DEMAND-SIDE MANAGEMENT: DETERMINING APPROPRIATE SPENDING LEVELS AND COST-EFFECTIVENESS TESTING

EXECUTIVE SUMMARY

Prepared for:

Canadian Association of Members of Public Utility Tribunals
(CAMPUT)

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The Canadian Association of Members of Public Utility Tribunals (CAMPUT) RFP listed seven items that would provide insights and information to lead to a reasoned approach for addressing the overall engagement objective: *"What is the appropriate level of spending on DSM and what are the best mechanisms to ensure the testing of costs/benefits with a view to adopting guidelines for use by utilities and regulators?"*

1. The present level of interest in DSM in Canada and the US and how this may vary between areas in which deregulation has occurred and those areas which are still served by vertically integrated utilities.

2. Is the interest in DSM mainly driven by government, utilities, regulators, or others?

3. For areas that are promoting DSM, what types of programs are being promoted, e.g., load shifting, conservation, interruptible load, etc.?

4. What types of tests are used to determine the costs and benefits of DSM programs?

5. What is the level of spending by both utilities and customers, expressed in common units such as % of revenue, cents/kWh, etc.?

6. What criteria have various areas and entities used to determine the optimum level of spending?

7. Who determines what the optimum level of spending is?

Summit Blue Consulting and the Regulatory Assistance Project joined to determine the current state of energy efficiency and demand response in key states and provinces that could offer insights to CAMPUT. Our goal was to look for common threads, indicators of success. We also gathered data to support choices to engage in energy efficiency, illuminating things to watch out for. We identified jurisdictions with experiences useful for CAMPUT and interviewed knowledgeable people and applied what we learned and already knew from previous and current work. It is clear there is no single best way to implement energy efficiency and demand response, and electric energy efficiency is distinct from natural gas energy efficiency. Yet there are questions that regularly emerge, and sets of internally consistent choices regulators make that lead to a coherent, satisfying program. From this experience, we gleaned some insights for CAMPUT.

Overall spending levels have, in most cases, not been at a level sufficient to realize most of the cost-effective DSM in any jurisdiction. This is due to several factors: 1) concerns about the immediate rate impact of energy efficiency costs; 2) the inherent caution present in most legislative or regulatory proceedings; 3) changes in energy prices, particularly natural gas prices, between the time the enabling legislation or regulations were enacted and the present; and 4) rate structures that penalize utilities for conducting DSM programs. The research revealed seven key approaches to setting DSM funding levels.

1. DSM Spending Based on Cost-Effective DSM Potential Estimates

2. DSM Spending Based on Percentages of Utility Revenues

3. DSM Spending Based on Mills/kWh of Utility Electric Sales

4. DSM Spending Levels Set through Resource Planning Processes

5. DSM Expenditures Set through the Restructuring Process

6. Levels of DSM Tied to Projected Load Growth

7. Case-by-Case Approach

The scan of DSM issues across jurisdictions provides insights into lessons learned concerning natural gas and electric energy efficiency programs. There are a lot of factors associated with a successful DSM effort – that is the reality in the jurisdictions we examined, and illustrates why regulatory orders in energy efficiency dockets tend to be quite lengthy. The following are recommendations for various issues of interest to CAMPUT members.

It is extremely important that these recommendations not be taken out of context. There are a lot of variables that impact these recommendations that cannot easily be summarized. It is critical to read Section 4 of this report to understand the implications and nuances related to these recommendations.

Setting Appropriate Targets for the Amount of DSM

Determining the appropriate level of DSM is a challenging task for any utility, jurisdictional, or regional organization. There is no single or predominant approach but in many cases results are similar in terms of rough size of targeted savings and dollars allocated, sometimes as a percent of total revenues. Overall recommendations based on the scan of jurisdictions implementing DSM for several years are:

- *A minimum expenditure of 1.5% of annual electric revenues might be appropriate with a ramping up to a level near 3%.* These figures are irrespective of whether a jurisdiction has adopted retail electric competition or imposed generation divestiture, though regulatory oversight details may be quite different in either case.

- *Higher percentages may be warranted if there is expected to be rapid growth in electric demand or an increasing gap between demand and supply due to such things as plant retirements or siting limitations.* Even those states with 3% of annual revenues as an expenditure target have found that there have typically been more cost-effective DSM opportunities than could be met by the 3% funding.

- *For gas utilities, the expenditure levels have been found to be lower in virtually every jurisdiction examined.* No good reason was found for this other than that gas has not received as much attention as electricity in analytic studies. Gas space heating and water heating, as well as industrial uses, can benefit from DSM efforts. Given the history observed through the interviews, recommending a range of 1% to 2% for gas DSM is consistent with industry practice.

- *These DSM targets should be reviewed periodically.* California calls for a review every three years, Texas requests annual DSM forecast and filings to ensure the 10% of growth is being obtained by the DSM programs offered, and Idaho and British Columbia conduct an IRP update every two years. It is important to update avoided costs used as the benchmark for determining cost-effective DSM, and to incorporate any unforecasted events (e.g., the recent rise in the price of natural gas) that might change the economics of

DSM versus other resources. The review should take into account the importance of maintaining a critical mass of basic capacity within markets for implementing energy efficiency programs, such as contractors, craftsmen, and trade ally relationships.

Cost Recovery of DSM Expenditures

Cost recovery of expenditures is important for organizations spending monies and implementing DSM programs. Most utilities and regulators prefer to expense efficiency costs; in the long run, this is less expensive than capitalizing – deferring and amortizing – them. The only exception is where programs are being started from scratch, and decision-makers are worried about rate impacts. Expensing DSM program costs, possibly through a balancing account, seems to be an acceptable approach but there are probably several acceptable approaches. If near term rate impacts are a concern, capitalizing a portion of the costs may be appropriate. In general, jurisdictions address issues of cost recovery once a DSM target is set.

Of greater interest is how potential disincentives (e.g., lost revenues) are treated. Jurisdictions that allocate an automatic or formulaic budget to energy efficiency create a disconnect between DSM funding and other resource decisions made by utilities and regulators. A regulatory process that compares the values of all resources is more likely to settle on the least cost mix of resources, factoring in the long run and known risks. Updating DSM plans is important either when using a resource planning process or a benefit-cost analysis based on updated avoided costs. Failure to periodically analyze such a budget poses planning risks and decreases the flexibility to address unexpected events through DSM programs. A key component of the value of DSM investments is portfolio diversification and risk mitigation.

Addressing Incentives and Disincentives for DSM

Organizations that traditionally earn profits from selling a product now work with customers to help them use less of their product which lowers overall revenues and potentially lowers profits. This disincentive is real and should be addressed either through an adjustment clause that tracks and makes the utility whole (or mostly whole) for lost margins due to lower revenues, or through a decoupling option to eliminate this disincentive.

The overall recommendations are:

- *Lost margins due to lower sales of electricity and/or gas should be addressed such that it is not a disincentive to utility investment in DSM.*

- *Where additional incentives to meet or exceed DSM targets have been used, the impact on the utility and its rate-payers appears to be positive.*

Benefit-Cost Tests and Avoided Costs

Assessing and evaluating DSM accomplishments are important on a prospective basis to develop a cost-effective mix of DSM programs, and on a retrospective basis to discern whether the expected benefits were actually obtained. These retrospective studies also can be used to develop a more cost-effective mix of DSM activities and provide suggestions on how to make a specific program more effective. The use of benefit-cost tests reflects the importance that regulators in a jurisdiction place on different factors. This is one reason why there are five tests incorporated into the methodology in common use today—the California Standard Practice Manual tests. There is

no single answer to the question about which test to use and how to construct it, but this effort provides the following recommendations for use of benefit-cost tests:

- *The primary test that should be used is the Total Resource Cost Test applied to a portfolio of programs, with program specific tests used to address appropriate program design and the mix of programs in the portfolio.* For retrospective analyses, it is important to understand that delivering a DSM program is like introducing a new product into a market. Some programs will likely work better than expected, while others will encounter problems that need to be rectified. As a result, it may be unreasonable to expect all programs to pass the TRC test, but the portfolio as a whole should pass the TRC test.

- *The Participant Test should be part of implementation to ensure that customers that participate in the program do benefit, but it should not have a significant role in setting overall DSM expenditure levels.* Rather, it is useful in the design of specific programs to ensure that the customer perspective in represented.

- *The other tests commonly calculated can be used to provide different perspectives.* If there is a large discrepancy between a ranking of DSM activities based on the TRC Test and one based on the RIM or Societal Test, then the planning process should be flexible enough to make adjustments. Also, if one program drops substantially in its ranking relative to other programs, it may pose some equity problems across customers that could be corrected by making adjustments in the program. It is recommended that the TRC Test generally be the guide, with other tests used to check for extreme differences suggesting some flexibility in the design of a DSM program or the mix of DSM activities.

- *The benefit-cost tests need accurate estimates of avoided costs.* This means that this should include not only avoided costs of generation (i.e., the commodity cost), but also avoided transmission and distribution (T&D) costs. Progress is being made on determining avoided T&D costs in various states that have started to focus on this issue. It is recommended that the best estimates of avoided generation and T&D costs both be used in the application of these tests.

DSM Program Assessment, Monitoring, and Evaluation

Any investment of ratepayer funds should be the subject of ongoing assessment and verification to provide assurances anticipated benefits are being attained, and feedback on the programs and their implementation such that they may be improved over time. There is extensive literature in this area from many jurisdictions. California is adopting evaluation protocols and BC Hydro has developed a state-of-the-industry evaluation approach; other regions have a long history of evaluating energy efficiency programs. The New York State Research and Development Authority has conducted three years of evaluation of their SBC funded Energy $mart^{SM} programs. And many New England states have helped pioneer evaluation literature as their evaluations have had to meet scrutiny required by payment of incentives.

Specific recommendations are:

- *At program design and initiation, key success factors in terms of number of participants, measures installed, monies spent, trade allies signed up or participating, customer satisfaction, and a timeline for meeting these success goals need to be developed.*

- *Also at program design, the data collection to be used to assess energy savings will need to be incorporated into a program tracking system with customer IDs such that sites can be sampled as part of a monitoring and verification process.* These data will also be used to estimate overall program impacts, net of what would have happened without the program. The key is to have an evaluation plan completed at program initiation so all data needed for evaluation will be in program records when it is time for evaluation.

- *An approach used by BC Hydro is representative of current state-of-the-practice evaluation efforts.* This consists of:

    - A complete evaluation plan prepared at DSM program initiation.
    - Actual evaluations conducted at major milestones or at program completion.
    - Process, market, and impact evaluations are conducted, and are overseen by a cross-functional DSM Evaluation Oversight Team.
    - For programs including larger individual projects, technical and financial reviews are conducted before an incentive is offered to provide assurance the technology is feasible, estimated electricity savings are reasonable, and the cost-effectiveness is acceptable.

Interest in DSM, Leadership, Pricing, and Other Factors

There are many facets to launching and overseeing quality energy efficiency and demand response programs. Success does nothing to diminish the appropriate level of oversight and vision needed to be effective. Some essential threads:

- *Leadership is needed to push through the challenges that invariably arise and to keep the longer term in mind – a DSM program may not be immediately cost-effective and it will take time for the value of DSM to be realized.* Good leadership can set appropriate expectations and timelines, as well as ensure that the effort is sustained and is one component of a multi-year plan.

- *A stakeholder process encompassing trade allies, customers, and other stakeholders can be valuable to gain new perspectives and support for programs.*

- *Demand response needs to be integrated with energy efficiency since there are complementary aspects in delivery and economies that can be gained through technologies that both save energy and provide the customer with the ability to manage their energy use such that they can participate in a DR program.*

- *Pricing of electricity and gas is important for the economics of energy efficiency and demand response.* Time differentiated rates that recognize the varying value of the resource across hours and also better reflect the full societal cost of new resources will make DSM look more favorable to planners and customers.