

Staff Briefing Papers

Meeting Date May 29, 2020 Agenda Item 1**(2)

Company Xcel Energy

Docket No. **E002/M-19-666**

In the Matter of Xcel Energy's Integrated Distribution Plan and Advanced Grid Intelligence and Security Certification Request

- Issues
1. Should the Commission approve, modify, or deny certification of Xcel Energy's Advanced Grid Intelligence and Security (AGIS) Initiative?
 2. Should the Commission approve, modify, or deny certification of Xcel Energy's Advanced Planning Tool (APT)?

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Relevant Documents

Date

Initial Filing

Xcel Energy, 2019 IDP Report; Att. A1-C (Public)	Nov. 1, 2020
Xcel Energy, Att. D1 – M2 (Public)	Nov. 1, 2020
Xcel Energy, Att. M3- O4 (Public)	Nov. 1, 2020

Initial Comments

Department of Commerce–Div. of Energy Resources	Mar. 17, 2020
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The attached materials are work papers of the Commission Staff. They are intended for use by the Public Utilities Commission and are based upon information already in the record unless noted otherwise.

Relevant Documents

	Date
Office of Attorney General – Residential Utilities Division	Mar. 17, 2020
Xcel Large Industrials	Mar. 17, 2020
Citizens Utility Board-MN	Mar. 17, 2020
Environmental Law & Policy Center and Vote Solar	Mar. 17, 2020
Clean Energy Economy Minnesota	Mar. 17, 2020
Innovative Power Systems (IPS) Solar	Mar. 17, 2020
City of Minneapolis	Mar. 17, 2020
Fresh Energy	Mar. 17, 2020
Fresh Energy, Xcel IR Responses 1-45 (includes 3 Public filings)	Mar. 17, 2020
Fresh Energy, Xcel IR Responses 46-50	Mar.18, 2020

Reply Comments

Xcel Energy	Apr. 10, 2020
Department of Commerce-Div. of Energy Resources	Apr. 10, 2020
Environmental Law & Policy Center and Vote Solar	Apr. 10, 2020
Office of Attorney General – Residential Utilities Division	Apr. 10, 2020
Institute for Local Self Reliance	Apr. 10, 2020

Supplemental Comments

Department of Commerce-Div. of Energy Resources	Apr. 22, 2020
Xcel Large Industrials	Apr. 22, 2020
Environmental Law & Policy Center and Vote Solar	Apr. 22, 2020
Innovative Power Systems Solar	Apr. 22, 2020
Fresh Energy	Apr. 22, 2020
Xcel Energy	Apr. 22, 2020
Xcel Energy, Attachment B	Apr. 22, 2020
City of Minneapolis	Apr. 22, 2020
Citizens Utility Board-MN	Apr. 22, 2020

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I. Statement of the Issues

Should the Commission approve, modify or deny certification of the following investments that are components of Xcel Energy's Advanced Distribution Planning Tool (APT) and Advanced Grid Intelligence and Security (AGIS) Initiative at this time? Specifically:

Should the Commission approve, modify, or deny certification of the following investments, which are components of Xcel Energy's Advanced Grid Intelligence and Security (AGIS) Initiative, at this time:

- a. Advanced Metering Infrastructure (AMI)
- b. Field Area Network (FAN)
- c. Fault Location, Isolation, and Service Restoration (FLISR)
- d. Integrated Volt-Var Optimization (IVVO)

Should the Commission certify the Advanced Distribution Planning Tool (APT) at this time?

What, if anything, should the Commission set as conditions or clarify if granting certification of these distribution projects?

What should the Commission consider or address related to realizing benefits of each of the investments in the Company's AGIS Initiative for ratepayers?

At the stage of certification, what consideration should the Commission give to subsequent cost recovery, via either the Transmission Cost Recovery rider or general rate case, for each of the AGIS investments?

II. Background

On November 1, 2019, Xcel Energy filed the Company's 2019 Integrated Distribution Plan (IDP), which includes the Company's certification request of both the Advanced Grid Intelligence and Security (AGIS) Initiative and an Advanced Distribution Planning Tool. AGIS includes Advanced Metering Infrastructure (AMI), a Field Area Network (FAN), Fault Location and Isolation Service Restoration (FLISR), and Integrated Volt Var Optimization (IVVO). The Company anticipates Minnesota incurring capital expenditures totaling \$582 million and operation & maintenance costs totaling \$152 million for the overall AGIS Initiative from 2020-2029. For the APT, the Company anticipates Northern States Power Minnesota (NSPM) incurring capital expenditures totaling \$4 million and minimal O&M expenditures.

On March 5, 2020, the Commission's Agenda Meeting hosted a discussion item with an Xcel Energy presentation on how the proposed Advanced Grid Intelligence and Security (AGIS) investments relate to the Company's overall strategy, planning and related filings.

On March 17, 2020, the Department of Commerce – Division of Energy Resources (Department), Office of Attorney General- Residential Utilities Division (OAG), Xcel Large Industrial (XLI), Citizens Utility Board-Minnesota (CUB), Environmental Law & Policy Center and Vote Solar (ELPC/VS), Clean Energy Economy Minnesota (CEEM), Innovative Power Systems

Solar (IPS Solar), City of Minneapolis (Minneapolis), and Fresh Energy filed Initial Comments. Fresh Energy also filed a series of Information Request Responses from Xcel Energy on March 17-18, 2020.

On April 10, 2020, the Department, OAG, ELPC/VS, and Xcel Energy filed Reply Comments. Institute for Local Self Reliance (ILSR) also filed Comments.

On April 22, 2020, the Department, XLI, CUB, IPS Solar, Minneapolis, Fresh Energy, and Xcel Energy filed Supplemental Comments.

Table 1: Commission Action on Minn. Stat. 216B.2425 Certification Requests and Cost Recovery

Docket No.	Order Issued	Title
<i>Certification Requests</i>		
E002/M-19-562	June 28, 2016	Order Certifying Advanced Distribution-Management System (ADMS) Project Under Minn. Stat. §216b.2425 and Requiring Distribution Study
E002/M-17-775, E002/M-17-776	Aug. 7, 2018	Order Approving Pilot Program, Setting Reporting Requirements, and Denying Certification Request
<i>Cost Recovery Request of Certified Project</i>		
E002/M-17-797	Sep. 27, 2019	Order Authorizing Rider Recovery, Setting Return on Equity, and Setting Filing Requirements

Briefing Papers Overview

Parties do not agree on AGIS certification nor do they agree on the standard or process for the Commission's certification review overall. Two key disagreements arise: 1) should the Commission establish conditions on cost recovery at the time of certification (this proceeding) or during a cost recovery proceeding (future rider recovery or rate case proceeding); and 2) whether Xcel Energy's proposed AGIS investments should be allowed the option of rider recovery. Several parties raise a first order challenge of whether Xcel Energy even qualifies for AGIS certification under Minn. Stat. §216B.2425.

Section III. Parties' Comments work through the record by topic: 1) Xcel Energy's eligibility under Minn. Stat. 216B.2425; 2) what certification means and both the current and proposed certification standard; 3) cost recovery options and impacts; 4) the APT Certification Request; and finally, 5) the AGIS Certification Request.

Staff provide analysis of several issues parties raise in this record in **Section IV: Staff Analysis**. Staff does not provide analysis of the merits of Xcel Energy's initial filing and supporting documentation for the AGIS certification request beyond what was offered by parties.

III. Parties' Comments

Staff notes nearly all parties include comments recognizing Xcel Energy's effort, and the need, to invest in distribution grid modernization.¹ The bulk of party comments focuses on how, and if, such investments should be certified for rider recovery; and specifically, whether the AGIS proposal should be certified *at this time*.

Minn. Stat. 216B.2425 Eligibility and Xcel Energy's MYRP

XLI asserts Xcel Energy is not eligible for certification of distribution projects under Minn. Stat. § 216B.2425 because the Company is no longer under a MYRP. XLI points out that the Company claims Commission certification "preserve[s] the option to put the AGIS costs in a rider between general rate case filings,"² but disagrees noting Minn. Stat. § 216B.16; subd. 7b(b)(5) only permits cost recovery of investments certified under Minn. Stat. § 216B.2425 of which Xcel Energy is not eligible. OAG and CUB also flag the question of statutory authority given Xcel Energy's MYRP has expired.³

Xcel Energy counters that the Company filed the AGIS and APT Certification Requests while still operating under the MYRP as required by the statute. Further, the Company claims XLI's argument flips the requirements of the statute on their head, noting:

... this section is a requirement for utilities operating under multiyear rate plans; nothing within its text states that utilities not operating under multiyear rate plans are prohibited from identifying investments necessary to modernize the grid.

XLI counters Xcel Energy's argument reads the MYRP-limitation out of the statute noting:⁴

Distribution investments are only mentioned in § 216B.2425, subd. 2(e), addressing grid modernization for utilities operating under a MYRP; § 216B.2425, subd. 8, addressing distribution upgrades for distributed generation for utilities operating under a MYRP; and in the provision in § 216B.2425, subd. 3 requiring the Commission to "certify, certify as modified, or deny certification of the transmission and distribution projects proposed under subdivision 2."

Further, XLI argues certification without a new MYRP promotes negative policies and utility incentives. First, it is unclear how Xcel Energy's burden of proof is not lessened via certification, which necessarily increases the burden customer advocates face in any subsequent cost-recovery proceedings. Second, stakeholders do not have the bandwidth to adequately scrutinize and invest resources in reviewing various utility proposals intentionally scattered across multiple dockets. Third and finally, certification will incentivize Xcel Energy and other

¹ CUB Supplemental, p. 1; Department Supplemental, pp. 10-11; Staff Note: XLI and OAG comments do not appear to address this issue.

² Xcel Energy 2019 IDP Filing, p. 3

³ OAG Reply, p. 3. CUB Initial, p. 9

⁴ XLI Supplemental, pp. 3-4

utilities to avoid general rate cases and pursue cost recovery of large expenses through miscellaneous dockets and riders.⁵

OAG agrees noting that certification of substantial investments outside a MYRP “... runs the risk of inadvertently creating a de facto burden shift as the Company could point to certification as a signal of Commission approval of these investments...[and]... opening the door to rider recovery could incent the Company to continue avoiding the holistic review inherent in general rate cases.”⁶

Xcel Energy cites the Commission’s 2010 Report to the Legislature that the creation of some riders was “prompted by the imposition of policy mandates, as well as a desire to recover very large capital expenditures for single projects (or a group of related projects) or to simply encourage certain types of expenditures.” Additionally, the Company highlights three projects with revenue requirements similar to or greater than the AGIS and APT Certification Requests: 1) Metro Emission Reduction Project through the Emission Reduction rider; 2) CapX2020 transmission project through the TCR rider; and 3) numerous wind projects through the Renewable Energy Standard rider.⁷

The issue of whether cost recovery of this substantial of grid modernization investments is warranted in a rider versus a rate case is addressed further later in these briefing papers.

Certification under Minn. Stat. 216B.2425

What Certification Means

Certification of distribution projects under Minn. Stat. 216B.2425 is referenced in Minn. Stat. 216B.16; Subd. 7b (Transmission Cost Recovery (TCR) Rider), which states, in part:

Minn. 216B.16; Subd. 7b. **Transmission cost adjustment.** (a) Notwithstanding any other provision of this chapter, the commission may approve a tariff mechanism for the automatic annual adjustment of charges for the Minnesota jurisdictional costs net of associated revenues of:

(1) new transmission facilities that have been separately filed and reviewed and approved by the commission under section 216B.243 or new transmission or **distribution facilities that are certified as a priority project** or deemed to be a priority transmission project under section 216B.2425; [emphasis added]

Xcel Energy describes certification as:⁸

... essentially a gate-keeping function for investments to become eligible (but not approved) for recovery through a TCR Rider in a subsequent and separate proceeding...

⁵ XLI Initial, pp. 4-8

⁶ OAG Reply, p. 3

⁷ Xcel Energy Supplemental, pp. 4-5

⁸ Xcel Energy Supplemental, p. 6

[E]ven after a project is certified, the Company still bears the burden of proving the prudence of investments for cost recovery – whether through the TCR Rider or base rates.

Xcel Energy further describes the Commission’s later prudence review as “the opportunity to review actual costs and expenditures as part of the Company’s subsequent TCR or general rate case filings, when the Company seeks cost recovery for the projects.”⁹

ELPC/VS highlight certification confers significant ratemaking benefit by allowing the utility to minimize lag and recover costs of the investment through a rider while executing the project, rather than wait for the next rate case.¹⁰ XLI goes further stating “certification must be viewed as a form of pre-determination of cost recovery, because Xcel is unwilling to proceed without it” and that “necessarily shifts the burden to ratepayers.”¹¹

The Department also views Xcel Energy’s AGIS Certification Request to include cost recovery assurance by authorizing rider treatment, and notes the statutory timeframe does not allow full consideration of ratepayer protections. The Department points to the ADMS certification and subsequent TCR Rider proceeding as showing certified projects lack cost control or clarity. The Department argues that certification is not acting as a cost cap, nor is the TCR proceeding including a prudence review because certification already deemed the project “necessary.”¹²

Xcel Energy responds certification is neither intended nor appropriate to establish or act as a cost cap, and suggests the ADMS example was a learning process for all and resulted in a new set of requirements *for future cost recovery requests*¹³ (*staff emphasis*).

Xcel Energy highlights the expected prudence review in the TCR proceeding:

Minn. Stat 216B.16; subd. 7b(d)

Upon receiving a filing for a rate adjustment pursuant to the tariff established in paragraph (b), the commission shall approve the annual rate adjustments provided that, after notice and comment, the costs included for recovery through the tariff **were or are expected to be prudently incurred and achieve transmission system improvements at the lowest feasible and prudent cost to ratepayers.** [Emphasis added]

June 28, 2016 Order

The Commission’s decision represents only a finding that the project is consistent with the requirements of section 216B.2425. Any rider recovery of costs associated with the project will be determined in response to a petition for rider recovery of those costs under Minn. Stat. § 216B.16, subd. 7b. **At that time, Xcel will have the burden of**

⁹ IBID

¹⁰ ELPC/VS Initial, p. 5

¹¹ XLI Supplemental, p. 4

¹² Department Reply, pp. 22 - 23

¹³ Xcel Energy Supplemental, p. 5. Citing September 27, 2019 Order

**establishing the prudence of the costs it requests to recover through the TCR Rider.
[Emphasis added]**

Xcel Energy restates the Company's willingness waive the June 1st statutory deadline to allow additional time for review of the AGIS and APT Certification Requests.

Past Commission Orders on Certification

Regarding the Commission's review of Certification Requests, Xcel Energy notes the Commission's June 28, 2016 Order certifying Advanced Distribution Management System (ADMS) declined to adopt "a comprehensive list of criteria"; instead, outlines the Commission's determination on certification will "interpret the statute on a case by case basis until such time as a comprehensive list of criteria is established."¹⁴ Xcel highlights the Commission's certification decision described ADMS as consistent with Minn. Stat. 216B.2425 (statute) and "an investment necessary to modernize the distribution system that will enhance reliability and increase energy conservation opportunities using control technologies and other innovative technologies."¹⁵ Xcel Energy notes the Commission's Order on ADMS certification did not imply any decision on cost recovery of the project's costs.¹⁶

ELPC/VS claim the Commission's apparent use of consistency with statute in the June 28, 2016 Order as the criteria for certification is not a clear, logical, or workable standard for evaluating certification requests, and cautions consistency would require a project to achieve all of the following from Subd. 2(e):¹⁷

- Necessary to modernize the transmission and distribution system by
 - Enhancing reliability, [AND]

¹⁴ ORDER CERTIFYING ADVANCED DISTRIBUTION-MANAGEMENT SYSTEM (ADMS) PROJECT UNDER MINN. STAT. §216B.2425 AND REQUIRING DISTRIBUTION STUDY (June 28, 2016), Docket No. E002/M-15-962, at p. 9: "Moreover, the Commission agrees with Xcel that it can interpret the statute on a case-by-case basis until such time as a comprehensive list of criteria is established. Rather than initiate rulemaking immediately, the Commission is convinced that it is more prudent to develop these criteria over time as the Commission gains experience with grid modernization. The experience gained through biennial grid-modernization reports and the grid-modernization investigation in Docket No. E-999/CI-15-556 will prove valuable should the Commission decide to initiate rulemaking on this subject."

¹⁵ June 28, 2016 Order at pp.8-9: "Section 216B.2425 requires Xcel to identify 'investments that it considers necessary to modernize the . . . distribution system by enhancing reliability . . . 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 project falls squarely within this definition. ADMS is a suite of software that will enable expanded distributed generation while creating a grid that is more transparent, reliable, and efficient. It is an investment necessary to 'modernize the . . . distribution system' that will 'enhanc[e] reliability' and 'increas[e] energy conservation opportunities' using 'control technologies . . . and other innovative technologies.'"

¹⁶ Xcel Energy Reply, pp. 16-17. June 28, 2016 Order at p. 9: "The Commission's decision represents only a finding that the project is consistent with the requirements of section 216B.2425. Any rider recovery of costs associated with the project will be determined in response to a petition for rider recovery of those costs under Minn. Stat. § 216B.16, subd. 7b. At that time, Xcel will have the burden of establishing the prudence of the costs it requests to recover through the TCR Rider."

¹⁷ ELPC/VS Initial, pp. 5-6. Department agrees in Reply at p. 20

- Improving security against cyber and physical threats, [AND]
- 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. [ELPC/VS addition]

Fresh Energy offers a different perspective arguing that a determination of consistency with the statute ensures a project has demonstrated potential benefits to the distribution system and/or Xcel Energy's customers, but does not specifically address the appropriateness of rider recovery.¹⁸

Xcel Energy also notes the Commission's August 7, 2018 Order¹⁹ established criteria for addressing future certification requests; including the certification requests in this docket:²⁰

(1) details on why the project is necessary for grid modernization; (2) how it is in the public interest; (3) how it is consistent with the Commission's Guiding Principles for Grid Modernization (Docket 15-556); (4) the intended objectives for the project; (5) a description of the available alternatives to meet the intended objectives; (6) a cost benefit analysis of the project; (7) and potential interrelation with other initiatives, projects, and Xcel's long-term grid modernization plans.

Fresh Energy suggests this language provides guidance on the content of a certification petition, but is comparatively silent on the criteria for a Commission determination on certification. Fresh Energy notes the June 28, 2016 Order states "... it is more prudent to develop [certification] criteria over time as the Commission gains experience with grid modernization." Fresh Energy argues given the scale of the AGIS and APT investments, the likelihood of additional complex proposals in the next few years, and the experience gained by the Commission in grid modernization proceedings to date, the Commission should provide further guidance via additional certification criteria now.²¹

Additional Certification Criteria Proposed

A number of parties propose adopting additional criteria for certification prior to making a decision on Xcel Energy's AGIS Certification Request. Fresh Energy²² and ELPC/VS²³ identify language offered by Commissioner Schuerger in 2016 as a Motion Setting Forth Certification Requirements for Distribution Systems Project:²⁴

¹⁸ Fresh Energy Initial, p. 5

¹⁹ ORDER APPROVING PILOT PROGRAM, SETTING REPORTING REQUIREMENTS, AND DENYING CERTIFICATION REQUEST (August 7, 2018), E002/M-17-775 & -776, Order Point 11, p. 9

²⁰ Xcel Energy Reply, p. 17

²¹ Fresh Energy Initial, p. 5. Citing June 28, 2016 Order at p. 9

²² Fresh Energy Initial, pp. 5-7

²³ ELPC/VS Initial, pp. 2,7-8

²⁴ MN PUC, Revised Decision Options (May 24, 2016), Proposed Motions of Commissioner Schuerger for May 25, 2016, Docket No. E002/M-15-962, Decision Option 50, p. 1



1. The project is consistent with Minn. Stat. §216B.2425 Subd 2(e) and is necessary for modernizing the utility distribution system with respect to (i) enhancing system reliability, (ii) improving system security, and/or (iii) increasing energy conservation.
2. The project is a priority project above and beyond normal distribution projects, consistent with Minn. Stat. §216B.16 Subd. 7b(a)(1) and is appropriate to consider for current cost recovery through the transmission cost recovery (TCR) rider.
3. The information that the Commission requires to make its certification determination includes but is not necessarily limited to:
 - a. The utility has identified specific expected improvements in distribution system reliability, security, and/or energy conservation that would result from the project and how they will be achieved.
 - b. The utility has identified specific metrics and evaluation methods that will be used to assess the project's performance and whether it has achieved the expected improvements.
 - c. The utility has performed a detailed cost benefit analysis and provided supporting evidence for the estimated costs and benefit levels used in the calculation. This shall include a discussion of mechanisms that will be employed to maximize cost reductions and minimize cost increases.
 - d. The utility has thoroughly considered the feasibility and costs and benefits of alternatives and has demonstrated that the proposed approach is preferable to alternatives.
 - e. Criteria that will be used by the utility to determine whether at any point it has become imprudent to bring the certified project to completion due to the project failing to meet its performance and/or cost expectations.

CUB suggests the central question is not whether the underlying investments are in the public interest, nor whether the Commission has the authority to exercise its discretion to certify the investments. Rather, CUB outlines the central question (see 2. in criteria above) is whether to recover the identified investments via a rider as opposed to other means. Fresh Energy agrees.²⁵ Several other parties support denying the AGIS certification request, at least in part, because of potential cost recovery in a rider instead of a rate case.

Xcel Energy summarizes what it sees as different in the proposed additional certification criteria:²⁶

The two main differences are the proposed requirements that (1) the utility identify how a project's performance will be measured to establish whether it has achieved the expected improvements, and (2) the utility include criteria that will be used to determine whether it has become imprudent to bring a project to completion.

²⁵ Fresh Energy Supplemental, pp. 6-7

²⁶ Xcel Energy Reply, p. 24

Xcel Energy does not take a position on whether the proposed criteria are more appropriate than the criteria identified in the Commission's August 7, 2018 Order. Rather, Xcel Energy notes the AGIS and APT Certification Request satisfy both and are particularly appropriate for rider recovery.²⁷

ELPC/VS disagree:²⁸

[W]hile Xcel has explained at length why the APT and AGIS... are necessary to enhance system reliability and increase energy conservation, Xcel has not demonstrated that its APT or AGIS projects are "priority projects", or explained why these projects are of such importance that they warrants current cost recovery through a rider while the project is being executed, rather than typical cost recovery in a rate case after the project has been completed.

The Department agrees with other parties that additional certification criteria should be established either for: 1) an AGIS certification, or 2) future certification requests. The Department suggest addressing the additional criteria in a comment period for AGIS certification or rulemaking for any utility that seeks distribution project certification under Minn. Stat. §216B.2425; Subd. 3.²⁹

Cost Recovery Options and Impacts

CUB argues the Commission's certification analysis would be incomplete if it did not account for the impact the certification decision will have upon the next MYRP's efficacy on just and reasonable rates and exemplary utility performance. CUB explains:³⁰

A regulatory framework that permits a utility to recover a large percentage of its capital expenditures through riders rather than base rates allows a utility to side-step any financial downside of an MYRP, including the cost containment features, while allowing the utility to take advantage of the upside of an MYRP, including reduced regulatory lag and a narrowed prudence review.

CUB cites the Commission's 2010 Utility Rates Study on eroding cost control incentives:

"The risk to incentives is especially significant when special recovery is allowed for cost categories that do not inherently pose a danger of severe financial risk; i.e., costs that are not always outside of the control of the utility, unpredictable or substantial. In those instances, allowing automatic recovery would also be expected to erode incentives for cost control."

CUB concludes:³¹

²⁷ Xcel Energy Reply, pp. 22-24

²⁸ ELPC/VS Initial, p. 22

²⁹ Department Supplemental, p. 17. Staff Correction: changed the statutory reference from Subd. 7 to Subd. 3

³⁰ CUB Initial, pp. 5-7

³¹ CUB Initial, p. 8

If the Commission continues to certify distribution and transmission investments identified under Minn. Stat. § 216B.2425 Subd. 2 (and then subsequently allows for TCR rider cost recovery) the Company, over time, will be permitted to operate in a regulatory framework that is unduly tilted in its favor – one that shifts a large percentage of risk away from Xcel and onto customers, and dampens the importance, efficacy and transparency of rate case proceedings.

Xcel Energy responds that rider implementation allows for regulatory review and oversight of costs through regular filings, and rider recovery of AGIS investments is consistent with public policy, authorized by statute and falls within an established regulatory framework that works in concert with rate case proceedings. Xcel Energy notes the AGIS revenue requirement would be the equivalent of 1.92% of total costs for all customers currently in base rates and riders.³²

APT and AGIS Certification Review Summary of Comments

Xcel Energy requests the Commission certify both the Advanced Planning Tool (APT) and the Advanced Grid Intelligence and Security (AGIS) Initiative pursuant to Minn. Stat. §216B.2425; subd. 3 (APT and AGIS Certification Requests).

Advanced Planning Tool (APT) Certification Request

The Company expects the Advanced Planning Tool (APT) to enhance non-wires alternatives (NWA) analysis, DER and load forecast scenario analysis, and help facilitate greater alignment and integration of distribution, transmission and resource planning. The APT evaluates and projects hourly load data, including load shapes, on a feeder (or other specific point on the grid), and is capable of simulating the addition of certain types of DER on a feeder. APT is a spatial load forecasting tool, which combines several layers of detailed electric infrastructure, weather, economic and other data layers to generate statistically robust best-fit hourly load forecasts and shapes. Xcel Energy notes this detail will help evaluate how future load and energy demands on the grid may change and where distribution upgrades may be required.³³

The Company currently relies on annual peak load analysis and is capable of feeder, but not sub-feeder level analysis.³⁴ The Company highlights that as customers adopt DER and beneficial electrification, peak loading on a specific feeder may result in different levels of load, or may occur at a different time of day than the system as a whole. Both hosting capacity analysis and non-wires alternatives analysis requires more granular time and location-specific data, which currently requires the Company to manually evaluate and pull historic data. For NWAs, this also requires scaling them to the forecast study year.³⁵ Not unlike the situation with the Company's

³² Xcel Energy Reply, Att. A, p. 33 "... for context, T&D related costs are approximately 24 percent of total costs for all customers— largely recovered through base rates. The revenue requirement for the AGIS investments that we have proposed for certification is approximately eight percent of total T&D costs currently in base rates and riders."

³³ Xcel Energy 2019 IDP, pp. 1, 86, 98, 182, 209-210, 218-219, 252-253, 255, and Att. D1, pp. 1-23

³⁴ The Company notes each feeder has approximately 1,500 to 8,000 endpoint depending on the area's population density and types of customers served.

³⁵ Xcel Energy Reply, Att. A, pp. 21-22

metering, Xcel Energy reports that the current tool (Distribution Asset Analysis) is no longer sufficient and will not be supported in the near future.³⁶

Xcel Energy expects to procure and integrate an APT (LoadSEER from Integral Analytics) in early 2020 with an all-in upfront cost of approximately \$9.3 million Xcel-Energy wide. NSPM upfront costs amount to approximately \$4 million (increase of \$3.1 million in the Company's revenue requirement).³⁷ The Company offers the planned APT implementation timeline (subject to change) in Figure 1³⁸ and the benefit-to-cost ratio for NSPM in Table 2.³⁹

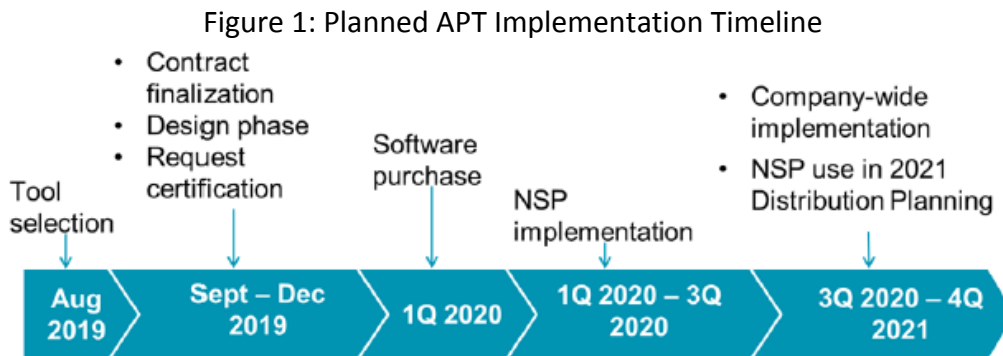


Table 2: NSPM APT Benefit-to-Cost Ratio

Net Present Value Components	Total
Benefits (\$ millions)	1.3
O&M Benefits	0.8
Other Benefits	-
Capital Benefits	0.5
Costs (\$ millions)	3.7
O&M Expense	0.6
Change in Revenue Requirements	3.1
Benefit/Cost Ratio	0.35

Xcel Energy notes the benefit cost ratio does not indicate positive returns (.35 over the full seven year assumed financial life of the software), but believes the investment is essential to perform the more sophisticated analyses required with the evolving distribution grid. The Company expects the O&M expenditures for APT to be lower than the existing tool, and believes the APT may enable deferral of some distribution capital expenditures in the future; as well as, improving analysis efficiency and precision. Xcel Energy describes the choice to procure the tool as a hosted solution on a perpetual license using the cloud to access the tool on the

³⁶ Xcel Energy 2019 IDP, p. 11, Att. D1, pp. 2, 4-6

³⁷ Xcel Energy 2019 IDP, Att. D1, p. 17. Staff Note: Xcel arrives at this allocation (for NSPM) using a to-be-proposed method based on each operating company's number of distribution feeders.

³⁸ Xcel Energy 2019 IDP, Att. D1, p. 16, Figure 5

³⁹ Xcel Energy 2019 IDP, Att. D1, p. 19, Table 5

vendor's servers, noting this is the most cost effective option if the Company uses the tool for eight years or more.⁴⁰

Xcel Energy argues rider recovery is appropriate for the APT because it is a foundational tool supporting distribution modernization, enhancing reliability and better facilitating evaluation and identification of conservation opportunities; as well as, facilitating analysis the Commission and stakeholders have requested.⁴¹

The Department recommends the Commission certify the Advanced Planning Tool, limit cost recovery to a hard cap of \$4 million, and include the specific scope and functionality expected as outlined by the Company's filing⁴² in the Commission's Order (**Decision Option 15**). The Department's rationale:⁴³

... there is: 1) enough experience with the APT in the industry for the functions and uses so that Xcel's use of the tool will be able to be monitored and reviewed, 2) benefits of LoadSEER (industry-wide) have been proven by other utilities, and 3) the investments aid in resolving known limitations in several dockets - largely surrounding DER forecasting - and the resulting benefits are expected to be near term.

Fresh Energy strongly supports the APT and approval if the Commission makes a certification request at this time.⁴⁴ Fresh Energy notes LoadSEER is a state-of-the-art tool for load and DER forecasting, and a major upgrade to the Company's distribution planning capabilities. Fresh Energy gives the example of the Company's peak load forecasts and potentially unnecessary capital spending as an area that would benefit from better load forecasting.⁴⁵ IPS Solar also supports approving the APT Certification Request.

Xcel Energy notes the APT will help, but not resolve, the challenge of load forecasts for non-wires alternatives analysis requiring short-term (day ahead), feeder-by-feeder forecasts.⁴⁶

Parties' general concerns with certification apply, but no party provides specific opposition to the APT.

⁴⁰ Xcel Energy 2019 IDP, Att. D1, pp. 2, 12

⁴¹ Xcel Energy Reply, Att. A, p. 23

⁴² Staff Note: Because the Department only refers to the Company's IDP filing, Staff summarizes the description from Xcel's IDP at p. 11 as **Decision Option 15.b**.

Staff notes the IDP provides additional detail on the APT and its capabilities at pp. 182, 209-210, and Att. D1, D2, APT CBA Workpapers (filed as both public and Trade Secret).

⁴³ Department Supplemental, pp.18-19

⁴⁴ Fresh Energy Supplemental, p. 4.

⁴⁵ Fresh Energy Initial, p. 12

⁴⁶ Xcel Energy Reply, pp. 34-35

AGIS Certification Request

AGIS includes four individual components, of which AMI and FAN represent the majority of the Company's proposed investment:⁴⁷

- **Field Area Network (FAN).** A private, secure two-way communication network that provides wireless communications across Xcel Energy's service area – to, from, and among, field devices and the Company's information systems.
- **Advanced Metering Infrastructure (AMI).** An integrated system of advanced meters, communication networks, and data processing and management systems that enables secure two-way communication between Xcel Energy's business and operational data systems and customer meters the Company is proposing as a solution to expiring, outdated AMR meters used today.
- **Fault Location, Isolation, and Service Restoration (FLISR).** An ADMS application that takes the form of distribution automation that involves the deployment of automated switching devices that work to detect issues on Xcel Energy's system, isolate them, and restore power. FLISR aims to improve customers' reliability experience, reducing the duration of outages and the number of customers affected.
- **Integrated Volt Var Optimization (IVVO).** An ADMS application that uses selected field devices to optimize voltage as power travels from substations to customers. IVVO decreases system losses and may result in energy savings for customers.

The Company proposes AGIS to build off the Advanced Distribution Management System certified by the Commission's June 28, 2016 Order:

- **Advanced Distribution Management System (ADMS).** A real-time operating system that enables enhanced visibility into the distribution power grid and controls advanced field devices. The Company considers it foundational to advanced grid capabilities that will provide the visibility and control necessary for enhanced planning and significant DER integration.

Xcel Energy offers three goals for AGIS and the Company's advanced grid infrastructure, platforms and technologies more generally: 1) a transformed customer experience; 2) improved core operation, and 3) facilitation of future capabilities. New programs and service offerings, digital experiences, enhanced billing and rate options and timely outage communication aim to give customers greater convenience and control to save money while more efficiently managing the grid. Smarter networks mean to serve as the backbone of Xcel's future operations to manage the complexities of a more dynamic electric grid through additional monitoring, control, analytics and automation. Designing for interoperability allows the Company to extend communications to more grid technologies, customer devices and third party systems in a stepwise fashion that strives to, in the near term, offer more frequent energy usage data for customers and, in the longer term, advanced price signals to support new smart products and services. The Company concludes now is the time to modernize the interface where Xcel Energy

⁴⁷ Xcel Energy 2019 IDP, pp. 4-5, 147

connects directly with customers – the distribution system, and the AGIS Initiative is a measured and thoughtful approach to ensure customers receive the greatest value, fundamentals of the business remain sound, and the Company preserves flexibility needed as technology and customers’ expectations continue to evolve.⁴⁸

Xcel Energy summarizes the drivers that led the Company to request certification of the AGIS Initiative.⁴⁹

- The Company’s strategic priorities to lead the clean energy transition, enhance the customer experience, and keep bills affordable;
- The Company’s desire to meet the growing needs and expectations of our customers;
- Current distribution system needs; and
- Commission policy and direction, and stakeholder input relative to customer offerings, performance, and technological capabilities of the grid.

The Company outlines an AGIS implementation timeline through 2028 with a majority of the implementation occurring by 2024.⁵⁰

Table 3: AGIS Deployment Timeline

Program	Implementation Timeline
ADMS	In-service 2020
AMI	Meter roll-out 2021-2024
FAN	Deployment 2021-2024 (preceding AMI deployment by approximately six months)
FLISR	Limited testing 2020; Implementation 2020-2028
IVVO	Limited testing 2021; Implementation 2021-2024

The Company anticipates incurring capital expenditures totaling \$582 million and O&M costs totaling \$152 million for the overall AGIS initiative through 2029 as summarized in Table 4 and Table 5 below.⁵¹

⁴⁸ Xcel Energy 2019 IDP, pp. 6-8. Att. M1, pp. 246-251 (and repeated on pp. 276- 280) describes the product or service for each of these goals, the customers affected, and the general timeframe. Staff Note: Att. M1, p. 273 includes an implementation timeline of the products and services with Day 1 (2020-2021), near term (2022-2025) and future (2025-2030). This timeline also includes an estimated DER Management System (DERMS) development in 2025.

⁴⁹ Xcel Energy 2019 IDP, pp. 147-152

⁵⁰ Xcel Energy 2019 IDP, p. 153, Table 36

⁵¹ Xcel Energy 2019 IDP, pp. 153-154, Tables 37 and 38. Staff Note: Does not include the Company’s estimated \$69.1 million anticipated in capital expenditures for ADMS (Minnesota only). Does not include the \$2.4 million in annual O&M expenditures (Minnesota only) estimated by Xcel Energy for ADMS (see Xcel Energy, ADMS compliance filing (January 25, 2020) at pp. 15-17.) Expenditures in the AGIS Certification Request are displayed for NSPM (MN, ND, SD). Does not include APT. Xcel Energy, Att. M2 at pp. 185 includes similar Tables 55 & 56 with different budgets. Over the 10 year budget forecast, the total difference in capital expenditures between Tables 55 (\$447.8 million) and 37 (\$581.9 million) is \$134.1 million, and for O&M Tables 56 (\$46.5 million) and 38 (\$151.6 million) is \$105.1 million.

Table 4: Total AGIS Capital Expenditures, NSPM – Electric (Millions)

AGIS Program	Rate Case Period			5-Year Period	10-Year Period
	2020	2021	2022	2023-2024	2025-2029*
AMI	\$14.0	\$28.9	\$144.0	\$185.2	\$15.0
FAN	\$14.7	\$37.3	\$36.8	\$3.8	\$0.0
FLISR	\$3.5	\$8.6	\$6.6	\$18.8	\$29.7
IVVO	\$0.1	\$6.5	\$9.8	\$18.6	\$0.0
Total	\$32.3	\$81.3	\$197.2	\$226.4	\$44.7

*Period may include additional assumptions, including inflation and labor cost increase that are not part of the capital budget in periods 2020-2024.

Table 5: Total AGIS O&M, NSPM – Electric (Millions)

AGIS Program	Rate Case Period			5-Year Period	10-Year Period
	2020	2021	2022	2023-2024	2025-2029*
AMI	\$6.6	\$16.4	\$14.1	\$25.2	\$67.2
FAN	\$0.1	\$2.3	\$1.5	\$0.5	\$8.6
FLISR	\$0.2	\$0.4	\$0.3	\$3.3	\$2.5
IVVO	\$0.0	\$0.4	\$0.8	\$0.6	\$0.8
Total	\$6.9	\$19.5	\$16.7	\$29.4	\$79.1

*Period may include additional assumptions, including inflation and labor cost increase that are not part of the capital budget in periods 2020-2024.

In response to XLI, the Company offers estimated revenue requirement by customer class (Minnesota specific) using allocators proposed in Xcel Energy's 2020 Class Cost of Service Study submitted with the since withdrawn MYRP.⁵²

Table 6: Estimated AGIS Revenue Requirement by Class – State of Minnesota

Year	MN Total	Residential	Commercial Non-Demand	C&I Demand Billed	Lighting
2020	\$10,415,136	\$5,523,080	\$468,243	\$4,054,215	\$369,598
2021	\$30,613,493	\$16,283,095	\$1,415,004	\$11,866,792	\$1,048,602
2022	\$41,933,397	\$22,547,571	\$2,337,632	\$16,082,523	\$965,670
2023	\$56,842,434	\$31,614,714	\$3,659,659	\$20,605,950	\$962,111
2024	\$63,589,359	\$35,862,263	\$4,306,718	\$22,482,056	\$938,322

Using the proposed/withdrawn 2020 Class Cost of Service Study and several assumptions for the example customer,⁵³ Xcel Energy provides several estimated total monthly bill impacts by customer class (Minnesota specific) in Table 7. Xcel Energy notes the best proxy to understand

⁵² Xcel Energy Reply, Att. A, pp. 30-32, Table 1. Staff Note: Att. M1, p. 299 provide the details of this Annual Revenue Requirement Rate Analysis for Minnesota.

⁵³ Xcel Energy Reply, Att. A, p. 31, Table 2, fn. 19: "Based on monthly average estimated usages – Residential 675kWh; Commercial Non-Demand 1,000kWh; C&I Demand 37,500 kWh."

the cost of AGIS is the *net* of the difference between the AGIS and Automated Meter Reading (AMR) reference (Table 8 below) because of the need to replace the expiring AMR meters.⁵⁴

Table 7: Estimated Total Monthly Bill Impact of AGIS – State of Minnesota

Year	Residential	Commercial Non-Demand	C&I Demand Billed
2020	\$0.44	\$0.55	\$7.83
2021	\$1.33	\$1.68	\$23.26
2022	\$1.84	\$2.80	\$31.65
2023	\$2.58	\$4.47	\$40.98
2024	\$2.87	\$5.34	\$45.08

Table 8: Estimate Net Monthly Bill Impact of AGIS – State of Minnesota

Year	Residential	Commercial Non-Demand	C&I Demand Billed
2020	\$0.44	\$0.54	\$7.77
2021	\$1.14	\$1.32	\$21.47
2022	\$1.21	\$1.54	\$25.86
2023	\$1.39	\$1.98	\$30.03
2024	\$1.36	\$1.99	\$30.95

Xcel Energy’s AGIS CBA results indicate a quantifiable costs and benefits total .87 in the baseline scenario and 1.03 under a high benefit, no contingency scenario. The Company notes this does not include qualitative benefits such as customer satisfaction and operational, power quality, and safety enhancements.⁵⁵ The Company also introduced a “least cost/best fit” assessment of the AMI and FAN components discussed later.

⁵⁴ Xcel Energy, Reply, Att. A, p. 32, Table 4

⁵⁵ Xcel Energy 2019 IDP, p. 156

Table 9: AGIS Combined Cost-Benefit Ratio (Millions)⁵⁶

NSPM AMI, FLISR, IVVO NPV	Total
Benefits	\$571
O&M Benefits	\$53
Other Benefits	\$222
Customer Benefits	\$103
Capital Benefits	\$193
Costs	\$(656)
O&M Expense	\$(186)
Change in Revenue Requirement	\$(470)
Baseline Benefit-Cost Ratio (IVVO CVR 1.25% energy, 0.7% capacity, with contingencies)	0.87
High Benefit/No Contingency Sensitivity (IVVO CVR 1.5% energy/0.8% capacity, no contingency)	1.03
Lower Benefit/With Contingency Sensitivity (IVVO CVR 1.0% energy/0.6% capacity, with contingencies)	0.86

As mentioned, ELPC/VS and other parties question whether AGIS and APT are “priority projects” or appropriate for rider recovery. Xcel Energy responds that both the AGIS and APT investments are particularly appropriate for rider recovery because they are: 1) fundamental elements of the Company’s plans for modernizing the distribution grid; and 2) much equipment will be used and useful before the AMI installation project is complete in 2024. Xcel Energy elaborates:⁵⁷

- AMI and FAN are core pieces of AGIS – the advanced meters and communication network needed to convey meter data to the Company’s other systems.
- FLISR and IVVO are advanced applications for ADMS that the Company believes will provide substantial benefits to customers.

CUB asserts Xcel Energy did not demonstrate why rider recovery of the AGIS investments is in the public interest. Further, CUB suggests the Commission’s determination on certification should be made with the totality of circumstances; including factors such as timing and efficacy of the next MYRP, size of investment, low cost to benefit ratio, and unclear customer class impacts.⁵⁸

CUB and XLI challenge Xcel Energy’s suggestion that the AGIS implementation plan is at risk without certification in this proceeding. XLI points to Xcel Energy’s response as demonstration that “certification must be viewed as a form of pre-determination of cost recovery, because Xcel is unwilling to proceed without it” and that “necessarily shifts the burden to ratepayers.”⁵⁹ CUB suggests the Company may be attempting to sidestep the type of comprehensive analysis

⁵⁶ Xcel Energy 2019 IDP, p. 157, Table 41

⁵⁷ Xcel Energy Reply, pp. 22-24

⁵⁸ CUB Supplemental, p. 2

⁵⁹ XLI Supplemental, p. 4

and evaluation an investment of this magnitude and complexity needs and deserves. CUB notes:⁶⁰

In fact, if certainty is truly what the Company seeks, holding further process at the certification stage pursuant to the Department's recommendation, as revised in its reply comments, would streamline and expedite the type of process that Xcel concedes is appropriate for the cost recovery phase of its request for TCR rider treatment of AGIS investments. Waiting until the cost recovery phase of the process to engage in a contested case proceeding would not confer any greater clarity or certainty and should not impact whether or not "portions of the projects would need to be abandoned altogether.

The Department does not recommend the Commission certify AGIS at this time given the uncertain facts and significant lack of assurances from the Company. The Department explains:⁶¹

The Department shares the desire to use advanced grid technologies as soon as possible, but however desirable new technology and services may be, the public interest demands assurances of reasonable and sound investments. Any certification should include sufficient ratepayer protections and clear plans for accountability to achieve system benefits. No other entity, other than Xcel, can ensure that benefits materialize and ensure that investing in the project was the least-cost, best-fit solution. Moving forward without protections puts significant risks on ratepayers, misaligning the risk and incentives that should be placed on Xcel to achieve the benefits claimed.

The Department offers guidance if the Commission should proceed with certification of AGIS or any of the components (**Decision Option 5a-d**):

.. the Department recommends strong cost caps and clear descriptions of what is certified to protect ratepayers from cost exceedances, changing project descriptions, and in the event that the capabilities, functionalities, and benefits that Xcel represented in the certification request do not materialize. The Department also recommends that any certification should be conditioned on a presumption that all revenues from the AGIS Initiative belong to ratepayers unless otherwise approved by the Commission.

The Department's recommendation is additional process, via a contested case or some other stakeholder process, which continues the evaluation of AGIS prior to a certification determination. The Department sees the goals of such process as more public participation and protecting ratepayers by ensuring Xcel Energy is accountable to both the costs and benefits articulated in the AGIS Certification Request.⁶² The Department's preference is a contested case (**Decision Option 13**) further described later in these papers.

⁶⁰ CUB Supplemental, pp. 4-5

⁶¹ Department Supplemental, pp. 18-19

⁶² Department Supplemental, p. 19

Conditions on AGIS Certification and/or Cost Recovery

CUB suggests consumer protection, like fixed and variable cost recovery caps and a methodology to ensure delivery of benefits to customers, should be included whether the AGIS investment continues with rider recovery or the next MYRP. CUB agrees and supports the Department's claim that the consumer protection proposals offered by parties if the Commission proceeds with certification at this time would benefit from additional consideration such as a contested case.⁶³ The Department offers as an alternative to the contested case: an additional comment period.

Fresh Energy recommends the Commission hold the Company accountable for achieving the customer benefits claimed in the cost-benefit analyses, and notes setting performance goals in planning proceedings helps the utility, stakeholder and Commission identify the specific targets the planning effort seeks to achieve.

Fresh Energy notes 96% of the total benefits are in twelve of the benefit categories, and believes tracking performance of these twelve metrics is reasonable to maximize benefits to customers while keeping reporting efficient and focused.⁶⁴ The twelve categories are outlined in Table 10.

Table 10: Fresh Energy Benefit Categories

	AGIS Component	Metric	NPV of Benefits	% of Total	Cum. % of Total
1	AMI	Avoided Drive-by Meter Reading Cost (capital & O&M)	\$223,137,004	37%	37%
2	AMI	Critical Peak Pricing-DSM Peak	\$138,479,332	23%	60%
3	FLISR	Customer Minutes Out-Customer Savings	\$98,458,717	16%	76%
4	AMI	Theft/ Tamper Detection & Reduction	\$22,354,455	4%	80%
5	AMI	Avoided Meter Purchases	\$17,455,428	3%	83%
6	IVVO	Energy Reduction	\$14,934,748	2%	85%
7	AMI	Time of Usage-Customer Energy Price Shift	\$13,576,886	2%	88%
8	AMI	Costs Savings from Remote Disconnect Capability	\$12,291,603	2%	90%
9	AMI	Reduced Outage Duration Benefit	\$10,323,309	2%	91%
10	AMI	Reduced Consumption on Inactive Meters	\$9,235,364	2%	93%
11	AMI	Outage Management Efficiency (storm spend capital)	\$9,047,289	2%	94%
12	AMI	Reduced Uncollectible/Bad Debt Expense	\$7,493,278	1%	96%

Fresh Energy outlines possible performance metrics and baselines for these benefit categories from Xcel's cost benefit analyses in Table 11⁶⁵

⁶³ CUB Supplemental, p. 6

⁶⁴ *Id.*

⁶⁵ Fresh Energy Initial, pp. 13-14; Supplemental, pp. 5-6.

Table 11: Fresh Energy Proposed Performance Metrics and Baselines

AGIS Component		Metric	Baseline	Target	Source
AMI (capital)	1	Capex for Asset Health/Reliability, Capacity projects	TBD	1% reduction	Bloch, p. 164
	2	Storm related capital restoration costs	TBD	10% reduction	Bloch, p. 165
	3	AMI meter failure rate (avoided meter purchases)	N/A	0.5%	Bloch, p. 165
AMI (O&M)	4	Annual trips for damaged customer equipment	1,796 trips	50% reduction	Bloch, p. 170
	5	Annual trips for residential manual disconnection	TBD	70% reduction	Bloch, p. 171
	6	Annual trips for residential manual reconnection	TBD	95% reduction	Bloch, p. 171
	7	Annual "OK on Arrival" field visits	7,464 trips	50% reduction	Bloch, p.172
	8	Annual voltage investigation field visits	2,858 trips	50% reduction	Bloch, p. 173
	9	O&M for Asset Health/Reliability, Capacity projects	TBD	0.1 % reduction	Bloch, p. 173
	10	O&M for storm related activity	\$2.1million	10% reduction	Bloch,p.174
AMI (other)	11	Customer-minutes of outage (CMO) - major events	\$115 mil	0.5% reduction	Bloch, p. 177
	12	CMO – single customer events	\$1.05 mil	20% reduction	Bloch, p. 178
	13	CMO - tap level events	TBD	TDD	Bloch, p. 179
	14	Cost of consumption on inactive meters	TBD	20% reduction	Cardenas, p. 62
	15	Commodity bad-debt expense	TBD	8% reduction	Cardenas, p. 64
	16	Residential demand shift from TOU rates	TBD	161MW	Duggirala, p. 28
	17	Medium C&I demand shift from TOU rates	TBD	52MW	Duggirala, p. 28
	18	Residential peak demand reduction from CPP	TBD	164MW	Duggirala, p. 28
	19	Medium C&I peak demand reduction from CPP	TBD	90MW	Duggirala, p. 28
IVVO	20	Customer energy consumption	TBD	1.5% reduction	Bloch, p. 272
	21	Electrical loss savings	TBD	225-900 MWh	Bloch, p. 274
	22	System peak demand	TBD	0.7% reduction	Bloch, p. 275

Fresh Energy recommend that the Commission require the Company to measure and report its progress on achieving the CBA benefits and underlying CBA assumptions for each AGIS investment in an annual report starting November 1, 2020 to be filed in this docket. (**Decision Option 7**)

The Company points to the proposed AGIS progress metrics, reporting (AGIS and Service Quality), and the May 2022 start date for the first report. Xcel Energy proposes to develop

metrics and reporting protocols associated with future operational capabilities, products, or services enabled by AGIS in future proceedings.⁶⁶ (**Decision Option 8.**)

Table 12: Xcel Energy's AGIS Progress Metrics Summary

		Description	AGIS Report*
Customer Outreach and Education	1	Survey results of customers on the adequacy and clarity of communications prior to installation of advanced meters.	AGIS
Installation and Deployment	2	Number of advanced meters installed.	AGIS
	3	% of FAN deployed.	AGIS
	4	Number of feeders with FLISR enabled.	AGIS
	5	Number of feeders with IVVO enabled.	AGIS
	6	Number of customers electing to opt-out of AMI installation.	AGIS
	7	Number of calls to Customer Contact Center and meter installation vendor regarding meter installation.	AGIS/SQ
	8	Number of complaints regarding AMI installation.	AGIS/SQ
Post-Deployment	9	Avoided CMO due to FLISR installations	AGIS/SQ
	10	Energy reduction (MWh) due to IVVO that result in cost savings and CO2 emissions reductions.	AGIS
	11	Percentage of customers with advanced meters that receive estimated bills.	AGIS/SQ
	12	Percentage of customers with an advanced meter that have made a complaint of inaccurate meter readings.	AGIS/SQ
	13	Survey of customer satisfaction with outage related communications.	AGIS
	14	Number of customers with an advanced meter with an active web portal account.	AGIS
	15	Number of monthly, unique visits to the web portal (My Account).	AGIS

*Service Quality potential impact and reporting noted

The next section offer a “choose your path” approach to considering AGIS certification at this time.

Options for Additional Certification Review of AGIS

Request for Contested Case on AGIS

The Department argues the current Commission process for project certification does not appear to contemplate the uncertainties and complexities of a distribution project like AGIS. Specifically, the Department argues there is not sufficient time for broad public input on the future of Xcel Energy's distribution system, business model, or customer relationships; nor, for an evidentiary proceeding to enable the Company to fully develop, and remain accountable for, the costs and benefits, and to develop conditions that would manage risk and protect ratepayers.⁶⁷ Therefore, the Departments recommends a contested case referral to the Office of Administration Hearings (OAH) that includes in scope: Xcel Energy's proposed AGIS,

⁶⁶ Xcel Energy Reply, p. 24, referencing Att. M1, p. 301

⁶⁷ Department Supplemental, p. 14

Incremental System Investment, and increased distribution system spending, as necessary, and as they relate to the AGIS initiative. The Department's recommendation also includes a substantial list for the evaluation of AGIS that includes, but is not limited to the following:⁶⁸

(Decision Option 13A-H)

1. Public interest determination for AGIS;
2. Public input;
3. Additional cost and cost recovery details with fixed and variable cost caps for AMI and FAN;
4. Consideration of AGIS impacts on transmission-level customers;
5. Cost allocation options, including an initial five-year outline of bill impacts for each customer class;
6. How the Company will pass the savings and revenues associated with AGIS to customers;
7. Other necessary conditions for customer value and ratepayer protection;
8. Specific plans and timeline for future customer offerings and system capabilities and whether Commission approval is required (e.g. service tier plans, remote connect/disconnect, AMI customer notice plan, customer data access requirements and rights, interconnection agreement and process modification, Advanced Rate Design Roadmap, and performance metrics, baselines and targets)

CUB supports the Department's request for a contested case as an optimal path forward for evaluation and analysis of Xcel Energy's AGIS Certification Request, akin to a rate case, while facilitating alignment with the next MYRP or next TCR filing.⁶⁹ CUB cautions certification without this additional scrutiny would be inefficient as the issues are likely to return in the next MYRP or the 2021 TCR docket. The Department goes further to say if the Commission does not refer the current proceeding to a contested case and grants certification, the Department will likely request a contested case for the next TCR Rider petition.⁷⁰ CUB also supports including the ISI Initiative and increased distribution system spending outlined in the IDP in the contested case to ensure appropriate ratepayer protections, clear plans for system benefits, and clear outcomes that would inform future Commission decisions.⁷¹ The Department and CUB suggest an important benefit of such an evaluation by contested case is that it possible conclusion before or during the next MYRP.⁷²

XLI opposes the Department's recommendation for a contested case, and asserts the appropriate venue is Xcel Energy's next rate case.⁷³ IPS Solar also opposes, and suggests the process is not supported by the record and will significantly delay the development of the Minnesota market for solar plus storage. IPS Solar suggests the cost-effective use cases of solar

⁶⁸ Department Supplemental, pp. 20-21 (recommendation matches Decision Option)

⁶⁹ Department Reply, p. 15. CUB Supplemental, p. 3

⁷⁰ Department Supplemental, p. 23

⁷¹ CUB Supplemental, p. 3

⁷² Department Reply, p. 22. CUB Supplemental, p. 3

⁷³ XLI Supplemental, p. 5

+ storage in the Department's *Minnesota Energy Storage Cost-Benefit Analysis* is linked to Xcel Energy's AGIS implementation.⁷⁴

Xcel Energy argues a contested case is unwarranted, and notes, despite many opportunities in the current docket, few parties engaged in discovery. Xcel Energy argues much of what the Department suggests as in scope of a contested case is already included in the record in this docket highlighting the Company went so far as to include "a business case and comprehensive assessment of qualitative and quantitative benefits to customers" something the Commission requires "[i]f and when Xcel requests cost recovery."⁷⁵ Specifically, Xcel opposes the scope including the Company's entire \$2.5 billion five-year Distribution budget in the contested case, and highlights the IDP filing requirements state "Commission review of annual distribution system plans are not ... a prudence determination of any proposed system modifications or investments."⁷⁶ Lastly, the Company argues some of the implementation items on the Department's evaluation list do not belong in a contested case, such as, procedures, notice plans, and formatting of data or rate schedule.

The Company also opposes the Department's suggestion that the Commission issue an additional comment period on potential customer protections if the Commission makes a certification decision without a contested case. Xcel Energy claims it would be unreasonable if the Company were unable to recover certified investments in base rates or through a rider because of a condition placed on certification; therefore, suggests conditions be addressed in a cost recovery proceeding.⁷⁷

That said, the Company remains willing to provide additional time beyond the June 1 statutory deadline for the Commission to provide clear direction on the AGIS and APT Certification Requests, noting:⁷⁸

While we have some flexibility in the implementation schedule we have set out, delaying certification pending a rulemaking proceeding or contested case would create uncertainty regarding the Commission's desired direction.

Extend Statutory Deadline (and MERP-like process)

Xcel proposes, rather than a contested case, the Commission should consider an expanded opportunity for stakeholders and the public to vet proposed investments modeled after the

⁷⁴ IPS Supplemental, p. 1

⁷⁵ Xcel Energy Supplemental, p. 3. Citing ORDER AUTHORIZING RIDER RECOVERY, SETTING RETURN ON EQUITY, AND SETTING FILING REQUIREMENTS (September 27, 2019), Docket No. E002/M-17-797, Ordering Paragraph 9, pp. 13-15

⁷⁶ Xcel Energy Supplemental, p. 3. Citing ORDER APPROVING INTEGRATED DISTRIBUTION PLANNING FILING REQUIREMENTS FOR XCEL ENERGY (August 30, 2018), Docket No. E002/M-18-251

⁷⁷ Xcel Energy Reply, p. 28

⁷⁸ Xcel Energy Supplemental, pp. 1-2. Staff Note: In Reply at pp. 24-25, Xcel provides analysis of law and precedent for the Company's offer to waive the statute. Other parties do not address waiving the statutory deadline.

Metropolitan Emission Reduction Plan (MERP) proceedings. Xcel Energy highlights the description of the proceedings in the Commission's March 9, 2004 Order.⁷⁹

Due to the proposal's technical complexity, its significant financial implications for ratepayers, and the widespread public interest it had generated, the Commission scheduled a series of public hearings, convened a technical conference to explore the financial consequences of converting two of the plants to natural gas, and established a 90-day period for the parties to meet, develop the record, exchange information, and attempt to clarify and narrow the issues in dispute.

Commission Considerations for a Certification Determination Now

Above described procedural paths that do not involve a certification determination at this time. Another path is to make such a determination on AGIS or some of its components at this time. Below staff describes each component as outlined in Xcel Energy's Certification Request and party comments.

Advanced Metering Infrastructure and Field Area Network (AMI and FAN)

Xcel describes Advanced Metering Infrastructure (AMI) as a key element of the AGIS initiative because it provides a central source of information that will interact with many of the other components of the AGIS initiative. Xcel believes that AMI will increase reliability, enable the ability for remote connection, as well as offer greater customer offerings for rates, programs, and services. Xcel states that AMI is critical to support certain benefits of the advanced grid such as TOU rates and associated price signals, more efficient distribution management system, and greater customer control over energy usage. AMI will also enhance utility planning and operational capabilities. Xcel plans to deploy approximately 1.3 million AMI meters in Minnesota starting in the third quarter in 2021 and continuing through 2024. This mass deployment of AMI meters builds off the limited AMI meter installation that will be completed in late 2020 as part of the TOU pilot. Xcel will own and operate the AMI meters and the Field Area Network (FAN) communication network.⁸⁰

Xcel's current Automated Meter Reading (AMR) meters are at the end of their service contract and will no longer be supported by the vendor past the mid-2020s.⁸¹ Xcel is proposing to replace its AMR service with AMI to ensure that it will continue to provide its customers with timely accurate bills.⁸² In addition, Xcel explains that AMI technology will expand the use of its meter system beyond basic billing functions for the benefit of its customers.⁸³

⁷⁹ Xcel Energy Reply, pp. 27-28. Citing ORDER APPROVING XCEL'S PROPOSED PLAN, SUBJECT TO THE TERMS OF A SETTLEMENT AGREEMENT AND ADDITIONAL CONDITIONS AND CLARIFICATIONS (March 8, 2004), Docket No. E002/M-02-633, p. 1

⁸⁰ Attachment M2, p. 39 of 202, Bloch Direct, p. 143

⁸¹ Xcel Reply Comments, p. 5

⁸² Xcel Energy 2019 IDP, pp. 5-6

⁸³ Xcel Energy 2019 IDP, p. 1

Xcel describes AMI as an integrated system of advanced meters, communication networks, and data processing and management systems that is capable of secure two-way communication between Xcel Energy's business and operational data systems and customer meters.⁸⁴

The AMI consists of new meters and associated hardware and software. The components of AMI include: (1) the meter itself (responsible for measurements and storage of interval energy data); (2) module (responsible for transmitting measured data and event data available to backend applications); (3) embedded Distributed Intelligence capabilities;⁸⁵ and (4) an internal service switch (to support remote connection and disconnection of service).⁸⁶

The AMI meters measure, store, and transmit meter data, including energy usage data from customer locations. The advanced meters can also measure values such as voltage, current, frequency. Additionally, these meters will detect outage and restoration events, detect tampering and energy theft events, and perform meter diagnostics.⁸⁷

AMI technology will provide for automated meter reading via the FAN communications network. Xcel notes there may be instances when a meter is not read by the AMI system, primarily due to network communication or meter issues. In these cases, the meter will be manually read. In addition, there may be customers who opt-out of AMI meter installation, which will also require Xcel to manually read meters for these customers.⁸⁸

While the primary purpose of the advanced meter is the same the existing AMR meters – to measure the amount of electricity used by Xcel's customers for billing purposes – the advanced meters have additional capabilities and can be remotely configured to measure bi-directional and/or time-of-use energy consumption in kilowatt hours (kWh) and demand in kilowatts (kW). An advanced meter that is configured for bi-directional energy measurement measures energy provided by the Company to the customer and also measures net energy provided from customers (i.e., customers with solar panels) to Xcel. Energy consumption data for billing purposes can be recorded by advanced meters in intervals as short as five minutes, or longer intervals if desired. The advanced meters also provide granular data regarding voltage and outages.⁸⁹

Xcel believes AMI is a necessary first step to better customer data, enhanced customer service, and the addition of applications and services for future energy management and optionality.

According to Xcel, AMI will enable near real-time monitoring and communication between the meter and ADMS about energy usage, outages, and other conditions of the distribution grid.

⁸⁴ Xcel Energy 2019 IDP, p. 5

⁸⁵ Staff Note: At IDP pp. 9, 26, 173 and 211, Xcel Energy describes the Distributed Intelligence platform as essentially providing a computer in each customer's meter that will be able to "connect" usage information from the customer's appliances for further insights – and be updated with new software applications, much like customers can currently update their mobile devices with applications. Further, Distributed Intelligence provides Xcel Energy deeper insights into the Company's secondary system and operation of DER.

⁸⁶ Attachment M1, p. 81 of 301, Gersack Direct, p. 77

⁸⁷ Attachment M1, p. 81 of 301, Gersack Direct, p. 77

⁸⁸ Attachment M4, p. 18 of 50, Cardenas Direct, p. 43

⁸⁹ Attachment M2, pp. 41-42 of 202, Bloch Direct, pp. 145-146

Xcel states the AMI meter functions as a sensor that, along with other intelligent field devices, will provide the Company with the necessary information to continually monitor and make the necessary adjustments to the system.⁹⁰

In addition to the ability to measure, store, and transmit interval meter data, capabilities of AMI include the ability to:

- Measure and transmit voltage, current, and power quality data;
- Detect and transmit meter power outage and restoration events;
- Detect and report meter tampering events;
- Perform and transmit meter diagnostics pertaining to the correct functioning of the meter and communications module;
- Support electric vehicle interconnections;
- Support customer-facing energy conservation technologies (i.e., smart thermostats);
- Support Distributed Intelligence; and
- Support remote connect/disconnect functions for customers taking single-phase service (generally, residential and some small business customers).⁹¹

Xcel states that its current AMR system has provided efficient meter reading services for nearly 30 years, but the AMR technology in Minnesota is nearing its end of life. Xcel's meter reading services vendor, Landis+Gyr (Cellnet), has informed Xcel that it will no longer manufacture replacement parts for this system after 2022. Xcel is the last Cellnet customer still using AMR technology. In addition, Xcel's contract with Cellnet for meter reading services expires at the end of 2025.⁹²

In addition to providing the meter readings, Cellnet owns and maintains the proprietary communication network and software used to transmit the readings. As AMR technology is becoming increasingly outdated, Xcel asserts that AMI technology has advanced to the point where the technology has been well-tested by other utilities, and its two-way communication and command capabilities will provide multiple benefits for customers while meeting the progressively complex needs of its distribution system.⁹³

Xcel believes AMI is the appropriate technology to replace the AMR system in order to meet both its current and future system and customer needs. Unlike AMR, Xcel explains AMI has two-way communications capabilities and will provide additional features and information that can be used to support advanced rate design, improve outage information, support demand response and distributed generation, and provide timely usage information that can help customers save money by managing their use of electricity. AMI will allow Xcel to meet the demands of an evolving distribution system with increasing amounts of DER, and customers

⁹⁰ Attachment M1, p. 77 of 301, Gersack Direct, p. 73

⁹¹ Attachment M2, p. 43 of 202, Bloch Direct, p. 147

⁹² Xcel Energy 2019 IDP, p. 150

⁹³ Xcel Reply Comments, p. 5

who expect timely energy usage data and the ability to connect their smart devices to their meter.⁹⁴

In March 2018, Xcel issued a Request for Proposal (RFP) to select an electric AMI meter vendor that could provide an AMI meter, project management, and installation services. As part of the RFP process, potential vendors were asked to review the Company's priorities and vision for its AMI solution and were asked to provide precise and detailed responses to numerous technical questions regarding their AMI meter offerings. Xcel received responses from four different meter vendors and evaluated these responses on a number of factors including: (1) total cost; (2) schedule requirements; (3) core metrology; (4) customer benefits and capabilities; (5) integration with the selected Network Interface Card (NIC) from Silver Springs (which was purchased by Itron, Inc.); (6) future proofing/new technology; (7) commercial terms and conditions; and (8) security.⁹⁵

In December 2018, Xcel issued a Limited Notice to Proceed to a meter vendor, but learned in March 2019, the vendor would not be able to integrate the selected NIC and meet the Company's meter deployment schedule without a significant increase in cost and a risk of further schedule delays. However, the Company also received a comprehensive proposal from another meter vendor that responded to the initial RFP that was able to meet the Company's requested deployment schedule with the necessary NIC integration, offered the necessary meter capabilities, and offered favorable price and contractual terms. As a result, in May 2019, Xcel Energy selected Itron as its meter vendor and a contract was executed on September 1, 2019.⁹⁶

The specific AMI meter Xcel selected for AGIS is the Itron Riva Generation 4.2 advanced meter, the latest model in Itron's Riva family of meters. For the TOU pilot, Xcel installed a different AMI meter, because the Riva Generation 4.2 advanced meter will not be ready for installation until 2021. The meters installed for the TOU pilot will be replaced by Itron with the Riva Generation 4.2 during the mass deployment at no cost to Xcel Energy. Xcel believes the physical life of these advanced meters will likely exceed the 15 year service life it has assumed for the AMI meters for purposes of depreciation and the CBA.⁹⁷

The Itron AMI meter will collect and transmit data to the Company a minimum of six times per day or every four hours. However, Xcel states there are several circumstances when the meters will communicate more often than every four hours, which include:

- An on-request basis. For example, a Customer Care employee may request and collect the meter data while on the phone assisting a customer.
- Through the internet portal or smartphone application, a customer could request an on-demand meter reading. This request will provide a customer with near real-time energy information.

⁹⁴ Xcel Reply Comments, p. 6

⁹⁵ Attachment M2, pp. 81-82 of 202, Bloch Direct, pp. 185-186

⁹⁶ Attachment M2, p. 83 of 202, Bloch Direct, p. 187

⁹⁷ Attachment M2, p. 41 of 202, Bloch Direct, pp. 144-145

- During event occurs such as a power outage, power restoration, power quality event, or a diagnostic event. The length of time between the data transmission and the event depends on the type of the event.
- Some AMI meters selected along the distribution feeders will transmit data to the head-end application every five minutes to make that information available to ADMS.⁹⁸

In addition, each Itron AMI meter also has an internal service switch that has the ability to remotely connect or disconnect power to the customer's electric service upon command from the head-end data application. Xcel notes that remote connection/disconnection of residential or small commercial customers would require revisions to its existing tariff and Xcel is not currently seeking Commission approval to enable this capability.⁹⁹

Xcel's RFP that was issued to select the AMI meter vendor also required the meter to have several interoperability characteristics, which included that the meter must be built to the industry standard and have an interface capable of supporting multiple communication modules.¹⁰⁰

The Itron AMI meters embedded two-way radio frequency communication module will utilize the Xcel's communication network (i.e., the FAN) to provide two-way communication between the meter and the AMI head-end application. The AMI head-end application is the operating system that is used to send data requests and commands to an advanced meter, and receive data from the meter, including:

- Transmitting the measurements, alarms, and events performed by the meter to the head-end application;
- Receiving commands from the head-end application to send specific meter measurements, alarms, and events, configure the meter to measure specific sets of energy parameters or time-of-use intervals and data recording intervals;
- Remotely performing meter firmware upgrades;
- Receiving commands from the head-end application to open or close the internal service switch and communicate its status.¹⁰¹

While the primary purpose of the two-way radio is to capture and transmit customer billing data and service quality data from the AMI meter to the Company, there is also a second radio within the meter that is Wi-Fi compatible and can be configured to communicate with a customer's Home Area Network (HAN) and HAN devices. A HAN device can be as simple as an in-home energy display that provides real-time energy data and may also include thermostats, home security systems, energy display devices, and smart appliances, that can communicate with each other to support energy management functions. Xcel assures it will continue to build

⁹⁸ Attachment M2, pp. 42-43 of 202, Bloch Direct, pp. 146-147

⁹⁹ Attachment M2, p. 48 of 202, Bloch Direct, p. 152

¹⁰⁰ Attachment M2, p. 99 of 202, Bloch Direct, p. 203

¹⁰¹ Attachment M2, p. 44 of 202, Bloch Direct, p. 148

and refine its next steps with both advanced grid technologies and customer products and services that will leverage these AMI capabilities.¹⁰²

With its embedded communication module, the AMI meter itself will be a part of Xcel's FAN communication network.¹⁰³ Xcel describes the Field Area Network (FAN) as a private, secure two-way communication network that provides wireless communications across Xcel Energy's service area – to, from, and among, field devices and its information systems.¹⁰⁴ According to Xcel, FAN will enable communications between the existing communications infrastructure at the Company's substations, ADMS, meters, and the new intelligent field devices associated with advanced grid applications.¹⁰⁵ Xcel states the FAN can be viewed as the nervous system of the AGIS system as it transmits information both to and from the advanced meter. This two-way communication is necessary to allow the meter to transmit data about energy usage or outages back to the Company's meter data management and ADMS systems.¹⁰⁶

Xcel's current communication network is the Wide Area Network (WAN). Xcel explains the WAN provides high-speed, two-way communications capabilities and connectivity in a secure and reliable manner between Xcel Energy's core data centers and its service centers, generating stations, and substations.¹⁰⁷ Xcel's WAN communications network is primarily composed of private fiber-optic cable and a collection of routers, switches, and private microwave communications that are supplemented by leased circuits from a variety of carriers as well as satellite backup facilities.¹⁰⁸

Xcel notes the WAN is not able to provide communications to support AMI meters or facilitate the operation of FLISR and IVVO. Leveraging the existing WAN, Xcel states the primary function of FAN mesh network is to enable the communications between the intelligent devices deployed across the distribution system – up to and including meters at customers' homes and businesses. These advanced applications cannot be supported with the Company's current communication network. Xcel explains further that the WAN does not allow the Company to monitor and manage impacts of distributed energy resources (for example, solar resources) and other events occurring on the grid in a timely manner. The FAN will provides capabilities to monitor and assess impacts closer to the field devices themselves, enhancing the Company's ability to integrate more distributed resources¹⁰⁹ Xcel explains the ability to deploy computing capability closer to the field devices allows for quicker identification of potential issues and immediate resolution and also enables Xcel to monitor and manage impacts of DER and other events occurring on the grid in a more timely manner.¹¹⁰

¹⁰² Attachment M2, p. 45 of 202, Bloch Direct, pp. 148-149

¹⁰³ Attachment M1, p. 77 of 301, Gersack Direct, p. 73

¹⁰⁴ Xcel Energy 2019 IDP, p. 5

¹⁰⁵ Attachment M1, p. 77 of 301, Gersack Direct, p. 73

¹⁰⁶ Attachment M1, pp. 112-113 of 301, Gersack Direct, pp. 108-109

¹⁰⁷ Xcel Reply Comments, p. 9

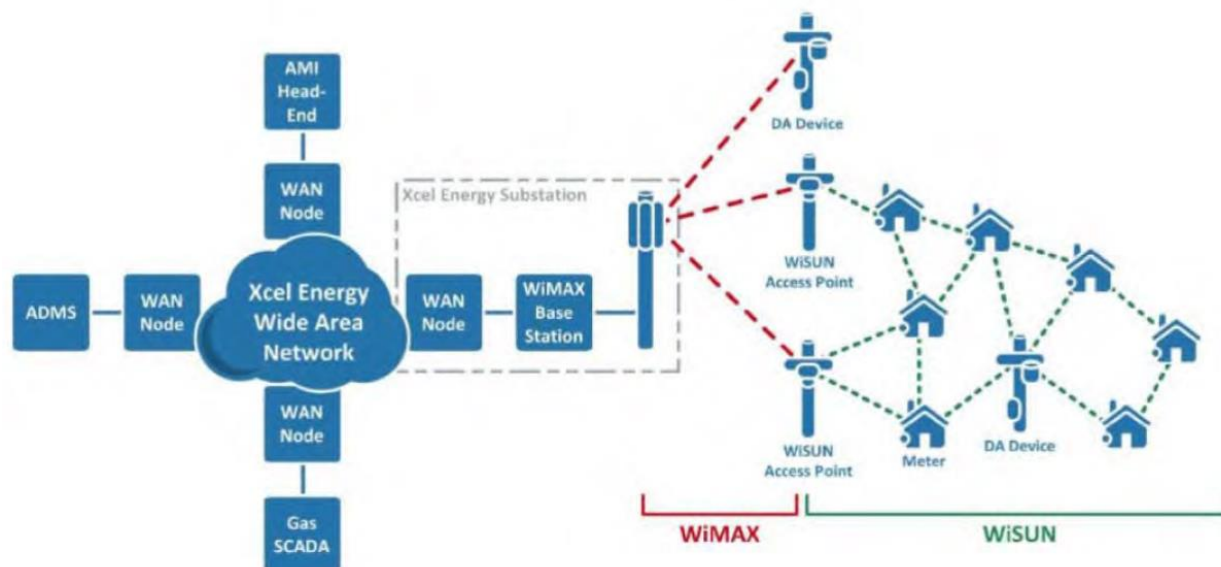
¹⁰⁸ Attachment M3, pp. 84-85 of 143, Harkness Direct, pp. 178-179

¹⁰⁹ Attachment M1, p. 61 of 301, Gersack Direct, p. 57

¹¹⁰ Xcel Reply Comments, p. 9

The FAN is a private, Xcel-owned wireless communications network. Xcel states the primary function of FAN is to enable secure and efficient two-way communication of information and data between Xcel's existing WAN network located at its substations and new or planned intelligent field devices, including AMI meters located at customers' homes and businesses. The FAN will enable back-office applications to directly communicate with field devices providing usage information for Xcel and its customers.¹¹¹

Figure 2: FAN Overview¹¹²



The WAN, which resides upstream of the FAN, will continue to be Xcel's primary means of communicating data between the Company's data centers that house data and ADMS, with its AGIS applications, such as FLISR and IVVO, and facilities such as generating plants and service centers as well as the FAN. The FAN, in turn, will provide the connectivity to intelligent devices installed across the distribution system.¹¹³

To provide communication between the substation and field devices, Xcel states the FAN will use two wireless technologies: (1) Wireless Smart Utility Network (WiSUN) mesh network; and (2) a Worldwide Interoperability for Microwave Access (WiMAX) network. The WiSUN mesh network will communicate directly with the AMI infrastructure (including the advanced meters) and the field devices used for IVVO and FLISR. The WiMAX network will provide secure connectivity between the WiSUN network and the Company's WAN. The field devices and the WiSUN access points connect to the WiMAX base stations (mostly located at the Company's substations) via wireless communication modules integrated into these devices.¹¹⁴

According to Xcel, a Company-owned network enhances security against cyber threats by reducing the use of third party networks, the use of public networks (*i.e.*, cellular), and the

¹¹¹ Attachment M2, p. 100 of 202, Bloch Direct, p. 204

¹¹² Attachment M2, p. 102 of 202, Figure 11, Bloch Direct, p. 206

¹¹³ Attachment M3, p. 85 of 143, Harkness Direct, p. 179

¹¹⁴ Attachment M2, p. 101 of 202, Bloch Direct, p. 205

reliance on external entities for communications support. Further, Xcel states the FAN will allow Xcel to implement its cyber security measures into the design at all levels and to utilize the network's full bandwidth and all capacity for the Company's use, which may be critical during emergency and outage situations. Xcel explains the FAN will provide for greater security and efficiency and avoids requiring the Company to incur monthly usage fees that would otherwise be paid to private vendors.¹¹⁵

Timing - Implementation Schedule

To begin implementing AMI, Xcel must install the AMI meter hardware, as well as software necessary to integrate the advanced grid across its system. Once these meters and associated software and hardware are implemented, additional work is needed to build the digital platforms for its customers.¹¹⁶ Xcel began the limited AMI deployment for its TOU pilot. Installation of AMI in connection with the pilot began in 2019 and was scheduled to be completed during the first quarter of 2020, with TOU pilot launch scheduled for April 2020.¹¹⁷

Because AMI consists of both software and hardware and works with other Company systems, information technology integration is key to the success of AMI.¹¹⁸ The new AMI field devices will provide data that Xcel has not stored in its systems before and this data will be in larger quantities than it has obtained before. As a result, effective use and communication of this data will require upgrades to many of Xcel's existing business processes. While Xcel's project plans have identified these upgrades and enhancements, there may be some additional requirements that will not be fully determined until the AGIS initiative is approved and final requirements are determined.¹¹⁹

The advanced meters will be integrated with Xcel's IT systems. AMI is data intensive with meter readings, energy usage interval profiles, power outage and restoration events, power quality information and other data transmitted and collected frequently. All data to/from the advanced meters is transmitted to the AMI head-end application and, depending on what the data is, needs to be integrated and made available to the applicable business system in an accurate and timely manner. Xcel states that many of the existing integrations already built will be leveraged and any newly required interfaces with legacy systems will be identified and developed as required to meet unique system needs.¹²⁰

Xcel will connect the AMI meter with the AMI head-end software that sends commands to meters and receives data from the meter using the FAN communication network. From the AMI head-end, data will be distributed to back office applications to enable the Company and customers to use this data in a meaningful way. ADMS data from field devices, including

¹¹⁵ Attachment M1, p. 85 of 301, Gersack Direct, p. 81

¹¹⁶ Attachment M1, pp. 83-84 of 301, Gersack Direct, pp. 79-80

¹¹⁷ Attachment M1, p. 84 of 301, Gersack Direct, p. 80. Staff notes the TOU Pilot Launch has been postponed due to the COVID-19 crisis.

¹¹⁸ Attachment M3, p. 53 of 143, Harkness Direct, p. 147

¹¹⁹ Attachment M3, p. 21 of 143, Harkness Direct, p. 116

¹²⁰ Attachment M3, p. 53 of 143, Harkness Direct, p. 147

advanced meters, will also be distributed to various back office applications, to enable the Company to manage the distribution grid more effectively and efficiently.¹²¹

Xcel refers to the AMI meter and head-end as endpoints, in addition to communication devices such as routers or switches. The concept of “endpoints” is not limited to distribution system field devices and also includes other end user devices, such as Company personal computers and network servers. Endpoint Protection is the installation and/or enablement of protective and detective cyber security controls to thwart malware and external influences from causing unexpected, unwanted or invalid behavior at an endpoint. Endpoint Protections include: (1) Access Controls including Authentication and Authorization; (2) System Patching; and (3) Data Validation and Protection. These endpoint protections were specified as cyber security controls in the AMI vendor selection process, as they are essential to protect the devices and the data that are handled by AMI meters and headend servers.¹²²

Xcel’s current AMI plan for Minnesota is to complete the installation of AMI meters in 2024, in anticipation of the end of the support for AMR meters and the end of the present service agreement. Xcel states that it is not necessary for it to conclude the TOU pilot prior to full implementation of AMI, because the TOU pilot is not intended to validate its plan for full roll-out of AMI to all customers. Xcel states the TOU pilot is intended to study the TOU rate and its impacts.¹²³

Xcel plans to install approximately 1.3 million AMI meters throughout its Minnesota service territory as part of the AGIS initiative starting in the third quarter of 2021. This deployment is in addition to the installation of 17,500 AMI meters Xcel installed as part of the TOU pilot. By the end of 2023, Xcel anticipates over 90 percent of the meter installations will be complete. Table 13 below provides a summary of the number of planned installation of AMI meters it anticipates installing per year from 2021 through 2024.¹²⁴

Table 13: AMI Meter Installation by Year

Year	2021	2022	2023	2024
Number of AMI Meters Installed	100,000 – 130,000	550,000 – 650,000	530,000 – 600,000	30,000 – 60,000

The deployment of the FAN will begin ahead of AMI installation to provide the necessary communications for advanced meter operations. Xcel began the limited deployment of FAN in connection with the TOU pilot and anticipates the full FAN deployment to begin in 2020 to ensure network readiness when AMI meters and other devices are deployed. During the installation of FAN equipment, Xcel’s Business Systems will work concurrently on integration of the FAN with the Company’s other systems. To support the TOU pilot, Xcel has begun to deploy WiMAX base stations in three substations, and the equipment necessary to enable the functioning of those base stations. Xcel has also conducted field coverage studies to ensure

¹²¹ Attachment M3, p. 24 of 143, Harkness Direct, p. 118

¹²² Attachment M3, p. 31 of 143, Harkness Direct, pp. 124-125

¹²³ Attachment M1, pp. 84-85 of 301, Gersack Direct, pp. 80-81

¹²⁴ Attachment M2, p. 53 of 202, Table 34, Bloch Direct, p. 157

adequate coverage of the FAN for both the TOU pilot as well as full deployment of meters and other devices in those areas. Work related to full FAN deployment will continue in 2020, and full FAN implementation is expected to be completed in 2024.¹²⁵

Xcel intends to submit the following future filings requesting necessary Commission approvals and eliciting stakeholder input for:¹²⁶

- Opt-out provisions – requesting approval of the processes, cost structure, and tariffs necessary to allow customers to opt out of AMI meter installation (2020);
- AMI billing – requesting approval of a rule variance and any tariff changes necessary to enable AMI interval billing (2020);
- Future filing to enable remote connect/disconnect capabilities;
- Future filing to request approval of a pre-pay option (for electric service) for customers; and,
- Future service quality reporting under Minnesota Rules (beginning April 1, 2022) and the Company's QSP (beginning May 1, 2022) to address any impacts to service quality metrics as a result of AGIS implementation.

Cost-Benefit Analysis

Xcel describes its Cost Benefit Analysis (CBA) as one tool to evaluate potential quantifiable costs and benefits of the core AGIS components, including AMI, FLISR, and IVVO, and supporting FAN costs. It can capture most costs (which are in themselves quantifiable), but only compares quantifiable projected benefits, such as O&M and capital expenditures savings and known quantifiable societal benefits.¹²⁷

Xcel cautions that while balancing the costs and benefits of any project is an important consideration, it is not the only consideration for evaluation. Other evaluation criteria include the need for the investments to serve customers, customer-facing benefits, efficiencies, system benefits, avoiding obsolescence, and for other reasons. Xcel asserts that the primary test is always whether the investment is just and reasonable – not whether dollar savings are greater than the price of the project.¹²⁸

Xcel's CBA model compares the costs with the quantifiable benefits of each component of the Company's AGIS initiative, which includes AMI. The cost components of the FAN are also incorporated into the CBA and allocated across the individual AGIS components it serves, because the FAN benefits are realized through its support of AMI and other AGIS components. The CBA utilizes specific cost and quantifiable benefit estimates and assumptions provided by

¹²⁵ Attachment M1, p. 87 of 301, Gersack Direct, p. 83

¹²⁶ Attachment M4, pp. 29-37 of 50, Cardenas Direct, pp. 54-70

¹²⁷ Attachment M1, p. 155 of 301, Gersack Direct, p. 151

¹²⁸ Attachment M1, pp. 174-175 of 301, Gersack Direct, pp. 170-171

the Company. The CBA model uses a 2019 Net Present Value (NPV) for quantifiable costs and benefits, to determine the value of the AMI and FAN investments.¹²⁹

Because AMI is the predominant beneficiary of the WiSUN system, 100 percent of WiSUN costs have been allocated to AMI. WiMAX costs will be distributed between AMI, FLISR, and IVVO according to the number of devices in proportion to the number of feeders. Based on the total number of devices installed by feeder for each program, and given that additional devices affecting the WiMAX component may be installed in the future, Xcel has estimated an allocation to capture that growth of AMI at 80 percent.¹³⁰

The CBA model compares the project implementation costs (including planning and installation) against the quantifiable benefits of the Company's proposed project, including the avoided costs of an AMR alternative, over the analysis period. The model incorporates the Distribution, Customer Care, and the Business Systems costs required for the implementation of the projects, including integration, software-hardware, project management, and other costs in order to provide a complete picture of AMI costs. Further, the CBA model quantifies the estimated net impact of costs and savings to customers, including Commission-approved measures of societal benefits. According to Xcel, all quantifiable utility costs and benefits were estimated in the model as they would be effectuated through utility electric rates. The CBA model takes the projected capital costs and benefits and estimates a net capital revenue requirement and the net capital revenue requirement represents the aggregate impact of both the capital costs and the capital savings over the analysis period. Accordingly, net capital revenue requirement estimates how the capital related costs and benefits would impact the customer through electric rates.¹³¹

Xcel explains further that once the stream of the net capital revenue requirements, O&M costs and benefits are calculated, the streams are compared on an NPV basis. Each stream of costs or benefits is present-valued back to 2019 dollars utilizing the Company's Weighted Average Cost of Capital (WACC) as a discount rate. The Model then divides the NPV of benefits by the NPV of costs to calculate a benefit-to-cost ratio. A benefit-to-cost ratio of 1.0 indicates benefits of AMI equal costs; a ratio of less than 1.0 means costs exceed benefits; and a ratio of greater than 1.0 means benefits exceed costs.¹³² Table 14 below summarizes the results of the Company's evaluation of AMI, both with and without contingency.¹³³

¹²⁹ Attachment M5, pp. 7-8 of 161, Duggirala Direct, pp. 5-6

¹³⁰ Attachment M5, pp. 14-16 of 161, Duggirala Direct, pp. 12-14

¹³¹ Attachment M5, pp. 11-12 of 161, Duggirala Direct, pp. 8-10

¹³² Attachment M5, p. 12 of 161, Duggirala Direct, p. 10

¹³³ Attachment M5, p. 40 of 161, Table 14, Duggirala Direct, p. 38

Table 14: AMI Benefit-to-Cost Ratio

NSPM AMI-NPV	Total (\$M)
Benefits	\$446
O&M Benefits	\$53
Other Benefits	\$203
CAP Benefits	\$190
Costs	(\$538)
O&M Expense	(\$179)
Change in Revenue Requirements	(\$359)
Benefit/Cost Ratio	0.83
Benefit/Cost Ratio (no contingencies)	0.99

Xcel's CBA model estimates benefit-to-cost ratio for AMI to be approximately 0.83-0.99, which indicates that the costs exceed quantitative benefits over the analysis period.¹³⁴ Xcel cautions that the CBA is just one phase of a more extensive assessment performed by the Company prior to seeking Commission approval for the four AGIS components presented in this case. This assessment included evaluation of the needs and goals of Xcel's distribution system, customers, the Commission, and other stakeholders, and then assessments of the alternatives to meet those needs and goals. Xcel provides the CBA model to identify and discuss the cost-effectiveness of AMI, which includes the avoided costs of a drive-by AMR alternative solution.¹³⁵

While the CBA by itself does not indicate that AMI quantifiable benefits are equal to quantifiable costs, Xcel proposes AMI to replace its near end-of-life AMR system, while also adding capabilities for its customers and for a future that includes greater DER, distributed intelligence, artificial intelligence, and greater customer engagement with all facets of their life. Xcel states it would not expect to save money (on a net basis) when investing in these kinds of technologies.¹³⁶ Xcel explains that the CBA does not address all reasons for undertaking the AGIS program or the benefits of the program because many such reasons and benefits cannot be quantified or reduced to a dollar value. Therefore, the CBA provides an appropriate perspective on the quantifiable costs and benefits of the program but not on all relevant considerations.¹³⁷

The CBA model for AMI examines the period beginning in 2019 and ending 2035. This is consistent with the 15-year depreciation terms presently approved by the Commission for its existing AMR meters. While the potential service life of AMI meters is between 15 and 20 years in the industry, Xcel uses a fifteen-year period for AMI examination. The timeframe reflects the current phase of work beginning in 2019, and future installation phases beginning in 2021 and includes the assumption that AMI meters and associated software and hardware, as well as the necessary components of the FAN will begin depreciation upon installation. The CBA also

¹³⁴ Attachment M5, p. 41 of 161, Duggirala Direct, p. 39

¹³⁵ Attachment M5, p. 9 of 161, Duggirala Direct, p. 7

¹³⁶ Xcel Energy 2019 IDP, p. 161

¹³⁷ Attachment M5, pp. 22-23 of 161, Duggirala Direct, pp. 20-21

includes the meters Xcel installed in 2019 and 2020 for the TOU pilot evaluation period, which will subsequently be replaced at no cost to the Company or customers. While additional meters will be installed after 2021, the IT components will need to be in place by the time of the initial meter installations in order for the system to function. Thus by 2035 (after the fifteen-year period from 2021-2035), the network will be fully depreciated.¹³⁸

Benefits of AMI

At a high level, the benefits of AMI include:

- providing more granular customer energy usage information that supports greater customer energy usage choice, pricing flexibility, and carbon reduction;
- reducing field and meter service and meter reading costs; (iii) reducing unaccounted for energy;
- assisting with identification of service outages and foster restoration; (v) providing voltage measurement information to assist in load flow and voltage calculations performed in the ADMS;
- serving as signal repeaters for other AMI meters and FAN network components; and
- improving infrastructure investment efficiencies.¹³⁹

The purchase of AMI meters also enables the Company to retire the end-of-life Cellnet technology that will no longer be supported in the future and avoid the purchase of other, less functional advanced meter reading (AMR) meters in the near future. As discussed below, not all of the above benefits of AMI are quantifiable or able to be reduced to a dollar value. In the cost benefit model, however, Xcel identified and captured the costs and quantifiable benefits associated with the technology.¹⁴⁰

Xcel identifies four categories of benefits that it expects from implementation of

AMI:

1. quantifiable capital benefits,
2. quantifiable O&M benefits,
3. other quantifiable benefits, and
4. non-quantifiable benefits.¹⁴¹

Only the quantifiable benefits of AMI were utilized by Xcel in the CBA model.

Quantifiable capital benefits include estimates of distribution system management efficiency, outage management efficiency, and avoided meter purchases for an AMR alternative.

¹³⁸ Attachment M5, pp. 12-13 of 161, Duggirala Direct, pp. 10-11

¹³⁹ Attachment M5, pp. 24-25 of 161, Duggirala Direct, p. 22-23

¹⁴⁰ *Id.*

¹⁴¹ Attachment M2, pp. 55-56 of 202, Bloch Direct, pp. 159-160

Quantifiable O&M benefits include reductions in field and meter service costs, improved distribution system management, outage management savings, as well as customer outage reductions, and the avoided meter reading costs of an AMR alternative system. With respect to other quantifiable benefits, Xcel anticipates reduction in energy theft, reduced consumption on inactive premises, reduced uncollectible and bad debt expense, load flexibility savings, and carbon emissions benefits.¹⁴²

A significant quantifiable benefit in the CBA model is the avoided cost of an alternative AMR drive-by system. Because Xcel's current meter reading contract is set to expire in 2025 and the Company will need to find a replacement meter reading system, Xcel explains an alternative option is to replace the current AMR Cellnet meter reading system with another basic AMR meter reading alternative such as a drive-by system. Since the deployment of AMI will eliminate the need to replace the existing AMR Cellnet meter reading with an alternative drive-by meter reading system, these avoided costs are assumed as a benefit of AMI by Xcel in the CBA model. Xcel utilized actual costs of an AMR drive-by system PSCo employs in Colorado to estimate the upfront and projected capital and ongoing operating costs to deploy a similar system in Minnesota. The capital cost components include meters, meter installation, other deployment costs, vehicles, equipment and material, and project management. Xcel also estimated the avoided O&M costs that include meter reading labor, vehicles, equipment maintenance, customer claims, and contingencies. The O&M benefit associated with implementing AMI as opposed to a drive-by meter reading system (i.e., avoided O&M for drive-by meter reading costs). The total costs of this AMR drive-by system was assumed as the benefit of AMI as these costs would not be incurred if AMI is deployed.¹⁴³

The non-quantifiable benefits that Xcel anticipates will result from the implementation of AMI include:

- Improved customer choice and experience, leading to customer empowerment and satisfaction;
- Enhanced distributed energy resource integration;
- Environmental benefits of enhanced energy efficiency;
- Improved safety to both customers and Xcel Energy employees; and
- Improvements in power quality.¹⁴⁴

AMI Costs

The key costs of AMI include the meters themselves, including the labor cost of installation and testing, supporting FAN and IT resources, AMI program and management, and other supporting labor for operations.¹⁴⁵

¹⁴² Attachment M2, p. 56 of 202, Bloch Direct, p. 160

¹⁴³ Attachment M2, pp. 63-64 of 202, Bloch Direct, pp. 167-168

¹⁴⁴ Attachment M2, pp. 75-76 of 202, Bloch Direct, pp. 169-180

¹⁴⁵ *Id.*

The costs are identified by Xcel as:

- Either capital or O&M;
- Either Business Systems or Distribution costs; and
- Direct, Indirect, Tangible, or Intangible costs, consistent with Order Point A.3 in the Commission's September 27, 2019 TCR Rider Order.¹⁴⁶

Xcel defines these categories of costs as follows:

- *Direct costs* – the cost of the materials and the workers that are involved when a company makes a particular product or provides a particular service that can be easily traced to that product, department, or project – similar to costs that are assigned rather than allocated.
- *Indirect costs* – a cost that cannot be directly traced to a particular product, department, activity, project, or providing a particular service – similar to overhead, or costs that are allocated rather than assigned.
- *Tangible costs* – Like direct costs, a tangible cost (or benefit) is a quantifiable cost related to an identifiable source or asset. It can be directly connected to a material item used to conduct operations or run a business. Tangible costs represent expenses arising from such things as purchasing materials, paying employees or renting equipment. The costs in the CBA are tangible.
- *Intangible costs* – an unquantifiable cost (or benefit) relating to an identifiable source. Intangible costs represent a variety of expenses such as losses in productivity, customer goodwill, drops in employee morale, or damage to corporate reputation. Most qualitative costs and benefits are intangible, although the Company has chosen not to assign a dollar value to some potentially tangible costs (like human safety).
- *Real costs* – total costs the utility incurs to produce a good or service or to implement a program, including the cost of all resources used and the cost of not employing those resources in alternative uses. Real costs analysis gives a greater picture of a product and the spending associated with it. The CBA model is intended to identify Real Costs throughout.¹⁴⁷

In addition to the cost estimates, the CBA also incorporates contingency estimates for each aspect of the project that warranted a contingency. These contingency estimates are depicted as cost line items. Since by definition the amount and type of contingency dollars that will actually be spent cannot be wholly defined up front, Xcel prepared CBAs summaries for each component both with and without contingency dollars, to provide insight into how the range of potential contingency amounts could affect the overall benefit-cost ratio.¹⁴⁸ Contingency

¹⁴⁶ Attachment M5, pp. 19-20 of 161, Duggirala Direct, pp. 117-18

¹⁴⁷ *Id.*

¹⁴⁸ Attachment M5, p. 21 of 161, Duggirala Direct, p. 19

estimates reflect corresponding risk allowances and contingencies for inherent uncertainties associated with budget estimates at the current stage of project development and approval.¹⁴⁹

Distribution's capital costs associated with implementing AMI are: (1) the meters; (2) meter installation; (2) vendor project management; (3) AMI operations; and (4) testing equipment. The costs for the AMI meters and installation are based on the meter contract with the AMI meter vendor, Itron. Xcel includes additional overheads such as taxes in these estimates.¹⁵⁰ The primary components of Distribution's AMI O&M expense relate to: (1) AMI operations (internal and external); and (2) customer claims.¹⁵¹ Table 15 below provides a summary of Xcel's capital and O&M expenditures and forecasts attributed to Distribution, and Business Systems for 2020 through 2029.^{152; 153}

Table 15: AMI Expenditures – NSPM, Total Company Electric (Dollars in Millions)

		Rate Case Period			5-year Period	10-year Period
		2020	2021	2022	2023-2024	2025-2029*
Distribution	Capital	\$2.6	\$22.3	\$133.9	\$179.5	\$14.1
	O&M	\$2.3	\$3.3	\$5.0	\$10.0	\$15.7
Business Systems	Capital	\$11.4	\$6.5	\$10.0	\$5.7	\$0.9
	O&M	\$4.2	\$13.1	\$9.1	\$15.2	\$51.5

*Period may include additional assumptions, including inflation and labor cost increases that are not part of the capital budget in periods 2020-2024

FAN Costs and Benefits

As noted above, the FAN, in and of itself, does not provide direct benefits to customers or the Company and any benefits are instead realized through FAN's support of, and interaction with, the proposed AMI implementation and similarly enables other technologies that transform the customer experience and create customer value. The reliable, private, secure network capabilities provided by the FAN also enable the end-to-end transport of interval meter data to provide the customer and grid benefits enabled by AMI.¹⁵⁴

FAN implementation requires installation of WiMAX and WiSUN equipment in the field as well as implementation of the necessary software components and IT integration with the Company's other systems.¹⁵⁵ WiSUN will be deployed throughout the entire network where Xcel is connecting to field devices such as AMI meters. WiMAX is the current primary means of connecting WiSUN to the main WAN backhaul systems, but it is not the only solution that will

¹⁴⁹ Attachment M1, p. 158 of 301, Gersack Direct, p. 154

¹⁵⁰ Attachment M2, p. 80- 81 of 202, Bloch Direct, pp. 184-185

¹⁵¹ Attachment M2, p. 85 of 202, Bloch Direct, p. 189

¹⁵² Attachment M2, pp. 88-89 of 202, Tables 38-39, Bloch Direct, pp. 192-193

¹⁵³ Attachment M3, p. 81 of 143, Tables 30-31, Harkness Direct, p. 175

¹⁵⁴ Attachment M3, p. 89 of 143, Harkness Direct, p. 183

¹⁵⁵ Attachment M3, p. 92 of 143, Harkness Direct, p. 186

be deployed. As the Company performs field coverage studies it may deploy other solutions, such as fiber or private LTE, to provide that connectivity.¹⁵⁶

FAN capital costs include FAN devices, installation, and project management, as well as preparation costs. To estimate the device costs and installation costs for FAN, Xcel determined the location and number of access points, repeaters, and CPEs that would be required to facilitate a reliable FAN communication network for the AMI meter and the distribution automation devices. Xcel concludes that approximately 550 access points, 3,000 repeaters, and 2,500 Customer Premise Equipment (CPEs)¹⁵⁷ will be required for the FAN coverage area. After determining the number of devices, the price for each device was derived from prices included in contracts that resulted from several RFP processes. The labor costs to install each device are based on a combination of contractor and internal labor and labor estimates are based on Xcel's prior experience with installing FAN devices for both FAN rollout in Colorado and the limited deployment of FAN in Minnesota to support the TOU pilot.¹⁵⁸

The FAN's O&M costs include costs for infrastructure and hardware, operations (including equipment and personnel), preparation costs. Xcel states that these costs include the field level support for fixing broken and damaged equipment, additional personnel to monitor and manage the FAN, other preparation work that is designated as O&M, hardware and software maintenance, and training. Personnel will include both Company employees and contractors.¹⁵⁹ Table 16 below provides a summary of Xcel's capital and O&M expenditures and forecasts attributed to Distribution, and Business Systems for 2020 through 2029.^{160;161}

Table 16: FAN Expenditures – NSPM, Total Company Electric (Dollars in Millions)

		Rate Case Period			5-year Period	10-year Period
		2020	2021	2022	2023-2024	2025-2029*
Distribution	Capital	\$3.2	\$6.2	\$0.0	\$0.0	\$0.0
	O&M	\$0.1	\$0.2	\$0.4	\$0.3	\$0.4
Business Systems	Capital	\$11.5	\$31.1	\$36.8	\$3.8	\$0.0
	O&M	\$0.0	\$2.1	\$1.1	\$0.2	\$8.2

*Period may include additional assumptions, including inflation and labor cost increases that are not part of the capital budget in periods 2020-2024

Alternatives to AMI

Xcel states it considered the following alternatives to AMI

1. extend the life of the existing AMR meters;
2. replace existing AMR meters as they fail with AMI meters;
3. utilize a different AMR solution with limited TOU capabilities;

¹⁵⁶ Attachment M3, p. 95 of 143, Harkness Direct, p. 189.

¹⁵⁷ Staff Note: Customer in CPE refers to Xcel Energy

¹⁵⁸ Attachment M2, pp. 107-108 of 202, Bloch Direct, pp. 211-212

¹⁵⁹ Attachment M2, pp. 108-109 of 202, Bloch Direct, pp. 212-213

¹⁶⁰ Attachment M2, p. 110 of 202, Tables 43-44, Bloch Direct, p. 214

¹⁶¹ Attachment M3, p. 106 of 143, Tables 34-35, Harkness Direct, p. 200

4. utilize an AMR drive-by solution; or
5. return to non-AMR, manually read meters.

Xcel notes that none of these alternatives provide the same benefits and functionality for its customers that are provided by the full deployment of AMI proposed by the Company.¹⁶²

1. Extend life of existing AMR meters

Xcel describes its current meters as supporting a one-way transmit-only Radio Frequency (RF) fixed network AMR system. Xcel explains the AMR system provides total energy and demand information once a day based on the type of meter installed. The AMR meter is affixed with a Cellnet module that transmits meter pulse data multiple times a day to pole-mounted network components. While the current AMR system has some ability to support more complex rate designs, such as limited TOU rates, and provides non-usage data, such as a “last gasp” when the power goes out, these meters do not have two-way communication capabilities. Xcel states that without two-way capabilities, it must dispatch a meter technician to reconfigure a meter’s TOU intervals each time a customer wants to change their rate.¹⁶³

In addition, Xcel notes that the Cellnet meter reading and vendor support contract expires at the end of 2025. Xcel states it has the ability to extend this contract for one additional year but at a significant cost increase as compared to prior years. Because Xcel is the last remaining customer on the Cellnet system, and Xcel believes extending this meter reading and vendor support contract beyond 2026 is highly unlikely. As a result, Xcel stresses that its ability to continue to use the Cellnet system for meter reading beyond 2026 would require it to purchase the existing meter reading network, software, and meter modules from Cellnet. Xcel asserts this would create a challenge to continue to operate and maintain the AMR system in good working order because Cellnet will stop manufacturing replacement parts for this system in 2022. As this system is proprietary, Xcel notes there are no other vendors that it can utilize to provide replacement parts for this system. As a result, as these meters age and require repair, Xcel will not be able to purchase the necessary replacement components. Given the inability to find replacement parts for the existing Cellnet meters, Xcel determined that trying to extend the life of these meters beyond the end of the Cellnet contract was simply not a reasonable or prudent alternative.¹⁶⁴

2. Replacing AMR meters one at a time

Xcel determined that installing the 1.3 million AMI meters at the same time to all of its Minnesota customers was the best option for several reasons. First, Xcel explains that deploying all of the AMI meters at once reduces the cost of installation of each individual meter as there are efficiencies of scale in such a large deployment. Second, the AMI mesh technology that allows the AMI meters to communicate with each other and the utility requires a certain density of meters in a particular area to sustain reliable communications. Third, AMI is an

¹⁶² Attachment M2, p. 89 of 202, Bloch Direct, p. 193

¹⁶³ Attachment M2, pp. 89-90 of 202, Bloch Direct, pp. 193-194

¹⁶⁴ Attachment M2, pp. 90-91 of 202, Bloch Direct, pp. 194-195

integral component to the overall AGIS initiative that are needed to support other AGIS applications.¹⁶⁵

3. AMR alternatives

Xcel evaluated the following different types of AMR metering systems: (1) two-way RF system; (2) one-way RF system (currently in use in most of Xcel Energy's Minnesota service territory); and (3) a drive-by system. Xcel Energy evaluated each of these AMR systems and a manual read meter alternative and compared their capabilities to the AMI system. Of the three types of AMR solutions, Xcel concludes that the drive-by solution is the most antiquated because such meters cannot be read remotely. A drive-by AMR solution only provides meter readings when a meter reader drives by and would also have higher O&M costs.¹⁶⁶ Xcel concluded that none of the alternative meter systems could match the features and capabilities of the AMI system. While Xcel concludes the AMR alternatives perform similarly to AMI in terms of basic meter reading capabilities, Xcel maintains they cannot match the advanced TOU information, two-way capabilities, or other functions provided by AMI.¹⁶⁷

4. Manual Read Meters

Xcel also maintains that reverting to manual read meters is not a reasonable alternative, because reverting to non-AMR meters would require the replacement of well over a million meters. In addition, manual read meters would not provide any of the benefits of the AMI meter such as timely energy usage data, outage information, or voltage information. Further, manual read meters would have higher meter reading costs as compared to AMI meters due to the need to send personnel out into the field to perform manual monthly readings. Finally, Xcel notes that manual reading also has a lower read rate and an increase in the number of billing exceptions per read as compared to both AMR and AMI.¹⁶⁸

Least – Cost Best-Fit Analysis: AMI and FAN

Xcel states that principal alternative to the FAN for supporting AMI is the use of cellular carrier solutions. This would require Xcel to deploy a cellular modem in every meter and pay monthly fees for usage and for the private internet protocol service for every device and would cause the Company to incur substantial monthly and annual expenses. Xcel also states that other key decision criteria such as security, reliability, and support costs all weighed into the decision to choose the FAN.¹⁶⁹

In support of its AMI proposal, Xcel also presents a model it calls “Least-Cost/Best-Fit” analyses with respect to the costs/benefits of AMI, the cost of drive-by AMR and qualitative capabilities of manual reading and other AMR solution.¹⁷⁰ Specifically, Xcel compares the qualitative

¹⁶⁵ Attachment M2, pp. 91-92 of 202, Bloch Direct, pp. 195-196

¹⁶⁶ Staff Note: Of the AMI alternatives, Xcel Energy chose drive-by AMR as the avoided cost in the AMI CBA.

¹⁶⁷ Attachment M2, pp. 95-96 of 202, Bloch Direct, pp. 199-200.

¹⁶⁸ Attachment M2, pp. 96-97 of 202, Bloch Direct, pp. 200-201.

¹⁶⁹ Attachment M3, pp. 111-112 of 143, Harkness Direct, pp. 205-206.

¹⁷⁰ Attachment M1, p. 33 of 301, Gersack Direct, p. 29.

capabilities of AMI to other alternatives, (manual reading, drive-by AMR and other AMR solution), while also factoring in incremental cost for drive-by AMR alternatives compared with the benefits and costs of AMI. Xcel claims its “Least-Cost/Best-Fit” analysis supports its conclusion that AMI has significant additional capabilities and a higher net costs/benefits of AMI as compared to drive-by AMR. While Xcel admits its “Least-Cost/Best-Fit” analysis does not have specific pricing information for manual read meters and other AMR options, the Company concludes that the capabilities of older technology are sufficiently limited and outdated as to be incomparable.¹⁷¹

Table 17 below represents Xcel’s “Least-Cost/Best Fit” analysis of AMI alternatives.¹⁷²

¹⁷¹ Attachment M1, pp. 175-176 of 301, Gersack Direct, pp. 171-172.

¹⁷² Attachment M5, pp. 46-48 of 161, Table 18, Duggirala Direct, pp. 44-46. Staff Notes: Circles are filled in to denote whether the technology has the capability fully, mostly (three-quarter), partially (half), minimally (quarter) or not at all. Operational features are denoted as A for applicable, PA for partially applicable, and NA as not applicable.

Table 17: Meter Reading Least-Cost Best-Fit Alternative

Item	Description	Alternative			
		Manual	AMR 1 way/ Limited 2 way	AMR Drive- By	AMI
Meter Capabilities	Time of use data	●	●	●	●
	Real time notification of power outages	○	●	○	●
	Fast response to customers inquiries	○	●	○	●
	Support integrated systems that offer customers	○	●	○	●
	Vehicle to grid interconnects	○	○	○	●
	Remote reconfiguration/ firmware updates	○	○	○	●
	Availability of real time data	○	○	○	●
	Availability of power quality events	○	○	○	●
	Remove availability of meter diagnostic data	●	●	●	●
	Remote disconnect/ connect	○	○	○	●
	Detect unsafe field metering conditions	○	○	○	●
	Energy Theft	●	●	●	●
	Support for advanced rates	○	○	○	●
	Support for ADMS	○	○	○	●
Operational Features	Time consuming activity	A	NA	NA	NA
	Labor intensive - Safety Concerns	A	NA	PA	NA
	Cost of paying someone to read the meters.	A	NA	PA	NA
	Need access to meters to read them.	A	NA	NA	NA
	Accuracy of the meter read, human error.	A	NA	NA	NA
	Usually carried out infrequently (monthly).	A	PA	PA	NA
	Doesn't usually match invoice billing period.	A	PA	PA	NA
	Cost of system maintenance	NA	A	A	A
	Relying on technology	NA	A	A	A
NPV (2019)	Calculated COSTS - CAP Change in RR and O&M			\$223M	\$539M
	BENEFITS-Incremental to current reading/ billing			\$0M	\$442M
	NET COST-OUTCOME			\$223M	\$97M
Least-Cost, Best-Fit Alternative Selected					AMI System

Legend for Capabilities				
Full	Most	Partial	Minimal	None
●	●	●	●	○

Legend for Operational Features		
Applicable	Partially Applicable	Non- Applicable
A	PA	NA

Xcel also presents a similar comparison qualitative capabilities of FAN alternatives, including a cellular or dedicated AMI communications network alternative. Table 18 below represents Xcel's "Least-Cost/Best-Fit."¹⁷³

Table 18: Communications Least-Cost Best-Fit Alternative

Item	Feature/ Requirement	Alternatives		
		Cellular	Dedicated AMI	FAN Mesh
Network Capabilities	Two way communications	●	●	●
	Peer-to-Peer	◐	●	●
	Multipurpose	◐	◐	●
	Latency Requirements	●	●	●
	Security	◐	●	●
	Dedicated traffic	◐	◐	●
	Priority traffic	◐	●	●
	O&M Costs Impact (run state)	◐	◐	●
	Resiliency	◐	◐	●
Operational Features	Cost of paying a third party for service	A	NA	NA
	Unable to fully control the system "end-start"	A	NA	NA
	Unable to implement to some AGIS processes	NA	PA	NA
NPV (2019)	Relying on technology	A	A	A
	Calculated COSTS - CAP Change in RR and O&M			\$102M
	BENEFITS-Incremental to current reading/ billing			\$0M
	NET COST-OUTCOME			\$102M FAN Mesh
Least-Cost, Best-Fit Alternative Selected				

Other than general expressions of concern over certification of AGIS and cost-recovery, parties expressed few specific concerns about Xcel's proposal for replacing its aging AMR system with AMI and the implementation of FAN. When addressing Xcel's AMI and FAN proposal, most comments were generally in favor of Xcel Energy's proposal for AMI and FAN. For example, CUB states that AMI and FAN can lay an important foundation for a dynamic, customer-centric utility approach in the future.¹⁷⁴

CUB agrees with Xcel that AMI is a foundational element to AGIS, including provision and measurement of new customer rate and demand-side management service offerings; improved

¹⁷³ Attachment M5, pp. 48-49 of 161, Table 19, Duggirala Direct, pp. 46-47.

¹⁷⁴ CUB Comments, p. 2

grid awareness, visibility and performance; improved operational efficiencies and performance; and new potential customer benefits including access to customer energy data.¹⁷⁵

However, CUB cautions that the record for the deployment of AMI in other regions across the nation has been mixed. CUB states that some utilities have had to interrupt their roll out of smart meters (AMI) to reassess the technology selected, some have switched vendors, and others have incurred cost overruns due to systems integration issues. In addition, some utilities have failed to realize expected benefits from AMI because of change-management issues.¹⁷⁶

For the above reasons, CUB recommends that the Commission direct Xcel to move forward with its AMI and FAN investments, but deny certification given the significant risk and because CUB believes rider recovery for AGIS is inappropriate. As discussed earlier, CUB argues AGIS investments, including AMI and FAN, should be recovered through rate cases.¹⁷⁷

Alternatively, if the Commission proceeds with certification determinations, CUB recommends the Commission grant certification as modified, with rider recovery subject to certain consumer protections, including cost caps, a methodology for passing benefits to customers as they are realized, and data access assurances.¹⁷⁸

Similarly, Fresh Energy supports Xcel's plans to implement AMI and FAN. Fresh Energy believes Xcel has satisfied the requirements in the Commission's August 7, 2018 Order and demonstrated that AMI and FAN will modernize the distribution system with new capabilities for enhanced planning and operations, while providing its customers with new tools and information to reduce peak demand and energy consumption.¹⁷⁹

However, Fresh Energy also argues an approval of certification should indicate that a project has demonstrated additional importance and warrants consideration for rider recovery and the burden of proof is on the utility to demonstrate the project is a priority project above and beyond normal distribution projects, consistent with Minn. Stat. §216B.16 Subd. 7b(a)(1).¹⁸⁰ As AGIS includes both AMI and FAN, Fresh Energy prefers the Commission defer a decision on certification of the both projects until the Commission has developed guidance on the threshold projects should achieve in order to be certified.¹⁸¹

If the Commission chooses to make a certification determination at this time, Fresh Energy recommends that the Commission approve Xcel Energy's certification request for FAN.¹⁸² Similar for AMI, if the Commission chooses to make a certification determination at this time, Fresh Energy recommends that the Commission approve Xcel Energy's certification request for

¹⁷⁵ Cub Comments, Attached Report: Strategen – Review and Recommendations for the Xcel Energy Integrated Distribution plan, p. 13 of 18

¹⁷⁶ Cub Comments, Attached Report: Strategen – Review and Recommendations for the Xcel Energy Integrated Distribution plan, p. 11 of 18

¹⁷⁷ CUB Comments, p. 3

¹⁷⁸ *Id.*

¹⁷⁹ Fresh Energy Comments, p. 7

¹⁸⁰ Fresh Energy Comments, p. 14

¹⁸¹ Fresh Energy Comments, p. 7

¹⁸² Fresh Energy Comments, pp. 8-9

AMI and direct Xcel to develop a Draft Rate Design Roadmap to be filed as part of the Company's next rate case or the next IDP, whichever comes first.¹⁸³ Fresh Energy explains the roadmap should describe how Xcel will leverage AMI capabilities to support the Commission's and Xcel's stated priorities for customer savings, grid reliability and efficiency, and emission reductions and should include the following components:

- a. A summary of the Company's current advanced rate designs and demand management programs, advanced rate designs in development, and relevant industry best practices.
- b. A timeline for offering updated dynamic rates and/or demand management programs for all customer classes.
- c. Potential rate and program design strategies to support low-income customer participation in these offerings.
- d. A discussion of opportunities for utilizing distributed energy resources and/or beneficial electrification technologies in conjunction with planned dynamic rates and/or demand management programs.
- e. Enrollment mechanisms for convenient customer participation in the advanced rate offerings.
- f. Implementation plans for offering advanced rates, including education and outreach to customers.
- g. Evaluation plans for monitoring, verifying, and improving the effectiveness of advanced rate designs.¹⁸⁴

Fresh Energy also recommends that Xcel engage stakeholders in the process of preparing the public-facing rate design plan and host at least two stakeholder meetings by April 30, 2021 to solicit input from stakeholders and inform the Draft Rate Design Roadmap.¹⁸⁵ As discussed in the IDP briefing papers, a number of parties support the concept of a rate design roadmap.

The City of Minneapolis expresses a concern that the benefit to cost ratio of the AMI project for customers is only 0.83 and understands that to mean that the cost being borne by customers exceeds the value of benefits customers will receive. The City states that if the AGIS plan does not empower people to more cost effectively integrate renewables and level 2 electric vehicle charging, and access and share data easily, the system costs should not be recovered from customers.¹⁸⁶ While it does not make a specific recommendation on the certification of AMI and FAN, the City believes that cost recovery should be analyzed and addressed through the MYRP to assure more equitable cost recovery from customers.¹⁸⁷

The Department believes Xcel's AMI and FAN proposal has not been fully reviewed in this proceeding up to this point. As an example, the Department states it appears there was no AMI meter-to-meter comparison (only AMI to AMR) and Xcel selected the newest (potentially most

¹⁸³ Fresh Energy Supplemental Comments, p. 3

¹⁸⁴ Fresh Energy Comments, p. 7

¹⁸⁵ Fresh Energy Comments, p. 8

¹⁸⁶ City of Minneapolis Comments, p. 8

¹⁸⁷ City of Minneapolis Comments, p. 11

advanced) Itron meter. Therefore, the Department argues that additional information would be useful in the comparison analysis, beyond what was provided by Xcel.¹⁸⁸

The Department recommends that the Commission refer Xcel's AGIS Initiative proposal, which includes AMI and FAN, to the OAH for a contested case hearing for further record development. As discussed previously, the contested case referral should include consideration of the proposed costs associated with the Incremental System Investments and increased distribution system spending, as necessary, and as they relate to the AGIS Initiative. Among the criteria to be established by the Commission that the Department recommends the contested case evaluation considerations are:

- a. Fixed cost recovery caps for AMI and FAN capital costs (no more than the lower of actual costs incurred or costs as proposed in Xcel's 2019 IDP)
- b. Variable cost recovery caps, including O&M and labor, for AMI and FAN (no more than the lower of actual incurred costs or Xcel's variable costs as proposed in the 2019 IDP, applied on a per-meter basis)¹⁸⁹

While the Department argues that the Commission should refer this matter to a contested case hearing, in the event that the Commission decides to certify any of the AGIS Initiative, including AMI and FAN, the Department recommends strong cost caps and clear descriptions of what is certified to protect ratepayers from cost exceedances, changing project descriptions, and in the event that the capabilities, functionalities, and benefits that Xcel represented in the certification request do not materialize. The Department also recommends that any certification should be conditioned on a presumption that all revenues from the AGIS Initiative belong to ratepayers unless otherwise approved by the Commission.¹⁹⁰

Xcel believes it is premature at this stage to address commenters' recommendations regarding specific cost caps, consumer protections, and conditions on cost recovery. While these are important issues that deserve consideration, Xcel argues they are more appropriately addressed in a cost recovery proceeding, whether that be a proceeding related to the TCR Rider or a general rate case.¹⁹¹

With respect to conditions parties suggested the Commission apply to a certification determination for AMI and FAN, Xcel generally responds that it is too early for the Commission to broadly set conditions for what is presently, a thoroughly-scoped, but still preliminary plan.¹⁹²

Xcel responds to CUB that it is not appropriate to make substantive decisions on issues around customer data and third party access at this time or in the IDP. Xcel asserts that while data access issues are raised in the context of its AGIS initiative, they are not related or reliant on Xcel's request for certification in this proceeding. Xcel argues that third party access to

¹⁸⁸ DOC Reply Comments, p. 20

¹⁸⁹ DOC Reply Comments, pp. 16-17

¹⁹⁰ DOC Comments, p. 21

¹⁹¹ Xcel Reply, p. 27

¹⁹² Xcel Reply Comments, Attachment A, p. 22 of 39.

customer data, including billing information, and any alterations to the current third party customer data access framework are outside the scope of this proceeding. Xcel believes any changes to the Company's or the Commission's customer and third party data access frameworks are complex and deserve a focused examination and are more appropriately addressed in a separate proceeding. Xcel and CUB both acknowledge that the Commission currently has such an open proceeding in Docket No. E,G999/CI-19-505.¹⁹³

Xcel responds to recommendations for the development of a rate design roadmap (**Decision Option 10**), by stating that rate design is best and most comprehensively addressed in the context of either a general rate case, where regulators review a complete record and consider input from experts and stakeholders in a ratemaking proceeding, or alternatively, in a proceeding otherwise dedicated to rate-design topics. While Xcel appreciates the link to the enabling technologies addressed in the Company's integrated distribution planning process, it does not believe these topics are properly in scope here. Should the Commission wish to direct the Company to produce a draft Advanced Rate Design plan, Xcel believes a separate rate-design proceeding is the appropriate forum for such a plan in lieu of a general rate case proceeding.¹⁹⁴

While Xcel does not oppose including a description of its advanced rate design efforts in future IDP filings, Xcel maintains it is already engaged in significant advanced rate-design initiatives today, and it sees minimal value in establishing a new set of processes with the potential to slow down the progress currently being made. Should the Commission disagree, however, and direct the Company to produce a draft "roadmap" in a separate proceeding, such as docket E002/M-20-86, the Company would not oppose the following components¹⁹⁵ (**Decision Option 11**):

- A summary of the Company's current advanced rate designs and demand management programs, advanced rate designs in development, and relevant industry best practices.
- A timeline for proposing advanced rates and/or demand management programs for all customer classes. A discussion on what should be discussed in petitions for rate design changes, including:
 - Whether program design strategies will be needed to support low-income customer participation in these offerings,
 - Application to distributed energy resources
 - Implementation plans, including education and outreach to customers.
 - Evaluation plans

In response to parties' recommendations the Commission require the Company to track and report on the savings it claims in its CBA, Xcel states the specific benefit and cost amounts are from the point in time it began its analysis, and rooted in the specific deployment plan, scope, and timing that it proposed and any changes to that plan could significantly affect the identified

¹⁹³ Xcel Reply Comments, Attachment A, pp. 26-27 of 39.

¹⁹⁴ Xcel Reply Comments, Attachment A, p. 24 of 39.

¹⁹⁵ Xcel Reply Comments, Attachment A, p. 25 of 39.

benefits (and costs). Therefore, Xcel argues it would not be reasonable for the Company to commit to the costs or the savings it estimated in the CBA underlying its certification request.¹⁹⁶

Finally, Xcel believes that additional process prior to certification is unnecessary. Xcel does remain willing to provide additional time beyond the June 1 statutory deadline for the Commission to provide clear direction on the Company's proposal. However, Xcel does not believe a contested case is warranted.¹⁹⁷

Xcel does not believe it is appropriate to hold these certification requests and investments in limbo while that process moves forward. Xcel argues that delaying certification pending a rulemaking proceeding or contested case would put unnecessary pressure and uncertainty on these investments, particularly when the Commission already has laid out a process for certification that has successfully vetted projects in past proceedings. For example, Xcel explains its proposed AMI plan contemplates the Company making a modest final order for legacy equipment in 2022 – and largely relies on the ability to reuse the legacy equipment removed from the field as it is replaced with AMI equipment to meet near-term new business or meter replacement needs until AMI is fully deployed. Xcel asserts that a delay will likely require that the final order for equipment be much larger – estimating approximately \$8 million more than it otherwise would have been – as a later start with AMI will mean less legacy equipment to redeploy for ongoing metering needs until the Cellnet AMR system is fully replaced. Additionally, as Xcel replaces each Cellnet AMR meter, its payments to Cellnet decrease and a delay will push these savings out in time, eroding savings Xcel has factored into its cost-benefit analysis of AMI.¹⁹⁸

Other parties' general concerns with certification apply, but no party provides specific opposition to AMI and FAN.

Fault Location Isolation and Service Restoration (FLISR)

Fault Location Isolation and Service Restoration (FLISR) is a form of Distribution Automation that allows service to be restored to customers more expediently after an outage occurs. It is an additional application of ADMS that works with new and existing automatic switching devices on Xcel's distribution network.¹⁹⁹ FLISR relies on three components: the ADMS software to manage the application, intelligent field devices to perform switching, and FAN for wireless communication to field devices. **Attachment A** depicts on a high level how FLISR functions on the distribution grid.

Xcel initially offered FLISR for certification in its 2017 Biennial Distribution Grid Modernization Report. The Commission denied certification of FLISR without prejudice, reasoning in its Order:²⁰⁰

¹⁹⁶ Xcel Reply Comments, Attachment A, pp. 27 of 39

¹⁹⁷ Xcel Supplemental, pp. 1-2

¹⁹⁸ Xcel Reply Comments, pp. 25-27

¹⁹⁹ Xcel Energy 2019 IDP, p. 147

²⁰⁰ ORDER APPROVING PILOT PROGRAM, SETTING REPORTING REQUIREMENTS, AND DENYING CERTIFICATION

[T]he Company has not fully demonstrated that FLISR is “necessary to modernize the transmission and distribution system by enhancing reliability,” as statutorily required. Further, the Company’s cost calculations emphasize the value of reliability but do not adequately assess that value and do not quantify estimated cost savings to ratepayers.

In its 2019 AGIS Certification Request, Xcel again includes FLISR as part of its grid modernization package. Xcel expects to implement FLISR from 2020 through 2028, with capital expenditures totaling \$67.2 million, and O&M costs totaling \$6.7 million.

From a reliability standpoint, Xcel expects customers will experience fewer sustained outages, resulting in improved SAIFI numbers (System Average Interruption Frequency Index). However, the Company expects customers will experience an increased number of momentary outages as sustained outages decrease. Xcel explains this could result in worsening MAIFI²⁰¹ and CAIDI²⁰² metrics, however customers should experience less time without electric service overall.²⁰³

Furthermore, Xcel expects to see greater efficiency in staff deployment through reduced patrol time looking for faults.²⁰⁴ Xcel plans to target FLISR to areas with high customer density and large numbers of outages. The Company clarifies in order for FLISR to work, there must be adjacent feeders it can switch customers to during an outage event. In many rural areas, there are not feeders available for switching operations.²⁰⁵

The Company explains the benefits to its vendor neutral approach to FLISR, which will prevent technological obsolescence and interoperability issues it currently experiences with its more rudimentary distribution automation system. Xcel notes FLISR allows it to respond to events without putting as many personnel in the field during times where it is unsafe to send employees into the field.²⁰⁶ Finally, new sensing equipment will send additional data points back to Xcel, which will enhance its planning models and hosting capacity analysis.²⁰⁷

Changes from 2017 Proposal

In 2017, Xcel proposed to cover 238 feeders and approximately 290,000 customers with FLISR. In the present proposal, Xcel proposes a slightly smaller system of 206²⁰⁸ feeders covering 267,000 customers. The Company prepared a cost benefit analysis as well, and with a cost benefit ratio ranging from 1.31 to 1.53.²⁰⁹

REQUEST, p. 7, August 7, 2017. Docket No. E002/M-17-776,

²⁰¹ Momentary Average Interruption Frequency Index

²⁰² Customer Average Interruption Duration Index

²⁰³ Xcel, IDP, Attachment M2, pp. 219-220

²⁰⁴ Xcel, IDP, Attachment M2, p. 232

²⁰⁵ Xcel, IDP, Attachment M2, pp. 228-230

²⁰⁶ Xcel, Reply, p. 11

²⁰⁷ Xcel, Reply, p. 14

²⁰⁸ In its petition, Xcel notes 208 feeders, however in its provided spreadsheets only 206 feeders are listed.

²⁰⁹ Xcel, IDP, Attachment M2, p. 226

For the FLISR CBA, Xcel uses two reliability measures to quantify customer benefits: reduction in customer minutes out (CMO), and a reduction in patrol response time to outages. For the calculation of the value of a customer minute out, Xcel adapts Lawrence Berkley National Laboratory's (LBNL) Interruption Estimate Cost (ICE) Calculator. Factoring in the differences for residential and C&I customers, the average cost per customer minute out is around \$0.72 for proposed FLISR feeders. The Company then calculates an average number of CMO for each feeder, an estimated number of CMO saved, and a value based on CMO saved and the cost to implement FLISR for that particular feeder.²¹⁰ For outage patrol time savings, Xcel estimates an average reduction of 10 minutes per outage and assigned a value using the ICE calculator.²¹¹

Xcel evaluates three alternatives to implementing FLISR: maintaining its current system, implementing FLISR without other AGIS components, and delaying the deployment of FLISR. Xcel concludes maintaining the current system can only offer minimal improvement, as it would have limited visibility into the system and limited ability to control any existing devices. Because FLISR relies on the same FAN infrastructure as AMI, there are efficiency gains by implementing it as part of an AGIS package, but it could be done alone. Xcel notes delaying FLISR would delay its benefits, and could result in increased costs due to inflation or increased labor costs.²¹²

Party Comments

Fresh Energy is the only party to provide comments specifically on the FLISR portion of Xcel's AGIS proposal, and recommends denial of certification. Fresh Energy points to Xcel's performance of reliability compared to similarly situated electric utilities, especially in its Metro West service region, where over 60% of FLISR feeders would be deployed.²¹³ Fresh Energy also believes Xcel may have improperly calculated the value of a customer minute out, which would result in an inflated cost benefit ratio. Fresh Energy indicates Xcel did not initially provide the background calculations for the value of a customer minute out.²¹⁴ Finally, Fresh Energy notes for some customers, simply reducing the length of an outage is not helpful, as even a momentary outage causes high expense levels. Therefore, the first minute without power may hold a much higher value than subsequent ones.²¹⁵

In Reply Comments, Xcel explains that while it is currently in the top first or second quartile of utilities in terms of reliability results, this only applies to indices with major event days excluded. When storms and other major outage events are included, it falls into the third and fourth quartile.

The Company walks through the calculation of the value of reducing customer minutes out, and explains the use of more conservative inputs than will likely occur, for example limiting patrol time reduction to 10 minutes, and assigning all C&I customers to the lower value "small"

²¹⁰ Xcel, IDP, Attachment M2, pp. 237-239

²¹¹ Xcel, IDP, Attachment M2, pp. 239-240

²¹² Xcel, IDP, Attachment M2, pp. 246-248

²¹³ Fresh Energy, Initial, p. 9

²¹⁴ Fresh Energy, Initial, pp. 10-11

²¹⁵ Fresh Energy, Initial, p. 11

class.²¹⁶ In Supplemental Comments, Xcel provides an updated sensitivity analysis for FLISR, in response to Fresh Energy's comments. In the refined model, Xcel includes the impacts of momentary outages, which reduces the net present value (NPV) to 1.17 (compared to the original 1.31). However, Xcel adds when other variables are modified to be less conservative, the NPV can increase to as much as 2.41.²¹⁷

Xcel notes as customers increasingly electrify their transportation and households, they will become less tolerant of prolonged outages, as it disrupts more of their household needs. Furthermore, as DER penetration increases, Xcel implies FLISR could assist with optimizing solar production so as not to cause system overloads.²¹⁸

In supplemental comments, Fresh Energy points out FLISR only reduces outages resulting from mainline feeder faults, but not tap, secondary, service, or service transformer events. Fresh Energy also provides the results of an information request looking at the historical outage history for the feeders Xcel proposes to include in FLISR. Fresh Energy finds 17 of the 206 proposed feeders Xcel plans to implement FLISR on had zero outages related to mainline feeder events for the preceding five years, and an additional 35 feeders only had one event. Therefore, Fresh Energy continues to recommend denial of FLISR.²¹⁹

Integrated Volt-VAr Optimization (IVVO)

Integrated Volt-VAr (IVVO) is an additional application with the ADMS that automates and optimizes the operation of the distribution voltage regulation and VAr (reactive power) control devices at the substation and along feeder to reduce electrical losses, electrical demand, energy consumption, and provides increased distribution system capacity to host DER. The proposed IVVO application has four operating modes: Voltage Control, Peak Reduction, VAr Control, and Conservation Voltage Reduction (CVR.) Like FLISR, IVVO also requires the procurement and installation of intelligent field devices.²²⁰ Additionally, AMI meters, if installed, act as voltage

²¹⁶ Xcel, Reply, Attachment A, p. 15

²¹⁷ Xcel, Supplemental, p. 9

²¹⁸ Xcel, Reply, Attachment A, pp. 18-19

²¹⁹ Fresh Energy, Supplemental, p. 4

²²⁰ Xcel Energy at Att. M2, pp. 147-149 describes four principal utility equipment components of IVVO: capacitors, secondary static VAr compensators (SVC), voltage and current sensing devices, and Load Tap Changers (LTC). Existing capacitor banks can be changed from the existing SmartVAr system to ADMS. The Company plans to install 96 additional capacitors to ensure proper IVVO performance. Initially, the Company plans to change control of capacitors on 189 feeders within the western Twin Cities metro to IVVO, and in the future the remaining feeders. The Company will also procure and place 270 SVC devices utilizing Grid Edge Management System (GEMS) software to provide dynamic voltage response faster, and closer to customers, than capacitors to respond to the variability of renewable DERs. LTC are at the substation transformer and provide voltage regulation based on settings and the demand on the substation transformer. Existing LTC will be used by IVVO with control upgrades. New LTC may require substation Remote Terminal Unit (RTU) upgrades due to increased data demands for new LTC controls and FLISR relays. The Company is budgeting to replace 7 RTUs as part of IVVO. In addition to utilizing AMI, FLISR devices, and metering at larger DER sites, the Company plans to install 180 powerline sensors on the initial feeders using IVVO.

sensors that send information to the ADMS. The IVVO application then operates voltage control devices on the grid to optimize voltage within a desired bandwidth.²²¹

Xcel Energy proposes a targeted, core deployment of IVVO in the western Twin Cities Metro with implementation beginning in 2019 and continuing through 2024. The Company explains why this scale, scope and location was selected: ADMS overlay, load tap changer (LTC) costs, customer density, load density (including EV adoption), and uniformity of feeder length.²²²

Table 19 below provides a summary of Xcel’s capital and O&M expenditures and forecasts attributed to Distribution and Business Systems for 2020 through 2029 for IVVO.^{223; 224}

Table 19: IVVO Expenditures – NSPM, Total Company Electric (Dollars in Millions)

		Rate Case Period			5-year Period	10-year Period
		2020	2021	2022	2023-2024	2025-2029*
Distribution	Capital	\$0.1	\$4.6	\$7.6	\$14.3	\$0.0
	O&M	\$0.0	\$0.4	\$0.8	\$0.5	\$0.8
Business Systems	Capital	\$0.0	\$1.9	\$2.2	\$4.3	\$0.0
	O&M	\$0.0	\$0.0	\$0.0	\$0.1	\$0.0

Xcel Energy describes the potential of IVVO to “act as a demand side management-type tool with carbon reduction and energy savings benefits without requiring any action from customers.”²²⁵ The Company explains customer end use devices operate over a range of voltage, but the higher the voltage the more energy consumed. IVVO allows the Company to lower the voltage on the feeder resulting in small energy savings for most customers on the feeder.

According to the Company, a pilot at the Wilson substation in Bloomington between October 2014- February 2015 identified a Conservation Voltage Reduction (CVR) factor of between 0.88 and 0.91 (i.e. an over 2% reduction in energy consumption with a 3% reduction in voltage.) CVR factors vary across the system, and can range from 0.4 to as high as 1.5. The Company expects CVR factors to decline over time with the use of LED lighting and additional constant power devices.

Xcel Energy anticipates incremental annual electrical loss reductions of 225 MWh in 2022 (13 substations) and 900 MWh in 2025 over the Company’s existing Smart VAR program.

²²¹ Xcel Energy, Att. M2, pp. 18, 145-183

²²² Xcel Energy, Att. M2, p. 157

²²³ Xcel Energy, Att. M2, p. 180 of 202, Tables 53- 54. Staff Note: Tables 37 and 38 include different anticipated capital expenditure (\$18.6 million) and O&M expenditure (\$0.6 million) for 2023-2025. Table 53 & 54 includes approximately 10% contingency.

²²⁴ Attachment M3, p. 127 of 143, Tables 43-44, Harkness Direct, p. 221.

²²⁵ Xcel Energy 2019 IDP, p. 148

Xcel Energy provides the IVVO benefit to cost ratio in Table 20 with several sensitivities on CVR performance (energy savings) and corresponding capacity savings; as well as, the use of the contingency budget.²²⁶

Table 20: IVVO Benefit to Cost Ratio

NSPM IVVO-NPV	Total (\$M)
Benefits	\$22
Other Benefits	\$19
CAP Benefits	\$3
Costs	\$(39)
O&M Expense	\$(2)
Change in Revenue Requirements	\$(37)
Benefit/Cost Ratio (CVR 1.25% energy; 0.7% capacity)	0.57
Benefit/Cost Ratio (no contingencies)	0.61
Low Benefit Sensitivity	
Benefit/Cost Ratio (CVR 1% energy; 0.6% capacity)	0.46
Benefit/Cost Ratio (no contingencies)	0.49
High Benefit Sensitivity	
Benefit/Cost Ratio (CVR 1.5% energy; 0.8% capacity)	0.67
Benefit/Cost Ratio (no contingencies)	0.72

Quantifiable benefits include a reduction in energy consumption, reduced electric losses, and avoided capacity costs.²²⁷ Xcel Energy chose not to quantify fewer voltage-related complaints or improved DER hosting capacity in the cost benefit analysis given deployment is not service territory wide at this time.

Fresh Energy highlights the results of the Wilson pilot, as well as two other pilots in Colorado, as demonstrating potential energy savings from IVVO between 2-4%. Fresh Energy is enthusiastic about the system-wide energy conservation that IVVO can achieve, and supports the Company's planned investments as long as the Company commits to achieving a minimum 1.25% reduction in customer energy consumption. Further, Fresh Energy recommends the Commission require the Company to measure and report its progress on achieving 225 – 900 MWh of electrical loss savings and a 0.7% reduction in NSP system peak demand from IVVO (**Decision Option 5.c(i)**).²²⁸ ILSR also requests the Commission require Xcel Energy makes a commitment to a minimum benefit for customers from IVVO before approving a Certification Request.²²⁹ The Department does not address IVVO specifically, but includes a 1.5% reduction in customer energy consumption as part of the metrics, baselines, and targets for system

²²⁶ Xcel Energy 2019 IDP, Table 44, p. 159

²²⁷ Xcel Energy Reply, p. 14

²²⁸ Fresh Energy Initial, p. 12; Fresh Energy Supplemental, p. 4. Staff Note: Fresh Energy modifies the customer energy consumption reduction from 1.5% to 1.25% based on Xcel Energy Reply at p. 14

²²⁹ ILSR Reply, pp. 2-3

performance in the scope of their recommendation for a contested case (**Decision Option 13H(f)**).²³⁰

Xcel Energy responds the Company commits to and has proposed reporting on associated energy and demand savings from IVVO. The similar tension between the timing of conditions on the realization of benefits emerge with Xcel Energy committing.²³¹

Pending Commission certification of an IVVO project for Minnesota, we will outline the technical assumptions associated with our calculations of system demand reductions, line losses, and energy reductions associated with the approved project.

Parties' general concerns with certification apply, but no party provides specific opposition to IVVO.

IV. Staff Analysis

Distribution grid modernization is an emerging, important topic with significant investments. How Commissions evaluate utility proposals and consumer protections is still in development. Staff commends Xcel Energy on the thorough presentation of the Company's Advanced Grid Intelligence and Security Initiative and Advanced Planning Tool. Additionally, staff appreciates the thoughtful comments by parties, including the Company, on how the Commission should evaluate these grid modernization proposals.

Minn. Stat. §216B.2425 originally only applied to transmission projects, and certification was an alternative to a certificate of need under Minn. Stat. §216B.243 for the transmission project. A certificate of need is a finding that a transmission line is necessary based on a number of statutory and rule criteria, and is in effect an advance determination that the project is prudent. In 2015, the legislature added distribution projects to the existing statute. But, because distribution projects do not require certificates of need, and most of the criteria set out in Minn. Stat. §216B.243 are not relevant or not easy to apply to distribution projects, legislative intent on what standard (or criteria) for certification should be applied is not completely clear. The Commission through its past orders has developed a standard for certification applied to past Xcel Energy certification requests.

Minn. Stat. §216B.2425 and MYRP Status

The Commission should first consider the question posed by XLI on whether or not Xcel Energy is eligible for Commission consideration under Minn. Stat. §216B.2425. If the Commission determines the Company is not eligible, no further action on the AGIS or APT Certification Requests is required. The Commission may choose to further address a standard to review future certification requests. If the Commission determines the Company is eligible, the Commission should determine whether or not to provide additional clarity on the standard for certification either for the AGIS and APT Certification Requests or future certification requests.

²³⁰ Department Supplemental, p. 21, 8.(f)

²³¹ Xcel Energy Reply, Att. A, p. 20

Standard for Certification

The Commission has been clear in its Orders of the intent to use the statute as a guide and to develop additional certification criteria over time as warranted. Staff note the additional criteria proposed by parties for this and/or future certification requests (**Decision Option 2**) include two issues the Commission's criteria to-date may not fully address:

1. Whether the project is a priority that is appropriate to consider for current cost recovery through the TCR rider; and,
2. What metrics, evaluation methods, cost control mechanisms, and prudence criteria the Company will use.

For comparison, staff provides the standard for certification outlined in the Commission's Orders to-date and the proposed additional criteria in **Decision Option 2**.

Table 21: Staff Analysis of Commission Orders and Proposed Additional Certification Criteria

Commission Orders	Decision Option 2
Consistent with Minn. Stat. 216B.2425; Subd. 2(e) ²³²	a) The project is <i>consistent with Minn. Stat. §216B.2425 Subd 2(e)</i> and is <i>necessary for modernizing the utility distribution system with respect to (i) enhancing system reliability, (ii) improving system security, and/or (iii) increasing energy conservation.</i>
Necessary for grid modernization	
	b) The project is a priority project above and beyond normal distribution projects, consistent with Minn. Stat. §216B.16 Subd. 7b(a)(1) and is appropriate to consider for current cost recovery through the transmission cost recovery (TCR) rider.
In the public interest	
Information Provided with Certification Request	
How it is consistent with the Commission's Guiding Principles for Grid Modernization	
Intended objectives for the project	The utility has identified specific expected improvements in distribution system reliability, security, and/or energy conservation that would result from the project and how they will be achieved.
	The utility has identified specific metrics and evaluation methods that will be used to assess the project's performance and whether it has achieved the expected improvements.

²³² Minn. Stat. 216B.2425; Subd. 2(e), in part: "... 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."

Description of the available alternatives to meet the intended objectives	The utility has thoroughly considered the feasibility and costs and benefits of alternatives and has demonstrated that the proposed approach is preferable to alternatives.
Cost-benefit analysis of the project	The utility has performed a detailed cost benefit analysis and provided supporting evidence for the estimated costs and benefit levels used in the calculation. This shall include a discussion of mechanisms that will be employed to maximize cost reductions and minimize cost increases.
Potential interrelation with other Initiatives, projects, and Xcel's long-term grid modernization plans	
	Criteria that will be used by the utility to determine whether at any point it has become imprudent to bring the certified project to completion due to the project failing to meet its performance and/or cost expectations.

Staff defer to the Commission on whether additional clarification is necessary at this time.

Process for AGIS and APT Certification Review

If the Commission determines Xcel Energy is eligible for certification, Staff outline three procedural paths for AGIS and APT Certification review.

First, it may be reasonable, if the Commission so determines, for the Commission to determine that Xcel Energy's AGIS and APT Certification Requests include the information requested by the Commission in past Orders, and to evaluate the requests on their merits at this time.

This first path makes a certification determination at this time by applying the standard for certification outlined in previous Orders (see the first column in Table 20 above), and if appropriate, any additional criteria the Commission believes is important (e.g. from the second column in Table 20.) The Commission would issue a determination of approve, approve with modification (approving some, but not all of the Certification Request), or deny each of the Certification Requests (**Decision Options 2 or 3**). As discussed by parties, what certification means is somewhat ambiguous, but it is not a prudency determination. The key outcome of an approved certification request is eligibility for potential TCR rider recovery. Most parties have expressed a preference for AGIS to continue through a rate case, rather than a rider.

Denying certification does not preclude the Company from seeking cost recovery in a future rate case or certification request. Absent a rate rider that specifically allows cost recovery before the project is completed, the standard ratemaking process is that a project does not get cost recovery in a rider or go into rate base unless and until the facilities are used and useful in providing service to customers. However, the Company requests the Commission provide guidance, preferably in the form of certification, at this time given the scope of the near term investments. Additionally, approving certification does not guarantee the Company will be able to recover AGIS or APT expenditures in the TCR rider if the Commission determines in a future

prudence or reasonableness review that the Company's investments do not warrant rider recovery. At this stage, the parties' discussion of who bears risk is relevant.

Without further guidance, consumer protections and whether or not the Company would be allowed rider recovery of specific AGIS or APT related costs would be left a future cost recovery docket and associated program or tariff dockets. This is Xcel Energy's preferred path. This is not a path supported by the other parties.

Both issues - whether rider recovery is appropriate and what conditions should apply (e.g. metrics, cost control, etc.) – lead most parties to not support certification of AGIS at this time without some form of additional process or conditions. Nearly all parties prefer to address AGIS investments in the context of the Company's future rate cases. However, if the Commission chooses to certify AGIS at this time, some parties offer a number of conditions *for future prudence and reasonableness reviews* summarized by staff in Table 22.

Table 22: Parties' Proposed Conditions if Commission Certifies

Component	Parties' Proposed Conditions
AMI (& FAN)	- Fixed and variable cost recovery caps (no more than the lower of actual costs incurred or costs as proposed in the 2019 IDP) - Performance goals (metrics) (see Tables 10-12)
FLISR	No party offered specific conditions
IVVO	Performance goals (metrics) (see Tables 10-12)
APT	- Limit cost recovery to \$4 million - Identify specific scope and functionality expected
AGIS overall	- Fixed and variable cost recovery caps - Pass-through methodology and/or development of a process/mechanism to pass the savings and revenues associated with AGIS to customers in a reasonable timeframe - Specific plans and timelines for future customer offerings and utilization of system capabilities; including data access standards and a rate design roadmap - Other necessary conditions for customer value and ratepayer protection

The Department cautions, like details of the AGIS Certification Request, that the associated conditions need further vetting before a Commission decision. The Department recommends the conditions be developed in further proceedings *prior* to the Company's cost recovery filing whether in a rate case or a rider docket. Xcel Energy argues setting conditions on the certification is not appropriate, and should be addressed at the same time as and *during* a cost recovery proceeding or in a relevant program or tariff docket. Staff defer to the Commission on which approach to setting conditions to inform a *future prudence or reasonableness review*, or program or tariff design is appropriate.

The Commission could establish conditions as part of approval at this time; however, staff caution against establishing specific detail in conditions established at this stage. First, none of

the parties support setting the conditions offered as their preferred path for AGIS²³³; rather, the parties offer these conditions as a way of reducing risk for customers in a future prudence or reasonableness review at the time of cost recovery. Second, the Department notes the conditions are based on the Company's AGIS filing that warrants more review than allowed in the seven-month timeframe offered by the statute. Third, setting of conditions like specific cost caps increasingly approach an advanced prudence or reasonableness determination. If the Commission wishes to modify approval of AGIS to offer guidance to the Company and parties to inform a *future review*, staff recommends such guidance be directional and further fleshed out either *prior to* or *during* the cost recovery docket, but as a part of the cost recovery process where review is conducted.

Staff offers alternative language in **Decision Option 3** meant to allow the Commission to provide guidance on the direction or functional requirements of AGIS without certifying the specific AGIS components included in Xcel Energy's Certification Request. In other words, the Commission may wish to certify the Company moving forward with Advanced Metering Infrastructure (AMI) without committing to the specific details offered in the Company's AGIS Initiative. For instance, it may be necessary for grid modernization to upgrade Xcel Energy's automated meter reading meters reaching the end of their contract and useful life with advanced metering infrastructure which allows for two way communication. Yet, the Commission and this record may not be clear at this time that an investment in the specific AMI technology for every customer (who does not opt out) in the next four years is necessary. As Xcel Energy notes, the AGIS proposal includes information which is required as part of the cost recovery review, and the parties have expressed concern that such review has not occurred. The Company notes parties did not engage in discovery on the specific details of AGIS in the statutory timeframe allowed, but that may be because such review is usually reserved for cost recovery or, at least, a longer timeframe.

If the Commission wants to investigate either the details of the AGIS Certification Request or the conditions offered by the party *prior* to a cost recovery proceeding, further guidance on how that will occur would be useful. The remaining two paths offer the Commission options.

The second path offers the Commission flexibility and may reduce the overall timeline of regulatory review of the AGIS Initiative through cost recovery. This path involves making a determination on the AGIS Certification Request at this time and providing additional guidance on expediting the *future prudence or reasonableness review*. This path could be adopted with either a denial or approval of certification at this time, and could be applied to the current certification request when it returns as a rider cost recovery filing or in a rate case. The Department has been explicit about the intent to engage in a contested case review of AGIS regardless of the cost recovery mechanism (rider or base rates.) This path involves outlining a process to further address the details of the certification requests and/or the consumer protection conditions either *prior* or *during* cost recovery. This path is not recommended for an extension of a certification decision because of the concerns of further blurring the line between certification and a prudence or reasonableness determination. Rather, this path offers

²³³ Staff Note: The Department does support this approach for the APT Certification (see **Decision Option 15a-b.**)

the Company and parties guidance from the Commission on what a *future review* for cost recovery is likely to include and possibly a more expedited process for that review.

The third path allows the Commission to seek additional information while extending the certification decision beyond the statutory deadline of June 1. If additional record development is necessary to make an informed certification decision, the Commission should provide guidance on the scope, timing, and procedure. Xcel Energy continues to offer to waive the June 1 statutory deadline and asks for a certification determination by September 2020; other parties do not address this deadline directly.

Xcel Energy and the Department each offer suggestions on the next procedural step. Below staff offers Table 23 which attempts to capture how the Company and Department's proposals differ not just on procedure (including which of the paths outlined by staff), but also in stage, scope, timing and intended outcome.

Table 23: Comparison of Procedural Proposals

	Contested Case	90 day Comment Period	MERP-like Proceeding
Proposer	Department Preferred (Recommendation 3)	Department Alternative (Recommendation 6)	Xcel Energy Alternative
Path	1,2,3	2, 3	2
Stage	In tandem with or after additional guidance on certification criteria. Alternatively, with either denial at this time or conditional approval of the 2019 AGIS Certification Request.	After a modified certification approval with conditions for future prudence or reasonableness review.	Before a certification decision extended beyond June 1.
Timing	12 – 24 months (~2021/2022)	90 days (2020)	90 days (2020)
Format	Referred to OAH, testimony, cross-examination, discovery, public hearing(s).	Written record with possible, additional discovery.	May include: Public hearing(s), technical conference, informal party discussions with possible settlement, discovery, written record.
Scope	Align with cost recovery docket and cover reasonable costs, expected and potential benefits, ratepayer and customer protections, and clarity on public interest of Xcel's proposal.	Further development and refinement of certification conditions for accountability and ratepayer protections.	Inform certification by allowing parties to fully assess the proposed investments and narrow the issues before the Commission.
Outcome	Written Record; OAH Report and Recommendations; Further evaluation of technologies, functions, and costs; Commission Action.	Written Record, Commission Action.	Written Record, Possible Settlement of Some Disputed Issues, Commission Action.
Response	Xcel opposes.	Xcel opposes.	Department position not stated.
Decision Option	4	2.f	5

If the Commission is convinced by the Company about timing concerns but wants additional record development on the investment details of AGIS or consumer protection conditions (either the second or third path outlined by Staff), Staff suggests the Commission could either expedite a contested case with a more narrow scope (**Amend Decision Option 4**) or consider an alternative regulatory proceeding (e.g. Xcel Energy's MERP-like proceeding) (**Decision Option 5**). Staff contacted the OAH and confirmed adequate administrative law judge (ALJ) availability for a partial or full contested case proceeding. Regarding Xcel Energy's proposal, the Department is the only party that requested public hearings or a technical conference. Staff suggest a public technical conference or workshop(s) focused on narrowing the issues before the Commission, including further clarifying options for conditions related to consumer protections, may be valuable either for an extended certification determination or to inform future reviews for cost recovery.

Regardless of the procedural path the Commission chooses or the ultimate cost recovery mechanism, consumer protections for grid modernization investments should address what regulatory action is required and by when, so the Commission has a clear understanding of its responsibility and expectations in ensuring the intended benefits are realized.

Regulatory Considerations (Other Dockets Mentioned)

Xcel Energy's plans with AGIS for a transformed customer experience touch on a number of topics in other dockets before the Commission. Part of realizing the benefits of AGIS that Xcel Energy describes will require regulatory action. Staff offers a running list of associated dockets in Table 24.

Table 24: Other Dockets Mentioned

Docket No.	Topic	Issue
02-2034	OMS, record keeping	Outage reporting and record keeping
17-775	Res. TOU pilot	AMI/FAN deployment, TOU rates pilot
20-406	Annual Service Quality Report	NWA, ISI investment, locational reliability
16-521*	Interconnection	advanced inverters, interoperability, interconnection review
19-685	2019 Hosting Capacity Analysis (and future HCA filings)	
17-401	Performance Metrics	customer benefits and performance metric tied to AGIS
19-505*	Open Access Data Standard (Aggregation/Anonymization)	AMI/HAN data access for customers and authorized third parties, Green Button Connect My Data
TBD	Multi-Year Rate Plan	Cost recovery
TBD	Integrated Distribution Plan	
19-368	Integrated Resource Plan	APT support for integration of distribution, transmission and resource planning.
20-86	C&I Time of Use Rates	AMI
12-383	Quality of Service Plan (QSP report)	Reliability performance metrics
19-563*	Service Disconnection/Reconnection Reporting	service disconnection/reconnection reporting with AMI
AI-20-XXX	Cost Allocation Method in Service Agreement	cost allocation by # of feeder
19-721	Transmission Cost Recovery Rider	recovery of ADMS; ADMS CBA/progress filing
	Conservation Improvement Program	
12-1344*	Privacy and Customer Energy Usage Data	Customer energy usage data access
20-425*	Financial Effects of COVID-19	Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic
*Denotes a generic docket rather than Xcel Energy-specific docket.		

Staff notes that a number of decision options recommended by parties in this docket, if adopted, may overlap with issues pending and commented on in existing dockets.²³⁴ Those decision options include the topics of data access, Saver's Switch, disconnections, and a rate design roadmap. Not only are some parties to those existing dockets not parties here, but adopting those decision options here may slow or temporarily stop those corresponding dockets, while the Commission and parties attempt to coordinate the already proceeding

²³⁴ See **Attachment B** which includes Staff analysis of the Department's contested case scope list by procedural option and potentially impacted docket.

docket with this new action. In the limited instances when the Commission has offered some type of pre-approval of AMI plans for other utilities, the Commission has focused its decision on the petition before it and has not included conditions that impact other dockets.²³⁵ Staff cautions against adopting any decision option that would impact already open and proceeding dockets.

ADMS annual filing

Staff does not summarize the record on Xcel Energy's request to establish January 25th and the most recent IDP docket as the filing date and location for the annual ADMS filing required by the Commission's September 27, 2019 Order. On this issue, the Commission deferred authority to the Executive Secretary on this issue. The Commission's May 19, 2020 Notice of Annual ADMS Filing establishes the filing date and location.

V. Decision Options

Minn. Stat. 216B.2425 and MYRP

1. Determine Xcel Energy is not eligible for certification of distribution projects under Minnesota Statute 214B.2425 because the Company is no longer under a MYRP (XLI)

Standard for Certification

[Note: If the Commission wishes to address criteria for all future certification requests, rulemaking may be required. The Commission may wish to apply the suggested criteria to this specific case at this time.]

2. For certification requests of distribution system projects, the Commission will use the following criteria: (*Fresh Energy*)
 - a. The project is consistent with Minn. Stat. §216B.2425 Subd 2(e) and is necessary for modernizing the utility distribution system with respect to (i) enhancing system reliability, (ii) improving system security, and/or (iii) increasing energy conservation.
 - b. The project is a priority project above and beyond normal distribution projects, consistent with Minn. Stat. §216B.16 Subd. 7b(a)(1) and is appropriate to consider for current cost recovery through the transmission cost recovery (TCR) rider.
 - c. The information that the Commission requires to make its certification determination includes but is not necessarily limited to:
 - i. The utility has identified specific expected improvements in distribution system reliability, security, and/or energy conservation that would result from the project and how they will be achieved.

²³⁵ See, for example, In the Matter of Dakota Electric Association's Petition to Implement Tracker Recovery for Advanced Grid Infrastructure Investments, Order Issued May 8, 2018, Docket No. E-111/M-17-821.

- ii. The utility has identified specific metrics and evaluation methods that will be used to assess the project's performance and whether it has achieved the expected improvements.
- iii. The utility has performed a detailed cost benefit analysis and provided supporting evidence for the estimated costs and benefit levels used in the calculation. This shall include a discussion of mechanisms that will be employed to maximize cost reductions and minimize cost increases.
- iv. The utility has thoroughly considered the feasibility and costs and benefits of alternatives and has demonstrated that the proposed approach is preferable to alternatives.
- v. Criteria that will be used by the utility to determine whether at any point it has become imprudent to bring the certified project to completion due to the project failing to meet its performance and/or cost expectations.

AGIS Certification Determination

3. Certify the following components [*alternative: functional requirements*] of Xcel Energy's Advanced Grid Intelligence and Security (AGIS) Initiative. This certification does not imply either of the following: (1) any finding of prudence or reasonableness with respect to the recovery of costs in a petition for rider recovery under Minn. Stat. § 216B.16, subd. 7b(b); or (2) certification or approval of investments beyond AGIS [*alternative: approval of the specific AGIS investments not enumerated by the Commission*]. (*Staff interpretation of Xcel Energy, IPS Solar with Staff Alternative*)
 - a. AMI
 - b. FAN
 - c. FLISR
 - d. IVVO
4. Deny certification of the following components of Xcel Energy AGIS Initiative at this time: (*XLI, Minneapolis, CUB, Fresh Energy, Department, ELPC/VS, XXXXX*)
 - a. AMI
 - b. FAN
 - c. FLISR
 - d. IVVO

[*and?*]

 - e. Clarify cost recovery should be addressed in a MYRP or general rate case (*XLI, Minneapolis*)

Conditions for Future Prudence Review of AGIS

[*If approving AGIS certification or providing guidance for future prudence review (First or Second Path).*]

5. Establish the following guidance on some, but not all, conditions the Commission will consider in a future prudency review of Xcel Energy's AGIS Initiative:
 - a. Advanced Metering Infrastructure
 - i. Conditioned on a commitment by Xcel to develop a Draft Rate Design Roadmap to be filed with the next IDP. (*Fresh Energy*) [see *Decision Options 10, 11, or 13(H)(g)* for details on a rate design roadmap]
 - b. Fault Location Isolation and Service Restoration
 - c. Integrated Volt-Var Optimization
 - i. Conditioned on a commitment by Xcel to achieve a minimum 1.25% reduction in customer energy consumption and 0.7% reduction in NSP system peak demand as a result of IVVO technologies. (*Fresh Energy*)
 - d. AGIS Overall
 - i. Establish fixed and variable cost caps
 - ii. All revenues from the AGIS Initiative belong to ratepayers unless otherwise approved by the Commission. (Department)
 - iii. Establish performance metrics from Tables 11 and 12 and Attachment B of Briefing Papers

Further Proceedings on AGIS

[If Approving AGIS Certification (First Path)]

6. Require Xcel to file, in its performance metrics docket, any cost recovery proposals that it justifies based on improvements in the metrics developed in that docket. (*ELPC and Vote Solar*)
7. Require the Company to measure and report its progress on achieving the CBA benefits and underlying CBA assumptions for each AGIS investment in an annual report starting November 1, 2020 to be filed in this docket. (*Fresh Energy*)

OR

8. Accept Xcel Energy's proposed metrics and reporting for AGIS implementation in an annual report starting May 2, 2022 as outlined in Table 12 of briefing papers. Additional metrics and reporting associated with future operational capabilities, produce or services enabled by AGIS will be developed in future proceedings (*Xcel Energy*)
9. Xcel shall submit a compliance filing within 30 days of this Order date providing baselines, targets and a plan for measuring, verifying and reporting on all of the top benefit categories and key CBA assumptions, as shown in Tables 10 and 11 of briefing papers. (*Fresh Energy*)

10. Xcel shall develop a Rate Design Roadmap to accompany the next IDP that describes how the Company will leverage AMI capabilities to support the Commission's and Xcel's stated priorities. Xcel shall seek input from stakeholders on the development of the Draft Rate Design Roadmap and host at least two stakeholder meetings by April 30, 2021. This roadmap should include the following components: (*Fresh Energy*)

- a. A summary of the Company's current advanced rate designs and demand management programs, advanced rate designs in development, and relevant industry best practices.
- b. A timeline for offering updated dynamic rates and/or demand management programs for all customer classes.
- c. Potential rate and program design strategies to support low-income customer participation in these offerings.
- d. A discussion of opportunities for utilizing distributed energy resources and/or beneficial electrification technologies in conjunction with planned dynamic rates and/or demand management programs.
- e. Enrollment mechanisms for convenient customer participation in the advanced rate offerings.
- f. Implementation plans for offering advanced rates, including education and outreach to customers.
- g. Evaluation plans for monitoring, verifying, and improving the effectiveness of advanced rate designs.

OR?

11. Direct the Company to produce a draft "roadmap" in a separate proceeding, such as docket E002/M-20-86, the Company would not oppose the following components: (*Xcel Energy alternative to Decision Option 10*)

- a. A summary of the Company's current advanced rate designs and demand management programs, advanced rate designs in development, and relevant industry best practices.
- b. A timeline for proposing advanced rates and/or demand management programs for all customer classes. A discussion on what should be discussed in petitions for rate design changes, including:
 - i. Whether program design strategies will be needed to support low-income customer participation in these offerings,
 - ii. Application to distributed energy resources
 - iii. Implementation plans, including education and outreach to customers.
 - iv. Evaluation plans

[Commission guidance on conditions to inform future prudency review (Path Two)]

12. Condition certification of AGIS on the outcome of a 90-day comment period that allows stakeholders to propose and respond to proposed (or potentially new) conditions regarding ratepayer protections. Delegate to the Executive Secretary authority to set deadlines and issue notices to develop a supplemental record for Commission consideration. *(Department)*
13. Refer Xcel's AGIS Initiative proposal (AMI, FAN, FLISR, IVVO) to the OAH for a contested case hearing for further record development. The referral should include consideration of the proposed costs associated with the Incremental System Investments and increased distribution system spending, as necessary, and as they relate to the AGIS Initiative. The evaluation should consider, under any criteria that may be established by the Commission, at a minimum: *(Department)*

[Alternatively, amend to limit scope and set timeframe for an expedited contested case. See Attachment B for alternative paths to address these issues:]

- A. Public interest determination for the AGIS Initiative
- B. Public input
- C. Delineation of project costs, scope, and expected functions, including but not limited to:
 - a. Clearly identified costs, including the following subcategories of Company costs:
 - i. Total revenue requirements on total-company and MN-jurisdictional bases (including identification of the MN jurisdictional allocator used)
 - ii. Incremental/new capital costs and depreciation lives and support for the depreciation lives
 - iii. Incremental expenses and revenue (all expenses and revenues not already in rates, including expenses that are in rates that will be reduced (i.e. all changes in expenses and revenues)
 - iv. Identification of any future AGIS Initiative-related investment costs that would be needed to maximize the potential of the AGIS Initiative as outlined in the IDP
 - b. Fixed cost recovery caps for AMI and FAN capital costs (no more than the lower of actual costs incurred or costs as proposed in Xcel's 2019 IDP)
 - c. Variable cost recovery caps, including O&M and labor, for AMI and FAN (no more than the lower of actual incurred costs or Xcel's variable costs as proposed in the 2019 IDP, applied on a per-meter basis)
- D. Impacts of distribution investments on transmission-level customers
- E. Cost allocation options, including outline of bill impacts for each customer class over an initial five-year period
- F. Pass-through methodology and/or development of a process or mechanism to pass the savings and revenues associated with the AGIS Initiative on to the Company's customers in a reasonable timeframe

- G. Other necessary conditions for customer value and ratepayer protection
- H. Specific plans and timelines for future customer offerings and system capabilities and their implications, including recommendations on whether Commission approval is required or warranted. Plans or timelines should include at a minimum, the following:
 - a. Service Tier Plans: potential new options and pricing options for levels of system service expected to be enabled by the AGIS Initiative, including identification of the impacts on non-participant ratepayers, opt-out provisions, etc.
 - b. Remote Connect/Disconnect Procedures
 - c. Customer Notice Plan for AMI Installation
 - d. Customer Data Access Requirements and Rights, including Xcel's intentions regarding:
 - i. Customer data rights and terms for inadvertent data release
 - ii. Green Button Connect My Data after smart meter deployment
 - iii. Home Area Network functionality issues
 - iv. Format for providing customers with customer usage data and rate schedules
 - v. Potential enhancements to Saver's Switch, and the timing of any enhancements
 - vi. Third-Party Service and Data Sharing Plans including whether such plans would result in revenues that would offset costs or reduce rates;
 - e. Distributed Generation Interconnection Agreement and Process Modification
 - f. Metrics, Baselines, and Targets for System Performance: including baseline data for performance evaluation and reporting plan (or proposal for how advanced grid metrics will be tied to or incorporated into to the Commission's Performance Incentives Mechanisms proceeding) including a minimum 1.5% reduction in customer energy consumption from IVVO technologies
 - g. Advanced Rate Design Roadmap that offers a specific timeline and implementation strategy for advanced rate offerings to customers (including the 400 MW of demand response by 2023 as noted in Xcel's current Integrated Resource Plan, Docket No. E002/RP-19-368). The Advanced Rate Design Roadmap should include:
 - i. Xcel's current advanced rate designs and demand management programs
 - ii. A summary of industry best practices
 - iii. A timeline and implementation plan (including education and outreach) for the Company to offer updated dynamic rates for all residential and commercial customers (including, the introduction of time-varying rates), which should include demand response offerings
 - iv. Potential low-income rate reform options

- v. Enrollment mechanisms for convenient customer participation
- vi. Evaluation plans for monitoring, verifying, and improving the effectiveness of advanced rate designs
- vii. Opportunities for utilizing distributed energy resources and/or beneficial electrification technologies in conjunction with planned dynamic rates and/or demand management programs

[If the Commission seeks further information outside a contested case (Path Three)]

14. Delegate authority to the Executive Secretary to initiate supplemental record development including, but not limited to procedures such as a technical conference, to narrow the issues before the Commission in reviewing the AGIS Certification Request with an anticipated Commission decision in September 2020. *(Staff interpretation of Xcel Energy's MERP-like process.)*

[and?]

- a. Include ratepayer and consumer protection conditions within scope

APT Certification Determination

15. Certify the Advanced Planning Tool. This certification does not imply either of the following: (1) any finding of prudence with respect to the recovery of costs in a petition for rider recovery under Minn. Stat. § 216B.16, subd. 7b(b); or (2) certification or approval of any investments beyond those specifically associated with the APT. *(Xcel Energy, IPS Solar, Department)*

[With the modification identified below:]

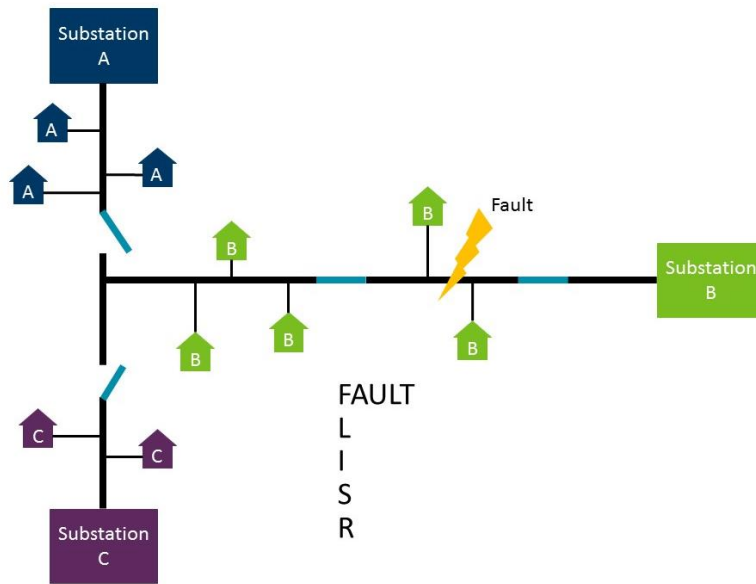
- a. Limit cost recovery to a hard cost cap of \$4 million *(Department)*
- b. Recognize, beginning in 2020, the APT offers enhanced capabilities to consider DER adoption scenarios, hosting capacity, and non-wires alternatives; as well as more efficient planning, enhanced load forecasting, and better integration with the Company's other planning efforts. *(Staff interpretation of Department)*

16. Deny certification of the Advanced Planning Tool at this time.

Attachment A

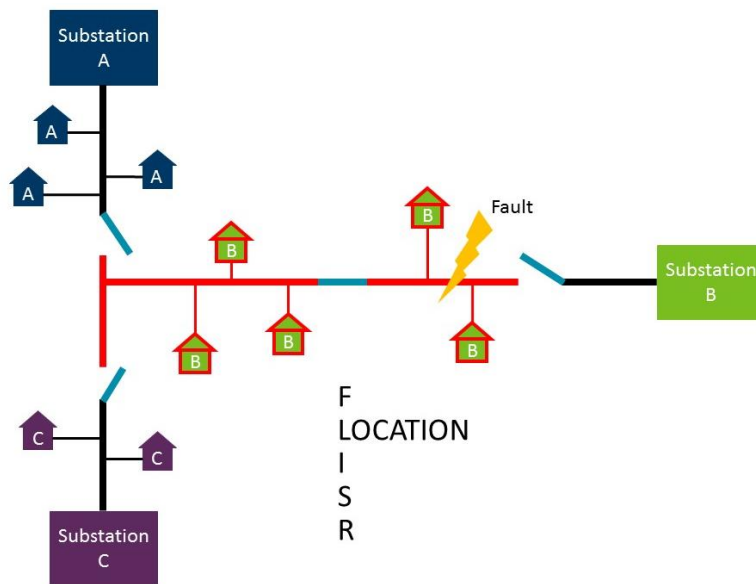
In Figure 1, a **fault** has occurred on the distribution system, symbolized by the lightning bolt. Typical faults are trees falling on a power line, animal contact, or human interference, like vehicle damage to a utility pole.

Figure 1



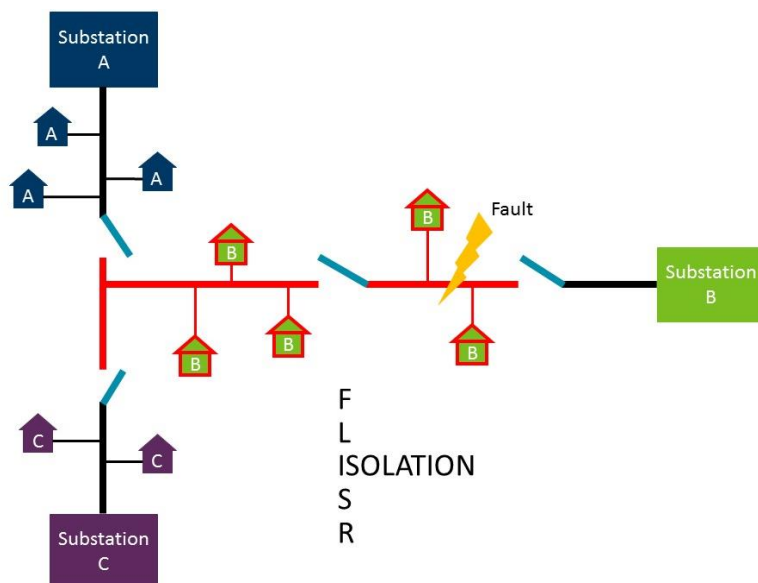
In Figure 2 FLISR has **located** the source of the fault on the distribution line and opened an automatic switching device, cutting the flow of power from Substation B to all customers located on the feeder.

Figure 2



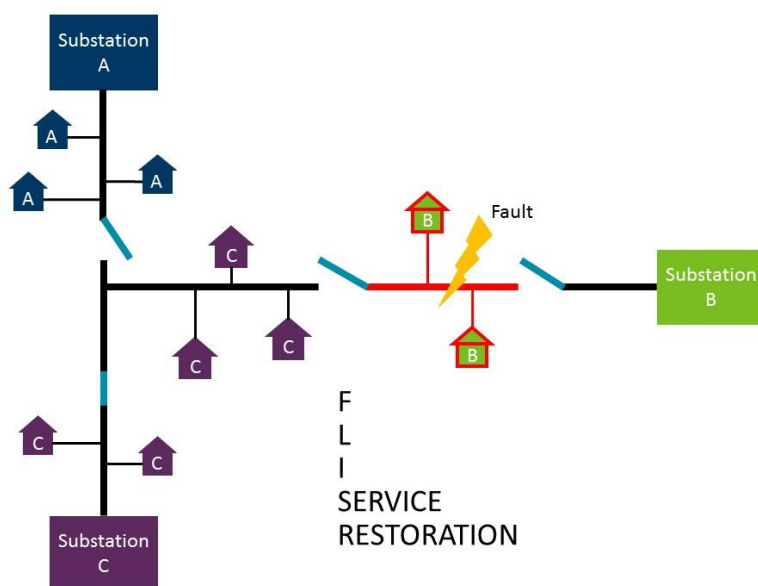
In Figure 3, the fault has been **isolated** to a specific section of the feeder through the opening of another automatic switching device.

Figure 3



Finally, in Figure 4, **service is restored** to customers previously impacted by the outage. Another automatic switching device is closed, allowing customers previously served by Substation B to instead receive power from Substation C.

Figure 4



In the end, a much smaller portion of customers are without power than before. Additionally, crews have a much narrower section of feeder to patrol to find the source of the fault, allowing them to more quickly address the cause of the outage and restore power to all customers.

Attachment B: Staff Analysis of Department Contested Case Scope and Alternative Process Options

Key	
X	Alternative
*	Possible Alternative
#	Additional Review

Department Contested Case Scope	Cost Recovery	Tariff Filing	Future IDP/Certify	Other Docket	Xcel MERP-like
consideration of the proposed costs associated with the Incremental System Investments and increased distribution system spending, as necessary, and as they relate to the AGIS Initiative	X		X		# (AGIS related)
A. Public interest determination for the AGIS Initiative			X		X
B. Public input	X	X	X		X
C. Delineation of project costs, scope, and expected functions, including but not limited to:	X	X	X		#
a. Clearly identified costs, including the following subcategories of Company costs:	X				#
i. Total revenue requirements on total-company and MN-jurisdictional bases (including identification of the MN jurisdictional allocator used)	X				#
ii. Incremental/new capital costs and depreciation lives and support for the depreciation lives	X				#
iii. Incremental expenses and revenue (all expenses and revenues not already in rates, including expenses that are in rates that will be reduced (i.e. all changes in expenses and revenues))	X				#
iv. Identification of any future AGIS Initiative-related investment costs that would be needed to maximize the potential of the AGIS Initiative as outlined in the IDP			X		*

Attachment B: Staff Analysis of Department Contested Case Scope and Alternative Process Options

Department Contested Case Scope	Cost Recovery	Tariff Filing	Future IDP/Certify	Other Docket	Xcel MERP-like
b. Fixed cost recovery caps for AMI and FAN capital costs (no more than the lower of actual costs incurred or costs as proposed in Xcel's 2019 IDP)	X				*
c. Variable cost recovery caps, including O&M and labor, for AMI and FAN (no more than the lower of actual incurred costs or Xcel's variable costs as proposed in the 2019 IDP, applied on a per-meter basis)	X				*
D. Impacts of distribution investments on transmission-level customers	X	X	X		X
E. Cost allocation options, including outline of bill impacts for each customer class over an initial five-year period	X	X			
F. Pass-through methodology and/or development of a process or mechanism to pass the savings and revenues associated with the AGIS Initiative on to the Company's customers in a reasonable timeframe	X	X			*
G. Other necessary conditions for customer value and ratepayer protection	X	X			*
H. Specific plans and timelines for future customer offerings and system capabilities and their implications, including recommendations on whether Commission approval is required or warranted. Plans or timelines should include at a minimum, the following:		X	x (timelines)		
a. Service Tier Plans: potential new options and pricing options for levels of system service expected to be enabled by the AGIS Initiative, including identification of the impacts on non-participant ratepayers, opt-out provisions, etc.		X			
b. Remote Connect/Disconnect Procedures		X		E999/CI-19-563 (reporting)	
c. Customer Notice Plan for AMI Installation		X		E002/M-17-775 (pilot)	

Attachment B: Staff Analysis of Department Contested Case Scope and Alternative Process Options

Department Contested Case Scope	Cost Recovery	Tariff Filing	Future IDP/Certify	Other Docket	Xcel MERP-like
d. Customer Data Access Requirements and Rights, including Xcel's intentions regarding:				E999/CI-12-1344 E999/M-19-505	
i. Customer data rights and terms for inadvertent data release		X			
ii. Green Button Connect My Data after smart meter deployment		X			
iii. Home Area Network functionality issues		X			
iv. Format for providing customers with customer usage data and rate schedules		X			
v. Potential enhancements to Saver's Switch, and the timing of any enhancements		X		CIP	
vi. Third-Party Service and Data Sharing Plans including whether such plans would result in revenues that would offset costs or reduce rates;					
e. Distributed Generation Interconnection Agreement and Process Modification		X		E999/CI-16-521	
f. Metrics, Baselines, and Targets for System Performance: including baseline data for performance evaluation and reporting plan (or proposal for how advanced grid metrics will be tied to or incorporated into to the Commission's Performance Incentives Mechanisms proceeding) including a minimum 1.5% reduction in customer energy consumption from IVVO technologies		X		E002/CI-17-401 E002/M-20-406 (Service Quality & Reliability) E002/M-12-383 (Quality of Service)	*

Attachment B: Staff Analysis of Department Contested Case Scope and Alternative Process Options

Department Contested Case Scope	Cost Recovery	Tariff Filing	Future IDP/Certify	Other Docket	Xcel MERP-like
g. Advanced Rate Design Roadmap that offers a specific timeline and implementation strategy for advanced rate offerings to customers (including the 400 MW of demand response by 2023 as noted in Xcel's current Integrated Resource Plan, Docket No. E002/RP-19-368). The Advanced Rate Design Roadmap should include:			D.O. 10	E999/CI-16-521 (rate guidance) E002/M-17-775 (TOU Pilot) E002/M-20-86 (C&I TOU) Planning Meeting?	
i. Xcel's current advanced rate designs and demand management programs		X	*	E002/RP-19-368 (DR) E002/M-17-775 (TOU pilot) E002/M-20-86 (C&I TOU)	
ii. A summary of industry best practices					
iii. A timeline and implementation plan (including education and outreach) for the Company to offer updated dynamic rates for all residential and commercial customers (including, the introduction of time-varying rates), which should include demand response offerings		X	X (timelines)	E002/M-17-775 (TOU pilot) E002/M-20-86 (C&I TOU)	
iv. Potential low-income rate reform options		X			
v. Enrollment mechanisms for convenient customer participation		X		E002/M-17-775 (TOU pilot) E002/M-20-86 (C&I TOU)	

Attachment B: Staff Analysis of Department Contested Case Scope and Alternative Process Options

Department Contested Case Scope	Cost Recovery	Tariff Filing	Future IDP/Certify	Other Docket	Xcel MERP-like
vi. Evaluation plans for monitoring, verifying, and improving the effectiveness of advanced rate designs		X		E002/M-17-775 (TOU pilot) E002/M-20-86 (C&I TOU)	
vii. Opportunities for utilizing distributed energy resources and/or beneficial electrification technologies in conjunction with planned dynamic rates and/or demand management programs		X	X	E999/CI-16-521 (rate guidance)	

Northern States Power Company
AGIS Implementation and Customer Experience Timeline

Docket No. E002/GR-19-564
Exhibit____(MCG-1), Schedule 5
Page 1 of 1

