application filed June 5, 2003
- ✤ 44 Parties:
 - Utilities
 - State Agencies
 - Local Municipalities
 - Regional Planning Commission
 - Advocacy Groups
 - Affected Property Owners
 - ISO-NE
- ✤ 5 Public Hearings
- ✤ 36 Days of Evidentiary Hearings
- Final Order issued January 28, 2005



Docket No. 6860 – VELCO's analysis of DSM alternative (1 of 3)

- * VELCO developed 6 Alternative Resource Configurations ("ARCs") designed to provide the same level of system reliability as the proposed project
- * Many of the NRP elements could not be deferred or replaced, so were included in all ARCs



Docket No. 6860 – VELCO's analysis of DSM alternative (2 of 3)

\clubsuit DSM was included in the 5th and 6th ARCs

- VELCO retained a consultant to study the potential for energy efficiency to reduce peak demand growth in northwest Vermont; also considered demand response programs
- DSM alone could not address all of the reliability issues
 - Even with all the identified DSM, many of the proposed transmission elements would still be needed (e.g., elements that control voltage and direct flows)
 - Local generation would also be needed, due to time lag in accomplishing full energy efficiency savings – 120 MW in 5th ARC, 180 MW in 6th ARC



Docket No. 6860 – VELCO's analysis of DSM alternative (3 of 3)

- VELCO compared net present value of total costs (economic and societal) of the ARCs
- Least-cost alternative was 5th ARC (\$66 million less in total present-value societal cost than proposed project -- \$1206 million v. \$1272 million)
- Remaining ARCs were more costly than the proposed project



Docket No. 6860 – **Opponents'** Position

- Project opponents argued that DSM alone could meet the need for additional MWs of system capacity
- Source Board rejected this claim, because:
 - It was based on projections of energy efficiency savings outside the area that would benefit northwest Vermont
 - It did not take into account the 120 MW of local generation that would be needed



Docket No. 6860 – Board Decision (1 of 2)

- Energy-efficiency component of ARC 5 is aggressive but achievable; however, energy efficiency alone is not enough
- The required 120 MW of local generation unlikely to be built
- * "The most cost-effective alternative that will meet the need for service and that has a reasonable likelihood of implementation is the proposed Project."



Docket No. 6860 – Board Decision (2 of 2)

- * Approved the proposed Project
- Sut "deeply troubled" that there may have been a more cost-effective solution that could not be implemented in a timely fashion due to lack of advance least-cost planning
- Board announced it would investigate VELCO's planning process