BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange	Chair
Dan Lipschultz	Commissioner
Matthew Schuerger	Commissioner
Katie J. Sieben	Commissioner
John A. Tuma	Commissioner

In the Matter of Xcel's Residential Time of Use Rate Design Pilot Program	ISSUE DATE: August 7, 2018
	DOCKET NO. E-002/M-17-775
In the Matter of Xcel's 2017 Biennial Distribution Grid Modernization Report	DOCKET NO. E-002/M-17-776
	ORDER APPROVING PILOT PROGRAM, SETTING REPORTING REQUIREMENTS, AND DENYING CERTIFICATION REQUEST

PROCEDURAL HISTORY

On November 1, 2017, Xcel Energy filed its 2017 Biennial Distribution Grid Modernization Report under Minn. Stat. § 216B.2425, subd. 2 (e). On the same date, Xcel filed a petition requesting Commission approval of its proposed Residential Time of Use (TOU) Rate Design Pilot Program.

On November 30, 2017, Communities United for Responsible Energy (CURE) filed comments recommending that steps be taken to encourage public participation in Commission energy planning proceedings.

On February 5, 2018, the Commission received comments on Xcel's Grid Modernization Report from the Residential Utilities and Antitrust Division of the Office of the Attorney General (OAG); the Division of Energy Resources of the Department of Commerce (the Department); and the Citizens Utility Board (CUB). The Commission received comments on Xcel's proposed TOU Rider from the OAG; the Department; CUB; the Suburban Rate Authority (SRA); and jointly from Fresh Energy and the Minnesota Center for Environmental Advocacy (MCEA).

On February 26, 2018, the Commission received reply comments on the filings from the OAG; the Department; CUB; the SRA; and Xcel.

On May 31, 2018, the filings came before the Commission.

FINDINGS AND CONCLUSIONS

I. Legal Background

Minn. Stat. § 216B.2425 (the Grid Modernization Statute) directs utilities, including public utilities that own or operate electric transmission lines in Minnesota, to file by November 1 of each odd-numbered year a transmission projects report.[1] Under the statute, a utility such as Xcel that is operating under a multi-year rate plan must also:

> …identify in its report investments that it considers necessary to modernize the transmission and distribution system by enhancing reliability, improving security against cyber and physical threats, and by increasing energy conservation opportunities by facilitating communication between the utility and its customers through the use of two-way meters, control technologies, energy storage and microgrids, technologies to enable demand response, and other innovative technologies.[2]

Under subdivision 3 of the statute, the Commission must decide whether to certify any of the transmission and distribution projects proposed in the Report.

Utilities may seek recovery of the costs of their projects under Minn. Stat § 216B.16, subd. 7b, which authorizes the Commission to approve a tariff that "allows the utility to recover costs associated with distribution planning required under section 216B.2425," including those projects certified by the Commission under the Grid Modernization Statute.[3]

II. Xcel's Grid Modernization Report

Xcel is operating under a multi-year rate plan and therefore filed a Biennial Distribution Grid Modernization Report (Report) under subdivision 2 of the statute.

In its Report, Xcel identified distribution grid investments and requested Commission certification of two projects.

Xcel stated that a number of converging factors drives the need for continuing system upgrades. These include rapid technological advances; changing customer needs; increased reliability standards across the industry; and emerging generation resources. According to Xcel, a modernized grid will enable higher penetration levels of renewable energy resources, greater system efficiency, and a broader range of energy services.

The Company identified a number of steps to modernize the grid, including the addition of new technologies such as: Advanced Distribution Management System (ADMS); Field Area Network (FAN); Energy Management System (EMS); Field Devices; Geospatial Information System (GIS); and underlying Information Technology (IT) infrastructure.

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[1] Minn. Stat. § 216B.2425, subd. 2 (a).

[2] Minn. Stat. § 216B.2425, subd. 2 (e).

[3] Minn. Stat. § 216B.16, subd. 7b (b) (5).

ADMS is a software platform that assists the control room and personnel with grid monitoring and control. This platform uses Distribution Supervisory Control and Data Acquisition (D-SCADA, which is an application of hardware and software) to calculate load flow, a process that improves load monitoring and reliability. ADMS is designed to achieve integrated grid preparedness, improved reliability, and increased grid efficiency.

The FAN is a communications network that enables the secure transfer of information between various endpoints, such as substation infrastructure and customers' meters. The Company intends to own the FAN infrastructure to increase the level of security and the quality of performance.

EMS is also a communications system that assists the Company in remotely managing the flow of electricity during outage and maintenance time periods. In addition, deployment of field devices, including power line sensors, would be used until SCADA is fully implemented across the grid.

GIS technology analyzes data using visual representations of the Company's physical assets and would be integrated with ADMS. Underlying IT infrastructure is intended to increase automation and enhance the integration of systems, which aids the successful operation of ADMS, as well as the capability and performance of the distribution system.

III. Certification Requests

Xcel has requested certification of two projects, the Residential Time of Use Rate Design Pilot Program (TOU Rider Pilot, or the Pilot), and the Fault Location Isolation and Service Restoration (FLISR) system.

A. The TOU Rider Pilot

Xcel established a framework and identified preliminary objectives as the basis of a stakeholder process through which the Company received input on the design of the Pilot and made further refinements.

Xcel stated that it developed the Pilot proposal with the goal of sending adequate price signals to reduce peak demand; identifying effective customer engagement strategies; understanding customer impacts by segment; and supporting demand response goals.

Xcel intends to offer the Pilot to a total of 10,000 customers, with 5,000 from each of the following two geographic areas: the Hiawatha West/Midtown substation in Minneapolis, and the Westgate substation in Eden Prairie. Although no rural customers are represented, the Company stated that its average residential customer is within the average of the income and energy usage levels of customers within these two locations.

Advanced Metering Infrastructure (AMI) would be installed on all participating customers' premises. Additionally, Xcel would establish a control group of 7,500 non-participating customers with AMI meters as a means of measuring performance.

The TOU Rider Pilot would run as a pilot for two years and include new time of use rates for residential customers, with the option to opt out of the program at any time. The Pilot would offer three rate periods: an on-peak period (between 3 p.m. and 8 p.m.), an off-peak period (between 12 a.m. to 6 a.m.), and a middle period (for all other hours). The rates during the

on-peak period are approximately four times higher than rates during the off-peak period. According to Xcel, utilities are more successful in reducing energy consumption during peak demand hours if the margin between the on- and off-peak rates is a ratio of at least 4:1.

Xcel also stated that its proposed five-hour on-peak period is a more effective design method than a shorter or longer timeframe. In particular, a shorter time period might result in higher usage immediately after the on-peak period, counteracting the energy savings achieved during the on-peak period. Xcel stated that stakeholders, as well as customers who were surveyed, supported shifting customer usage to overnight periods when wind generation is highest.

Xcel developed a cost-duration curve to establish rates that recover costs when system assets are in use. Xcel used the load curve to assign a share of systems costs to each hour of the year. To develop the rate, Xcel used the forecast year 2024 to more closely represent the conditions that are expected when the Pilot concludes and to account for planned renewable energy additions. July is ordinarily the highest load month of the year, and Xcel therefore included July average weekday hourly loads in comparing usage throughout an entire day. The trend over time, according to the data, shows that usage will continue to move to later in the day. Based on the measurements and the trends, Xcel stated that its five-hour on-peak period ending at 8 p.m. is therefore reasonable.

To analyze and understand the effectiveness of the Pilot, Xcel proposed to file an initial report on the Pilot after 15 months and a final report after 27 months.

1. Comments

Most parties recommended approval of Xcel's proposed TOU Rider Pilot program, although some parties recommended changes to the proposal.

The OAG recommended approval of the Company's proposal, stating that the program would benefit ratepayers and reduce system peak demand by sending effective price signals, particularly in light of the 4:1 on-peak rate to off-peak rate ratio. But the OAG also recommended offering bill protections to low-income customers who are either receiving assistance from, or are eligible for, the Low Income Home Energy Assistance Program (LIHEAP). The OAG supported a customer education and outreach plan, robust reporting requirements, including a plan for designing TOU rates using information gathered from the Pilot program, which would be available to all customers after the conclusion of the Pilot.

MCEA supported approval of the Pilot but recommended two changes. First, MCEA recommended shortening the duration of the peak period by setting it at 2 p.m. to 6 p.m., the Company's four highest-usage hours, which more accurately reflects actual demand. MCEA stated that limiting the duration of the peak period to those four hours of the day would produce better customer responses to price signals and result in more significant reductions in peak demand.

Second, MCEA recommended allowing net-metered customers to participate, contrary to Xcel's proposal, which would exclude those customers. Because net-metered customers often add electricity to the grid during peak hours, MCEA stated that it would be useful to collect data on how the TOU Rate impacts their costs of energy and how the solar market would be affected.

CUB supported approval of the Pilot but recommended clarifying Xcel's intended customer engagement strategies and setting reporting requirements. CUB also recommended anonymizing individual customer usage data and then making the data available to the public for further analysis before transitioning to a final TOU rate available to all residential customers.

The SRA stated that further details on TOU Rider implementation and customer communication are needed prior to approving the Company's proposal. In particular, the SRA stated that detailed information on education and ongoing communication would illuminate important information on how customers would be selected and how the program would be marketed. The SRA noted that it could be useful to expand the areas where the TOU Rider is available to allow other interested customers in the vicinity to also participate. Further, the SRA recommended that Xcel address how participants would be transitioned at the end of the Pilot and that Xcel provide additional details in the bill to encourage continuing customer participation throughout the duration of the program.

2. Commission Action

The Commission appreciates the participation of stakeholders and the thorough analyses of the parties. Xcel relied on valuable stakeholder input in developing its proposal, which the Commission concurs is reasonable. The Pilot program is an opportunity for Xcel and its customers to learn about the advantages of the TOU Rider rate, as well as potential disadvantages. The data derived will be subsequently analyzed to determine whether additional changes are necessary before the rate becomes available to all residential customers.

For these reasons, the Commission will certify the Residential TOU Rate Pilot, along with the applicable tariff, and grant Xcel's request to certify the Pilot as a distribution project under the Grid Modernization Statute. This certification does not imply either of the following: (1) any finding of prudency with respect to the recovery of costs in a petition for rider recovery under Minn. Stat. § 216B.16, subd. 7b(b); or (2) certification or approval of any investments beyond those specifically associated with the Pilot.

Xcel will be required, as it proposed, to file reports after approximately 15 months (mid-point) and after approximately 27 months (final report). To address issues raised by the parties in their comments, the Commission will also set forth the following additional requirements.

The Commission will require Xcel to develop a one-page "dashboard" monthly statistical report that includes data on enrollment percentages and customer bill impacts and energy usage.

The Commission will require Xcel to include as an attachment to its mid-point and final reports all marketing and educational communications provided to participants before and during the pilot program. The Commission will also direct Xcel to work with interested parties to develop a post-pilot transition plan for TOU Pilot participants and to work with interested parties to develop a plan to fully implement a TOU rate for all residential customers after completion of the pilot.

Xcel must include in its mid-point and final reports the metrics set forth in the ordering paragraphs below.

Xcel must modify the Availability provision in its Residential Time of Use Pilot Program Service tariff to reflect the exclusion of medical equipment-dependent customers from the pilot.

Within 30 days of the date of this order, Xcel must file compliance filings in this docket, along with updated tariff sheets, to reflect the Commission's decisions. Xcel must also file its proposed bill insert language for approval by the Commission's Executive Secretary.

Xcel may file a combined Grid Modernization Report, certification request, and Integrated Distribution Plan in Docket No. E-002/CI-18-251.

B. Fault Load Isolation and Service Restoration (FLISR)

Xcel requested certification of its proposed FLISR project, a form of distribution automation that deploys automated sensing and switching devices to detect feeder mainline faults, isolate them, and restore power to other sections—thereby decreasing the duration of outages and the number of customers affected by them.

Implementation of FLISR requires prior development of ADMS, FAN, and field devices. The FLISR system would use the following equipment: reclosers (circuit breakers that automatically close the breaker after a fault), automated overhead switches (they sense the loss of voltage and then open to isolate the fault), automated switch cabinets (similar to overhead switches but used in underground feeders), and substation relays (generate a switching plan to restore service).

The operational benefits, as described by Xcel, include a view of conditions and load across the distribution system in real time and the remote restoration of power. This high level of automation is designed to increase the accuracy of available information and the capability of remote system management, thereby enhancing efficiency and the speed with which crews respond to outages.

Under the proposal, Xcel would implement FLISR in areas where the electric system is primarily overhead, where there is high customer density, and where there is a higher percentage of outages compared to the rest of the distribution system. A portion of the total geographic area would overlay with the TOU Rider Pilot area, maximizing use of the underlying FAN infrastructure. The expectation is that FLISR will facilitate much shorter outages by restoring service to up to two-thirds of customers on the affected feeder within minutes of the outage and by reducing the duration of longer outages.

Xcel stated that if the project is certified, the Company would first run FLISR in an advisory mode in which field devices will identify the optimal switching sequence for isolation and restoration, using inputs sent directly to the ADMS. Once the Company determines that there is no need for manual interaction with field devices, FLISR would function automatically.

Xcel also stated that the value of automating the mainline system outweighs the cost of other potential reliability improvement methods, such as burying overhead lines. Further, Xcel noted that the system average interruption duration index (SAIDI) is the industry standard for measuring utility reliability performance and would be a useful tool in evaluating the benefits of the proposed FLISR project.

To identify the benefits of FLISR, the Company first calculated expected project costs. The Company then counted the number of outages and the duration of those outages at select feeders and then developed a formula to calculate the cost of those outages, including a customer minute out (CMO) cost. Based on its calculations, the Company estimated that the outage cost is $0.76 per minute per Minnesota customer (whether residential, commercial, or industrial). The Company then used the CMO cost to estimate the cost savings of individual feeders using FLISR, which would reduce the number of outage minutes.

1. Comments

The Department recommended that the Commission defer approval of FLISR and instead require a cost-benefit analysis to compare the FLISR proposal with that of other distribution modernization projects, such as Integrated Volt-VAr Optimization (IVVO). IVVO is a technology that automates and optimizes distribution voltage regulating devices on distribution feeders. The Department recommended that Xcel explore this option and compare the potential cost savings to the cost savings FLISR is estimated to achieve.

The Department also stated that Xcel's cost analysis lacked a demonstration of the net savings to ratepayers. Further, Xcel's calculation of its CMO varies across tariffs. For example, the Department calculated the customer cost under Xcel's service quality tariff as equal to $0.035, or approximately 4.6 percent of the CMO assigned in the FLISR calculations. That variation, without further analysis, calls into question the actual cost savings of FLISR.

The OAG recommended that the Commission deny certification of FLISR, stating that the Company did not persuasively demonstrate that the proposal is consistent with the Grid Modernization Statute, which requires that such projects be "necessary to modernize the transmission and distribution system by enhancing reliability…"[4] The OAG also stated that Xcel did not quantify estimated cost savings that FLISR would achieve, and as a result, cost recovery under the Rider statute is unwarranted. The OAG further stated that Xcel is achieving its reliability targets without FLISR.

CUB also recommended against certification of the FLISR project, stating that a cost/benefit analysis is needed to demonstrate ratepayer savings and quantify the total resource cost of each feeder that would be upgraded.

2. Commission Action

The Commission concurs that the Company has not fully demonstrated that FLISR is "necessary to modernize the transmission and distribution system by enhancing reliability," as statutorily required. Further, the Company's cost calculations emphasize the value of reliability but do not adequately assess that value and do not quantify estimated cost savings to ratepayers. At this time, the Commission will therefore deny the certification request without prejudice.

[4] Minn. Stat. § 216B.2425, subd. 2(e).

ORDER

1. The Commission hereby approves Xcel's proposed Residential TOU Rate Pilot, along with the applicable tariff, and grants Xcel's request to certify the Pilot as a distribution project under Minn. Stat. § 216B.2425.

2. Xcel must develop a one-page "dashboard" monthly statistical report that includes data on enrollment percentages and customer bill impacts and energy usage and other data sets.

3. Xcel must include as an attachment to its reports all marketing and educational communications provided to Participants before and during the pilot program.

4. Xcel must include in its mid-point report (at approximately 15 months) and final report (at approximately 27 months) the following metrics:

    a. Participation metrics, including the number of customers who have opted out of the TOU rate;
    b. Customer bill impacts;
    c. Customer satisfaction indicators, including:
        (i) quantification of the relative impacts of the TOU rate on customers' bills compared to the current residential rate and
        (ii) identification of groups that are disproportionally impacted either positively or negatively.
    d. Total peak demand savings achieved by participating customers, and incremental load curve data at an hourly or sub-hourly level by:
        (i) assessing how various customer groups within the Residential class change their consumption behavior during peak times in response to the proposed rate structure; and
        (ii) analyzing how certain household characteristics impact responsiveness to peak price signals.
    e. Track customers who self-identify as LIHEAP eligible separately from customers who are LIHEAP recipients, and preserve the data for analysis;
    f. Customer satisfaction engagement by:
        (i) measuring and tracking customer satisfaction, preferences, attitudes, acceptance, and comprehension; and
        (ii) understanding drivers for active customer participation.
    g. Energy usage changes by:
        (i) measuring how various customer groups within the Residential class change their overall consumption patterns in response to the proposed rate structure;
        (ii) and determine how consumption changes during off-peak (high renewable hours);
    h. Post-pilot takeaways must include:
        (i) evaluating new capabilities of advanced meter infrastructure meters; and
        (ii) assessing impacts of the TOU rate on the Company's revenue recovery.
    i. In the final report, Xcel must include recommendations for including net metered customers in TOU tariffs, including any necessary changes to the Company's net metering and/or cogeneration tariffs, based on engagement with and feedback from stakeholders.

5. Xcel must work with interested parties to develop a post-pilot transition plan for TOU Pilot participants.

6. Xcel must work with interested parties to develop a plan to fully implement a TOU rate for all residential customers after completion of the Pilot.

7. Xcel must modify the Availability provision in its Residential TOU Pilot Program Service tariff to reflect the exclusion of medical equipment-dependent customers from the pilot.

8. Within 30 days of the date of this order, Xcel must file compliance filings, and updated tariff sheets, reflecting the Commission's decisions herein.

9. Xcel must file its proposed bill insert for approval by the Executive Secretary.

10. Xcel's request to certify FLISR is hereby denied without prejudice.

11. Xcel may file a Grid Modernization Report and certification request on November 1, 2018 in combination with an Integrated Distribution Plan in Docket No. E-002/CI-18-251. The filing should include for any certification request(s) at a minimum: (1) details on why the project is necessary for grid modernization; (2) how it is in the public interest; (3) how it is consistent with the Commission's Guiding Principles for Grid Modernization (Docket 15-556); (4) the intended objectives for the project; (5) a description of the available alternatives to meet the intended objectives; (6) a cost benefit analysis of the project; (7) and potential interrelation with other initiatives, projects, and Xcel's long-term grid modernization plans.

12. If Xcel is required to file an Integrated Distribution Plan (IDP) (Docket 18-251) by or on November 1, 2018, the Grid Modernization Report required by Minn. Stat. § 216B.2425 shall be included as part of the IDP filing.

13. This order shall become effective immediately.

BY ORDER OF THE COMMISSION

Daniel P. Wolf

Daniel P. Wolf
Executive Secretary

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