

SGIG Consumer Behavior Study Minnesota Power *AMI Behavioral Research Pilot*

Overview

Minnesota Power (MN Power) is a winter peaking investor-owned electric utility with ~145,000 customers in its ~26,000 square mile service territory that covers central and northeastern Minnesota. The utility’s SGIG project includes a two phase consumer behavior study. The first (Phase One) evaluates customer acceptance to various forms and timing of information feedback about electricity consumption, while the second (Phase Two) evaluates customer response to a TOU rate with a CPP overlay. The utility is targeting residential customers in the Duluth/Hermantown area for both phases of the study; an area with a slightly older and higher-income population than the rest of the state.

Consumer Behavior Study Features

Goals and Objectives— MN Power is implementing two phases of their consumer behavior study which address different goals and objectives.

In Phase One, the study centers primarily on customer preferences for various electricity usage feedback approaches that are higher in latency (e.g., daily vs. monthly) and resolution (e.g., hourly vs. monthly) compared to what customers currently receive. MN Power is also interested in evaluating the timing and magnitude of changes in customers’ energy usage patterns due to the various feedback approaches.

In Phase Two, the study centers primarily on evaluating the timing and magnitude of changes in customers’ peak demand due to exposure to a TOU rate with a CPP overlay (TOU w/CPP). MN Power is also interested in learning about customers’ willingness to accept and remain on a TOU rate with CPP overlay.

Treatments of Interest— MN Power is implementing a two period TOU rate that augments its existing flat rate and includes a 13 hour on-peak period (i.e., 8 a.m. – 10 p.m.) each weekday. In addition, MN Power is testing the effects of substituting, during various blocks of the on-peak period, a higher price on critical peak event days (TOU w/CPP). Customers receive day-ahead notice of critical peak events, called when a major energy event is taking place in the Midwest Independent System Operator markets or on MN Power’s system. Participants will be exposed to no more than 160 hours of critical peak events each year of the study.

Control/information technology treatments include the deployment of an enhanced web-portal with access to meter data at a variety of levels of resolution and latency: 1) monthly aggregated data provided on a monthly basis (this will be the control cell); 2) daily aggregated data provided on a daily basis; or 3) hourly aggregated data provided on a daily basis (requires installation of an AMI smart meter). In addition, a treatment was planned to include IHDs (which require the installation of an AMI smart meter) with hourly aggregated meter data on an hourly basis. All of the experimental cells were not filled and consequently MN Power chose to drop the IHD treatment. All customers participating in the study receive customer support and a variety of education materials.

MN Power Rate Levels (¢/kWh)

Period	TOU w/CPP*
Off-Peak	-2.990
Peak	1.415
Critical Event	77.000

* Rate levels represent adders to existing volumetric retail rates, which are largely based on an inclining block design.

Minnesota Power (continued)

Experimental Design— Phase 1 of the study is a randomized controlled trial with denial of treatment for the control group (see Figure 8). All residential customers in the Duluth/Hermantown area who meet certain eligibility criteria receive an invitation to opt in to a study where participating customers can gain access to a web portal and receive one of three information feedback treatments. Customers who opt in are surveyed, stratified and then randomly assigned to receive one of the three web portal information feedback treatments.

All of the experimental cells were not filled and consequently MN Power augmented the existing study sample. All AMI-enabled residential customers who passed up the original offer to join the Phase One study were stratified and randomly assigned to receive one of the three information feedback treatments. These customers are notified of this opportunity, effectively allowing them to opt out of the treatment by choosing to not access the information now made available to them via the web portal.

Phase 2 of the study is a within subjects design. All customers with installed AMI meters as well as residential customers in the Duluth/Hermantown area who meet certain eligibility criteria to have an AMI meter installed receive an invitation to opt in to a study where participating customers receive the rate treatment for one year. A limited number of AMI meters are available to be installed for those who opt in to this phase of the study but don't currently have one.

Enrollment Incentives and Retention Activities—None

Sample Size Requirements—Sample size requirements are shown in the table below.

MN Power Sample Size Requirements

Phase 1

Experimental Cell	Opt-Out	Opt-In
Monthly feedback data provided monthly (Control)	768	1,000
Daily feedback data provided daily	768	675
Hourly feedback data provided daily	768	675
IHD (Control)	n/a	1,000
IHD (Treatment)	n/a	675

Phase 2

In phase 2, no specific sample size requirements were developed due to the type of experimental design used.

Key Milestones

Key Milestones	Target Dates
Phase 1 study period begins	March 2012
Interim evaluation report submitted	March 2013
Phase 2 study period begins	May 2013
Phase 1 and 2 study period ends	March 2014
Final evaluation report submitted	June 2014

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