

February 25, 2022

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101

RE: **Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E002/M-21-694

Dear Mr. Seuffert:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

Xcel Energy's 2021 Integrated Distribution Plan and Request for Certification of Distributed Intelligence and the Resilient Minneapolis Project

As discussed in the attached comments and Report from Synapse Energy Economics, Inc. (Synapse), the Department provides its response to the Minnesota Public Utilities Commission's (Commission) November 15, 2021 *Notice of Comment Period on Xcel Energy's 2021 Integrated Distribution Plan and Request for Certification of Distributed Intelligence and the Resilient Minneapolis Project*.

The Department and Synapse request additional information from Xcel Energy, and will provide final recommendations in Party Reply comments. The Department is available to respond to any questions the Commission may have on this matter.

Sincerely,

/s/ MATTHEW LANDI
Rates Analyst

/s/ CHRISTOPHER WATKINS
Rates Analyst

ML/CW/ja
Attachment



Before the Minnesota Public Utilities Commission

Comments of the Minnesota Department of Commerce Division of Energy Resources

Docket No. E002/M-21-694

I. INTRODUCTION AND BACKGROUND

A. OVERVIEW

On November 1, 2021, Northern States Power Company d/b/a Xcel Energy (Xcel, or the Company) filed its 2021 Integrated Distribution Plan (2021 IDP)¹ as required by the Minnesota Public Utilities Commission's (Commission) in its July 23, 2020 Order in Docket No. E002/M-19-666 (the 2020 Order).²

On November 15, 2021, the Commission issued a *Notice of Comment Period on Xcel Energy's 2021 Integrated Distribution Plan and Request for Certification of Distributed Intelligence and the Resilient Minneapolis Project* (Notice). The Commission's Notice seeks comments on two primary issues related to Xcel's 2021 IDP and its Requests for Certification, which are as follows:

1. Should the Commission accept or reject Xcel Energy's 2021 Integrated Distribution Plan (IDP)?
2. Should the Commission approve, modify, or deny certification of Distributed Intelligence and the Resilient Minneapolis Project?

The Commission's Notice also identifies twelve topics open for comment, which are as follows:

2021 Xcel Integrated Distribution Plan (IDP)

1. Should the Commission accept or reject Xcel Energy's Integrated Distribution Plan (IDP)?
2. Does the IDP filed by Xcel Energy achieve the planning objectives outlined in the filing requirements as amended by the Commission's November 2, 2019 Order? [footnote omitted]

¹ Xcel Energy's Integrated Distribution Plan, 2022 – 2031, Docket No. E002/M-21-694. November 1, 2021. Accessed at (PUBLIC):

<https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={2018DC7C-0000-C41B-992F-7ED95D99A9EE}&documentTitle=202111-179347-01.>

² *In the Matter of Xcel Energy's Integrated Distribution Plan and Advanced Grid Intelligence and Security Certification Request*, Docket No. E002/M-19-666 (2019 IDP). ORDER ACCEPTING INTEGRATED DISTRIBUTION PLAN, MODIFYING REPORTING REQUIREMENTS AND CERTIFYING CERTAIN GRID MODERNIZATION PROJECTS. Order Point No. 2. July 23, 2020. Accessed at:

<https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={F00E7D73-0000-CD15-B6E0-EA73F0AC037E}&documentTitle=20207-165209-01.>

3. What IDP filing requirements provide the most value to the process, and why?
4. Are there filing requirements that are not information and/or should be deleted or modified, and why?
5. Are there other issues or concerns related to this matter?

Distributed Intelligence (DI) Certification Request

6. Should the Commission approve, modify, or deny certification of Distributed Intelligence (DI), including the following use cases? [footnote omitted]
 - a. Home Area Network (HAN)
 - b. Energy Analysis
 - c. Electric Vehicle Detection
 - d. Secondary Equipment Assurance
 - e. Meter Bypass Theft Detection
 - f. Connectivity
7. What, if anything, should the Commission set as conditions or clarify if granting certification of the DI and the six initial use cases?
8. What should the Commission consider or address related to realizing benefits of each of the investments in the Company's DI and the six initial use cases for ratepayers?
9. How should the Commission consider customer data privacy and value, including third party vendor access to data obtained through the customer facing DI applications?
10. Are there any other issues or concerns related to this matter?

Resilient Minneapolis Project Certification Request

11. Should the Commission approve, modify, or deny certification of the Resilient Minneapolis Project?
12. Are there any other issues or concerns related to this matter?

B. XCEL'S 2021 IDP

Xcel's IDP is required to be filed biennially and to be responsive to the Commission's IDP Planning Objectives, consisting of information required by the Commission's IDP Filing Requirements.³ The IDP is intended to build upon Commission, stakeholder, and customer understanding of the Company's distribution system planning in two key areas: (1) development of a framework for ongoing distribution

³ The Department's review of each utility's 2019 IDP proceedings found that the only comprehensive list of IDP filing requirements that reflect modifications made by the Commission's Orders related to utilities' 2019 IDPs is found in the Commission's December 4, 2020 *Notice of Stakeholder Meeting*, which was filed in each utility's 2019 IDP proceeding. See Attachment 5 of the December 4, 2020 *Notice of Stakeholder Meeting* for red-line version of Xcel's IDP Filing Requirements (IDP Filing Requirements). Accessed at: <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={50352E76-0000-C27D-8DB5-05C019CDB398}&documentTitle=202012-168786-04>.

system planning and related analyses (such as DER forecasts); and (2) grid modernization implementation plans and analyses. At a high level, the Xcel's 2021 IDP provides an overview of its distribution system, planning and operational strategy, and how the Company plans the system to meet customers' current and future needs.

The Commission's IDP Filing Requirements require utilities to provide information and analyses related to internal distribution system planning processes, historical actual and budgeted capital expenditures, present and forecasted levels of distributed energy resources (DER), forecasted levels of energy demand, hosting capacity data (and for Xcel, information related to its ongoing hosting capacity analysis), and non-wires alternatives (NWA) analysis. Utilities are also required to discuss how their IDPs fulfill the Commission's IDP Planning Objectives.

Xcel provided a Compliance Matrix in Attachment B of its 2021 IDP, which includes a list of statutory and Commission-ordered requirements for Xcel's 2021 IDP.⁴ The Commission's 2020 Order also required the Company to file an annual update of baseline financial data and non-wires alternatives analysis (Compliance Filing).^{5,6} The Department's Initial Comments on Xcel's 2019 IDP viewed annual updates of financial and NWA analysis as helpful in understanding how ratepayer funds are spent on the distribution system and due to the potential of NWA analysis to defer utility investments in traditional capital assets.⁷

Xcel's 2019 IDP projected total distribution spending of approximately \$2.3 billion between 2019 and 2024. Xcel's Compliance Filing projected total distribution system spending of approximately \$2.5 billion between 2020 and 2025.⁸ Xcel's 2021 IDP increased that projection to over \$3 billion between 2021 and 2026.

The table below provides a high-level overview of the projected spending levels Xcel provided in its 2019 IDP, Compliance Filing, and in its 2021 IDP, organized by the IDP Budget Categories required by IDP Filing Requirements 3.A.29. IDP Filing Requirement 3.A.29 requires Xcel to provide information on "[p]lanned distribution capital projects, including drivers for the project, timeline for improvement, summary of anticipated changes in historic spending"⁹ and contain eight IDP Budget Categories, which are listed in the table below.

⁴ 2021 IDP, Attachment B. Accessed at (PUBLIC):

<https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={2018DC7C-0000-C132-ACD2-DD340813DFFC}&documentTitle=202111-179347-02.>

⁵ Commission's 2020 Order, Order Point No. 3.

⁶ Xcel Compliance, Annual Update (Compliance Filing). Docket No. E002/M-19-666. October 30, 2020. Accessed at: <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={00477B75-0000-CC1A-B39B-8B4C2A720F67}&documentTitle=202010-167865-01.>

⁷ Department's Initial Comments, at 14. Docket No. E002/M-19-666. March 17, 2020. Accessed at: <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={5040EA70-0000-CA19-AFF2-ACEAD6D0D77C}&documentTitle=20203-161327-01.>

⁸ Xcel Compliance Filing, at 5.

⁹ IDP Filing Requirement 3.A.29.

**Table 1. Comparison of Xcel Distribution System Spending Projections:
2019 IDP, Compliance Filing, and 2021 IDP**

	2019 IDP (2019 - 2024)	Compliance Filing (2020 - 2025)		2021 IDP (2021 - 2026)	
IDP Budget Category	Spending (Millions)	Spending (Millions)	Δ	Spending (Millions)	Δ
<i>Age-Related Replacement and Asset Renewal</i>	\$ 478.20	\$ 804.30	\$ 326.10	\$ 971.40	\$ 167.10
<i>New Customer Projects and New Revenue</i>	\$ 227.70	\$ 222.00	\$ (5.70)	\$ 237.40	\$ 15.40
<i>System Expansion or Upgrades for Capacity</i>	\$ 207.10	\$ 286.50	\$ 79.40	\$ 273.70	\$ (12.80)
<i>Projects Related to Local (or other) Government Requirements</i>	\$ 176.30	\$ 217.80	\$ 41.50	\$ 210.10	\$ (7.70)
<i>System Expansion or Upgrades for Reliability and Power Quality</i>	\$ 508.00	\$ 257.50	\$ (250.50)	\$ 239.20	\$ (18.30)
<i>Other</i>	\$ 218.30	\$ 276.50	\$ 58.20	\$ 286.60	\$ 10.10
<i>Metering</i>	\$ 24.60	\$ 37.10	\$ 12.50	\$ 21.80	\$ (15.30)
<i>Grid Modernization and Pilot Programs</i>	\$ 444.60	\$ 416.20	\$ (28.40)	\$ 763.30	\$ 347.10
Total Spending	\$ 2,284.80	\$ 2,517.90	\$ 233.10	\$ 3,003.50	\$ 485.60

For each IDP Budget Category and overall, this table calculates the difference in projected spending between the 2019 IDP and the Compliance Filing, and the difference in spending between the Compliance Filing and the 2021 IDP.

These filings were made a year apart from one another (November 1, 2019, October 30, 2020, and November 1, 2021), and overall distribution system spending projections increased from approximately \$2.3 billion to over \$3 billion over that time period. The IDP Budget Categories of “Age-Related Replacement and Asset Renewal” and “Grid Modernization and Pilot Programs” are the main drivers of the spending increase: accounting for projected increases of \$167.10 million and \$347.10 million each. There is a notable decrease in projected spending for the IDP Budget Category “System Expansion or Upgrades for Reliability and Power Quality,” accounting for a total decrease in projected spending of \$268.80 million

While this table shows increases in projected spending in each subsequent filing, it is important to note that this isn’t an apples-to-apples comparison given the periods analyzed in each filing (e.g., the 2019 IDP period covers years 2019 through 2024, whereas the 2021 IDP period covers years 2021 through 2026).

In order to obtain a better apples-to-apples comparison between each filing, the Department reviewed the annual spending projections provided in each filing and was able to compare projected spending between the 2021 through 2024 period. Table 2 below provides such a comparison.

**Table 2. Comparison of Xcel’s Distribution System Spending Projections for the 2021 – 2024 Period:
2019 IDP, Compliance Filing, and 2021 IDP**

	2019 IDP (2021 - 2024)	Compliance Filing (2021 - 2024)		2021 IDP (2021 - 2024)	
IDP Budget Category	Spending (Millions)	Spending (Millions)	Δ	Spending (Millions)	Δ
<i>Age-Related Replacement and Asset Renewal</i>	\$ 318.50	\$ 557.40	\$ 238.90	\$ 596.20	\$ 38.80
<i>New Customer Projects and New Revenue</i>	\$ 157.40	\$ 146.50	\$ (10.90)	\$ 155.00	\$ 8.50
<i>System Expansion or Upgrades for Capacity</i>	\$ 143.20	\$ 185.70	\$ 42.50	\$ 163.20	\$ (22.50)
<i>Projects Related to Local (or other) Government Requirements</i>	\$ 116.10	\$ 186.10	\$ 70.00	\$ 129.50	\$ (56.60)
<i>System Expansion or Upgrades for Reliability and Power Quality</i>	\$ 466.60	\$ 181.90	\$ (284.70)	\$ 157.80	\$ (24.10)
<i>Other</i>	\$ 153.40	\$ 191.80	\$ 38.40	\$ 201.80	\$ 10.00
<i>Metering</i>	\$ 12.40	\$ 24.00	\$ 11.60	\$ 18.10	\$ (5.90)
<i>Grid Modernization and Pilot Programs</i>	\$ 420.10	\$ 363.70	\$ (56.40)	\$ 586.60	\$ 222.90
Total Spending	\$ 1,787.70	\$ 1,837.10	\$ 49.40	\$ 2,008.20	\$ 171.10

This table calculates the difference in spending reported in each filing for each IDP Budget Category and overall compared to the 2019 IDP for the 2021 through 2024 period. Overall, Xcel’s projected distribution system spending increased in each subsequent filing compared to the 2019 IDP: by almost \$50 million between the 2019 IDP and Xcel’s Compliance Filing, and by over \$170 million between Xcel’s Compliance Filing and its 2021 IDP.

There are also notable differences in spending in certain IDP Budget Categories: in comparing the 2021 IDP to the 2019 IDP, Xcel reports a reduction in spending in the “System Expansion or Upgrades for Reliability and Power Quality” IDP Budget Category of approximately \$308.80 million in the 2021 through 2024 period. Generally, the overall trend is an increase in projected distribution system spending driven largely by increased spending in the “Age-Related Replacement and Asset Renewal” and “Grid Modernization and Pilot Programs” IDP Budget Categories, which, in comparing the 2021 IDP to the 2019 IDP, account for increases of \$160.70 million and \$166.50 million in the 2021 through the 2024 period.

Finally, the Department reviewed the 2021 IDP's provision of information related to Xcel's historical actual distribution system spending from the 2016 to 2020 period, and compared that spending to Xcel's projected distribution system spending from the 2021 to 2026 period. This high-level overview of financial data in Xcel's 2021 IDP is summarized in the table below.

Table 3. Comparison of Distribution System Spending Reported in Xcel's 2021 IDP, Historical Actual (2016 – 2020) vs. Budgeted (2021 – 2026)

IDP Budget Category	Historical Actual (2016 - 2020)		Budgeted (2021 - 2026)		Δ	
	Spending (Millions)	% of Total Spend	Spending (Millions)	% of Total Spend	(Millions)	%
<i>Age-Related Replacement and Asset Renewal</i>	\$ 389.90	34.70%	\$ 971.40	32.30%	\$ 581.50	149.14%
<i>New Customer Projects and New Revenue</i>	\$ 153.50	13.70%	\$ 237.40	7.90%	\$ 83.90	54.66%
<i>System Expansion or Upgrades for Capacity</i>	\$ 119.00	10.60%	\$ 273.70	9.10%	\$ 154.70	130.00%
<i>Projects Related to Local (or other) Government Requirements</i>	\$ 147.50	13.10%	\$ 210.10	7.00%	\$ 62.60	42.44%
<i>System Expansion or Upgrades for Reliability and Power Quality</i>	\$ 116.80	10.40%	\$ 239.20	8.00%	\$ 122.40	104.79%
<i>Other</i>	\$ 164.00	14.60%	\$ 286.60	9.50%	\$ 122.60	74.76%
<i>Metering</i>	\$ 32.30	2.90%	\$ 21.80	0.70%	\$ (10.50)	-32.51%
<i>Grid Modernization and Pilot Programs</i>	\$ 0.40	0.00%	\$ 763.30	25.40%	\$ 762.90	190725.00%
Total Spending	\$ 1,123.40		\$ 3,003.50		\$ 1,880.10	167.36%

Xcel's total budgeted distribution system spending is projected to total over \$3 billion for the 2021 through 2026 period compared to the historical actual distribution system spending of \$1.123 billion for the 2016 through 2020 period. Xcel has budgeted an increase in spending for every IDP Budget Category except for Metering. The total increase is largely attributable to two IDP Budget Categories: Age-Related Replacement and Asset Renewal, and Grid Modernization and Pilot Programs; together, they account for \$1.344 billion of the \$1.880 total increase in distribution system spending.

Another important aspect of Xcel's 2021 IDP is its proposed methodological change in its Non-Wires Alternatives (NWA) analysis. Xcel's Compliance Filing presaged some of these changes,¹⁰ and Xcel presented its proposed NWA approach to stakeholders in its September 23, 2021 IDP Stakeholder Meeting.¹¹ A summary of the changes it proposed to NWA is provided on page 42 of Attachment A of

¹⁰ Compliance Filing, at 20 and 22. Xcel discussed that a long-term approach to identify candidate projects will involve more than a financial threshold, the Advanced Planning Tool (APT)/LoadSEER will help in the development of forecasted load curves, and that it was working with EPRI to build a tool capable of evaluating different alternatives in a model-based format (noting that it was years away).

¹¹ 2021 IDP Stakeholder Presentation, dated September 23, 2021. Presentation accessed at: <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={80C3137C->

the September 23, 2021 IDP Stakeholder Meeting Presentation. Xcel's 2021 IDP provides a more detailed discussion of these changes and its proposed approach to NWA analysis in Appendix F.¹²

C. XCEL'S REQUEST FOR CERTIFICATION OF THE DISTRIBUTED INTELLIGENCE PROJECT AND THE RESILIENT MINNEAPOLIS PROJECT

Also included in the 2021 IDP is the Company's certification request for the Distributed Intelligence (DI) project and the Resilient Minneapolis Project (RMP). The DI project consists of \$18,044,787 in capital expenditures in 2021 and 2022, and \$33,382,808 in operation and maintenance (O&M) costs between 2021 and 2026¹³; and the RMP consists of \$8,938,878 in capital expenditures in 2022 and 2023 and \$62,043 in annual O&M costs over a ten-year period, with a total NPV project cost of \$9,387,831.¹⁴

The Company indicated that its DI project seeks to leverage the DI technology that the Company's Advanced Metering Infrastructure (AMI) meters are equipped with, and consists of six distinct uses case, half of which are customer-facing (Home Area Network (HAN) Connectivity, Energy Analysis, and Electric Vehicle Detection) and the other half are grid-facing (Secondary Equipment Assurance, Meter Bypass Theft Detection, and Connectivity).¹⁵

The RMP seeks to improve community level resilience at three locations in Minneapolis: the North Minneapolis Community Resiliency Hub, Sabathani Community Center, and the Minneapolis American Indian Center.¹⁶ The Company stated that it would work with partners to install rooftop solar, battery energy storage systems (BESS), microgrid controls, and necessary distribution system modifications to integrate these technologies at each of the sites.¹⁷

As explained by the Commission's 2020 Order, certification "permit[s] Xcel to request rider recovery in the future, which the Commission may approve or deny based on the facts available at that time."¹⁸ The Department's February 9, 2022 Letter (Department's Letter) provides an overview of the Certification Request Process, one of the Grid Modernization Pathways available to utilities in Minnesota:¹⁹

[0000-C318-A916-0E1D423E41F6}&documentTitle=20219-178196-01](https://www.efiling.com/recordings/0000-C318-A916-0E1D423E41F6?documentTitle=20219-178196-01). Recording available at: <https://youtu.be/pxXeNogaiMc>.

¹² 2021 IDP, Appendix F, Section VI.B.

¹³ 2021 IDP, at 29 – 30.

¹⁴ 2021 IDP, at 37 – 38.

¹⁵ 2021 IDP, at 23 – 28.

¹⁶ 2021 IDP, at 32.

¹⁷ *Id.*

¹⁸ Commission's 2020 Order, Order Point No. 11.

¹⁹ *In the Matter of Northern States Power Company d/b/a Xcel Energy's Petition for Approval of the Transmission Cost Recovery Rider Revenue Requirements for 2021 and 2022, Tracker True-up and Revised Adjustment Factors*, Docket No. E002/M-21-814. Department's Letter, at 4. February 9, 2022. The Department's Letter was also cross-filed in the instant proceeding. Accessed at: <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={D09BE07E-0000-CF35-A4E2-65022155DC31}&documentTitle=20222-182633-02>.

1. Path 1: together, the Certification Request Process [footnote omitted];
 - a. Path 1a: Pursuant to the Grid Modernization Statute [Minn. Stat. §216B.2425], a utility operating under a Multi-Year Rate Plan can request certification of grid modernization project and the Commission is required to certify, certify as modified, or deny certification of proposed grid modernization project(s);
 - b. Path 1b: Pursuant to Minn. Stat. §216B.16, subd. 7b(b)(5), if a grid modernization project is certified or certified as modified, then that utility is authorized to request cost recovery in the Transmission Cost Recovery (TCR) Rider proceeding.

Xcel's Certification Request is currently undergoing the regulatory process explained in Path 1a of the Grid Modernization Pathways.

D. THE GUIDANCE DOCUMENT AND THE PRELIMINARY REPORT FROM SYNAPSE ENERGY ECONOMICS, INC.

As explained in the Department's Letter, the Department retained Synapse Energy Economics, Inc. (Synapse) in response to the Commission's September 27, 2019 Order in Docket No. E002/M-17-797 requesting that the Department secure specialized technical professional investigative services to investigate the potential costs and benefits of grid modernization investments proposed by Xcel in its next rate case or Transmission Cost Recovery filing and to assist the Department in providing recommendations to the Commission regarding any such investments.

Through this engagement and in service of the Commission's request, Synapse developed a document, attached to the Department's Letter, titled *Review and Assessment of Grid Modernization Plans: Guidance for Regulatory, Utilities, and Other Stakeholders* (Guidance Document). The Guidance Document was developed to support the analysis of grid modernization investments in Minnesota.

The Department also retained Synapse to evaluate Xcel's request to certify the DI project and the RMP. Synapse is developing a report that will offer final recommendations regarding whether the Commission should certify, certify as modified, or decline certification of the DI project and the RMP.

Attached to the Department's Initial Comments is a preliminary report from Synapse with its analysis to date, which provides an overview of Synapse's analytical approach: it explains the role of the Guidance Document in reviewing Xcel's certification requests, recommends a standard for certification for the Commission to consider, and specifically assesses the completeness of Xcel's filing measured up against statutory and procedural requirements as well as the Guidance Document's recommended filing requirements.

The Department and Synapse will provide final recommendations on whether the Commission should certify, certify as modified, or decline certification in Party Reply comments.

II. DEPARTMENT ANALYSIS

The Department's analysis responds to the IDP-related topics of the Commission's Notice. First, the Department provides additional insight regarding the Guidance Document and the Department's analytical framework and methodology that will be applied to utility IDPs and grid modernization plans and proposed investment.

A. *THE DEPARTMENT'S ANALYTICAL FRAMEWORK AND METHODOLOGY*

The Department aims to apply a consistent and methodical approach to analyzing biennial IDPs from Xcel Energy (and other regulated utilities) with the goal of providing timely and useful advice to the Commission to ensure a) completeness of submitted IDPs in meeting IDP Filing Requirements and Commission-ordered modifications, b) consistency in planning scenarios and horizons, economic evaluation techniques, and forecasting methodology across system resource and transmission planning dockets, and c) utility IDPs continue to provide the conceptual foundation and context for short- and long-term grid modernization investment while eliminating information asymmetries between utilities and regulators.

As noted in the Guidance Document the emergence of new technologies on the distribution grid has introduced new complexities and opportunities in how utilities plan and operate the electricity grid across multiple scales. Increased interdependencies between technologies and applications requires that regulators understand the implications of the incremental investments by utilities in the distribution system across the scale of the grid as a whole. This necessitates the provision of a detailed and consistently applied benefit-cost analysis (BCA) framework to ensure that any and all distribution and grid modernization investments can be clearly justified as responding to first principles defined by state policy and customer expectations, and the selected use case can be proven to be the most efficient use of utility and ratepayer funds relative to other proposed and similarly analyzed investment scenarios. If these conceptual linkages throughout a project's development are not first clearly defined in proposals, the Commission runs the risk of approving superfluous or wasteful spending or allowing for cost recovery that does not accurately capture the true range of benefits and costs to ratepayers.

The Guidance Document is intended to help the Commission, stakeholders, and utilities thoughtfully and comprehensively approach investments made to modernize utility distribution systems so that the true range of benefits and costs to ratepayers associated with such investments are sufficiently understood and evaluated. Section 3 of the Guidance Document details Initial Filing Requirements that are intended for all Minnesota utilities that submit proposals for grid modernization investment plans. These requirements address the information that should be provided with these plans, including necessary detail on economic evaluation methods and results to support proposed investments, and are consistent with previous Commission Orders.

The Department will evaluate utility grid modernization proposals using the initial filing requirements detailed in Section 3 of the Guidance Document. For the instant proceeding, Synapse is conducting analysis of the DI project and RMP with regards to whether Xcel provided information consistent with Section 3 of the Guidance Document.

Attached to these comments is Synapse's preliminary report regarding its findings (Department Attachment 1).^{20,21} Synapse's report addresses the merits of the proposals, but its assessment is challenged by informational gaps. Synapse will provide final recommendations in Party Reply comments after Xcel furnishes additional information in Utility Reply comments.

An important aspect of the Guidance Document is Section 4, which details Ongoing Reporting Requirements. As explained in the Department's Letter, the Guidance Document is intended in part to complement and incorporate the recommendations of the Department's report called *Methods for Performance Evaluations, Metrics, and Consumer Protections for AMI and FAN* (December 2020 Report), filed in Docket Nos. E002/M-19-666 and E999/DI-20-627.²²

Section 4 of the Guidance Document is the manifestation of this intent, as the Department's December 2020 Report is intended to prescribe methods for evaluating performance of a grid modernization investment, establish metrics that can be used in cost recovery assessments, and establish consumer protection at the outset of a utility grid modernization proposal. Similarly, Section 4 of the Guidance Document (Ongoing Reporting Requirements) is intended to hold utilities accountable to the costs they anticipate incurring in pursuing a grid modernization proposal, as well as the realization of the benefits that a utility claims a grid modernization proposal will provide over the life of the grid modernization project.

For the instant proceeding, Synapse is conducting analysis of the DI project and RMP with regards to whether Xcel proposed ongoing reporting requirements and metrics for performance evaluation.

The Department is appreciative of the hard work and dedication shown by Xcel in maintaining and improving the reliability, resiliency, and safety of their distribution grid in Minnesota and the potential this provides for implementing further grid modernization initiatives. The requisite investments made by the Company to maintain this system have historically been approved and made under an implicit

²⁰ In response to several of the information requests, Xcel provided multiple trade secret files and data. The Department's Initial Comments has twenty attachments and has to be submitted in 14 parts due to the file size limitation (10 MB) of the eFiling system. Appendix A to these comments contains a list of Department trade secret attachments, which includes the files and data provided by Xcel as accessible files within the PDF document. Appendix B to these comments provides an overview of the Department's submissions and a description of what information is included in each submission.

²¹ The Department notes that the file size of Attachment A of Xcel's response to DOC IR 35 is too large (>40 MB) to submit to the eFiling system. Please contact the Department and/or Xcel if there are any questions about this information.

²² Minnesota Department of Commerce. *Methods for Performance Evaluations, Metrics, and Consumer Protections for AMI and FAN*. Department of Commerce Report to the Public Utilities Commission. Filed in Minnesota Public Utilities Commission. Docket. No. E-002/M-19-666 and E-999/DI-20-627. December 1, 2020. Accessed at: <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={40E01F76-0000-C232-AC19-D0DBF3B76F62}&documentTitle=202012-168688-02>.

trust that that this spending was the most efficient and appropriate use of ratepayer funds and in calling for increased scrutiny into distribution system spending the Department is not implying that this trust has been misplaced or abused, but rather the increased complexity and interoperability of components in the modern distribution system requires coincident increased scrutiny and detail of analysis to ensure efficient resource allocation and ratepayer protection.

Therefore, the Department affirms the following from the February 9, 2022 Letter:²³

It is the Department's intention to evaluate utility grid modernization proposals based on the prescriptions of the Guidance Document and will do so absent Commission action.

Nevertheless, **the Department recommends that the Commission require utility grid modernization proposals to adhere to the filing requirements, methods of evaluation, and ratepayer protections detailed in the Guidance Document.**

B. IDP NOTICE TOPIC #1: SHOULD THE COMMISSION ACCEPT OR REJECT XCEL ENERGY'S INTEGRATED DISTRIBUTION PLAN (IDP)?

The Department's review of Xcel's IDP begins at a threshold question: did Xcel provide information and analyses required by the Commission's IDP Filing Requirements and previous Commission Orders?

As a preliminary matter, the Department notes that Xcel provided a Compliance Matrix in Attachment B of its 2021 IDP. This matrix includes a description of each of the IDP Requirements, the requirements imposed on Xcel's 2021 IDP by the Commission's 2020 Order and the Commission's July 16, 2019 Order (2019 Order) in Docket No. E002/CI-18-251, and the location within the IDP where information related to those requirements can be found. The Department has reviewed the Compliance Matrix and concludes, as a preliminary matter, that Xcel has sufficiently addressed each of the IDP Filing Requirements and Commission Orders.

However, the Department will provide a final recommendation regarding whether the Commission should accept Xcel's 2021 IDP in Party Reply comments once the Department reviews additional information from Xcel and has an opportunity to review valuable stakeholder input.

C. IDP NOTICE TOPIC #2: DOES THE IDP FILED BY XCEL ENERGY ACHIEVE THE PLANNING OBJECTIVES OUTLINED IN THE FILING REQUIREMENTS AS AMENDED BY THE COMMISSION'S NOVEMBER 2, 2019 ORDER?

²³ Department Letter, at 10.

The Commission's August 30, 2018 Order (2018 Order) in Docket No. E002/CI-18-251 provided the Commission's Planning Objectives:²⁴

The Commission is facilitating comprehensive, coordinated, transparent, integrated distribution plans to:

- Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies;
- Enable greater customer engagement, empowerment, and options for energy services;
- Move toward the creation of efficient, cost-effective, accessible grid platforms for new products, new services, and opportunities for adoption of new distributed technologies; and,
- Ensure optimized utilization of electricity grid assets and resources to minimize total system costs.
- Provide the Commission with the information necessary to understand Xcel's short-term and long-term distribution system plans, the costs and benefits of specific investments, and a comprehensive analysis of ratepayer cost and value.

The Commission's 2019 Order requires Xcel to do the following:²⁵

Xcel shall discuss in future filings how the IDP meets the Commission's Planning Objectives, including:

- A. An analysis of how the information presented in the IDP related to each Planning Objective;
- B. The location in the IDP;
- C. Analysis of efforts taken by the Company to improve upon the fulfillment of the Planning Objectives; and
- D. Suggestions as to any refinements to the IDP filing requirements that would enhance Xcel's ability to meet the Planning Objectives.

Attachment C of Xcel's 2021 IDP contains the information and analysis required by the Commission's 2019 Order regarding the Commission's Planning Objectives. Attachment C includes a detailed

²⁴ *Id.* ORDER APPROVING INTEGRATED DISTRIBUTION PLANNING FILING REQUIREMENTS FOR XCEL ENERGY. August 30, 2018. Accessed at: <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={F05A8C65-0000-CA19-880C-C130791904B2}&documentTitle=20188-146119-01>.

²⁵ *In the Matter of Xcel Energy's 2018 Integrated Distribution Plan*, Docket No. E002/M-18-251. ORDER ACCEPTING REPORT AND AMENDING REQUIREMENTS. Order Point No. 5. July 16, 2019. Accessed at: <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={5072FC6B-0000-C715-8B8F-F971D67B302B}&documentTitle=20197-154416-01>.

explanation of how the information presented in the IDP relates to each of the Commission's Planning Objectives, where in the IDP that information can be found, and efforts taken by the Company to provide the Commission and stakeholders with additional information related to the Planning Objectives. Notably, Xcel also emphasized their position that a full two years between IDP filings allows the Company to make more significant and meaningful progress on the IDP objectives between filings.²⁶

The Department reviewed Attachment C and analyzed whether Xcel's 2021 IDP was responsive to the Commission's Planning Objectives.

1. *Planning Objective #1- Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies*

Table 1 of Attachment C provides a list of locations throughout the IDP where Xcel discusses each of the topics referenced in the Commission's first IDP Planning Objective. While the Department finds the table to be exhaustive, it is very general in its description of locations for topic discussions, for example: it lists "Integrated Distribution Plan" as an IDP Location for the topic of Safety. The Department finds that it would be more instructive if sections within the IDP or appendices were called out with more specificity to draw attention to the most relevant mentions of how safety considerations impact distribution planning and operations, such as the discussion of electric distributions standards and design manuals in Section 1 of Appendix A2. Doing so would help stakeholders navigate the voluminous nature of Xcel's IDP, particularly those who are not as well versed in the proceedings.

a. Safety

The Department found that the most informative discussion regarding safety consideration in Xcel's distribution system planning and management is located in Appendix A2: Standards, Asset Health, and Reliability Management. In this section Xcel provided information on the applicable industry standards for distribution engineering, how these are incorporated into Company manuals and practices by the Electric Distribution Standards division, and examples of projects that showcase how these considerations are applied to risk assessment and technology selection for deployment in the field.

b. Security

Xcel provided information regarding its dedicated Enterprise Security and Emergency Management (ESEM) business unit in Appendix B3, Section II: Data Security and Protocols for Grid Modernization. The Department concludes that the information contained therein is relevant to the Planning Objective's topic and addresses both existing and future considerations regarding the criticality of physical and cyber security in a rapidly evolving distribution system.

²⁶ 2021 IDP, Attachment C, at 6.

c. Reliability and Resilience of the Electricity Grid

Xcel notes that while they have been able to maintain good reliability on their distribution system, meeting IEEE's 2020 reliability thresholds for SAIFI, SAIDI, and CAIDI at the second quartile for large utilities,²⁷ the increasing average age of equipment in the field necessitates that "[t]he majority of the investments in the near term will be in established programs such as our pole replacement and substation renewal programs."²⁸ The Department's analysis in Xcel's 2020 Annual Electric Service Quality Report included a regression analysis of reliability metrics over a ten-year period that concluded that reliability in Xcel's service territory was generally improving with the exception of the Southeast work center.²⁹

d. Fair and Reasonable Costs

The Department is developing the knowledge base to better evaluate whether investments made or costs incurred by Xcel in the maintenance and operation of the distribution system are fair and reasonable. However, this does not imply that there is any reason to assume that they are unreasonable. At this time, the Department has limited information with which to quantitatively assess the reasonableness of specific investment strategies made by Xcel in managing the distribution system. To accurately ascertain the most fair and reasonable costs to be recovered from ratepayers, the Department would need to see reference and investment scenarios and BCA results that were studied by Xcel, consistent with the Guidance Document's prescriptions. This will involve additional transparency on Xcel's part regarding certain types of distribution system investments. The Department addresses this in Section II.C.4 below in the analysis of the fourth Planning Objective.

e. Consistent with State Energy Policies

Throughout the IDP process and associated technology certification requests, Xcel has justified proposed investments and initiatives in part by referencing their applicability to state energy policies. Grid modernization proposals and certification requests have been consistently presented as being aligned with the objectives of relevant statutes encouraging utilities to increase customer accessibility to distributed energy resources, energy efficiency, and conservation. The Department notes that beyond the implied correlation between proposed initiatives and statutory cost recovery requirements, there is often no clear line of sight from the specific technology back to the guiding Commission principles. To the extent that a clear line of sight exists, the Department expects Xcel and other utilities to illuminate that connection, and notes that such connections are likely to help establish the bona fides of the proposed initiative.

²⁷ 2021 IDP, at 6.

²⁸ 2021 IDP, at 11.

²⁹ Department's Initial Comments, at 14. Docket No. E002/M-21-237. August 16, 2021. Accessed at: <https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId={50D44F7B-0000-C014-9377-84F966E29D12}&documentTitle=20218-177148-01>.

The Department is considering a recommendation to create such a link: a requirement that utilities discuss how each technology or program offering proposed is influenced by IDP Planning Objectives and state energy policies (as well as local government mandates and/or policy goals), including how the metrics chosen to evaluate the performance of those technologies or program offerings in meeting those objectives were selected. The Department invites Xcel and other stakeholders to provide feedback on whether this topical area needs further elucidation.

2. Planning Objective #2 - Enable greater customer engagement, empowerment, and options for energy services.

Xcel discussed increased customer engagement, empowerment, and options for energy services throughout the IDP, focusing on proposed new initiatives and investments in enabling technologies that would make possible further offerings to their customers. Appendix B2 contains the Customer Strategy and Roadmap, a section substantially improved upon from the 2019 IDP to include details regarding the customer-choice implications and opportunities afforded by the foundational investments in Xcel's Advanced Grid Intelligence and Security (AGIS) initiative and new grid modernization proposals of DI and RMP for which Xcel is seeking certification from the Commission in the instant proceeding.

While the Company provides a thorough explanation of the potential of these grid modernization investments to increase customer engagement and satisfaction, there is a lack of quantitative data to prove the business case for selecting these specific technologies over alternatives.

The Department recommends that in future filings the Commission require Xcel to provide the following information that will allow for an independent verification of the reasonableness of the proposed incurred costs related to customer-facing utility offerings and programs:

- **Xcel's internal benefit-cost analyses for reference and investment case scenarios, including reasonably known and analyzed alternatives;**
- **Assumptions and data supporting the projected customer participation rates;**
- **Sensitivity analysis for varying rates of adoption of proposed programs; and**
- **Discussion of how the proposed customer-facing utility offerings and programs may interact with existing or proposed Conservation Improvement Plan or Next Generation Energy Act programs.**

3. Planning Objective #3 - Move toward the creation of efficient, cost-effective, accessible grid platforms for new products, new services, and opportunities for adoption of new distributed technologies.

In addition to the observations above, the Department finds it instructive to evaluate Xcel's response to the third Planning Objective by analyzing the differences in distribution system spending over the time periods 2016 – 2020 and 2021 – 2026. Table 3 above provides a breakdown of Xcel's historic and projected distribution system expenditures. The Department provides it here again for convenience.

Table 3. Comparison of Distribution System Spending Reported in Xcel's 2021 IDP, Historical Actual (2016 – 2020) vs. Budgeted (2021 – 2026)

IDP Budget Category	Historical Actual (2016 - 2020)		Budgeted (2021 - 2026)		Δ	
	Spending (Millions)	% of Total Spend	Spending (Millions)	% of Total Spend	(Millions)	%
<i>Age-Related Replacement and Asset Renewal</i>	\$ 389.90	34.70%	\$ 971.40	32.30%	\$ 581.50	149.14%
<i>New Customer Projects and New Revenue</i>	\$ 153.50	13.70%	\$ 237.40	7.90%	\$ 83.90	54.66%
<i>System Expansion or Upgrades for Capacity</i>	\$ 119.00	10.60%	\$ 273.70	9.10%	\$ 154.70	130.00%
<i>Projects Related to Local (or other) Government Requirements</i>	\$ 147.50	13.10%	\$ 210.10	7.00%	\$ 62.60	42.44%
<i>System Expansion or Upgrades for Reliability and Power Quality</i>	\$ 116.80	10.40%	\$ 239.20	8.00%	\$ 122.40	104.79%
<i>Other</i>	\$ 164.00	14.60%	\$ 286.60	9.50%	\$ 122.60	74.76%
<i>Metering</i>	\$ 32.30	2.90%	\$ 21.80	0.70%	\$ (10.50)	-32.51%
<i>Grid Modernization and Pilot Programs</i>	\$ 0.40	0.00%	\$ 763.30	25.40%	\$ 762.90	190725.00%
Total Spending	\$ 1,123.40		\$ 3,003.50		\$ 1,880.10	167.36%

The Department notes that the proposed increased spending in the Age-related Replacement and Asset Renewal, System Expansion or Upgrades for Reliability and Power Quality, and Grid Modernization and Pilot Programs IDP Budget Categories comports with Xcel's language elsewhere in the IDP and aligns with the Company's stated priorities. While the analysis of relative investments across standardized categories is a useful tool, there is limited information provided that allows for a rigorous assessment of the investment decisions being made *within* each category. The Department addresses this in further detail in Section II.C.4 below.

The Department is building the capacity to make assessments regarding the efficiency or cost-effectiveness of grid investments within each IDP Budget Category, and in order to alleviate this asymmetry, the Department is considering a recommendation for future IDPs to include some illustrative examples of detailed and complete BCAs for proposed projects within each of the IDP Budget Categories, a description of the methodology employed to prevent double counting of benefits or costs across programs or enabling technologies, a clear conceptual line of sight between the project selected and the Commission's Planning Objectives, and metrics to evaluate the project's performance with respect to the benefits identified and in relation to the Commission's Planning Objectives.

Such illustrations seem reasonably likely to help the Department, the Commission, and stakeholders develop a deeper understanding of how Xcel plans for and spends ratepayer funds on these myriad grid investments.

The Department invites Xcel and other stakeholders to provide feedback on this potential recommendation.

4. Planning Objective #4 - Ensure optimized utilization of electricity grid assets and resources to minimize total system costs

The fourth Planning Objective is designed to ensure optimized utilization of electricity grid assets and resources to minimize total system costs.

In Attachment C of Xcel's 2021 IDP, Xcel indicated that its discussion regarding efforts to integrate distribution, transmission, and resource planning in Appendix A1 (System Planning) supports the fourth planning objective.³⁰ Additionally, Xcel referenced Appendix E2 (Distributed Energy Resources) and Appendix A2 (Asset Health and Reliability Management) provides additional information and discussion relevant to the fourth planning objective.³¹

The Department is building its knowledge base of issues related to this planning objective and expects to be better positioned to evaluate this Planning Objective over time as more experience is gained with utility distribution systems. One way to better discern whether Xcel is optimally utilizing electricity grid assets and minimizing total system costs is to evaluate Xcel's spending on its distribution.

Appendix A1 of the 2021 IDP provides a broad explanation of how Xcel approaches annual system planning: Xcel plans, measures, and forecasts distribution system load with the goal of ensuring that all customer electric load is served under normal (N-0) operating conditions and first contingency (N-1) operating conditions.³² Corrective actions are identified as part of this process, and proposed projects undergo analysis that seeks to determine the best options based on several factors including operational requirements, technical feasibility, and future year system need.³³

Xcel's 2021 to 2025 annual planning process identified the following total risks across [Northern State Power Company-Minnesota Operating Company]:³⁴

- N-0 normal overloads on 65 feeder circuits
- N-0 normal overloads on 20 substation transformers
- N-1 contingency risks on 566 feeder circuits
- N-1 contingency risks on 151 substation transformers

Once identified, these risks are scored in a process described in Attachment D of the 2021 IDP (Risk Scoring Methodology), which is the way the Company prioritizes which risks to mitigate that year and includes looking at a potential project's raw financial benefit, reliability benefit, and ultimately results

³⁰ 2021 IDP, Attachment C, at 5.

³¹ *Id.*

³² 2021 IDP, Appendix A1, at 1.

³³ *Id.*

³⁴ *Id.*, at 19.

in a benefit-to-cost ratio referred to as the Risk Score.³⁵ Xcel then develops mitigation plans for the risks using a risk/reward model to determine which solutions should be selected and prioritized, which feeds into latter stages of its planning process whereby specific projects are budgeted for, initiated, and ultimately implemented. Xcel explained that “the total number of risks identified in the risk analysis generally exceeds the number of risks that can be mitigated with available funds.”³⁶

This approach provides some transparency into the Company’s planning process and into why specific projects were selected in a given year, which helps stakeholders understand the utility’s overall distribution system spending. Notably, however, Xcel’s approach is only applicable to capacity-related projects: Xcel indicated that this is the only category that it has the ability to objectively quantify the annual risk.³⁷

For other IDP Budget Categories (Mandates, New Business, Asset Health, Blankets (projects that are high volume, low dollar, current year, reactive work), and Programs), Xcel explained that it prioritizes projects based on other factors whose value is difficult to capture or otherwise quantify in a transparent way that lends itself to a broader understanding of how exactly Xcel is spending ratepayer funds in these areas.³⁸

As an example: for the Asset Health IDP Budget Category, Xcel explained that its programs or projects are driven by engineering analyses to address aging infrastructure and improve system resilience, but that its budget benefit-to-cost model does not effectively capture the value that a programmatic approach to asset health provides.³⁹

These explanations perpetuate the information asymmetry that exists between utilities and stakeholders, and it is an area that the Department believes Xcel should take efforts to address in order to provide additional transparency regarding its budgeting process.

Additional transparency is a particularly acute need given Xcel’s projected distribution system spending: as shown in Table 3, the “System Expansion or Upgrades for Capacity” IDP Budget Category accounts for only \$273.30 million in projected spending during the 2021 to 2026 period, only 9.30% of Xcel’s total projected distribution system spending during that time. The two predominant drivers of Xcel’s total projected distribution system spending – the “Age-Related Replacement and Asset Renewal” and “Grid Modernization and Pilot Programs” IDP Budget Categories accounts for \$971.40 million (32.30%) and \$763.30 million (25.40%) of Xcel’s total projected distribution system spending for the 2021 to 2026 period, respectively. Together, they represent over \$1.7 billion in total projected distribution system spending for the 2021 to 2026 period.

³⁵ 2021 IDP, Attachment D, at 2.

³⁶ 2021 IDP, Appendix A1, at 19.

³⁷ 2021 IDP, Attachment D, at 2.

³⁸ *Id.*

³⁹ *Id.*

The Department requests that Xcel provide additional information and/or discussion regarding how projects in non-capacity project categories are evaluated and funded in Utility Reply comments.

The Department welcomes insight into how to approach the evaluation of non-capacity projects, especially for the “Age-Related Replacement and Asset Renewal” IDP Budget Category, given its proportionate and raw share of Xcel’s projected distribution system spending during the 2021 to 2026 period.

The Department understands that distribution system spending can fluctuate over the course of a year due to acute distribution system needs and the need for operational flexibility. It follows that projected spending levels would fluctuate and be inconsistent year-to-year as reported in Xcel’s 2019 IDP, the Compliance Filing, and the 2021 IDP, as the Department summarized above in Section I.B of these comments.

Xcel provided the following explanation regarding why the IDP budget details are inconsistent year-to-year:⁴⁰

[W]hile our budget process has generally proven to be a reasonably accurate gauge of overall budget levels, it is important to understand that plan details – exclusive of large and strategic investments approved for implementation by the Commission – generally are inconsistent year-to-year. As we have explained, the Distribution budget is an ongoing and iterative process that is largely driven by the immediacy of reliability and other emergent circumstances that are the practical reality of the Distribution business. The distribution system is the connection to our customers, and we must respond to these circumstances to meet our obligation to serve and ensure we provide adequate service. This means that long-term plans, which, in a distribution context, include five-year action plans, have a much shorter shelf-life.

While this explanation is helpful in a broader sense, and in view of Xcel’s approach to spending on non-capacity related distribution system project, there is an important element of transparency missing from Xcel’s distribution system spending. As an example: it is difficult to fully understand Xcel’s projected increase in spending in the “Age-Related Replacement and Asset Renewal” IDP Budget Category. Xcel provided a description of this IDP Budget Category on page 11 of Appendix D of its 2021 IDP, indicating that there are two types of projects that fall under this IDP Budget Category: Reactive Asset Health and Proactive Asset Health.

However, it does not appear that Xcel addressed why projected spending is expected to increase to almost \$1 billion over the 2021 – 2026 period from a projection of less than \$500 million in Xcel’s 2019 IDP (referring to Table 1 above). Xcel provides information on individual distribution system projects

⁴⁰ 2021 IDP, at 21.

and Capital Profile Trends in Attachments H and I of the 2021 IDP, but provides little substantive explanation of these projects, the drivers of this increased spending trend, nor any comparison to previous filings (the 2019 IDP nor the Compliance Filing).

This relatively dramatic increase in spending in this one IDP Budget Category without an accompanying explanation is troubling. While the IDP is not the forum to address the prudence of these projected spending levels, it is important that utilities are providing information that helps stakeholders understand their distribution system planning and spending. Absent discernible reasons for such increases in projected spending year-over-year, it is difficult to understand how Xcel's capital budget planning works for non-capacity related spending and whether Xcel is fulfilling the goal of the fourth planning objective's call to minimize total system costs.

The Department requests that Xcel provide a narrative explanation for the changes in spending for each IDP Budget Category compared to previous filings (including the 2019 IDP and the Compliance Filing) in Utility Reply comments.

The Department suggests that one approach to helping stakeholders understand spending on non-capacity related projects is to provide information that indicates that Xcel is "right-sizing" its system by demonstrating projects are designed to solve the problem that is identified, and in so doing, that Xcel is minimizing the amount of money being spent and can show that its spending is concomitant to the level of need.

Applied to the "Age-Related Replacement and Asset Renewal" IDP Budget Category, Xcel could provide stakeholders with information that Xcel's spending on Reactive Asset Health and Proactive Asset Health projects is the "right size" for the problem identified. The Department asks the general question: is Xcel's spending on specific components of the distribution system appropriate given the issue that Xcel is trying to address or prevent?

The Department proposes "right-size analysis" as a way to help answer this question, defined as: the process of matching utility investments to the need identified by the engineering analysis of the distribution system so performance and reliability of the distribution system is achieved at the lowest possible cost. This also includes the process of looking at deployed equipment and identifying opportunities to eliminate redundancies, downsize components that may be no longer needed, repurpose and redeploy equipment, and/or incorporate NWAs or DERs to decrease loading thereby reducing thermal stress on components and extending the life of deployed assets, all without compromising performance or reliability with the express goal of reducing total system costs.

The Department's experience in the distribution system, however, is limited, and invites Xcel and other stakeholders to comment generally on this proposed analytical method. The preliminary, theoretical approach articulated above can and should be scrutinized: is it the appropriate way to think about these issues and evaluate the general question articulated above?

The Department welcomes feedback and information on how to best approach answering this question.

5. *Planning Objective #5 - Provide the Commission with the information necessary to understand the utility's short-term and long-term distribution system plans, the costs and benefits of specific investments, and a comprehensive analysis of ratepayer cost and value*

The fifth Planning Objective relates to whether the IDP provides the Commission with information necessary to understand Xcel's short-term and long-term distribution system plans, the costs and benefits of specific alternatives to any proposed or anticipated investments, and a comprehensive analysis of ratepayer cost and value.

This planning objective articulates the expectation that utilities should prepare complete evaluations of planned investments, and particularly investments in grid modernization, to ensure that the Commission and stakeholders are provided with the necessary information to evaluate the reasonableness of these plans.

Xcel stated that the IDP provides a comprehensive discussion about its short-term and long-term distribution system plans and investments within Appendix A3 (Distribution Operations), Appendix C (Action Plans), and Appendix B1 (Grid Modernization).⁴¹ Further, Xcel stated that it provided a discussion of costs and benefits of specific investments through its IDP, and specifically in Appendix F (Non-Wires Alternatives Analysis), Appendix G (DI), and Appendix H (RMP).⁴²

The Department emphasizes that information related to IDP Filing Requirement 3.D. is vital to understanding Xcel's distribution system plans, specifically with regards to investments in technologies that Xcel asserts is necessary to modernize its distribution system. There should be a clear connection between the information and analyses provided in response to IDP Filing Requirement 3.D. and specific grid modernization proposals. The Department further addresses the value of IDP Filing Requirement 3.D., especially in the context of the Guidance Document's prescriptions for filing requirements related to a utility's grid modernization plans, in the Notice topics that follow.

The Department contends that certain elements of Xcel's IDP can be improved upon to assist with the evaluation of whether the IDP fulfills the Commission's Planning Objectives, particularly if the Department's and Synapse's recommendations for additional information and transparency are heeded. Overall, the Department concludes that Xcel generally provided relevant information and sufficient information to assess whether the outcomes that the Planning Objectives articulate can materialize over time, but emphasizes the need for additional information and transparency in some aspects of the IDP.

⁴¹ 2021 IDP, Attachment C, at 6.

⁴² *Id.*

D. IDP NOTICE TOPIC #3: WHAT IDP FILING REQUIREMENTS PROVIDE THE MOST VALUE TO THE PROCESS, AND WHY?

1. Overview

In general, the Department reiterates its focus on three overarching themes regarding distribution system planning: (1) distribution system planning should itself be cost-effective and lead to outcomes that are also cost-effective; (2) distribution system planning reporting should correct a historic, long-term information asymmetry between regulators and utilities; and (3) IDP requirements between utilities should be consistent to the greatest extent practicable. IDPs should provide stakeholders with enough information to enable the evaluation of a utility's approach to distribution system planning.

The Department builds upon these three themes by articulating a fourth, which was also evinced in Xcel's Integrated Resource Plan proceeding in stakeholder comments and summarized in Staff Briefing Papers: utilities should undertake efforts to align the planning processes of integrated distribution system planning and integrated resource planning to the extent that such processes rely on tools, methods, data, and information (notably, forecasting of distributed energy resources (DERs)) that can be shared in ways that lead to mutually beneficial outcomes for both processes and the consistent use of data and information in each process.⁴³

2. IDP Filing Requirement 3.C.: Distributed Energy Resource Scenario Analysis

There are numerous opportunities for such alignment, and notably in the information and data relied upon to produce the Distributed Energy Resource Scenario Analysis required by IDP Filing Requirement 3.C. This filing requirement generally requires utilities to prepare for various scenarios of DER deployment and proactively identify and plan for mitigations or investments to facilitate increased DER adoption. Developing forecasts that are used in the IDP proceeding as well as the IRP proceeding allows Xcel to consider the impact that DERs may have on its future resource acquisition needs, and likewise, cost-effective DER integration can be more readily identified in Xcel's resource plan if costs and benefits are better understood in terms of the impact that DERs may have on Xcel's distribution system.

3. IDP Filing Requirements 3.A.26-30 and 3.E

Additionally, the Department also continues to support and encourage further development of those sections of Xcel's IDP that elucidate the guiding philosophies and prioritization of variables in the creation of scenarios for analysis and ultimate selection of a final investment strategy.

⁴³ *In the Matter of Xcel Energy's 2020 – 2034 Integrated Resource Plan (IRP)*, Docket No. E002/RP-19-368. Staff Briefing Papers, at 115, 125 – 126, and 181 – 184. January 18, 2022. Commission Order forthcoming.

In this and past IDPs, Xcel has provided the most information in their NWA analysis required by IDP Requirement 3.E. and explanations of past and projected allocations of distribution system spending required by IDP Requirements 3.A.26-30, particularly concerning the IDP Budget Category of System Expansion or Upgrades for Capacity (found in IDP Filing Requirements 3.A.26.b and 3.A.29.b).

The Department reiterates the earlier discussion in Section 3.C.3 above regarding a potential recommendation for future IDPs to include some illustrative examples of detailed and complete BCAs for proposed projects within each of the IDP Budget Categories. While not necessarily related to grid modernization, such information would nevertheless be consistent with the Guidance Document's prescriptions regarding the provision of additional information regarding the evaluation of utility investments.

4. IDP Filing Requirement 3.D

Regarding the Guidance Document: one of the Department's goals is to create a framework for grid modernization in Minnesota. Utility IDPs can serve as the planning forum for any such proposed investments, similar to the planning function that integrated resource plans (IRPs) in Minnesota serve.

Section 3.D of utility IDP Filing Requirements require utilities to provide a 5-year Action Plan as part of a 10-year long term plan for distribution system developments and investments in grid modernization, with sub-requirements for utilities to discuss topics and provide information that have parallels to the information that utilities are required to provide in utility IRPs, specifically related to requirements that a utility must identify resource options available to meet the service needs of its customers over the forecast period and supporting information that utilities are required to provide to support the selection of its proposed resource plan.⁴⁴

Once the Commission approves the resource plan that identifies generic resources that it needs to acquire over the forecast period, a utility then proposes to acquire specific resources based on the resource plan and in a Certificate of Need (CN) proceeding that has its own extensive set of filing requirements and evaluation criteria upon which a decision to grant a CN must be made, all of which require a utility to demonstrate that it is making a reasonable, prudent decision in the public interest.⁴⁵

The Department contends that a meaningful connection between a utility's IDP and specific grid modernization proposals can and should be made in the same spirit of the IRP-CN connection. Section 3.D of a utility's IDP serves a similar planning function to the IRP process, and the Guidance Document serves a similar prudency determination and ratepayer protection function to the CN process.

It is in that spirit that the Department offers the Guidance Document for consideration and why the Department will evaluate grid modernization proposals based on the prescriptions of the Guidance Document.

⁴⁴ See generally Minn. R. 7843, accessed at: <https://www.revisor.mn.gov/rules/7843/full>.

⁴⁵ See generally Minn. R. 7849, accessed at: <https://www.revisor.mn.gov/rules/7849/full>.

E. IDP TOPIC #4: ARE THERE FILING REQUIREMENTS THAT ARE NOT INFORMATIVE AND/OR SHOULD BE DELETED OR MODIFIED, AND WHY?

1. The Definition of “Non-Traditional” Distribution Projects

The Department recommends that the Commission further clarify its intent in Filing Requirement 3.A.28 which requires the utility to provide “[p]rojected distribution system spending for 5-years into the future for the categories listed above, itemizing any *non-traditional* distribution projects (emphasis added).”⁴⁶

Upon review of the utilities’ response to this filing requirement it appears to the Department as if respondents are choosing to define this somewhat ambiguous term as being synonymous with Non-Wires Alternatives and are thus only presenting itemized cost data for those projects meeting NWA thresholds for consideration. This has greatly limited the amount of detailed financial information provided to the Commission for review and frustrates Department efforts to confirm that projected investments in Xcel’s 5-year plan are indeed timed and sized appropriately to meet or otherwise respond to short-term distribution system needs.

As a starting point for consideration, the Department invites feedback on a potential recommendation regarding the definition of “non-traditional” in the context of distribution system planning: should it be centered around the ability of a proposed project or technology to enable two-way information or power flows on the distribution system?

Such a definition would potentially capture the majority of technologies proposed in the instant proceeding and previous proceedings for certification that not only meet the Planning Objectives of enabling further customer engagement and options, but also enable the incremental deployment of additional technologies that each have their own unique set of costs and benefits that must be included in the immediate analysis of the proposal in front of the Commission.⁴⁷

2. Benefit-cost Analysis

Benefit-cost analyses (BCAs) are fundamentally necessary in order to better understand why Xcel is proposing or planning to propose specific investments and determine whether the proposed investment is the most reasonable choice. This is especially true for grid modernization investments.

The Guidance Document affirms this view in Section 2.3:

BCA is a systematic approach for assessing the cost-effectiveness of investments by comparing benefits and costs of alternative options. The analysis entails identifying all the relevant benefits and costs of a project

⁴⁶ Commission’s 2018 Order.

⁴⁷ As an example, the Department notes that Xcel’s DI project is enabled by Xcel’s AMI meters and the DI hardware included. The AMI project was previously certified in Xcel’s 2019 IDP.

and determining whether the benefits exceed the costs over the lifetime of the expected program or project.

...

BCAs place the onus on the utility to demonstrate that an investment should be made, rather than starting from the assumption that it is necessary. By presenting and comparing the full range of costs and benefits to make the case for the utility investment in question, BCAs facilitate complete assessment of how a proposed investment will affect utility customers. BCAs...should be the primary means of evaluating grid modernization plans—even in instances where investments are claimed to be necessary.

The Guidance Document details how BCAs should be conducted by utilities so that the Commission and stakeholders can evaluate the reasonableness of the utility's proposed investment.

Modifications of IDP Filing Requirements may be necessary if utilities are not furnishing appropriate levels of detail regarding their BCAs for proposed investments. However, at this time, the Department is not recommending any modifications of IDP Filing Requirements related to the provision of BCA information but will monitor future IDPs to ensure that Xcel and utilities are providing BCA information consistent with the Guidance Document's prescriptions.

F. IDP TOPIC #5: ARE THERE OTHER ISSUES OR CONCERNS RELATED TO THIS MATTER?

As the Department explained in footnote 3, it was difficult to find a current version of utility IDP Filing Requirements. The Department suggests that IDP Filing Requirements should be published with each Commission Order that reflects any modifications so that stakeholders and utilities have an updated version of IDP Filing Requirements.

The Department recommends that the Commission include Xcel's IDP Filing Requirements in its Order in this and subsequent IDP proceedings, including a red-line version if modifications are made to Xcel's IDP Filing Requirements.

IV. DEPARTMENT RECOMMENDATIONS

The Department appreciates the opportunity to comment on Xcel Energy's 2021 IDP and looks forward to the review of other stakeholder comments. The Department requests that Xcel provide the following information in Utility Reply comments:

- **The Department requests that Xcel provide additional information and/or discussion regarding how projects in non-capacity project categories are evaluated and funded.**

- **The Department requests that Xcel provide a narrative explanation for the changes in spending for each IDP Budget Category compared to previous filings (including the 2019 IDP and the Compliance Filing).**

The Department makes the following, initial recommendations:

- **The Department recommends that the Commission require utility grid modernization proposals to adhere to the filing requirements, methods of evaluation, and ratepayer protections detailed in the Guidance Document.**
- **The Department recommends that in future filings the Commission require Xcel to provide the following information that will allow for an independent verification of the reasonableness of the proposed incurred costs related to customer-facing utility offerings and programs:**
 - **Xcel’s internal benefit-cost analyses for reference and investment case scenarios, including reasonably known and analyzed alternatives;**
 - **Assumptions and data supporting the projected customer participation rates;**
 - **Sensitivity analysis for varying rates of adoption of proposed programs; and**
 - **Discussion of how the proposed customer-facing utility offerings and programs may interact with existing or proposed Conservation Improvement Plan or Next Generation Energy Act programs.**
- **The Department recommends that the Commission further clarify its intent in Filing Requirement 3.A.28 which requires the utility to provide “[p]rojected distribution system spending for 5-years into the future for the categories listed above, itemizing any *non-traditional* distribution projects (emphasis added).”**
- **The Department recommends that the Commission include Xcel’s IDP Filing Requirements in its Order in this and future IDP proceedings, including a red-line version if modifications are made to Xcel’s IDP Filing Requirements.**

The Department will provide a final recommendation regarding whether the Commission should accept Xcel’s 2021 IDP in Party Reply comments once the Department reviews additional information from Xcel and has an opportunity to review valuable stakeholder input.

Additionally, the Department and Synapse will provide final recommendations on whether the Commission should certify, certify as modified, or decline certification in Party Reply comments.

Appendix A: List of Department Attachments

Due to the volume and size of files and data provided by Xcel in response to information requests and a 10 MB file size limit in the eFiling system,⁴⁸ the Department created multiple attachments to Initial Comments so that information provided by Xcel could be submitted.

The Department notes that Attachment A to Xcel's TRADE SECRET response to Department Information Request 35 is too large (>40 MB) to submit directly to the eFiling system. Please contact the Department and/or Xcel for any questions about this information.

Attachment	Description
1	Synapse Report, "Comments on the Grid Modernization Proposals in Xcel's 2021 IDP: Analysis of the Proposals for Distributed Intelligence and the Resilient Minneapolis Program and Recommendations on Certification"
2	Xcel's PUBLIC Responses to Department Information Requests
3	Xcel's PUBLIC Responses to Fresh Energy Information Requests 8 – 10 and 43
4	Xcel's TRADE SECRET Response to Department Information Request 13
5	Xcel's TRADE SECRET Response to Department Information Request 29
6	Xcel's TRADE SECRET Response to Department Information Request 35
7	Xcel's TRADE SECRET Response to Department Information Request 57
8	Xcel's Response to Department Information Request 72, Attachments A – D
9	Xcel's Response to Department Information Request 72, Attachments E and F
10	Xcel's Response to Department Information Request 72, Attachments G and H
11	Xcel's Response to Department Information Request 72, Attachments I – L
12	Xcel's Response to Department Information Request 72, Attachments M – T
13	Xcel's TRADE SECRET Response to Department Information Request 79
14	Xcel's TRADE SECRET Response to Fresh Energy 43, Folder A, Part 1
15	Xcel's TRADE SECRET Response to Fresh Energy 43, Folder A, Part 2
16	Xcel's TRADE SECRET Response to Fresh Energy 43, Folder A, Part 3
17	Xcel's TRADE SECRET Response to Fresh Energy 43, Folder A, Part 4
18	Xcel's TRADE SECRET Response to Fresh Energy 43, Folder A, Part 5
19	Xcel's TRADE SECRET Response to Fresh Energy 43, Folder A, Part 6
20	Xcel's TRADE SECRET Response to Fresh Energy 43, Folder B

⁴⁸ See "Technical Requirements" menu of the *eFiling Help* website, accessed at: <https://mn.gov/commerce/industries/efiling/>.

Appendix B: Overview of Department Submissions

Due to the file size limitations of the eDocket filing system, the Department had to submit files in multiple parts. The table below provides a description of what is included in each submission.

Submission	Description
Part 1	Department Initial Comments, Attachments 1 – 3 PUBLIC
Part 2	Department Attachments 4 – 7 and 13 TRADE SECRET
Part 3	Department Attachment 8
Part 4	Department Attachment 9
Part 5	Department Attachment 10
Part 6	Department Attachment 11
Part 7	Department Attachment 12
Part 8	Department Attachment 14 TRADE SECRET
Part 9	Department Attachment 15 TRADE SECRET
Part 10	Department Attachment 16 TRADE SECRET
Part 11	Department Attachment 17 TRADE SECRET
Part 12	Department Attachment 18 TRADE SECRET
Part 13	Department Attachment 19 TRADE SECRET
Part 14	Department Attachment 20 TRADE SECRET

Comments on the Grid Modernization Proposals in Xcel's 2021 IDP

Analysis of the Proposals for Distributed
Intelligence and the Resilient Minneapolis Program
and Recommendations on Certification

Prepared for Minnesota Department of Commerce

February 25, 2022

AUTHORS

Synapse Energy Economics, Inc.

Divita Bhandari

Alice Napoleon

Ben Havumaki

Wired Group

Paul Alvarez



485 Massachusetts Avenue, Suite 3
Cambridge, Massachusetts 02139

617.661.3248 | www.synapse-energy.com

CONTENTS

1.	INTRODUCTION	1
1.1	Key concerns about Xcel’s grid modernization proposal	1
1.2	Summary of preliminary recommendations.....	2
2.	REGULATORY AND PROCEDURAL BACKGROUND.....	3
2.1	Procedural context for Xcel’s certification request	3
2.2	The Commission’s IDP filing requirements.....	4
2.3	Standardizing benefit-cost analysis through the Guidance Document.....	4
3.	CERTIFICATION AND GRID MODERNIZATION	5
3.1	Commission precedents for certification of grid modernization.....	5
3.2	Recommended standard for certification	6
4.	ASSESSING COMPLETENESS	6
4.1	Initial completeness review and IRs.....	8
4.2	Residual gaps in completeness	9
5.	EVALUATION OF XCEL’S DISTRIBUTED INTELLIGENCE PROPOSAL	10
5.1	Relationship between Distributed Intelligence and long-term planning.....	10
5.2	Functional and technical dimensions of Distributed Intelligence and alternatives.....	11
5.3	Benefit-cost analysis	14
5.4	Key customer protection issues	17
5.5	Preliminary findings on DI	20
6.	EVALUATION OF XCEL’S RESILIENT MINNEAPOLIS PROGRAM PROPOSAL	21
6.1	Relationship between RMP and long-term planning.....	21
6.2	Functional and technical dimensions of the RMP.....	26
6.3	Benefit-cost analysis	27
6.4	Alternatives	29
6.5	Key customer protection issues	29
6.6	Preliminary findings on RMP	31
	APPENDIX A.	A-1

1. INTRODUCTION

On November 1, 2021, Northern States Power Company, d/b/a Xcel Energy (Xcel Energy or Company) filed its Integrated Distribution Plan (IDP) in Docket No. E-002/M-21-694. Included in this plan were proposals for two grid modernization initiatives: Distributed Intelligence (DI) and the Resilient Minneapolis Project (RMP). For its DI program, Xcel proposes to deploy six use cases designed to utilize the DI capabilities of the DI-enabled advanced metering infrastructure (AMI) meters. These include three customer-facing use cases and three grid-facing use cases. The total cost estimate inclusive of capital costs and O&M is approximately \$43 million. For the RMP, Xcel proposes to invest in Company-owned and -operated battery energy storage systems (BESS) and islanding switch, microgrid controller, and interconnection hardware. Xcel intends to pair this equipment with participant-owned solar generation at three sites in Minneapolis. The total cost for the RMP as proposed is approximately \$9 million.

The Department of Commerce (Department) commissioned Synapse Energy Economics (Synapse) to review these proposals. This report summarizes Synapse's preliminary findings based on information available at the time of writing.

1.1 Key concerns about Xcel's grid modernization proposal

This report identifies concerns with both investment proposals in this proceeding. The proposals for DI and RMP as originally filed were deficient, with key information missing from both the benefit-cost analyses (BCA) and the broader application. While some of these issues have been shored up through the interrogatory (IR) process, there are still gaps in the record that may inhibit the ability of the Commission and other stakeholders to fully vet the proposed investments.

The informational gaps in Xcel's proposals in this proceeding interact with broader issues in the Company's approach to proposing grid modernization investments to multiply the review challenge. The Company has made these proposals in a piecemeal fashion, distributed across multiple proceedings and over many years. Starting with Xcel's first grid modernization proposals included in its 2015 biennial transmission plan, the Company has pursued regulatory approval in increments for its grid modernization initiatives, which include its Advanced Grid Intelligence and Security program (AGIS).¹

¹ Xcel's ADMS investment was certified on June 28, 2016 in Docket No. E-002/M-15-962 and the Company was later granted cost recovery for ADMS through the Transmission Cost Recovery (TCR) rider in Docket No. E-002/M-17-797 on September 27, 2019. Xcel later proposed additional grid modernization investments in AMI, FAN, and several other technologies, which were certified in Docket No. E-002/M-19-666 on July 23, 2020 and are pending a Commission decision on cost recovery through the TCR rider in Docket No., E-002/M-21-814. Meanwhile, the



This piecemeal approach is unlikely to comport with the public interest and is inconsistent with the intent of the Commission's Order in Docket No. E-002/CI-18-251 on August 30, 2018 (IDP Filing Requirements Order) which sought to *integrate* grid modernization planning into wider distribution system planning.² It is also an ineffective approach for grid modernization planning, since these investments are highly interrelated, with benefits arising through interactions between components.

Overall, the DI and RMP proposals suffer from similar defects. Neither proposal includes sufficient detail about the relationships between these investments and Xcel's broader goals and grid plans, and both lack specific metrics and performance targets. While Xcel has provided BCAs for both DI and RMP, in both instances, key benefits have not been quantified or monetized, and neither project shows overall compelling BCA results.

1.2 Summary of preliminary recommendations

The issues above notwithstanding, grid modernization is still somewhat novel and regulatory standards continue to evolve. Xcel's application should be viewed in this context and evaluated against a broad set of considerations. In any case, since the proposals for DI and RMP provided by Xcel are not complete, this report makes no recommendations about certification for either of these proposals. Pending additional information, Synapse will provide the Department with appropriate analysis updates to inform final recommendations during the reply comment period in this proceeding that is set to close on April 4, 2022.

The *incompleteness* of Xcel's filings has significantly challenged the review of its investment plans. The Commission should act to ensure that future grid modernization filings will not suffer from the same defects by adopting the filing requirements included in the document filed by the Department in this proceeding titled "Review and Assessment of Grid Modernization Plans: Guidance for Regulators, Utilities, and Other Stakeholders" (Guidance Document).³ As will be explained in greater detail in this report, these filing requirements build upon past Commission Orders and include key additions that should help to close informational gaps.

The filing requirements include a provision indicating that grid modernization BCAs should account for all intended future grid modernization investments. This requirement is particularly relevant for the instant DI proposal. Unfortunately, Xcel did not include the DI investments that have been proposed in this proceeding with its earlier AMI proposal – which is now under consideration for Transmission Cost Recover (TCR) Rider cost recovery in Docket No E-002/M-21-814. Among other potential problems with

Company was denied certification for its Fault Location, Isolation, and Service Restoration (FLISR) proposal and is currently seeking cost recovery through its ongoing rate case proceeding in Docket No. E-002/GR-21-630.

² Minnesota Public Utilities Commission. Docket No. E-002/CI-18-251. Order Accepting Report and Amending Requirements. August 30, 2018.

³ Minnesota Public Utilities Commission. Docket No. E-002/M-21-694. Letter of the Minnesota Department of Commerce, Division of Energy Resources. February 9, 2022.

this segmented approach, regulators in the instant proceeding face the challenge of having to make a certification determination for DI without knowing whether DI-capable AMI will be installed.

Utilities may omit anticipated future investments from their BCAs in order to improve the optics of their proposals and to increase the chance for regulatory approval. Yet these are not legitimate reasons for excluding key information. While Xcel should have flexibility to develop new proposals to address emerging grid needs or in response to technological developments, as a general principle the Company should not need to make serial grid modernization investment proposals merely because it has not thought far enough ahead or because it sought strategic advantage by pursuing a segmented, piecemeal approach.

2. REGULATORY AND PROCEDURAL BACKGROUND

2.1 Procedural context for Xcel's certification request

Xcel Energy was the first investor-owned utility (IOU) in Minnesota required to file a grid modernization plan. Enacted in 2015, Minn. Stat. §216B.2425, Subd. 2(e) and Subd. 8 (the Grid Modernization Statute) directed subject utilities to include within their biennial transmission plans investments necessary to modernize the transmission and distribution systems. Since Xcel Energy was the lone transmission-owning utility then operating under a multi-year rate plan, only it was subject to the requirement to file a biennial transmission plan. Subsequently, in 2015 it became the first utility in the state to file a grid modernization investment proposal.

The Grid Modernization Statute established bounds on what could be proposed under the grid modernization heading. It limited qualifying investments to those that would modernize the grid 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."⁴ The Grid Modernization Statute further required subject utilities to conduct an interconnection study to identify distribution system upgrades that would be required to "support the continued development of distributed generation resources."⁵

From the outset, it has been clear that Minnesota policymakers have viewed grid modernization within the wider context of transmission and distribution system planning. In 2018, the Commission further strengthened this connection by directing Xcel to address grid modernization within its IDP.⁶ This

⁴ Minn. Stat. §216B.2425, Subd. 2(e) and Subd. 8.

⁵ Ibid.

⁶ Minnesota Public Utilities Commission. Docket No. E-002/CI-18-251. Order Accepting Report and Amending Requirements. August 30, 2018.

standard was later extended to apply to the state's other investor-owned utilities through a 2019 Commission Order.⁷

2.2 The Commission's IDP filing requirements

Minnesota's IOUs are required to file IDPs on a biennial basis. Through its Orders, the Commission has aimed to standardize both general distribution system planning and the more specific grid modernization plans that are included within the IDP.

To this end, the Commission's IDP planning principles require that the IDP "[p]rovide the Commission with the information necessary to understand [the utility's] short-term and long-term distribution system plans, the costs and benefits of specific investments, and a comprehensive analysis of ratepayer cost and value."^{8,9} The Commission has also required that grid modernization proposals within the IDP be supported with detailed information on scope, functionality, alternatives, timing, costs, and other key facets. In short, the Commission has required that grid modernization investment proposals within the IDP be supported by BCA.¹⁰

2.3 Standardizing benefit-cost analysis through the Guidance Document

BCA should be central in both utility investment planning and regulatory assessment of utility investment proposals. The key role of economic evaluation has been recognized by the Commission through many Orders, including those noted in the preceding section and also in its Order granting Advanced Distribution Management System (ADMS) cost recovery in Docket No. E-002/M-17-797 on September 27, 2019 (ADMS Order).

To help ensure that utility grid modernization plans and accompanying BCAs meet a consistent standard, Synapse has prepared a guidance document on BCA that is titled, "Review and Assessment of Grid Modernization Plans: Guidance for Regulators, Utilities, and Other Stakeholders" (Guidance Document).¹¹

The Guidance Document distills best practices in economic evaluation of grid modernization and includes a recommended set of filing requirements that aim to elicit the detail and quality of analysis

⁷ Minnesota Public Utilities Commission. Docket No. E-017/CI-18-253. Docket No. E-017/CI-18-254. Docket No. E-017/CI-18-255. Order Adopting Integrated-Distribution-Plan Filing Requirements. February 20, 2019.

⁸ Minnesota Public Utilities Commission. Docket No. E-002/CI-18-251. Order Approving Integrated Distribution Planning Filing Requirements for Xcel Energy. August 30, 2018.

⁹ Minnesota Public Utilities Commission. Docket No. E-017/CI-18-253. Docket No. E-017/CI-18-254. Docket No. E-017/CI-18-255. Order Adopting Integrated-Distribution-Plan Filing Requirements. February 20, 2019.

¹⁰ Minnesota Public Utilities Commission. Docket No. E-002/CI-18-251. Order Accepting Report and Amending Requirements. August 30, 2018.

¹¹ Minnesota Public Utilities Commission. Docket No. E-002/M-21-694. Letter of the Minnesota Department of Commerce, Division of Energy Resources. February 9, 2022.

needed to permit complete review by regulators and other parties. These filing requirements are consistent with past Commission directions, including its ADMS Order.

This report relies on the Guidance Document as a core reference in its evaluation of Xcel's DI and RMP proposals.

3. CERTIFICATION AND GRID MODERNIZATION

3.1 Commission precedents for certification of grid modernization

Minnesota law requires that the Commission decide whether to certify, certify as modified, or deny certification to any of the utilities' proposed transmission and distribution projects—including grid modernization projects. Only projects that have been certified are eligible for recovery through the TCR Rider. The Commission has clarified that certification of grid modernization plans does not establish their reasonableness or imply that cost recovery should be granted.^{12,13} Conversely, the failure to achieve certification does not prevent a utility from seeking cost recovery through other mechanisms.

The Commission has not established formal criteria for certification of grid modernization investments, indicating instead that it would consider certification requests on a “case-by-case” basis,¹⁴ and hewing to the language of the Grid Modernization Statute in recent decisions. In granting certification to ADMS and to AMI and FAN, the Commission noted that these were necessary investments for modernizing the distribution system, and it correlated expected benefits to the language of the Grid Modernization Statute.^{15,16} In declining to certify the Fault Location, Isolation, and Service Restoration (FLISR) and Integrated Volt-VAr Optimization (IVVO) proposals, the Commission noted that neither rose to the level of “necessary and foundational.”¹⁷

¹² Minnesota Public Utilities Commission. Docket No. E-002/M-15-962. Order Certifying Advanced Distribution Management System (ADMS) Project Under Minn. Stat. §216B.2425 And Requiring Distribution Study. June 28, 2016.

¹³ This contrasts with other, traditional expenditures that are recovered in riders. For transmission investments, for example, a finding during the certification process that an investment is needed paves the way to cost recovery. Certification of a transmission project signifies prudence.

¹⁴ Minnesota Public Utilities Commission. Docket No. E-002/M-19-666. Order Accepting Integrated Distribution Plan, Modifying Reporting Requirements, and Certifying Certain Grid Modernization Projects. July 23, 2020, p. 12.

¹⁵ Minnesota Public Utilities Commission. Docket No. E-002/M-15-962. Order Certifying Advanced Distribution Management System (ADMS) Project Under Minn. Stat. §216B.2425 And Requiring Distribution Study. June 28, 2016.

¹⁶ Minnesota Public Utilities Commission. Docket No. E-002/M-19-666. Order Accepting Integrated Distribution Plan, Modifying Reporting Requirements, and Certifying Certain Grid Modernization Projects. July 23, 2020.

¹⁷ Ibid.

3.2 Recommended standard for certification

The Commission should further standardize the grid modernization review process by expanding its certification standards to include an *evidentiary* requirement: in addition to the Commission's existing requirements for certification—including the requirement that requests for certification be complete—a utility should have to demonstrate that its grid modernization investment proposal and BCA indicates that, by a preponderance of the evidence on the record, the proposed investment will be in the public interest.

Such a judgement should not be limited to a narrow consideration of cost effectiveness, as would be indicated by the results of BCA, though these BCA results should play an integral part in decisions about certification. The Commission should also consider how well a proposal has demonstrated the connection between the grid modernization investments that have been proposed and grid needs identified in the IDP, how thoroughly the utility has considered alternatives to the proposed grid modernization investments, and how effectively the utility has addressed risk, equity, and customer protection issues.

The decision to certify would therefore represent a Commission finding that, after consideration of these factors, a more reasonable and prudent alternative to the proposed grid modernization has not been demonstrated by a preponderance of the evidence on the record.

4. ASSESSING COMPLETENESS

As a first step in its review of Xcel's grid modernization proposals, Synapse evaluated them for completeness. Xcel's filings were judged for completion with reference to the filing requirements in the Guidance Document. These requirements are summarized briefly below and are provided in full in the Appendix.

1. Proposals should be based on long-term planning.

By making grid modernization planning a subordinate part of the overall IDP process, the Commission has recognized the key connection between grid modernization and wider distribution grid planning. Grid modernization does not exist as an end unto itself, but rather as one route among many to meet distribution system needs. The Guidance Document expands on this principle through its filing requirements, which direct utilities to articulate connections between proposed grid modernization investments and distribution, transmission, and resource planning processes. To make these connections more explicit, the filing requirements indicate that grid modernization plans should articulate goals clearly and in a measurable fashion.

2. Proposals should identify the roles and relationships of the components.

In its IDP Filing Requirements Order, the Commission required that grid modernization proposals include analysis of alternative investments, with detail on functionality, cost, and installation sequencing.¹⁸ Drawing from the Commission's ADMS Order, the Guidance Document's filing requirements expand on the IDP standard to call for a more comprehensive accounting of the technical and functional characteristics of each proposed component and of alternative components. On the basis of this analysis, utilities are to explore "alternative deployment scenarios," which should be distinguished from the proposed plan by the particular mix of components, the sequence of component installations, or other details. The Guidance Document recommends that all reasonable alternative scenarios be articulated. Each of these scenarios in turn should be evaluated systematically using BCA.

3. Proposals should justify the evaluation scope.

In its ADMS Order, the Commission required that grid modernization evaluations identify the scope that is employed (i.e., the cost test). The Guidance Document's filing requirements expands on this standard to recommend consistency in scope throughout an analysis. Where multiple scopes are used, they should be used consistently throughout.

4. Evaluation methods should be thoroughly detailed in the proposal.

As noted above, the Commission provided direction on conducting BCA in both its IDP Filing Requirements Orders and in its ADMS Order. In addition to this overall standard calling for detail and transparency in economic evaluation, the Guidance Document's filing requirements comprehensively address how to account for benefits and costs. These sub-requirements are consistent with the key Commission Orders noted above.

5. Proposals should specify metrics and targets.

The filing requirements in the Guidance Document are consistent with the Commission's ADMS Order in directing that proposals should include metrics. The filing requirements further draw from the report filed by the Department in Docket No. Docket. No. E-002/M-19-666 on December 1, 2020, titled, "Methods for Performance Evaluations, Metrics, and Consumer Protections for AMI and FAN."

6. Proposals should clearly present all results.

In its ADMS Order, the Commission set requirements on how proposals should present results. The Guidance Document filing requirements expand on these standards with the requirement that proposals should present equity impacts alongside BCA results. Furthermore, the filing requirements establish that proposals should provide a clear rationale for the investment plans: proposals should specifically address quantitative BCA criteria, equity, and any other considerations. In other words, it is not enough

¹⁸ Minnesota Public Utilities Commission. Docket No. E-002/CI-18-251. Order Approving Integrated Distribution Planning Filing Requirements for Xcel Energy. August 30, 2018.

to merely put forward BCA results. Instead, the utility should use these data, alongside other key quantitative and qualitative information, to make an affirmative case for the proposed investment.

4.1 Initial completeness review and IRs

Overall, Synapse finds that Xcel's requests for certification of its DI and RMP initiatives are not complete.

4.1.1 Gaps in DI proposal

The DI proposal as originally filed contained several shortcomings. These included failures to establish concrete and measurable goals for DI, which means that the DI investments may not be effective in helping the Company to meet key system needs that have been identified through its long-term planning processes. The Company also has not identified the functional and technical capabilities it seeks to achieve through these DI investments, and it has not provided any formal assessment of alternatives. Indeed, the Company's ability to assess alternative is partly hamstrung by its (unjustified) bifurcated approach to proposing AMI and DI. Were these two investments proposed in the same docket, then the Company could have more appropriately explored the range of possible alternative technical solutions.

In addition, the Company is silent on the risks associated with the investments, and also on any issues associated with interoperability, access to meter data, and capabilities by customers and third parties.

The BCA analysis has shortcomings which include the absence of a clearly articulated BCA perspective and a lack of quantified benefits. Finally, Xcel has not established any metrics or performance targets against which to evaluate the performance of DI.

While the Department issued IRs in relation to all of the above-mentioned topics, there remains a lack of clarity on the justification for and other aspects of the proposed DI investments.

4.1.2 Gaps in RMP proposal

Likewise, as originally filed, the RMP proposal was lacking in many key aspects. These deficiencies included a failure to establish concrete and measurable goals. While the RMP arose from the discussions related to the 2019 IDP, Xcel did not find a need for a non-wires alternative (NWA),¹⁹ and thus the RMP is no longer grounded in the Company's long-term planning process. The Company loosely identified the functional and technical capabilities of each component, although it did not articulate alternative possible configurations (e.g. battery storage without controllers). Moreover, Xcel has not provided any

¹⁹ Xcel stated, "...the Company struggled to identify an appropriate NWA location, primarily because there were no obvious distribution system locations within Minneapolis with a near-term need for the sort of conventional distribution system improvements that an NWA solution could avoid." (Appendix H, p. 6.)

assessment of alternatives, as it claims (without justification) that the only alternative is a no-action case.

The BCA analysis for the RMP has shortcomings, including not articulating a BCA perspective. Xcel also did not quantify several of the claimed benefits in any fashion, such as using quantification methods that do not involve monetizing the benefit (e.g., change in energy burden for participants, change in employment by persons in disadvantaged communities). Beyond the proposed data to report during RMP implementation, Xcel has not established any metrics for the RMP. Even more critically, Xcel has provided no performance targets for evaluating the project performance whatsoever.

While the Department issued IRs in relation to all of the above-mentioned topics, there remains a lack of clarity on the justification for and other aspects of the proposed RMP investments.

4.2 Residual gaps in completeness

As noted above, a majority of the initial gaps identified still remain and have not been addressed through the IRs. In particular, the lack of analysis of alternatives continues to be a key concern. The IR process has provided some clarity on the availability and access of meter data and capabilities for customers and third parties. It has also provided some additional understanding of the company-wide targets for reliability, safety, customer satisfaction, and other outcomes, that Xcel could use to establish goals and metrics.

Overall, Synapse notes its concern with the lack of detail that has been provided in the initial application. Xcel has provided limited information to external stakeholders, and so Synapse has had to rely on IRs to obtain information about fundamental aspects of the application. This process is burdensome and results in significant asymmetry of information between the utility and stakeholders (including regulators). Xcel should be clear and transparent about its decision-making process from the outset so that stakeholders can participate effectively and regulators can make best-informed decisions.

5. EVALUATION OF XCEL'S DISTRIBUTED INTELLIGENCE PROPOSAL

Synapse reviewed Xcel's proposal for DI, including the portions of the application protected as trade secret. While Xcel cited many valid benefits of DI, its diffuse approach to proposing interrelated grid modernization investments is concerning. This is an enduring issue that has characterized the Company's grid modernization initiative from the start. The technologies and applications included in Xcel's DI program are closely related to its proposed AMI investments. While the Company proposed DI-capable AMI in its 2019 IDP in Docket No. E-002/M-19-666 and subsequently received certification from the Commission on July 23, 2020, Xcel did not formally bring forward its proposal for DI investments until this proceeding.

The question of whether to pursue DI use cases should not have been taken up separately from meter selection. There is simply no public interest rationale for bifurcating these decisions and there are several conceivable downsides to taking such an approach. It is not clear how to best approach the question of certification for the proposed DI investments when the viability of these investments depends on the installation of meters yet to be initiated. Indeed, the Commission has yet to determine whether to approve cost recovery for AMI.

The remainder of this section evaluates Xcel's proposal for DI across several key dimensions, consistent with the Guidance Document's filing requirements. The section begins by addressing the information provided by Xcel relating its DI proposal to the Company's long-term planning. Next, it covers the information provided on component functionality, technical details, and alternatives. Following that, this section addresses the DI BCA that has been provided by the Company. Finally, the section covers key consumer protection issues and then concludes with findings and recommendations on DI.

5.1 Relationship between Distributed Intelligence and long-term planning

As part of the IDP, the Company has requested certification for its Distributed Intelligence initiative. The Company has indicated that the proposed DI initiative is a foundational capability required to support the DI components of the AMI meters. In other words, the Distributed Intelligence investments proposed in the 2021 IDP are additional investments that will avail of the capabilities of these AMI meters. Xcel has indicated that, at the time of AMI certification, it had not fully developed plans for implementation of DI and did not have definitive use cases and costs to include in the certification request.²⁰

²⁰ Response to DOC IR 2. See Department Attachment 2.

Xcel has qualitatively described its intended objectives for Distributed Intelligence.²¹ However, Xcel has not established concrete and measurable goals that it expects to achieve through DI or its other grid modernization investments.²² As a result of that, Xcel has not been able to address how the DI proposal relates to the goals of its broader grid modernization program or to its overarching grid plans.

Synapse response

The piecemeal analysis conducted by Xcel indicates that it may not have a long-term perspective on the future of its grid modernization investments as a combined set of investments. This issue is further addressed in the BCA section below

The petition lacks measurable and concrete long-term goals, both for the DI initiative in isolation and at the aggregate level for all grid modernization investments. As a starting point, Xcel should provide a clear connection to established company-wide targets. Xcel has indicated that the Commission establishes targets for reliability—including SAIDI, SAIFI and CAIDI. Xcel also has other reliability metrics reported in the annual reports.²³ Xcel also has targets for customer satisfaction as part of its key performance indicators which measure the overall satisfaction of residential electric power customers.²⁴ Xcel has indicated that it has a corporate vision of 100 percent carbon-free electricity by 2050 and a vision to power 1.5 million electric vehicles.²⁵ Xcel, as part of the Integrated resource plan (IRP), has proposed annual goals of achieving 2.8 percent of sales or 780 GWh of energy efficiency.²⁶ As part of the certification request, Xcel should provide quantitative targets and establish concrete and measurable goals that it expects to achieve through DI. Furthermore, these goals would provide a reference against which to compare the alternatives to DI. As we will discuss further, the petition is lacking in its consideration of alternatives, particularly in its comparison of DI and non-DI meters. Xcel should address the incremental contribution that DI would have to the established goals in comparison with non-DI meters.

5.2 Functional and technical dimensions of Distributed Intelligence and alternatives

Xcel's DI application is integrally related to the AMI meters that have already been certified. The benefits that Xcel claims for DI stem from the ability of the meters to conduct on-meter analysis using onboard computing capabilities. This allows for a more localized analysis of granular data and provides

²¹ Appendix G, p. 33.

²² The DI program is not explicitly classified as a part of the AGIS initiative, but it is highly dependent on the DI-enabled meters that are a part of AGIS.

²³ Response to DOC IR 41.

²⁴ Response to DOC IR 42.

²⁵ Response to DOC IR 43.

²⁶ Response to DOC IR 41.

insights and tools to customers regarding their energy usage.²⁷ Xcel Energy has chosen the Riva 4.2 meter manufactured by Itron.²⁸

Xcel has proposed both customer- and grid-facing use cases. Xcel has indicated that the DI “foundational” capabilities are required for deployment of the DI use cases.²⁹ The Company has indicated that without these investments the meters would act like non-DI AMI meters. The Company has proposed that the DI use cases will allow for on-meter analysis at a sub-second level. The transfer of data to the Company’s back-end systems will occur at 15-minute intervals and will include the results of the on-meter analysis done by the meter.³⁰

Customer-facing use cases are applications that provide customers with more insights and tools that assist them in better understanding and managing their energy data. Grid-facing use cases are applications that will provide insights to Xcel in order to improve the operation and reliability of the distribution grid. Xcel proposes the customer- and grid-facing use cases described in Table 1 below.³¹

Table 1. Customer- and grid-facing use cases proposed by Xcel

Use Case	Description
Customer-facing	
HAN Connectivity	This involves enabling the HAN functionality of the meter to allow the customer’s meter to connect through Wi-Fi on the customer’s premise, which will allow the customer to get kW and kWh reads from the meter on their mobile application. The DI application on the customer meter will connect with the customer’s mobile application using a standard communication protocol (IEEE 2030.5). Xcel has assumed 9.75 percent HAN enrollment.
Energy Analysis	The energy analysis use case will allow customers to view disaggregated energy usage of various appliances. This use case will not require a customer to own smart appliances but will disaggregate energy based on load characteristics using the on-meter analysis. The Company has indicated that it expects the energy analysis results will be available to the customer through the mobile application.
Electric Vehicle Detection	This use case allows detection of the presence of an EV when a customer first plugs in an EV at their premise. This provides Xcel with information about growing EV penetration to facilitate better management of EV growth and allows the customer to access suitable rates and programs.
Grid-facing	
Secondary Equipment Assurance	This use case helps monitor the secondary portion of the grid, leveraging separate applications for (1) high/low impedance detection and (2) open secondary neutral connection, which are expected to identify secondary issues on the grid before the customer does.
Meter Bypass Theft Detection	This use case will detect meter bypass theft. The Company has indicated that there are only about 12 bypass diversions per year, so this is mainly a use case to eliminate public safety hazards.
Connectivity	This will improve mapping of customers in the GIS, which will improve ADMS accuracy and accuracy in outage management, planning, and operational modeling.

²⁷ Appendix G, p. 6.

²⁸ Appendix G, p. 1.

²⁹ Appendix G, p. 7.

³⁰ Appendix G, p. 9

³¹ Appendix G, pg. 13 – 17.

Xcel has not meaningfully explored alternatives to DI. The Company has indicated that it is “not aware of any alternatives that would satisfactorily meet the intended objectives.”³² Xcel presents two other options, but both appear to have defects. One alternative that is mentioned by Xcel is the option of not using the DI capabilities on the meter. The other alternative mentioned is the possibility of installing smart meters throughout the grid to achieve the same capabilities, which Xcel indicates would be cost prohibitive.³³ In addition, Xcel has not put forward any quantitative objectives for DI.

Synapse response

In regard to Xcel’s evaluation of alternatives, the primary concerns are (1) whether a non-DI meter can achieve similar functional and technical capabilities, (2) whether DI is required or benefits can be achieved through other software platforms/technologies (irrespective of the meters approved), and (3) what the incremental functional capabilities and benefits of the proposed DI are when compared with these software platforms/technologies. A core part of this concern is that the Company has not established any quantified objectives to be achieved. This makes it difficult to assess what the “intended objectives” are and whether an alternative could achieve those objectives or not. There is no demonstrated analysis to prove that “no alternatives would satisfactorily meet the intended objectives.”

Most lacking in the application is a clear distinction between the functional and technical capabilities that can be achieved with DI-enabled meters and those that can be achieved with non-DI meters. The non-DI-enabled meters may also achieve some of the functionality expected from DI meters. For example, the Company has indicated that disaggregation of appliance-specific energy usage (i.e., capabilities proposed through the energy analysis use case) can be achieved with limited accuracy through a non-DI meter.³⁴ EV detection can also be feasible through certain non-DI platforms.³⁵ However, Xcel has not formally assessed these options. Similarly, from the application it is not clear what level of HAN connectivity can be achieved with a non-DI meter, if any. Xcel has made no mention of alternative communications protocols that have been explored for this HAN connectivity.

Another concern is that Xcel has assumed by default that DI-enabled meters will be installed. DI-enabled meters have not been approved or installed, and the alternatives that should be presented should include a comparison with non-DI enabled meters. When asked, the Company was unable to provide an analysis of the incremental benefits that could be achieved by a DI-enabled meter compared with a non-DI meter.³⁶ This should have been provided as part of the initial IDP during request for AMI certification.

³² Appendix G, p. 33.

³³ Ibid.

³⁴ Response to Fresh Energy IR 9. See Department Attachment 3.

³⁵ Response to Fresh Energy IR 10.

³⁶ Response to DOC IR 12.

The Company has not presented any results of its prioritization process and selection process that clearly demonstrate a need for the chosen use cases provided in the application. The Company indicated that it “could choose to focus initially on only grid-facing uses of DI (as at least one other electric utility is doing); however, [it has] chosen to deploy both initial customer- and grid-facing use cases because of the forecasted benefits to [its] customers.” When asked for the analysis behind this choice, the Company indicated that it wanted to maximize the investment in AMI to benefit the customer.³⁷ However, Xcel presented no formal analysis of this assessment. The Company has cited some customer surveys that indicate their choice of use cases, but there is no clarity into how these were conducted and whether there is a demonstrated need for the chosen use cases.³⁸ These customer survey methods and results that point to the specific choice of use cases should have been clearly presented in the initial application; however, these were provided only in response to IRs, so we could not validate the results in time for these comments.

5.3 Benefit-cost analysis

Xcel conducted a BCA for DI as part of the certification request, which included investments for specific use cases identified by the Company.³⁹ There were several issues with this analysis, which are discussed below.

Table 2. Benefit-cost results for DI

COSTS	DI FOUNDATIONAL CAPABILITIES AND INITIAL USE CASES (millions)
Capital	
Total Capital Cost	\$17
O&M	
NPV of Annual O&M Costs (10 years)	\$26
Total Capital and O&M	\$43
BENEFITS	
Total benefits	\$40
BENEFIT-COST RATIO	0.93

Appendix G, p. 35.

5.3.1 BCA perspective

The Company does not articulate the perspective (i.e., cost test) for its BCA.

³⁷ Response to DOC IR 11.

³⁸ Response to DOC IR 5, Response to Fresh Energy IR 43. See TRADE SECRET Department Attachment 3. The TRADE SECRET version of Department Attachment 3 contains Xcel’s trade secret responses to Fresh Energy information requests as files attached within the PDF file.

³⁹ Appendix G, Table 3.

Synapse response

The choice of perspective may determine whether a proposal is deemed cost-effective, and it is incumbent on the utility to identify and justify the perspective or perspectives taken. As a general principle, all BCAs conducted in conjunction with a proposal should take the same perspective. If multiple perspectives are taken, then the same set of perspectives should be used across the BCAs.

5.3.2 Alternatives

Xcel has not evaluated costs and benefits for alternative deployment scenarios. As indicated earlier, the Company has indicated that it is “not aware of any alternatives that would satisfactorily meet the intended objectives.”⁴⁰ One alternative mentioned by Xcel is to not use the DI capabilities on the meter. The other alternative mentioned is the possibility of installing smart meters through the grid to achieve the same capabilities, which Xcel indicates would be cost-prohibitive.⁴¹

Synapse response

As noted previously, Xcel should evaluate the costs and benefits of alternative scenarios which should include an evaluation of (1) the costs and benefits of non-DI AMI meters (this should have been done as part of the initial AMI certification in the 2019 IDP and provided in subsequent TCRR proceedings during requests for cost recovery), and (2) the costs and benefits of DI that is agnostic of meter technology (i.e., consideration of alternative ways of achieving the same goals that DI achieves). Xcel has also not prioritized the use cases by individual benefits and costs in order to explore a combination of different use cases.

5.3.3 Benefits

Xcel has quantified the benefits for only the customer-facing use cases. The remainder of the use cases have only been addressed qualitatively.⁴² In addition, the Company has not provided any supporting evidence on benefits from DI from other jurisdictions due to the overall limited implementation.

Synapse response

The only benefits quantified by Xcel are the customer savings through 2026. These benefits are an outcome of the customer-facing use cases under an assumption that 9.75 percent of the customers with AMI meters will enroll in the real-time energy insights. The benefits are expected to accrue in 2022.⁴³ The remainder of the benefits are qualitative, and the utility has not provided proxy estimates or methodologies that look to quantify these qualitative benefits. Additionally, Xcel has not provided the benefits that could be achieved through its larger grid modernization portfolio when combined with DI.

⁴⁰ Appendix G, p. 33.

⁴¹ Ibid.

⁴² Appendix G, p. 37.

⁴³ Appendix G, p. 36.

Finally, both the meters and the use cases appear to be nascent with no proof that they will provide incremental benefits relative to traditional AMI meters.⁴⁴ The Company has not provided sufficient data to evaluate whether the benefits are realistic and/or achievable.⁴⁵

5.3.4 Costs

Xcel has indicated that all the costs for DI are estimates informed by expertise from a third-party consultant using conservative assumptions.⁴⁶ As part of a confidential attachment, Xcel has provided a decomposition of costs into the categories set forth by the Commission in its ADMS Order.⁴⁷ Xcel has included a contingency cost estimate.⁴⁸ However, it is not clear exactly how the contingency estimates account for future risks. Risk is addressed below in Section 5.4.2.

Synapse response

Xcel's estimated costs are budgetary estimates and it is unclear how the Company dealt with the fact that DI-enabled meters are a nascent technology and there is limited information on actual costs of implementation. The Company has not clarified what the incremental cost of the DI-enabled meters are to traditional meters. In addition, the cost estimates are not separated by each use case. They are more broadly separated into grid- and customer-facing use cases.

5.3.5 Overall results

Xcel reports a benefit-cost ratio of 0.93.⁴⁹

Synapse response

The results of the BCA indicate that DI is not cost-effective from the perspective of its monetized benefits. However, we note that owing to gaps in its application, Xcel has not provided a complete view of the value of DI. Most concerning from the vantage of trying to assess whether DI is cost-effective is the lack of quantified benefits and lack of exploration of alternatives included in Xcel's BCA. Further compromising this analysis is that the costs and benefits that are claimed for DI do not have sufficient precedent elsewhere since Xcel is one of the first jurisdictions to install DI-enabled meters.⁵⁰ This attaches significant risks to the realization of the reported results. See Section 5.4.2 for further discussion of risk.

⁴⁴ Response to Fresh Energy IR 8 and DOC IR 4.

⁴⁵ Response to DOC IR 4.

⁴⁶ Response to DOC IR 29(a).

⁴⁷ TRADE SECRET Response to DOC IR 29(d). See TRADE SECRET Department Attachment 2. The TRADE SECRET version of Department Attachment 2 contains Xcel's trade secret responses to Department information requests as files attached within the PDF file.

⁴⁸ Appendix G, p. 35.

⁴⁹ Appendix G, Table 3.

⁵⁰ Appendix G, p. 6

5.4 Key customer protection issues

5.4.1 Metrics

Xcel has not provided a clear set of metrics or associated performance targets to track the benefits of DI. The Company has indicated that certain metrics provided for FAN and AMI may be relevant in gauging DI impacts, but that metrics and targets for DI cannot be established until the technology, design, scope, and implementation plans are approved. Further, Xcel notes that any metrics put forward at the time of the certification request would be illustrative and would depend on the outcome of the cost recovery proceeding that “pairs a specific plan and its associated revenue requirements with the functionality that will create the benefits.”⁵¹

Synapse response

The absence of a clear set of metrics and associated performance targets is a key omission. Xcel’s justification for not having provided the metrics is also problematic. Xcel has indicated that development of the metrics would depend on the technology, design, scope, and implementation plans that are approved. In this instance, Xcel has switched the proverbial horse with the proverbial cart. Information on metrics and performance targets is required in order to make a clear decision on whether the proposed investments should be certified, and whether Xcel should ultimately be awarded cost recovery for them. Indeed, cost recovery should be contingent upon a successful demonstration, through performance metrics, that the proposed investments are achieving performance targets. Metrics and targets which should be created during this review process.

5.4.2 Future risk

Xcel has made no mention of the risks associated with implementation in the context of costs, benefits, implementation, and interoperability.

Synapse response

Xcel’s lack of treatment of risk is particularly concerning given that DI has had limited implementation with limited data on demonstrated costs and benefits. Xcel has not addressed the issue of interoperability of the DI-enabled meters with other equipment on customer premises. Xcel has made no mention of interoperability risks associated with the selected communications protocols and whether other protocols exist that were explored from an interoperability perspective. The Company has indicated that since the meter is the first in this generation to use the IEEE 2030.5 standard, they are currently not aware of studies around interoperability of the meter with other HAN devices.⁵² Xcel has made no mention of the risk of technology obsolescence. In addition, Xcel has not addressed whether there are any risks due to delayed implementation or other risk factors (e.g., associated around the

⁵¹ Response to DOC IR 23.

⁵² Response to DOC IR 87.

assumptions that have been made around enrollment in DI). Xcel should address the different risks that may arise in the course of implementation, indicate how these are monetized, and discuss the overall cost and benefit implications. AMI introduces new cybersecurity risks, and the addition of DI is likely to make Xcel even more vulnerable to these cybersecurity risks. Xcel should clearly indicate how these risks will be addressed.

5.4.3 Reporting requirements

Xcel has not proposed to provide specific updates on DI project outcomes through any dedicated reporting.

Synapse response

Since DI is integrally related to AMI, any future reporting on AMI is likely to capture impacts from DI, should the proposed DI investments go forward. Nonetheless, it is incumbent on Xcel to indicate how it will provide regulators, customers, and other stakeholders with the necessary information on DI costs and benefits on an ongoing basis.

5.4.4 Bill impacts

For DI specifically, Xcel has indicated that the bill impact would be approximately \$0.31 per month in 2026.⁵³ Xcel has indicated that customers would be willing to pay \$1-\$2 per month for services such as arc detection, appliance health monitoring, virtual energy advisor, and smart energy optimizer.⁵⁴

Synapse response

Xcel has not provided the results of the total bill impacts related to all grid modernization investments across the different proceedings, including those investments that have been certified and/or are being recovered through other proceedings. This should also include the impacts of investments that are being planned in the near future for cost recovery in other proceedings. Xcel should clearly convey the total bill impact of all grid modernization investments for customers and stakeholders to make an informed assessment of these investments.

5.4.5 Data access and interoperability of meters

For DI, Xcel has indicated that 15-minute interval Customer Energy Use Data (CEUD) will be available to customers and customer-authorized third parties via an energy usage portal and via Green Button Connect, if they choose to enroll in these services.⁵⁵ CEUD will not be available to customers in finer than 15-minute granularity.⁵⁶ Xcel has indicated that the customers will be able to view their CEUD in

⁵³ Appendix G, p. 29.

⁵⁴ Response to DOC IR 5.

⁵⁵ Response to DOC IR 32(b).

⁵⁶ Response to DOC IR 33c.

the energy usage web portal and that data will be updated on a daily basis.⁵⁷ Xcel has indicated customers and third parties will not have access to sub-second CEUD, grid-facing data, or the results of on-meter processing.⁵⁸ HAN connectivity will allow the customers to read real-time kW and kWh data from the meter.⁵⁹ Xcel has indicated that it does not plan to monetize the customer access to CEUD via the HAN but that it may seek to implement use cases that would involve revenue at a later date after seeking regulatory approval.⁶⁰

Regarding contracting, the Company has indicated that only third-party app developers that are contracted with the Company and Itron will have access to sub-second data.⁶¹ In addition, the Company will choose the applications to be installed on the meter and Itron will have a certification and testing program that will certify new third-party applications.⁶² Xcel has indicated that the terms and conditions between Xcel Energy and Itron do not specifically address equal access and non-discrimination to third party applications or equipment.⁶³

Synapse response

We have concerns about the limited access to data that Xcel proposes to provide to customers and third-party app developers. Xcel will have data available at a 15-minute granularity (through FAN), while Xcel proposes to provide customers and third-party developers with access to the data only every 24 hours. We have concerns over the latency with which the data would be made available on the energy use portal for access by customers and third parties.

It is not clear why the Company has not proposed to offer customers and developers access to the same 15-minute meter-analysis and grid-facing data. While there may be legitimate customer privacy concerns, customers could be protected through the requirement that third-party app developers be granted access to data only with customer permission. Also, Xcel has not justified why its customer will not have access to upload applications on the meters that are not developed by the Company or Itron. It is concerning that the terms and conditions in the contract with Itron do not address equal access to third-party developers in accessing the meter given that Itron is responsible for the testing and certification of the apps that can be approved for use on the meter.

Finally, Xcel has not indicated whether other HAN devices will be able to connect with the meter and whether there would be any concerns around interoperability of other devices with the meter.

⁵⁷ Response to DOC IR 33(d)

⁵⁸ Response to DOC IR 32(c).

⁵⁹ Response to DOC IR 32(d).

⁶⁰ Response to DOC IR 32(e) and (f).

⁶¹ Response to DOC IR 37.

⁶² Response to DOC IR 38.

⁶³ Response to DOC IR 86.

Unfortunately, Xcel's unequal data access provisions are likely to distort and stifle competition in an arena where such competition would likely provide considerable consumer benefit. Absent a compelling justification for depriving customers and developers of equal access to data, it appears that the proposed asymmetrical approach is likely to confer benefits on Xcel at a cost to its customers.

5.5 Preliminary findings on DI

5.5.1 General preliminary findings

The application is incomplete and addressing the outstanding gaps identified in this report should be a priority. Recommendations for addressing these gaps are provided below.

- Xcel should establish concrete and measurable goals and demonstrate how it expects to achieve these through DI.
- Xcel should evaluate the costs and benefits of alternative scenarios, which should include an evaluation of (1) the costs and benefits of non-DI AMI meters (in this and other relevant proceedings), and (2) the costs and benefits of DI that is agnostic of meter technology (i.e., consideration of alternative ways of achieving the same goals that the proposed DI achieves).
- Xcel should demonstrate the need for the proposed use cases and present a prioritization of these cases exploring different combinations of scenarios.
- Xcel should articulate its perspective regarding the BCA.
- Xcel should attempt to quantify all benefits as opposed to addressing the benefits qualitatively.
- Xcel should provide a clear set of metrics and performance targets for DI at the time a request for certification is made.
- Xcel should conduct bill impact analysis for all grid modernization investments including DI so customers and stakeholders can make an informed assessment regarding these investments.
- Xcel should address the different risks that may arise during implementation, indicate how these are monetized, and discuss the overall associated cost and benefit implications.
- Xcel should clearly state the differences in data accessibility (e.g., latency, granularity, etc.) that may be available to customers and third parties and the data available to the Company and/or Itron.
- Xcel should ensure non-discriminatory access to data and equipment demonstrated through its terms and conditions with Itron.

5.5.2 Overall findings on cost-effectiveness

The BCA indicates that the application for DI is not cost-effective. However, it is premature to draw any conclusions about cost-effectiveness since the application for certification is incomplete. Moreover, as discussed previously, the decision about whether to certify the proposed investments should account for both cost-effectiveness and other considerations.

6. EVALUATION OF XCEL'S RESILIENT MINNEAPOLIS PROGRAM PROPOSAL

Synapse reviewed Xcel's proposal for RMP, including those parts protected as trade secret. Based on information available at this time, Synapse offers the following notes on Xcel's proposal for RMP.

Overall, Synapse notes that the stated goals of resilience and equity are reasonable, and the cited benefits of the RMP are plausible. Further, we commend Xcel for its efforts to work with communities to co-create solutions. Meaningfully engaging populations who have not been historically included in the energy decision-making process is a critical step toward improving the equity of outcomes.

However, the lack of relationship between the RMP proposal and the Company's long-term planning process is concerning. This deficit includes a lack of clear goals and a lack of connection of those goals with the planning process. Also concerning is the low benefit-cost ratio and lack of effort to establish any metrics and goals with respect to the claimed difficult-to-quantify benefits, as well as the complete lack of consideration of alternatives. Absent these elements, it is impossible to determine if the RMP is reasonably likely to be in the public interest, or whether the RMP as proposed is the best use of funds to achieve the stated objectives.

The remainder of this section evaluates Xcel's proposal for RMP across several key dimensions, consistent with the Guidance Document's filing requirements. The section begins by addressing the information provided by Xcel relating its RMP proposal to the Company's long-term planning. Next, it covers the information provided on component functionality and technical alternatives. Following that, this section addresses the RMP BCA that has been provided by the Company. Next, we describe the extent to which alternatives beyond technological ones were addressed. Finally, the section covers key consumer protection issues and then concludes with findings on RMP.

6.1 Relationship between RMP and long-term planning

The RMP arose from the discussions related to the 2019 IDP. Ultimately, Xcel did not find a need for a non-wires alternative in Minneapolis.⁶⁴ With this finding, Xcel shifted to a goal of improving resilience, which the Company defines consistent with the Urban Sustainability Directors Network (USDN) definition:

...the ability to anticipate, accommodate and positively adapt to or thrive amidst changing climate conditions, while enhancing quality of life, reliable systems, economic vitality, and conservation of resources. Resilience requires community capacity to plan for, respond

⁶⁴ Xcel stated, "...the Company struggled to identify an appropriate NWA location, primarily because there were no obvious distribution system locations within Minneapolis with a near-term need for the sort of conventional distribution system improvements that an NWA solution could avoid." (Appendix H, p. 6.)

to, and recover from stressors and shocks. Shocks are major disruptions such as storms, heat waves, derechos, or other extreme weather events – often intensified by climate change – that can disrupt a variety of critical systems. Stressors refer to the everyday issues that make people and communities more vulnerable to those shocks, including epidemic drug use, poverty, aging infrastructure and unemployment – all of which are exacerbated by shocks and make it more difficult to respond and recover... A more resilient community also includes consideration of foundational elements of community quality of life, such as greater access to jobs, more affordable housing, strengthening infrastructure, and stronger social support systems.⁶⁵

In addition to the objective of improving resilience, Xcel states that “while the primary justification we present for the RMP is couched in terms of the Commission’s IDP objectives, and the resiliency and grid services these technologies can deliver, the energy equity objectives in the list above are crucial to our partners and thus to success of the RMP.”⁶⁶ These equity-related objectives include:

- Energy affordability and reducing energy burden for community residents and businesses;
- Equitable access to renewable energy, and the opportunity to use renewable energy and energy efficiency projects to create jobs and build community wealth in chronically under-resourced and under-invested communities;
- Workforce training, diversification, and Black, Indigenous, and people of color (BIPOC) energy careers; and
- Environmental justice concerns and the desire to reduce or eliminate emissions in neighborhoods that have historically suffered disproportionate pollution impacts.⁶⁷

Xcel claims that the goals for the RMP proposal tie in with the following IDP objectives:

- Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state’s energy policies;
- Enable greater customer engagement, empowerment, and options for energy services;
- Move toward the creation of efficient, cost-effective, accessible grid platforms for new projects, new services, and opportunities for adoption of new distributed technologies; and
- Provide the Commission with the information necessary to understand Xcel Energy’s short- and long-term distribution system plans, the costs and benefits of specific investments, and a comprehensive analysis of customer cost and value.⁶⁸

⁶⁵ Urban Sustainability Directors Network 2020. Resilience Hubs: Shifting Power to Communities and Increasing Community Capacity. Available at <https://ppp-ejcc.com/wp-content/uploads/2020/03/USDN-Resilience-Hubs-2018.pdf>. Cited in Xcel’s IDP, Appendix H, p. 4.

⁶⁶ Appendix H, p. 5.

⁶⁷ Appendix H, p. 5.

⁶⁸ Response to DOC IR 51.

Synapse response

With the shift from a potential NWA to the proposed RMP, the question of whether and how the RMP relates to the long-term planning process becomes more critical. Demonstrating how the proposal furthers the objectives of long-term planning requires explicitly identifying goals (i.e., the benefits that will be produced) and connecting them to key planning processes. However, Xcel has not identified clear goals, and the goals that Xcel has identified are not tied to specific documented problems. Furthermore, Xcel has not made a connection between these goals and the objectives of planning processes.

6.1.1 Goals

Xcel's goals in proposing to implement the RMP are unclear. Regarding the goal of improving resilience, the definition that Xcel cited for resilience from USDN involves several factors that are tangential or only loosely related to energy infrastructure in general and to the proposed RMP in particular. For example, epidemic drug use, poverty, and unemployment are likely only weakly influenced, if at all, by Xcel's investments and operations. Xcel may have a more substantial influence on other factors mentioned in USDN's definition of resilience, such as system reliability, conservation of resources, and adaptation to changing climate conditions. Of these factors, conservation does not appear to be a core objective of the RMP,⁶⁹ while reliability and adaptation to changing climate conditions are.

Xcel does not define the goals for reliability and adaptation with reference to specific problems – either existing ones or ones predicted to arise in the future. A study projecting Minnesotans' vulnerability to heat waves or storm-related events, for example, would provide support and context for these goals. As another example, a showing that reliability in Minneapolis is likely to suffer in the future would likewise prove helpful in this regard. Significantly, Xcel has not projected a specific reliability problem in Minneapolis that could be avoided by a traditional NWA project.⁷⁰ Also, reliability statistics for the relevant feeders do not reveal a current reliability problem, as shown in the table of non-weather normalized feeder performance below.⁷¹

⁶⁹ Appendix H, p. 7.

⁷⁰ IDP, p. 31.

⁷¹ Xcel did not provide projections of reliability statistics for the neighborhoods considered for the RMP projects, as requested through discovery (DOC IR 49).

Table 3. Historical reliability statistics for proposed sites

All Days/All Levels			
Outage Year	SAIDI	SAIFI	CAIDI
North Minneapolis Community Resiliency Hub			
2017	101	1.55	65.19
2018	40	0.44	92.4
2019	68	0.48	141.77
2020	76	0.67	114.39
2021	159	2.08	76.28
5 Yr Avg	89	1.04	98.01
Minneapolis American Indian Center			
2017	5	0.07	72.66
2018	27	0.31	89.99
2019	233	2.04	114.17
2020	35	0.12	298.26
2021	124	0.79	156.38
5 Yr Avg	85	0.67	146.29
Sabathani Community Center			
2017	80	0.27	292.82
2018	39	0.38	104.38
2019	24	0.26	90.06
2020	67	1.08	61.59
2021	230	2.51	91.72
5 Yr Avg	88	0.90	128.11

Source: DOC-049.

6.1.2 Connection of goals to planning processes

Regarding mapping RMP objectives to IDP goals, Xcel stated that:

The grid services provided by the RMP technologies do, however, map to the statute and IDP planning objectives, as we discussed in Appendix H, Section VI. Minn. Stat. §216B.2425 reads:

...investments [the utility] 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.

The RMP meets the statutory requirement to enhance reliability and improve security against physical threats by helping communities recover from outages and continue to provide critical services despite increasing physical threats from climate change. These

threats are expected to increase in frequency and severity, and our BIPOC customers are often disproportionately exposed to the impacts; the RMP investments are designed to help communities be more resilient to such threats.⁷²

Despite citing the IDP goal of maintaining and enhancing the safety, security, reliability, and resilience of the electricity grid, Xcel has not demonstrated that the RMP is needed to maintain and enhance reliability and resilience, as discussed above.⁷³

Via discovery, we requested information on how the RMP will enable greater customer engagement, empowerment, and options for energy services. However, as proposed, the RMP will provide most of these benefits to just the three participating customers. While the RMP may result in learnings that would allow Xcel to expand such services to a larger number of customers, it is unlikely that such services would be expanded to reach a substantial share of customers given the poor cost-effectiveness.

Xcel notes that engagement with the RMP hosts will enable deeper engagement with the Company's residential and business customers throughout those neighborhoods. Such engagement could provide a new platform for those customers to learn about Xcel's offerings that can make their energy use cleaner and save them money.⁷⁴ Xcel has not, however, described how it plans to leverage this potential opportunity.

In response to discovery, Xcel provided a list of questions that the RMP seeks to answer with the RMP pilot.⁷⁵ However, the response provided no clarity regarding the research objectives specific to equity and how the attainment of these objectives will be attained. Lessons learned are likely to have value only if they are documented, accessible, and replicable by Xcel employees and decision-makers in the future.

The poor cost-effectiveness of the RMP also means that it is unlikely that the model would result in "cost-effective, accessible grid platforms for new projects, new services, and opportunities for adoption of new distributed technologies" on any scale. And as Xcel has not tied the RMP in with its other services, it is unclear how the RMP would "provide the Commission with the information necessary to understand Xcel Energy's short- and long-term distribution system plans," and the lack of metrics for assessing many of the benefits of the project means that as designed the RMP will not provide "a comprehensive analysis of customer cost and value."

⁷² Response to DOC IR 51(b).

⁷³ It does not appear that the RMP is geared toward grid safety and security.

⁷⁴ Response to DOC IR 75(a).

⁷⁵ Response to DOC IR 81.

6.2 Functional and technical dimensions of the RMP

To some extent, Xcel defined the functional role of the different components of the RMP. However, Xcel did not clearly indicate how each component (BESS and switching and/or microgrid controllers) contribute to the goals of the project.

Xcel's RMP proposal also includes details about the requests for proposal issued, including information about bids received⁷⁶ and selection criteria.⁷⁷ The selection criteria were generally subjective. For example, the scope of project benefits criterion, which addresses the extent to which the proposed project benefits the community at large or particular under-served segments of the community, were scored as follows:

- Project benefits relatively few people = 0 points
- Project benefits greater number, or benefits a disadvantaged group = 5 points
- Project benefits large number of people and/or disadvantaged groups = 10 points⁷⁸

It appears that Xcel did not consider alternative components or technologies. Xcel claims that the alternative to the RMP is a no-action alternative.⁷⁹ Xcel seems to have been targeting specific technologies early on. For example, Xcel states, "we believe our proposed RMP has benefits for the Company and its customers more broadly, in addition to the specific benefits for the RMP partner organizations. Existing or enhanced CIP-based energy efficiency programs would not be sufficient to address the resiliency objectives of the RMP, *since these programs do not support investments in solar, batteries and microgrids*" (emphasis added).⁸⁰

Synapse response

While it would not make sense to have the switching and microgrid controller without the BESS, the BESS could be installed without the switching and controllers. Thus, it would be appropriate to provide the contribution of each of the components separately.

Consideration of alternatives, including different technologies and configurations, is necessary to determine whether the project is appropriately scoped. It is not clear whether the proposal selection process was open to different technologies, or to other alternatives (as discussed in the following section).

⁷⁶ Appendix H, p. 10-13.

⁷⁷ Appendix H, p. 10.

⁷⁸ Appendix H, p. 10.

⁷⁹ Appendix H, p. 36.

⁸⁰ Response to DOC IR 52.

6.3 Benefit-cost analysis

The costs and benefits of the RMP are shown in the following table. The benefit-cost ratio is very low for these projects individually (ranging from 0.22 to 0.24) and collectively (0.22). This means that for every dollar invested in these projects, the monetized system benefits are expected to amount to only \$0.22 in benefits.

Table 4. Benefit-cost results for RMP

	North Minneapolis Community Resiliency Hub	Sabathani Community Center	Minneapolis American Indian Center	Aggregate
COSTS				
Capital				
Total Capital Cost	\$3,911,367	\$2,644,276	\$2,383,235	\$8,938,878
O&M				
Annual O&M Cost	\$23,861	\$19,091	\$19,091	
NPV of Annual O&M Costs (10 years)	\$172,662	\$138,146	\$138,146	\$448,953
Total Capital and O&M	\$4,084,029	\$2,782,421	\$2,521,381	\$9,387,831
BENEFITS				
Resilience/Value of Lost Load	\$575,076	\$575,076	\$460,060	\$1,610,212
Bulk System Capacity Value	\$111,344	\$54,384	\$65,643	\$231,371
Generation & Carbon Emissions	\$133,138	\$25,417	\$22,997	\$181,551
Arbitrage	\$62,174	\$3,173	\$12,417	\$77,764
Lifetime Benefit	\$881,732	\$658,050	\$561,117	\$2,100,899
BENEFIT-COST RATIO	0.22	0.24	0.22	0.22

Appendix H, p. 35.

With respect to the benefit-cost ratio, Xcel states:

We understand the priority placed by the Commission on advancing development of distributed energy systems that combine solar and energy storage to create multiple grid benefits. Also, the emergency back-up role these BESS projects support in these applications could support communities in times of significant or prolonged duress, which is inherently hard to value, as discussed above. Therefore, we do not believe these low benefit-to-cost ratios are a cause for concern here as they might be in a different context.

Also, we reiterate that, while some of the benefits discussed in Section IV.B can be quantified in dollar terms, others are equally important but more difficult to quantify. Since all costs are quantified, but only a subset of benefits are quantified, the benefit-to-cost ratios presented in this section reflect an incomplete picture of the overall benefit of the RMP projects to our communities and customers.⁸¹

⁸¹ Appendix H, p. 35.

The benefits that are “equally important but more difficult to quantify” include the following:

- Training and job creation.
- Value of learning for future resiliency and/or NWA projects.
- Energy equity objectives.

Xcel does not propose to report data on training, job creation, or attainment of energy equity objectives. With respect to learnings, Xcel indicated data that will be provided in the annual operations reports:

- Number and duration of islanding events for each project;
- Battery state of charge at the time of islanding events;
- Use of on-site renewable and non-renewable generation during islanding events;
- Summary of any unplanned outages, technical failures or maintenance issues;
- Summary of how batteries were dispatched over the course of the year, including dispatch for arbitrage, system peak, and feeder peak, and associated non-quantifiable benefits realized from dispatch;
- Summary of monetary benefits and emission reductions related to the projects, to the extent such data can reasonably be isolated to the projects collectively or individually;
- Load growth on the feeders serving each RMP site, and whether over time these projects grow in their ability to serve as non-wires alternatives deferring capital expense for conventional distribution system upgrades;
- Summary of interactions and feedback from host communities: how well are the RMP projects serving the core needs of partner organizations? What changes to the project design could serve those needs better?; and
- Summary of lessons learned from the operations of the RMP projects to date.⁸²

Synapse response

Xcel’s statements imply that these non-monetized benefits could push the benefit-cost ratio above 1—that is, make the total benefits exceed the costs. Yet, Xcel does not give a range of values or provide any kind of measure for benefits that cannot be easily monetized.⁸³ While monetization is ideal, such benefits could be measured and tracked using other types of metrics such as an index (e.g., SAIDI or

⁸² See Appendix H, p. 38.

⁸³ Response to DOC IRs 46 and 61.

change in energy burden for participating customers) or other quantification (e.g., change in employment in clean energy in disadvantaged communities).

Regarding Xcel's claimed benefits, as noted above, Xcel has not demonstrated the need for enhanced resilience. Without a resilience problem, benefits from improving resilience may be negligible. Further, Xcel appears to be claiming benefits that accrue due to the participants' investments in solar resources, such as reductions in emissions. However, Xcel is not providing incentives for the solar panels, and the participants may invest in solar panels even in the absence of utility investment in the battery, switching, and controls.⁸⁴

We also note that Xcel has provided little information about whether the projects are an appropriate or optimized size.

Xcel claims that learnings could be a benefit; however, Xcel has not provided any indication of whether this is likely to be cost-effective enough to be rolled out more broadly. Further, there is no plan for how this model could be leveraged for broader roll out.

6.4 Alternatives

As noted above, it does not appear that Xcel considered alternative components. Xcel claims that the alternative to the RMP is a no-action alternative.⁸⁵

Synapse response

There are various dimensions along which the RMP proposal could vary. These include different ownership structures, different geographies, and different timelines for deployment. Different ownership structures may be particularly significant, as Xcel's monopoly status may give it advantages in the market for services that might otherwise be competitively supplied. It is also not clear why Xcel focused on Minneapolis to the exclusion of all other communities.

6.5 Key customer protection issues

6.5.1 Metrics

As discussed above, Xcel has not provided a clear set of metrics or associated performance targets to track the benefits of the RMP.

⁸⁴ Response to DOC IR 61.

⁸⁵ Appendix H, p. 36.

Synapse response

The absence of a clear set of metrics and associated performance targets is a key omission. Information on metrics and performance targets is required in order to make a clear decision on whether the proposed investments should be certified, and whether Xcel should ultimately be awarded cost recovery for them. This is especially important given that the RMP is not justified on the basis of the BCA alone.

6.5.2 Future risk

Xcel made no mention of the risks associated with implementation in the context of costs, benefits, implementation, and interoperability.

Synapse response

The magnitude of risk associated with the RMP is likely much smaller than with the DI investment. However, Xcel has not indicated whether there are any risks due to delayed implementation. In addition, there may be other risk factors, such as risk of higher costs or lower benefits than forecast.

6.5.3 Reporting requirements

As shown in Section 6.3, Xcel proposes to provide data on islanding events and unplanned outages, battery performance and dispatch and associated benefits, emissions reductions, host community feedback, and other related information in its annual operations reports.⁸⁶

Synapse response

We note that emissions reductions result from the participant-owned solar resources, rather than from the battery per se. Thus, emissions reductions are more relevant if they are associated with solar generation that would have been curtailed but for the presence of the battery. These incremental emissions reductions should be reported.

Also, reporting should include data on any equity-related metrics that Xcel proposes pursuant to our comments.

6.5.4 Bill impacts

Xcel states that it did not perform a rate analysis because the total investment is expected to result in minimal rate impacts.⁸⁷

⁸⁶ Appendix H, p. 38.

⁸⁷ Appendix H, p. 40.

Synapse response

Ideally, a bill impact analysis would be provided for all investments. While we note that Xcel has not provided this, we acknowledge the Company's point regarding the magnitude of rate impacts.

6.6 Preliminary findings on RMP

6.6.1 Findings

The application is incomplete. The following information is missing and should be provided to close gaps in the proposal.

- Xcel should establish concrete and measurable goals—including ones related to equity--and demonstrate how it expects to achieve these through the RMP. Further, Xcel should set goals with reference to specific problems, either existing ones or ones predicted to arise in the future.
- Xcel should evaluate the costs and benefits of alternative technologies. Further, Xcel should consider, or provide justification for not considering, alternative geographies, timelines, and ownership structures.
- Xcel should articulate its perspective regarding the BCA.
- Xcel should attempt to quantify all benefits wherever possible, as opposed to addressing the benefits qualitatively.
- Xcel should provide a clear set of metrics and performance targets for RMP at the time a request for certification is made.

6.6.2 Overall findings on cost-effectiveness

The BCA indicates that the application for RMP is not cost-effective. However, it is premature to draw any conclusions about cost-effectiveness since the application for certification is incomplete so an assessment on cost-effectiveness cannot be made. Moreover, as discussed previously, the decision about whether to certify the proposed investments should account for both cost-effectiveness and other considerations.

APPENDIX A.

This appendix includes two section. First, the complete set of recommended filing requirements from the Guidance Document is presented below in Section A.1. Then, the results of the completeness review conducted by Synapse is presented in a series of tables in Section A.2.

A.1. Filing requirements

1. Plans Should Be Based on Long-Term Planning

- a. Plans should be consistent with long-term distribution system planning, as required by the Commission in its Orders imposing IDP filing requirements⁸⁸ and any subsequent modifying Orders.
- b. Plans should be consistent with all other distribution, transmission, and resource planning processes.
- c. The goals of each plan should be clearly indicated, and proposals should explain how each of the indicated goals relates to the outcomes of the planning processes referenced in (a) and (b).
- d. The identified goals for the plan should be expressed as concrete and measurable outcomes, to the extent possible.
- e. Proposals should clearly explain how the goals of the plan relate to state policy, statutes, rules, and Commission Orders, including the objectives for grid modernization provided in the Grid Modernization statute⁸⁹ and the Commission's distribution planning goals.⁹⁰

2. Proposals Should Identify the Roles and Relationships of the Components

- a. For each component included in the plan, proposals should describe the component in detail, addressing:

⁸⁸ Minnesota Public Utilities Commission. Docket No. E-002/CI-18-251. Order Approving Integrated Distribution Planning Filing Requirements for Xcel Energy. August 30, 2018. Docket No. E-017/CI-18-253. Docket No. E-017/CI-18-254. Docket No. E-017/CI-18-255. Order Adopting Integrated-Distribution-Plan Filing Requirements. February 20, 2019.

⁸⁹ Minn. Stat. §216B.2425, Subd. 2(e) and Subd. 8.

⁹⁰ Minnesota Public Utilities Commission. Docket No. E-002/CI-18-251. Order Approving Integrated Distribution Planning Filing Requirements for Xcel Energy. August 30, 2018, p. 6.

- i. The functional role of this component;
 - ii. The expected useful life of the component;
 - iii. An explanation of how the component promotes the goals of the plan;
 - iv. The relationship between this component, other components in the plan, and the rest of the grid—including grid modernization components not included in this plan but either already implemented or intended for future implementation; and
 - v. All known and potential future use cases for the component.
- b. Proposals should include details about any requests for proposal (RFP) issued, and any alternative component selection processes, including information about bids received, selection criteria, and rationale for ultimate selection.
- c. For each component included in the plan, proposals should describe all alternative components that were considered, addressing the extent to which each alternative component achieves the identified goals that justify the grid modernization plan.
- d. For every component that is included in the plan and is claimed to be necessary to comply with policy or statutory mandates, the proposal should include a clear explanation of why this component is required to comply with any such mandates.
- e. For every component that is included in the plan and is claimed to be necessary to enable other grid modernization capabilities, functionalities, or technologies, the proposal should include a clear explanation of why this component is required to enable these other grid modernization capabilities, functionalities, or technologies.
- f. For plans including multiple components, proposals should include a narrative that addresses the following:
 - i. Which components are inseparable;
 - ii. Any alternative deployment sequences for installation of components or alternative deployment timelines for installation of components;
 - iii. The effects of substituting selected components for alternatives that were considered in the plan but not ultimately selected. The alternative components that are considered here should be the same as those discussed in response to requirement 2(c).
 - iv. The effects of including grid modernization components that are expected to be proposed in future proceedings but have not been included in the current plan.
- g. For plans including multiple components, proposals should include a description of all reasonable scenarios assessed that had alternative components or

implementation plans—referred to here as alternative deployment scenarios.⁹¹ This description should be based on the narrative information provided in response to requirement 2(f).

- i. Alternative deployment scenarios should include all necessary detail, including identification of all investments included in each alternative deployment scenario and a timeline for these investments.
- ii. Alternative deployment scenarios should differ from the plan on the basis of the components that are included, the installation sequence, or the timeline for installation.

3. Proposals Should Justify the Evaluation Scope

Proposals should indicate the scope of the evaluation by identifying which cost test has been used—whether the Utility Cost Test, the Societal Cost Test, or an alternative test. Proposals should also provide justification as to why the chosen cost test is appropriate. The same cost test should be used consistently throughout the plan.

4. Evaluation Methods Should Be Thoroughly Detailed in the Proposal

Every evaluation included in a grid modernization proposal should meet the following requirements:

- a. Include a reference case that uses only traditional solutions and does not include any new grid modernization investments.
- b. Identify and provide justification for all inputs and assumptions.
- c. Identify the discount rate used and justify its use.
- d. For both the plan and each reasonable alternative deployment scenario that was described for requirement 2(g):
 - i. Indicate all monetized and unmonetized benefits for each component individually;
 - ii. Indicate all monetized and unmonetized benefits for all components together;
 - iii. Indicate all monetized and unmonetized benefits that arise distinctly through the interactions between components, reporting these

⁹¹ The term “alternative deployment scenarios” is used rather than “bundles” to refer to an investment plan other than the plan that has been proposed by the utility. The Commission has used the term “bundles” in, for example, its Order Authorizing Rider Recovery, Setting Return on Equity, and Setting Filing Requirements in Docket No. E-002/M-17-797. Note that there may be a distinction drawn between bundles and portfolios in this context which is not maintained in these filing requirements. See: Minnesota Public Utilities Commission. Docket No. E-002/M-17-797. Order Authorizing Rider Recovery, Setting Return on Equity, and Setting Filing Requirements. September 27, 2019.

- incremental benefits separately for each relevant interaction between components;
- iv. For every benefit identified above in 4(d)i-4(d)iii, indicate how this benefit will be distributed across its beneficiaries, to the extent possible;
 - v. For every unmonetized benefit identified above in 4(d)i-4(d)iii, explain why this benefit cannot be monetized, and justify all alternative methodologies used to gauge non-monetized impacts.
- e. For both the plan and each reasonable alternative deployment scenario that was described for requirement 2(g):
- i. Indicate all costs for each component individually;
 - ii. Indicate all costs for all components together;
 - iii. For every cost identified above in 4(e)i-4(e)ii, provide a breakdown of this cost by the following categories: direct costs (product, service, customer, project, or activity); indirect costs; tangible costs; intangible costs; and real costs;
 - iv. For each of the cost categories listed reported for 4(e)iii, provide the utility's definition of each of the cost categories;
 - v. For each of the cost categories reported for 4(e)iii, indicate whether internal or external labor costs are included in the category, and, if there is overlap between internal and external labor costs, or costs that are included in both categories, outline the overlapping costs and explain.
- f. For each component that is included in the plan, indicate:
- i. Where and when cost recovery will be sought. If recovery for any costs is sought outside of a rate case (i.e., through a rider), provide detailed justification of the eligibility for recovery of any such costs outside of a rate case;
 - ii. Whether this cost has been partially approved already or has been included in previous or ongoing docket riders, rate cases, or other cost recovery mechanisms;
 - iii. Whether it might lead to stranded costs and how such stranded costs were treated in the analysis.
- g. For every grid modernization component not included in the plan but that is expected to be proposed in a future proceeding, detail where and when cost recovery will be sought.

5. Proposals Should Specify Metrics and Targets

All proposals should include recommended metrics and targets for future evaluation of grid modernization benefits, satisfying the following criteria:



- a. Metrics should track the costs, benefits, and other goals identified in the grid modernization evaluation.
- b. Metrics should reflect discrete outcomes.
- c. Targets should correspond to the level of performance assumed in the grid modernization evaluation.
- d. Metrics and targets should reflect the same time periods specified in the grid modernization evaluation.

6. Proposals Should Clearly Present All Results

- a. The proposal should clearly present all the results of all evaluations used to justify the grid modernization plan.
- b. The proposal should present the present value of costs, present value of benefits, present value of net benefits, and the benefit-cost ratio for each plan component individually, and jointly for all components included in the plan.
- c. For each alternative deployment scenario considered, the proposal should present the present value of costs, present value of benefits, present value of net benefits, and the benefit-cost ratio for each component individually, and jointly for all components.
- d. The proposal should include a customer equity analysis, which includes a long-term bill analysis that reflects the impacts on customer bills of the grid modernization plan relative to the reference case:
 - i. The bill analysis should include bills for each customer class and should show annual bill impacts as well as long-term averages.
 - ii. The bill analysis should indicate the likely impacts on low-income, moderate-income, vulnerable, and disadvantaged customers, to the extent possible.
- e. The proposal should include a clear articulation of why each grid modernization component was selected for the grid modernization plan, based on the results of the BCA and the customer equity analysis.



A.2. Completeness review

1. Proposals should be based on long-term planning

Table 1-1. Required information connecting grid modernization plan to other long-term planning

Filing Requirement	Requirement Number	DI	RMP
Plans should be consistent with long-term distribution system planning, as required by the Commission in its Orders imposing IDP filing requirements and any subsequent modifying Orders.	1(a)	PARTIAL	NO
Plans should be consistent with all other distribution, transmission, and resource planning processes.	1(b)	PARTIAL	TBD
The goals of each plan should be clearly indicated, and proposals should explain how each of the indicated goals relates to the outcomes of the planning processes referenced in (a) and (b).	1(c)	PARTIAL	PARTIAL
The identified goals for the plan should be expressed as concrete and measurable outcomes, to the extent possible.	1(d)	NO	NO
Proposals should clearly explain how the goals of the plan relate to state policy, statutes, rules, and Commission Orders, including the objectives for grid modernization provided in the Grid Modernization statute and the Commission's distribution planning goals.	1(e)	YES	PARTIAL

2. Proposals should identify the roles and relationships of the components

Table 2-1. Required basic functional and technical information about each plan component

Filing Requirement	Requirement Number	DI	RMP
Include a description of the functional role of each component	2(a)i	YES	YES
Include the expected useful life of each component	2(a)ii	PARTIAL	YES
Include an explanation of how each component promotes the goals of the plan	2(a)iii	PARTIAL	PARTIAL
Indicate the relationship between each component, other components in the plan, and the rest of the grid – including grid modernization components not included in this plan but either already implemented or intended for future implementation.	2(a)iv	PARTIAL	PARTIAL

Indicate all known and potential future use cases for each component	2(a)v	YES	PARTIAL
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Table 2-2. Required information related to consideration of alternatives to individual plan components

Filing requirement	Requirement Number	DI	RMP
Include details about any solicitation or alternative selection processes, including information about bids received, selection criteria, and rationale for ultimate selection.	2(b)	NO	YES
Include description of all alternatives to the component that were considered, addressing the extent to which the alternative achieves the identified goals that justify the grid modernization plan.	2(c)	NO	NO
For every component that is included in the plan and is claimed to be necessary to comply with policy or statutory mandates, the proposal should include a clear explanation of why this component is required to comply with any such mandates.	2(d)	N/A	N/A
For every component that is included in the plan and is claimed to be necessary to enable other grid modernization capabilities, functionalities, or technologies, the proposal should include a clear explanation of why this component is required to enable these other grid modernization capabilities, functionalities, or technologies.	2(e)	PARTIAL	N/A

Table 2-3. Required information on the development of alternative deployment scenarios in plans with multiple components

Filing Requirement	Requirement Number	DI	RMP
Include a narrative that addresses the following: <ul style="list-style-type: none"> Which components are inseparable Any alternative sequences for installation of components or alternative timelines for installation of components The effects of substituting selected components for alternatives that were considered in the plan but not ultimately selected. The alternative components that are considered here should be the same as those discussed in response to requirement 2(c) The effects of including grid modernization components that are expected to be proposed in other dockets but have not been included in the current plan 	2(f)	NO	NO

<p>Include a description of all reasonable alternative deployment scenarios, based on the narrative information provided in response to requirement 2(f):</p> <ul style="list-style-type: none"> Alternative deployment scenarios should include all necessary detail, including identification of all investments included in each alternative deployment scenario and a timeline for these investments. Alternative deployment scenarios should differ from the plan on the basis of the components that are included, the installation sequence, or the timeline for installation. 	2(g)	NO	NO
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3. Proposals Should Justify the Evaluation Scope

Consistent with the Commission’s requirement in its ADMS Order, the Guidance Document recommends that all utility grid modernization evaluations justify the cost-effectiveness test presented in the filing.

For DI and RMP projects, there is no justification for the chosen scope and no reference to traditional cost-effectiveness tests such as the Utility Cost Test (UCT), Total Resource Cost (TRC) test, or Societal Cost Test (SCT).

4. Evaluation Methods Should be Thoroughly Detailed in the Proposal

Table 4-1. Required fundamental BCA elements

Filing Requirement	Requirement Number	DI	RMP
Include a reference case that uses only traditional solutions and does not include any new grid modernization investments	4(a)	NO	N/A
Identify and provide justification for all inputs and assumptions.	4(b)	PARTIAL	YES
Identify the discount rate used and justify its use.	4(c)	YES	TBD

Table 4-2. Required information on benefits for both the plan and each reasonable alternative deployment scenario

Filing Requirement	Requirement Number	DI	RMP
Indicate all monetized and unmonetized benefits for each component individually	4(d)i	YES	NO
Indicate all monetized and unmonetized benefits for all components together	4(d)ii	NO	PARTIAL

Indicate all monetized and unmonetized benefits that arise distinctly through the interactions between components, reporting these incremental benefits separately for each relevant interaction between components	4(d)iii	NO	NO
For every benefit identified above in 4(d)i-4(d)iii, indicate how this benefit will be distributed across its beneficiaries, to the extent possible	4(d)iv	NO	NO
For every unmonetized benefit identified above in 4(d)i-4(d)iii, explain why this benefit cannot be monetized, and justify all alternative methodologies used to gauge non-monetized impacts	4(d)v	NO	NO

Table 4-3. Required information on costs for both the plan and each reasonable alternative deployment scenario

Filing Requirement	Requirement Number	DI	RMP
Indicate all costs for each component individually	4(e)i	YES	YES
Indicate all costs for all components together	4(e)ii	YES	YES
For every cost identified above in 4(e)i-4(e)ii, provide a breakdown of this cost by the following categories: direct costs (product, service, customer, project, or activity); indirect costs; tangible costs; intangible costs; and real costs	4(e)iii	YES	NO
For each of the cost categories listed reported for 4(e)iii, provide the utility's definition of each of the cost categories	4(e)iv	PARTIAL	NO
For each of the cost categories reported for 4(e)iii, indicate whether internal or external labor costs are included in the category, and, if there is overlap between internal and external labor costs, or costs that are included in both categories, outline the overlapping costs and explain	4(e)v	NO	NO

Table 4-4. Required information on costs recovery for each plan component

Filing Requirement	Requirement Number	DI	RMP
For each component, indicate where and when cost recovery will be sought. If recovery for any costs is sought outside of a rate case (i.e., through a rider), provide detailed justification of the eligibility for recovery of any such costs outside of a rate case	4(f)i	YES	PARTIAL

For each component, indicate whether this cost has been partially approved already or has been included in previous or ongoing docket riders, rate cases, or other cost recovery mechanisms	4(f)ii	PARTIAL	TBD
For each component, indicate whether it might lead to stranded costs and how such stranded costs were treated in the analysis.	4(f)iii	NO	NO
For every grid modernization component not included in the plan but that is expected to be proposed in a future proceeding, detail where and when cost recovery will be sought	4(g)	NO	N/A

5. Proposals Should Specify Metrics and Targets

Table 5-1. Required Metrics and Targets

For each component, whether the proposed:	Filing Requirement	DI	RMP
Metrics should track the costs, benefits, and other goals identified in the grid modernization evaluation	5(a)	NO	NO
Metrics should reflect discrete outcomes	5(b)	NO	NO
Targets should correspond to the level of performance assumed in the grid modernization evaluation	5(c)	NO	NO
Metrics and targets should reflect the same time periods specified in the grid modernization evaluation	5(d)	NO	NO

6. Proposals Should Clearly Present All Results

Table 6-1. Reporting of benefits and costs

For each component, whether the detail includes:	Filing Requirement	DI	RMP
The proposal should clearly present all the results of all evaluations used to justify the grid modernization plan.	6(a)	PARTIAL	PARTIAL



The proposal should present the present value of costs, present value of benefits, present value of net benefits, and the benefit-cost ratio for each plan component individually, and jointly for all components included in the plan.	6(b)	PARTIAL	PARTIAL
For each alternative deployment scenario considered, the proposal should present the present value of costs, present value of benefits, present value of net benefits, and the benefit-cost ratio for each component individually, and jointly for all components.	6(c)	NO	N/A

Table 6-2. Reporting of equity impacts

For each component, whether the detail includes:	Filing Requirement	DI	RMP
<p>The proposal should include a customer equity analysis, which includes a long-term bill analysis that reflects the impacts on customer bills of the grid modernization plan relative to the reference case:</p> <ul style="list-style-type: none"> The bill analysis should include bills for each customer class and should show annual bill impacts as well as long-term averages The bill analysis should indicate the likely impacts on low-income, moderate-income, vulnerable, and disadvantaged customers, to the extent possible 	6(d)i–6(d)ii	PARTIAL	NO

Table 6-3. Articulation of rational for component selection

For each component, whether the detail includes:	Filing Requirement	DI	RMP
The proposal should include a clear articulation of why each grid modernization component was selected for the grid modernization plan, based on the results of the BCA and the customer equity analysis.	6(e)	PARTIAL	NO

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Xcel Energy Information Request No. 3
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, Table 3. Are there any potential overlaps in benefits between AMI proposed in the TCRR and DI proposed in IDP? If yes, please describe. If no, please justify how overlaps of benefits between these two programs were separated to avoid double counting.

Response:

As described in Appendix G (pages 7-8), DI benefits are associated with innovative capabilities of computer processing not available with traditional AMI. As such, the primary drivers of benefits for DI as put forward in Appendix G Table 3, are connected to customer bill savings as a result of additional capabilities for local data processing and analytics at the meter, resulting overall in incremental energy usage reductions.

As part of our AMI initiative as included in our 2021 TCR Petition in Docket No. E002/M-21-814, we projected several O&M, Capital, and other customer benefits including, but not limited to, load flexibility (Critical Peak Pricing and Time of Use) benefits. These load flexibility benefits were focused on limited generation and transmission and distribution (T&D) avoidances, as well as limited price shifting from on-peak to off-peak. To mitigate potential overlap and double-counting between AMI and DI, we focused our assessment of benefits associated with DI on the incremental value and capabilities that we believe DI will be able to deliver as a result of operating from a less centralized system to a more distributed one, where customers will have more options. That said, system benefits associated with energy reductions due to

demand management or TOU impacts were not projected as part of the DI benefits, even though we expect DI to enable and potentially more cost-effectively help to achieve the benefit projections that we put forward as part of our AMI proposal.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 4
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, pages 11-19, please indicate if the benefits of each of the customer facing use cases have been observed and quantified within Xcel's territory through pilot projects or whether these benefits have been observed and quantified within any other jurisdiction. Please provide supporting information that corroborates the observed benefits.

Response:

Because Distributed Intelligence is a new capability with our AMI investment, we have not observed these benefits directly within any of Xcel Energy's jurisdictions to-date. Rather, the benefits were estimated for Minnesota based upon customer research for participation and engagement rates and peer utility research with comparable energy insights products and services.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 1, 2022

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Xcel Energy Information Request No. 5
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, pages 11-19, please identify any customer surveys that point to the specific needs driving these customer-facing use cases including information on the price customers are willing to pay for such services.

Response:

The customer-facing use cases identified in Appendix G, pages 11-19 included:

1. HAN
2. Energy Analysis (appliance disaggregation)
3. EV Detection

We used customer panel surveys to gauge customer interest in various solutions and services and other products, as well as their willingness to pay. Surveys from 2019 indicated that a majority of customers who ranked a product in their top three would be willing to pay \$1-2 per month for services such as arc detection, appliance health monitoring, virtual energy advisor, and smart energy optimizer (Figure 1). The panel surveys we conducted in April 2020 were conducted with 515 customers in Colorado and Minnesota to gauge interest in general services (Figure 2) and interest in more specific services (Figure 3).

Figure 1: Willingness to Pay for Services – 2019 Surveys

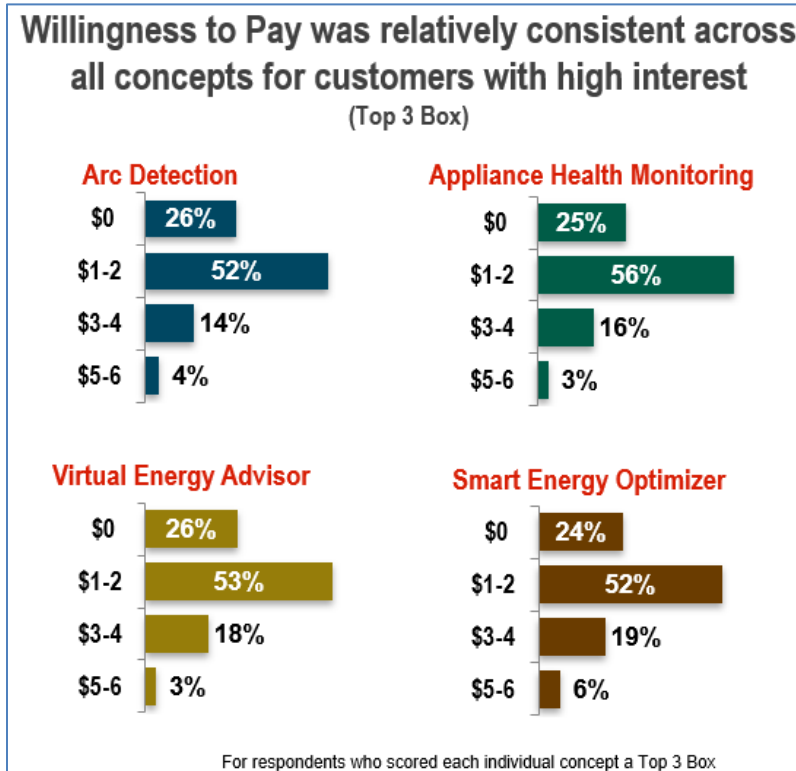
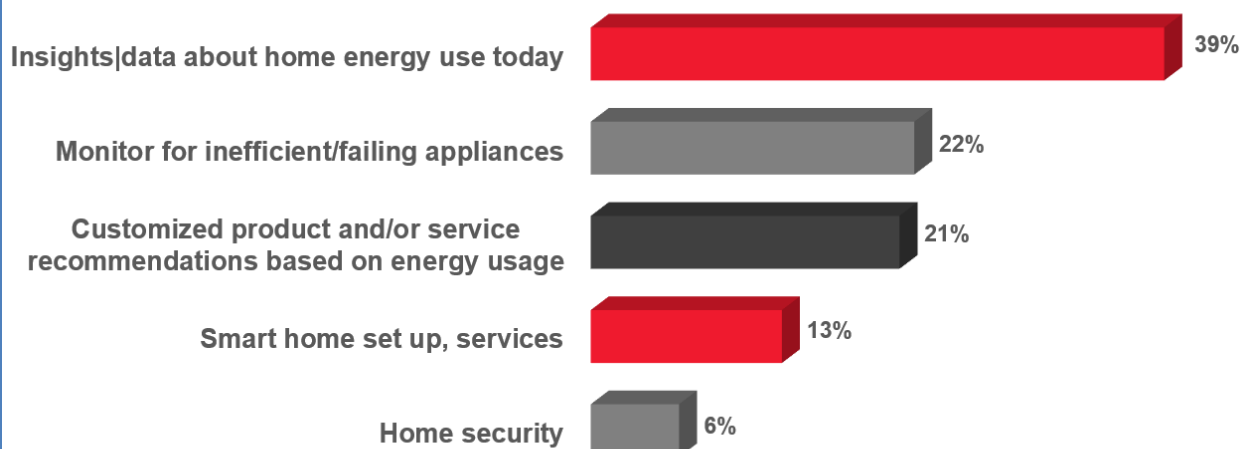


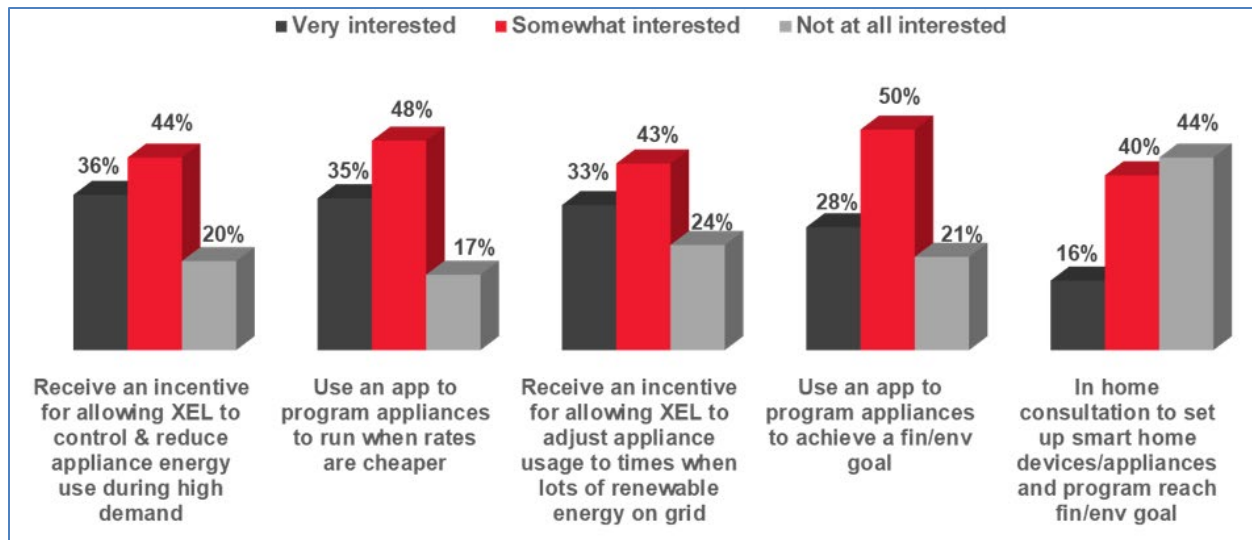
Figure 2: Customer Interest Levels in General Services – April 2020 Surveys

Customer Interest Levels in General Services



Beyond providing power to your home, what other services would you like Xcel Energy to offer? Please rank the following items, with 1 being the most desirable and 5 being the least desirable.

Figure 3: Customer Interest in Specific Services – April 2020 Surveys



In addition, ZeitGeist Research conducted online focus groups (via video conference) for the Company with 21 Denver-area Xcel Energy electricity customers during the weeks of July 27 and August 3, 2020. Customers included those with advanced technology interests and capabilities and those without and included a mix of:

- Owners and Renters
- Ethnicity
- Gender
- Age
- Income

Customers were asked questions about the following program concepts:

- Real-Time Energy Usage
- Disaggregation
- Home Appliance Monitoring
- Home Automation and Control
- Virtual Home Energy Audit

Some of the key findings from these focus groups that are applicable to HAN include:

- Customers believe they will be able to save money, both through improved habits and more control over their usage. This ties into several of their key desires on how they want Xcel Energy to innovate: lower my bill, help me use less energy, help me use more renewables, and alert me if my usage is high or abnormal.
- For many, the potential to lower their environmental impact is a more

appealing benefit than cost savings. For some in the focus group, they felt as if their consumption and bill were already low due to their actions, so were not convinced of the value of smart meters. However, when the topic of environmental messaging was discussed, the same customers saw tremendous value. This is also consistent with the message that customers' interest in saving energy goes beyond cost savings.

- Customers are excited about the potential to control appliances and devices, though cost is a perceived barrier for many in upgrading to a smart home.
- Customers were interested in ensuring that their data and privacy were respected and that their personal information was secure.
- Most customers want to use less energy as long as it is easy for them to do so. Products need to focus on saving the customer time and making their life better.
- Customers already feel overwhelmed with alerts and notifications from all the apps they use today. They want to manage alerts from the Xcel Energy app.

Customer inputs about program concepts from ZeitGeist work is further summarized below in Figure 4.

**Figure 4: Customer Inputs about Program Concepts – July/August 2020
 Online Focus Groups**

PROGRAM CONCEPTS	Real-Time Energy Usage	<ul style="list-style-type: none"> ✓ Insight into energy usage beyond what's on the bill at the end of the month. ✓ Potential to lower energy use, cost, environmental impact. - A minority are not willing to put forth any effort to lower their energy use. - Real-Time seems overwhelming to some who prefer data be presented in a way that is easier to consume.
	Disaggregation	<ul style="list-style-type: none"> ✓ Seeing the actual cost of using each appliance rather than energy consumption is very appealing because many customers don't understand the kWh metric, but they can understand dollar amounts and how that impacts their bill. - Customers are unsure of how this will work and concerned they may need to purchase smart appliances to participate.
	Home Appliance Monitoring	<ul style="list-style-type: none"> ✓ Most customers are not appliance experts and cannot assess performance until the unit is not functioning. ✓ Alerts from Xcel telling customers when their appliance needs attention are welcome. - Some customers are unsure how Xcel can tell if their appliances are not working properly and are <u>concerned</u> they may receive a false alarm. - Some customers are unsure how Xcel can tell if their appliances are not working properly and are concerned about receiving false alarms.
	Home Automation and Control	<ul style="list-style-type: none"> ✓ Customers like the idea of being able to control devices remotely. ✓ The concept of scheduling events when energy is cheaper or renewable is abundant is very appealing, <u>as long as</u> the customer is in control of the schedule. - Most customers do not want to purchase new appliances or smart plugs to participate. - Some who are already invested in smart devices (Nest, Alexa) are not interested in moving controls to an Xcel app.
	Virtual Home Energy Audit	<ul style="list-style-type: none"> ✓ Customers are interested in learning where they could save energy and the concept of a virtual audit is low cost/risk, so "Why not try it?" - Customers have doubts about how much Xcel can really tell them without being in their home.

Preparer: Drew Quirk
 Title: Manager, Business Solutions & Results
 Department: Advanced Grid Customer Solutions
 Telephone: 612.337.2024
 Date: February 3, 2022

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Xcel Energy Information Request No. 6
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, Table 3, how has the Company accounted for AMI opt-outs that may occur in estimating the benefits of DI?

Response:

Customers who opt-out of AMI are not included in our DI benefit estimates. We expect the number of customers who will opt out of AMI to be less than one percent and, therefore, are not likely to have a material impact on our benefits estimates. Additionally, the meters that opt-out customers will receive will not have DI capabilities.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 1, 2022

DATA & ANALYTICS

HOW DISTRIBUTED INTELLIGENCE DEMONSTRATES VALUE

- COUNTRY: USA
- AREA: FLORIDA

More than ever, operating a modern grid with increasing penetration of variable decentralised generation and complex power flows requires visibility from the edge up to the control room. As the number of connected devices increases, from smart appliances and distributed generation in the home to sensors and gateways in substations and the network, distributed intelligence opens the way for more rapid awareness and insights by moving processes away from the central control room to distributing them across the grid.

When central Florida utility Tampa Electric Company embarked on the upgrade of its 810 000 meters with smart meters, the opportunity presented itself to investigate the potential for distributed intelligence (DI) in the meters to provide customer and grid operation benefits.

To explore this innovation and validate the decision to implement distributed intelligence applications, Tampa Electric, in partnership with Itron, opted for a leading analytics company to test the performance

against back-office cloud analytics to determine which option would deliver the maximum value in terms of detecting conditions more effectively.

Tampa Electric expected that moving the analytics to the meter with access to one-second data and peer-to-peer communications would deliver greater accuracy in finding conditions and result in a higher yield and fewer inference and wasted resources.

With faster decision-making based on more valuable information –

assuming the value of data degrades with latency – a significant drop in the total cost of ownership could result through less data backhaul, storage and analysis in the back-office.

Tampa Electric selected three applications (apps) for testing in the lab over one month: meter bypass theft detection; residential neutral fault detection; and high impedance detection.

Among the results, the meter bypass theft detection DI app identified all ten use cases; how whereas, while the back-

office analytics identified all the use cases as well, it also produced seven false positives.

The residential neutral fault detection DI app identified six use cases, but the back-office analytics identified zero use cases as the attributes required to identify broken neutrals are not present in the data available in the back-office.

Similarly, the high impedance detection DI app also identified all the five use cases, but again the back-office analytics identified zero use cases as the attributes required to identify broken neutrals are not present in the back-office data.

“These results demonstrated that Tampa Electric’s predictions were correct in that the access of distributed intelligence to real-time data provided actionable information and the ability to tackle problems from

an entirely different perspective,” says David Lukcic, Director of AMI Strategic Solutions at Tampa Electric.

“In addition, distributed intelligence has enabled the discovery of events with safety and customer impact issues that are otherwise undetectable by back-office analytics, and highlighted the potential money savings in investigating false positives.”

NEXT STEPS

With Tampa Electric’s smart meter rollout now largely complete, some features have become effective immediately. Among these are the more convenient starting and stopping of electricity services, increased privacy with secure meter read data transmission and minimisation of estimated bills.

Further benefits that are being planned include the provision of alerts and other information for consumers to control their electricity use and potentially more payment options.

Tampa Electric is also in the process of deploying the distributed intelligence apps in the field, and these can be uploaded to the smart meters in the same way as apps are to smartphones.

Tampa Electric and Itron have jointly conducted the first real-world, large scale pilot project to demonstrate that Itron’s Distributed Intelligence (DI) applications can be deployed at scale and deliver their intended outcomes in a real-world, production environment.

Tampa Electric was aiming for full-scale deployment of the three distributed intelligence apps by the end of 2021. In 2022, the company plans to work toward a second bundle of apps to include location awareness, electric vehicle and photovoltaic (PV) detection.

Lukcic explains that Tampa Electric’s interest in distributed intelligence emerged as part of its broader digital transformation around the automation of data and services. The company is well on its way to maximising the benefits of earlier AMI investments and was looking for ways to further improve service delivery and to provide additional revenue opportunities in a decentralising system.

“We’re one of the first utilities in the country that’s teaming up with technology companies to test and develop apps that can help detect failing equipment before an outage occurs, detect tampering with meters and more,” comments Lukcic.

In a survey with Zpryme, almost three-quarters of respondents reported that grid edge technology is critical to their utility’s future. Outage identification and management, a key use case outcome of distributed intelligence, was identified as the number one plan for managing and creating customer value in the grid. ■

➡➡
These results demonstrated that Tampa Electric’s predictions were correct in that the access of distributed intelligence to real-time data provided actionable information.
◀◀

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Xcel Energy Information Request No. 7
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, page 6, in reference to the deployment of DI capable meters in Tampa, please provide any studies or data that support the reported benefits of the DI-capable meter over traditional AMI meters that are being observed through deployment in Tampa.

Response:

As noted on the page referenced, we are aware that TECO has installed DI-capable meters and is deploying some grid-facing DI applications.

With that said, we are also aware that TECO's initial deployment of DI has focused on three grid-facing applications: (1) meter bypass theft detection, (2) residential neutral fault detection, and (3) high impedance detection. We are aware that based on their initial deployment, DI has provided benefits and performed as expected – identifying issues for each of these grid-facing Use Cases. We provide as Attachment A, an article in the Clarion Power & Energy Elites that outlines the results of TECO's test uses, all of which demonstrated better results by processing the real-time data at the meter with the DI capabilities compared to processing it in the back-office.

The Company is unable to detect these types of issues today, unless we investigate an issue that a customer has reported. DI has the capability to provide the Company with real-time actionable data that previously was not possible and that will bring

value to our customers and our operations.

Preparer: Chad Nickell
Title: AGIS Delivery Lead for Distribution
Department: System Planning & Strategy
Telephone: 303.571.3502
Date: February 3, 2022

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Xcel Energy Information Request No. 8
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

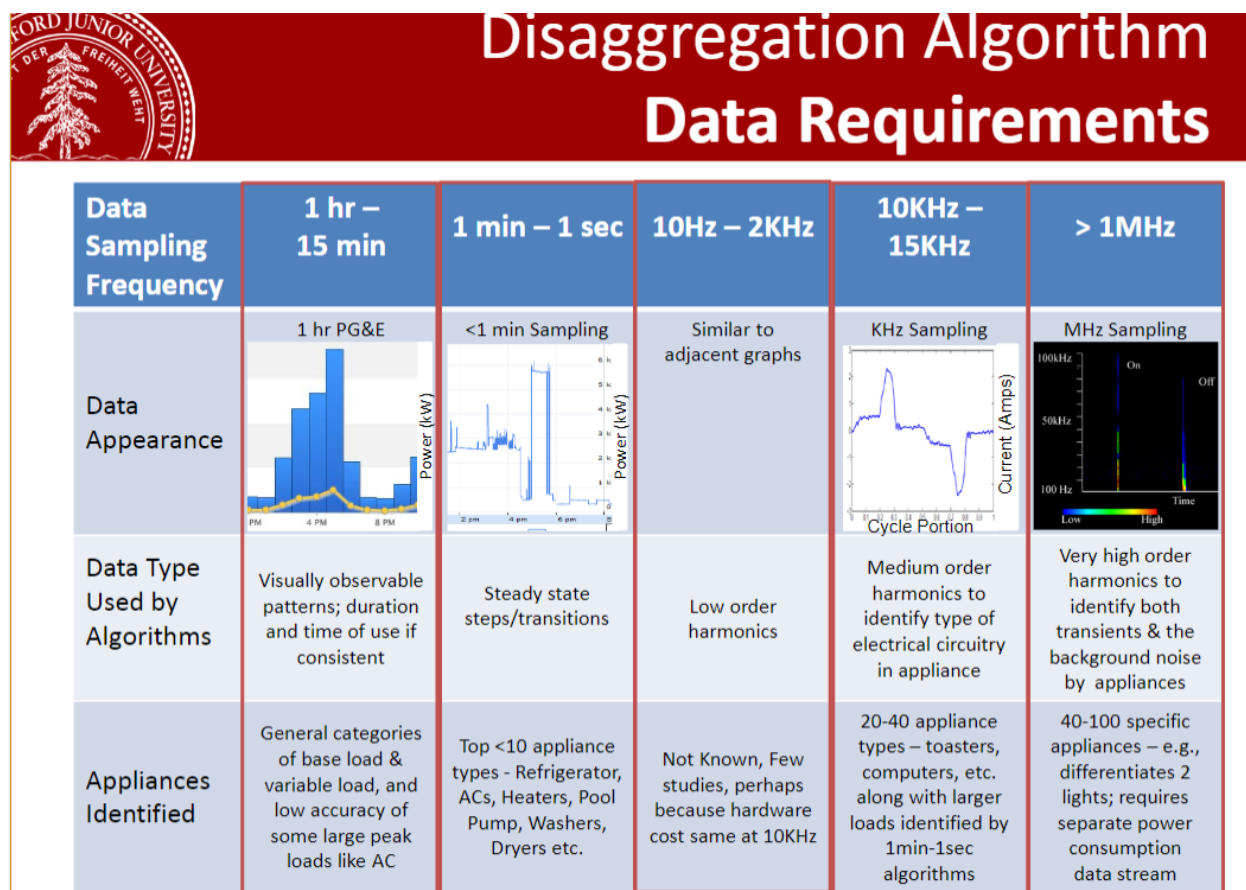
Referring to Appendix G, page 9, please provide any research conducted by the Company that indicates the level of data granularity required by customers – i.e., any research that indicates that customers require decentralized processing of sub-second data as opposed to five- or fifteen-minute data.

Response:

We did not assess customer preferences regarding the level of data granularity. As illustrated in our response to DOC-5, customers have expressed interest in services that require greater levels of granularity, including real-time data access, appliance health monitoring, and disaggregation. For all of these services, the results for customers will be better with more granular data.

Figure 1 below illustrates that as the frequency of data used for disaggregation predictions increases, the ability to accurately identify the specific appliances also increases.

Figure 1: Disaggregation Data Requirements¹



Preparer: Drew Quirk
 Title: Manager, Business Solutions & Results
 Department: Advanced Grid Customer Solutions
 Telephone: 612.337.2024
 Date: February 3, 2022

¹ Armel, Carrie. (December 2011). *Energy Disaggregation* [PowerPoint presentation]. Precourt Energy Efficiency Center, Stanford. <https://web.stanford.edu/group/peec/cgi-bin/docs/events/2011/becc/presentations/3%20Disaggregation%20The%20Holy%20Grail%20-%20Carrie%20Armel.pdf>.

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Xcel Energy Information Request No. 11
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program

Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, page 10, the Company indicates that it “could choose to focus initially on only grid-facing uses of DI (as at least one other electric utility is doing); however, we have chosen to deploy both initial customer- and grid-facing use cases because of the forecasted benefits to our customers.”

Please provide any further information and analysis that supports this conclusion and choice of deploying both customer- and grid-facing use cases simultaneously as opposed to deploying only gridfacing use cases.

Response:

As we show in our response to DOC-5, customers are interested in the types of services that are enabled through DI. We also want to maximize our investment in AMI to the benefit of our customers. These combined have prompted us to initially implement both customer and grid-facing Use Cases.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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☐ Public Document – Not Public Data Has Been Excised
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Xcel Energy Information Request No. 12
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, page 33, regarding alternatives, please quantify the total incremental benefits of DI-enabled AMI meters (inclusive of the benefits of implementing DI) compared with traditional AMI meters.

Response:

The DI benefits that we have quantified and qualitatively discussed in Appendix G are incremental to the benefits we have attributed to our implementation of AMI. We note that we have not attempted to quantify additional benefits beyond those we have specified for the period of time covered by the IDP. We also note that Appendix G discusses potential future Use Cases that would have additional benefits.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 1, 2022

Docket No. E002/M-21-694

DOC IR No. 013

Attachment A - Page 1 of 1

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NOT FOR PUBLIC DISCLOSURE
NOT PUBLIC IN ENTIRETY

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Attachment A to this response has been designated as Trade Secret information pursuant to Minn. Stat. § 13.37, subd. 1(b). In particular the documents contain confidential information relating to proprietary technology, pricing, and contract terms. The information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Pursuant to Minn. R. 7829.0500, subp. 3, the Company provides the following description of the excised material:

1. Nature of the Material: Confidential bid and contract information.
2. Author(s): Project Sourcing.
3. Importance: This response and Attachment A contain proprietary details regarding the vendors' technology, pricing, and terms.
4. Date the Information was Prepared: February 2022 and October 2020.

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Xcel Energy Information Request No. 13
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, page 33, regarding alternatives, please quantify the total incremental costs of DI-enabled AMI meters (inclusive of the costs of implementing DI) compared with traditional AMI meters.

Response:

Please see our response to Revised TRADE SECRET DOC-8 from Docket No. E999/DI-20-627, a copy of which is attached. That discovery response answered a similar request and provided information regarding the cost of the selected Riva 4.2 meter and the cost of other meters, including AMI meters without DI. As was noted in that prior discovery response, the "Riva 4.2 meter provided an advanced meter with DI capabilities **[PROTECTED DATA BEGINS**

PROTECTED DATA ENDS]

From an O&M perspective, **[PROTECTED DATA BEGINS**

PROTECTED DATA ENDS]

The anticipated costs of developing the foundational capabilities necessary to use DI and deploy the first wave of uses for DI are provided in Tables 1 and 2 of Appendix

G. These are the costs for which the Company is seeking certification as part of its 2021 IDP.

Portions of this response and Attachment A to this response have been designated as Trade Secret information pursuant to Minn. Stat. § 13.37, subd. 1(b). In particular the documents contain confidential information relating to proprietary technology, pricing, and contract terms. The information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Pursuant to Minn. R. 7829.0500, subp. 3, the Company provides the following description of the excised material:

1. Nature of the Material: Confidential bid and contract information.
2. Author(s): Project Sourcing.
3. Importance: This response and Attachment A contain proprietary details regarding the vendors' technology, pricing, and terms.
4. Date the Information was Prepared: February 2022 and October 2020.

Preparer:	Mark Raak
Title:	Manager, Capital Projects Sourcing
Department:	Supply Chain
Telephone:	612-330-6667
Date:	February 3, 2022

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Xcel Energy Information Request No. 14
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, page 12, please indicate how many customers HAN connectivity is expected to reach under the proposed DI.

Response:

Our long-term projection of HAN enrollment is 9.75 percent, which is based on a projected eligibility rate of 65 percent and an adoption rate of 15 percent ($65\% \times 15\% = 9.75\%$). We explain these further below:

- *Eligibility Rate* – this represents a weighted average rate of the percent of Xcel Energy customers by dwelling type (e.g. single family, townhome, apartment, etc.) and the availability of smart phones and home Wi-Fi, and being within Wi-Fi range of the meter for each dwelling type.
 - *Availability of smart phones* – estimated at 90 percent based on penetration rates of iOS and Android devices.
 - *Availability of home Wi-Fi* – based on Xcel Energy Customer Insights studies from 2020. Single family homes had the highest value at 87 percent, and apartments and mobile homes had the lowest at 74 percent.
 - *Range of Wi-Fi* – Estimated values with single family, townhome, and mobile homes assigned higher values (>90 percent) and condominiums and apartments were assigned lower values (50 percent).
 - *Adoption Rate* – an estimate based on the take-rate of a peer utility when they transitioned their real-time usage HAN service to App-based, and also confirmed by direct customer research undertaken by the Company.
-

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 1, 2022

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☐ Public Document – Not Public Data Has Been Excised
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Xcel Energy Information Request No. 15
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, page 14, please provide any quantified benefits that resulted from the demonstration of the energy analysis use case that the Company may have conducted (whether in the form of testing or a pilot).

Response:

The benefits of the of energy analysis use case are set forth in Appendix G, Section F: Cost-Benefit Analysis of the DI Project. These benefits were informed by assumptions derived from industry research, customer data analysis, and direct customer research including the activities described in Appendix G, page 14.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 1, 2022

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Xcel Energy Information Request No. 16
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, page 16, please provide any information regarding current EV penetration within Xcel's territory and expected growth over the next 15 years. Please indicate whether this information is consistent with EV forecasts that Xcel has provided in other proceedings

Response:

- *Current EV Penetration and Forecast:* The most recent available IHSMarkit zip code level detail that is available is from September 2021. The IHSMarkit data provides volumes of electric vehicles (EV) registered by zip code, which we use to estimate the numbers of EVs in our service area. Using the September 2021 data, we estimate that there are approximately 19,000 electric vehicles (EV) in Xcel Energy's Minnesota service territory, which is about 0.5 percent penetration. Our latest forecast of expected future growth of EV penetration within the Xcel Energy service area is presented in Appendix E2, page 24 (Figure 11) of our November 2021 IDP.
 - *Forecast Timing and Vintage:* We update our forecast annually in June. As such, our November 2021 IDP reflects the Company's June 2021 forecast. With respect to the vintage of EV forecast included in other proceedings, that will depend on the timing and context or requirements specific to those other proceedings.
-

Preparer: Jason Mauch
Title: Manager, Asset Risk Management
Department: Risk Analytics
Telephone: 303.571.2735
Date: February 1, 2022

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Xcel Energy	Information Request No.	17
Docket No.:	E002/M-21-694	
Response To:	Minnesota Department of Commerce	
Requestor:	Matthew Landi & Divita Bhandari	
Date Received:	January 21, 2022	

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 21. How are the benefits associated with reduced open secondary neutral application calculated? Please provide the isolated benefits.

Response:

Please see our response to Fresh Energy Information Request No. 12 in this docket, provided to the Department February 1, 2022.

Preparer: Chad Nickell
Title: AGIS Delivery Lead for Distribution
Department: System Planning & Strategy
Telephone: 303.571.3502
Date: February 1, 2022

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Xcel Energy Information Request No. 18
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 20. How are the benefits associated with high/low impedance detection calculated? Please provide the isolated benefits.

Response:

Please see our response to Fresh Energy Information Request No. 12, provided to the Department February 1, 2022.

Preparer: Chad Nickell
Title: AGIS Delivery Lead for
Department: System Planning & Strategy
Telephone: 303.571.3502
Date: February 1, 2022

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Xcel Energy Information Request No. 19
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 22. How are the benefits associated with meter bypass theft detection calculated? Please provide the isolated benefits.

Response:

Please see our response to Fresh Energy Information Request No. 14, provided to the Department February 1, 2022.

Preparer: Chad Nickell
Title: AGIS Delivery Lead for
Department: System Planning & Strategy
Telephone: 303.571.3502
Date: February 1, 2022

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Xcel Energy Information Request No. 21
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 25, Table 1. Please provide justification for why each of these capital costs was not included in AMI certification.

Response:

Please see the response to DOC IR No. 2.

Preparer: Drew Quirk
Title: Manager, Business Solutions &
Department: Advanced Grid Customer
Telephone: 612.337.2024
Date: February 1, 2022

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Xcel Energy Information Request No. 22
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, page 33, did Xcel measure the costs and benefits of any alternatives to DI? If no, then please explain why not.

Response:

No, due to the embedded DI capabilities of the meters we selected, we did not explicitly analyze any alternatives to DI. To replicate an equivalent level of data granularity and communication capability that the embedded DI capabilities of our selected AMI meters provide, additional hardware and networking would be required, which would ultimately be much more expensive.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 23
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 36-37. For each of the benefits listed, please cite to any metrics that have been included in this application, including those proposed for other technologies, that will capture this benefit.

Response:

In our Petition for cost recovery of AMI and FAN in Docket No. E002/M-21-814, we outlined numerous metrics that stemmed from the Department's December 1, 2020 Report *Methods for Performance Evaluations, Metrics, and Consumer Protections for AMI and FAN* that we agreed to report.¹ Some of these correlate to our implementation of DI. For example, in Table 15:

- Number of customers with an advanced meter with an active web portal account
- Number of monthly, unique visits to the web portal
- Percentage of customers with an advanced meter with Home Area Network (HAN) functionality
- Number of customers with an advanced meter with Home Area Network (HAN) functionality

And, in Table 16:

- Customer access to hourly or sub-hourly data
- Variety, quality, accessibility of customer data available

¹ See Attachment 4, Section XI Metrics and Reporting, Xcel Energy Petition, In the Matter of the Petition of Northern States Power Company for Approval of the Transmission Cost Recovery Rider Revenue Requirements for 2021 and 2022, Tracker True-Up, and Revised Adjustment Factors (November 24, 2021).

As we also explain in that filing and the proceedings that lead to the metrics identified in the Department's Report, any metrics must be aligned with the benefits we anticipate from our implementation – which can only be known at the time the specific technology, design, scope and implementation plans are approved by the Commission. As such, any metrics at the point of a certification request would be illustrative and would need to be refined based on the outcome of a subsequent cost recovery proceeding that pairs a specific plan and its associated revenue requirements with the functionality that will create the benefits – providing the necessary balance between costs, benefits, and accountability for the Company.

So while we thoughtfully prepared the cost and benefit estimates in our proposal, and believe they are reasonable estimates of the initial costs and benefits we expect from our DI investment, the actual costs and benefits depend on the technology, design, scope, and implementation plans approved by the Commission. As such, although we do not oppose such metrics conceptually, it would be premature to establish metrics that go beyond the above at this time. Instead, we believe it would be best to wait until the DI technology is fully operational, and then establish metrics based on the actual approved functionality.

Preparer: Jody Londo
Title: Regulatory Policy Specialist
Department: Regulatory Affairs
Telephone: 612.330.5601
Date: February 1, 2022

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Xcel Energy Information Request No. 24
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 37-38. For each of the benefits listed, please indicate why this benefit cannot be quantified and/or monetized.

Response:

Please see Appendix G, pages 13 to 16, 18, 21 to 24, and 36 to 38 and the Company's response to Fresh Energy Information Request Nos. 12 and 14, and our response to DOC-20. In addition, the Company notes that DI is a newer technology, and so there is little to no historical or comparative information available to quantify the benefits of certain planned uses of DI.

The Company has not estimated energy savings beyond 2026 because we believe it is best to take a conservative approach to the quantification of benefits for this emergent software. As such, we did not quantify benefits beyond the 5-year expected life for software. That said, the meters themselves have a significantly longer life – and we expect their DI capabilities will continue to facilitate customer savings well beyond 2026, even if the amounts of such savings cannot be quantified at this time with sufficient certainty. Consequently, we believe that the benefits of DI over the life of the meters will be greater than reflected in the CBA presented.

We also note that in the future, we expect to develop and present quantified estimates of expected environmental benefits and avoided system costs for services and

solutions supported by DI as a part of our CIP program as noted in our response to DOC-25.

Preparer:	Drew Quirk	Chad Nickell
Title:	Manager, Business Solutions & Results	AGIS Delivery Lead for Distribution
Department:	Advanced Grid Customer Solutions	System Planning & Strategy
Telephone:	612.337.2024	303.571.3502
Date:	February 3, 2022	February 3, 2022

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Xcel Energy Information Request No. 25
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 36 – 37. For each of the benefits listed, please indicate whether Xcel has a concrete plan for achieving this benefit, specifically addressing the timeline in which the benefit will be achieved and any other incremental investments required to achieve this benefit.

Response:

Benefit	Response
Customer bill savings through 2026	Yes, the Company plans to achieve this benefit beginning upon the introduction of the energy insights solution, which is currently projected to be available by the end of 2022 or early 2023.
Customer Savings after 2026	The Company plans to achieve this benefit after evaluation of the initial introduction period of 2022 – 2026.
Environmental Benefits	The Company plans to introduce a CIP Program that has established methodologies for quantifying and achieving this benefit. We expect to begin to achieve this benefit with the approval and launch of this program, likely in 2023.
Avoided System Costs	The Company plans to introduce a CIP Program that has established methodologies for quantifying and achieving this benefit. We expect to begin to achieve this benefit with the approval and launch of this program, likely in 2023.
Distributed grid reliability and efficiency	Please see the Company's response to Fresh Energy Information Request No. 12.
Public Safety	Please see the Company's response to Fresh Energy IR No. 14.
Planning and Modeling	Please see the Company's response to DOC-20.
Increase meter service life	The Company has not attempted to quantify the increase in meter service life.

Preparer:	Drew Quirk	Chad Nickell
Title:	Manager, Business Solutions & Results	AGIS Delivery Lead for Distribution
Department:	Advanced Grid Customer Solutions	System Planning & Strategy
Telephone:	612.337.2024	303.571.3502
Date:	February 3, 2022	February 3, 2022

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Xcel Energy Information Request No. 26
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to the benefits of Appendix G, page 36-37. For each benefit that can only be achieved by DI in conjunction with other grid modernization components, specify the additional component(s) that will interact with DI to achieve this benefit.

Response:

Benefit	Response
Customer savings through 2026	AMI, FAN
Customer savings after 2026	AMI, FAN
Environmental benefits	AMI, FAN
Avoided system costs	AMI, FAN
Distribution grid reliability and efficiency	AMI, FAN
Public safety	AMI, FAN
Planning and modeling	AMI, FAN
Increase meter service life	AMI, FAN
Future use cases	To be determined, but at a minimum, AMI and FAN

Preparer:	Drew Quirk	Chad Nickell
Title:	Manager, Business Solutions & Results	AGIS Delivery Lead for Distribution
Department:	Advanced Grid Customer Solutions	System Planning & Strategy
Telephone:	612.337.2024	303.571.3502
Date:	February 1, 2022	

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Xcel Energy Information Request No. 27
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 36-37, would DI be cost effective if ADMS, AMI, FLISR, and FAN were not to be installed? Please explain in detail.

Response:

DI is a technological capability of the AMI meters purchased by the Company; it is not a separate component of AGIS. AMI meters with DI capabilities are the next step in AMI metering, not an alternative to AMI metering or any other AGIS component. The computing capabilities of the DI-capable meters open up new possibilities and offer an improved form of AMI metering, but in isolation the computer processors and memory do not have any functionality.

The Riva 4.2 meters each contain the computer hardware necessary for some on-meter processing of data. It is this data processing capability, or "intelligence," that is "distributed" throughout our distribution grid as a result of its location on individual meters. Consequently, DI cannot exist without installation of the AMI meters. The FAN is also necessary for DI because it provides the network used to communicate with the meters as it would be for AMI without DI capabilities.

ADMS provides the platform for the overall management of the distribution system, which includes the AMI meters. The DI capabilities of the new meters do not depend on FLISR; however, there could be future use cases in which the DI capabilities of the new meters are used to support and improve FLISR or other advanced applications.

Preparer: Chad Nickell
Title: AGIS Delivery Lead for
Department: System Planning & Strategy
Telephone: 303.571.3502
Date: February 1, 2022

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Xcel Energy Information Request No. 28
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 20-22. How were each of the customer- and grid-facing DI use cases prioritized? What assessment or selection criteria was utilized?

Response:

The Company used several criteria to prioritize Use Cases, including: the customer benefits/operational value and complexity of each Use Case (including considerations such as data granularity, analytic complexity, customer engagement and device interoperability); the technical interrelationships between Use Cases; the Company's strategic priorities and long-term goals; market and economic forces; the Use Case's fit within current regulatory structures; and the impact of current technological capabilities of Xcel Energy and potential partners on deployment of a particular Use Case. The Company conducted the prioritization analysis by category, first identifying the value and complexity of each potential Use Case, then considering the additional criteria listed above.

The Company scored each identified Use Case on two of the criteria described above—value and complexity. For each Use Case, the Company assigned a Value Score and a Complexity Score on a scale of 1 to 5. The Value Score was a combination of two scores based on the anticipated customer and operational benefits of each Use Case. The Complexity Score was comprised of four separate scores based on the level of data granularity, analytics complexity, customer engagement, and device interoperability of each Use Case. It is important to reiterate that this scoring exercise was only one part of the Company's prioritization process and represented only two of the criteria that were considered for each Use Case.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 1, 2022

Docket No. E002/M-21-694

DOC IR No. 29

Attachment A - Page 1 of 2

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Attachment A to this response has been designated as Trade Secret information pursuant to Minn. Stat. § 13.37, subd. 1(b) in its entirety. In particular the documents contain confidential information relating to proprietary technology, pricing, and contract terms. The information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Pursuant to Minn. R. 7829.0500, subp. 3, the Company provides the following description of the excised material:

1. Nature of the Material: Confidential company and vendor costs and technology information.
2. Author(s): Accenture Consulting with Xcel Energy
3. Importance: Attachment A contains proprietary details regarding the Company and vendors' technology, pricing, and terms.
4. Date the Information was Prepared: February 2022.

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Xcel Energy Information Request No. 29
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 25-26, in relation to the capital costs.

- a. For any estimated or forecasted costs, please provide supporting information and calculation in spreadsheet format with formulae intact on how these costs were estimated or derived using historical data.
- b. For any vendor-provided support or equipment, please provide the cost estimates provided to the Company and how they compare with Table 1.
- c. For each cost in Table 1, please indicate any risk or contingency costs and how these were estimated.
- d. For each cost in Table 1, please indicate the following
 - ☐ Direct Costs (product, service, customer, project, or activity);
 - ☐ Indirect Costs;
 - ☐ Tangible Costs;
 - ☐ Intangible Costs; and
 - ☐ Real Costs.

Response:

- a. The costs we estimated were not based on historical data. Instead, the Company utilized expertise from a third-party consultant to inform our estimates. Conservative assumptions were used to create the estimates. Please see

Attachment A for the underlying sources and assumptions for cost information relating to third-party support.

- b. We estimated the costs based on the expertise of our third-party consultant. Because we are still early in the development of this technology, we have not received finalized third party equipment and support costs to compare these two. We will report the actual spend in each of these categories and adjust future cost forecasts accordingly.
- c. Costs were conservatively estimated based upon the level of complexity of the Use Cases. No additional contingency costs were included in these estimates.
- d. Please see below:

<u>Cost Category</u>	<u>Labor Type</u>
Software Architecture – Internal Development	Direct Cost
Software Architecture – 3 rd party	Direct Cost
Infrastructure / Hardware	Tangible Cost
Use Case Development (customer and grid-facing use cases) – 3 rd party	Direct Cost
Use Case Development (Customer and grid-facing use cases) – Xcel Energy	Direct Cost

Portions of this response, specifically Attachment A to this response have been designated as Trade Secret information pursuant to Minn. Stat. § 13.37, subd. 1(b) in its entirety. In particular the documents contain confidential information relating to proprietary technology, pricing, and contract terms. The information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Pursuant to Minn. R. 7829.0500, subp. 3, the Company provides the following description of the excised material:

1. Nature of the Material: Confidential company and vendor costs and technology information.
2. Author(s): Accenture Consulting with Xcel Energy
3. Importance: Attachment A contains proprietary details regarding the Company and vendors' technology, pricing, and terms.
4. Date the Information was Prepared: February 2022.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 30
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29, regarding customer bill impacts. Please provide justification for why a class cost of service model was not conducted.

Response:

Class cost of service analysis is typically conducted in the context of a rate case or rate case order when the entirety of all the utility's proposed or ordered costs are identified. An entire class cost of service study analysis is not necessary to calculate a rate and bill impact analysis. The analysis method used for the Integrated Distribution Plan is similar that what is conducted for the Integrated Resource plan where the rate and bill impact of the incremental costs is analyzed using a class cost allocator(s) that would be used in a rate case.

Preparer: Michael Peppin
Title: Principal Pricing Analyst
Department: Regulatory Analysis
Telephone: 612-337-2317
Date: February 3, 2022

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Xcel Energy Information Request No. 31
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29, in relation to data security and data access. Have all costs for compliance with requirements set forth by the Commission in its January 19, 2017 Order in Docket No. E,G999/CI-12-1344 and its November 20, 2020 Order Adopting Open Data Access Standards and Establishing Further Proceedings in Docket Nos. E,G999/CI-12-1344 and E,G999/M-19-505 been included in the proposed DI? Please explain in detail.

Response:

The Commission's January 19, 2017 Order defines customer energy usage data (CEUD) and requires utilities to not disclose CEUD without the customer's consent unless the utility has adequately protected the anonymity of the CEUD. The Commission's November 20, 2020 Order adopts and applies open data access standards to utility release of whole building data for building owners and for benchmarking purposes.

The foundational DI capabilities and initial Use Cases that we have proposed are unrelated to whole building benchmarking as contemplated by the November 2020 Order, and are focused on customers accessing their own data and the Company using the data for regulated utility purposes as contemplated by the January 2017 Order. As such, the Company's proposal, including the budgets set forth in Appendix G is compliant with the referenced requirements

Preparer: Jody Londo
Title: Regulatory Policy Specialist
Department: Regulatory Affairs
Telephone: 612.330.5601
Date: February 1, 2022

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Xcel Energy Information Request No. 32
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program

Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29 in relation to data security and data access.

- a. Will the data transmitted through HAN be made directly available to the consumer and third parties?
- b. If so, what data and level of granularity will be made available to consumers and third parties?
- c. What data and level of granularity will not be made available to the customer and third parties?
- d. How soon after collection will this data be made available to consumers and third parties?
- e. Does the Company plan to monetize the value of this data access? Why or why not?
- f. Does the Company plan to otherwise generate revenue from the data? If so, how? If not, why not?

Response:

- a. HAN connectivity will allow for direct connection between customers' devices and the meter using Wi-Fi and the IEEE 2030.5 protocol. The initial HAN Connectivity Use Case will allow customers to use the Company's My Energy Connection mobile application to connect with the meter located at their premises and receive kW and kWh reads as depicted in Figures 3 and 4 of Appendix G. As we noted on Page 13 of Appendix G, the HAN Connectivity Use Case is an important building block. Using the lessons learned from activating the connection between the meter and the HAN, the Company contemplates implementing future Use Cases that will provide greater access for customers to their customer energy usage data (CEUD) using the HAN.

Finally, we clarify that customers will have the option, as they do today, to share their data with a third-party, but the Company itself will not directly make any customer data available to third parties via the HAN, absent customer consent.

- b. Initially, customers will only be able to obtain current kW consumption and total kWh since installation of the meter, as depicted in Figure 4 of Appendix G. However, the HAN connectivity of the AMI meters uses Wi-Fi radio and the IEEE 2030.5 communications protocol, which allow for the transmission of CEUD from the meter with a granularity of up to one-second. With future potential Use Cases, customers may be able to access such data using any device that complies with the IEEE 2030.5 protocol; this would allow customers to share CEUD with third parties as they choose, including through the use of third-party applications running on customer devices. However, it should be noted that not all customers have Wi-Fi – and, the quality of Wi-Fi at a customer’s location can vary for a variety of reasons; as a result, there will be variations in whether and to what extent customers are able to connect to the meter via the HAN. The Company also notes that 15-minute interval CEUD will be available to customers and customer-authorized third parties via our online energy usage portal and via Green Button Connect, if they choose to enroll in these services. As noted in part a above, the Company will not directly make any HAN-based customer data available to third parties, absent customer consent.
 - c. Customers and third parties will not have access to sub-second CEUD, grid-facing data, or the results of on-meter processing.
 - d. The HAN Connectivity Use Case will allow for near real-time kW and kWh meter read information. With potential future Use Cases using the IEEE 2030.5 protocol, customers may be able to access CEUD with a granularity of up to one second on a near real-time basis, provided there is sufficient Wi-Fi connection.
 - e. No. The Company does not have plans to monetize customers’ access to CEUD via the HAN.
 - f. No. See our response to part e above. The Company may, in the future, seek to implement Use Cases that would involve revenue; prior to implementation, we would, however, seek any necessary regulatory approvals.
-

Preparer: Drew Quirk
Title: Manager, Business Solutions &
Department: Advanced Grid Customer
Telephone: 612.337.2024
Date: February 1, 2022

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Xcel Energy Information Request No. 33
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29 in relation to data security and data access.

- a. Will the energy usage data transmitted to the FAN be made available to the consumer and third parties via the utility?
- b. If so, what data and level of granularity will be made available to consumers and third parties?
- c. What data and level of granularity will not be made available to the customer and third parties?
- d. How soon after collection will this data be made available?
- e. Does the Company plan to monetize the value of this data access? Why or why not?
- f. Does the Company plan to generate revenue from the data? If so, how? If not, why not?

Response:

For purposes of our response to these questions, we note that the Company will not directly provide any data to third parties, unless the customer authorizes us to do so

on the customer's behalf.

- a. Customers will have access to 15-minute interval customer energy usage data (CEUD) through the Company's energy usage web portal. Just as they can do today, customers can choose to share that information with specific third parties either directly, or they can consent to the Company's release of the data to a specific third-party. Customers will also have the ability to share their CEUD with customer-authorized third parties via Green Button Connect My Data (GBC), in addition to the other methods we already provide customers who want to share their CEUD with third parties.
- b. See part a above.
- c. The Company does not intend to make grid-facing data available to customers. CEUD with granularity finer than 15-minute intervals will not be available to customers through the energy usage web portal nor Green Button Connect My Data. The FAN is not intended to transmit CEUD that is more granular than 15-minute intervals.
- d. Customers will be able to view their CEUD in the energy usage web portal. Initially, that data will be updated daily and over the next year we will increase the frequency to updates approximately every four hours. Customers will be able to share that data with any third parties they choose as soon as the data is viewable in the portal. With respect to GBC, the first release of a customer's data to their chosen GBC provider will be completed upon enrollment; ongoing releases will be available on the same frequency as updates are made to the energy usage web portal. The GBC provider ultimately determines the specific frequency that their service requires.
- e. No. We view these services as providing reasonable access to their energy usage data.
- f. No. We may, in the future, offer fee-based premium data services. In that case, we would seek Commission approval in advance of offering these services.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 34
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29 in relation to data security and data access.

- a. Has the Company identified any smartphone mobile applications as part of the DI program that are not developed by Itron or the Company? If so, please describe.
- b. Is the Company currently developing or planning to develop any mobile smartphone applications for the distributed intelligence now or in the future? If so, please describe. If not, why not?

Response:

- a. No.
- b. Yes. As discussed in Appendix G, pages 12-13, the Company developed a mobile application to test the HAN connectivity capability of the AMI meters. In the future, we plan to include features enabled by DI into the Company's Mobile Application, which currently allows customers to access their energy usage and pay their bills, among other things.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

Docket No. E002/M-21-694
DOC IR No. 035
Attachment A - Page 1 of 1213

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This Attachment A has been designated as Trade Secret information pursuant to Minn. Stat. § 13.37, subd. 1(b) in their entirety. In particular the documents contain confidential information relating to proprietary technology, pricing, and contract terms. The information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Pursuant to Minn. R. 7829.0500, subp. 3, the Company provides the following description of the excised material:

1. Nature of the Material: Confidential bid and contract information.
2. Author(s): Project Sourcing.
3. Importance: Attachments A and B contain proprietary details regarding the vendors' technology, pricing, and terms.
4. Date the Information was Prepared: February 2022.

Docket No. E002/M-21-694
DOC IR No. 035
Attachment B - Page 1 of 117

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This Attachment B has been designated as Trade Secret information pursuant to Minn. Stat. § 13.37, subd. 1(b) in their entirety. In particular the documents contain confidential information relating to proprietary technology, pricing, and contract terms. The information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Pursuant to Minn. R. 7829.0500, subp. 3, the Company provides the following description of the excised material:

1. Nature of the Material: Confidential bid and contract information.
2. Author(s): Project Sourcing.
3. Importance: Attachments A and B contain proprietary details regarding the vendors' technology, pricing, and terms.
4. Date the Information was Prepared: February 2022.

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Xcel Energy Information Request No. 35
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29 in relation to data security and data access. Please provide any contracts between Itron and Xcel in relation to the advanced meters and other DI investments.

Response:

We provide two contracts as noted below between Itron and Xcel Energy in relation to the advanced meters and DI.

- Attachment A: Amended & Restated Agreement between Xcel Energy and Itron, dated September 1, 2019.
- Attachment B: Distributed Intelligence Platform Agreement between Xcel Energy and Itron dated September 1, 2019.

Portions of this response, specifically Attachments A and B to this response have been designated as Trade Secret information pursuant to Minn. Stat. § 13.37, subd. 1(b) in their entirety. In particular the documents contain confidential information relating to proprietary technology, pricing, and contract terms. The information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Pursuant to Minn. R. 7829.0500, subp. 3, the Company provides the following description of the excised material:

1. Nature of the Material: Confidential bid and contract information.
2. Author(s): Project Sourcing.
3. Importance: Attachments A and B contain proprietary details regarding the vendors' technology, pricing, and terms.
4. Date the Information was Prepared: February 2022.

Preparer:	Mark Raak
Title:	Manager, Capital Project Sourcing
Department:	Supply Chain
Telephone:	612-330-6667
Date:	February 3, 2022

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Xcel Energy
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Information Request No. 36

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29 in relation to data security and data access. Will there be any differentiation between the DI data that is accessible to the Company and the data accessible to customers and third parties? If so, please describe.

Response:

Please see our response to DOC-32 and DOC-33.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Information Request No. 37

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29 in relation to data security and data access. In what format will data be available to the customer and third-party app developers?

Response:

Please see our response to DOC-32 for data that will be available to customers. Third-party app developers may work directly with the Company and Itron to develop DI applications that can be made available for either customer or grid-facing Use Cases. Under this scenario, third-party developers we have contracted with would have access to the full set of sub-second DI data.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 38
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29 in relation to data security and data access.

- a. Who will be responsible for approving and/or certification of new third-party DI apps that can be accessed by customers?
- b. Please indicate the process for that will be followed for establishing the terms and conditions for authorization of new third party DI apps.
- c. What steps are taken to ensure that third party app developers will have equal access to develop DI applications?

Response:

- a. The Company will choose what applications are installed on the meters. Itron, the meter manufacturer, has a certification and testing program, and the Company will also conduct its own review of applications being considered for deployment on its meters.
- b. Like any new product development and introduction activity, the Company would perform market and customer and/or system research to understand the impact and benefits of the prospective application. These benefits would be compared to the costs for acquiring the application and subsequently supporting customer use of the application after initial deployment. In parallel,

the Company would confirm that the application conforms to all relevant technical architecture requirements, cybersecurity requirements, and data privacy and confidentiality standards. We anticipate making decisions regarding which applications to acquire using our normal procurement processes.

- c. Itron, the meter manufacturer, has a developer program for third-party developers, which provides access to a software development kit. Itron also provides testing and certification of third-party applications. Itron has repeatedly indicated that a robust community of third-party developers is important for the success of its DI-enabled meters.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 39
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 29 in relation to data security and data access.

- a. Are there any differences in the steps that are required to download and access an app developed by Itron and/or the Company?
- b. What are the differences from a. in steps that are required to download and access a third party developed app?

Response:

- a. No. Customers will not directly be involved in the process of downloading applications installed on the meter at the customer's premise. The Company will determine which applications are downloaded and installed on individual meters based on the solutions and services that the Company is deploying using DI, the location of individual premises on the grid (for applications supporting grid-facing Use Cases), and available meter capacity and application licenses, and will follow the same basic steps regardless of who developed the application in question. The Company will rely on the information generated by the applications running on the meter for customers to participate in.
 - b. See part a above.
-

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Information Request No. 40

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 30, where the Company provided the following statement:

“As new distributed technologies are developed and deployed, the Company may determine, depending on the technology, that software applications running on individual meters can help monitor, control, or interact with those new technologies. When it is appropriate to do so, the Company would then be able to remotely install such software on the meters”

- a. Do the software applications referenced also include third party developed apps?
- b. Will there be any difference in how third party developed apps will be treated in relation to monitoring, control, interaction or remote installation compared with apps developed by the Company?

Response:

The referenced quote contemplates the potential for grid and/or customer benefits from the interaction of future technologies and future software.

- a. As a general matter, we anticipate procuring DI applications using our normal procurement processes which typically include issuing requests for proposals to which third-party developers would respond. We currently do not anticipate that the Company will develop the software applications.

b. No.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 41
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 37 in relation to grid modernization benefits.

- a. Please also provide any company wide target metrics for reliability, efficiency, public safety, security and resilience established by the Company and their associated timelines
- b. please indicate quantitatively how DI contributes to these specific targets including reliability through SAIDI, SAIFI and CAIDI metrics.

Response:

- a. In addition to specific Minnesota reliability targets contained in our Quality of Service (QSP) tariff and that are set each year as part of our Annual Service Quality Reports under the Minnesota Rules, Xcel Energy has reliability and public safety targets on the corporate scorecard. Energy efficiency targets are set through various Commission proceedings, including the integrated resource planning and Conservation Improvement Program frameworks. We do not have specific security and resilience metrics. We address reliability, efficiency, and public safety in turn below.

Reliability – SAIDI serves as our corporate-wide reliability metric. We use the IEEE Distribution Reliability Working Group Survey as a benchmark for our reliability at the corporate level. We set our target in order to maintain

performance relative to peer utilities. In 2021, our SAIDI target was 92 minutes corporate wide.

In addition to our corporate target for reliability, the Commission establishes SAIDI, SAIFI, and CAIDI targets for our Minnesota service territory as part of our Annual Service Quality Reports as we noted above – most recently in Docket No. E002/CI-21-237. We also report MAIFI, CEMI and CELI as part of these Annual Reports. The performance thresholds in our QSP tariff are the result of a negotiated process, which was then approved by the Commission. We also report reliability metrics as part of our reporting in the Company's Performance Based Rates (PBR) Docket No. E002/CI-17-401. In the PBR docket, the Company has explained, and the Commission has supported, that we would continue to report on our current metrics for three years to determine if we are collecting the correct data prior to re-visiting the metrics or establishing a baseline. As a result, we do not plan to revise the PBR metrics until at least 2023.

Efficiency – Xcel Energy does not have corporate-wide targets for energy efficiency. For our Minnesota service territory, the Integrated Resource Plan establishes the overall energy efficiency target, and our triennial plans implement the targets. Our current annual energy efficiency goal is 1.5 percent of sales, or 440 GWh, as established in our 2016-2030 IRP in Docket No. E002/RP-15-21. We note that the Commission is scheduled to make determinations in our currently pending IRP, Docket No. E002/RP-19-368, on February 8, 2022. In that proceeding, we have proposed annual goals averaging 2.8% of sales, or 780 GWh, for energy efficiency. Our most recent Triennial Plan, covering the time period 2021-2023, was submitted in Docket No. E002/CIP-20-473. The final approved goals, filed in a January 2021 compliance filing, average 2.5% of sales, or 710 GWh annually.

Public Safety – Natural gas emergency response serves as our corporate-wide reliability metric. Our targets are set based on benchmarking by the American Gas Association. We seek to respond to emergencies in 60 minutes or less, with response duration measured from the time an order has been created for an emergency to the time the responder arrives on scene. In 2021, our target was 96%. Our QSP tariff also includes a Gas Emergency Response metric with specific performance thresholds.

- b. As described on Appendix G, page 37, the secondary equipment assurance Use Case will improve our operation of the distribution grid. We have not yet performed an analysis of the estimated benefits, and any future analysis will rely on the final Use Case. That said, we expect any specific performance improvements will be assessed in relation to the Company's overall reliability performance to

ensure any changes to performance targets or thresholds are assessed in the proper context. Please also see the Company's response to Fresh Energy Information Request No. 12.

Preparer: Karin Haas
Title: Regulatory Policy Specialist
Department: Regulatory Affairs
Telephone: 612-321-3116
Date: February 3, 2022

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Xcel Energy Information Request No. 42
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 32 in relation to grid modernization principles satisfied by DI.

- a. Please provide any company wide target metrics for customer engagement and empowerment that the Company hopes to achieve and their associated timelines

Response:

The Company does not have specific metrics for customer engagement and empowerment. That said, one of our three strategic priorities is “enhance the customer experience.” Customer engagement and empowerment fall under this strategic priority. Broadly speaking, to enhance the customer experience and deliver what our customers want, one of the things that we are doing that is related to our DI certification proposal is working to give them the freedom and tools to take control of their energy use. As discussed in the page referenced, DI will help us achieve this strategic priority.

To measure our progress on this strategic priority, we have customer satisfaction as a key performance indicator on our corporate scorecard. This key performance indicator (KPI) measures overall satisfaction of residential electric customers through quarterly online surveys administered by JD Power and its partners. JD Power provides year-to-date scores for each Xcel Energy Operating Company, which are then weighted to produce an overall score based on residential electric revenue using

JD Power's national weighting model. In 2021, our target was 763. Results for 2021 will be finalized by the end of March, as will our 2022 scorecard targets.

We also report on various customer satisfaction targets and results in our annual service quality report in Docket No. E002/CI-21-237. Section IV, Part J provides a full discussion of our 2020 customer satisfaction goals and performance. Our 2021 results will be reported in our annual service quality report that we submit on April 1, 2022.

Preparer:	Drew Quirk
Title:	Manager, Business Solutions & Results
Department:	Advanced Grid Customer Solutions
Telephone:	612.337.2024
Date:	February 3, 2022

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Xcel Energy Information Request No. 43
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 30, in regard to the following statement:

“Importantly, DI is one of the technologies the Company is relying on to move to its ultimate goal of 100 percent carbon-free electricity by 2050.”

- a. Please provide any company wide target metrics for environmental benefits on the Company's system apart from the statement mentioned above and the associated timelines.
- b. Please provide any supporting quantitative information that demonstrates the need for DI meeting the above-mentioned environmental benefits.
- c. Please indicate quantitatively the impact on environmental benefits that would occur without DI investments proposed in the IDP.

Response:

- a. As part of our corporate vision to provide 100 percent carbon-free electricity by 2050, we have an interim goal to reduce carbon emissions 80 percent by 2030, from 2005 levels. From 2005 through 2020, we reduced carbon emissions approximately 51 percent, Xcel Energy-wide, from the electricity provided to customers, and 54 percent on our Upper Midwest system. DI will provide customers with powerful and more granular energy usage information than will be available with only AMI. This provides participating customers with greater

insights and control over how and how much energy they use, which we believe will lead to lower consumption – translating to lower need for power generation and lower emissions.

We also have a corporate vision to power 1.5 million electric vehicles (EV) across our eight-state service territory by 2030. Under our EV vision, we estimate that 5 million tons of carbon emissions will be avoided annually by 2030.¹ Our proposed EV Detection Use Case will improve our ability to identify customers with EVs, which will allow the Company to better make them aware of our EV-related programs that offer benefits such as reduced rates for off-peak charging.

We recently set and announced a corporate goal related to our natural gas distribution business. Our vision is to provide net-zero natural gas service by 2050. This includes emissions from our natural gas operations, as well as the emissions from suppliers and customer gas use, which are outside our management. Our interim goals are to accelerate reductions in methane, achieving net-zero methane on the gas delivery system by 2030, and to reduce all greenhouse gas emissions associated with the supply, delivery and use of natural gas 25% by 2030 (from 2020 levels), as we aim for net-zero greenhouse gas emissions by 2050.² We note that DI will not directly benefit our natural gas distribution operations or emissions.

Lastly, we set a new, long-term environmental goal in 2020 for reducing water consumption from power generation. Company-wide, we expect to reduce water consumption from the electricity provided to customers 70 percent by 2030, compared to 2005 levels. As of year-end 2020, we have reduced water consumption 34 percent from 2005 levels. A result of customers reducing their energy use is the reduced need for power generation.

- b. As we have explained, we expect DI to empower customers with more information about their energy usage in the short term, leading to projected savings in energy and peak demand usage. Once we are able to quantify these benefits and their impact on the overall system, we expect to include them into more of our long-term planning toward environmental benefits.

¹ For more information about our EV vision, see <https://www.xcelenergy.com/staticfiles/xcel-responsive/Company/Xcel%20Energy%20Electric%20Transportation%20Vision.pdf>.

² For more information about our net-zero vision for natural gas, see <https://www.xcelenergy.com/staticfiles/xcel-responsive/Net-Zero-Vision-for-Natural-Gas.pdf>.

- c. At this point, we have only estimated customer bill savings associated with our Energy Analysis Use Case. We have not taken that further to estimate environmental benefits such as a reduction in carbon emissions. Please see our response to DOC-25 for our response regarding when and how we expect various benefits

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 44
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix G, Table 1 and 2, please provide the metrics that the Company plans to use to track the DI costs.

Response:

For all costs, the Company plans to track actual spend in each budgeted category compared to the budget.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 45
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Grid Modernization and DER Interconnection
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix E1, pages 18 and 32. In Docket Nos. E999/CI-16-521 and E999/CI-01-1023, the Company discussed a distributed energy resource technical planning limit (DER TPL) that would cap the total capacity of a particular feeder or substation as a function of its respective equipment rating and daytime minimum load (DML).

- a. Please explain why a DER TPL is necessary and reasonable in light of the Company's plans for grid modernization and associated planning tools (including, but not limited to: Distributed Energy Resource Management System, Supervisory Control and Data Acquisition, Hosting Capacity Analysis, the Advanced Distribution Management System project, the Advanced Planning Tool/LoadSEER project, and the Advanced Grid Intelligence and Security Initiative, which includes Advanced Metering Infrastructure, Field Area Network, Fault Location, Isolation, and Service Restoration, and the Distributed Intelligence proposal and x Minneapolis Project).
- b. Please explain how the Company's plans for grid modernization can be leveraged to avoid or mitigate reverse power flow concerns and any other concerns that led to the proposed DER TPL.
- c. Please explain provide the Company's engineering and business case assumptions for how the Company's grid modernization plans can benefit

the Minnesota Distributed Energy Resources Interconnection Process (MN DIP) and the Company's interconnection process.

- i. Please provide a disaggregated breakdown of the benefits of each grid modernization component's impact on MN DIP and the Company's interconnection process.
- d. Please explain how the Company's grid modernization plans can be leveraged to enhance DER interconnection.

Response:

- a. The need for planning limits has been discussed extensively in the referenced dockets. Generally, the grid modernization items noted in the question will enhance the visibility and situational awareness for the Company; however, the TPL is necessary in light of the technical limits of electric equipment, which is not fundamentally changed with the implementation of the Company's grid modernization efforts.
- b. The TPL was not intended to avoid reverse power flow, but rather to reduce the potential of reaching technical limits of electrical equipment, which is the case without the use of the TPL. Due to the nature of DER, two-way or reverse power flow is inherent, and avoiding or mitigating it would require more extreme measures to curtail the output of DER and/or to reject interconnection if reverse power flow is expected.
- c. We understand this question to be asking what we are doing to support DER integration onto our distribution grid, and how our grid modernization plans and investments support DER integration. We also note that we have not disaggregated how each grid modernization project or other effort we have proposed or that is underway will support the MN DIP or DER interconnection more broadly, and due to the integrated nature of the Company's grid modernization and other efforts, attempting to delineate our efforts in such a way would not be meaningful.

We discussed how our processes and our plans intersect with the interconnection process throughout our 2021 IDP, including how our grid modernization plans support DER. See Appendix A1, Section III.A, where we talk about our system planning tools and processes and specifically how we currently use and envision we will use our new LoadSEER tool (certified by the Commission as part of our 2019 IDP) to support DER. Appendix B1, Part H discusses our recognition that we will need increased visibility into DER on the system, and how we are examining how a DERMS can help support higher DER scenarios, among other

things. That same section notes our work with SEPA and EPRI – and, that as FERC Order 2222 enables aggregated DER to participate in wholesale markets, utilities will need additional capabilities – and a DERMS may be able to fulfill some of those capabilities. See also our discussion of FERC Order 2222 in Appendix E1: *Hosting Capacity, System Interconnection and Advanced Inverters/IEEE 1547*. Appendix D: Distribution Financial Framework and Information discusses how our planned investments help to enable the clean energy transition that we have underway; see specifically Part B.

Appendix E1 discusses interconnection and other related tools, such as hosting capacity, in more detail. See for example Figure 1, which is a conceptual view of how we envision DER interconnection processes evolving over the long-term. This shows our recognition that over time as DER penetrations increase, we will need to actively manage DER through control and curtailment with use of smart inverters and other tools. We discuss the study work we intend to initiate and how we are engaged on new developments across the industry. Section II of Appendix E1 discusses how we are evolving the hosting capacity analysis and the investments we have outlined to begin to integrate it with the interconnection process¹ – and in the narrative to support IDP Requirement 3.A.32 on page 18, we again discuss how LoadSEER will aid DER forecasting over the long-term. Section V. of Appendix E1 – particularly Part A – discusses how modernization of the grid and enabling higher penetrations of DER require new planning approaches and investment in foundational and advanced technologies. This section provides some examples, such as how we are examining how we can improve situational awareness through AMI and the load flow model from the ADMS; how we envision ADMS and its advanced applications are well-situated to fill the need for greater DER monitoring and control; and, how the data improvements we are doing as part of our ADMS initiative will help to improve the accuracy and efficiency of our interconnection review modeling and planning analysis. This same section talks about our plans to continue deploying Supervisory Control and Data Acquisition (SCADA) to more substations, along with dynamic voltage control at higher DER penetrations. Here, we also summarize how AMI along with the FAN are essential to achieving higher DER levels. Finally, we note that we envision the integration of other technologies that may not connect directly to our FAN, but through other paths. Our discussion in Part D starting on page 33 of Appendix E1 discusses the types of system upgrades that might be necessary to accommodate DER at higher penetration levels. Section VI of Appendix E1 discusses advanced inverters and IEEE 1547 considerations, which we discuss in the context of our system planning in Part B. Here we discuss

¹ See also our 2021 Hosting Capacity Analysis Annual Report in Docket No. E002/M-21-767 (November 1, 2021).

an EPRI study that we are a part of that will help identify best-fit or universal DER functions to meet system objectives. We expect this work will also carry over to EPRI's DRIVE tool, which we use for our hosting capacity analysis, so these inverter settings can be more easily modeled. We expect this overall effort to help provide benefits to our customers in terms of enhanced voltage management and system reliability. Finally, Section VII of Appendix E1 discusses the changes occurring at the federal and regional level – namely, FERC Orders 841 and 2222 – and the capabilities we will need to support interconnection and ongoing operations of the DER aggregations those Orders enable.

Appendix E2: Distributed Energy Forecast Methodology and Forecasts discusses DER treatment in the load forecast, how we see LoadSEER fitting into that over the long-term, and how we view evolution of the distribution system (Figure 2), in terms of capabilities and tools. We discuss here how the investments that we are currently making in asset health and grid modernization, such as ADMS, lay an important foundation for continued resilience and reliability as we deploy more modernization investments. Figure 3 on page 7 shows the timing and pace considerations for DER integration and utilization – again, also in terms of capabilities tools. We note how our FAN, the ADMS, and LoadSEER fit into this walk-jog-run model.

Appendix G discusses our proposed Distributed Intelligence (DI) investments and the customer- and grid-facing Use Cases that we are proposing. One of the grid-facing Use Cases is Connectivity, which will help provide the more precise system model data needed for DER interconnections. We discuss this Use Case starting at page 22. We note that we have also provided additional information about our proposed DI Use Cases as part of the discovery process with the Department of Commerce and Fresh Energy.

Other than our 2021 IDP, we discussed how various grid modernization efforts would support DER interconnection and the Company's interconnection processes in our 2019 IDP proceeding in Docket No. E002/M-19-666 – specifically with respect to LoadSEER (a/k/a Advanced Planning Tool) and AMI – and more generally, as part of our advanced grid customer strategy. We however also provide similar information in our November 24, 2021 Transmission Cost Recovery Rider in Docket No. E002/M-21-814, where we are seeking cost recovery of AMI, FAN, ADMS, LoadSEER, and a time of use rate pilot. In addition, please see the Company's cost recovery and compliance filings in Docket Nos. E002/M-15-962 E002/M-17-797, E002/M-20-680, and E002/M-21-814. In these, we discuss our efforts to enhance the field asset data we store in our Geospatial Information System (GIS) which also provides a more accurate model when doing interconnection studies.

d. Please see our response to parts (a) through (c).

Preparer:	Chad Nickell	Dean Schiro
Title:	AGIS Delivery Lead for Distribution	Manager DER Integration
Department:	System Planning & Strategy	Electric Distribution Engineering
Telephone:	303.571.3502	612.330.6934
Date:	February 3, 2022	February 3, 2022

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Xcel Energy Information Request No. 46
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, Table 3, what perspective are the benefits and costs in?

Response:

We view the cost-benefit analysis that we provided as a conservative representation of quantifiable estimated benefits to participating customers. As we explain, the CBA ratio does not reflect other/non-quantifiable benefits, including that the work to implement our proposed initial Use Cases will position the Company to subsequently deploy future DI Use Cases that will further benefit the Company, customers, and the environment. Although we cannot quantify such benefits at this time, we explained that these qualitative benefits are expected to be considerable, and it is not unusual for an investment in foundational technology to have a benefit to cost ratio below 1.0.

Preparer: Pablo Martinez
Title: Senior Analyst
Department: Risk Analytics
Telephone: 303.571.7639
Date: February 3, 2022

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Xcel Energy Information Request No. 47
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to page 37, Table 10, please describe all costs that are included in the "Miscellaneous" cost row.

Response:

Please see response to Fresh Energy's Information Request No. 23.

Preparer: Andre Gouin
Title: Consultant, Business Technology
Department: Strategic Partnerships and Ventures
Telephone: (303) 294-2975
Date: February 3, 2022

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Xcel Energy Information Request No. 48
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix H, page 1:

- a. Please provide historical and projected baseline installations and capacity of distributed energy resources, battery systems, and microgrids.
- b. Please provide historical and projected installations and capacity of distributed energy resources, battery systems, and microgrids if the proposed RMP is certified.

Response:

- a. We provided a summary of currently installed and in-queue distributed energy resources in Appendix E1 of our November 2021 IDP (see Tables 1 and 2). As we also note in Appendix E1 of the IDP, we submit this information annually in our Distributed Generation Interconnection filing each March 1 in the "xx-10" docket. Our most recent report is available on eDockets in Docket No. E999/PR-21-10.
- b. As noted in part a above, we provide DER forecasts in Appendix E1 of the IDP. As for how the RMP, if approved, will impact projected DER installations, it will add three solar systems and three BESS to our Minnesota DER totals. Currently, microgrids are not included in our forecasts and are extremely limited in Minnesota. As noted in Appendix H, page 4, the Company consulted the Clean

Energy Group's Resilient Power Project interactive map¹ for current status of resiliency-focused, solar+storage microgrid projects in Minnesota. This map shows only two such microgrid projects in Minnesota today: OATI's South Campus microgrid in Bloomington and the Hartley Nature Center in Duluth. The Company is aware of a third microgrid that is more oriented to research purposes – the Center for Microgrid Research at the University of Saint Thomas in Saint Paul.² So there are, to our knowledge, currently two resiliency-focused microgrids and one research microgrid in the state. The RMP would approximately double the number of microgrid projects in Minnesota, and would represent the first microgrids specifically focused on supporting resiliency for under-resourced and BIPOC communities.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

¹ See <https://www.cleanelectricgroup.org/ceg-projects/resilient-power-project/map/>.

² See [Center for Microgrid Research | School of Engineering | University of St. Thomas \(stthomas.edu\)](#).

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Xcel Energy Information Request No. 49
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 4, regarding extreme weather and other disruptions. Please provide historical and projected reliability statistics for the neighborhoods considered for the RMP projects, including SAIDI, SAIFI, CAIDI, etc.

Response:

We provide the requested reliability indices (SAIDI, SAIFI, CAIDI) in Table 1 below. Please note that we do not maintain reliability data by neighborhood; the information below is based on the distribution feeder that serves each Resilient Minneapolis Project (RMP) host site. As such, the indices are not completely aligned with the overall neighborhoods. We also note that we do not project reliability performance at a feeder level, so the information we provide is historic.

We also point out that the index information we provide is non-storm normalized, which means that it includes Major Event Days (MEDs); it is also not comparable to normalized data, such as is reported under our Quality of Service Tariff or our Annual Service Quality Report under the Minnesota Rules. We provide the requested information with this view of reliability, because it more closely approximates a customer's experience and it also provides a fuller picture of the opportunity for resiliency improvements. Typically, utility reliability index performance and performance measures are based on storm-normalized data, which excludes MEDs using an agreed-upon methodology, such as IEEE Standard 1366.

**Table 1: Historic RMP Site Feeder Performance – SAIDI, SAIFI, CAIDI
All days/Not storm-normalized**

All Days/All Levels				
Location	Outage Yr	SAIDI	SAIFI	CAIDI
North Minneapolis Community Resiliency Hub	2017	101	1.55	65.19
	2018	40	0.44	92.4
	2019	68	0.48	141.77
	2020	76	0.67	114.39
	2021	159	2.08	76.28
	5 Yr Avg	89	1.04	98.01
Minneapolis American Indian Center	2017	5	0.07	72.66
	2018	27	0.31	89.99
	2019	233	2.04	114.17
	2020	35	0.12	298.26
	2021	124	0.79	156.38
	5 Yr Avg	85	0.67	146.29
Sabathani Community Center	2017	80	0.27	292.82
	2018	39	0.38	104.38
	2019	24	0.26	90.06
	2020	67	1.08	61.59
	2021	230	2.51	91.72
	5 Yr Avg	88	0.9	128.11

Finally, as part of our ongoing Service Quality proceeding, we also note that we are finalizing an Xcel Energy Minnesota map that will portray the CEMI-6 and CELI-12 indices by census block group, with demographic equity data layers sourced from the US Census Bureau. This map-based view of these reliability indices will be available on the Company's website April 1, 2022, in conjunction with submission of our Annual Quality Service Report.

Preparer: Patrick Kurelich
Title: Manager
Department: Distribution System Performance
Telephone: (303) 571-3694
Date: February 3, 2022

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Xcel Energy Information Request No. 51
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 5, regarding equity objectives.

- a. For each of the equity objectives, please provide metrics for assessing the success of the RMP. For each of these metrics, please provide historical and projected performance under a baseline scenario and under a scenario with the RMP.
- b. Please link each of the equity objectives to the objectives for grid modernization provided in the Grid Modernization statute and the Commission's IDP Planning Objectives.

Response:

- a. The objectives listed on page 5 were designed based on the collective desire of the Company, the City of Minneapolis and other stakeholders to identify opportunities to enhance energy equity through Company investments in BIPOC communities. They were also articulated in the applications we received from, and subsequent conversations with, the organizations that ultimately became our three RMP host sites.

It would be a difficult and subjective exercise to attempt to capture these objectives in quantitative metrics comparing historical/projected equity with and without the RMP, for two reasons. First, many of the equity objectives are

qualitative in nature. We did not present quantified metrics for most of them in our cost/benefit analysis in Section IV; doing so would require subjective judgments and we believe, oversimplify and likely undervalue their impact.¹ Instead, we urge the Commission to equally consider non-quantified benefits in its certification decision, since they are central to the Company and its customers, even if not assigned a monetary value in the CBA (see Appendix H, Section IV.B).

Second, the listed equity objectives are much broader than can be accomplished by the RMP alone. A small pilot program like the RMP can make a useful contribution to supporting equity, and provide lessons learned to scale up that impact, but on its own is only one of many efforts to address equity. The Company (and Department and Commission) have entire programs devoted to energy affordability, reducing energy burden for low-income customers, equitable access to renewable energy, low-income energy efficiency, workforce training and diversification, and reducing conventional pollution to address environmental justice concerns. Since the RMP can only be a small contributor alongside these larger programs, it would be misleading to present projected performance under a baseline scenario and under a scenario with the RMP.

- b. The Company proposed the RMP as an initiative advancing equity objectives *in addition to* advancing the objectives in the Grid Modernization statute and the Commission's IDP Planning Objectives, rather than suggesting each equity objective maps to a specific part of the statute or IDP planning objectives. It would be difficult to create such a one-to-one mapping, since the equity objectives are much broader. The grid services provided by the RMP technologies do, however, map to the statute and IDP planning objectives, as we discussed in Appendix H, Section VI. Minn. Stat. §216B.2425 reads:

...investments [the utility] 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.

The RMP meets the statutory requirement to enhance reliability and improve security against physical threats by helping communities recover from outages and continue to provide critical services despite increasing physical threats from climate change. These threats are expected to increase in frequency and severity, and our BIPOC customers are often disproportionately exposed to the impacts;

¹ An exception is the value of avoided carbon emissions, which is included in Table 5 on Appendix H, page 35 using the Commission's approved externality value for CO₂ emissions.

the RMP investments are designed to help communities be more resilient to such threats. Second, the RMP meets the statutory requirement to facilitate communication between the utility and its customers through the use of control technologies, energy storage and microgrids, technologies to enable demand response, and other innovative technologies. The grid services provided by the BESS systems on a routine, non-outage basis will serve these statutory objectives and provide learnings to the benefit of all the Company's customers. Finally, the RMP supports equity by using the technologies highlighted in statute (distributed solar, energy storage and microgrids) to provide critical services without adding to carbon and criteria pollutant emissions in communities heavily impacted by pollution.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

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Xcel Energy Information Request No. 52
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 7, regarding requests by partner organizations for efficiency services.

- a. Has the Company considered an alternative that just involves enhanced, focused energy efficiency services for partner organizations? If not, why not?
- b. Has the Company considered whether an alternative that includes enhanced, targeted energy efficiency services for a broader set of customers would meet the integrated distribution planning objectives? If not, why not?

Response:

- a. As we have explained, we believe our proposed RMP has benefits for the Company and its customers more broadly, in addition to the specific benefits for the RMP partner organizations. Existing or enhanced CIP-based energy efficiency programs would not be sufficient to address the resiliency objectives of the RMP, since these programs do not support investments in solar, batteries and microgrids.

We note on page 7 that some of the RMP applicant organizations voiced interest in energy efficiency and HVAC measures in addition to solar, batteries and microgrids. CIP-based energy efficiency programs can help pay for such measures – e.g., lighting retrofits, building shell improvements, HVAC system replacements – and the Company is assisting the RMP hosts to take advantage of existing rebates and cost-sharing

available via CIP, as well as connect them with other sources of funding. We did not include any energy efficiency or HVAC-related costs in the RMP request for certification.

- b. No. The integrated distribution planning objectives we seek to advance via the RMP require investments that are generally not covered by an existing or expanded energy efficiency program.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

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Xcel Energy Information Request No. 53
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 8, regarding objectives of the RFA.

- a. How did the Company arrive at these specific objectives?
- b. Please link each of the objectives to the objectives for grid modernization provided in the Grid Modernization statute and the Commission's integrated distribution planning objectives.

Response:

- a. In recent years – and particularly in 2020 and 2021 – the Company, the Commission, and our stakeholders have looked for opportunities to further address energy equity issues in the communities we serve. The specific objectives of the RMP Request for Applications were designed through a series of discussions with the City of Minneapolis and community organizations based in BIPOC neighborhoods and the Minneapolis Green Zones. The overall RMP goal and five stated objectives reflect clean energy and equity priorities that consistently arose in these discussions.
- b. Please see Table 1 below.

Table 1: RMP Goal or Objective and Link to Statute or IDP Objectives

RMP Goal or Objective (Appendix H page 8)	Link to Statute or Commission's IDP Objectives
Goal: enhance community resiliency; support projects that use solar, energy storage, and microgrids to create a Resilience Hub to deliver critical services in the event of an electrical system outage	<ul style="list-style-type: none"> • Investments [the utility] considers necessary to modernize the transmission and distribution system by enhancing reliability and improving security against cyber and physical threats (<i>Minn. Stat. §216B.2425, subd. 2(e)</i>) • Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies (IDP objectives)
RFA objective 1: advancing the clean energy future	<ul style="list-style-type: none"> • 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 (<i>Minn. Stat. §216B.2425, subd. 2(e)</i>) • Move toward the creation of efficient, cost-effective, accessible grid platforms for new projects, new services, and opportunities for adoption of new distributed technologies (IDP objectives)
RFA objective 2: creating renewable energy projects in under-represented communities	<ul style="list-style-type: none"> • Enable greater customer engagement, empowerment, and options for energy services (IDP objectives)
RFA objective 3: improving outage restoration times	<ul style="list-style-type: none"> • Investments [the utility] considers necessary to modernize the transmission and distribution system by enhancing reliability and improving security against cyber and physical threats (<i>Minn. Stat. §216B.2425, subd. 2(e)</i>) • Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies (IDP objectives) • Provide the Commission with the information necessary to understand Xcel Energy's short- and long-term distribution system plans, the costs and benefits of specific investments, and a comprehensive analysis of customer cost and value (IDP objectives)
RFA objective 4: securing facilities' power supply	<ul style="list-style-type: none"> • Investments [the utility] considers necessary to modernize the transmission and distribution system by enhancing reliability and improving security against cyber and physical threats (<i>Minn. Stat. §216B.2425, subd. 2(e)</i>) • Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies (IDP objectives) • Provide the Commission with the information necessary to understand Xcel Energy's short- and long-term distribution system plans, the costs and benefits of specific investments, and a comprehensive analysis of customer cost and value (IDP objectives)
RFA objective 5: creating more clean energy jobs	<ul style="list-style-type: none"> • Maintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies (IDP objectives)¹

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

¹ There is no clause in *Minn. Stat. §216B.2425* or the Commission IDP objectives that explicitly references clean energy workforce development or diversification. However, we here interpret “consistent with the state’s energy policies” to be inclusive of Minnesota Session Laws, 2019, First Special Session, Chapter 7, Article 11, Section 13, which convened Minnesota stakeholders to “examine the challenges and opportunities for Minnesota's energy utilities to attract a diverse workforce with the skills needed to advance a 21st century industry and to increase supplier diversity of energy utilities” and explore “possible approaches to assist workers and energy utilities to develop a diverse workforce that has the skills to build, maintain, and operate the electricity system of the future.”

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Xcel Energy Information Request No. 54
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Divita Bhandari
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 10, regarding weighted scoring criteria.

- a. How did the Company arrive at these specific criteria?
- b. How did the Company arrive at the scoring and weights for each?
- c. Please link each of the criteria to the grid modernization objectives provided in the Grid Modernization statute and the Commission's integrated distribution planning objectives.

Response:

- a. The Company received six responses to our RFA, all of them compelling, responsive to the RFA objectives, and beneficial to the respective communities served by the applicant organizations. Because budget constraints would not allow us to fund them all, we felt we needed a transparent and objective process – analogous to what the Company's sourcing department uses for RFPs – to evaluate and score the applications. We first created minimum criteria all projects would have to meet to be geographically in scope, safe, possible under existing regulations governing the Company, and physically feasible to implement (Appendix H page 9). No application was eliminated based on these minimum criteria. We then developed eight scored criteria (Appendix H page 10) to help our reviewers rank the projects in terms of number of potential beneficiaries, impact

on existing distribution infrastructure, maturity and innovation in the proposed technology, likelihood of success in the implementation stage based on experience of the project lead and strength of the project team, and similar considerations. We vetted the draft criteria with our external reviewers (see Appendix H page 13) and incorporated their input prior to reviewing applications.

- b. The scores in column 3 of Table 1 represented our assessment of how an application could be evaluated against each criterion. Using the first criterion as an example, a resilience hub designed to serve a large number of beneficiaries, implemented by an organization with a large client population in that neighborhood, would receive more points than a project that was otherwise similar but would only offer critical resilience services to a small number of people. We chose a simple 0/5/10 point scoring scale. The weights in column 4 of Table 1 represented our assessment of the importance of that criterion to the eventual success, cost-effectiveness, replicability or lessons learned from a project. We vetted the scores and weights with our external reviewers prior to reviewing applications, and the internal and external reviewers then worked together to score applications against them.
- c. The criteria, scores and weights were designed to score applications and choose the partners/sites that would be most likely to be successful in implementation, be replicable and provide useful lessons learned. We did not attempt to create a scoring criterion for each statutory or IDP planning objective. Some of the scoring criteria can however be linked to those objectives. For example:
 - The scoring criteria for Impacts on distribution infrastructure, Maturity of proposed technology and innovation in application of technology are clearly linked to the statutory objective to “facilitate 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” and the IDP planning objectives to “move toward the creation of efficient, cost-effective, accessible grid platforms for new projects, new services, and opportunities for adoption of new distributed technologies” and to “provide the Commission with the information necessary to understand Xcel Energy's short- and long-term distribution system plans, the costs and benefits of specific investments, and a comprehensive analysis of customer cost and value.”
 - The scoring criterion for number of beneficiaries can be linked to the IDP planning objective to “enable greater customer engagement, empowerment,

and options for energy services,” since projects reaching more beneficiaries will enable greater customer engagement.

- The remaining scoring criteria pertain more to success in project execution than to the statutory or IDP planning objectives directly.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

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Xcel Energy Information Request No. 55
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 14, regarding applicant selection.

- a. How did the Company decide to select 3 applicants (as opposed to 1, 2, 4, 5, or 6)?
- b. How did the Company arrive at the scoring and weights for each?
- c. Please link each of the criteria to the objectives for grid modernization provided in the Grid Modernization statute and the Commission's IDP Planning Objectives.

Response:

- a. As noted on Appendix H, page 6, the initial concept for the RMP emerged from 2019 discussions with the City of Minneapolis and a proposed Non-Wires Alternative (NWA) Pilot, with an estimated budget of \$4 to 8 million, included in our response to the Commission's request for proposed economic recovery investments in Docket No. E, G999/CI-20-492. While the RMP objectives evolved since that time – in part because we were unable to identify a location in Minneapolis where NWA investments would avoid an otherwise needed distribution system upgrade, and in part because our conversations with community partners focused on much broader resiliency and equity objectives – we were still working within an estimated budget of roughly \$8 million. With this

budget we decided we could effectively fund three projects. Other considerations included Company staff time and resources necessary to support the projects. We believe we struck the right balance. Funding fewer projects would have meant less impact and representation across our customer base, neighborhoods served, and BIPOC populations represented, as well as fewer potential lessons learned for how to support community resiliency across a range of physical conditions, building types, populations served, and community-specific needs.

- b. The internal and external reviewers worked together to score the six applications against the agreed-upon criteria in Table 1 on page 10. Each reviewer assigned scores and then the Company applied the pre-determined weights to derive the weighted scores shown in the bottom row of Table 2, page 14. All reviewers were in agreement on the three top-ranked applications.
- c. Please see response to Department Information Request No. 54, part c.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

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Xcel Energy Information Request No. 56
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 17, regarding use of the Resiliency Hub as an emergency shelter and cooling center. Has the Company attempted to quantify potential avoided health impacts associated with community residents having access to a shelter? If so, please describe the Company's findings. If not, why not?

Response:

No. We appreciate the Department pointing out that potential avoided health impacts could be a useful addition to the list of currently non-quantified benefits (on page 33 of Appendix H) that we believe are relevant and important for the Commission to consider with respect to our proposed RMP.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

Xcel Energy	Information Request No.	57
Docket No.:	E002/M-21-694	
Response To:	Minnesota Department of Commerce	
Requestor:	Matthew Landi & Alice Napoleon	
Date Received:	January 21, 2022	

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Please refer to Appendix H, page 19, Table 3. Please provide historical data for the past 5 years, or as many years as are available.

Table 1 below provides five years of historical data for each of the three buildings included in the North Minneapolis Community Resiliency Hub. Power factor was not included as that data was not readily available from our systems.

As this data constitutes customer energy usage data (CEUD) as defined by the Minnesota Public Utilities Commission,¹ Xcel Energy maintains the specific, individual CEUD provided in Table 1 as Private Data on Individuals and Trade Secret. The information is Private Data on Individuals pursuant to Minn. Stat. § 13.02, as the data is not public and is accessible to individual subjects of those data. Pursuant to Minn. Stat. § 13.37, subd. 1(b), the information is Trade Secret as the specific customer information derives independent economic value, actual or potential, to Xcel Energy, its customers, suppliers, and competitors, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use. Disclosure of the trade secret provisions would have a detrimental effect by providing valuable information not otherwise readily ascertainable and from which could be obtained economic value.

¹ See January 19, 2017 Order in Docket No. E,G999/CI-12-1344.

Table 1: Historical Data – North Minneapolis Community Resiliency Hub Buildings

Premise	Year	Annual kWh	Highest monthly Peak (kW)	Lowest monthly peak (kW)
[PROTECTED DATA BEGINS]				
Hall Elementary	2017			
	2018			
	2019			
	2020			
	2021			
Franklin Middle	2017			
	2018			
	2019			
	2020			
	2021			
Nutrition Center	2017			
	2018			
	2019			
	2020			
	2021			

PROTECTED DATA ENDS]

Preparer: Andre Gouin
 Title: Consultant, Business Technology
 Department: Strategic Partnerships and Ventures
 Telephone: (303) 294-2975
 Date: February 3, 2022

Xcel Energy	Information Request No.	57
Docket No.:	E002/M-21-694	
Response To:	Minnesota Department of Commerce	
Requestor:	Matthew Landi & Alice Napoleon	
Date Received:	January 21, 2022	

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Please refer to Appendix H, page 19, Table 3. Please provide historical data for the past 5 years, or as many years as are available.

Table 1 below provides five years of historical data for each of the three buildings included in the North Minneapolis Community Resiliency Hub. Power factor was not included as that data was not readily available from our systems.

As this data constitutes customer energy usage data (CEUD) as defined by the Minnesota Public Utilities Commission,¹ Xcel Energy maintains the specific, individual CEUD provided in Table 1 as Private Data on Individuals and Trade Secret. The information is Private Data on Individuals pursuant to Minn. Stat. § 13.02, as the data is not public and is accessible to individual subjects of those data. Pursuant to Minn. Stat. § 13.37, subd. 1(b), the information is Trade Secret as the specific customer information derives independent economic value, actual or potential, to Xcel Energy, its customers, suppliers, and competitors, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use. Disclosure of the trade secret provisions would have a detrimental effect by providing valuable information not otherwise readily ascertainable and from which could be obtained economic value.

¹ See January 19, 2017 Order in Docket No. E,G999/CI-12-1344.

Table 1: Historical Data – North Minneapolis Community Resiliency Hub Buildings

Premise	Year	Annual kWh	Highest monthly Peak (kW)	Lowest monthly peak (kW)
[PROTECTED DATA BEGINS]				
Hall Elementary	2017	464,182	292	139
	2018	463,705	308	92
	2019	468,766	296	163
	2020	408,352	355	112
	2021	484,555	298	106
Franklin Middle	2017	852,000	408	213
	2018	1,008,000	477	216
	2019	1,049,376	464	216
	2020	833,291	403	186
	2021	1,020,006	428	149
Nutrition Center	2017	1,630,877	470	296
	2018	1,676,187	469	323
	2019	1,961,799	632	308
	2020	1,953,841	537	296
	2021	2,121,934	632	290

PROTECTED DATA ENDS]

Preparer: Andre Gouin
 Title: Consultant, Business Technology
 Department: Strategic Partnerships and Ventures
 Telephone: (303) 294-2975
 Date: February 3, 2022

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Xcel Energy Information Request No. 58
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 25, regarding potential future electrification. Please provide historical and projected baseline installations of heating and transportation electrification.

Response:

Our forecasts for electric vehicle (EV) adoption and its impacts on the distribution system for the NSP Minnesota service area overall are summarized in Appendix E2, *Distributed Energy Forecast Methodology and Forecasts*, section G. There were about 20,000 EVs in Minnesota as of June 2021. Our forecast projects cumulative adoption rate, numbers of EVs, and electricity consumption in the NSP Minnesota service area under Low, Mid and High forecast assumptions (Figure 12, page 24 of that appendix).

We do not have forecasts of heating and transportation electrification specific to the feeder serving, or neighborhood surrounding, Sabathani Community Center. We note that Sabathani is contemplating plans to convert some portion of its own building heating demand to electric, replacing current gas boilers. This could increase load on its feeder, but those plans are still at an early stage of study (see Appendix H page 24).

Preparer: Nicholas Martin
Title: Policy & Outreach Manager

Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

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Xcel Energy
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Information Request No. 60

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 31, Table 4. Please confirm that cost estimates included in the Table are for Xcel only. If not, please provide a break-out for Xcel and for partners.

Response:

The cost estimates included in Table 4 are for Xcel Energy only.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

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Xcel Energy Information Request No. 61
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 31-34, regarding benefits.

- a. Does Xcel expect that each of the RMP hosts would install solar components in the absence of Xcel's RMP investments. If not, why not? If so, why does Xcel claim benefits associated with emissions avoidance?
- b. For each of the proposed RMP projects, please indicate whether the partners own the facilities in which the PV, BESS, and microgrid would be installed.
- c. For each of the proposed RMP projects, please indicate the status of design, engineering, procurement, and contracting for the equipment to be owned and operated by the hosts/partners. Please include information on such milestones as financing, local permits, interconnection agreements, landlord approval, and any other needed approvals or contracts.
- d. For each of the proposed RMP projects, if the relevant feeders were closer to capacity, how much would the value of avoided or deferred capital expenses be?
- e. For each of the non-quantified benefits, please indicate whether it is possible to monetize it. If not, please describe how the non-quantified benefit could be otherwise quantified.

Response:

- a. The Company does not know whether each RMP host would install a stand-alone solar array in the absence of the proposed RMP investments. They would certainly have the option to do so. Only when solar is paired with the proposed RMP investments (i.e., BESS and microgrid components), however, are the projects able to support resilience in the event of an extended power system outage.
- b. For all projects, the partner organizations own the facilities (buildings and land) on which solar, BESS and microgrid technologies will be installed.
- c. The Company does not have detailed status of the design, engineering, procurement, and contracting for equipment to be owned and operated by the hosts/partners. If the RMP is certified, the Company's own design and procurement processes will begin; at that time, we will coordinate closely with the partner organizations to ensure project timelines (financing, local permits, interconnection agreements, landlord approval, and any other needed approvals or contracts) for the partner-owned and Company-owned project components align.
- d. We have not completed an analysis under the hypothetical that the RMP feeders were closer to capacity. Any analysis attempting to estimate the value of avoided or deferred capital expenses when there is not a specific capacity risk to evaluate would require numerous speculative assumptions and would have little analytical value.
- e. Some of the non-quantified benefits listed on Appendix H pages 33-34 are theoretically possible to quantify, but we did not attempt to do so since this would require subjective judgements and would be outside the scope of current methods we have used to assess the cost/benefit of grid modernization projects in Minnesota. Our cost/benefit analysis focuses on tangible benefits that lend themselves to quantification. We provide further thoughts below, but do not propose integrating these into our quantitative cost/benefit analysis at this time.
 - 1) *Training and job creation.* This is a macro-economic benefit impacting communities that the Company cannot monetize at this time. It is difficult to forecast with any certainty the number of people who would benefit from the "know-how" developed through RMP investments, since there has not yet been a formal apprenticeship program focusing on such technologies. The benefit could partially be assessed if the City and/or

partner organizations implement a formal apprenticeship program with registered individuals that will benefit.

- 2) *Value of learning for future resiliency and/or NWA projects.* This type of knowledge is an intangible asset that the Company cannot monetize. It might be considered an essential source of advantage for communities, but understanding its monetary value is challenging, since beneficiaries are individuals and nonprofit organizations. The Company is not aware of any method that can be utilized to quantify and/or track this benefit.
- 3) *Energy equity objectives.* This is macro-economic benefit impacting communities that the Company cannot monetize at this time. The Company did include in our cost/benefit analysis the generation and carbon emission benefits for these projects, which comprise one component of energy equity (reduced pollution). However, we have not attempted to quantify advancing environmental justice in communities disproportionately impacted by pollution, nor any of the several other components of energy equity listed on page 5 of Appendix H. The Company is not aware of methods to quantify or monetize the majority of these energy equity benefits.

As we note in Appendix H, page 35, the fact that these benefits are not monetized does not make them less important for the Commission to consider. Since all costs are quantified in Table 5 on that page, but only a subset of benefits are quantified, the benefit-to-cost ratios presented in the table reflect an incomplete picture of the overall benefit of the RMP projects to our communities and customers.

Preparer:	Nicholas Martin	Brian Monson
Title:	Policy & Outreach Manager	Manager
Department:	Community Relations	System Planning and Strategy
Telephone:	(612) 330-6255	(763) 493-1811
Date:	February 3, 2022	February 3, 2022

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Xcel Energy Information Request No. 62
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix H, page 36, please describe the measure life of all equipment for the RMP.

Response:

The battery energy storage system (BESS) is presumed to have a 10-year life. This is predicated on the expected life of the battery cells and inverter. At the end of this period the system could be re-powered or de-commissioned. Project performance would be reviewed as a basis to making that decision. Switching equipment, transformers, and other electrical equipment is generally assumed to have a 20-year life. The type of solar installations we expect will be installed and owned by the site hosts are expected to have a 20+ year life.

Preparer: Andre Gouin
Title: Consultant, Business Technology
Department: Strategic Partnerships and Ventures
Telephone: (303) 294-2975
Date: February 3, 2022

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Xcel Energy Information Request No. 63
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to Appendix H, please provide any benchmark analysis Xcel performed on BESS, switching, and other microgrid equipment to assess the reasonableness of the proposed costs.

Response:

Cost estimates for the BESS were based on the National Renewable Energy Laboratory's (NREL) Annual Technology Baseline data, a compilation of detailed cost and performance data (both current and projected) for renewable and conventional technologies. A copy of this data can be found on NREL's website here: [Data | Electricity | 2021 | ATB | NREL](#) (reference "Commercial Battery Storage" 2021 cost projections). Cost estimates for switching and other microgrid components were drawn from similar projects currently being installed within Xcel Energy's Colorado service territory. Actual project costs will be refined through competitive requests for proposal (RFP) that would be issued after an affirmative Commission certification decision.

Preparer: Andre Gouin
Title: Consultant, Business Technology
Department: Strategic Partnerships and Ventures
Telephone: (303) 294-2975

Date: February 3, 2022

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Xcel Energy Information Request No. 64
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 36.

- a. Has the Company considered any technological or locational alternatives to the proposed RMP projects? Why or why not?
- b. Would any technological or locational alternatives meet the objectives of the proposed RMP projects? Please explain.
- c. Please describe Xcel's assumptions about its other grid modernization initiatives in the no-RMP scenario.

Response:

- a. Regarding technological alternatives, since the primary objective of the RMP is to support community resilience to deliver critical services in the event of an electrical system outage, the Company believed a combination of solar, BESS, and microgrid technologies was most appropriate. This combination of technologies allows a key community site – i.e. resilience hub – to be islanded and continue to provide critical services through an outage. This also aligns with the statutory objective to improve security against physical threats (in this case threats from climate change).¹ Fossil fuel-fired (diesel or natural gas) back-

¹ Minn. Stat. §216B.2425, subd. 2 (e).

up generation could also serve this purpose, but we considered BESS paired with solar more appropriate in view of a) our communities' priority on environmental justice, including reducing emissions in these neighborhoods disproportionately impacted by pollution, and b) the statutory objective to "facilitat(e) communication between the utility and its customers through the use of... energy storage and microgrids, technologies to enable demand response, and other innovative technologies."² There are other technologically feasible clean solutions – e.g. hydrogen fuel cell – but these technologies are less commercially mature and more expensive than battery storage.

Regarding locational alternatives, as explained in Appendix H page 6, the RMP grew out of discussions with the City of Minneapolis in the 2019 IDP docket around developing a Non-Wires Alternative (NWA) pilot in Minneapolis, which the Company then incorporated into our May 2020 filing in Docket No. E,G999/CI-20-492. Although the RMP objectives became broader over time, we maintained our locational focus on Minneapolis, and in our March 2021 RFA to identify RMP project sites we required applicants to be electric retail customers within the City of Minneapolis. If the RMP delivers significant benefits and learnings in Minneapolis, the Company may consider replicating it elsewhere in our service territories.

- b. See response to part a.
- c. RMP is a stand-alone pilot project and does not have an impact on any of the Company's other grid modernization initiatives or proposals.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

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

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Xcel Energy Information Request No. 65
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, page 32-34 and 40.

- a. Will any of the benefits result in lower rates to customers?
- b. Please explain how the proposed RMP projects provide greater energy affordability.

Response:

- a. If the Department is referring here to electric rates for the three RMP partner organizations themselves, we do not expect participation in the RMP to change the rates paid by the RMP site hosts, though it could reduce their energy bills (see part b). If the question is referring to rates paid by all customers, some of the grid services we are testing via the RMP – mitigating system and feeder peaks, price arbitrage, deferring capex investments if future growth on the RMP feeders causes them to approach capacity – could, when applied at scale, result in system cost savings that translate into lower rates. At the pilot scale of the RMP, any effect on rates would be negligible, but the “value of learning” benefit on Appendix H, page 34 highlights that learnings from managing the RMP systems for grid benefit may be able to be scaled up.
- b. We see three ways participation in the RMP could result in greater energy affordability for the RMP partner organizations. First, the rooftop solar

component of the projects may result in lower bills via net metering bill credits. Since that energy affordability benefit would accrue to the RMP site hosts only, the Company determined it should be paid for by them; thus we chose to require the hosts to finance solar themselves so that any solar incentives and/or net metering bill credits would accrue to them. Second, while the BESS and microgrid components will not deliver direct bill reductions, since they will be on the utility side of the meter and managed for grid benefit, they will reduce or eliminate the need to run back-up generators to provide critical services in the event of an electric outage. This will reduce the host organizations' expenses for diesel/natural gas fuel for back-up generators. Third, the remaining energy affordability benefits from participating in the RMP will come largely from energy efficiency and HVAC improvements – which we are supporting through existing CIP programs but not including in the RMP budget – delivering lower electric and/or natural gas bills.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

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Xcel Energy Information Request No. 66
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H, Table 5.

- a. What perspective are the benefits and costs in?
- b. Please provide BCA results for all other BCA tests used in Minnesota.
- c. Please provide BCA results for all BCA tests used in Minnesota, if Xcel's other grid modernization initiatives are implemented.

Response:

- a. The Company sought clarification from the Department on these questions. For part a, the Department clarified it is referring to the four perspectives – utility/program administrator cost, total resource cost, societal cost, and ratepayer impact measure – that are conventionally used in Minnesota's Conservation Improvement Program (CIP). As a threshold matter, we note that RMP is not an energy efficiency program and is not being proposed in the CIP context. Further, the IDP requirements require the Company to provide a cost-benefit analysis for each grid modernization project in its 5-year action plan, based on the best information it has at the time and including a discussion of non-quantifiable benefits.¹ They do not specify that the cost/benefit

¹ See Order in Docket No. E002/CI-18-251 (July 16, 2019).

analysis should or must use the CIP framework. We performed a CBA using the same method we have used for other grid modernization investments in this and earlier IDPs. That said, the CBA presented in Table 5 attempts to quantify costs and benefits to participants (here the RMP site hosts), but also to all customers (e.g., by dispatching the BESS for grid-wide benefits) and to society (e.g., generation and carbon emissions).

- b. As we discuss in part a above, the RMP is not a CIP investment and the CIP cost test framework is thus not applicable.
- c. As we have otherwise noted and responded in DOC-64 part c, the RMP is a stand-alone initiative and as such has no bearing on the Company's other grid modernization investments or initiatives.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 3, 2022

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Xcel Energy Information Request No. 67
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H. To what extent has the Company considered risks associated with the proposed RMP? Please describe specific risks considered, potential costs associated with the risks, and how the Company proposes to mitigate them.

Response:

We have generally considered risks in the following categories:

Safety and reliability. The primary risk considered with the RMP projects is ensuring the safe, reliable operation of this distribution asset. Xcel Energy has a long history of installing and maintaining electrical distribution equipment safely and reliably and these same practices would be followed as normal course of business for the RMP projects. Two components of the project are outside our typical distribution assets: (1) the battery energy storage system, and (2) the microgrid controls. Energy storage systems by their nature present some level of risk. Risk mitigation measures include ensuring safety measures are built into the design of the energy storage system, installation location and clearance considerations, and development of emergency action plans and training for operators, maintenance personnel and first responders. Costs associated with ensuring the energy storage system meets desired safety requirements are ultimately included in the purchase price of the battery storage system and are not delineated individually. The Company has estimated costs for site improvements (security fencing, protection walls) at approximately \$182,000 total for the three sites. We have also budgeted approximately \$80,000 for an energy storage

safety consultant to provide guidance around installation and to provide training to maintenance personnel and first responders.

Project execution. These are the most common project execution risks – i.e. risks that could delay successfully bringing the RMP projects into service by the targeted date. These are associated with supply chain, inflation, labor availability, required permitting and regulatory processes, weather, community relations, union labor issues, unanticipated schedule delays, construction pricing, major scope changes, and interconnection issues. While not all such risks can be controlled, contingencies in the project budget are intended to mitigate unforeseen issues and/or tackle variances to the extent feasible.

Operational risks. The most common risks assessed and tracked after a project has been placed in service include:

1. Extreme weather conditions impacting the integrity of the assets. This risk will be mitigated by installing additional weather protections.
2. Asset quality deficiencies as a result of manufacturing defects. This risk will be mitigated by controlling vendor's risk scoring in the procurement process and signing contracts that demand warranties.
3. Unanticipated changes in equipment performance due to environmental changes or asset degradation. If this occurs after warranties and before the end of useful life, risk will be mitigated through insurance policies or replacement of assets.
4. Network integration issues due to system upgrades. This is only applicable to assets owned by the Customers that require integration with the Company's assets (i.e., the solar arrays). This risk will be mitigated by strict coordination between the parties.
5. Operational cyber-attacks specifically directed to RMP facilities. For Company assets, this risk will be mitigated by coverage under the Company's cyber defense strategy plan.
6. Third-party damages including but not limited to vandalism, terrorism, and operational sabotage due to community protests. For Company assets, this includes a holistic review of each area applicable to the business security risk advisory.
7. Risk of incidents caused by RMP operators with deficient qualifications. While all Company personnel in contact with the assets will have appropriate training to minimize this risk, the risk could still exist in cases where outside maintenance people are in contact with Company-owned facilities. This risk will be mitigated by securing Company assets and through exhaustive training and coordination.

Preparer:	Andre Gouin	Pablo Martinez
Title:	Consultant, Business Technology	Senior Analyst
Department:	Strategic Partnerships and Ventures	Risk Analytics
Telephone:	(303) 294-2975	(303) 571-7639
Date:	February 3, 2022	February 3, 2022

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Xcel Energy Information Request No. 68
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Question:

Topic: Resilient Minneapolis Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix H.

- a. Please describe how lessons learned from RMP would tie into the broader system planning process.
- b. Please describe how the RMP would function as a part of the larger grid modernization initiative.
- c. Please describe how the RMP would contribute to the overall goals of the larger grid modernization initiative.

Response:

- a. The RMP project will provide the Company with experience integrating and operating microgrids pairing solar and battery energy storage into the distribution grid. It will provide insight into real-world capabilities and limitations of energy storage when dispatched for a range of different grid services as described in Appendix H, page 32-33. Deployment of the projects will also provide actual cost basis for the installation, maintenance, and operation of solar/battery energy storage microgrids. This will allow us to properly consider these technologies as a potential solution in future system planning.

- b. The assets deployed through RMP are planned to be integrated into the Company's Advanced Distribution Management System (ADMS) and will be enabled with two-way communication.
- c. The ability of energy storage technology to act as either load (when charging) or generation (when discharging) provides the Company with additional flexible grid resources. Creating this flexibility helps the grid respond quickly to rapidly changing needs as the grid is modernized. Energy storage can assist with the integration of high penetrations of renewable energy. Energy storage can also assist in meeting increased peaking conditions that may be brought on by electric vehicles or other electrification efforts. The RMP project provides the Company with real world experience deploying and managing energy storage assets so it can be prepared when these types of assets are necessary for operating and managing the distribution grid in the future.

Preparer: Andre Gouin
Title: Consultant, Business Technology
Department: Strategic Partnerships and Ventures
Telephone: (303) 294-2975
Date: February 3, 2022

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Xcel Energy
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi & Alice Napoleon
Date Received: January 21, 2022

Information Request No. 69

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to Appendix G, page 27, in relation to the O&M.

- a. For any estimated or forecasted costs please provide supporting information and calculation in spreadsheet format with formulae intact on how these costs were estimated based on experience or derived using historical data.
- b. For any vendor or third party provided support or equipment, please provide the cost estimates provided to the Company and how they compare with Table 2.
- c. For each cost in Table 2, please indicate any risk or contingency costs and how these were estimated.
- d. For each category of costs, please identify internal and external labor.

Response:

Parts a-c: Please see our response to TRADE SECRET DOC-29.

d. See below

<u>Cost Category</u>	<u>Labor Type</u>
Governance and Change Management	Internal
Product Development	Internal
Sales and Marketing	Internal with some supplemental external (<i>unknown at this time</i>)
Customer Service	Internal with some supplemental external (<i>unknown at this time</i>)
Third Party Consulting	External
Architecture Run Cost	75/25 External vs. internal
Use Case Run Cost	75/25 External vs. internal

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: February 3, 2022

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Xcel Energy Information Request No. 71

Docket No.: E002/M-21-694

Response To: Minnesota Department of Commerce

Requestor: Matthew Landi; Alice Napoleon

Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project

Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Refer to the response to DOC-047.

- a. Please provide a breakout of miscellaneous costs for each of the proposed RMP projects.
- b. Please indicate how the contingency amount was determined.

Response:

- a. Table 1 below provides a breakout of the miscellaneous costs estimated for the RMP projects.

Table 1: RMP Estimated Miscellaneous Costs Breakout

Component	Unit	Cost	North Minneapolis		MAIC		Sabathani		Totals
			Qty	Cost	Qty	Cost	Qty	Cost	
Miscellaneous									
Warehouse/Storage	BESS Cost	4%	1,712,196	\$ 68,488	758,196	\$ 30,328	758,196	\$ 30,328	\$ 129,144
Sourcing	BESS Cost	2%	1,712,196	\$ 34,244	758,196	\$ 15,164	758,196	\$ 15,164	\$ 64,572
Training (internal)	ea	\$ -	1	\$ -	1	\$ -	1	\$ -	\$ -
Additional NFPA and Fire Code Support (ESRG)	ea	\$ 26,486	1	\$ 26,486	1	\$ 26,486	1	\$ 26,486	\$ 79,459
Land lease	ea	varies	1		-	\$ -	-	\$ 125,000	\$ 125,000
Contingency	Total Cost	15%	3,401,189	\$ 510,178	2,072,378	\$ 310,857	2,190,674	\$ 328,601	\$ 1,149,636
Total Miscellaneous Costs									\$ 1,547,811

- b. The 15 percent contingency is an estimate based on uncertainties related to design and implementation that arose for similar battery storage projects implemented by Xcel Energy in Colorado. These uncertainties include working with a technology that is still relatively new, the Company's limited experience with installation and deployment of battery storage systems, and uncertainties around potential site work required. If the RMP is certified, we will complete more detailed design work and initiate the work to select equipment suppliers, etc., which will result in refined project cost estimates. Our subsequent cost recovery request will reflect actual costs incurred, and for forward-looking costs, refined cost estimates based on our detailed design and actual contracted costs we expect to incur.

Preparer: Andre Gouin
Title: Consultant
Department: Strategic Partnerships & Ventures
Telephone: (303) 294-2975
Date: February 22, 2022

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Xcel Energy Information Request No. 72
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to the response to DOC-048, please provide the 10 most recent annual filings regarding installations and capacity of distributed energy resources.

Response:

Please see Attachments A through T.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 22, 2022

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Xcel Energy Information Request No. 73
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Refer to the response to DOC-049.

- a. Please provide projected reliability statistics for each feeder serving an RMP project, in terms of SAIDI, SAIFI, CAIDI, and any other reliability metrics used by the Company, assuming that the RMP projects are implemented.
- b. If the Company projects no change in these reliability metrics as a result of implementing the RMP projects relative to the results provided in responses to DOC-49, why not?
- c. What are the goals for improvement in reliability? Please propose specific goals for improvement in reliability.
- d. Given that the values provided in the response show relatively good reliability over the past 5 years, why does the Company propose to make reliability and resilience investments?

Response:

- a. As noted in the Company's response to DOC-49, we do not project future reliability performance at a feeder level. As a result, the only information we are able to provide at this time is historic as provided in response to DOC-49.
- b-d. The Company has not suggested there would be no change in reliability as a

result of implementing the RMP projects. To the contrary, we expect the RMP sites to have an improved reliability experience, due to our proposed resilience investments that would lessen the possibility of those sites completely losing power in a system outage situation. Additionally, we note that the RMP is oriented to community resiliency, not solely reliability. Please see in particular our discussion of community resilience hubs in Appendix H, pages 2-4. The definition and scope of community resiliency hubs provides broader benefits than what is captured in standard industry SAIDI, SAIFI, and CAIDI reliability metrics. Among other differences, a power outage in a disproportionately vulnerable community like the three RMP communities would be a high-impact event – even if standardized reliability statistics suggest such events may be relatively rare – that could significantly impact these organizations’ ability to continue delivering critical services such as serving as a community gathering location, food distribution, a safe environment during extreme heat or cold, communications capabilities, etc. Our RMP proposal seeks to improve community resiliency, of which reliability is just one part of the broader resiliency objective, while delivering a broad range of grid services and system learnings during routine, non-outage operations.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 22, 2022

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Xcel Energy Information Request No. 74
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Refer to the response to DOC-051.

- a. Which non-monetized, quantitative metrics has Xcel considered for assessing the proposed RMP's contribution toward equity objectives?
- b. If any such non-monetized quantitative metrics were rejected, why were they rejected?
- c. If any such non-monetized quantitative metrics were not rejected, please provide historical and projected performance under a baseline scenario and under a scenario with the RMP.

Response:

- a-b. As discussed in our response to DOC-051, we expressed the equity benefits of the RMP in qualitative terms for several reasons. As we explained there, we determined it would be a difficult and subjective exercise to attempt to capture these objectives in quantitative metrics comparing historical/projected equity with and without the RMP, for two reasons. First, many of the equity objectives are qualitative in nature. Attempting to monetize them would require subjective judgments and we believe, oversimplify and likely undervalue their impact. Instead, we urged the Commission to equally consider non-quantified benefits in its certification decision, since they are central to the Company and its customers, even if not assigned a monetary value in the CBA (see Appendix H, Section

IV.B). Second, the listed equity objectives are much broader than can be accomplished by the RMP alone. A small pilot program like the RMP can make a useful contribution to supporting equity, and provide lessons learned to build on that impact, but on its own, is only one of many efforts necessary to address equity. The Company (and Department and Commission) have entire programs devoted to the equity objectives listed in Appendix H, page 5 (energy affordability, reducing energy burden for low-income customers, equitable access to renewable energy, low-income energy efficiency, workforce training and diversification, and reducing conventional pollution to address environmental justice concerns). We are unaware of standardized quantitative metrics or cost-benefit frameworks associated with these broader equity programs and objectives that are intended to be applied to an initiative such as the RMP, which is a single and relatively small contributor alongside these larger programs. As such, we believe any quantifiable examination of equity needs to be done in the context of a Minnesota equity framework. To date, we believe the Commission has considered equity in a qualitative manner.

c. Not applicable.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 22, 2022

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Xcel Energy Information Request No. 75
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to the response to DOC-053, regarding the IDP goal to "[e]nable greater customer engagement, empowerment, and options for energy services."

- a. Customer engagement
 - i. How does Xcel define customer engagement?
 - ii. Will the proposed RMP projects "[e]nable greater customer engagement" for customers besides the three selected RMP partners? If so, which other customers will experience greater customer engagement, and how?
 - iii. Does Xcel measure customer engagement in any aspect of its business?
 1. If so, please describe the context and how these data are used.
 2. If not, why not?
- b. Customer empowerment
 - i. How does Xcel define customer empowerment?
 - ii. Do the proposed RMP projects enable greater empowerment for customers besides the three selected partners? If so, which other customers will experience greater customer empowerment, and how?
 - iii. Does Xcel measure customer empowerment in any aspect of its business?
 3. If so, please describe the context and how these data are used.
 4. If not, why not?
- c. Options for energy services
 - i. How does Xcel define options for energy services?

- ii. Do the proposed RMP projects enable more options for customers besides the three selected partners? If so, which other customers will experience more options, and how?
- iii. Does Xcel measure options in any aspect of its business?
 - 1. If so, please describe the context and how these data are used.
 - 2. If not, why not?

Response:

As used here, all three of these terms – customer engagement, customer empowerment, and options for energy services – are Commission terms, used in the Commission’s integrated distribution planning objectives in Docket No. E002/CI-18-251. That said, though the Company may use similar terms in general parlance for our various customer programs, we respond to these questions in the context of our proposed RMP and how we believe it advances this IDP planning objective established by the Commission. Broadly, the RMP promotes greater customer engagement and customer empowerment, and provides greater options for energy services, both to the RMP hosts themselves and to their surrounding communities.

We provide below, RMP examples for each of the terms identified in the question:

- a. *Customer engagement:* inviting several customers to propose resiliency projects in the Request for Applications, and then engaging closely with our three selected hosts – Renewable Energy Partners, Sabathani Community Center, and the Minneapolis American Indian Center – to design the RMP initiative over the past year, has enabled a qualitatively new level of engagement than existed previously between the Company and these customers. This has helped the Company to better understand our customers’ needs and enabled three specific customers who serve thousands of our customers as community hubs, to better understand the many different offerings the Company has (including but not limited to solar and batteries) to meet those needs. Moreover, because those three organizations are so deeply embedded in their neighborhoods – in particular, Sabathani and MAIC host thousands of visitors every year through the programs and services they offer, most of whom are also Xcel Energy customers¹ – our engagement with the three RMP hosts themselves will enable deeper engagement with the Company’s residential and business customers throughout those neighborhoods. This will enable those customers to learn about Xcel Energy offerings that can make their energy use cleaner, save them money, etc. Hundreds of students attend Hall Elementary and Franklin Middle schools and will see solar and battery systems in operation in the North Minneapolis Community Resiliency Hub; this is an

¹ Sabathani estimates 43,000 people served annually; MAIC 22,000. See Appendix H, pages 20 and 27.

extraordinary opportunity to engage our future customers, have them talk with their parents about clean energy, and expose them to the idea of a career in energy.

- b. Customer empowerment:* participating in the RMP planning process, learning about available utility programs, better understanding their energy options, and better understanding Public Utility Commission dockets and decision-making has empowered the three RMP hosts to take more control of their energy future. As an example, Sabathani Community Center has now developed a “Community Revision Project” that includes the RMP resiliency initiative but also a much broader array of projects (lighting retrofits, building efficiency improvements, HVAC system updates, etc.). The Company does not take credit for that effort – that belongs to Sabathani; but engaging with the Company has empowered Sabathani to think bigger because they understand more about the programs and services available. It has also empowered the Company to think in new ways about how we can design and improve our programs to serve all our customers. Again, this provides a mechanism to empower not only the RMP hosts but the large number of Xcel Energy customers who walk through the RMP hosts’ doors every year.
- c. Options for energy services:* participation in the RMP obviously provides new options for energy services for the three RMP hosts: rooftop solar generation, batteries and microgrid controls to support resiliency in their communities. These technologies are a subset of the distributed energy resources the Company is enabling through its grid modernization and other efforts. We have also been able to make the site hosts aware of energy service options we provide that are not directly related to the RMP, including lighting rebates, support for engineering studies, energy design assistance, building shell improvements, etc. As other residential and business customers visit the RMP sites and see these technologies in operation, they will become aware of new energy products and services also available to them. Again, partnering with organizations who touch so many of the Company’s customers offers an extraordinary opportunity to make our customers aware of the ever-growing set of options for energy services.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 22, 2022

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Xcel Energy Information Request No. 76
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to the response to DOC-053, regarding the IDP goal to "[e]nable greater customer engagement, empowerment, and options for energy services."

- a. Please indicate whether any energy service providers operating in Xcel's service area provide the switching services that Xcel proposes to provide to RMP partners.
 - i. If so, please provide the organization name, location, contact information, a description of their services, and area served.
 - ii. If so, please indicate whether Xcel plans to work with these organization(s) for provision of RMP services. If not, why not?
- b. Please indicate whether any energy service providers operating in Xcel's service area provide the BESS installation services that Xcel proposes to provide to RMP partners.
 - i. If so, please provide the organization name, location, contact information, a description of their services, and area served.
 - ii. If so, please indicate whether Xcel plans to work with these organization(s) for provision of RMP services. If not, why not?
- c. Please indicate whether any energy service providers operating in Xcel's service area provide the battery operation services that Xcel proposes to provide to RMP partners.
 - i. If so, please provide the organization name, location, contact information, a description of their services, and area served.

- ii. If so, please indicate whether Xcel plans to work with these organization(s) for provision of RMP services. If not, why not?

Response:

- a. By “switching services” in this subpart (a), we understand the question to be referring to switching from grid connected to “islanded,” or microgrid, mode. This would happen automatically in the event of a grid outage. The islanding switches will be interconnected at distribution voltage on the Company’s distribution system and be tied to the Company’s Advanced Distribution Management System (ADMS). As such, the device would be under the purview of the Company and could not be operated by any other potential service provider.
- b. It is our general understanding that there are energy service providers operating within the Company’s service area that may be able to provide BESS installation services. We do not, however, maintain a list. Should the RMP project be certified, we intend to issue a request for proposal (RFP) to acquire the BESS and associated installation services. This RFP would be directed toward companies who can operate within our service territory and who have demonstrated experience and a proven track record of delivering projects similar to what is being proposed for RMP.
- c. As proposed, the RMP project contemplates the battery system being operated to perform grid services the majority of the time. As the grid operator, the Company would determine when these services are required. Creating the algorithms and systems necessary to operate the BESS to perform the required operations is the responsibility of the BESS provider, who would be selected through the RFP process mentioned above.

Preparer: Andre Gouin
Title: Consultant, Business Technology
Department: Strategic Partnerships and Ventures
Telephone: (303) 294-2975
Date: February 22, 2022

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Xcel Energy Information Request No. 77
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please refer to the response to DOC-053, regarding the IDP goal to “[m]aintain and enhance the safety, security, reliability, and resilience of the electricity grid, at fair and reasonable costs, consistent with the state's energy policies.” In light of the benefit cost ratios found in Table 5 of Appendix H, how is the RMP proposal consistent with “fair and reasonable costs”?

Response:

We acknowledge the benefit-cost ratios for the RMP are less than one – in part because all costs are included, but only a subset of benefits are included, in these ratios – but we note that a benefit-cost ratio is just one aspect of assessing whether an initiative is in the public interest. We noted in Appendix H:

...the benefit-to-cost ratios above are not particularly high. We understand the priority placed by the Commission on advancing development of distributed energy systems that combine solar and energy storage to create multiple grid benefits. Also, the emergency back-up role these BESS projects support in these applications could support communities in times of significant or prolonged duress, which is inherently hard to value, as discussed above. Therefore, we do not believe these low benefit-to-cost ratios are a cause for concern here as they might be in a different context.

Also, we reiterate that, while some of the benefits discussed in Section IV.B can be quantified in dollar terms, others are equally important but more difficult to quantify. Since all costs are quantified, but only a subset of benefits are quantified, the benefit-to-cost ratios presented in this section reflect an incomplete picture of the overall benefit of the RMP projects to our communities and customers” (Appendix H, page 35).

We reiterate our assertion that the RMP projects will enhance the resilience of the electricity grid at fair and reasonable costs, consistent with Minnesota's energy policies. First, the RMP is consistent with the policy of the State of Minnesota to promote greater equity in the energy sector, as evidenced by multiple statutes, Commission rulings, and Walz/Flanagan Administration statements. To name one recent example, the Commission in its February 8, 2022 deliberations on Xcel Energy's Integrated Resource Plan (IRP) verbally adopted a decision option requiring the Company to address equity objectives including:

...design for the equitable delivery of electricity services and programs for energy burdened customers in the next IRP... create new options to improve customer access to energy efficiency and renewable energy... design distributed generation resource incentive programs that ensure distributed generation programs provide equitable access to low income and Black, indigenous, and communities of color that have disproportionately borne costs of unjust and inequitable energy decisions.¹

The Commission's decisions in an IRP similarly require consideration of cost along with several other dimensions including minimizing adverse socioeconomic and environmental effects, and enhancing the utility's ability to respond to changes in financial, social, and technological factors affecting its operations.² So, while this verbal decision applies to our IRP, we have no reason to believe the Commission would have a substantially different view of the "fair and reasonable cost" aspect of the IDP objectives with respect to equity.

Moreover, several of the specific components of equity listed above – electricity services and programs for energy-burdened customers, new options to improve customer access to renewable energy, and equitable access to distributed generation for low-income and Black, indigenous and communities of color – are precisely what the RMP will deliver. We assume those Commission priorities for upcoming IRPs would apply equally to IDPs.

¹ Commission deliberations in Docket No. E002/RP-19-368 (February 8, 2022). Order pending.

² See Minn. R. 7843.0500, subp. 3, which provides the factors the Commission must consider in issuing its findings of fact and conclusions in an IRP:

- A. Maintain or improve the adequacy and reliability of utility service,
- B. Keep the customers' bills and the utility's rates as low as practicable, given regulatory and other constraints,
- C. Minimize adverse socioeconomic effects and adverse effects upon the environment,
- D. Enhance the utility's ability to respond to changes in the financial, social, and technological factors affecting its operations, and
- E. Limit the risk of adverse effects on the utility and its customers from financial, social, and technological factors that the utility cannot control.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 22, 2022

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Xcel Energy Information Request No. 78
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Referring to the response to DOC-056, please provide an estimate of the value of avoided health impacts associated with each of the proposed RMP projects.

Response:

We believe the Minnesota Department of Health's work on health equity may provide insights for valuing avoided health impacts in communities that are disproportionately impacted by pollution and have greater health vulnerabilities than the population as a whole; see for example [Health Equity - Minnesota Department of Health \(state.mn.us\)](https://www.health.state.mn.us/equity/). We also refer the Department to the Minnesota Pollution Control Agency's work on reducing pollution in areas of environmental justice concern at [MPCA and environmental justice | Minnesota Pollution Control Agency \(state.mn.us\)](https://www.mn.gov/communities/justice/air-quality). Based on the interactive map of *Minnesota Areas of Environmental Justice Concern* at the link above, all three RMP sites are located in neighborhoods that a) have high poverty levels, with at least 40% of residents with incomes below 185% of the federal poverty level, b) have at least 50% of residents identifying as people of color, and c) have an MPCA Air Pollution Score that is higher than the State as a whole. We believe these sources may provide helpful information for the Department and the Commission to consider, to the extent it is determined such a framework is needed to assess utility proposals in IDP and other dockets.

We also note that the Commission has examined public health impacts as one component of the environmental costs associated with each method of electricity generation. The Commission's latest examination of this issue was in Docket No.

E999/CI-14-643, and it resulted in the Commission's adoption of values to represent the environmental costs of carbon dioxide (CO₂) and criteria pollutants.¹ As evidenced by that proceeding, assessing the issue and applying scientific methods to derive reasonable and appropriate approximations and conclusions is complex. In the case of criteria pollutants that would contribute to health effects, the Commission's examination required modeling of dispersion, a photochemical-grid model using a geographic scope appropriate for criteria pollutant emissions, and calculation of costs for a manageable set of sources that were representative of the types of resource planning scenarios the Commission is likely to encounter. This is in addition to the examination of the most up-to-date epidemiological and economic literature and most rigorous statistical methods. That said, this type of examination has not been done for grid modernization investments, and it would be inappropriate to use a framework designed for a different purpose to attempt to monetize health effects from a different type of investment, including the RMP. We are unaware of an existing framework for Minnesota utilities to assess and estimate the monetized value of avoided health impacts of grid modernization investments such as what was done in the 14-643 proceeding. We also note that there are currently no requirements to monetize the avoidance of potential health impacts in IDPs in Minnesota.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 22, 2022

¹ See ORDER UPDATING ENVIRONMENTAL COST VALUES (January 3, 2018). In the Matter of the Further Investigation into Environmental and Socioeconomic Costs Under Minnesota Statutes Section 216B.2422, Subdivision 3. Docket No. E-999/CI-14-643.

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Xcel Energy Information Request No. 79
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Refer to the response to DOC-057.

- a. North Minneapolis Community Resiliency Hub
- i. Which functions/end uses would be supported by the BESS?
 - ii. Please provide the capacity in kW for each service that the proposed investment would provide.
 - iii. How would the loads for the buildings that would be served by the North Minneapolis Community Resiliency Hub change when they are providing emergency services to the community? Please provide an estimate.
 - iv. For each type of emergency service (shelter, cooling center, electricity, food, water, etc.), how many people could be served by these facilities during a black sky event without Xcel's proposed investment?
 - v. For each type of emergency service (shelter, cooling center, electricity, food, water, etc.), how many people could be served by these facilities during a black sky event with Xcel's proposed investment?
- b. Sabathani Center
- i. Which functions/end uses would be supported by the BESS?
 - ii. Please provide the capacity in kW for each service that the proposed investment would provide.
 - iii. Please provide historical data on annual kWh and highest monthly peak for the Sabathani Center for the past 5 years, or as many years as are available.
 - iv. How would the loads for Sabathani Center change when providing emergency services to the community? Please provide an estimate.

- v. For each type of emergency service (shelter, cooling center, electricity, food, water, etc.), how many people could be served by these facilities during a black sky event without Xcel's proposed investment?
- vi. For each type of emergency service (shelter, cooling center, electricity, food, water, etc.), how many people could be served by these facilities during a black sky event with Xcel's proposed investment?
- c. Minneapolis American Indian Center
 - i. Which functions/end uses would be supported by the BESS?
 - ii. Please provide the capacity in kW for each service that the proposed investment would provide.
 - iii. Does the Minneapolis American Indian Center plan to provide emergency services during black sky events? If so, please describe these services. If not, please explain how the proposed project provides resiliency benefits.
 - iv. Which functions would be supported by the BESS?
 - v. How would the loads for the MAIC change during black sky events? Please provide an estimate.

Response:

Not all the information requested is available at this time; we provide the information currently available here. Some additional information regarding building critical loads and usage requirements is currently being collected. This information will inform the design criteria for an RFP the Company intends to issue should this project be approved.

Regarding questions around battery sizing estimates, the table below illustrates the parameters the Company took into consideration to size the BESS associated with each project. We summarize our approach as follows:

- First, the Company looked at the peak demand for each facility as well as the winter peak at each facility. The BESS power was sized to meet the facility's peak power needs, rounded to the next highest 250 kW increment. 250 kW represents a typical inverter capacity block for estimation purposes. For example, the North Minneapolis Community Resiliency Hub's aggregated peak load is approximately 1,350 kW. Rounding this up to the nearest 250 kW block indicated the BESS must have a power rating of 1,500 kW.
- Next, an estimate of the facilities' emergency energy requirements was estimated. For this the facility's winter peak was used as an indication of the total power demands required to keep the facility fully operational during the heating season – the premise being that air conditioning may be sacrificed while space heating could not. The winter peak load represents the maximum demand seen at the facilities.

Average demand is often considerably less. For estimation purposes we assumed that emergency loads would account for 50% of the total loads during winter peak. The projects are being designed to serve these critical loads solely from the battery for a minimum of four hours. Multiplying 50% of the winter peak load by four hours provides the minimum energy to be reserved within the battery for emergencies. Again, using the North Minneapolis Community Resiliency Hub as an example: 50% of the 571 winter peak load equals 286 kW (rounded). 286 kW times four hours equals 1,142 kWh of energy to be reserved for emergency purposes. It should be noted that this is the minimum amount of energy to be reserved in the system. At any given time, the BESS may have a state of charge somewhere between its maximum energy capacity and this minimum threshold.

- With this information, we estimated the BESS energy capacity. The Company's work on other projects has revealed that "energy" battery systems (where the amount of energy provided equals two or more hours at the system's rated power) are more cost effective on a \$/kWh basis than "power" batteries (where the amount of energy provided equal less than two hours of storage at the rated power). For each facility, the BESS energy capacity was calculated to ensure each facility's emergency energy requirements could be met while having a minimum of two hours total storage capacity.

Table 1: RMP BESS Sizing Estimates

Facility Energy Usage	North Mpls	MAIC	Sabathani
Peak Load (kW)	1,350	355	334
Winter Peak (kW)	571	143	200
Emergency Curtailment Factor (%)	50%	50%	50%
Emergency Load Estimate (kW)	286	72	100
Battery Power (kW)	1,500	500	500
Battery Capacity (kWh)	3,000	1,000	1,000
Emergency backup duration (hours)	4	4	4
Emergency Reserve Capacity (kWh)	1,142	286	400

a. North Minneapolis Community Resiliency Hub

i. Which functions/end uses would be supported by the BESS?

The BESS will be able to support the facility's full load, all functions/end-uses, for a short period of time. In the case of an outage that is more extended, through coordination with the facility's building automation system, it is expected that non-critical loads within the facility would be shed to preserve the remaining state of charge within the BESS. The specific duration loads can be served is dependent upon the state of charge within the BESS when the outage occurs, whether or not onsite solar generation is available to serve the

load, and how aggressively the facility operator chooses to conserve energy. At a minimum, the system would be designed to carry 50% of the facility's winter peak load for four hours as described above.

- ii. *Please provide the capacity in kW for each service that the proposed investment would provide.*

The methodology for sizing the BESS is described above. The full power rating in kW of the BESS is available for each service that the proposed investment would provide. However, the way each BESS is ultimately deployed for each service is dependent on a number of parameters and can vary from event to event. For example, a BESS might be dispatched to support a system peak event at full kW less than an hour if there is an immediate, short duration need. But if the event is forecasted for the following afternoon the BESS might be scheduled to discharge at 50% capacity over a four-hour period.

- iii. *How would the loads for the buildings that would be served by the North Minneapolis Community Resiliency Hub change when they are providing emergency services to the community? Please provide an estimate.*

The building's loads would be limited as much as possible to those considered "critical" by the facility's operators. For example, for the North Minneapolis Community Resiliency Hub, food provision is considered a critical service so refrigeration would likely be a critical load. Non-critical loads, as determined by the facility's operators, would be curtailed to extend the length of time the BESS can sustain critical loads. Such changes could include shutting off/dimming non-critical lighting, raising set-points or otherwise reducing air-conditioning loads, shutting off HVAC equipment to non-critical sections of the facility, etc. As described above, critical loads have been estimated to be 50% of the facility's winter peak demand.

- iv. *For each type of emergency service (shelter, cooling center, electricity, food, water, etc.), how many people could be served by these facilities during a black sky event without Xcel's proposed investment?*

Currently the North Minneapolis Community Resiliency Hub facilities have diesel back-up generators tied only to critical load panels. These systems only provide service to emergency lighting and other loads deemed for life/safety purposes. They are not intended to ensure the facility can be operated to provide emergency services. For this reason, no one could currently be served during a black sky event.

- v. *For each type of emergency service (shelter, cooling center, electricity, food, water, etc.), how many people could be served by these facilities during a black sky event with Xcel's proposed investment?*

As noted in Appendix H, page 17, the estimated population served by the North Minneapolis Community Resiliency Hub is 4,775 residents and 15 businesses. This is the population that could in some way benefit from services provided by or at the North Minneapolis Community Resiliency Hub. This does not presume that 4,775 residents could be housed at said facilities. In addition, because the North Minneapolis Community Resiliency Hub includes the Minneapolis Public School District's Nutrition Center, which prepares meals for all 64 school sites and has the capacity to prepare thousands of meals for delivery throughout Minneapolis, the potential population served by being able to deliver this critical service through an electric system outage is much larger than the 4,775 people estimated as immediate beneficiaries of the Resiliency Hub.¹

b. Sabathani Community Center

i. Which functions/end uses would be supported by the BESS?

Similar to our response for DOC-79 Part a.i, the BESS can support all loads for a short duration of time. Of critical importance at Sabathani is the ability of the BESS to support the Neighborhood Food Shelf and associated refrigeration equipment.

ii. Please provide the capacity in kW for each service that the proposed investment would provide.
Please see our response to DOC-79 Part a.ii above.

iii. Please provide historical data on annual kWh and highest monthly peak for the Sabathani Center for the past 5 years, or as many years as are available.

Please see Table 2 below. The data provided in Table 2 constitutes customer energy usage data (CEUD) as defined by the Minnesota Public Utilities Commission,² Xcel Energy maintains the specific, individual CEUD provided in Table 2 as Private Data on Individuals and Trade Secret. The information is Private Data on Individuals pursuant to Minn. Stat. § 13.02, as the data is not public and is accessible to individual subjects of those data. Pursuant to Minn. Stat. § 13.37, subd. 1(b), the information is Trade Secret as the specific customer information derives independent economic value, actual or potential, to Xcel Energy, its customers, suppliers, and competitors, from not being generally known to, and not being readily ascertainable by proper means by,

¹ According to data obtained from Renewable Energy Partners, the Minneapolis Public School District serves 31,598 students at 64 school sites (pre-K, elementary and middle, high school and alternative or special academies). 63% of all students are non-white, and 57.6% qualify for free and reduced lunch (percentages are higher for North Minneapolis schools). The Nutrition Center prepares meals for all of the sites, which includes free breakfast offered to all students.

² See January 19, 2017 Order in Docket No. E,G999/CI-12-1344.

other persons who can obtain economic value from its disclosure or use. Disclosure of the trade secret provisions would have a detrimental effect by providing valuable information not otherwise readily ascertainable and from which could be obtained economic value.

Table 2: Sabathani Center Energy Usage Data

Premise	Year	Annual kWh	Highest Monthly Peak (kW)	Lowest Monthly Peak (kW)
		[PROTECTED DATA BEGINS]		
Sabathani	2017			
	2018			
	2019			
	2020			
	2021			

PROTECTED DATA ENDS]

- iv. How would the loads for Sabathani Center change when providing emergency services to the community? Please provide an estimate.*

Please see our response to DOC-79 Part a.iii above. As with the North Minneapolis Community Resiliency Hub, one of the critical services for Sabathani Community Center is food distribution – in this case the Neighborhood Food Shelf – so refrigeration would likely be a critical service. Non-critical loads, as determined by the facility’s operators, would be curtailed to extend the length of time the BESS can sustain critical loads.

- v. For each type of emergency service (shelter, cooling center, electricity, food, water, etc.), how many people could be served by these facilities during a black sky event without Xcel’s proposed investment?*

Sabathani is not currently equipped with any back-up generation, so no community members could currently be served during a black sky event.

- vi. For each type of emergency service (shelter, cooling center, electricity, food, water, etc.), how many people could be served by these facilities during a black sky event with Xcel’s proposed investment?*

As noted in Appendix H, page 21, Sabathani estimates the area served by a community resiliency hub would extend from Nicollet Avenue on the West to Bloomington Avenue on the east, and from 36th Street on the north to 40th Street on the South, with an approximate population of 72,000 people and over 30 businesses. This population is estimated to be 87% BIPOC and 80% below the poverty line. Sabathani estimates the number of people served annually by its various programs and services at 43,000. This is the overall population that

could in some way benefit from services provided by or at Sabathani. Of course, not all services are directly connected to the RMP investments, and not all are equally critical in an emergency situation. The number of people who directly benefit from services that could not otherwise be sustained through an outage absent the RMP investments will be determined by which services Sabathani determines are critical vs. non-critical when prioritizing loads for the BESS.

c. Minneapolis American Indian Center

i. Which functions/end uses would be supported by the BESS?

Please see our response to DOC-79 Part a.i above.

ii. Please provide the capacity in kW for each service that the proposed investment would provide.

Please see our response to DOC-79 Part a.ii above.

iii. Does the Minneapolis American Indian Center plan to provide emergency services during black sky events? If so, please describe these services. If not, please explain how the proposed project provides resiliency benefits.

Yes. Similar to Sabathani, the MAIC has for decades been a key gathering place and provider of critical services both to its immediate neighborhood and to the broader Twin Cities American Indian population. As noted in Appendix H, page 26-27, the approximate population served annually by MAIC's programs and services is 22,015, most of whom are low-income and experience significant opportunity gaps in health and wellness, education, access to basic needs and resources, housing, living-wage jobs and career pathways, civic and community engagement, and long-term economic stability and prosperity. MAIC's current programs and services include Native Fitness and Nutrition, Indigenous Women's Life Net (domestic violence and sexual assault services), Indian Child Welfare Program (assisting families involved in child protection program), Bright Beginnings (assistance for Native women), Indian Family Stability (case management), Gineu/Golden Eagle (year-round after school program for ages 5-18), Workforce Innovation Opportunity Act program (employment and training services), Culture Language and Arts Network (reducing substance abuse). In addition, MAIC hosts a large physical fitness facility that could serve as a community gathering site in emergencies, and the Gatherings Café for food preparation. With the renovation and addition of 35,000 sq. ft. of additional space, MAIC's ability to serve as a critical community asset in times of emergency will expand even further. In the event of a heat wave, polar vortex or other emergency where there is an outage, MAIC could provide a safe community gathering space, food, communications, etc., similar to the other two RMP sites. In addition, in certain situations, such as a heat wave that does not cause an outage, MAIC could serve as a

community gathering space for area residents whose premises may not have air conditioning.

iv. Which functions would be supported by the BESS?

Please see our response to subpart i above.

v. How would the loads for the MAIC change during black sky events? Please provide an estimate.

Please see our response to DOC-79 Part a.iii above.

Preparer: Andre Gouin
Title: Consultant, Business Technology
Department: Strategic Partnerships and Ventures
Telephone: (303) 294-2975
Date: February 22, 2022

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Xcel Energy Information Request No. 80
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

- a. What will Xcel do with the BESS if the customer's solar assets cease to function for an extended period of time?
- b. What is the time frame for any such actions?
- c. If the battery is left in the same location despite the solar no longer functioning, how do the benefits of the battery change?
- d. If Xcel moves the battery to another location, what costs (e.g. related to switching, transport, etc.) would be incurred to do so?

Response:

- a. Should the customer's solar assets cease to function at any point, the Company would make the customer aware so they could address the issue.
- b. The Company would strive to notify the customer of any issues with their solar installation within two business days. Facilitating any repairs is at the discretion of the customer.
- c. Operation of the BESS is not contingent upon the customer's solar assets functioning, as the BESS is proposed to be interconnected in front of the customer's meter, directly to the electric distribution system; therefore, all proposed use cases can still be delivered. The only reduction in functionality for

the customer if their solar assets were to cease functioning, would be the ability for the customer's solar to offset load the BESS must carry while operating in microgrid mode.

- d. The costs would include preparing the new site, designing a new interconnection, decommissioning the current site, transporting the BESS and any associated materials to the new site, re-installation of BESS and associated equipment, establishing communications for the new site, and commissioning the new site. We have not performed a detailed analysis for this scenario, but believe a rough estimate of costs associated with relocating the BESS would be approximately 50 percent of the original project cost.

Preparer: Andre Gouin
Title: Consultant, Business Technology
Department: Strategic Partnerships and Ventures
Telephone: (303) 294-2975
Date: February 22, 2022

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Xcel Energy Information Request No. 81
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Please provide the specific questions that the Company wants to answer with the RMP pilot, and describe how the elements of the pilot design will answer these questions.

Response:

The questions the Company aims to answer with the RMP are discussed throughout Appendix H. We attempt to summarize that here; we also note where we discussed each question more fully in Appendix H.

Question	Location in Appendix H	How pilot design will answer
How can the Company support community resiliency, as broadly defined by our partners and in the USDN framework? ¹	I.B	RMP partners define resiliency more broadly than electric system outages, to include supporting communities through a variety of ongoing stressors and shocks. RMP pilot is limited to electric system resiliency, but will help partners define which services are most critical for community resiliency, dependent on resilient power, and should be prioritized for islanded operation in outages.

¹ Urban Sustainability Directors Network (USDN). 2018. *Resilience Hubs: Shifting Power to Communities and Increasing Community Capacity*.

Question	Location in Appendix H	How pilot design will answer
How can the Company best manage the RMP microgrids to support delivery of critical services (as prioritized by partners) during a power outage?	I.B, VI (Annual Operations Reports)	Number and duration of islanding events for each project. Battery state of charge at the time of islanding events. Use of on-site renewable and non-renewable generation during islanding events. Summary of any unplanned outages, technical failures or maintenance issues. Planning for brief vs. extended outages; for unanticipated outages vs. anticipated extreme weather. For extended outages: ability to recharge BESS with solar, ability to curtail non-critical building loads to extend BESS capability.
How can the Company best manage the RMP microgrids for routine, non-outage operations? How can we optimize for a broad range of grid services, while reserving sufficient BESS energy for an unanticipated or anticipated outage?	I.C, IV.B, VI (Annual Operations Reports)	Summary of how batteries were dispatched over the course of the year, including dispatch for arbitrage, system peak, and feeder peak, and associated non-quantifiable benefits realized from dispatch. Summary of monetary benefits and emission reductions related to the projects, to the extent such data can reasonably be isolated to the projects collectively or individually.
Which services of the BESS can be delivered simultaneously and which exclude others?	IV.B, VI (Annual Operations Reports)	Same as row immediately above.
By how much can system peak and feeder peak be mitigated by the BESS?	IV.B, VI (Annual Operations Reports)	Estimated in Table 5 on page 35; update with actual operating data.
By how much can the RMP technologies (solar and BESS) reduce CO ₂ emissions?	I.D, IV.B, VI (Annual Operations Reports)	Estimated in Table 5 on page 35; update with actual operating data.
As load growth continues on the three RMP feeders, do the RMP investments delay the need for distribution system upgrades that would otherwise have been needed?	IV.B VI (Annual Operations Reports)	Annual updates on load growth and available unused capacity on the three RMP feeders.
Which specific BESS systems are most appropriate to the RMP sites and use cases?	VI (Initial Progress Report)	Selection of BESS in Request for Proposals.

Question	Location in Appendix H	How pilot design will answer
Which BESS vendors have the most appropriate systems, are best able to deliver, and (where feasible) meet supplier diversity requirements?	VI (Initial Progress Report)	Selection of BESS vendor(s) in Request for Proposals.
What construction hurdles were encountered, how were they solved, and what did we learn to inform design of later projects?	VI (Construction Progress Report)	Report on any issues encountered and solutions reached in RMP construction phase; lessons learned, things to replicate or avoid next time.
Were there any material deviations in cost from initial estimates?	VI (Construction Progress Report)	Actual costs of BESS based on Request for Proposal. Tracking of actual costs for other line items estimated in Table 4 on page 31.
How well are the RMP projects serving the core needs of our partner organizations? What changes to the project design could serve those needs better?	VI (Annual Operations Reports)	Ongoing consultation with RMP partner organizations in design and implementation phases; provide updates on lessons learned in annual operations reports.
How can we best use the combination of technologies installed here – solar, batteries, and microgrids – to provide opportunities for clean energy workforce training and diversification?	I.D, IV.B, VI (Annual Operations Reports)	Report on workforce training activities implemented at Renewable Energy Partners and Sabathani Community Center.
How can the Company further its efforts to address racial inequities that persist in Minnesota and develop relationships with and invest in communities that tend to be disproportionately vulnerable to disruptions including the impacts of climate change?	I.D, IV.B, VI (Annual Operations Reports)	Updates on collaborative efforts with site partners and the communities they serve.

Preparer: Nicholas Martin
Title: Policy & Outreach Manager
Department: Community Relations
Telephone: (612) 330-6255
Date: February 22, 2022

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Xcel Energy Information Request No. 82
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Has the Company considered expanding the microgrids to serve a larger number of customers? If so, please describe the expanded project and explain why it was not pursued. If not, why not?

Response:

As part of the Company's application review process for the RMP, we considered the number of community members that could be served by each site, rather than the number of customers (i.e. metered Xcel Energy premises) that were part of the microgrid. Based on the projects submitted for consideration, the Company selected the three that demonstrated they could provide the greatest community benefit within a target budget range, while supplying locational benefit to the grid, and being technically feasible. At each of the three project sites, we looked for adjacent facilities (i.e., metered Xcel Energy premises) that could provide additional benefit while still being technically feasible to add to the microgrid. No additional customers were located near the North Minneapolis Community Resiliency Hub or MAIC sites that could be readily accommodated into the microgrid. At Sabathani, we considered extending the microgrid to incorporate the adjacent fire station. Upon examination it was determined the fire station was equipped with existing back-up generation; adding this customer would have increased the overall cost of the project without providing an additional resilience benefit.

Preparer: Andre Gouin
Title: Consultant, Business Technology
Department: Strategic Partnerships and Ventures
Telephone: (303) 294-2975
Date: February 22, 2022

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Xcel Energy Information Request No. 83
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Alice Napoleon
Date Received: February 11, 2022

Question:

Topic: Resilient Minneapolis Project
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

Has the Company considered reducing the size of the investment to the smallest viable part? If so, please describe the smallest viable part and explain why it was not pursued. If not, why not?

Response:

With regard to the size of the investment at each individual RMP site: all components are necessary to achieve the objectives of the projects being proposed. None of the components individually can accomplish the dual objectives of providing greater community resilience while delivering benefits to the grid, so we consider the size of investment proposed to be the smallest viable one.

With regard to the size of the RMP initiative overall: in theory it would be possible to reduce the RMP budget by eliminating one or two of the sites. We believe the size of the investment that includes all three project sites is appropriate and will provide significant value as we have described. Each of the three sites has distinct characteristics and needs, and each will provide unique learnings about supporting resiliency in different BIPOC neighborhoods of Minneapolis. The North Minneapolis site is in partnership with a private sector firm, serves a predominantly African American population, and will be implemented at three public (Minneapolis Public School District) buildings – providing lessons from operating a multi-building microgrid. The Sabathani site is in partnership with a non-profit community center, serves a South Minneapolis BIPOC population of many different backgrounds, and will support resiliency at a key neighborhood gathering center just blocks from

George Floyd Square. It will provide lessons from operating a single-building microgrid in a relatively old and quite large (188,000 sq. ft.) building. Sabathani is also the core of the 38th Street Thrive Cultural District approved by the Minneapolis City Council in early 2021 – which even at that time, included the vision of a Resilience Hub at Sabathani. The MAIC site is in partnership with a non-profit American Indian organization, serves a primarily Native population, and will support resiliency in a different South Minneapolis neighborhood with programs and services for a population with needs quite distinct from those at Sabathani (see our response to DOC-79). It will provide lessons from operating a single-building microgrid in a medium-sized, relatively old building that is now doubling in size and significantly modernizing its energy profile.

Preparer: Andre Gouin
Title: Consultant, Business Technology
Department: Strategic Partnerships and Ventures
Telephone: (303) 294-2975
Date: February 22, 2022

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Xcel Energy Information Request No. 84
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Divita Bhandari
Date Received: February 11, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

In response to DOC-012 and DOC-013 comparing the benefits and costs of traditional non-DI AMI meters with DI-enabled meters

- a. Please indicate whether the Company has done any analysis comparing traditional non-DI AMI meters with DI-enabled meters in terms of capabilities and incremental benefits that can be offered. If so, please provide this analysis.
- b. As indicated in response to FE-009 and FE-010, it appears that a number of the DI use cases could perhaps be achieved through traditional AMI meters as well. For customer and grid facing use cases included in DI, has the Company done any quantitative comparison of the specific use cases and associated benefits that can be achieved through a traditional non-DI AMI meter compared with the proposed use cases and benefits of DI-enabled meters? If so, please provide this analysis.
- c. What is the incremental bandwidth required for Field Area network (FAN) communications for the proposed DI-enabled meters and use cases compared with traditional non-DI AMI meters?
- d. What are the incremental costs required for Field Area network (FAN) communications for the proposed DI-enabled meters and use cases compared with traditional non-DI AMI meters?

Response:

- a. The Company understands this question as asking for a comparison of the capabilities of traditional non-DI AMI meters and DI-enabled meters. As described in Appendix G, in general, DI-enabled meters allow for analytics to be performed directly on the meter, whereas non-DI AMI meters require the AMI meter data to be backhauled to the Company and analytics performed by a back-office application (that would require purchase or development and deployment). Additionally, a system that uses non-DI AMI meters and back-office applications to perform the analysis does so based on 15-minute interval data transmitted every four hours, whereas DI allows for near real-time evaluation of sub-second data. The lag time involved with AMI metering without DI does not allow for near real-time notifications and information for customers and the Company; we anticipate this will be an important tool in shifting customers' behaviors and encouraging energy efficiency, as well as an important tool for responding to issues on the distribution grid.

As an example, while the Company noted in response to request FE-10 that EV detection could be feasible with non-DI AMI meters with data backhaul to back-office applications, it would be with lower accuracy and would have a lag time that could reduce the effectiveness of the use case. By contrast, EV detection using DI-enabled meters with analytics directly on the meter would be highly accurate and could enable a future use case in which a customer receives a real time notification that they are charging during a peak pricing period.

With that said, the Company has generally analyzed the potential capabilities of DI-capable meters versus the combined capabilities of a non-DI AMI meter collecting AMI data and utilizing back-office applications. With respect to customer facing use cases, there are two primary factors that influence the degree to which the DI capability enables or enhances the use case when compared with a non-DI AMI meter system. First, the level of data granularity required. As the applications running on the meter have direct access to sub-second data, they have the ability to provide more accurate insights into usage patterns. With sub-second data, for example, it is possible to detect premature failure of an appliance like an air conditioner, where this is not possible with non-DI AMI meters. In terms of disaggregation, as discussed in our response to FE-9, the accuracy of both detection and quantification of the usage of specific appliances is enhanced with higher granularity, such as the sub-second data the DI-capable meters will provide. The second factor is the customer engagement model, which is determined by whether the engagement is real-time, near real-time, or asynchronous. With a DI-enabled meter, real-time engagement is possible, whereas it is not with a non-DI AMI meter. This is important for highly time-sensitive use cases, such as a time of

use period alert where a large energy using appliance is left running when a rate transitions from an off-peak to higher on-peak price. With a DI-enabled meter, the customer could be notified in real time of this event, whereas with a non-DI meter, this notification would need to be provided after the fact when it is too late for the customer to take direct and timely action.

In addition to providing potential new Use Cases and benefits for customers, the data granularity and real-time analytics made possible by DI also benefits the Company in terms of management of its distribution operations. The high-resolution meter data collected by DI meters can provide the Company with the ability to better identify and analyze power quality and reliability issues such as voltage sag/swell events and calculating the precise location of primary faults. The distributed processing of DI meters can also allow for decentralized control of the distribution grid in some circumstances, including meter-to-meter communication that can automatically detect and address potential problems. This would enhance reliability by foregoing the need for AMI data to be backhauled to Company control rooms before instructions for how to respond can be issued.

- b. As noted in response to subpart (a), while some Use Cases could be achieved through non-DI AMI meters in combination with AMI data and back-office analytics, the enhanced data granularity and real-time capability of DI meters enable enhanced customer-facing and grid-facing use cases. The Company has not specifically performed a quantitative comparison of the specific use cases that could be achieved with non-DI AMI meters versus those use cases with DI-capable meters. We also point to the summary of Tampa Electric Company's comparison of processing real-time data at the meter using DI capabilities with processing it in the back-office for three test uses that we provided as Attachment A to DOC-7.
- c. There are two main categories of increased bandwidth as additional applications are added to the DI-enabled meters – application updates and data traffic. The first is for the maintenance, patching and updates of the applications themselves, which does not necessarily require more bandwidth but will be managed by priority of traffic over the FAN. The second category is the data itself. The incremental bandwidth for the DI-enabled meters is highly dependent on the specific applications and their data needs as well as how many meters in a particular area (block) participate. Data that can be transmitted over the FAN based on requirements that meet the FAN capabilities will be handled by QOS¹ and

¹ Quality of Service (QOS) technologies work to ensure the network will dependably run applications and data traffic under limited network capacity.

delivered in the background. Data that exceeds FAN capabilities will be redirected to other channels such as the local internet connection.

- d. The addition of DI-enabled meters will not result in additional FAN costs. The FAN was designed with consideration of the Use Cases listed in subpart (c) above.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: (612) 337-2024
Date: February 22, 2022

Preparer: Chad Nickell
Title: AGIS Delivery Lead for Distribution
Department: System Planning & Strategy
Telephone: (303) 571-3502
Date: February 22, 2022

Preparer: Michael O. Remington
Title: Regulatory Director
Department: Technology Services
Telephone: (612) 370-3612
Date: February 22, 2022

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Xcel Energy Information Request No. 85
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Divita Bhandari
Date Received: February 11, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

In response to DOC-032 (d), the Company indicated that the HAN connectivity use case will allow for real time kW and kWh meter read information. However, in response to DOC-033(d), the Company indicates that the customer energy use data (CEUD) will only be updated on a daily basis on the energy usage web portal (and thereby the Green Button Connect My Data (GBC)).

- a. Please clarify this discrepancy and indicate at what latency the data will be made available to customers, third parties and GBC and the format for delivery of the data.
- b. Can this similar level of latency be achieved with traditional non-DI AMI meters? If not, please clarify.
- c. As described in response to DOC-033 (c), can this similar level of access to 15-minute interval data be achieved with traditional non-DI AMI meters? If not, please clarify.
- d. In reference to Appendix G, pg. 7, the Company indicates that communication to customer devices via HAN would not be possible with non-DI meters. Please clarify whether DI enabled meters are required to achieve communication via HAN. If not, please explain the extent of communication that a non-DI meter could achieve with HAN devices compared with DI-enabled AMI meters.

Response:

We clarify that DOC-33 asked about access to data transmitted via the field area network (FAN) and DOC-32 asked about data access through the HAN, which are two very different things. Because the HAN will utilize the DI capabilities of the AMI meters, the data is processed and provided locally at the meter that is at the customer's home or business. The FAN is not being designed to handle the volume and granularity associated with near real-time data from millions of meters to be able to provide that to customers via the Company's web portal on a continuous and real-time basis. Rather, the FAN will transmit customers' interval energy usage data and make it available in the Company's energy data portal, or for customers to share with a GBC provider at the cadence we have explained in previous information requests. We provide more details below.

- a. As described in the Company's response to DOC-32, the initial HAN Connectivity Use Case will allow customers to use the Company's My Energy Connection mobile application to access near real-time kW and kWh meter read information via their home Wi-Fi connection. This data will initially be made available to customers in a format similar to what was shown in Figures 3 and 4 of Appendix G. As noted in our response to DOC-32(b), the DI meters transmit this data via Wi-Fi and the IEEE 2030.5 communications protocol, which allow for the transmission of customer energy usage data (CEUD) with a granularity of up to one-second from the meter to a device on the HAN. In the future, customers may be able to access such one-second data using any device that complies with the IEEE 2030.5 protocol. This would allow customers to share this one-second CEUD with third parties as they choose, including through the use of third-party applications running on customer devices. Due to the volume and granularity of the near real-time data made available via the HAN, the Company's FAN does not have sufficient bandwidth to transport this data from millions of meters to the Company's backend IT systems on a continuous and real-time basis. However, customers are able to access 5-minute or 15-minute interval data (as appropriate based on their current rate) using the Company's web portal, and can also choose to make this interval data available to authorized third parties via Green Button Connect.
- b-d. Traditional non-DI AMI meters are able to collect 15-minute interval data, which can be provided to customers and their authorized third parties via Green Button Connect as described above. There are also certain non-DI AMI meters that can collect data of up to one-second granularity and provide it to local devices on the HAN. However, in the past, those non-DI AMI meters have used the Zigbee Smart Energy Profile 1.1 communications protocol, which requires the customer to procure an additional hardware device to

connect to the meter. We clarify that without DI, the DI-capable meters that the Company has selected cannot connect to a customer HAN. This is due to the fact that the Itron Riva 4.2 meters utilize DI in order to enable HAN connectivity. The DI-capable meters selected by the Company use Wi-Fi and the IEEE 2030.5 communications protocol, as described above, meaning customers will be able to connect their mobile device directly to the meter via Wi-Fi in the initial HAN Connectivity Use Case, and other IEEE 2030.5-compatible devices may be able to connect to the meter in the future, as described in the response to part (a). The Company notes that the DI-capable Itron Riva 4.2 meters selected by the Company capture additional, even more granular (sub-second) data, which is made available to applications running directly on the meter. As discussed in the Company's response to DOC-84, this granularity allows more accurate insights into usage patterns and makes real-time engagement by customers possible. Traditional non-DI AMI meters do not have this capability.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: (612) 337-2024
Date: February 22, 2022

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Xcel Energy Information Request No. 86
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Divita Bhandari
Date Received: February 11, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

In reference to the response to DOC-035, do the terms and conditions within the provided contracts between Itron and Xcel Energy incorporate and/or address concerns regarding equal access and non-discrimination to third party applications and equipment? If so, please clarify how.

Response:

No. Neither the Amended and Restated Agreement or the Distributed Intelligence Platform Agreement between Itron and Xcel Energy have terms and conditions that specifically address equal access and non-discrimination to third party applications and equipment. However, Itron and Xcel Energy have consistently held the position that a robust ecosystem of third-party application developers is critical to the success of Distributed Intelligence. Additionally, Section 3.7 of the Distributed Intelligence Platform Agreement does require Itron to use commercially reasonable efforts to keep the DI Platform and the delivery of the DI Platform services competitive with respect to quality, service, performance standards, and technology with comparable software and services provided by other vendors or used by Xcel Energy's competitors.

Preparer: Mark Raak
Title: Manager, Capital Project Sourcing
Department: Supply Chain
Telephone: (612) 735-4753
Date: February 22, 2022

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Xcel Energy Information Request No. 87
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Divita Bhandari
Date Received: February 11, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

In reference to the footnote on pg.14 of Appendix G, does the IEEE 2030.5 communications protocol allow for compatibility with other HAN devices? Please outline any studies and/or concerns around interoperability of the meter with other HAN devices.

Response:

To the extent the HAN device can communicate via the IEEE 2030.5 application Standard and also uses a WiFi radio, the device should be able to connect. Because the Company's AMI meter is among the first in this generation to use the IEEE 2030.5 standard, we are not aware of any studies around interoperability of the meter with other HAN devices at this time.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: (612) 337-2024
Date: February 22, 2022

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Xcel Energy Information Request No. 88
Docket No.: E002/M-21-694
Response To: Minnesota Department of Commerce
Requestor: Matthew Landi; Divita Bhandari
Date Received: February 11, 2022

Question:

Topic: Distributed Intelligence Program
Reference(s): Xcel Energy's 2021 Integrated Distribution Plan

Request:

In reference to Appendix G, pg. 12, the HAN connectivity use case, will HAN devices that are not provided by the Company be able to connect to the meter? If yes, please outline the process for connecting these customer/third party supplied devices to the meter. Please also indicate if the process is different for connection of Company supplied devices.

Response:

The HAN connectivity use case will initially allow customers to connect to the meter using their own iOS and Android mobile devices and the Company's mobile application; it will not require Company-provided devices and the Company does not currently have plans to directly supply devices to customers.

The Company plans on subsequently enabling HAN connectivity to a broader array of third-party applications and devices via the IEEE 2030.5 Standard and its associated Metering function set. For example, the customer could connect a device to their home Wi-Fi network via a third-party vendor's application, and then use the Company's interface (e.g., MyAccount) to authenticate and authorize the device for connection to the HAN.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: (612) 337-2024
Date: February 22, 2022

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Xcel Energy	Information Request No.	9
Docket No.:	E002/M-21-694	
Response To:	Isabel Ricker	
Requestor:	Fresh Energy	
Date Received:	November 29, 2021	

Question:

Refer to Xcel's 2021 IDP, p. 25.

- a. Please explain Xcel's understanding of its ability to provide customers with disaggregated usage information using AMI data (without DI) with existing and mature software platforms (e.g., Biddgely).
- b. Please provide the relative cost of Xcel's proposed development of the DI Energy Analysis use case compared to using AMI data (without DI) with existing and mature software platforms (e.g., Biddgely).

Response:

- a. During our disaggregation RFP process, the Company gathered information regarding the improvement in disaggregation capabilities with DI data as compared to AMI (without DI), and determined that disaggregation using DI has greater accuracy and allows for near real-time information for customers. While the accuracy of disaggregation using only AMI data is comparable for identifying the load from those appliances that are in constant use, like refrigerators, disaggregation using DI allows for improved identification of appliances which are used for shorter periods, like microwaves. Therefore, DI's ability to more accurately identify usage information provides customers with higher quality information on which to base their energy consumption decisions. Moreover, data from AMI metering (without DI) is 15-minute increment data transmitted at 4-hour intervals whereas DI allows for near real-time evaluation of sub-second increment data. The lag time involved with AMI metering (without DI) does not allow for near real-time notifications and information for customers, which the Company anticipates could be an important tool for in shifting customers' behaviors and encouraging energy efficiency.
 - b. The Company has not performed such an analysis. Moreover, the two types of disaggregation offer different capabilities and are not directly comparable.
-

Preparer: Drew Quirk
Title: Manager, Business Solutions &
Department: Advanced Grid Customer
Telephone: 612.337.2024
Date: December 9, 2021

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Xcel Energy	Information Request No.	10
Docket No.:	E002/M-21-694	
Response To:	Isabel Ricker	
Requestor:	Fresh Energy	
Date Received:	November 29, 2021	

Question:

Refer to Xcel's 2021 IDP, pp. 25-26.

- Please explain Xcel's understanding of its ability to detect EVs using AMI data (without DI) with existing and mature software platforms (e.g., Biddgely).
- Please provide the relative cost of Xcel's proposed development of the DI EV Detection use case compared to using AMI data (without DI) with existing and mature software platforms (e.g., Biddgely).

Response:

- a. We have not performed a detailed analysis of EV detection using AMI data, but generally understand that it is feasible. Specifically, the Company believes a DI-based solution is superior to a basic AMI solution in terms of accuracy and timeliness of insights to customers. For example, a customer charging during a peak period when rates are higher could receive a notification reminding him or her of the savings advantages of charging at another time. The Company will learn and develop capabilities from deploying the initial EV Detection use case and will then be positioned for those future uses.
- b. The Company has not performed such an analysis.

Preparer: Drew Quirk
Title: Manager, Business Solutions &
Department: Advanced Grid Customer
Telephone: 612.337.2024
Date: December 9, 2021

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Xcel Energy	Information Request No.	43
Docket No.:	E002/M-21-694	
Response To:	Fresh Energy	
Requestor:	Isabel Ricker	
Date Received:	December 15, 2021	

Question:

Refer to Xcel's response to FE IR No. 9a.

- a. Please provide copies of Xcel's disaggregation RFP and all responses to the RFP.
- b. Please provide all data, analysis, studies, surveys, or reports demonstrating that Xcel's customers value and are willing to pay for the ability to more accurately identify usage information, including improved identification of appliances which are used for shorter periods, like microwaves.
- c. Please clarify if Xcel intends customers' participation in near real-time evaluation of sub-second increment data and receipt of near real-time notifications from DI to be opt-in or opt-out.

Response:

- a. Please see the RFP attachments provided with this response – located in folder A.
- b. Please refer to the PowerPoint attachments provided with this response - located in folder B. As demonstrated in these studies, we did not directly ask customers about interest in identification of smaller appliances; however, customers expressed a general interest in being able to explore usage of any device in their home.
- c. To access real-time notifications and services, customers will need to connect their smart meter to their home wi-fi network so that data may pass over the local network as opposed to the FAN. As such, customers will need to opt-in to receive these services. A contemplated future enhanced energy disaggregation Distributed Intelligence use case may be available to all customers via opt-out.

The attachments to this Information Response are have been designated as Trade Secret information pursuant to Minn. Stat. § 13.37, subd. 1(b). In particular the documents contain confidential information relating to proprietary technology,

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pricing and contract terms. The information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Pursuant to Minn. R. 7829.0500, subp. 3, the Company provides the following description of the excised material:

- 1. Nature of the Material:** Confidential RFP, RFP responses, and market research materials
- 2. Author(s):** Xcel Energy, RFP respondents, and Zeitgeist Research
- 3. Importance:** The RFP is considered confidential as it contains sensitive trade secrets regarding the capabilities of the Riva 4.2 meter. The RFP responses are considered confidential because they contain sensitive information regarding proposed pricing and terms as well as information regarding the responding firms' security. The market research documents contain sensitive and non-public information regarding possible future offerings.
- 4. Date the Information was Prepared:** the RFP was prepared December 2020, the RFP responses were received in January 2021, and the market research materials are from April 2020, and August 2021.

Preparer: Drew Quirk
Title: Manager, Business Solutions & Results
Department: Advanced Grid Customer Solutions
Telephone: 612.337.2024
Date: December 27, 2021

Docket No. E002/M-21-694

FE IR No. 43

Attachments

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