

Supporting Documentation for Volume 1, Chapter 3

Behavior Based DSM

The term “behavior-based” can be ascribed to many different DSM program designs. Behavior-based programs focus on energy savings resulting from changes in individual or organizational behavior and decision-making based on new or additional data, and information and knowledge gained from external sources. These external sources may be the utility, government, mass media, or other public or private sources. Mechanisms used to influence consumer energy decisions include marketing, customer education, communications, tips and technical assistance, goal setting, rewards, recognition, and financial help in the form of loans, grants, incentives or rebates. All of this is intended to increase consumer awareness of and engagement in energy use decisions. In whole or in part, all of NorthWestern’s DSM programs utilize these mechanisms and techniques to attempt to modify consumer behavior to reduce energy consumption. Therefore, all of NorthWestern’s DSM programs have a behavior-based component. In particular, the Building Operator Certification Program is a good example of a program intended to result in reduced energy use through modification of building operator behavior.

As described in Volume 2 - Chapter 3, the Smart Grid Pilot Demonstration Program included a residential customer behavior-modification feature based on regular provision of TOU energy consumption and TOU pricing and the ability for the customer to automatically control certain equipment based on the TOU price signal. This pilot program gave NorthWestern additional insight into the effects of higher levels of detailed energy usage information on consumer energy decision-making and whether customer behavior changed through regular provision of energy use information. Over the course of testing, October 2012 through August 2014, total savings from participants was \$13,815. The average savings per customer over the testing period was \$70.16 or \$3.05 per month. Equipment cost for testing was approximately \$1,400.00 per customer. Additional costs for metering infrastructure, equipment installation, training, technical support, and monthly

energy usage service fees increased the costs of providing this information to participants. Through the TOU trial with 200 residential participants in Helena, it was determined that the benefits of energy savings, in this case, did not, offset the costs of providing energy use information.

A category of programs that continues to be marketed by certain vendors (OPOWER and ACLARA, for example) supplies consumers with billing and energy usage data from the utility billing system at regular intervals, along with comparative billing and usage data from other “neighboring” or “similar” facilities. This is generally referred to as benchmarking. Benchmarking programs calculate an Energy Use Index (“EUI”) and present it to participating consumers. Benchmarking programs seek to inform consumers about their energy use (customer education), keep it raised in their consciousness (increased awareness and customer engagement), and create mild anonymous peer pressure and competition among participants to reduce their respective EUI. It is important to note that benchmarking programs of this type depend on vendor software integration with the utility billing system, and a sustained effort to recruit and maintain customer interest and participation. Both of these requirements, in particular the software integration (needed regardless of the size of the pilot program), translate into significant cost to introduce and operate such programs.

In 2011, NorthWestern evaluated a Behavior-based DSM program proposal from a vendor (OPOWER) selling its DSM benchmarking services. The results of this analysis concluded that there was a very low probability of that program meeting standard cost-effectiveness tests used to measure the success of utility DSM programs. Since that time, electric and natural gas avoided costs (a primary determinant of benefits of all DSM programs including behavior-based programs), have decreased. Most of NorthWestern’s residential customers use natural gas for space and water heating and natural gas supply costs have declined. We are currently in a period of low natural gas supply costs and prices are expected to remain

at or near these levels for some time. These lower natural gas costs translate into lower natural gas avoided costs, and therefore reduced benefits from such programs.

NorthWestern is aware of pilot programs operated by Puget Sound Energy (“PSE”), the Energy Trust of Oregon, and Sacramento Municipal Utility District (“SMUD”) to examine the performance and cost-effectiveness of behavior-based DSM programs. Based on information NorthWestern received from some of these utilities and from results of its Smart Grid Pilot Program, these behavior-based programs would not be cost-effective in NorthWestern’s market. The 2016 Efficiency Assessment currently underway will further evaluate the cost effectiveness of behavior-based DSM.

Price Elasticity of Demand

The TOU study program described earlier provides information from a small sample group of NorthWestern’s retail electric customers in Helena. Because customers were provided electricity price signals and the ability to modify their usage in response to energy price, theoretically, a price elasticity of demand calculation may be possible. Data produced from the study does not however, provide the necessary numerical inputs to perform any definitive price elasticity of demand calculations.

The TOU study program was not designed specifically to support the calculation of price elasticity demand for NorthWestern’s residential customers. In this case, the primary goal of the study was to gather information about customer behavior when time-of-use rates are available. Prior to the TOU program customer meters did not include interval usage recorders. This lack of baseline data prior to introduction of time of use pricing effectively prevented a comparison to purchasing behavior based on price following the introduction of the time of use pricing options.

Multiple resource procurement planning cycles have not identified useful sources of customer data to employ in a price elasticity of demand evaluation for retail Montana customers. To date, most reference materials found on this subject have identified the price elasticity of demand for electricity to be inelastic. This suggests that for long-term planning purposes, price elasticity is not a significant factor in the estimation of customer energy usage. NorthWestern will consider how to incorporate the effects of price elasticity in the future if and when suitable data necessary to perform calculations becomes available.