COMMERCE DEPARTMENT

March 15, 2022 **PUBLIC DOCUMENT**

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
Saint Paul, Minnesota 55101-2147

RE: **PUBLIC Report of the Minnesota Commerce Department, Division of Energy Resources**
Docket No. E002/M-19-666 and E999/DI-20-627

Dear Mr. Seuffert:

Attached you will find the **PUBLIC** Appendices to a Report from the Minnesota Commerce Department, Division of Energy Resources (Department) on Methods for AMI and FAN Performance Evaluations, Metrics, and Customer Protections. The Appendices to the Department's Report were removed due to an inadvertent error.

The Report is in response to the July 23, 2020 Minnesota Public Utilities Commission's (Commission) Order Point 9 in the following matter:

> Northern States Power Company d/b/a Xcel Energy's Integrated Distribution Plan and Advanced Grid Intelligence and Security Certification Request

The Department is available to answer any questions that the Commission may have in this matter.

Sincerely,

/s/ MATTHEW LANDI
RATES ANALYST

ML/ar
Attachment

COMMERCE DEPARTMENT

August 20, 2020

Notice of Solicitation of Stakeholder Input and Comments

Docket No. E999/DI-20-627

In the Matter of the Department Stakeholder Process Informing the Report on the Metrics, Performance Evaluation Methods, and Consumer Protection Conditions to be applied to Xcel Energy's Advanced Metering Infrastructure and Field Area Network Projects Certified in Docket No. E002/M-19-666

Comments Due September 18, 2020

The Minnesota Department of Commerce, Division of Energy Resources (Department) is soliciting stakeholder feedback in response to a request from the Minnesota Public Utilities Commission (Commission). The Commission has requested that the Department file a report by November 1, 2020 on several matters (noted below) related to Northern States Power Company d/b/a Xcel Energy's Advanced Metering Infrastructure (AMI) and Field Area Network (FAN) projects. The Commission certified these projects pursuant to Minn. Stat. 216B.2425 in an order dated July 23, 2020.[1]

The Commission requested the Department to provide recommendations on metrics, methods for evaluating performance, and consumer protections or other conditions, including cost caps, that should be applied to the certified projects (AMI and FAN). The Commission indicated that: 1) the report and recommendation should be informed by a stakeholder process; 2) the report is intended to be made part of the record for future cost recovery proceedings; 3) Xcel must participate in the stakeholder process; and, 4) the process should be open to all interested parties.

Considering the on-going, societal restrictions associated with the COVID-19 pandemic and the record-based nature of the report sought by the Commission, the Department is initiating a written, comment-based stakeholder process. After receiving initial comments, the Department will assess whether additional comments or reply comments are necessary to ensure a fully developed report is provided to the Commission for its consideration.

Please file comments using the Commission's and the Department's electronic filing system at www.edockets.state.mn.us/EFiling. If there are any questions about this process, please contact Department staff, Tricia DeBleeckere at Tricia.DeBleeckere@state.mn.us, 651-539-1849 or Matthew Landi at Matthew.Landi@state.mn.us or 651-539-1823.

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[1] ORDER ACCEPTING INTEGRATED DISTRIBUTION PLAN, MODIFYING REPORTING REQUIREMENTS, AND CERTIFYING CERTAIN GRID MODERNIZATION PROJECTS, Docket No. E002/M-19-666, *In the Matter of Xcel Energy's Integrated Distribution Plan and Advanced Grid Intelligence and Security Certification Request* (July 23 Order). https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={F00E7D73-0000-CD15-B6E0-EA73F0AC037E}&documentTitle=20207-165209-01

As part of its on-going development of the report and recommendations, the Department is soliciting input and stakeholder consideration on the following topics by September 18, 2020 in Docket E002/DI-20-627:

A. Cost Recovery Petition Content

The Commission outlined baseline Advanced Grid Intelligence and Security (AGIS) cost recovery petition filing requirements in its September 27, 2019 Order in Docket E002/M-17-797,[2] Order Point 9 (see Attachment 1 to this Notice).

1. Should Xcel provide any additional information to ensure clarity and transparency of costs when seeking cost recovery for the AGIS investments?

B. Metrics

In its July 23, 2020 Order in Docket No. E002/M-19-666,[3] the Commission indicated that certification of the AMI and FAN projects was made with the recognition that future cost recovery will be based upon Xcel accomplishing Commission-approved metrics and performance evaluations. As a result, any future proposals for cost recovery of investments certified by the Commission's July 23 Order must be accompanied by a proposal for specific metrics and evaluation methods, and a detailed plan describing how Xcel Energy will maximize the benefits of the investments for ratepayers.[4] Thus, the Department requests Xcel and stakeholder input on the appropriate metrics and evaluation methods, including but not limited to:

1. Are the metrics proposed by Xcel's witnesses Gersack, Bloch, Harkness, Cardenas, Duggirala sufficient to determine performance of the AMI and FAN projects?[5]
2. What are specific, accountable metrics that should be established?
3. Are there existing metrics in use by any utility or imposed by a commission that would be useful to evaluate Xcel's AMI and FAN projects? [6]
4. When should any given metric be established: prior to submittal of the cost recovery petition, at the time of any petition for cost recovery, at the time of a petition for a new service program, modified tariff, or other change to existing service or offerings enabled by AMI and/or FAN?

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[2] ORDER AUTHORIZING RIDER RECOVERY, SETTING RETURN ON EQUITY, AND SETTING FILING REQUIREMENTS, Docket No. E002/M-17-797, *In the Matter of the Petition of Northern States Power Company for Approval of the Transmission Cost Recovery Rider Revenue Requirements for 2017 and 2018, and Revised Adjustment Factor*.

[3] ORDER ACCEPTING INTEGRATED DISTRIBUTION PLAN, MODIFYING REPORTING REQUIREMENTS, AND CERTIFYING CERTAIN GRID MODERNIZATION PROJECTS, Docket No. E002/M-19-666, *In the Matter of Xcel Energy's Integrated Distribution Plan and Advanced Grid Intelligence and Security Certification Request* (July 23 Order) at Point 8.

[4] See Commission's July 23 Order at Point 10.

[5] See Xcel Energy's November 1, 2019 Integrated Distribution Plan, Attachments M1-M5. See Attachment 2 to this Notice.

[6] The U.S. Department of Energy recently released both the *AMI in Review: Informing the Conversation Report* and the Compendium for AMI in Review which provides a summary of AMI proposals and state approvals, noting which have established metrics. July 9, 2020. See https://www.smartgrid.gov/documents/voe_series/voe-ami-in-review-informing-the-conversation and https://smartgrid.gov/files/documents/Compendium_compiled.pdf. Accessed August 8, 2020.

5. For any given metric, what baseline data and targets are necessary in order to evaluate performance?
6. Do stakeholders recommend use of the proposed Fresh Energy metrics filed in the E002/M-19-666 on April 22, 2020? If Xcel were to provide information on the associated baseline or targets, are the proposed metrics reasonable and sufficient to measure and track performance of AMI and FAN?[7]
7. Should, or how should the metrics align with, inform, or be informed by, the Performance Based Mechanism (PBM) docket (E999/CI-17-401) or the annual Safety, Reliability and Service Quality docket[8] (or other relevant dockets)? Should any metric that is established for AMI and FAN be incorporated into the PBM docket or Service Quality docket, another proceeding, or considered only with respect to the cost recovery dockets pertaining to the certified AMI and FAN projects?

C. Methods for Evaluation of Performance

General Performance Evaluation

1. What are specific, accountable methods for evaluating the performance of the AMI and FAN projects?
2. What are the attributes or FAN functions or uses that should be explored or enabled by Xcel?
3. Should performance evaluations be tied to AMI and FAN implementation dates (as listed on Table 56 in Xcel Energy's 2019 IDP) or some other factor or consideration?[9]

Program	Implementation Timeline
ADMS[10]	In-service 2020
AMI	Meter roll-out 2021-2024
FAN	Deployment 2021-2024 (preceding AMI deployment by approximately six months)

4. What considerations should be given to short-term performance (installation rates of AMI, applications for new programs or offerings, etc.) versus long-term system performance (relating to overall system efficiencies and improvements) capabilities outlined in Xcel Energy's 2019 IDP?
5. How should evaluation of AMI and FAN performance be considered at the time of cost recovery (petitions that are likely to be filed in multiple filings, over several years)?
6. Are there considerations in recommending methods to evaluate performance that would align with, inform, or be informed by on-going dockets or previous Commission decisions or records?

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[7] See Fresh Energy Supplemental Comments, filed on April 22, 2020 in Docket E002/M-19-666, at pg. 7. https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={30C3A371-0000-C03B-9A4E-A1EADAD9CBDF}&documentTitle=20204-162316-03

[8] Filed pursuant to Minnesota Rules Chapter 7826.

[9] See Xcel's 2019 IDP at. Pg. 248.

[10] Advanced Distribution Management System.

7. Are there any other issues that should be considered when evaluating the performance of AMI and FAN projects?

Programs and Service Offerings

8. What AMI- and FAN-enabled programs or services (e.g., service/rate tier plans, remote connect and disconnect procedures, third-party service and data sharing, etc.) do stakeholders want Xcel Energy to propose? Provide as much detail as possible.
9. Is the Xcel proposed Customer Experience Timeline (see Attachment 3) comprehensive or are there other customer experiences or benefits that should be considered or established?[11]
10. How would stakeholders prioritize those AMI- and FAN-enabled programs or services (e.g., based on the expected customer benefits and associated risks of each offering, the extent to which the program/offering would offset costs or reduce rates, or other)?
11. Under what expected timeframe should the programs be designed, be filed for approval, and implemented?
12. At what point should design elements (notice plans for AMI installation, AMI customer data rights and protection, Home Area Network activation plan requirements, cybersecurity impacts, etc.) be considered by the Commission or stakeholders, if at all? Are there any design elements that should be explicitly considered or approved by the Commission?
13. Should the evaluation of performance for AMI or FAN be tied to a metric, successful establishment of a program or service, or other consideration or factor?
14. How can the Commission ensure customer benefits materialize from AMI and FAN implementation should Xcel Energy delay or fail to propose desired programs and services?

Program and Services Compliance Filing

15. Would a requirement for Xcel Energy to provide a compliance report outlining anticipated new programs and services, expected design periods (and methods for stakeholder input), projected Commission filing dates, projected system impacts, and its progress on any on-going new service programs or services offerings be sufficient?
    a. If so, how often should Xcel Energy file an AMI and FAN program and service offering compliance report (Progress Report)? What time period should the report cover (i.e. 2, 5, 10-years)?
    b. Is a May 1, 2022 inaugural filing date reasonable for an initial Progress Report (if using Xcel's annual compliance report filing timing proposal from its 2019 IDP[12])

[11] See Xcel's 2019 IDP, Attachment M1 Gersack Direct, Schedule 5, pg. 1
[12] See Xcel 2019 IDP, at Attachment M1 – Gersack Direct, pg. 178 (et. al.). https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={90E1276E-0000-CC54-B628-861D10E2F58D}&documentTitle=201911-157133-03.

or should the Progress Report be filed in conjunction with the requests for cost recovery? Or is some other timeframe reasonable?

c. Should stakeholders be provided an opportunity to review and comment on Progress Reports?
d. How should the Commission consider program and service offering compliance reports in relation to any Xcel Energy request for AMI and FAN cost recovery?
e. Should Xcel Energy be required to file information on programs or offerings not pursued, including the reasons for not pursuing them?

D. Consumer Protections

1. What consumer protections should be considered at the time of petition for cost recovery?
2. What consumer protections should be required or established outside of cost recovery petitions?
3. Does the Commission need to establish cost cap provisions for the AMI and FAN projects, beyond what was articulated in the Commission's April 27, 2010 Order Point 4 in Docket No. E002/M-09-1048 – which limits Transmission Cost Recovery to estimates provided at the time of the eligibility determination?[13]
    a. If yes, what are reasonable cost caps and how should they be considered in the light of the (expected) iterative request for cost recovery in multiple TCR Rider or rate case requests? In relation to percent progress of installation? In relation to benefits realized? Or another metric?
4. Should the Commission establish variable Operations and Maintenance (O&M) and cost recovery caps, for AMI and FAN (no more than the lower of actual incurred costs or Xcel Energy's variable costs as proposed in the 2019 IDP, applied on a per-meter basis) or use some other O&M cost protections?
5. Should the Commission require all revenues from the Advanced Grid Intelligence and Security (AGIS) Initiative to flow to ratepayers?
6. Should the Commission establish a pass-through methodology and/or develop 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? If so, please provide examples or proposals.
7. How should public input be considered or solicited by Xcel Energy or the Commission on AMI and FAN implementation; should Xcel Energy be required to hold public meetings or hearings, and if so, what should the timing be for those meetings in relation to project implementation?
8. Are there any other issues that should be considered?

[13] See the Commission's April 27, 2010 *Order Approving 2010 TCR Project Eligibility and Rider…* at pg. 8. https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={957B0578-27B2-4BA2-A4BC-C643C624853F}&documentTitle=20104-49616-01

ATTACHMENT 1
ORDER POINT 9 FROM THE COMMISSION'S SEPTEMBER 27, 2019 ORDER IN DOCKET E002/17-797

In the Matter of the Petition of Northern States Power Company for Approval of the Transmission Cost Recovery Rider Revenue Requirements for 2017 and 2018, and Revised Adjustment Factor

If and when Xcel requests cost recovery for Advanced Grid Intelligence and Security investments, the filing must include a business case and comprehensive assessment of qualitative and quantitative benefits to customers, considering, at a minimum, the following:

A. *SCOPE OF INVESTMENT*
   1. Investment Description
      a.) Detailed description of proposed investment and project life; and
      b.) If multiple components, overview of costs and descriptions of each:
         i. Include purpose and role;
         ii. Explain known and potential future use cases for each component;
         iii. Explain known and potential value streams and how each component fits with state policy, statues, rules and Commission orders; and
         iv. Describe beneficiaries of each investment (who, how many, over what time period).
      c.) Articulation of principles, objectives, capability, functionalities, and technologies enabled by investment; and
      d.) Interrelation and interdependencies with other existing or future investments, including overlapping costs: scope, amount, timing.

   2. Alternatives considered:
      a.) If a Request for Proposal was used provide:
         i. The RFP issued, including list of all services or assets scoped in the RFP;
         ii. Provide a summary of responses;
         iii. Provide assessment of bids and factors used for selection; and
         iv. The scope of offerings or services included in the selected bid.
      b.) If not, what was used.

   3. Costs
      a.) Provide sufficient information to determine what is included in the investment in each of the following categories:
         i. Direct Costs (product, service, customer, project, or activity)
         ii. Indirect Costs
         iii. Tangible Costs;
         iv. Intangible Costs; and
         v. Real Costs.
      b.) If needed, provide the utility's definition of each category and whether internal or external labor costs are included in the category and the instant petition. If the costs are not included in the petition, include information on where and when those costs will be sought to be recovered.
      c.) If there is overlap or costs included in both categories, outline the overlapping costs and explain.

d.) For each of the cost categories outline whether the investment has been partially approved or included in previous or on-going docket riders, rate cases, or other cost recovery mechanisms or note all costs are included in the instant petition.

4. Detailed Analysis of the type of proposed (or multiple) cost effectiveness analysis utilized:
   a.) Least-cost, best-fit (Xcel proposes in IDP Reply comments);
   b.) Utility Cost-test; and
   c.) Integrated Power System and Societal Cost test.

B. PROVIDE A COST BENEFIT ANALYSIS FOR: 1) EACH INVESTMENT COMPONENT WITH OVERLAPPING COSTS OR BENEFITS IN ISOLATION AND 2) EACH BUNDLED COMPONENTS, AS APPROPRIATE:

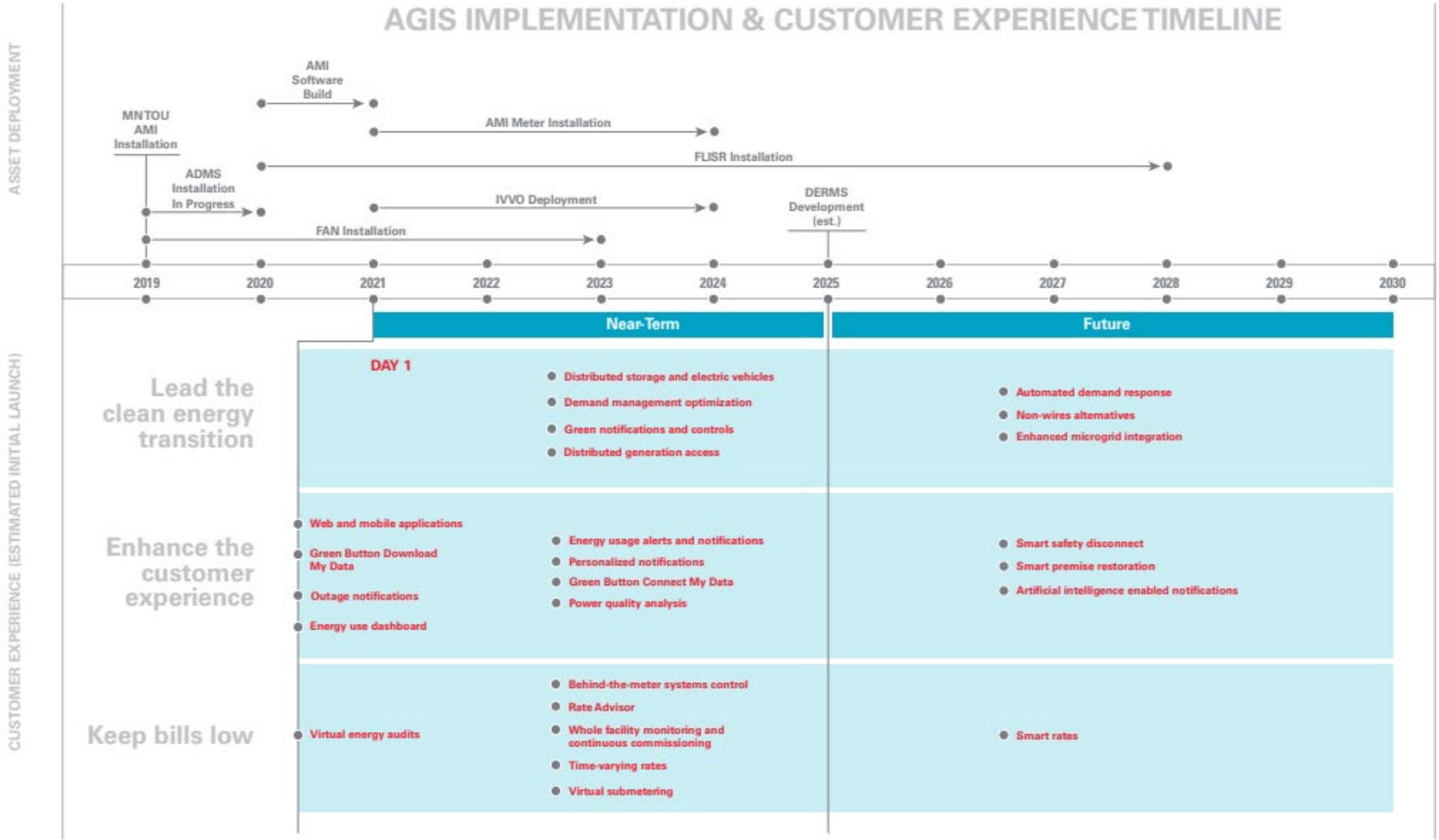
1. Provide Discount Rate Used and Basis; and
2. Identify cost categories and benefit categories used (explain metrics), including an explanation of how benefits can be monitored over time and proposal for reporting to Commission:
   a.) Identify quantitative costs and qualitative costs:
      i. Use quantitative methods to address qualitative benefits to the extent possible;
      ii. Explain system used to assess value and priorities to qualitative benefits (points and/or weighting); and
      iii. Identify sensitivity ranges on estimates or value.
   b.) Include a long-term bill impact analysis;
   c.) Include a reference case/scenario without the project (or group of projects); and
   d.) Apply the following principles to ensure the investment analysis has:
      i. compared with traditional resources or technologies;
      ii. clearly accounted for state regulatory and policy goals;
      iii. accounted for all relevant costs and benefits, including those difficult to quantify;
      iv. provided symmetry across relevant costs and benefits;
      v. applied a full life-cycle analysis;
      vi. provided a sufficient incremental and forward-looking view;
      vii. is transparent;
      viii. avoided combining or conflating different costs and benefits;
      ix. discuss customer equity issues, as needed;
      x. assessed bundles and portfolio where reasonable; and
      xi. addressed locational and temporal values.

ATTACHMENT 2
XCEL PROPOSED AGIS PROGRESS METRICS SUMMARY AS FILED ON NOVEMBER 1, 2019 IN DOCKET E002/M-19-666

	Description	AGIS Report (Service Quality potential impacts and reporting noted)
Customer Outreach and Education	Survey results of customers on the adequacy and clarity of communications prior to installation of advanced meters.	AGIS
Installation and Deployment	Number of advanced meters installed.	AGIS
	Percentage of FAN deployed.	AGIS
	Number of feeders with FLISR enabled.	AGIS
	Number of feeders with IVVO enabled.	AGIS
	Number of customers electing to opt-out of AMI installation.	AGIS
	Number of calls to Customer Contact Center and meter installation vendor regarding meter installation.	AGIS / SQ
	Number of complaints regarding AMI installation.	AGIS / SQ
Post-Deployment	Avoided Customer Minutes Out due to FLISR installation.	AGIS / SQ
	Energy Reduction (MWh) due to IVVO that result in cost savings and CO_2 emissions reduction.	AGIS
	Percentage of customers with advanced meters that receive estimated bills.	AGIS / SQ
	Percentage of customers with an advanced meter that have made a complaint of inaccurate meter readings.	AGIS / SQ
	Survey of customer satisfaction with outage related communications.	AGIS
	Number of customers with an advanced meter with an active web portal account.	AGIS
	Number of monthly, unique visits to the web portal (My Account).	AGIS

ATTACHMENT 3

XCEL PROPOSED AGIS IMPLEMENTATION & CUSTOMER EXPERIENCE TIMELINE AS FILED ON NOVEMBER 1, 2019 IN DOCKET E002/19-666



CERTIFICATE OF SERVICE

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

Minnesota Department of Commerce
Notice

Docket No. E999/DI-20-627

Dated this **21st** day of **August 2020**

/s/Sharon Ferguson

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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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October 16, 2020

Deputy Commissioner Aditya Ranade
Minnesota Department of Commerce
Division of Energy Resources
85 7th Place East, Suite 280
St. Paul, MN 55101

RE: Docket No. E999/DI-20-627
In the Matter of the Department Stakeholder Process Informing the Report on the Metrics, Performance Evaluation Methods, and Consumer Protection Conditions to be applied to Xcel Energy's Advanced Metering Infrastructure and Field Area Network Projects Certified in Docket No. E002/M-19-666

Dear Deputy Commissioner Ranade:

The Citizens Utility Board of Minnesota (CUB) respectfully submits these comments in response to the Minnesota Department of Commerce, Division of Energy Resources (Department) solicitation of stakeholder feedback, consistent with the request from the Minnesota Public Utilities Commission (Commission).[1]

The Commission has requested that the Department file a report by December 1, 2020 on several matters related to Northern States Power Company d/b/a Xcel Energy's (Xcel or Company) Advanced Metering Infrastructure (AMI) and Field Area Network (FAN) projects. The Commission certified these projects pursuant to Minn. Stat. 216B.2425 in an order dated July 23, 2020.

CUB maintains that a modernized grid is the backbone necessary to advance Minnesota's energy goals, support integration of additional levels of renewables, empower consumers to make their own choices about the level and type of electric service they desire, and leverage customer-sited resources to assist in grid operation. Likewise, implementation of a grid modernization program should assist in both improving system reliability and flexibility. In that spirit, many of the investments proposed in Xcel's Integrated Distribution Plan (IDP), namely AMI and the interrelated FAN, can lay an important foundation for a dynamic, customer-centric utility approach in the future.

CUB reiterates that, notwithstanding the potential benefits from AMI and grid modernization, experience has shown that these investments are inherently complex and can be subject to cost overruns. One recent example of this issue comes from the experience of Seattle City Light, which was facing a potential $12 million or 14 percent cost overrun in 2017. In order to stay below the roughly $84 million set aside for the project, the utility company decided to only deliver 70 percent of what it promised on schedule and to delay

[1] These comments were prepared with assistance from Matthew McDonnell of Strategen Consulting.

the rest.[2] For context, a 14% cost overrun for Xcel's AMI and FAN projects could amount to roughly $67 million in additional costs to customers.[3]

In addition, the customer-facing value proposition identified at the outset of a project is not often realized upon implementation. To illustrate this point, a recent report by the American Council for an Energy-Efficient Economy (ACEEE) has demonstrated that few U.S. utilities have truly captured the full range of AMI capabilities and customer-facing benefits. Of the 26 utilities with AMI in place, only one – Portland General Electric in Oregon – was engaging in all of the AMI business cases identified by ACEEE as of late 2018.[4] These elements are further underscored by the Company's own determination that quantifiable benefits do not exceed quantifiable costs. Accordingly, the realization of qualitative, customer-facing benefits is critical to justifying an investment of this magnitude and to protecting consumers.

Indeed, central to protecting consumers is the need to adopt a sensible approach to cost recovery. With respect to cost recovery, the prime issue before the Commission is one of risk management for an investment of this magnitude and importance – both the amount of risk overall as well as the allocation of risk between the Company and customers.

As the Commission has noted in its Utility Rates Study, the use of special cost recovery mechanisms, such as the TCR rider, inherently create the potential for unproductive 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."[5]

Furthermore, as the Commission has explained, "making certain cost categories subject to automatic recovery removes them from inclusion in the overall review of costs (those that decrease as well as those that increase) when a general rate case is ultimately filed."[6] Indeed, it "effectively takes them 'off the table' in a rate case review and thereby constricts the Commission's rate-making authority. And while special recovery [like the TCR rider] will have the effect of dampening the magnitude of rate requests that utilities make when they do ultimately file a rate case petition, the reality is this effect merely masks the full rate implications for ratepayers."[7]

Another important issue raised by the use of TCR rider recovery for AGIS Initiative investments is one of clear accountability for tracking the costs and benefits associated with the AGIS Initiative. An approach that handles cost recovery through the TCR rider and outside of base rates enhances the risk that certain costs associated with the AGIS Initiative will be double recovered - once through the TCR rider and again through base rates. Due to the separate venues for cost recovery, there are likely to be overlapping or difficult-to-

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[2] *See* David Kroman, "Facing cost overruns, City Light quietly pares smart-meter project," Crosscut, May 15, 2017, *available at* https://crosscut.com/2017/05/facing-cost-overruns-city-light-quietly-pares-smart-meter-project.

[3] Estimate based on Xcel's proposed capital budget of approximately $480 million.

[4] *See* Rachel Gold, Corri Waters, and Dan York, Leveraging Advanced Metering Infrastructure to Save Energy, American Council for an Energy-Efficient Economy, January 3, 2020.

[5] Minnesota Public Utilities Commission, Report to the Legislature: Utility Rates Study as Required by Laws of Minnesota, 2009, Chapter 110, June 2010, at 8 (Utility Rates Study), *available at* https://mn.gov/puc/assets/012854_tcm14-5188.pdf.

[6] Utility Rates Study at 8.

[7] Utility Rates Study at 8.

distinguish costs related to distribution investments. It will not always be clear which costs should be attributed to AGIS investments, recovered through a rider, and which costs should be classified as other distribution investments, recovered through a general rate case. Given this opportunity for confusion, there is a risk that certain costs will be double counted. By having to review distribution system investments across multiple filings, it makes it far more challenging to ensure accountability and avoid this potential double recovery issue. For these reasons, the Commission should embrace an approach that accounts for all AGIS Initiative costs in base rates to reduce the risk of double recovery and to better ensure that Xcel be held accountable for the cost estimates it has included in its IDP.

In sum, as the Commission evaluates the Company's request for TCR Rider recovery of the AGIS investment costs, the Commission should authorize cost recovery in a manner that adequately shares risk between the Company (i.e., the entity best positioned to manage the risk) and customers. Ideally, such an approach would permit Xcel to recover AGIS costs through base rates as determined and vetted through a comprehensive rate case proceeding. Rate case recovery, rather than TCR Rider recovery, is a better way to tie cost recovery to performance.

No matter whether the AGIS investment costs are recovered through base rates or through the TCR rider, sufficient consumer protections are still required to ensure that customers receive the benefits touted by Xcel in its IDP filing and that any unexpected cost overruns are not born wholly by customers. This need is greatly enhanced should the Commission decide to permit Xcel recovery via the TCR rider – an approach that CUB opposes. The sections that follow highlight specific consumer protection measures as well as metrics to help ensure performance and accountability through deployment of the Company's AMI and FAN.

I. Metrics

As noted by the Minnesota Department of Commerce, Division of Energy Resources (Department), in its July 23, 2020 Order in Docket No. E002/M-19-666,[8] the Commission indicated that certification of the AMI and FAN projects was "made with the recognition . . . that all future cost recovery will be based upon the Company accomplishing Commission-approved metrics and performance evaluations for the certified projects." As a result, "[a]ny future proposals for cost recovery of investments certified in [the Commission's July 23] Order must be accompanied by a proposal for specific metrics and evaluation methods, and a detailed plan describing how the company will maximize the benefits of the AGIS [Advanced Grid Intelligence and Security] investments for ratepayers."[9]

In recognition of the impediments and challenges to maximizing advanced metering infrastructure benefits for customers, CUB maintains that appropriate metrics and evaluation methods are critical consumer safeguards.

[8] Order Accepting Integrated Distribution Plan, Modifying Reporting Requirements, and Certifying Certain Grid Modernization Projects, Docket No. E002/M-19-666, *In the Matter of Xcel Energy's Integrated Distribution Plan and Advanced Grid Intelligence and Security Certification Request* (July 23 Order) at Point 8.

[9] *See* Commission's July 23 Order at Point 10.

A. The metrics proposed by Xcel's witnesses Gersack, Bloch, Harkness, Cardenas, Duggirala are not sufficient to determine performance of the AMI and FAN projects

CUB asserts that the Xcel's proposed metrics, in and of themselves, are insufficient to determine performance of the AMI and FAN projects.

The metrics outlined in Attachments M1-M5 of Xcel's IDP are primarily deployment metrics. Deployment metrics are used to measure AMI implementation performance. They generally relate to bringing AMI capabilities online within estimated costs and scheduled time frames. Though they are generally large in number, they are also fairly temporary and self-explanatory.

Tracking actual deployment costs against budgeted or forecasted costs is one of the most critical performance areas to measure. Regulators in other jurisdictions have set caps on AMI deployment cost, placing utilities at risk for any cost overruns. For example, the Hawaii Public Utilities Commission established cost recovery caps on both fixed and variable costs associated with Hawaiian Electric's AMI deployment.[10] However, these caps do not typically specify associated minimum capabilities. It may therefore be possible for a utility to simply cut back on planned functionality if it encounters cost overruns.

Other regulators are understandably interested in the status of deployments relative to planned schedules. Schedule metrics provide a reference point with which to evaluate deployment costs incurred to date, but they are also being used to help them anticipate (and perhaps accelerate) the point in time when AMI investments can be expected to begin delivering direct and indirect benefits to customers. These regulators recognize that customer payback periods can be affected by delays in the delivery of economic benefits as well as by more common concerns about the size of such benefits.

B. What are specific, accountable metrics that should be established?

CUB stresses that additional process and rigorous, stakeholder-led vetting are necessary to determine a sufficient complement of performance metrics that should be established. Such a process is important not just to safeguard customers and ensure accountability on the part of Xcel in this particular AMI deployment, but also to ensure that such metrics are well aligned and harmonized with the suite of performance metrics under consideration in the Commission's investigation to identify performance metrics in Docket No. E-002/CI-17-401.

CUB offers the following illustrative examples of potential metrics to be established, building on Xcel's proposed AGIS progress metrics as filed on November 1, 2019 in Docket No. E002/M-19-666. The shading indicates additional, CUB-proposed metrics to inform AMI and FAN deployment and utilization.

Category	Description
Customer Outreach and Education	Survey results of customers on the adequacy and clarity of communications prior to installation of advanced meters
Installation and Deployment	Number of advanced meters installed
	Percentage of customers with advanced meters
	Percentage of FAN deployed

[10] *See In re Application for Approval to Commit Funds in Excess of $2,500,000 for the Phase 1 Grid Modernization Project, to Defer Certain Computer Software Development Costs, Etc.*, Docket No. 2018-0141, Decision and Order No. 36320, at 24, filed March 25, 2019.

	Number of customers with electing to opt-out of AMI installation
	Number of calls to Customer Contact Center and meter installation vendor regarding meter installation
	Number of complaints regarding AMI installation
Post-Deployment	Percentage of customers with advanced meters that receive estimated bills
	Percentage of customers with an advanced meter that have made a complaint of inaccurate meter readings
	Survey of customer satisfaction with outage related communications
	Number of customers with an advanced meter with an active web portal account
	Number of monthly, unique visits to the web portal (My Account)
	Percentage of customers with an advanced meter with Home Area Network (HAN) functionality
	Number of customers with an advanced meter with Home Area Network (HAN) functionality
	Percentage of customers with an advanced meter with Green Button Connect My Data (CMD) functionality
	Number of customers with an advanced meter with Green Button CMD functionality
Customer Engagement	Percentage of customers with advanced meters at least 30 days that are targeted with energy savings messaging
	Percentage of low-income customers with advanced meters at least 30 days that are targeted with energy saving messaging
	Percentage of customers aware of AMI
	Percentage of low-income customers aware of AMI
	Number of customers with advanced meters that adopt an advanced rate option (e.g., TOU) tariff, expressed as a number and percentage of each by rate
	Number of organizational events attended where information on AMI presented, by region
	Demand Response: percentage participation, by class
	DER: percentage customer adoption, by class
	Storage: percentage customer adoption, by class
	Customer access to hourly or sub-hourly data
	Third-party service access to customer data
	Variety, quality, accessibility of customer data available
Customer-sited Asset Effectiveness	Demand Response: annual max MW reduction as percentage of load, by class
	Demand Response: MW enrolled as percentage load, by class
	DER: MWh generated as percentage of sales, by class
	DER: MW installed as percentage of load, by class
	Storage: MWh installed energy capacity as percentage of sales, by class
	Storage: MW installed capacity as percentage of load, by class
	Non-Wires Alternatives (NWA): MW as percentage of (peak) load
	NWA: percentage of customers participating, by class
	NWA: savings ($) per year
	Percentage of grid supporting services provided by DER vs. traditional solutions

II. Consumer Protection Measures

Nationally, the record of utilities' AMI and smart meters deployment has been mixed – unsurprising given the level of complexity involved. Some utilities have had to interrupt their rollout of smart meters to reassess the technology selected, and some have switched vendors. Still others have incurred hundreds of millions of dollars in cost overruns due to systems integration issues. And some utilities have failed to realize expected benefits from smart meter projects because of change-management issues.[11]

These false starts, cost overruns, and sub-par results underscore the need for consumer protections – both to ensure that customers are not on the hook for cost overruns due to poor project management and to guarantee realization of the promised customer benefits.

As noted above, one key element to ensuring that Xcel is incented to pursue cost reduction measures as it deploys AMI and FAN across its service territory is to recovery costs through base rates under the Company's Multi-Year Rate Plan (MYRP) – leveraging the purpose of an MYRP, to encourage cost containment during the course of the plan. Such an approach is vastly preferred to cost recovery through the TCR rider, which largely eliminates any performance incentive for the Company and unnecessarily pushes all the risk onto customers.

Even assuming cost recovery through base rates under an MYRP, there are still specific consumer protection measures that need to be put in places. These measures are even more critical should the Commission permit cost recovery through the TCR rider – an approach that CUB strongly opposes. The following sections highlight specific consumer protection measures that will help share risk between the Company and customers and ensure that customer benefits are fully realized.

A. Cost Recovery Caps

As CUB outlined in our initial comments, specific consumer protection measures must be included as conditions of any cost recovery approval. Indeed, the customer safeguard outlined therein, including fixed and variable cost recovery caps and a methodology to ensure contemporaneous delivery of benefits to customers, would be equally relevant and prudent should the Commission direct the Company to recover AGIS Initiative costs through its multi-year rate plan (MYRP).

If the Commission were to permit use of the transmission cost recovery (TCR) rider for AMI and FAN costs, there is an even greater need for consumer protections. One potential approach could operate akin to the asymmetrical capital cost-true up in the MYRP, in which ratepayers benefit from capital expense savings but do not pay for capital expenses above the baseline. The Commission approved Xcel's petition that left base rates at 2019 levels, with true-ups for 2020 actual experience.[12] The capital true-up, unlike the property tax or sales true-ups, is asymmetrical, meaning Xcel would refund to customers if it incurs lower capital related

[11] Anjan Asthana, Adrian Booth, and Jason Green, "Best practices in the deployment of smart grid technologies," McKinsey on Smart Grids, Summer 2010, *available at* https://www.mckinsey.com/~/media/mckinsey/dotcom/client_service/epng/pdfs/mck%20on%20smart%20grids/mosg_bestpractices_vf.ashx.

[12] *See In re Petition of Northern States Power Company d/b/a Xcel Energy for Approval of True-Up Mechanisms*, Docket No. E-002/M-19-688, "Order Approving True-Ups and Requiring Xcel to Withdraw its Notice of Change in Rates and Interim Rate Petition," filed March 13, 2020.

revenue requirements than provided by the benchmark, but will not be allowed to collect increased revenues through the true-up if capital related revenue requirements exceed that benchmark.[13]

The Commission should implement fixed and variable cost recovery caps, as outlined below.

Fixed Cost Recovery. The Commission should implement fixed cost recovery caps for the AGIS projects. For the AMI and FAN projects, in particular, the Company should recover no more than the lower of actual incurred costs or their proposed costs in the IDP filing, including both capital expense and any proposed deferred expense, as applicable.

Variable Cost Recovery. The Commission should also implement variable cost recovery caps, including O&M and labor costs, for the AMI and FAN projects that result in a per-meter cap on cost recovery. For the AMI and FAN projects, the Companies should recover, for each meter installed and in operating service, no more than the lower of actual incurred costs or their proposed aggregated costs applied on a per meter basis.

As mentioned previously, cost recovery caps of this nature were also required by the Hawaii Public Utilities Commission as a condition for its approval of the Hawaiian Electric Companies' proposed grid modernization investments, including AMI.[14]

B. Benefits Assurance

At a minimum, the Company should be required to commit to delivering to customers the benefits that it has identified in its cost-benefit analysis.

By providing Xcel cost recovery through a rider mechanism, a significant concern is that the cost-savings associated with projects included in the rider mechanism would not be captured at the same time as the cost recovery. To address this concern, if the Commission approves cost recovery through the TCR rider, CUB recommends that the Commission establish a pass-through methodology and/or process that will provide a means by which the savings associated with the AGIS Initiative be passed on to the Company's customers in a timely fashion.

To that end, as a potential template to be adapted for the TCR rider and the AGIS Initiative, the Commission and the Company could look to a benefits pass-through methodology proposed by the Consumer Advocate and Hawaiian Electric Companies, and adopted by the Hawaii Public Utilities Commission, in Docket No. 2014-0170.[15] In that proceeding, the Hawaiian Electric Companies reached agreement with the Consumer Advocate to use a rate case-centric approach to facilitate pass-through of benefits from a planned enterprise software system. The types of benefits included were: O&M expense reduction benefits, capital cost avoidance benefits, and tax cost avoidance benefits.

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[13] *See In re Petition of Northern States Power Company d/b/a Xcel Energy for Approval of True-Up Mechanisms*, Docket No. E002/M-19-688, "Petition for Approval of True-Up Mechanisms," filed November 1, 2019.

[14] *See In re Application for Approval to Commit Funds in Excess of $2,500,000 for the Phase 1 Grid Modernization Project, to Defer Certain Computer Software Development Costs, Etc.*, Docket No. 2018-0141, Decision and Order No. 36320, at 24, filed March 25, 2019.

[15] *See In re Hawaiian Electric Companies ERP/EAM Implementation Project*, Docket No. 2014-0170, Order No. 36166, Attachment: Consumer Advocate and Hawaiian Electric Companies' Supporting Documentation for Proposed ERP Benefits Pass-Through Methodology, filed February 20, 2019.

With respect to O&M benefits, between rate cases, O&M benefits that reduce base rates would be placed into a regulatory liability account and accumulated until the effective date of interim rates that reflect test year O&M savings benefits. The balance of the regulator liability account would be returned to customers via amortization credits to O&M expense in the next rate case. The amounts recorded in the regulatory liability account would be the higher of actual achieved O&M benefits, net of costs, or a guaranteed minimum benefits amount for the designated period preceding the test year and the months of the test year prior to when interim rates become effective. With respect to capital and tax benefits that may result, the Company could pass capital and tax benefits on to customers through annual rate adjustment mechanism filings and through future rate cases.

C. Progress Reports

CUB recommends that Xcel Energy be required to file quarterly or semi-annual reports that contain the following elements:

1. The Company's plans and scope for implementation of its AMI and FAN projects in the upcoming months and/or year;
2. The status of the number of meters and units of telecommunications infrastructure that the Company has installed and placed in service, in comparison to the Company's plans and scope, to be reported in aggregate, by class, and by class and census block or 9-digit ZIP code;
3. The status of the installation of the FAN in comparison to the Company's plans and scope;
4. Implementation status of metering and network communications headend systems in comparison to the Company's plans and scope; and
5. The actual capital and deferred costs incurred by the Company.

D. Data Access Policies to Unlock Customer Value

The deployment of AMI offers significant operational benefits for utilities and the potential for significant energy savings for consumers. A major lesson from prior state deployments of AMI is that full realization of consumer benefits from efficiency or time-shifting of usage will not occur unless consumers have convenient access to their own energy data made available by advanced meters. It is also critical that such policies are timely and consistently implemented. CUB offers that, should the Commission be inclined to grant certification of the Company's AGIS Initiative, such approval be conditioned on ensuring that consumers receive their share of the benefits of AMI – specifically, access to the energy data generated by their advanced meters, along with accompanying cost information.

As articulated in CUB's initial comments, CUB recommends that the Commission require Xcel to take certain, specific actions to ensure that Xcel's electricity customers have functional, secure access to new data-enabled technologies and services to help them save energy and money and otherwise realize value from the state's advanced metering infrastructure deployment. Namely, CUB recommends that Xcel be required to:

- Provide consumers easy access to the best available information about their energy usage through two interfaces, including both the Company's FAN and a customer's home area network;
- Provide customers and authorized third parties with access to historic billing information in a machine-readable, automated manner;
- Provide consumers and authorized third parties with rate information in standardized, machine readable formats; and

- Provide a customer authorization process that is easy for consumers to use and requires the least number of steps.[16]

CUB acknowledges and appreciates the Company's commitment to making Green Button Connect My Data (GBC) and the Home Area Network (HAN) accessible to customers within one year after mass deployment of AMI meters begins.[17] CUB also appreciates Xcel's confirmation that the Company's HAN offering contemplates customers' ability to "bring their own device" to take advantage of HAN capabilities. CUB further notes the Company's description of an ongoing "project to make rate information available in a machine-readable electronic format" to be completed in parallel with Xcel's GBC and HAN projects. The Commission should hold Xcel to these commitments by establishing a date-certain deadline of June 2022 as a condition of some portion of cost recovery.

Finally, CUB reiterates our position that standards should be developed that recognize the need for ensuring customer privacy while also allowing for the sharing of granular data sets for research in service to public policy goals.[18] The goal of adopting Open Data Access Standards is to provide energy use data in ways that are useful for third parties, while not unduly burdening utilities and associations, and protecting the privacy of individual customers. Xcel should be required to provide a set of open data access standards that would create the ability for third parties to access sets of customer energy use data, either aggregated or anonymized. However, as such standards are currently under consideration in PUC Docket 19-505, we make no additional recommendation as to their application relative to Xcel's AGIS cost recovery at this time.[19]

III. Conclusion and Recommendations

CUB maintains that the value of AMI is predicated upon Xcel's (and Xcel customers') realization of customer benefits. The Commission must ensure that the Company is acting timely and responsibly to achieve and credit customers with the full value promised through AMI implementation.In this spirit, we offer the following recommendations:

- The Commission should require specific, accountable metrics to provide consumer protections both during and after deployment of the AMI and FAN and should do so prior to approving any petition for cost recovery.
- Metrics should also align and be informed by, where appropriate, the performance metrics docket (E999/CI-17-410) and the annual Safety, Reliability and Service Quality docket – though not all metrics established for AMI and FAN need be incorporated in the these dockets.
- The Commission should require the imposition of fixed and variable cost recovery caps as well as the development of a methodology to ensure that benefits are contemporaneously realized by customers.
- The Commission should require Xcel to file quarterly or semi-annual reports that contain the following elements:
    - Company's plans and scope for implementation in the upcoming months and/or year;

[16] CUB's Initial Comments, Attachment A at 13-14.

[17] Xcel's Reply Comments, Attachment A at 25-26.

[18] *See* Docket No. E, G-999/M-19-505.

[19] CUB's Initial Comments, Attachment A at 13-14.

- Status of the number of meters and units of telecommunications infrastructure that the Company has installed and placed in service, in comparison to the Company's plans and scope, to be reported in aggregate, by class, and by census block;
- The status of the FAN in comparison to the Company's plans and scope;
- Implementation status of metering and network communications headend systems in comparison to the Company's plans and scope; and
- The actual capital and deferred costs incurred by the Company.

Thank you for your consideration of our comments in this matter.

Sincerely,

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September 25, 2020

Deputy Commissioner Aditya Ranade
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RE: In the Matter of the Department Stakeholder Process Informing the Report on the Metrics, Performance Evaluation Methods, and Consumer Protection Conditions to be applied to Xcel Energy's Advanced Metering Infrastructure and Field Area Network Projects Certified in Docket No. E002/M-19-666

Docket No. E999/CI-20-627

Dear Deputy Commissioner Ranade:

Fresh Energy submits these comments in response to the Department of Commerce's ("the Department") August 20, 2020 Notice of Comment Period regarding metrics, evaluation criteria, and consumer protection conditions for Xcel Energy's ("Xcel") Advanced Metering Infrastructure ("AMI") and Field Area Network ("FAN") Projects.

A. COST RECOVERY PETITION CONTENT

1. **Should Xcel provide any additional information to ensure clarity and transparency of costs when seeking cost recovery for the AGIS investments?**

In addition to the requirements described in the Commission's September 27, 2019 *Order* in Docket E002/M-17-797, Order Point 9, Fresh Energy recommends that each AGIS cost recovery filing include:

- An explanation of cost contingencies included in the cost/benefit analysis (i.e., amounts added to base costs to account for risks and uncertainty) and the corresponding range of potential cost/benefit analysis (CBA) results;

- An explanation of key CBA assumptions and a sensitivity analysis[1] of those assumptions;
- A description of how the investment(s) will support Minnesota's goals for transportation and building electrification.

B. METRICS

1. Are the metrics proposed by Xcel's witnesses Gersack, Bloch, Harkness, Cardenas, Duggirala sufficient to determine performance of the AMI and FAN projects?

Fresh Energy believes the metrics proposed by Xcel's witnesses Gersack, Bloch, Harkness, Cardenas, and Duggirala are a good start but are not sufficient. As we noted in our comments on Xcel's 2019 IDP, several of the proposed metrics lacked baselines, and some metrics lacked a specific target for improvement and/or timeline for achieving that targeted improvement. See reproduced below Figure 2 – Metrics for Key CBA Assumptions from Fresh Energy's Initial Comments in Docket E002/M-19-666.

Figure 2: Metrics for Key CBA Assumptions

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

[1] A typical grid modernization CBA includes multiple assumptions such as future reliability improvements, equipment failure rates, customer participation in future DSM programs, EV adoption rates, etc. Most, if not all, of these assumptions are uncertain. A sensitivity analysis determines how much the overall costs or benefits change from a change in one or more key assumptions. A sensitivity analysis also identifies the assumptions that have the most impact on the overall costs and benefits of the proposed investment, thus highlighting the key assumptions that Xcel should further validate, monitor, and report on throughout implementation.

2. **What are specific, accountable metrics that should be established?**

In addition to the metrics listed above, Fresh Energy believes it is important to establish metrics for financial performance, AMI/FAN project execution/delivery (e.g., meter and network deployment, meter accuracy, billing accuracy, meter reading effectiveness, etc.) as well as customer communications/education (e.g., awareness and understanding, community outreach, customer satisfaction, etc.). See Attachment A for Fresh Energy's complete set of recommended metrics for Xcel's AMI and FAN deployments. This is a preliminary list, which we look forward to completing in collaboration with Xcel and stakeholders.

3. **Are there existing metrics in use by any utility or imposed by a commission that would be useful to evaluate Xcel's AMI and FAN projects?**

As Fresh Energy discussed in the 2019 Xcel IDP proceeding, demand management programs like time varying rates and new energy efficiency/demand response programs[2] are foundational to actually achieving the benefits AMI has the potential to provide. Other state Commissions have made development of rate design plans and/or the availability of comprehensive time of use ("TOU") rates a condition of AMI approval.[3] Fresh Energy recommended the Commission ask Xcel to develop a Draft Rate Design Roadmap to describe in more detail how Xcel will leverage AMI capabilities to support an expanded portfolio of demand management and advanced rate design programs. The Commission included this requirement in Order Point 12 in its July 23, 2020 Order Accepting Integrated Distribution Plan, Modifying Reporting Requirements, and Certifying Certain Grid Modernization Projects.[4]

Xcel has begun the Rate Design Roadmap stakeholder engagement process and hosted a meeting on September 9 to collect feedback from stakeholders. Fresh Energy considers the meeting to be a good first step in the ongoing dialogue between Xcel and stakeholders about demand management programs and how AMI data can be leveraged to maximize value for Minnesota customers. To date, it appears Xcel's Draft Roadmap will focus on TOU and electric vehicle charging tariffs and plans for flexible pricing pilots and expanded demand response.

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[2] Such programs may include near-real-time energy use feedback to customers; behavior-based programs with customer feedback and insights; programs using data disaggregation; grid-interactive efficient buildings; pay for performance; targeting for program design, marketing, and technical assistance; and conservation voltage reduction. See Gold, Rachel, C. Waters, and D. York, *Leveraging Advanced Metering Infrastructure to Save Energy*, American Council for an Energy-Efficient Economy, Report U2001, January 27, 2020 (link).

[3] See for example, decisions by Hawaii PUC on HECO (link) and Virginia State Corporation Commission on Dominion (link) proposals for AMI implementation.

[4] MN Public Utilities Commission, *Order Accepting Integrated Distribution Plan, Modifying Reporting Requirements, and Certifying Certain Grid Modernization Projects*, July 23, 2020, at Point 12 (link).

Xcel has previously discussed potential behavior-based programs, targeted customer education and marketing, and related programs that will be enabled by AMI data.[5] Xcel should integrate these plans into the Roadmap as well to ensure a more complete record on potential conservation and demand management offerings that AMI can enable.

Baltimore Gas and Electric ("BGE") is an example of a utility that has taken advantage of its AMI deployment to develop a portfolio of very successful energy efficiency programs.[6] Prior to deployment, the Public Service Commission of Maryland required BGE to work with stakeholders to develop a comprehensive set of metrics for tracking costs/benefits, project execution and delivery, operational impacts, and customer communications and education. BGE and its stakeholders developed metrics for Phase I (Deployment Phase) and Phase II (Realization of Post Deployment AMI Benefits). Categories of Phase I metrics include:

- Financial Costs/Benefits
    - Capital and O&M costs including AMI meter install/provision, meter data management, network deployment, field installations, AMI register billing, web portal development, Smart Energy Pricing program development, event processing, large C&I meter deployment, communications, and project support costs
    - Capital and O&M savings
    - Monetization of dynamic pricing resources
    - Other economic benefits
- Project Execution and Delivery
    - Meter deployment
    - Network deployment
    - Hard to access meters
    - Meter billing
- Operational
    - Billing accuracy
    - Meter accuracy
    - Field visits
    - Meter reading effectiveness
- Communications and Education
    - Awareness and understanding
    - Community outreach
    - Customer satisfaction

Details of Maryland's Phase I metrics, calculations, and reporting frequency are available here.

[5] See Xcel presentation at the March 5, 2020 Commission Agenda Meeting (link)
[6] https://www.bge.com/News/Pages/Press%20Releases/200413-bge-wins-10th-energy-star-partner-of-the-year-award.aspx

4. **When should any given metric be established: prior to submittal of the cost recovery petition, at the time of any petition for cost recovery, at the time of a petition for a new service program, modified tariff, or other change to existing service or offerings enabled by AMI and/or FAN?**

Fresh Energy believes it is important to establish overall goals for a grid modernization program and to track progress toward these in the utility's IDP. Similarly, it is important to establish overall goals for how much a specific investment and/or program will contribute to grid modernization goals, and to track those in the related proceedings. For investment packages like AGIS, we recommend that the utility propose goals, metrics, and evaluation methods when initially requesting approval of an investment. The Commission should refine and approve final metrics and evaluation methods when approving cost recovery.

5. **For any given metric, what baseline data and targets are necessary in order to evaluate performance?**

For each metric proposed, it is necessary to have a baseline measurement, a target for improvement, a date for that improvement to be achieved, and the frequency of reporting the metric in order to track progress and evaluate eventual performance. In some cases, interim targets (with dates) are also warranted.

In Xcel's 2019 IDP, the following metrics for AMI did not have corresponding baselines:

- Capex for Asset Health/Reliability, Capacity Projects
- Storm related capital restoration costs
- Annual trips for residential manual disconnection
- Annual trips for residential manual reconnection
- O&M for Asset Health/Reliability, Capacity Projects
- Customer Minutes Out – tap level events (also missing a target for improvement)
- Cost of consumption on inactive meters
- Commodity- bad debt expense
- Residential demand shift from TOU rates
- Medium C&I demand shift from TOU rates
- Residential peak demand reduction from CPP
- Medium C&I demand shift from TOU rates

The Commission should require Xcel to establish these baselines, and expected timeline for achieving the targeted improvement, before cost recovery is granted. Additionally, the Commission should require Xcel to establish baselines (where relevant), targets, and expected timelines for all of the metrics shown in Attachment A.

6. **Do stakeholders recommend use of the proposed Fresh Energy metrics filed in the E002/M-19-666 on April 22, 2020? If Xcel were to provide information on the associated baseline or targets, are the proposed metrics reasonable and sufficient to measure and track performance of AMI and FAN?**

See Fresh Energy's response to question B.2 and Attachment A.

7. **Should, or how should the metrics align with, inform, or be informed by, the Performance Based Mechanism (PBM) docket (E999/CI-17-401) or the annual Safety, Reliability and Service Quality docket (or other relevant dockets)? Should any metric that is established for AMI and FAN be incorporated into the PBM docket or Service Quality docket, another proceeding, or considered only with respect to the cost recovery dockets pertaining to the certified AMI and FAN projects?**

A recent white paper from the Regulatory Assistance Project ("RAP") explains how a performance-based regulation (PBR) framework can increase the likelihood of on-time, on-budget delivery and customer benefit realization from complex IT projects such as AGIS.[7] RAP recommends establishing metrics, and associated rate-of-return adders or penalties, tied to specific project goals and desired outcomes. RAP's illustrative performance framework for AMI deployments is shown below.

[7] Littell, D., J. Shipley, and M. O'Reilly. 2019. *Protecting Customers from Utility Information System and Technology (IS/IT) Failures: How Performance-Based Regulation Can Mimic the Competitive Market*. Montpelier, VT: RAP (link).

Figure 3: RAP Illustrative PBR Framework for AMI[8]

Goal	Outcome	Performance criteria/Functionality	Metrics to track
Personnel savings	More efficient and less costly metering	AMI system provides reliable and regular metering information to utility billing system	Accuracy of customer bills and customer complaints on billing
Accurate and timely customer billing	Timely and accurate customer bills	AMI, database and billing system provides timely and accurate bill to customers	Timely information to the utility-the meters are tested to 98% or higher accuracy; or reductions in estimated bills
Improved storm response	Timelier storm response	Utility Outage manage system receives outage information	# of meters successfully providing accurate outage information for real time storm restoration
Customer understanding of energy usage	Higher customer satisfaction or understanding of energy usage	Operation of customer energy usage portal	Customer usage of energy portal, one time or regular access
Vibrant real time or TOU energy market for residential users	Customer costs more reflective of system costs: efficient pricing	Customers on a real-time or Time-of-Use (TOU) rate plan	# and % of customers opting out of or taking real time or TOU price offering
Third-party energy provider authorized access to customer data	Utility system supports works system for customers to share data with third-parties	Third party energy service company ability to access Green Button Connect data	Number of third parties successfully accessing customer data through Green Button Connect or other utility data sharing method; customers are able to authorize of third-party service company requests on first attempt (target 95%); third-party service provider receive access when authorized by customers (target 95% of the time)
Customers use of automated storm outage information	Higher customer knowledge of outage situation and storm response	# or percent of customers using storm outage system each day during storm events	# such as 10,000 customers using storm outage information for their accounts

Fresh Energy recommends that the Commission establish performance incentives for a set of high-priority metrics. High priority metrics may be those that track a major source of potential customer benefits, or those that track a harder-to-achieve benefit where an incentive may significantly improve the likelihood benefits will arise. This topic warrants additional discussion between stakeholders and Xcel, which could happen through stakeholder workshops or in the cost recovery proceeding.

As a preliminary matter, Fresh Energy offers that the following metrics could be a good starting point for considering which goals rate-of-return adders or penalties would be appropriate for.

- Meter accuracy test percentage

[8] *Id.*, pp. 13-14

- Percentage of interval reads received[9]
- Avoided field visits
- Number of customers enrolled in time-varying rates or other AMI-enabled demand management programs

Customer satisfaction with key elements like billing accuracy, communications, and customer service is also highly important and should be considered in cost recovery and performance evaluation. Fresh Energy believes that general customer satisfaction issues are addressed in annual service quality reports and should continue to be reported and incentivized/penalized there. However, AMI-specific customer satisfaction metrics like customer usage of My Account and outage information, may be appropriate to establish performance incentives for in the AGIS proceeding.

Fresh Energy recommends that AGIS performance incentives be established in the respective cost recovery proceedings, rather than in the existing Performance Based Mechanism (PBM) docket. The expertise of parties in the AGIS proceedings is relevant for robust consideration of metrics and incentives. We also believe developing metrics and incentives in the related cost recovery dockets will result in more appropriate timelines and more robust record development.

C. METHODS FOR EVALUATION OF PERFORMANCE

1. **What are specific, accountable methods for evaluating the performance of the AMI and FAN projects?**

Fresh Energy recommends that performance is tracked through quarterly reports and evaluated annually in the cost recovery proceeding. We do not believe a quarterly review procedure at the Commission is necessary, but there should be an opportunity for stakeholders to comment on quarterly reports if issues are revealed between annual reviews.

As discussed in Part B, Fresh Energy believes that regular quarterly and annual reports should cover a comprehensive set of metrics on financial performance, customer education and communication, project execution during and after deployment, and key cost-benefit assumptions for the project (see Attachment A for Fresh Energy's initial set of recommended metrics). For each metric, Xcel should report the baseline measurement, the overall target, the expected achievement for the reporting period, and the actual achievement during the reporting period.

[9] A measure of AMI/FAN meter reading effectiveness, calculated as number of intervals reported / total number of possible intervals to be reported * 100

2. **What are the attributes or FAN functions or uses that should be explored or enabled by Xcel?**

Fresh Energy understands that Xcel's FAN will provide wireless communications for both the AMI infrastructure and between Xcel's ADMS and intelligent field devices (i.e., AMI meters, switches, sensors, fault indicators, capacitors, voltage regulators). The FAN will therefore enable enhanced meter reading, enhanced energy efficiency/demand response programs, time-varying rates, IVVO, enhanced outage restoration, enhanced load/voltage monitoring and forecasting, and the enhanced ability to accommodate DER.

3. **Should performance evaluations be tied to AMI and FAN implementation dates (as listed on Table 56 in Xcel Energy's 2019 IDP) or some other factor or consideration?**

Fresh Energy recommends that the Commission evaluate performance regularly through quarterly and annual progress reports in the relevant cost recovery proceeding (see Attachment A for Fresh Energy's recommendations on frequency of reporting for each metric). While Xcel should achieve overall performance on each metric by the AMI and FAN implementation dates it provided in Table 56, regular benchmarking of incremental progress will help to ensure investment performance is on track and continued recovery is appropriate. We recommend that Xcel, in a petition for cost recovery, propose expected quarterly and annual milestone targets for each metric unless interim milestones are not appropriate for that metric.

4. **What considerations should be given to short-term performance (installation rates of AMI, applications for new programs or offerings, etc.) versus long-term system performance (relating to overall system efficiencies and improvements) capabilities outlined in Xcel Energy's 2019 IDP?**

In the near-term, Xcel's (and the Commission's) focus should be on successful and timely project execution. In the long-term, the focus should be on realizing benefits and achieving desired outcomes from the investments. Metrics tracking project delivery in the short-term are essential for tracking performance relative to plans and budgets, and will be helpful to the Commission in making determinations about subsequent cost recovery should a utility request recovery over multiple years and proceedings. As deployment proceeds, it will be essential to ensure that Xcel is achieving progress toward long-term customer benefits, such as reduced electricity consumption, reduced system peak, reduced billing inaccuracies, etc., on a reasonable timeframe.

5. **How should evaluation of AMI and FAN performance be considered at the time of cost recovery (petitions that are likely to be filed in multiple filings, over several years)?**

As stated above and described in more detail under C.15, Fresh Energy recommends that performance is tracked through quarterly reports and evaluated annually in the cost recovery proceeding. It is appropriate for the Commission to consider prior performance when evaluating a subsequent request for cost recovery, and if needed, establish additional customer protections, more frequent reporting, or more stringent metrics. For example, if Xcel is granted cost recovery in 2021 for 25% of the current budget for AMI installation, and after one year has installed significantly less than 25% of the AMI project, the Commission may need to re-evaluate the cost-benefit analysis previously provided and whether sufficient consumer protections and/or performance incentives are in place.

6. **Are there considerations in recommending methods to evaluate performance that would align with, inform, or be informed by on-going dockets or previous Commission decisions or records?**

As discussed under B.7, performance incentives and penalties can be effective in increasing the likelihood that customer benefits materialize. Xcel's Quality of Service Plan ("QSP") and associated reporting, underperformance thresholds, financial penalties, and evaluation procedures provide a construct that can inform AGIS evaluation procedures. The QSP is intended to provide the Commission (and customers) assurance that Xcel will continue to provide safe, adequate, and efficient service, and is therefore setting a floor on performance. For the AGIS initiative, some metrics may warrant penalties to protect against under performance, while incentives to encourage higher performance may be appropriate on other metrics. Fresh Energy recommends that AGIS performance incentives be established and evaluated in the respective cost recovery proceedings, rather than in the existing Performance Based Mechanism or QSP dockets.

7. **Are there any other issues that should be considered when evaluating the performance of AMI and FAN projects?**

None at this time.

8. **What AMI- and FAN-enabled programs or services (e.g., service/rate tier plans, remote connect and disconnect procedures, third-party service and data sharing, etc.) do stakeholders want Xcel Energy to propose? Provide as much detail as possible.**

<u>Remote connect/disconnect:</u>
In its 2019 IDP and request for AGIS certification, Xcel estimated that remote connect and disconnect procedures enabled by AMI would be responsible for 37% of the total customer benefits of the AGIS package. These are undoubtedly essential services for leveraging AMI functionality.

Conservation and demand management:

Continued development and refinement of advanced rate design and demand management programs should be a high priority. In the 2019 IDP, Xcel estimated that critical peak pricing programs would be responsible for 23% of the AGIS package's customer benefits. Itron meters with distributed intelligence functions, like those Xcel plans to deploy for Minnesota customers, will enable new energy efficiency and demand management programs via disaggregating electricity usage. In addition to the Company's ongoing work on TOU rates, demand response, and interruptible rates, we recommend Xcel develop and propose customer education and behavior-based programs that leverage AMI for energy conservation and demand management.

For example, Xcel should explore:

- Near-real-time energy use feedback to customers
- Grid-interactive efficient buildings
- Pay for performance programs
- Targeting program design, marketing, and technical assistance using AMI data
- Enhanced measurement and verification of energy efficiency and demand management programs (e.g. M&V 2.0) to improve program design over time

Third party service and data sharing:

Enabling customers to share data with third-party service providers and enabling third party providers to use AMI data to provide real-time energy management programs will help spur innovation, expand the market for conservation and demand management programs, and may reduce program costs. The installation of AMI with distributed intelligence and the potential for an "App Store-like" platform for customer engagement raises some novel oversight questions that will be important for the Company, Commission, and stakeholders to consider. For example, will third party energy management companies have access to real-time AMI data through an API? Will third-party programs/apps be available via Xcel/Itron's centralized platform? How is the quality and safety of third-party programs vetted? What fees will Xcel/Itron charge third parties? How will that revenue be allocated? Fresh Energy recommends that Xcel address these questions in their request for cost recovery and invite questions and feedback from stakeholders on these issues.

Other use cases:

Xcel should take full advantage of AMI data and load data from intelligent field devices, integrated with the Advanced Planning Tool ("APT"), to significantly improve its load and DER forecasting capabilities. The APT, which was recently certified by the Commission, will greatly enhance Xcel's forecasting sophistication and granularity. High-frequency data from AMI and other intelligent field devices should be leveraged to maximize forecast accuracy and improve forecasting methods over time.

Additionally, Fresh Energy recommends that Xcel use AMI data to improve geo-targeting of energy efficiency and demand response projects for distribution capacity deferrals (e.g., non-wires alternative projects).

9. **Is the Xcel proposed Customer Experience Timeline (see Attachment 3) comprehensive or are there other customer experiences or benefits that should be considered or established?**

The Customer Experience Timeline Xcel has proposed is a good start. Fresh Energy recommends Xcel update this timeline when submitting a request for cost recovery and at least annually throughout the project, refining it as Xcel establishes more certain timelines and develops additional programs and services.

10. **How would stakeholders prioritize those AMI- and FAN-enabled programs or services (e.g., based on the expected customer benefits and associated risks of each offering, the extent to which the program/offering would offset costs or reduce rates, or other)?**

Fresh Energy would prioritize AMI and FAN-enabled programs based on the net present value ("NPV") of expected customer benefits. This measure reflects the current value of future costs and benefits of an investment, and is commonly used in capital budgeting and investment planning.

11. **Under what expected timeframe should the programs be designed, be filed for approval, and implemented?**

Several of the programs and services that will leverage AMI data are already in development, and others are nascent. In general, Fresh Energy believes Xcel should describe its plans in full, to the extent possible, concurrently with the request for cost recovery for the related technology, although timing will need to vary depending on the maturity of the program offering. The following table offers a preliminary recommendation on timing for design, proposal, and implementation of the list of programs and services Fresh Energy identified in response to question C.8.

Table 1: Preliminary Recommendations on Timing of Design, Proposal, and Implementation of AMI-enabled programs and services

Program/Service	Design	File for Approval	Implement
Remote connect/disconnect	Ongoing	With initial AMI cost recovery petition	Concurrently with AMI installation
Advanced TOU rates and flexible pricing pilots	Ongoing	Ongoing	Suite of new C&I and residential rates in place by/before completion of AMI installation
Other AMI-enabled conservation programs: - Real time feedback - Targeted marketing and technical assistance - M&V 2.0	2020	2021-23	By completion of AMI installation
Advanced demand management: - Grid-interactive efficient buildings - Pay for performance	2021-23	2021-23	TBD
Third party service and data sharing	Initial plans in request for cost recovery, refined with stakeholder feedback	One year before launch of app-store and/or behavior-based programs	Concurrently with launch of app-store and/or behavior-based programs
Improved forecasting	Ongoing	Not necessary	Concurrently with AMI installation
Improved geo-targeting for distribution capacity deferrals	2021-23	With any future NWA proposals	With any future NWA proposals

12. At what point should design elements (notice plans for AMI installation, AMI customer data rights and protection, Home Area Network activation plan requirements, cybersecurity impacts, etc.) be considered by the Commission or stakeholders, if at all? Are there any design elements that should be explicitly considered or approved by the Commission?

The Commission and stakeholders should have an opportunity to provide input on Xcel's plans and metrics for customer communications and education prior to approval and implementation. Fresh Energy includes several customer communications/education metrics in Attachment A for consideration. Fresh Energy expects Xcel to detail proposals for customer communications like notices, activation plan requirements, etc. in their initial petition for cost

recovery. As discussed above, Fresh Energy recommends the Commission review and approve plans related to data privacy, customer and third-party data usage capabilities, and platform management – in addition to other notices or communications plans the Commission typically reviews.

13. **Should the evaluation of performance for AMI or FAN be tied to a metric, successful establishment of a program or service, or other consideration or factor?**

Fresh Energy recommends AMI and FAN performance be evaluated using several important metrics on a quarterly and annual basis. Actual performance compared to expected performance for the relevant reporting period should be considered in future cost recovery proceedings and inform the allocation of potential performance incentives.

14. **How can the Commission ensure customer benefits materialize from AMI and FAN implementation should Xcel Energy delay or fail to propose desired programs and services?**

Fresh Energy's recommended approach for developing a PBR framework will increase the likelihood that customer benefits will materialize.

15. **Would a requirement for Xcel Energy to provide a compliance report outlining anticipated new programs and services, expected design periods (and methods for stakeholder input), projected Commission filing dates, projected system impacts, and its progress on any on-going new service programs or services offerings be sufficient?**

For clarity, Fresh Energy differentiates between reporting to track performance of AMI/FAN implementation and outcomes, reporting on the progress of programs and services made possible by AMI/FAN (like those addressed under C.11), and plans describing future program and service offerings.

Xcel should report on AMI/FAN deployment and performance through quarterly reports tracking specific metrics, like those we propose in Attachment A, and an annual Progress Report. This Progress Report should also cover actual versus expected performance on progress of programs and services that leverage AMI/FAN, and describe plans for program/service modifications or additions. Fresh Energy expects that Xcel will provide a detailed plan for AMI-enabled programs and services as part of their request(s) for cost recovery.

Some of these programs may be addressed in the Company's Draft Rate Design Roadmap, new Demand Response Annual Report and/or will need to be proposed and evaluated in separate dockets. To streamline planning documents related to demand management programs, Fresh

Energy believes it may be most efficient to combine the Rate Design Roadmap and Demand Response Annual Report into one filing at a later date. However, it will still be important to include information about program performance and future plans in AMI/FAN Progress Reports to ensure a complete record for the Commission in cost recovery proceedings.

a. If so, how often should Xcel Energy file an AMI and FAN program and service offering compliance report (Progress Report)? What time period should the report cover (i.e. 2, 5, 10-years)?

Fresh Energy recommends that Xcel file an inaugural Progress Report on November 1, 2021 and annually thereafter. This report should cover the project's progress to-date, focusing on performance over the previous year. The Progress Report should also address planned modifications or new programs and services over a future three-year timeframe.

b. Is a May 1, 2022 inaugural filing date reasonable for an initial Progress Report (if using Xcel's annual compliance report filing timing proposal from its 2019 IDP) or should the Progress Report be filed in conjunction with the requests for cost recovery? Or is some other timeframe reasonable?

Fresh Energy recommends that Xcel file its inaugural Progress Report on November 1, 2021 and annually thereafter until the Commission determines the reporting is no longer necessary. A November 1 reporting date will coincide with requests for cost recovery, which will provide a more complete record for the Commission to consider. Fresh Energy recognizes that several other large records are filed on November 1. We are open to alternate reporting schedules that will facilitate a robust record for cost recovery decisions, i.e. that ensure sufficient reporting on the prior period is submitted in conjunction with, or before, a subsequent request for recovery.

The table below shows Fresh Energy's recommended reporting schedule for the first year of project tracking, should Xcel receive approval for cost recovery in mid-2021, following a November 2020 petition.

Table 2: Recommended Reporting Timeline November 2021-November 2022

Date	Reporting Due	Related Filings
November 1, 2021	Inaugural Progress Report - All metrics - Performance of AMI-enabled programs and services - 3-year plan for AMI-enabled programs and services	2021 Integrated Distribution Plan Second petition for cost recovery (at Xcel's option)
February 1, 2022	Quarterly Report - Quarterly metrics	Jan 25: ADMS Annual Report Feb 1: DR Annual Report
May 1, 2022	Quarterly Report - Quarterly metrics	
August 1, 2022	Quarterly Report - Quarterly metrics	
November 1, 2022	Annual Progress Report - All metrics - Performance of AMI-enabled programs and services - 3-year plan for AMI-enabled programs and services	Third petition for cost recovery (at Xcel's option)

c. Should stakeholders be provided an opportunity to review and comment on Progress Reports?

Yes. Progress Reports should be followed by a comment and reply comment period.

d. How should the Commission consider program and service offering compliance reports in relation to any Xcel Energy request for AMI and FAN cost recovery?

Progress and performance of AMI-enabled programs and services is a key component of overall AMI and FAN evaluation, and should be included in regular Progress Reports, but other factors, like project deployment eff should also be considered when evaluating overall performance of the investment in AMI and FAN.

e. Should Xcel Energy be required to file information on programs or offerings not pursued, including the reasons for not pursuing them?

Xcel should report on programs or offerings not pursued when these programs have been raised in prior Progress Reports, petitions for cost recovery, or plans like the Rate Design Roadmap that are associated with achieving AMI benefits.

D. CONSUMER PROTECTIONS

At this time, Fresh Energy does not have specific recommendations on the types or timing of customer protections for the AMI and FAN projects, aside from the performance incentive/penalty framework discussed above.

SUMMARY OF RECOMMENDATIONS

In summary, Fresh Energy requests the Department consider the following recommendations when developing its report to the Commission:

1. In addition to the requirements described in the Commission's September 27, 2019 *Order* in Docket E002/M-17-797, Order Point 9, each AGIS cost recovery filing should include:
    - An explanation of cost contingencies included in the cost/benefit analysis (i.e., amounts added to base costs to account for risks and uncertainty) and the corresponding range of potential cost/benefit analysis (CBA) results;
    - An explanation of key CBA assumptions and a sensitivity analysis[10] of those assumptions;
    - A description of how the investment(s) will support Minnesota's goals for transportation and building electrification.
2. AMI/FAN performance should be evaluated using actual versus expected performance on a comprehensive list of metrics such as those in Attachment A.
    a. In a request for cost recovery, Xcel should establish baselines, targets, and expected timelines for each metric. Xcel should also propose expected quarterly and annual milestone targets for each metric except where interim milestones are not appropriate.
3. Xcel should report on performance quarterly in the relevant cost recovery proceeding, and file inaugural Progress Report on November 1, 2021 and annually thereafter. Annual Progress Reports should cover performance metrics, performance of AMI-enabled programs and services, and a three-year plan for programs and services.
    a. For each metric, Xcel should report the baseline measurement, the overall target, the expected achievement for the reporting period, and the actual achievement during the reporting period.
    b. Annual Progress Reports should be followed by a comment period. Stakeholders

[10] A typical grid modernization CBA includes multiple assumptions such as future reliability improvements, equipment failure rates, customer participation in future DSM programs, EV adoption rates, etc. Most, if not all, of these assumptions are uncertain. A sensitivity analysis determines how much the overall costs or benefits change from a change in one or more key assumptions. A sensitivity analysis also identifies the assumptions that have the most impact on the overall costs and benefits of the proposed investment, thus highlighting the key assumptions that Xcel should further validate, monitor, and report on throughout implementation.

should have the option to raise issues after quarterly reports are filed, as necessary.

4. The Commission should establish performance incentives for a set of high-priority metrics through a stakeholder process in the AMI/FAN cost recovery proceeding.
5. Xcel should develop and propose a range of AMI-enabled programs and services including at minimum:
    a. New energy conservation and demand management programs including:
        i. Near-real-time energy use feedback to customers
        ii. Grid-interactive efficient buildings
        iii. Pay for performance programs
        iv. Targeted program design, marketing, and technical assistance
        v. Enhanced program measurement and verification
    b. Third party services and data sharing capabilities
    c. Improved load and DER forecasting
    d. Improved geo-targeting of energy efficiency and demand response projects for distribution capacity deferrals
6. Xcel should update the Customer Experience Timeline when submitting a request for cost recovery and at least annually throughout the project, refining it as Xcel establishes more certain timelines and develops additional programs and services.
7. Stakeholders should have an opportunity to provide input on Xcel's plans and metrics for customer communications and education prior to approval and implementation.

Fresh Energy appreciates the Department's work to ensure the AGIS initiative is implemented efficiently, effectively, and maximizes customer benefits. Thank you for your consideration of our comments. We look forward to ongoing discussion with the Department, Xcel, and other stakeholders about this important matter.

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Attachment A – Fresh Energy's Recommended AMI/FAN Metrics (Preliminary, 9/18/20)

Category	Metric	Baseline	Target	Reporting Frequency
Key CBA Assumptions	Capex for Asset Health/Reliability, Capacity projects	TBD	1% reduction	Annually
	Storm related capital restoration costs	TBD	10% reduction	Annually
	AMI meter failure rate (avoided meter purchases)	N/A	0.5%	Annually
	Annual trips for damaged customer equipment	1,796 trips	50% reduction	Annually
	Annual trips for residential manual disconnection	TBD	70% reduction	Annually
	Annual trips for residential manual reconnection	TBD	95% reduction	Annually
	Annual "OK on Arrival" field visits	7,464 trips	50% reduction	Annually
	Annual voltage investigation field visits	2,858 trips	50% reduction	Annually
	O&M for Asset Health/Reliability, Capacity projects	TBD	0.1% reduction	Annually
	O&M for storm related activity	$2.1 million	10% reduction	Annually
	CMO – major events	115 million	0.5% reduction	Annually
	CMO – single customer events	1.05 million	20% reduction	Annually
	CMO – tap level events	TBD	TBD	Annually
	Cost of consumption on inactive meters	TBD	20% reduction	Annually
	Commodity bad-debt expense	TBD	8% reduction	Annually
	Residential demand shift from TOU rates	N/A	161 MW	Annually
	Medium C&I demand shift from TOU rates	N/A	52 MW	Annually
	Residential peak demand reduction from CPP	N/A	164 MW	Annually
	Medium C&I peak demand reduction from CPP	N/A	90 MW	Annually
Financial	Total AMI project capital spend to-date vs. total AMI project capital budget	N/A	100% or less	Quarterly
	Total FAN project capital spend to-date vs. total FAN project capital budget	N/A	100% or less	Quarterly
	Total AMI project O&M spend to-date vs. total AMI project	N/A	100% or less	Quarterly

Category	Metric	Baseline	Target	Reporting Frequency
	O&M budget			
	Total FAN project O&M spend to-date vs. total FAN project O&M budget	N/A	100% or less	Quarterly
	O&M cost savings from avoided field visits	N/A	TBD	Annually
	Avoided distribution capital costs due to reduced peak load from time-varying rate program(s)	N/A	TBD	Annually
Customer Communications/ Education	Awareness of AMI technology and benefits (survey)	N/A	TBD	Quarterly
	Understanding of AMI technology and benefits (survey)	N/A	TBD	Quarterly
	Adequacy and clarity of communications prior to AMI installation (survey)*	N/A	TBD	Quarterly
	Number of customer/account inquiries regarding AMI	N/A	TBD	Quarterly
Project Execution/ Delivery – Deployment Phase	Number of AMI meters installed*	N/A	TBD	Quarterly
	Number of AMI meters installed vs. plan	N/A	100%	Quarterly
	Total AMI meters used for billing (activated)	N/A	TBD	Quarterly
	Percentage of FAN deployed*	N/A	100%	Quarterly
	Percentage of FAN deployed vs. plan	N/A	100%	Quarterly
	Number of intelligent field devices enabled by the FAN	N/A	TBD	Quarterly
	Number of customers electing to opt-out of AMI installation*	N/A	TBD	Quarterly
	Percentage of AMI customers receiving estimated bills*	N/A	TBD	Quarterly
	Number of missed installation appointments	N/A	TBD	Quarterly
	Number of calls to Customer Contact Center and meter installation vendor regarding meter installation*	N/A	TBD	Quarterly
	Number of complaints regarding AMI installation*	N/A	TBD	Quarterly
	Percentage of AMI customers that have complained of inaccurate meter readings/bills*	N/A	TBD	Quarterly

Category	Metric	Baseline	Target	Reporting Frequency
	Number of avoided truck rolls/field visits	N/A	TBD	Quarterly
	Meter accuracy test percentage	N/A	TBD	Quarterly
	Percentage of interval reads received	N/A	TBD	Quarterly
Project Execution/ Delivery – Post Deployment	Percentage of AMI customers that receive estimated bills*	TBD	TBD	Annually
	Percentage of AMI customers that have complained of inaccurate meter readings/bills*	TBD	TBD	Annually
	Number of customers electing to opt-out of AMI installation*	TBD	TBD	Annually
	Number of intelligent field devices enabled by the FAN	TBD	TBD	Annually
	Number of avoided truck rolls/field visits	TBD	TBD	Annually
	Number of remote meter disconnect operations	TBD	TBD	Annually
	Number of remote meter connect operations	TBD	TBD	Annually
	Percentage of interval reads received	TBD	TBD	Annually
Customer Engagement – Post Deployment	Customer satisfaction with outage related communications (survey)*	N/A	TBD	Annually
	Number of AMI customers with an active web portal account*	N/A	TBD	Annually
	Number of monthly, unique visits to the web portal*	N/A	TBD	Annually
	Number of customer/account inquiries regarding AMI or time-varying rates	N/A	TBD	Annually
	Number of customers enrolled in time-varying rate programs	N/A	TBD	Annually
	Number of customers enrolled in other AMI-enabled demand management programs	N/A	TBD	Annually

* - Included in Xcel's proposed AGIS progress metrics filed Nov. 1, 2019 in Docket E002/M-19-666

STATE OF MINNESOTA
BEFORE THE PUBLIC UTILITIES COMMISSION

Katie Sieben	Chair
Joseph Sullivan	Vice-Chair
Valerie Means	Commissioner
Matt Schuerger	Commissioner
John Tuma	Commissioner

In the Matter of the Department's Report on Performance Metrics and Other Conditions to Be Applied to Xcel Energy's Projects Certified in Docket No. E-002/M-19-666	DOCKET NO. E-999/DI-20-627
In the Matter of the Petition of Northern States Power Company for Approval of Transmission Cost Recovery Rider Revenue Requirements for 2021 and Revised Adjustment Factors	DOCKET NO. E-002/M-20-680

COMMENTS OF THE OFFICE OF THE ATTORNEY GENERAL

INTRODUCTION

The Office of the Attorney General—Residential Utilities Division ("OAG") respectfully submits the following Comments in response to the Commission's September 23, 2020 Notice of Comment Period on procedures for evaluating Xcel Energy's ("Xcel" or "Company") forthcoming petition to recover certain Advanced Grid Intelligence and Security ("AGIS") investments through the Company's Transmission Cost Recovery ("TCR") Rider. These Comments also respond to the Minnesota Department of Commerce's ("Department") September 24, 2020 Notice of Stakeholder Input and Extended Comment Period regarding metrics, methods for evaluating performance, and consumer protections or other conditions that should be applied to AGIS investments recovered through the TCR Rider.

The OAG recommends that the Commission evaluate Xcel's forthcoming TCR Rider petition through a contested-case process. If the Commission allows Xcel to recover the AGIS investments through the TCR Rider, the OAG would recommend that it require reporting on key

performance metrics, cap rider recovery based on Xcel's initial estimates, and require the Company to flow any incremental revenues or cost savings to ratepayers through the annual rider true-up process. Finally, the Commission should hold at least two public meetings to educate the public about the anticipated benefits of the AGIS initiative and to inform its decision on Xcel's TCR Rider petition.

BACKGROUND

I. XCEL INCLUDES AGIS INVESTMENTS IN BOTH ITS 2019 RATE CASE ITS 2019 INTEGRATED DISTRIBUTION PLAN. IT LATER WITHDRAWS THE RATE CASE.

On November 1, 2019, Xcel filed a rate case ("2019 rate case") and 2019 Integrated Distribution Plan ("IDP"). The filings included an AGIS initiative that would cost $734 million between 2020 and 2029—$582 million in capital costs and $152 million in O&M costs.[1]

Despite having a path to recovering the AGIS investments through its rate case, Xcel, in its IDP filing, also asked the Commission to certify them under Minn. Stat. § 216B.2425 as "investments . . . necessary to modernize the transmission and distribution system."[2] Certification is a prerequisite recovering electric distribution facility costs through a rider under Minn. Stat. § 216.16, subd. 7b.[3] Xcel explained that, even though the AGIS investments would be reviewed and approved through the 2019 rate case, it was nonetheless seeking certification "so that we may complete our AGIS investments at an appropriate pace and potentially include the out-year costs in a rider."[4]

The AGIS investments were never reviewed or approved through the 2019 rate case. Instead, the Commission approved Xcel's alternative proposal to "stay out" of a rate case for

[1] Docket No. E-002/M-19-666, Order Accepting Integrated Distribution Plan, Modifying Reporting Requirements, and Certifying Certain Grid Modernization Projects at 7 (July 23, 2020) (hereinafter "IDP Order").
[2] Docket No. E-002/M-19-666, Xcel 2019 IDP at 4 (Nov. 1, 2019) (hereinafter "2019 IDP").
[3] Xcel uses its TCR Rider to recover the costs enumerated in section 216B.16, subdivision 7b.
[4] 2019 IDP at 20.

another year, with the Company's sales revenues, capital costs, and property taxes to be "trued up" based on 2020 actuals. Meanwhile, Xcel moved forward with its AGIS certification request in the IDP docket.

II. THE COMMISSION FINDS THAT SOME AGIS PROJECTS MEET THE CERTIFICATION THRESHOLD FOR INCLUSION IN XCEL'S TCR RIDER.

A central issue in the IDP proceeding was the meaning and effect of certification. Some parties argued that certifying the projects would imply a favorable decision as to their necessity, prudence, and reasonableness; that the record was not sufficiently developed to make this decision for such a large project; and that the Commission should therefore refer the matter for contested-case proceedings. Xcel, however, assured other parties and the Commission that certification merely served "a gate-keeping function" for grid-modernization investments to become eligible for rider recovery and that the Company would still bear the burden of proving those investments' prudence.[5]

The Commission agreed with Xcel's view of certification, clarifying that "certification does not constitute a pre-judgment of whether costs will be recovered" and "simply permits a utility to request rider recovery in the future."[6] The Commission certified two AGIS components—Advanced Metering Infrastructure ("AMI") and Field Area Network ("FAN")—and established a process for evaluating any future petition for rider recovery of the certified projects.

III. THE COMMISSION ESTABLISHES A PROCESS FOR EVALUATING REQUESTS FOR RIDER RECOVERY OF CERTIFIED AGIS PROJECTS.

The IDP order outlines a two-pronged approach for evaluating a future petition for rider recovery of AMI and FAN costs: (1) a preliminary Commission decision on what procedure to

[5] Docket No. E-002/M-19-666, Xcel Supp. Comments at 6 (Apr. 22, 2020).
[6] IDP Order at 12.

use to evaluate the petition and (2) a stakeholder process, led by the Department, to investigate performance metrics and other conditions to apply to rider recovery.[7]

With respect to procedural scoping, the Commission required Xcel to file, 60 days before filing a rider-recovery petition, multiple procedural options for handling the petition, one of which must be a contested case.[8] The Commission declared its intent to make a "procedural and scoping" decision at the outset of a future rider proceeding.[9]

With respect to conditions on recovery, the Commission requested that the Department compile, with stakeholder input, a report containing "recommendations on specific metrics, detailed methods for evaluating performance, and consumer protections or other conditions, including cost caps, that should be applied to" AMI and FAN.[10] The Commission stressed that cost recovery would be contingent on Xcel's "accomplishing Commission-approved metrics and performance evaluations for the certified projects."[11]

IV. XCEL PROPOSES ALLOWING STAKEHOLDERS 60 DAYS TO REVIEW AND COMMENT ON ITS PROPOSED $450 MILLION INVESTMENT IN AMI AND FAN.

Xcel made its procedural-paths filing on August 28, 2020, in anticipation of seeking rider recovery of AMI and FAN costs in early November. The filing outlines three options: (1) a "standard miscellaneous filing process," (2) a "technical conference," and (3) a contested case. Each option is briefly outlined below.

[7] The Commission also established substantive requirements for a petition for rider recovery of AGIS costs, over and above the requirements contained in prior orders. It required Xcel to discuss "mechanisms that will be employed to maximize cost reductions and minimize cost increases" and demonstrate that the Company "thoroughly considered the feasibility, costs, and benefits of alternatives, and that the proposed approach is preferable to alternatives" including "different types of the same technology." IDP Order at 17.
[8] *Id.*
[9] *Id.*
[10] *Id.* at 16.
[11] *Id.*

Under the standard miscellaneous filing option, which is Xcel's preferred path, there would be 60 days for initial comments on the Company's petition, followed by a 30-day reply-comment period. Xcel acknowledges that its past TCR Rider filings have "generally involved somewhat longer periods of time for initial and reply comments."[12] But the Company suggests that its proposed comment periods are sufficient because the information it will submit with its rider petition "will largely be the same as we submitted with our certification request in November 2019," and that stakeholders "will have had the information—and opportunity to conduct discovery related to the information—for a full year."[13]

Xcel characterizes the second, "technical conference" option as being a "hybrid" of a notice-and-comment and contested-case process. Under this option, Xcel would host four virtual public forums between mid-October and mid-December 2020 covering key aspects of its proposed AMI and FAN investments. The proposed schedule includes a built-in discovery period from November 20 to January 15, with initial comments due on February 1, reply comments due on March 1, and supplemental reply comments due on March 15. Xcel asserts that such a process would be "more timely and productive" than a contested case and would "provide interested parties with the opportunity to fully assess the Company's proposed investments and narrow the issues before the Commission."[14]

Finally, as required by the Commission's order, Xcel presents a contested-case option. It argues, however, that a contested case is not warranted because there are no contested material facts regarding its request for rider recovery of AMI and FAN costs. If the Commission orders a contested case, Xcel believes that an expedited schedule would be appropriate because "the

[12] Docket No. E-002/20-680, Initial Filing at 2 (Aug. 28, 2020).
[13] *Id.*
[14] *Id.* at 3.

direct testimony we likely would file in a contested case would largely be the same as that filed in support of our certification request," though perhaps requiring supplementation to reflect the passage of time.[15] Xcel again asserts as a basis for a compressed schedule that "participants in a contested case will have had access to the bulk of our direct testimony for over a year and, therefore, should be able to produce responsive testimony in a . . . shortened period of time."[16]

ANALYSIS

I. THE COMMISSION SHOULD EVALUATE XCEL'S FORTHCOMING TCR RIDER FILING USING A ROBUST PROCESS CONSISTENT WITH THE EXTRAORDINARY SIZE AND IMPORTANCE OF THE INVESTMENTS INVOLVED.

In certifying Xcel's AMI and FAN investments, the Commission acknowledged that the hard work of reviewing these investments for prudence and rate recoverability had not yet been done. The Commission directed Xcel to provide supplemental information in any rider-recovery petition and to file procedural options for evaluating the petition, with a contested case being a mandatory option. Xcel's procedural filing presents three options, including a contested case. But the Company recommends that the Commission order a notice-and-comment process that would allow stakeholders only 60 days to review its petition. The Commission should reject this proposal and instead evaluate Xcel's forthcoming rider petition using a thorough process suited to the extraordinary size and importance of these investments.

TCR Rider dockets normally involve a lengthy evaluation process with numerous rounds of comments. Over the past six TCR dockets, the average time between the filing of Xcel's petition and the filing of the first stakeholder comment was 134 days, with a minimum period of 91 days. The average time between the filing of the first comment and the last comment was 168 days, with a minimum of 55 days. And the average time between the filing of the petition and

[15] *Id.* at 8.
[16] *Id.*

the Commission order was 466 days, with a minimum of 226 days. Importantly, these numbers do not reflect the time required to obtain a certificate of need for large energy facilities, a process which often involves a contested-case proceeding.

The proposed AMI and FAN projects represent a total capital investment of more than $450 million[17] and are integral to Xcel's plans for transforming its system to meet the changing needs of electricity consumers. Their size and importance thus equal or exceed that of many large transmission-line projects that have been included in the TCR Rider in the past. The process for evaluating AMI and FAN should be comparably rigorous to the usual TCR process, and allow ample time for stakeholders to review Xcel's petition after it is filed.

Xcel argues that it supplied the information needed to analyze the prudence of AMI and FAN in its 2019 IDP proceeding and suggests that stakeholders should already have reviewed their prudence. But the IDP proceeding was focused on a different issue—certification—and expressly did not consider the prudence or recoverability of these investments. Indeed, Xcel itself argued that certification merely served a gatekeeping function and did not require a detailed review for prudence or cost recovery. The Company now suggests that regulators should be poring over the AMI and FAN investments and conducting discovery before Xcel has made a formal request to recover their costs. The idea that parties would conduct discovery on a nonexistent cost-recovery petition is absurd. Stakeholders will need adequate time, after Xcel files its TCR Rider petition, to review these substantial investments and ensure that they are reasonable and prudent.

Beyond providing sufficient time for stakeholder review, the process that the Commission establishes should be robust enough to develop the facts and winnow the issues that

[17] 2019 IDP at 14 tbl.2.

it must resolve. An augmented notice-and-comment process, such as Xcel's second option, could potentially meet this need. But because the issues in this case are likely to involve contested material facts, the wiser course of action is to refer the matter for contested-case proceedings.

Xcel has yet to file its TCR Rider petition, so it is impossible to know with precision what disputed facts it might involve. But the Commission will likely need to resolve, at minimum, the following issues:

- Is rider recovery of the requested AMI and FAN costs in the public interest?
  - Will the proposed AMI and FAN investments achieve their goals at the lowest feasible and prudent cost to ratepayers?[18]
    - How do the AMI and FAN investments fit within and relate to the larger AGIS initiative?[19]
    - Are all proposed components necessary?
    - Are better alternatives available and did Xcel make reasonable efforts to find them?
    - Has Xcel taken sufficient concrete steps to ensure that the purported benefits will be realized?
  - Are any of the costs proposed to be recovered through the rider already being recovered through base rates or another mechanism?
    - Has an appropriate amount of AMI costs been assigned to NSP-MN from PSCo?[20]
- What rate of return is appropriate for rider recovery of these investments?
- What are the appropriate performance metrics to apply to these investments?
- What other ratepayer protections, such as cost caps, are in the public interest?
- What rate design is appropriate for the rider?

[18] *See* Minn. Stat. § 216B.16, subd. 7b(d).
[19] *See* Docket No. E-002/M-17-797, Order Authorizing Rider Recovery, Setting Return on Equity, and Setting Filing Requirements at 13 (Sept. 27, 2019) (ordering Xcel, if and when it seeks TCR Rider recovery of AGIS investments, to provide, among other things, information on "[i]nterrelation and interdependencies with other existing or future investments, including overlapping costs: scope, amount, [and] timing").
[20] *See* Docket No. E,G-002/AI-20-514, Annual Report at 7–8 (May 29, 2020) (discussing "new allocation method" for AMI head-end costs incurred by Xcel's Colorado operating company).

Because at least some of these issues are likely to involve disputed facts, the most prudent course of action would be to refer this matter for contested-case proceedings.

II. PERFORMANCE METRICS, COST CAPS, AND OTHER CONDITIONS ON RIDER RECOVERY

On September 24, the Department of Commerce issued a notice seeking stakeholder input to inform its forthcoming report on metrics and other conditions to be applied to rider recovery of AMI and FAN costs.[21] The Department's notice outlines a number of topics related to metrics, methods of evaluating performance, service offerings, and consumer protections.

The OAG does not address every topic that the Department identifies but instead focuses on areas where the OAG believes it can provide a helpful perspective. At a high level, the OAG recommends the Commission do the following:

- The Commission should, at minimum, require Xcel to track and report metrics that capture the quantifiable benefits that the Company has identified for AMI. This will allow the Commission and stakeholders to verify that the promised benefits are materializing. The mere requirement to report on these and other metrics will likely have a positive impact on Xcel's performance.

- To further protect ratepayers, the Commission should cap rider recovery based on Xcel's initial estimate of AMI and FAN costs, just as it does for other TCR Rider projects. In addition, the Commission should require Xcel to pass through to ratepayers any incremental revenues and cost savings resulting from its AGIS investments.

- Finally, the Commission should hold at least two public meetings to educate the public about the anticipated benefits of AMI and FAN and gather feedback to inform its decision on Xcel's rider petition.

[21] *See* Docket No. E-999/DI-20-627, Department's Notice of Solicitation of Stakeholder Input and Extended Comment Period (Sept. 24, 2020) (hereinafter "Department Notice").

A. The Commission Should Require Xcel to Report, at Minimum, Metrics that Capture the Quantifiable Benefits of AMI.

The Department seeks comments on what metrics to use to evaluate AMI and FAN investments.[22] As the Commission's IDP order recognizes, it will be important to establish robust metrics for these substantial investments. Xcel has touted numerous benefits of its AGIS initiative, some that are quantifiable and some that are not. The Commission should establish metrics that hold the Company accountable for these claimed benefits rather than allow the Company to increase its rate base and simply assume that benefits will follow.

In testimony filed with its last rate case, and attached to its IDP, Xcel identified four categories of AMI benefits: capital benefits, O&M benefits, other quantifiable benefits, and unquantifiable benefits.[23] At a minimum, the Commission should require Xcel to report metrics that measure the quantifiable benefits the Company identified. For example, under the category of quantifiable capital benefits, Xcel stated that AMI will improve distribution management efficiency by providing "a wealth of information about the workings of the distribution system" that will enable the Company to "prioritize areas for investments in tap, transformer, and secondary wire replacement" and "determin[e] the optimal transformer for replacement transformers."[24] Xcel estimates that AMI meters will provide a one percent reduction in capital expenditures for Asset Health and Reliability projects and Capacity projects. The Commission should therefore require Xcel to report its annual capital expenditures for Asset Health and

[22] Department Notice at 3–4.
[23] 2019 IDP, attach. M2 at 55. Xcel does not project that FAN will have benefits in its own right, but it is necessary to support AMI. *Id.*, attach. M1 at 163–64.
[24] *Id.*, attach. M2 at 60.

Reliability projects and Capital projects, with a goal of a one percent reduction in these expenditures.[25]

The Department also asks *when* metrics should be established—"prior to submittal of the cost recovery petition, at the time of any petition for cost recovery, at the time of a petition for a new service program" or based on some other triggering event.[26] The OAG recommends that the Commission establish the most essential metrics, including those that measure AMI's quantifiable benefits, in any order approving recovery of AMI or FAN costs. Establishing these initial metrics would not preclude adding new metrics, eliminating metrics, or modifying goals at a later date. But Xcel should start tracking and reporting data on essential metrics immediately to begin establishing a baseline.

Finally, the Department asks how AMI and FAN metrics should relate to metrics established in other dockets.[27] The metrics established for AMI, although they may relate to metrics that the Commission has established elsewhere, are not dependent on those other metrics because their purpose is different. For instance, in Docket No. E-002/CI-17-401, the Commission has established high-level performance metrics for Xcel. Some of these metrics, such as rates per kWh and average monthly bills, measure affordability.[28] These affordability metrics will indirectly capture any cost savings associated with AMI. But the specific, quantifiable benefits that Xcel identified for its AMI investments should also be measured separately to give the Commission and stakeholders a window into the performance of these substantial investments.

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[25] Fresh Energy lists the full set of metrics based on Xcel's identified benefits. *See* Docket No. E-999/DI-20-627, Fresh Energy Comments, attach. A at 1. The OAG also generally supports the other metrics that Fresh Energy lists.
[26] Department Notice at 3.
[27] *Id.* at 4.
[28] *See In the Matter of a Commission Investigation to Identify Performance Metrics, and Potentially, Incentives for Xcel Energy's Electric Utility Operation*, Docket No. E-002/CI-17-401, Order Establishing Performance Metrics (Sept. 18, 2019).

B. The Commission Should Evaluate AMI and FAN Performance by Setting Reporting Requirements, Establishing Baselines, and Using the Baselines to Inform Performance Goals.

The Department seeks comments on what methods should be used to evaluate Xcel's performance under any metrics the Commission establishes.[29] The Commission should begin by requiring Xcel to periodically report its performance under the metrics the Commission establishes. Once Xcel has reported enough performance data to establish a baseline for a metric, the Commission can use this baseline to establish a goal against which to judge Xcel's future performance.

The first step in evaluating Xcel's performance will be to establish reporting requirements. The OAG believes that an annual Xcel report followed by a Commission evaluation makes the most sense, and agrees with Fresh Energy's suggestion that quarterly reporting may be appropriate for metrics related to project implementation (e.g., number of smart meters installed, percentage of FAN deployed, capital spend vs. budget).[30] Quarterly reports would not require Commission action unless they reveal an issue that needs addressing.[31]

Xcel should begin reporting metric data immediately to start establishing a baseline for future evaluation. Initially, metrics that measure the benefits of AMI may not show any benefit, since Xcel will not realize most of these benefits until AMI is fully rolled out. For example, Xcel expects AMI to drive down meter-reading costs. Until AMI is implemented, however, Xcel's performance cannot be judged based on meter-reading costs, except to the extent that partial implementation will reduce these costs. Xcel should nonetheless begin reporting meter-

[29] Department Notice at 4–6.
[30] *See* Fresh Energy Comments at 8.
[31] *See id.*

reading costs immediately. Requiring the Company to report this and other data in the near term will allow the Commission to begin establishing baselines.

For some metrics, it may make sense to use Xcel's historical performance averaged over a three- or five-year period as a baseline. For example, assuming that AMI will begin reducing meter-reading costs in 2024, a 2021–2023 annual average of meter-reading costs could be used as the baseline. Using an average would help to smooth any anomalies and ensure that the baseline is representative. In addition to the baseline, any upward or downward trend in performance should inform goal-setting.

C. To Protect Ratepayers, the Commission Should Require Xcel to Report Performance Data, Cap Rider Recovery Based on Initial Estimates, and Require Xcel to Flow Incremental Revenue and Cost Savings to Ratepayers.

The final category in the Department's notice pertains to consumer protections that should be considered in conjunction with a petition for rider recovery of AMI and FAN costs. Rider recovery shifts risks from the utility to its ratepayers and lessens the utility's incentive to contain costs. Because of this, the Commission should impose conditions on AMI and FAN cost recovery to protect ratepayers. First, the Commission should require Xcel to report key metrics immediately, as discussed above. Second, the Commission should cap rider recovery based on the cost estimates Xcel provided with its 2019 IDP. Finally, the Commission should require Xcel to maximize the revenues and cost savings from its AGIS investments and to flow the incremental revenues and savings to ratepayers expeditiously.

1. The Commission Should Require Metric Reporting but Should Not Attach Incentives or Penalties to Xcel's Performance Yet.

The OAG does not believe that establishing performance incentives or penalties is necessary or wise at this time. The mere requirement to track and report various metrics will likely have a positive impact on Xcel's performance, and establishing incentives too soon would

therefore risk overpaying for performance that could have been obtained without any incentives. Instead, the Commission should follow the steps in its *Order Establishing Performance-Incentive Mechanism Process*[32] and consider an incentive mechanism only after establishing metrics and performance goals. Establishing a goal will in many cases require baseline data, which may take time to gather. The OAG recommends that the Commission revisit this question after Xcel has reported at least a year's worth of performance data.

If the Commission does consider awarding incentives for good performance, it should also consider imposing penalties for poor performance. A mechanism that only awards incentives would be inequitable because the AMI and FAN investments already represent a net cost to ratepayers before factoring in the cost of any incentives.[33] In other words, ratepayers can expect to pay more for AMI and FAN than they will receive in financial benefits, and adding incentive payments would make them even less cost-effective. A combined incentive/penalty mechanism would apportion risk more equitably between ratepayers and shareholders and would drive the desired level of performance more effectively than would an incentive alone.

One way that the Commission could implement an incentive/penalty mechanism in the context of the TCR Rider is to establish a base-level rate of return for rider investments that would be decreased for performance below a set goal and increased for performance substantially above the goal, up to some maximum return. The maximum return could be the Company's authorized rate of return, and the base return could be some lower rate deemed reasonable for rider projects because of their lower investment risk, such as the Company's weighted cost of debt. As the OAG has stated, though, the Commission preferably should not

[32] *See* Docket No. E-002/CI-17-401, Order Establishing Performance-Incentive Mechanism Process at 5, 11 (Jan. 8, 2019) (adopting OAG's recommended PIM design process).
[33] 2019 IDP, attach. M1 at 165 tbl.10 (showing benefit-to-cost ratio for AMI of 0.83)

establish either rewards or penalties without having a good sense of baseline performance data and trends.

2. The Commission Should Cap Rider Recovery of AMI and FAN Costs at the Estimates Provided in Xcel's 2019 IDP.

The Department requests comment on what, if any, cost-cap provisions should be established beyond the usual TCR Rider cap, which limits rider recovery to the cost estimate provided for a project when it is first included in the rider.[34] The Department also asks, specifically, whether the Commission should establish variable O&M cost-recovery caps for the AMI and FAN projects, set at the lower of the variable O&M costs that Xcel actually incurs costs or variable O&M costs as proposed in its 2019 IDP.[35]

The Commission adopted the existing TCR Rider cap based on concerns that rider recovery gives utilities insufficient incentives to minimize costs.[36] Unlike base rates, which do not vary between rate cases, riders use an annual "true-up" process wherein surcharges are adjusted up down depending on whether a utility over- or underrecovered its costs during the previous year. The utility thus has less incentive to contain the costs of projects being recovered through riders, since—without a cap on recovery—any overruns can be recovered expeditiously. This same rationale for capping recovery of traditional TCR projects applies with equal force to AMI and FAN because of their large cost.

If the Commission allows Xcel to recover AMI and FAN costs through the TCR Rider, it should cap rider recovery at Xcel's initial estimates to encourage fiscal discipline and align the

[34] Department Notice at 6.
[35] *Id.*
[36] *See* Docket No. E-002/M-09-1048, Order Approving 2010 TCR Project Eligibility and Rider, 2009 TCR Tracker Report, and TCR Rate Factors at 6 (Apr. 27 2010) (imposing cap on TCR Rider recovery while referencing recent order imposing similar cap on RES rider); Docket No. E-002/M-09-1083, Order Approving 2010 RES Rider and 2009 RES Tracker Report, Establishing 2010 RES Charge, and Requiring Revised Tariff at 4–5 (Apr. 22, 2010) (adopting Department recommendation to impose cap on RES rider recovery out of concerns about cost overruns).

Company's incentives with ratepayer interests. The cap should be applied separately to AMI and FAN so that overruns on one project cannot be obscured by combining the budgets for the two projects. The Commission should also consider applying separate caps to rider recovery of capital costs and variable O&M costs for each project.[37] The rationale for doing so would be similar to the rationale for applying the cap separately to each project—to hold the Company to its high-level estimates for each category and to incentivize it to control both types of costs.

3. The Commission Should Require Xcel to Pass Through to Ratepayers the Incremental Revenues and Cost Savings from AGIS Investments.

The Department asks whether the Commission should require all revenues from the AGIS initiative to flow to ratepayers—for example, by establishing a pass-through mechanism for AGIS-related revenues and cost savings.[38] The OAG agrees that all revenues and cost savings from AMI and FAN should flow to ratepayers expeditiously.

AMI and FAN investments are expected to drive certain types of cost savings, which Xcel identified in the cost–benefit analysis it filed with the 2019 IDP. Xcel should be required to track and report these cost savings through metrics, as discussed earlier in these comments. When the promised savings materialize, they could be flowed to ratepayers as a credit through the annual TCR Rider true-up process.

AGIS initiatives like AMI and FAN are not designed to bring in new ratepayer revenue, but there may be ways that Xcel can monetize these investments beyond rates. For example, there may be opportunities for Xcel to partner with other utilities and municipalities, share use of the FAN, and thereby reduce its net cost to Xcel's ratepayers.[39] The Commission should ensure

[37] *See* Department Notice at 6.
[38] *Id.*
[39] *See* Aclara, Four Trends in Utility Field Area Networks You Need to Know, https://blog.aclara.com/four-trends-in-utility-field-area-networks-you-need-to-know/ (accessed Oct. 13, 2020).

that Xcel both pursues opportunities to earn additional revenue from AGIS technologies and credits any revenue to ratepayers in a timely fashion. The additional revenue could be flowed to ratepayers through the annual rider true-up process.

D. The Commission Should Hold Public Hearings to Inform Its Decision.

Finally, the Department asks how public input should be considered and whether Xcel should be required to hold public meetings on its AGIS initiatives.[40]

Regardless of whether the Commission refers Xcel's TCR Rider petition for contested-case proceedings, it should ask the Office of Administrative Hearings to assign an administrative law judge ("ALJ") to hold at least two public hearings on the petition. The hearing should be publicized in a similar manner to rate-case public hearings to maximize the public's opportunity to participate. The ALJ could then summarize the public comments, both oral and written, for the Commission's consideration.

Giving the public a meaningful chance to learn about and provide feedback on the AGIS investments is advisable for several reasons. First, these are important and expensive investments. The Commission has held public hearings in many rate cases where a utility's total revenue deficiency was smaller than just these two investments. Second, the AGIS investments are presumably being made for ratepayers' benefit, and thus far, the quantifiable benefits appear to be outweighed by the costs. Xcel could take the opportunity that public hearings would afford to make the case to ratepayers that the intangible benefits of these investments are worth their cost. Finally, public input may be useful in shaping the final contours of these investments, as well as the conditions placed on rider recovery.

[40] Department Notice at 6.

CONCLUSION

For the foregoing reasons, the Commission should take the following actions:

1. Refer Xcel's forthcoming TCR Rider petition for contested-case proceedings;

2. Hold at least two public hearings regardless of whether it orders a contested case; and

3. If the Commission grants rider recovery of any AGIS investments,

    a. require Xcel to report on metrics that capture the quantifiable benefits it has identified for AMI,

    b. cap rider recovery of AGIS investments based on Xcel's initial estimates, and

    c. require the Company to flow incremental revenues and cost savings to ratepayers through the annual true-up process.

Dated: October 16, 2020

Respectfully submitted,

KEITH ELLISON
Attorney General
State of Minnesota

/s/ **Peter G. Scholtz**
PETER G. SCHOLTZ
Assistant Attorney General
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ATTORNEYS FOR OFFICE OF
THE ATTORNEY GENERAL—
RESIDENTIAL UTILITIES DIVISION

The Office of
Minnesota Attorney General Keith Ellison
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October 16, 2020

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

Re: ***In the Matter of the Department's Report on Performance Metrics and Other Conditions to Be Applied to Xcel Energy's Projects Certified in Docket No. E-002/M-19-666***
MPUC Docket No. E-999/DI-20-627

In the Matter of the Petition of Northern States Power Company for Approval of Transmission Cost Recovery Rider Revenue Requirements for 2021 and Revised Adjustment Factors
MPUC Docket No. E-002/M-20-680

Dear Mr. Seuffert:

Enclosed and e-filed in the above-referenced matter please find Comments of the Minnesota Office of the Attorney General—Residential Utilities Division.

By copy of this letter all parties have been served. A Certificate of Service is also enclosed.

Sincerely,

/s/ **Peter G. Scholtz**
PETER G. SCHOLTZ
Assistant Attorney General

(651) 757-1473 (Voice)
(651) 296-9663 (Fax)
peter.scholtz@ag.state.mn.us

Enclosure

CERTIFICATE OF SERVICE

Re: ***In the Matter of the Department's Report on Performance Metrics and Other Conditions to Be Applied to Xcel Energy's Projects Certified in Docket No. E-002/M-19-666***
MPUC Docket No. E-999/DI-20-627

In the Matter of the Petition of Northern States Power Company for Approval of Transmission Cost Recovery Rider Revenue Requirements for 2021 and Revised Adjustment Factors
MPUC Docket No. E-002/M-20-680

I, JUDY SIGAL, hereby certify that on the 16th day of October, 2020, I e-filed with eDockets ***Comments of the Minnesota Office of the Attorney General—Residential Utilities Division*** and served a true and correct copy of the same upon all parties listed on the attached service list by e-mail, electronic submission, and/or United States Mail with postage prepaid, and deposited the same in a U.S. Post Office mail receptacle in the City of St. Paul, Minnesota.

/s/ Judy Sigal
JUDY SIGAL

414 Nicollet Mall
Minneapolis, MN 55401

September 25, 2020

—Via Electronic Filing—

Aditya Ranade, PhD
Deputy Commissioner of Energy Resources
Minnesota Department of Commerce
85 7th Place East, Suite 280
St. Paul, MN 55101

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

RE: RESPONSE TO DEPARTMENT NOTICE
STAKEHOLDER PROCESS INFORMING REPORT AND XCEL ENERGY 2019 INTEGRATED DISTRIBUTION PLAN
DOCKET NOS. E999/DI-20-627 AND E002/M-19-666

Dear Dr. Ranade and Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, submits the enclosed Response to the Minnesota Department of Commerce in response to the Department's August 20, 2020 NOTICE OF SOLICITATION OF STAKEHOLDER INPUT AND COMMENTS, as modified by the September 18, 2020 NOTICE OF EXTENDED COMMENT PERIOD. We also submit this Response directly to the Minnesota Public Utilities Commission in our 2019 Integrated Distribution Plan docket, because it includes an update on our Field Area Network.

We have electronically filed this document with the Minnesota Public Utilities Commission, and copies have been served on the parties on the attached service lists. Please contact Jody Londo at jody.l.londo@xcelenergy.com or (612) 330-5601 or me at bria.e.shea@xcelenergy.com or (612) 330-6064 if you have any questions regarding this filing.

Sincerely,

/s/

BRIA E. SHEA
DIRECTOR, REGULATORY & STRATEGIC ANALYSIS

Enclosures
c: Service Lists

Northern States Power Company,
a Minnesota corporation

Response to Minnesota Department of Commerce
Notice of Solicitation of Stakeholder Input and Comments

In the Matter of the Department Stakeholder Process Informing the Report on the Metrics, Performance Evaluation Method, and Consumer Protection Conditions to be applied to Xcel Energy's Advanced Metering Infrastructure and Field Area Network Projects Certified in Docket No. E002/M-19-666

Docket No. E999/DI-20-627

Introduction

Northern States Power Company, doing business as Xcel Energy, submits these Comments to the Minnesota Department of Commerce and the Minnesota Public Utilities Commission in response to the Department's August 20, 2020 NOTICE OF SOLICITATION OF STAKEHOLDER INPUT AND COMMENTS, as modified by the September 18, 2020 NOTICE OF EXTENDED COMMENT PERIOD.

The Company appreciates the opportunity to provide these comments and looks forward to further dialogue related to our Advanced Metering Infrastructure (AMI) and Field Area Network (FAN) projects. Although these are substantial new investments, we believe existing Commission protocols and requirements for utility investments and program or service proposals – most notably our burden of proof for prudency – provide appropriate transparency with regard to scope, costs, and customer protections and implications related to the investments. Additionally, the statutory framework and specific requirements for advanced grid investment certification and cost recovery as outlined in Docket Nos. E002/M-15-962, E002/M-17-775 & E002/M-17-776, and E002/M-17-797 add to and complement these already robust procedures. As such, we believe it is reasonable, appropriate, and practicable to rely on existing Commission protocols and procedure to assess the appropriateness of any metrics, methods for evaluating performance, and consumer protections or other conditions that should be applied to the certified AMI and FAN projects.

Prior to responding to the specific topics identified by the Department, we want to inform the Commission and stakeholders of a change in our plans for one component of the FAN. The change is necessitated by a Federal Communications Commission (FCC) ruling that has limited the effectiveness of WiMAX technology and driven U.S.

vendors to abandon support of the product – forcing Xcel Energy to look for alternatives. During the course of the procedural process for our AMI and FAN certification request, the impact of the FCC ruling was playing out such that in our April 10, 2020 Reply Comments in Docket No. E002/M-19-666, we noted a migration from WiMAX to Long-Term Evolution (LTE) over time as technology advances. That change has occurred more abruptly than we expected.

The FCC ruled in late 2018, with an implementation date of April 2020, that the use of a network spectrum (frequency) called Citizen Band Radio Spectrum was going to be controlled by third parties to minimize congestion and interference, particularly for the U.S. Coast Guard and Navy, which also used this spectrum for operations. This is the spectrum that the WiMAX technology was designed to use when Xcel Energy selected it in 2014 as a part of the FAN. The FCC ruling that impacted the spectrum used with WiMAX not only made using that frequency more expensive to operate (with high O&M service fees to the designated third parties), but also quickly made the WiMAX technology obsolete, because the cost to network vendors to upgrade to meet FCC rules was cost-prohibitive with WiMAX. The new FCC regulations would have required Xcel Energy to replace WiMAX with new versions of hardware and software equipped with Spectrum Access Service (SAS) capability no later than October 14, 2020.[1] This requirement has driven U.S. vendors to abandon support of the WiMAX product, thus forcing Xcel Energy to look for alternative technology.

As a result, in 2020, Xcel Energy replaced all WiMAX supported technology with public cellular data technology to support continued connectivity to the WiSUN mesh network to support the AMI meters that have been deployed to-date. This is a reasonable interim solution because it is a proven technology in use by other utilities with similar needs and will ensure Xcel Energy meets its commitments to our customers as well as position the Company to potentially convert to private LTE in the future.

This change for a portion of our FAN plans is particularly relevant to these comments as it is a real-life example of the implications associated with evolving and emerging technologies – and highlights the importance of transparent and flexible processes that allow for changes outside of the Company's control and facilitate the Company identifying opportunities in the future that would provide additional benefits to our customers.

[1] SAS is the name the FCC gave to the three companies it certified to monitor entities that chose to use the CBRS (Citizen Band Radio Spectrum), which is the shared/free spectrum or frequency we planned to use WiMAX over.

COMMENTS

A. Cost Recovery Petition Content

The Commission outlined baseline Advanced Grid Intelligence and Security (AGIS) cost recovery petition filing requirements in its September 27, 2019 Order in Docket E002/M-17-797, Order Point 9 (provided as Attachment 1 to the Department's Notice).

1. *Should Xcel provide any additional information to ensure clarity and transparency of costs when seeking cost recovery for the AGIS investments?*

We believe the informational requirements the Commission has established for certification and cost recovery, including those in the referenced 17-797 Order are robust and facilitate transparency. These requirements include, among other things, a business case and comprehensive assessment of qualitative and quantitative benefits to customers. The information requirements specific to cost recovery are extensive and structured to provide transparency into not only costs, but also expected benefits – and thus requires the Company to paint a comprehensive picture of not only the direct costs of the technologies and their deployment, but also how it intends to implement the advanced grid technologies with customers. We provide a list of the existing extensive cost recovery-related requirements and the location of the associated information we included in our November 2019 Integrated Distribution Plan (IDP) to meet each of the requirements as Attachment A to these Comments.[2]

B. Metrics

In its July 23, 2020 Order in Docket No. E002/M-19-666, the Commission indicated that certification of the AMI and FAN projects was made with the recognition that future cost recovery will be based upon Xcel accomplishing Commission-approved metrics and performance evaluations. As a result, any future proposals for cost recovery of investments certified by the Commission's July 23 Order must be accompanied by a proposal for specific metrics and evaluation methods, and a detailed plan describing how Xcel Energy will maximize the benefits of the investments for ratepayers. Thus, the Department requests Xcel and stakeholder input on the appropriate metrics and evaluation methods, including but not limited to:

[2] Docket No. E002/M-19-666.

1. *Are the metrics proposed by Xcel's witnesses Gersack, Bloch, Harkness, Cardenas, Duggirala sufficient to determine performance of the AMI and FAN projects?*[3]

The Company believes that the metrics proposed by the referenced witnesses are sufficient and appropriate at this stage to monitor and assess our performance on the AMI and FAN projects. As stated in our 2019 IDP (at page 164), we proposed to file an annual report on our AGIS initiative that would include various progress metrics that relate to the different parts of our business that are involved in the AGIS implementation. We outlined these metrics in Exhibit____(MCG-1), Schedule 11 of Company Witness Michael C. Gersack's Direct Testimony provided as Attachment M1 to our 2019 IDP and certification request. As we explained, our intent with our proposed metrics is to provide the Commission and stakeholders comprehensive information on deployment progress for monitoring purposes, and performance and achievement of customer and system benefits as we implement the advanced grid initiatives.

We outlined two sets of metrics in our certification request that we believe would provide important, relevant, and appropriate insights into our AMI and FAN implementation from both operational and customer perspectives. The first set of metrics we proposed are designed to provide customer survey results on: (1) our communications and outreach programs prior to installation, (2) installation and deployment metrics of the AMI and FAN projects, and (3) metrics designed to measure the adoption of new products and services, and (4) customer satisfaction with our overall deployment. These metrics will provide relevant information from a customer perspective for the Commission and stakeholders to monitor the progress of our AMI and FAN implementation from pre- to post-deployment from both operational and program and service perspectives.

We derived the second group of metrics from the benefits described in witness testimony and as estimated in our Cost Benefit Analyses (CBA). While we believe it will be appropriate to establish metrics that align with the benefits we anticipate from our implementation, the specific benefits and the timing of when we will realize those benefits is dependent on the specific technology, design, scope and implementation plans approved by the Commission. As such, this second set of metrics we outlined in our certification request is illustrative. And, as we explained in our Reply Comments in the 2019 IDP,[4] while we thoughtfully prepared the CBAs and believe they are reasonable estimates of the costs and initial benefits we expect from these

[3] *See* Xcel Energy's November 1, 2019 Integrated Distribution Plan, Attachments M1-M5. See Attachment 2 to this Notice.

[4] *See* Xcel Energy Reply Comments, Attachment A at page 27, Docket No. E002/M-19-666 (April 22, 2020)

investments, the specific benefit and cost amounts are based on an estimate from the point in time we began our analysis. As we actually enable future AMI and FAN capabilities, developing additional metrics may be appropriate. Given that such metrics would be necessarily tied to the specific capabilities and plans approved by the Commission, it is premature to establish such metrics at this time.

2. What are specific, accountable metrics that should be established?

As we stated in our certification request and further committed above, we are committed to report the specific metrics we proposed in Exhibit____(MCG-1), Schedule 11 of the Gersack Direct Testimony, provided as Attachment M1 to our 2019 IDP and certification request. We do not propose any other additional specific benefit or metric at this time, as we believe the focus should be on the near-term at this stage. We reproduce Exhibit____(MCG-1), Schedule 11for easy reference below, though we note that we are no longer proposing any metrics related to technologies not certified by the Commission (FLISR and IVVO).

Table 1: Reproduction of Gersack Direct Exhibit____(MCG-1), Schedule 11

	Description	AGIS Report*
Customer Outreach and Education	Survey results of customers on the adequacy and clarity of communications prior to installation of advanced meters.	AGIS
Installation and Deployment	Number of advanced meters installed.	AGIS
	Percentage of FAN deployed.	AGIS
	Number of feeders with FLISR enabled.	AGIS
	Number of feeders with IVVO enabled.	AGIS
	Number of customers electing to opt-out of AMI installation.	AGIS
	Number of calls to Customer Contact Center and meter installation vendor regarding meter installation.	AGIS / SQ
	Number of complaints regarding AMI installation.	AGIS / SQ
Post-Deployment	Avoided Customer Minutes Out due to FLISR installation.	AGIS / SQ
	Energy Reduction (MWh) due to IVVO that result in cost savings and CO_2 emissions reduction.	AGIS
	Percentage of customers with advanced meters that receive estimated bills.	AGIS / SQ
	Percentage of customers with an advanced meter that have made a complaint of inaccurate meter readings.	AGIS / SQ
	Survey of customer satisfaction with outage related communications.	AGIS
	Number of customers with an advanced meter with an active web portal account.	AGIS
	Number of monthly, unique visits to the web portal (My Account).	AGIS

** Service Quality potential impacts and reporting noted.*

3. *Are there existing metrics in use by any utility or imposed by a commission that would be useful to evaluate Xcel's AMI and FAN projects?*

The metrics we included in our certification request and that we believe continue to be appropriate initial measures of our performance were based experience with the Company's Public Service Company of Colorado (PSCo) affiliate deployment and review of other utilities such as Ameren Corporation, Baltimore Gas & Electric, Potomac Electric Power Company, and Hawaiian Electric. We selected metrics from these sources that represented the scope and scale of the project we proposed at the time of certification.

4. *When should any given metric be established: prior to submittal of the cost recovery petition, at the time of any petition for cost recovery, at the time of a petition for a new service program, modified tariff, or other change to existing service or offerings enabled by AMI and/or FAN?*

Metrics that are designed to track the progress of the project implementation should be established in conjunction with the cost recovery request where those plans are detailed and so where the Company would define the technology, scope, and timing – all of which are essential to assessment of progress. Similarly, as future product and service offerings are developed, it may be appropriate as part of those proceedings to consider whether, and if so, what specific metrics may be appropriate to measure the Company's implementation and/or its effectiveness. Pairing the plan and associated revenue requirements provides the necessary tie between the costs incurred to develop the functionality that will create the benefits – providing necessary balance between costs and benefits.

5. *For any given metric, what baseline data and targets are necessary in order to evaluate performance?*

Minnesota statutes provide the just and reasonable standard as the measure against which adequate service should be considered.[5] Beyond this, we believe our Quality of Service Plan (QSP) Tariff proceedings in Docket Nos. E,G002/CI-02-2034 and E,G002/M-12-383 and the Commission's Performance Metrics and Incentives (PBM) proceeding in Docket No. E002/CI-17-401 offer important guidance to this question.

[5] Minn. Stat. § 216B.04 requires that every public utility shall furnish safe, adequate, efficient, and reasonable service. Minn. Stat. § 216B.09 gives the Commission authority to set just and reasonable service standards.

The Commission's purpose with our QSP proceeding was to ensure adequate service and provide a foundation for which to measure that service against.[6] Also instructive in the QSP proceeding, the Commission recognized the importance of having sufficient and consistent data upon which to determine fair and reasonable standards for performance. Specifically, in the case of reliability data, the Commission required the QSP performance threshold be renegotiated once the Company had five years of raw outage data under its new Outage Management System with a consistent outage count methodology.[7] The Commission's August 12, 2013 Order approving the current framework of our QSP Tariff further recognized the value of actual performance information over a period of time (in this case, seven years) in determining that the new benchmarks can be expected to maintain satisfactory service quality without penalizing the Company for occasional fluctuations in its performance.[8] As such, a period of time where sufficient, consistent, actual performance data is collected and reported is appropriate to form a foundation from which a baseline level of performance and targets can later be determined.

Through the parallel and ongoing Performance Metrics and Incentives (PBM) proceeding in Docket No. E002/CI-17-401, the Commission established the OAG's proposed performance incentive mechanism (PIM) process and concurred with the design principles the Company offered –incorporating those principles into the PIM process as a way to add further guidance and clarity to the process of identifying and developing performance metrics and standards, and potentially incentives for Xcel Energy.[9] We believe this framework, which the Commission characterized in the same Order as "sufficiently structured but necessarily flexible" provides helpful and important guidance to development of performance standards, metrics and incentives.

The PIM process has seven steps that begin with articulating goals, identifying desired outcomes, identifying performance metrics, establishing metrics, then establishing targets, as needed. The key metric design principles the Commission adopted are as follows:

- *Tied to the policy goal.* A metric should clearly reflect whether or not the underlying policy goal is being met. That is, it should seek and evaluate data that is specifically tied to the particular policy goal underlying the metric.

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[6] "The Commission's expressed purpose throughout this matter has been to investigate and correct as necessary Xcel's reporting of its achievement or non-achievement of existing performance standards rather than to raise those standards." *See* Order, In the Matter of an Investigation and Audit of Norther States Power Company's Service Quality Reporting, Docket No. E,G002/CI-02-2034 (October 13, 2006).
[7] *See* Order (October 13, 2006).
[8] *See* Order Approving Amendments to Service-Quality Tariff, Docket Nos. E,G002/CI-02-2034 and E,G002/M-12-383 (August 12, 2013).
[9] *See* Order (January 8, 2019).

- *Clearly defined.* The method of calculating a metric should be precise and unambiguous to enable meaningful comparisons and to reduce potential disputes.
- *Able to be quantified using reasonably available data.* Using already reported data or data that is readily available will reduce administrative burden and the costs associated with implementing the metric.
- *Sufficiently objective and free from external influences.* Metrics should seek to measure behaviors that are within a utility's control and free from exogenous influences, such as weather or market forces.
- *Easily interpreted.* Metrics should exclude the effects of factors outside a utility's control so they provide a better understanding of utility performance and should use measurement units that facilitate comparisons across time and utilities (i.e., "per kWh" or "per customer").
- *Easily verified.* Straight-forward data collection and analysis techniques should be used, and independent third-party evaluators can further ensure accurate verification with respect to performance metrics.
- *Should complement and inform evaluation of utility performance.* Performance metric systems should be designed to complement – not replace – other parts of a utility's regulatory system such as multi-year rate plans and cost trackers.

Finally, the Commission's Order established the Goals and Outcomes – the first two steps of the PIM process.

As this proceeding and progress along the PIM process wheel has continued, further issues are being examined and discussed. For example, the necessity of a period of data gathering and reporting before finalizing any specific performance measures or thresholds. In the PBM proceeding, we have recommended tracking and reporting the initial metrics ordered by the Commission for a period of three years to determine whether those metrics are the correct ones to be tracking – and if they remain valid as time goes by.[10] Further, a period of at least three years allows room for natural variations in performance. This is also consistent with the recognition of the importance of sufficient, consistent actual performance data to inform standards and metrics in the QSP proceeding.

In the case of AMI and FAN, with the deployment occurring over a 3-year period (2022-2024), the starting point for any metrics will also be important. First, it will be important to establish the goals and expected outcomes from any standards or metrics. Second, the performance evaluation period should begin no sooner than the

[10] *See* Xcel Energy, Reply Comments, Docket No E002/CI-17-401 (December 12, 2019).

actual performance data would be considered consistent. Outside of deployment-related performance reporting, we believe this will require a deployment to be complete and the initial effects (i.e., initial program enrollments, use of new services, improvements in operational efficiency, etc.) to have stabilized in order to validly measure the impacts that might be expected on a go-forward basis. Finally, after consistent data over a sufficient time period is available, monitoring of actual performance can begin.

To the extent the Commission determines a performance threshold is appropriate, the basis could include combinations of historic actual Company performance, relevant comparisons to other companies or utilities, industry benchmarks, or other relevant comparative information. Again, we believe the QSP and PBM proceedings will be instructive.

6. *Do stakeholders recommend use of the proposed Fresh Energy metrics filed in the E002/M-19-666 on April 22, 2020? If Xcel were to provide information on the associated baseline or targets, are the proposed metrics reasonable and sufficient to measure and track performance of AMI and FAN?*

Our understanding of what Fresh Energy proposed in our 2019 IDP is that the Commission require the Company to define and track metrics tied to the major AGIS Cost-Benefit Analysis categories. We agree with this concept. However, as discussed elsewhere in our response to this Notice, any metrics must result from a specific project scope, technology, plan, and timing. Further, we believe any metrics should focus on the most important areas of performance for the Commission and our customers (goals and outcomes in the PIM process). Therefore, while the benefits identified in the CBA may serve as a roadmap of future benefits, some may be tied to the development of specific programs or services in the future. As such, the appropriateness or need for any metrics associated with those, as well as the specifics associated with measurement should be determined as those programs or services are proposed or committed – again pairing program costs/revenue requirements and expected results.

7. *Should, or how should the metrics align with, inform, or be informed by, the Performance Based Mechanism (PBM) docket (E999/CI-17-401) or the annual Safety, Reliability and Service Quality docket (or other relevant dockets)? Should any metric that is established for AMI and FAN be incorporated into the PBM docket or Service Quality docket, another proceeding, or considered only with respect to the cost recovery dockets pertaining to the certified AMI and FAN projects?*

As we have discussed, we believe the PBM docket and the Company's QSP proceeding provide important guidance and framework for development of any AMI and/or FAN-related metrics. We would expect that any reporting associated with AMI and FAN would remain in the cost recovery docket initially, and provided as an ongoing compliance requirement. We expect some of metrics to be short-term - for example, those associated with deployment of the meters or programs and services. For those that the Commission determines are important measures of the public interest and should extend beyond deployment, it may be appropriate for them to move to a different forum at some point. For example, it may be appropriate for reliability-related reporting or operational impacts to established reliability metrics (e.g., SAIDI, SAIFI) from deployment of AMI/FAN to be reported in concert with the Company's other reliability reporting on those same metrics.

C. Method for Evaluation of Performance

General Performance Evaluation

1. *What are specific, accountable methods for evaluating the performance of the AMI and FAN projects?*

The metrics we outlined in Exhibit____(MCG-1), Schedule 11 of the Gersack Direct Testimony included with our 2019 IDP and certification request are specific, accountable methods for evaluating our initial performance, which we believe is the most relevant at this stage. It may be appropriate for the Company to begin tracking and reporting on other aspects of the final AMI and FAN plan that the Commission approves. However, as we have discussed and as has been recognized in the PBM and QSP proceedings, development of standards, metrics and any thresholds should rely on a sufficient and consistent baseline of data from which to measure future performance.

2. *What are the attributes or FAN functions or uses that should be explored or enabled by Xcel?*

Despite the shift away from WiMAX, the FAN functions will be the same with our near-term LTE strategy. The FAN specifically provides two-way communication, which in the case of AMI, is to the meters being deployed for AMI. The primary uses/functions of the FAN are to support specific capabilities and functionalities as described in the AMI section of our 2019 IDP and certification request. Further use of the FAN will depend on Company deployment of expanded AMI or other technologies beyond AMI, as well as the Company's longer-term plans with respect to FAN technology, which we have discussed are currently in flux.

3. *Should performance evaluations be tied to AMI and FAN implementation dates (as listed on Table 56 in Xcel Energy's 2019 IDP) or some other factor or consideration?*

Program	Implementation Timeline
ADMS[10]	In-service 2020
AMI	Meter roll-out 2021-2024
FAN	Deployment 2021-2024 (preceding AMI deployment by approximately six months)

Expectations for the Company's performance with respect to its implementation of AMI and FAN must be tied to the implementation timeline and plan. To do otherwise would not be reasonable. FAN-related metrics we proposed in Exhibit____(MCG-1), Schedule 11 of the Gersack Direct Testimony, and as we have elsewhere in this response explained remain relevant and appropriate include Percentage of FAN Deployed and indirectly, Percentage of customers with advanced meters that receive estimated bills, and Percentage of customers with an advanced meter that have made a complaint of inaccurate meter readings.

4. *What considerations should be given to short-term performance (installation rates of AMI, applications for new programs or offerings, etc.) versus long-term system performance (relating to overall system efficiencies and improvements) capabilities outlined in Xcel Energy's 2019 IDP?*

At this stage, we believe the focus should be on the near-term, with an eye to deploying the technologies to support long-term system performance and capabilities. Our initial focus will necessarily be on the foundational implementation and getting that right. Once that is successfully underway, we believe it will be appropriate to turn our attention to achieving the longer-term vision, capabilities, and functionalities. On a higher level, we believe metric performance should be measured consistent with the PBM docket, established through a significant regulatory process, and relate to the following three categories: (1) customer focus, (2) utility performance, and (3) public policy.

5. *How should evaluation of AMI and FAN performance be considered at the time of cost recovery (petitions that are likely to be filed in multiple filings, over several years)?*

We believe the metrics we outlined in our 2019 IDP and certification request (and as noted in this response, throughout) remain relevant to our initial AMI and FAN deployment – with the exception of the technologies that were not certified – specifically, FLISR and IVVO. Review of these metrics will be appropriate to consider in evaluating our implementation of AMI and FAN technology.

6. *Are there considerations in recommending methods to evaluate performance that would align with, inform, or be informed by on-going dockets or previous Commission decisions or records?*

As noted previously, we believe the PBM proceeding in Docket No. E002/CI-17-401 provides important learnings, framework, process and guidance for identifying and establishing performance measures.

7. *Are there any other issues that should be considered when evaluating the performance of AMI and FAN projects?*

As we have responded throughout, it is necessary to evaluate the performance of AMI and FAN relevant to the specific technology, scope, and timeline approved by the Commission.

Programs and Services Offerings

8. *What AMI- and FAN-enabled programs or services (e.g., service/rate tier plans, remote connect and disconnect procedures, third-party service and data sharing, etc.) do stakeholders want Xcel Energy to propose? Provide as much detail as possible.*

Although this inquiry is not directed at the Company, we believe it is worthwhile to discuss our approach to identifying programs and services to develop. We considered the following factors:

- *Customer research.* As detailed in the Company's 2019 IDP and certification request – the Gersack Direct Testimony and Customer Strategy specifically – the Company has performed and is continuing to perform direct customer research to understand customers' concerns, expectations, and aspirations around smart meters. Insights from these efforts have helped us prioritize customer products and services for the near- and long-term.
- *Industry research.* With the majority of U.S. electricity consumers currently having smart meters, there is a wealth of information available both from peer utilities as well as the research community with respect to the most impactful products and services to effectively leverage the AMI and FAN technologies.
- *Technology assessment.* Working with a variety of key technology partners and stakeholders, the Company identified and prioritized capabilities and solutions that were feasible given the known characteristics of our AMI and FAN technologies.
- *Internal Product Development.* Workgroups across the Company's customer products

and services organization developed the comprehensive roadmap outlined in our Customer Strategy.

9. Is the Xcel proposed Customer Experience Timeline (see Attachment 3) comprehensive or are there other customer experiences or benefits that should be considered or established?

As explained above, the Company's recommended product and service roadmap was informed by extensive customer research, industry research, technology assessment, and internal product development activities. We believe these are important and appropriate foundations on which to build such a timeline. That said, we do not view this as a comprehensive statement of the capabilities of AMI and FAN, and we intend to continue developing customer experiences and benefits over time.

10. How would stakeholders prioritize those AMI- and FAN-enabled programs or services (e.g., based on the expected customer benefits and associated risks of each offering, the extent to which the program/offering would offset costs or reduce rates, or other)?

When prioritizing products and services for development and release to customers, the Company considered the following:

1) *Customer benefit.* Both from the participant and societal viewpoint, we prioritized those services that had the highest impact and reached the greatest number of customers.
2) *Technology readiness.* Many of the new capabilities made possible by the Company's selected meter solution require time to perform the necessary research and development to fully realize. We therefore prioritized services for release to customers based on technology development timelines.
3) *Market readiness.* As energy service markets develop, particularly in the areas of demand management and distributed energy resources enablement, the Company prioritized those services along likely market development timelines.

Again, these considerations are foundational and appropriate to ensure the Company is in a position to deliver on its plan.

11. Under what expected timeframe should the programs be designed, be filed for approval, and implemented?

As described above, the Company's proposed implementation timelines attempt to optimize for customer benefits, technology readiness, and market readiness. To the

extent a program requires Commission approval, we will submit it with sufficient time for the appropriate regulatory procedural process to occur.

12. *At what point should design elements (notice plans for AMI installation, AMI customer data rights and protection, Home Area Network activation plan requirements, cybersecurity impacts, etc.) be considered by the Commission or stakeholders, if at all? Are there any design elements that should be explicitly considered or approved by the Commission?*

All of this was part of information we provided with our request for certification and considered by the Commission. Specifically, we provided our initial notice plan, customer data rights and protection (all of which follow and comply with the Commission's framework for customer data access and protection), cybersecurity considerations, discussion of our plans for HAN functionality and many other design elements with our certification request – and would expect to provide comparable information again with our request for Transmission Cost Recovery (TCR) rider recovery. One reason for this is to keep the Commission informed on prominent aspects of our implementation, but another would be because our cost recovery request will include the costs of some of these, for example, the deployment-related customer communications.

Additional design elements may require Commission approval and others may be more informational. We are committed to keeping the Commission informed on our plans as they progress, whether that takes the form of Petitions seeking approval or informational filings outlining the status of our development of various customer programs, services, or technology capabilities. To the extent there are costs associated with any of these that we seek to specifically recover, we would provide the relevant details either in a separate filing seeking approval and cost recovery, or in conjunction with other AMI and FAN costs – for example, through the TCR Rider.

13. *Should the evaluation of performance for AMI or FAN be tied to a metric, successful establishment of a program or service, or other consideration or factor?*

The Company believes that the relevant metrics (i.e., for the certified portions of our AGIS proposal) set forward in Exhibit____(MCG-1), Schedule 11 of the Gersack Direct Testimony provided as Attachment M1 to our 2019 IDP and certification request establishes a balanced set of performance evaluation measures for our initial AMI and FAN implementations. As we have discussed elsewhere in this response, to the extent we propose a specific program or service, it may be appropriate to eventually establish a performance measurement for that program or service. For the most part, we believe that should be done in conjunction with the program specifics

and cost recovery request. However, some programs or services may be a part of our Conservation Improvement Program (CIP) efforts, and as such, should follow the established measurement, benefits evaluation, and reporting protocols established for CIP.

14. *How can the Commission ensure customer benefits materialize from AMI and FAN implementation should Xcel Energy delay or fail to propose desired programs and services?*

We are committed to maximize the AMI and FAN technologies for the benefit of our customers. However, delays or changes to plans for customer programs and services could occur for many reasons, some of which we can control and some that we cannot. The FCC-driven change to our planned WiMAX technology is an example of something that is out of our control and that impacted our plans. As we have otherwise noted, we are committed to keep the Commission updated through informational reporting on the status of our plans.

Program and Services Compliance Filing

15. *Would a requirement for Xcel Energy to provide a compliance report outlining anticipated new programs and services, expected design periods (and methods for stakeholder input), projected Commission filing dates, projected system impacts, and its progress on any on-going new service programs or services offerings be sufficient?*

As we have noted, we are open and committed to keeping the Commission updated on our plans. We would suggest the frequency of the reporting correlate to the status and timeline for implementation. For the most part, we believe an annual report for the types of information the question contemplates would be appropriate.

a. *If so, how often should Xcel Energy file an AMI and FAN program and service offering compliance report (Progress Report)? What time period should the report cover (i.e. 2, 5, 10-years)?*

We expect development of new programs and services enabled by AMI and FAN to be most concentrated in the initial years, including and immediately following mass deployment. As such, we believe annual reporting that would continue for two years after AMI mass deployment is complete would be appropriate.

b. Is a May 1, 2022 inaugural filing date reasonable for an initial Progress Report (if using Xcel's annual compliance report filing timing proposal from its 2019 IDP) or should the Progress Report be filed in conjunction with the requests for cost recovery? Or is some other timeframe reasonable?

The Company believes May 1, 2022 would be reasonable for an initial progress report. We note additionally that we would expect to include some form of project status with our requests for cost recovery that correlates the dollars we have recovered with our plans and projections for the next cost recovery period.

c. Should stakeholders be provided an opportunity to review and comment on Progress Reports?

We believe the Commission's standard practices and procedures provide robust opportunities for stakeholders to review and comment in open proceedings. As such, we would expect stakeholders would have the same opportunity to comment on reports associated with AMI and FAN as they have to comment on reports in other proceedings.

d. How should the Commission consider program and service offering compliance reports in relation to any Xcel Energy request for AMI and FAN cost recovery?

We would expect that the Commission would treat these compliance filings like it would any other compliance filing associated with cost recovery.

e. Should Xcel Energy be required to file information on programs or offerings not pursued, including the reasons for not pursuing them?

Given the nature of program and service development, the number of offerings that are not pursued far exceeds the number of offerings that are. As such, we believe the focus should be on selected or planned offerings and the benefits they are expected to produce rather than the full breadth of potential development activities. We note that if we change our plans, we would also discuss the reasons we decided to no longer pursue a program(s).

D. Consumer Protections

1. What consumer protections should be considered at the time of petition for cost recovery?

and

2. *What consumer protections should be required or established outside of cost recovery petitions?*

We believe the Commission has already established notable customer protections in the form of transparency associated with our AMI and FAN investments. To date, we have laid out our plans in detail, the costs we expect to incur, and the benefit we expect to result – and we intend for that to continue, including updates on actual costs incurred and benefits realized. As the Commission does with all investments, it will review these costs to determine whether they are prudent – and we bear the burden of proving the prudency of our investments for cost recovery. Allowing stakeholders and the Commission to review in-depth information regarding our costs, benefits, and processes in connection with prudency determinations is a powerful customer protection.

Other customer protections could include customer privacy or confidentiality. In the case of AMI and FAN, customer protections could include a description of the Company's customer data practices and the actions the Company has taken to ensure data security. As we bring forward programmatic filings, it may be appropriate to establish additional targeted protections related to the specific elements of the proposals.

3. *Does the Commission need to establish cost cap provisions for the AMI and FAN projects, beyond what was articulated in the Commission's April 27, 2010 Order Point 4 in Docket No. E002/M-09-1048 – which limits Transmission Cost Recovery to estimates provided at the time of the eligibility determination?*

Rather than cost caps, we believe a transparent process whereby we detail the projects, we detail how we oversee and govern the projects and expenditures, and we demonstrate the steps and actions we have taken to manage costs in the short- and long-term would be the most reasonable, appropriate, and practical approach to protecting customers from unforeseen costs or cost overruns.

The cost cap provisions in the Order referenced in this question were established for regional transmission system investments that the Company has had decades of experience in developing, and the Commission has had decades of reviewing, leading to more accurate cost estimates at the time of eligibility proceedings. When established, these provisions did not contemplate the later 2015 modifications that were made to the statute allowing for recovery of advanced grid investments through the same TCR Rider mechanism. Unlike previous transmission investments, advanced grid technologies such as AMI and FAN are relatively new, developing technologies and are rapidly evolving such that even earlier AMI deployments may

not provide a full picture of what to expect in terms of deployment. This is especially true with respect to telecommunications as evidenced by the change with WiMAX at the Federal level.

Finally, we note that cost caps exist as one method for controlling whether an investment is prudent. There are also regulatory cost recovery review processes that provide control. For instance, detailed cost information is provided in rate cases and riders and the burden is on the Company to prove prudence. Given the nature of these investments, a cap for these types of projects is not appropriate.

   a. *If yes, what are reasonable cost caps and how should they be considered in the light of the (expected) iterative request for cost recovery in multiple TCR Rider or rate case requests? In relation to percent progress of installation? In relation to benefits realized? Or another metric?*

N/A

4. *Should the Commission establish variable Operations and Maintenance (O&M) and cost recovery caps, for AMI and FAN (no more than the lower of actual incurred costs or Xcel Energy's variable costs as proposed in the 2019 IDP, applied on a per-meter basis) or use some other O&M cost protections?*

First, as we discussed above, we do not believe that cost caps for these types of investments are appropriate in general; instead, the Company bears the burden of proving its costs are prudent, and we are confident stakeholders and the Commission can hold us to that standard without cost caps.

5. *Should the Commission require all revenues from the Advanced Grid Intelligence and Security (AGIS) Initiative to flow to ratepayers?*

   and

6. *Should the Commission establish a pass-through methodology and/or develop 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? If so, please provide examples or proposals.*

The regulatory process contemplates review of costs and revenues associated with program proposals to ensure they are flowing to customers appropriately. We do not believe that regular process needs to be modified here. Of course, we will always be looking for opportunities to maximize our investments and value for our customers.

Any specific program proposals should be addressed in a separate docket focused on the specific circumstances of such a proposal.

7. *How should public input be considered or solicited by Xcel Energy or the Commission on AMI and FAN implementation; should Xcel Energy be required to hold public meetings or hearings, and if so, what should the timing be for those meetings in relation to project implementation?*

We recognize the value stakeholder input can afford and have consistently provided forums for such input. As discussed and detailed in our 2019 IDP, in partnership with Great Plains Institute, we conducted four stakeholder workshops leading up to our filing in an effort to educate, build a better understanding of our work and stakeholders' needs, and to continue an iterative and ongoing dialogue and build a mutual understanding of our processes and the content of the IDP.[11] These included a session dedicated to the cost benefit framework for advanced grid investments and a session dedicated to the Company's financial and other forecasts – and 5-year action plan. As we noted, we internalized this feedback and the feedback we received on our 2018 IDP and factored it into the information we presented in our 2019 IDP – including how we presented the costs and benefits of our advanced grid components, and our proposal to implement IVVO in Minnesota (that was ultimately not certified by the Commission).

As we noted in our Reply Comments in our 2019 IDP and certification request proceeding, we are open to technical conferences or workshops to explore certain issues. In our August 28, 2020 compliance filing in Docket Nos. E002/M-19-666 and E002/M-20-680, we outlined as one option, a hybrid approach that would pair the Company's miscellaneous filing (for cost recovery) with the Company hosting a series of virtual public forums intended to educate and solicit input from interested stakeholders about the Company's AMI and FAN investments. We proposed the meetings be held in the approximately 60 days surrounding the Company's TCR cost recovery proposal – covering key aspects of our investment proposals that were the subject of broad stakeholder interest, specific issues the Department suggested should be the subject of a contested case, and/or specific stakeholder or informational directives from the Commission's Order certifying our proposed AMI and FAN investments. Please see that filing for more details.

[11] *See* Section XVI. Stakeholder Engagement beginning at page 260.

CONCLUSION

Xcel Energy appreciates the opportunity to provide these comments. We look forward further dialogue and exploration of these issues.

Dated: September 25, 2020

Northern States Power Company

IDP Grid Modernization Content Roadmap

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

Source	Requirement/Description	IDP	Rate Case: AGIS [as presented in Gersack as Exhibit___(MCG-1), Schedule 2]
Docket No. E002/CI-18-251 Aug. 30, 2018 Order (Updated to include changes from Jul 16, 2019 Order)	**A. Baseline Distribution System and Financial Data: Financial Data**		
	26. Historical distribution system spending for the past 5-years, in each category: a. Age-Related Replacements and Asset Renewal b. System Expansion or Upgrades for Capacity c. System Expansion or Upgrades for Reliability and Power Quality d. New Customer Projects and New Revenue e. Grid Modernization and Pilot Projects f. Projects related to local (or other) government-requirements g. Metering h. Other	II.D, III.B, XIII, XIV	Addressed in IDP
	28. Projected distribution system spending for 5-years into the future for the categories listed above, itemizing any non-traditional distribution projects	II.D-E, IX, XIV, Attachments M1, M2, M3, M5	Gersack II(C) AGIS Expenditures 2020-2029 Gersack V(D)(2) AGIS PM Costs 2020-2029 Bloch V(A) AGIS - Distribtuion 2020-2029 Bloch V(D)(5) AMI - Distribution 2020-2029 Bloch V(E)(3) FAN - Distribution 2020-2029 Bloch V(F)((6) FLISR - Distribution 2020-2029 Bloch V(G)(7) IVVO - Distribution 2020-2029 Harkness V(E)(3)(c)(4) AMI - IT 2020-2029 Harkness V(E)(4)(e)(4) FAN - IT 2020-2029 Harkness V(E)(5)(c) FLISR - IT 2020-2029 Harkness V(E)(6)(c) IVVO - IT 2020-2029 Harkness V(E)(7) AGIS - IT 2020-2029 Duggirala Schedules 2, 3, 4
	29. Planned distribution capital projects, including drivers for the project, timeline for improvement, summary of anticipated changes in historic spending. Driver categories should include: a. Age-Related Replacements and Asset Renewal b. System Expansion or Upgrades for Capacity c. System Expansion or Upgrades for Reliability and Power Quality d. New Customer Projects and New Revenue **e. Grid Modernization and Pilot Projects** f. Projects related to local (or other) government-requirements g. Metering h. Other	II.D, IX, XIV, and Attachments F1, G1, M1, M2, M3	Gersack II(B) Exec Summary - Drivers Gersack IV Drivers of AGIS Strategy Gersack II(C) Exec Summary - Implementation Gersack V(A) Component Implementaion Gersack V(B) Overall Timeline/Implementation Bloch V(A) Projects and Timeline Block V(B) Drivers (Limitations of System) Bloch V(D) AMI Bloch V(E) FAN Bloch V(F) FLISR Bloch V(G) IVVO Harkness V(B)(E) AGIS Overview Harkness V(E)(3) AMI Harkness V(E)(4) FAN Harkness V(E)(5) FLISR Harkness V(E)(6) IVVO
	30. Provide any available cost benefit analysis in which the company evaluated a non-traditional distribution system solution to either a capital or operating upgrade or replacement	VI and Attachment H	Addressed in IDP

Source	Requirement/Description	IDP	Rate Case: AGIS [as presented in Gersack as Exhibit___(MCG-1), Schedule 2]
Docket No. E002/CI-18-251 Aug. 30, 2018 Order (Updated to include changes from Jul 16, 2019 Order)	**D. Long-Term Distribution System Modernization and Infrastructure Investment Plan**	XIV and Attachments J, M1	Gersack II Exec Summary Gersack IV Drivers of AGIS Strategy Gersack V AGIS Components and Implementation Gersack VI Customer Experience
	2. Xcel shall provide a 5-year Action Plan as part of a 10-year long-term plan for distribution system developments and investments in grid modernization based on internal business plans and considering the insights gained from the DER futures analysis, hosting capacity analysis, and non-wires alternatives analysis. The 5-year Action Plan should include a detailed discussion of the underlying assumptions (including load growth assumptions) and the costs of distribution system investments planned for the next 5-years (expanding on topics and categories listed above). Xcel should include specifics of the 5-year Action Plan investments. Topics that should be discussed, as appropriate, include at a minimum:		
	· Overview of investment plan: scope, timing, and cost recovery mechanism	II, IX and XIV and Attachment M1	Gersack II Exec Summary
	· Grid Architecture: Description of steps planned to modernize the utility's grid and tools to help understand the complex interactions that exist in the present and possible future grid scenarios and what utility and customer benefits that could or will arise.	IX, X, XIV, Figure 73 and Attachments M1-M4	Gersack V AGIS Components and Implementation Bloch V(D) AMI Bloch V(E) FAN Bloch V(F) FLISR Bloch V(G) IVVO Harkness V(E)(3) AMI Harkness V(E)(4) FAN Harkness V(E)(5) FLISR Harkness V(E)(6) IVVO Harkness V(D) Cyber Security Cardenas V(F) Quantifiable Benefits Gersack VI Customer Experience (Benefits)
	· Alternatives analysis of investment proposal: objectives intended with a project, general grid modernization investments considered, alternative cost and functionality analysis (both for the utility and the customer), implementation order options, and considerations made in pursuit of short-term investments. The analysis should be sufficient enough to justify and explain the investment.	IX and Attachments M1-M3	Gersack V(C) Alternatives to AGIS Bloch V(D)(6) AMI Alternatives Bloch V(F)(7) FLISR Alternatives Bloch V(G)(6) IVVO Alternatives Harkness V(E)(4)(g) FAN Alternatives
	· System interoperability and communications strategy	IX, X and Attachments M2, M3	Bloch V(D)(7) AMI Interoperability Bloch V(F)(8) FLISR Interoperability Bloch V(G)(7) IVVO Interoperability Harkness V(E)(4) FAN Overview Harkness V(E)(4)(b) FAN Interoperability Harkness V(E)(3)(b) AMI Integration
	· Costs and plans associated with obtaining system data (EE load shapes, PV output profiles with and without battery storage, capacity impacts of DR combined with EE, EV charging profiles, etc.)	IDP XI (F)	Addressed in IDP
	· Interplay of investment with other utility programs (effects on existing utility programs such as demand response, efficiency projects, etc.)	Attachment M1	Gersack VI(B)(4) Energy Savings Programs
	· Customer anticipated benefit and cost	V.D.2, IX.F-G, XVI and Attachments M1-M5, O1-O4	Gersack VII Prudence of AGIS Investments (CBA) Duggirala Overall CBA Costs, Benefits, Results Gersack VIII Bill Impacts *Costs and Benefits are also discussed throughout Bloch V (AGIS), Harkness V (AGIS), and Cardenas V (AGIS)*
	· Customer data and grid data management plan (how it is planned to be used and/or shared with customers and/or third parties)	IX, X and Attachments M1, M3	Gersack VI Customer Experience (overall) Gersack VI(B)(3) Digital Experience (web portal) Gersack Schedule 3 Customer Strategy (Appendix B: Data Access, Privacy, Governance) Harkness V(D) Cyber Security
	· Plans to manage rate or bill impacts, if any	IX.G, XIV.A and Attachment M1	Gersack VIII Bill Impacts
	· Impacts to net present value of system costs (in NPV RR/MWh or MW)	XIV and Attachment L	Addressed in IDP

Source	Requirement/Description	IDP	Rate Case: AGIS [as presented in Gersack as Exhibit___(MCG-1), Schedule 2]
Docket No. E002/CI-18-251 Aug. 30, 2018 Order (Updated to include changes from Jul 16, 2019 Order)	**· For each grid modernization project in its 5-year Action Plan, Xcel should provide a cost-benefit analysis based on the best information it has at the time and including a discussion of non-quantifiable benefits. Xcel shall include all information used to support its analysis.**	IX, X and Attachments M1-M5, O1-O4, filed Workpapers	Gersack VII(A) CBA Gesack VII(B) Qualitative Benefits Duggirala II(B) Quantitative Inputs Duggirala II(C) Results Duggirala IV Qualitative Benefits
	· Status of any existing pilots or potential for new opportunities for grid modernization pilots	IX, X, XIII and Attachment M1	Gersack III Grid Mod Background (Res TOU Pilot) Gersack IV(C)(2) Advanced Rate Design/Billing Options
	3. In addition to the 5-year Action Plan, Xcel shall provide a discussion of its vision for the planning, development, and use of the distribution system over the next 10 years. The 10-year Long-Term Plan discussion should address long-term assumptions (including load growth assumptions), the long-term impact of the 5-year Action Plan investments, what changes are necessary to incorporate DER into future planning processes based on the DER futures analysis, and any other types of changes that may need to take place in the tools and processes Xcel is currently using.	IX, X, XIV and Attachments M1, M2	Gersack II Exec Summary Gersack V AGIS Implementation Gersack VI(D) Customer Experience (Long Term) Bloch D(4)(d)(1) AMI Benefits (DER) Bloch G(4)(b) IVVO Benefits (DER)
Docket No. E002/CI-18-251 July 16, 2019 Order	**8. Provide all information, analysis and assumptions used to support the cost/benefit ratio for AMI, FAN, and FLISR; and IVVO and CVR cost-benefit analysis as part of its 2019 IDP filing or other future filings.**	IX.F and Attachments M1-M5, O1-O4, filed Workpapers	Duggirala Overall - CBA testimony points to the other witnesses who provide detailed cost and benefit forecasts.
Docket No. E002/M-17-797 Sept. 27, 2019 Order	**9. If and when Xcel requests cost recovery for Advanced Grid Intelligence and Security investments, the filing must include a business case and comprehensive assessment of qualitative and quantitative benefits to customers, considering, at a minimum, the following:**	IX, X and Attachments M1-M5	Gersack II Exec Summary Gersack III Grid Mod Background Gersack IV(D) Commission Policy and Stakeholder Input Gersack V(A) AGIS Components Gersack V(B) Overall Implementation Gersack VII(A) CBA Quantified Benefits Gersack VII(B) Qualitative Benefits Bloch V(D) AMI Bloch V(E) FAN Bloch V(F) FLISR Bloch V(G) IVVO Harkness V(E)(3) AMI Harkness V(E)(4) FAN Harkness V(E)(5) FLISR Harkness V(E)(6) IVVO
	A. Scope of Investment **1. Investment Description**		
	a. Detailed description of proposed investment and project life		
	b. If multiple components, overview of costs and descriptions of each		
	i. Include purpose and role		
	ii. Explain known and potential future use cases for each component		
	iii. Explain known and potential value streams and how each component fits with state policy, statues, rules and Commission orders		
	iv. Describe beneficiaries of each investment (who, how many, over what time period)		
	c. Articulation of principles, objectives, capability, functionalities, and technologies enabled by investment; and		
	d. Interrelation and interdependencies with other existing or future investments, including overlapping costs: scope, amount, timing.		
	2. Alternatives considered	Attachments M1-M3, N1-N4	Gersack V(C) Alternatives to AGIS Bloch V(D)(5) AMI Cost Development (RFP discussion) Bloch V)D)(6) AMI Alternatives Bloch V(F)(6) FLISR Cost Development Bloch V(F)(7) FLISR Alternatives Bloch V(G)(5) IVVO Cost Development Bloch V(G)(6) IVVO Alternatives Harkness V(E)(4)(e) FAN Cost Development Harkness V(E)(4)(g) FAN Alternatives AGIS Supporting files, Vol. 2B (on disc)
	a. If a Request for Proposal was used provide:		
	i. The RFP issued, including list of all services or assets scoped in the RFP		
	ii. Provide summary of responses		
	iii. Provide assessment of bids and factors used for selection		
	iv. The scope of offerings or services included in the selected bid		
	b. If not, what was used.		
	3. Costs	IX and Attachments M5, O1-4, filed Workpapers	Duggirala II(A) Model Structure and Requirements Duggirala Schedules 2, 3, 4, 5
	a. Provide sufficient information to determine what is included in the investment in each of the following categories:		
	i. Direct Costs (product, service, customer, project, or activity)		
	ii. Indirect Costs		
	iii. Tangible Costs		
	iv. Intangible Costs		
	v. Real Costs		
	b. If needed, provide the utility's definition of each category and whether internal or external labor costs are included in the category and the instant petition. If the costs are not included in the petition, include information on where and when those costs will be sought to be recovered.	Attachment M5	Duggirala II(A) Model Structure and Requirements
	c. If there is overlap or costs included in both categories, outline the overlapping costs and explain.	Attachment M5	Duggirala II(A) Model Structure and Requirements Duggirala Schedules 2, 3, 4, 5
	d. For each of the cost categories outline whether the investment has been partially approved or included in previous or on-going docket riders, rate cases, or other cost recovery mechanisms or note all costs are included in the instant petition.	II.D-E, IX, XIV, XV	Gersack II(C) Exec Summary - AGIS Implementation Gersack III Grid Mod Background Bloch V(C) Grid Mod Efforts to Date Harkness V(E)(2) Grid Mod Efforts to Date

Source	Requirement/Description	IDP	Rate Case: AGIS [as presented in Gersack as Exhibit___(MCG-1), Schedule 2]
Docket No. E002/M-17-797 Sept. 27, 2019 Order	**4. Detailed Analysis of the type of proposed or multiple cost effectiveness analysis utilized:**	Attachment M5	Duggirala III
	a. Least-cost, best-fit (Xcel proposes in IDP Reply comments)		
	b. Utility Cost-test; and		
	c. Integrated Power System and Societal Cost test		
	B. Provide a cost benefit analysis for (1) each investment component with overlapping costs or benefits in isolation and (2) each bundled components, as appropriate	V.D, IX and Attachments D2, M1-M5, O1-O4, filed Workpapers	Duggirala II(C) CBA Results AGIS Supporting files, Vol. 2B (on disc) Gersack VII(A)(1) CBA Overview
	1. Provide Discount Rate Used and Basis; and	Attachment M5 and filed Workpapers	Duggirala II(A) Model Structure and Requirements
	2. Identify cost categories and benefit categories used (explain metrics), including an explaination of how benefits can be monitored over time and proposal for reporting to Commission:	IX and Attachments M1, M5	Duggirala II(B) Quantitative Inputs Gersack IX Metrics and Reporting
	a. Identify quantitative costs and qualitative costs: i. Use quantitative methods to address qualitative benefits to the extent possible. ii. Explain system used to assess value and priorities to qualitative benefits (points and/or weighting); and iii. Identify sensitivity ranges on estimates or value	V.D, IX and Attachments D1, D2, M5, O1-O4	Duggirala Overall CBA Costs, Benefits, Results
	b. Include a long-term bill impact analysis	IX , XIV and Attachment M1	Gersack VIII Bill Impacts
	c. Include a reference case/scenario without the project (or group of projects); and	IX, XIV and Attachments M1, M5	Duggirala II(A) Model Structure and Requirements Gersack VIII Bill Impacts
	d. Apply the following principles to ensure the investment analysis has:	Attachments M1-M5	*The Company has incorporated these priciples throughout its analyses, including:* Gersack V AGIS Components and Implementation Bloch V(D) AMI Bloch V(E) FAN Bloch V(F) FLISR Bloch V(G) IVVO Harkness V(E)(3) AMI Harkness V(E)(4) FAN Harkness V(E)(5) FLISR Harkness V(E)(6) IVVO Cardenas V(F) Quantifiable Benefits Gersack VI Customer Experience (Benefits) Duggirala Overall CBA Costs, Benefits, Results
	i. compared with traditional resources or technologies;		
	ii. clearly accounted for state regulatory and policy goals;		
	iii. accounted for all relevant costs and benefits, including those difficult to quantify;		
	iv. provided symmetry across relevant costs and benefits;		
	v. applied a full life-cycle analysis;		
	vi. provided a sufficient incremental and forward-looking view;		
	vii. is transparent;		
	viii. avoided combining or conflating different costs and benefits;		
	ix. discuss customer equity issues, as needed;		
	x. assessed bundles and portfolio where reasonable; and		
	xi. addressed locational and temporal values.		

October 14, 2020

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VIA E-FILING

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

Re: In the Matter of an Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic
PUC Docket No. E,G-999/CI-20-492

In the Matter of an Inquiry into Xcel Energy Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic
PUC Docket No. E,G-002/M-20-716

In the Matter of the Petition of Northern States Power Company dba Xcel Energy for Approval of 2021 True-up Mechanisms
PUC Docket No. E-002/M-20-743

In the Matter of Xcel Energy's Integrated Distribution Plan and Advanced Grid Intelligence and Security Certification Request
PUC Docket No. E-002/M-19-666

In the Matter of the Petition of Northern States Power Company for Approval of the Transmission Cost Recovery Rider Revenue Requirements for 2021 and Revised Adjustment Factors
PUC Docket No. E-002/M-20-680

In the Matter of the Department Stakeholder Process Informing the Report on the Metrics, Performance Evaluation Methods, and Consumer Protection Conditions to be applied to Xcel Energy's Advanced Metering Infrastructure and Field Area Network Projects Certified in Docket No. E002/M-19-666
PUC Docket No. E-999/DI-20-627

In the Matter of the Petition of Northern States Power Company for Approval of General Time-Of-Use Service Tariff
PUC Docket No. E-002/M-20-86

Electric Rate Case Sales Forecast Data
PUC Docket No. E-002/GR-20-723

Dear Mr. Seuffert:

Enclosed for filing in the above-titled dockets is a Motion and Initial Comments submitted on behalf of the Xcel Large Industrials ("XLI").

By copy of this letter, all parties have been served. A Certificate of Service is also attached.

Very truly yours,

Stoel Rives LLP

/s/ Andrew P. Moratzka

Andrew P. Moratzka

APM:cal
Enclosures

cc: Service Lists

CERTIFICATE OF SERVICE

I, Carmel Laney, hereby certify that I have this day served a true and correct copy of the following document(s) to all persons at the addresses indicated below or on the attached list by electronic filing, electronic mail, courier, interoffice mail or by depositing the same enveloped with postage paid in the United States Mail at Minneapolis, Minnesota.

MOTION AND INITIAL COMMENTS
ON BEHALF OF THE XCEL LARGE INDUSTRIALS

In the Matter of an Inquiry into Utility Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic
PUC Docket No. E,G-999/CI-20-492

In the Matter of an Inquiry into Xcel Energy Investments that May Assist in Minnesota's Economic Recovery from the COVID-19 Pandemic
PUC Docket No. E,G-002/M-20-716

In the Matter of the Petition of Northern States Power Company dba Xcel Energy for Approval of 2021 True-up Mechanisms
PUC Docket No. E-002/M-20-743

In the Matter of Xcel Energy's Integrated Distribution Plan and Advanced Grid Intelligence and Security Certification Request
PUC Docket No. E-002/M-19-666

In the Matter of the Petition of Northern States Power Company for Approval of the Transmission Cost Recovery Rider Revenue Requirements for 2021 and Revised Adjustment Factors
PUC Docket No. E-002/M-20-680

In the Matter of the Department Stakeholder Process Informing the Report on the Metrics, Performance Evaluation Methods, and Consumer Protection Conditions to be applied to Xcel Energy's Advanced Metering Infrastructure and Field Area Network Projects Certified in Docket No. E002/M-19-666
PUC Docket No. E-999/DI-20-627

In the Matter of the Petition of Northern States Power Company for Approval of General Time-Of-Use Service Tariff
PUC Docket No. E-002/M-20-86

Electric Rate Case Sales Forecast Data
PUC Docket No. E-002/GR-20-723

Dated this 14th day of October, 2020.

/s/ Carmel Laney
Carmel Laney

COMMERCE DEPARTMENT

Stakeholder Workshop on Xcel Energy's
Advanced Metering Infrastructure and Field Area Network
E999/DI-20-627

Attached are the October 23, 2020 Stakeholder Meeting presentations from:

- Xcel Energy,
- Plugged-In Strategies, and
- Mission:Data Coalition.

To view the webcast, go to :
https://minnesota.webex.com/recordingservice/sites/minnesota/recording/playback/ed940c9202ce4b8b90bb824cc74b0cea

For questions, please contact Tricia DeBleeckere at Tricia.DeBleeckere@state.mn.us, 651-539-1849 or Matthew Landi at Matthew.Landi@state.mn.us or 651-539-1823.

Stakeholder Workshop: Xcel Energy's AMI and FAN Investments

October 23, 2020 – Starting at 10AM

Workshop Agenda

10:00 AM	**Welcome and Introductions** Department of Commerce
10:10 AM	**Overview of Xcel AMI-Distributed Intelligence (DI) and FAN Proposals** Paul Davis, Advanced Metering Infrastructure (45 min) Wendell Reimer, Field Area Network (30 min) Paul Davis, AMI-DI and FAN Financials and Cost-Benefit Analysis (20 min) Lee Gabler, Customer and Stakeholder Engagement Roadmap Overview (30 min) Drew Quirk, Data Access and Home Area Network (20 min)
12:30 PM	**Lunch Break**
1:00 PM	**Advanced Metering Infrastructure in Review: Informing the Conversation Overview** Chris Villarreal, Plugged-In Strategies on behalf of Department of Energy
1:30 PM	**Data Portability: Customer Benefits and Communication Considerations** Michael Murray, Mission:data Coalition
2:00 PM	**Q&A and Wrap-Up**

Workshop Notes

- **Workshop Purpose and Objective**
  - Xcel sought and received a determination from the Minnesota Public Utilities Commission that certain investments (AMI and FAN) are eligible for consideration in a future rate rider.
    - Xcel's Petition – Integrated Distribution Plan and Certification Petition
    - Commission Order in Docket M-19-666 - Approved Eligibility of the Investment
      - Order Point 9 – The Department will file a report [December 1, 2020] including recommendation on **specific metrics, detailed methods for evaluation performance, and consumer protections or other conditions, including cost caps**, that should be applied to the certified projects. **The report should be informed by a stakeholder process and will be made part of the record for any future cost recovery proceedings.** Xcel must participate in the stakeholder process, which must be open to all interested parties, and fully cooperate with the Department.
  - Department Investigation Docket DI-20-627 – Report Due December 1, 2020 – Notice for Stakeholder Input
  - Transmission Rider - Xcel's Procedural Path Compliance Filing for 2020 Transmission Cost Recovery Rider, Docket M-20-680
  - Workshop #2?

Workshop Notes

- **Workshop Logistics**
  - Agenda
  - Webex Meeting Platform
  - Q & A Encouraged
  - Meeting is being recorded – *Change from agenda notice*
  - Slides will be posted to eDockets
  - A summary of the meeting will be included in the Department's December 1 Report
  - Any preliminary questions?

Workshop Notes

- **Next Steps**
  - Anticipated Xcel Petition for AMI and FAN Cost Recovery in Transmission Cost Recovery Rider (Est. Nov. 6, 2020)
  - Department Report Filed December 1, 2020 in Docket DI-20-627, M-19-666

Thank you

MN DOC Stakeholder Workshop on

Xcel's AMI and FAN Investments

Tricia.debleeckere@state.mn.us

Matthew.Landi@state.mn.us

DEPARTMENT OF COMMERCE STAKEHOLDER WORKSHOP

Xcel Energy's Advanced Metering Infrastructure and Field Area Network

October 23, 2020

AGENDA

1. Process Overview – Mark Raak
2. Advanced Metering Infrastructure – Paul Davis
3. FAN/Communication Systems – Wendall Reimer
4. AMI & FAN Financials – Paul Davis & Wendall Reimer
5. Customer/Stakeholder Engagement Roadmap Overview – Lee Gabler
6. HAN & Interface – Drew Quirk

Xcel Energy®

PROCESS OVERVIEW

Mark Raak –
Manager Commercial Services

History of AMI

- AMI Solution RFP, Aug 2016
- AMI Mesh Network Contract with SSN, Dec 2017
- Itron acquires SSN, Jan 2018
- Electric Meter RFP Issued, Mar 2018
- Focus on customer, Aug/Sep 2018
- Initial award, Dec 2018
- RFP letters Edge/DI issued Mar/Apr 2019
- Agreements with Itron, Sep 2019

Key Considerations

- Network
  - Technological capabilities, robust, standards-based network
  - Security & resilience
  - Price & commercial considerations
  - Meter agnostic
- Meter
  - Compatibility with the selected network
  - Core metrology
  - Edge Technology/Distributed Intelligence/Customer
  - Price & commercial considerations
  - Enterprise schedule

Distributed Intelligence Considerations

- Enable computing at the edge of the grid
- New communication capabilities
- Provides open application environment
- Enhanced customer experience
- Operational benefits
- Grid optimization

ADVANCED METERING INFRASTRUCTURE

Paul Davis –
Director Meter Reading

Itron Gen5 RIVA (HW4.2) Meter

- Consumer Services and Grid Optimization through Open Platform Distributed Intelligence (DI) enabled Smart Meters

- Third evolution of the RIVA meter
  - High frequency sampling + processing power to run local analytics
  - 2.35M RIVA (HW4.1) Meters deployed since becoming Itron standard in 2015
  - Gen5 Riva (HW4.2) Meters included Xcel Energy collaborative design suggestion integrations and wireless protocol enhancements to operated on multiple networks

Overview of Itron RIVA 4.2 Meter

- RIVA 4.2 meter incorporates billing registers, DI platform, Wi-Fi and Mesh radios on a single board – No separate NIC hardware
- DI hardware embedded with base meter. Functionality enabled via firmware

Itron Experience with the Gen5 RIVA (HW4.2) Meter

- Evolution of existing platform
- Qualified in compliance with all American National Standards Institute (ANSI) C12 requirements
- Rigorous Accelerated Life Cycle testing & >3.3M hours of “Meter Farm” operation.

2015 RIVA Meter Platform Initial DI Apps

2016 DI Lab Opens Utility App Store Initiated

2017 DI Launch: NAM Utility DI App Testing

2018 DI app deployed to field with First 3rd Party App

2019 6.2M DI meters contracted

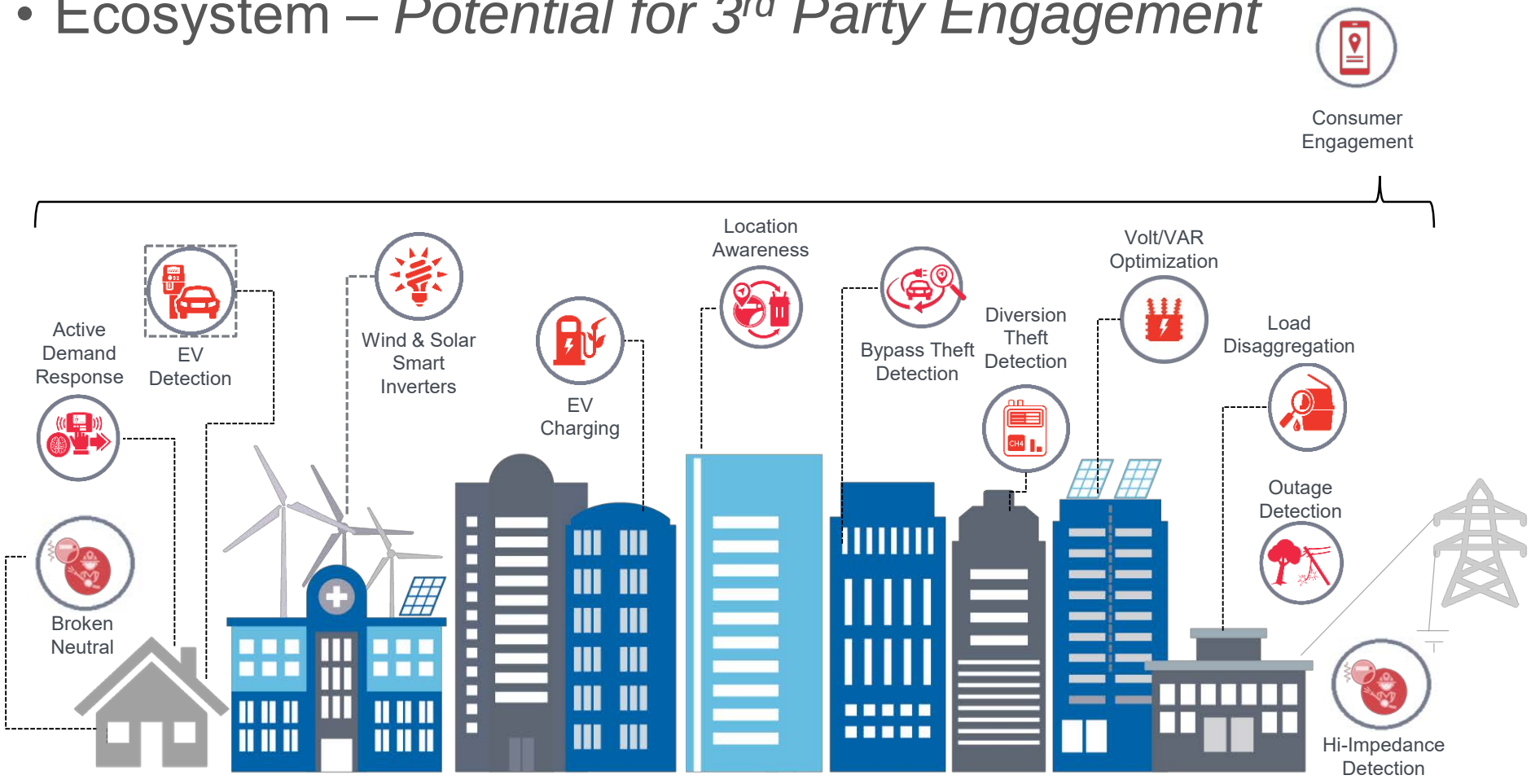
2021 Widescale Industry DI Deployment

Meter Functionalities

	Gen5 Riva
Compute Power	• Cortex A7 processor (600Mhz) for meter register firmware, comms and DI apps • 512MB Base 2GB Flash + 256MB RAM
Operating System	• Linux OS in order to create an ecosystem of developers • Secure isolated environment for DI Apps (container-based)
Meter Data	• DLMS/COSEM (subset of C12) • High Frequency Data Sampling • 60 days' worth of 1hr intervals in non-volatile memory
Peer-to-Peer communication	• Enhanced DI decisions based on environment
Outage Performance	• Supercap + DI App for additional outage scoping via peer-to-peer comms
Wi-Fi	• Local Access for Contingency Reads • Home Area Network (IEEE 2030.5) • DI Apps (e.g. DER connectivity)

Distributed Intelligence Potential

- Intelligence that empowers
- Ecosystem – *Potential for 3rd Party Engagement*



Existing Distributed Intelligence Applications

High Impedance Detection

- Detect “hotspots” in the low-voltage network including customer meter installations and poor wiring connections

Residential Neutral Fault Detection

- Reduce intermittent customer blinks and irregular operation of homeowner appliances
- Decrease customer costs from expensive repair of appliances due to broken neutrals

Theft Detection

- Increase customer satisfaction and safety
- Reduce non-technical energy usage impact on customer bills

Itron Application Access for Utilities

- Secure app deployment and management tool
- Marketplace for vendors to offer to utilities and distribute their apps
- Clearly defined app certification and submission processes and terms
- Tracking mechanism for license deployment and vendor compensation
- Tracking mechanism for app health and resource utilization

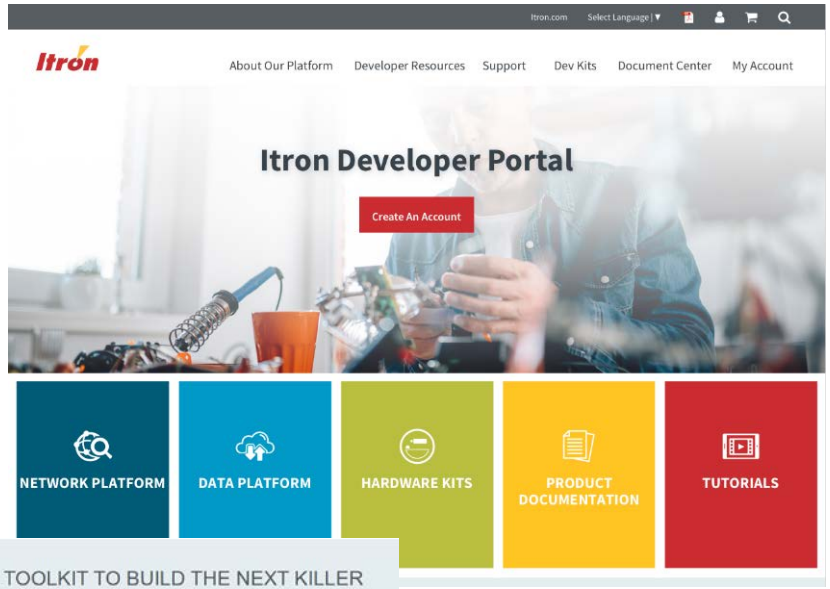
Application Development (developer.itron.com)

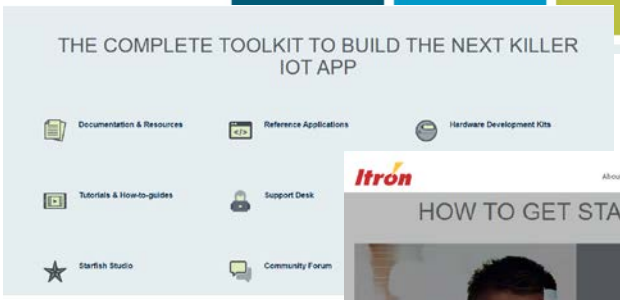
Engagement platform for all developer needs

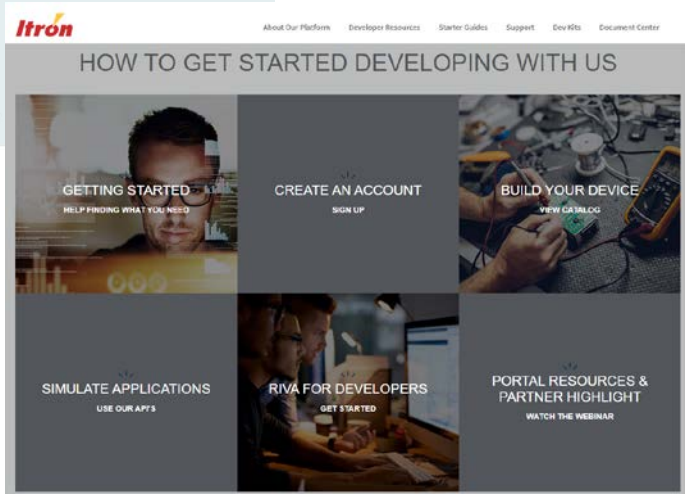
Documentation & Resource Library

Reference Applications

Quick Start Guides & Video Tutorials







DI Content Includes:

- DI Overview
- Desktop SDK reference
- Getting started guide
- DI API reference

TECO DI Performance Evaluation

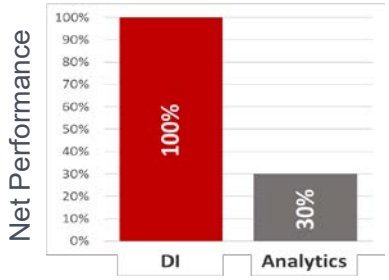
Purpose: evaluate relative performance of DI Apps versus traditional analytics

Method: blind test – use cases created across a population of meters, with neither solution aware of which conditions occurred or on which meters

Evaluation: Itron high Impedance detection, broken neutral detection, and bypass theft detection DI Apps compared against results from a well-known analytics vendor selected by TECO

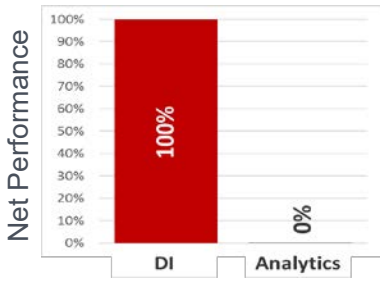
Results:

Bypass Theft Detection



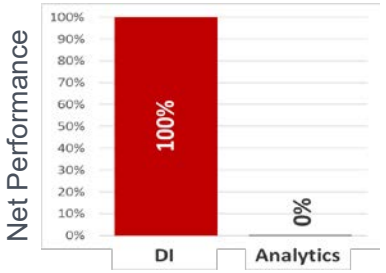
Events Created	10
DI Detected	10
DI False Positives	0
Analytics Detected	10
Analytics False Positives	7

High Impedance Detection



Events Created	5
DI Detected	5
DI False Positives	0
Analytics Detected	0
Analytics False Positives	0

Broken Neutral Detection



Events Created	6
DI Detected	6
DI False Positives	0
Analytics Detected	0
Analytics False Positives	0

Utilities With Itron RIVA Meters Deployed

Avangrid	City of Holyoke
Avista Corp	Liberty Utilities (Canada & USA)
City of Lubbock (Lubbock Power & Light)	NorthWestern Energy
City of Roseville, CA	Nova Scotia Power (Canada)
Conelectricas (Costa Rica)	TECO Energy
Emera Maine	Vectren

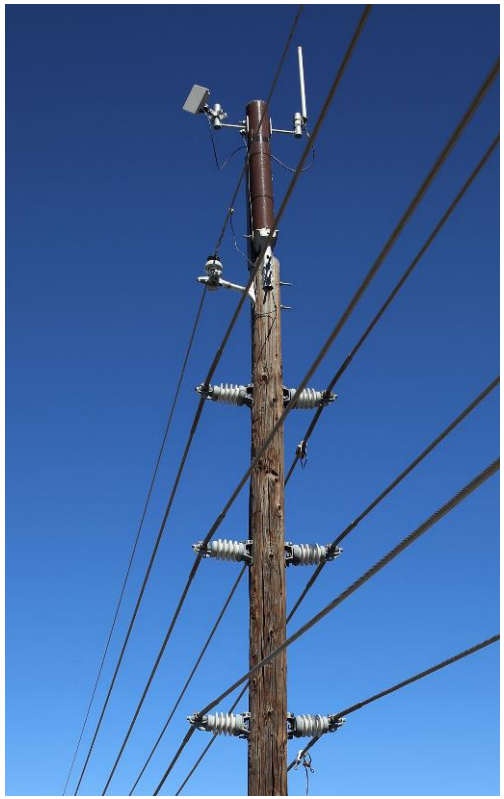
FIELD AREA NETWORK / COMMUNICATIONS SYSTEMS

Wendall Reimer –
Director Advanced Grid Delivery

Field Area Network (FAN)

- Provides high speed connectivity to field devices
- High Speed Communications Network
- Wi-SUN (RF Mesh) technology
- Standards Based, seeking interoperability
- Envisioned as part of 2013 Network Strategy
- Tiered network to future proof
  - Multiple standards deployed
  - Interoperability critical
  - Multi-purpose network

- Benefits – *Enabler of various program benefits*



Wi-SUN
(Wireless Smart Utility Networking)

Standards-based, interoperable wireless mesh network

- Based on IEEE 802.15.4g
- Uses standard network protocols (IPv4/IPv6)
- 2-way communication to all devices (electric + gas)
- Meters participate in mesh network
- Redundant paths for all nodes

Per hop bandwidth up to 1.2mbps, one-way latency less than 50ms

- 200x more bandwidth and 5x improved latency of legacy technology

Each mesh cluster is approximately ½ mile radius

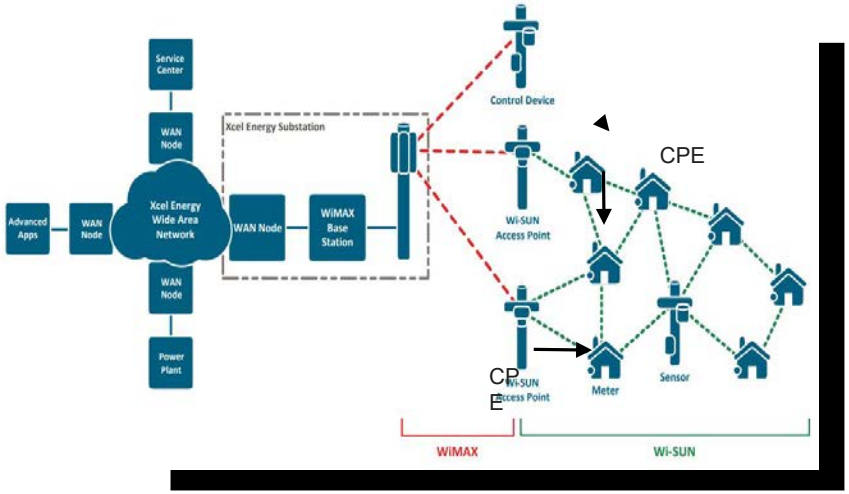
- Avg. 2500 meters per cluster – capable of 5000 per cluster

FAN Core Principles

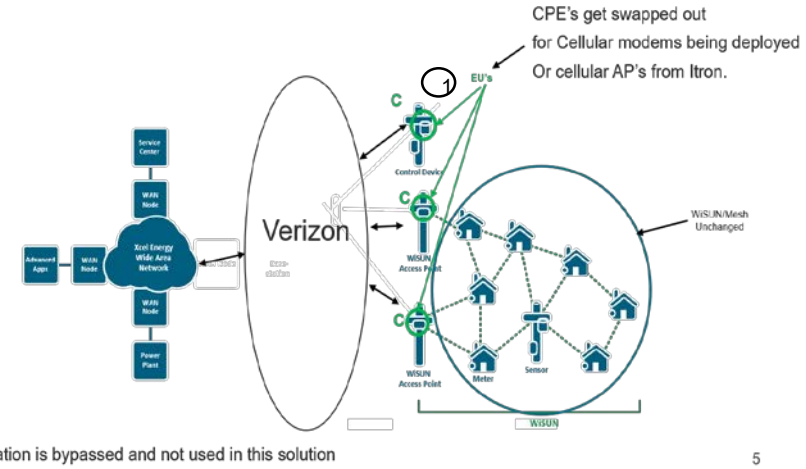
The Field Area Network will…

1. …leverage Xcel Energy-owned assets (towers, land, fiber optic, etc.)
2. …utilize industry standards for all tiers of network
3. …transparently support all types of traffic
4. …support prioritization of traffic over the network

Advanced Grid FAN Architecture



Previous WiMAX Network



Currently deployed Cellular

Network Privatization Considerations

1. Privatize versus public carriers

- Capital versus O&M – focus on owned asset and reduce O&M
- Own and operate – priority of traffic and control
- Security – defense in depth along with other field network traffic
- Prioritization of events – Xcel Energy top priority in event resolution
- Resilience/Redundancy – duplicate/alternate paths to minimize outages and impact to customers and operations

2. Device communication thru substations

- Peer-to-peer communications – single network – meters can talk to capacitor banks, etc.
- Latency requirements – low latency required – no round trip to data center
- Edge compute (data) capabilities – process data at sub – send only summary

3. Multi-use networks

- Electric Distribution (meters, cap banks, ENGO's, etc.)
- Two-way switches
- Streetlights
- Gas (meters and SCADA)
- Batteries

AMI AND FAN FINANCIALS

Paul Davis –
Manager Meter Reading

Wendall Reimer –
Director Advanced Grid Delivery

AMI and FAN Capital Expenditures – *State of Minnesota Electric*

	MYRP Case Period			5-Year Period	10-Year Period[1]
AGIS Component	**2021**	**2022**	**2023**	**2024-2025**	**2026-2030**
AMI	$16.4	$116.4	$117.8	$88.0	$0.4
FAN	$6.3	$44.2	$25.6	$15.5	-
Total	**$22.7**	**$160.6**	**$143.4**	**$103.5**	**$0.4**

[1] Period may include additional assumptions, including inflation and labor cost increases that are not part of the capital budget in periods 2021-2025.

Preliminary information. Amounts included in TCR cost recovery request may vary. FAN amounts beyond 2021 are representative of potential full private network.

AMI and FAN O&M Costs –
State of Minnesota Electric

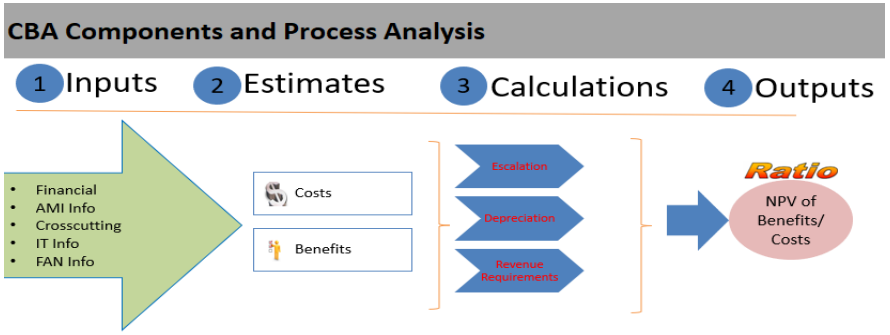
	Rate Case Period			5-Year Period	10-Year Period[1]
AGIS Component	**2021**	**2022**	**2023**	**2024-2025**	**2026-2030**
AMI	$5.8	$9.0	$9.4	$16.6	$51.9
FAN	$1.2	$1.2	$0.8	$0.9	-
Total	**$7.0**	**$10.2**	**$10.6**	**$17.5**	**$51.9**

[1] Period may include additional assumptions, including inflation and labor cost increases that are not part of the

Preliminary information. Amounts included in TCR cost recovery request may vary. FAN amounts beyond 2021 are representative of potential full private network.

Cost Benefit Analysis Framework – AMI

- Deployment timeframe: 2019-2024
- Meters to install: 1,400,000
- Includes Communication network cost
- Major benefit includes avoided replacement cost of the current depreciated AMR network
- Costs include contingencies



***Capital, O&M expenses, and Benefits are discounted back to the beginning of project, creating a present value (PV) for each stream*

Inputs
Financials
Inflation, property & income tax, discount rate, AFUDC rate, period
Execution & Operations Costs
Meters, labor, installation, blueprint, program mngmt, Business Systems, communication, ongoing support, integration, delivery,

Estimates and Calculations
Revenue Requirements
Book value & depreciation, tax depreciation, return on CWIP, rate base, deferred and current taxes
Inclusion of Benefits
Avoided costs, cost savings, efficiency gains, reduced consumption, CPP and TOU tariffs, DSM capacity avoidance, avoided CO_2, outage Mngmt, tamper reduction.

Outputs
Benefit to Cost Ratio (BCR)
BCR= PV Benefits/ PV Costs • Intangible factors are not included • Ideally to be used in conjunction with other types of analyses

Cost Benefit Analysis Snapshot – AMI/FAN

NSPM -AMI-PV	**Total ($MM)**
Benefits	**446**
O&M Benefits	53
Other Benefits	203
CAP Benefits	190
Costs[1]	**(554)**
O&M Expense	(180)
Change in Revenue Requirements	(374)
Benefit/Cost Ratio	**0.80**

RATIO SENSITIVITY	VALUE
FAN(100% WiMAx)+ Contingencies	0.80
FAN(100% WiMAx) NO Contingencies	0.96

[1] The CBA has changed in relation to the CBA submitted in the Company's 2019 IDP and Certification Request. FAN backhaul (formerly WiMAX) costs are now allocated 100% to the AMI program; previously, 20% was allocated to IVVO and FLISR, which were not certified by the Minnesota Public Utilities Commission.

CUSTOMER / STAKEHOLDER ENGAGEMENT ROADMAP OVERVIEW

Lee Gabler –

Director Customer Strategy and Solutions

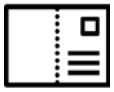
Customer Engagement Plan

Phase I
Raising Awareness

- xcelenergy.com
- Fact sheets and FAQs
- Stakeholder outreach & community meetings
- Social media
- Media outreach
- Paid advertising: radio, digital
- Market research

Phase II
Informing Meter Installation


90-Day Postcard


60-Day Postcard


30-Day E-mail or Letter


7-Day Phone Call or Text


Day-of Doorhanger

Phase III
Customer Engagement

- xcelenergy.com
- My Account/My Energy Portal
- Social media
- Intro of new Day One programs
- Web-based video
- Direct mail/e-mail
- Paid advertising TBD

Product and Service Roadmap

	DAY ONE (2022)	NEAR TERM (2022-2025)	FUTURE (2025+)
ENHANCE THE EXPERIENCE	• Energy Usage Dashboard • Enhanced Web and Mobile Apps • Enhanced Outage Notifications • Green Button Connect My Data	• Emergency and Safety Notifications • Energy Usage Alerts and Notifications • Personalized Notifications • Power Quality Analysis	• Artificial Intelligence Enabled Notifications • Smart Premise Restoration • Enhanced Microgrid Integration • Smart Safety Disconnect
KEEP BILLS LOW	• Virtual Energy Audits • Enhanced Communication Options with Behind the Meter Systems	• Whole Facility Monitoring • Rate Advisor • Time Varying Rates	• Smart Rates • Enhanced Automated Demand Response
CLEAN ENEERGY		• Demand management optimization • Enhanced access to battery storage and electric vehicles • Green notifications and controls • Enhanced DER enablement	

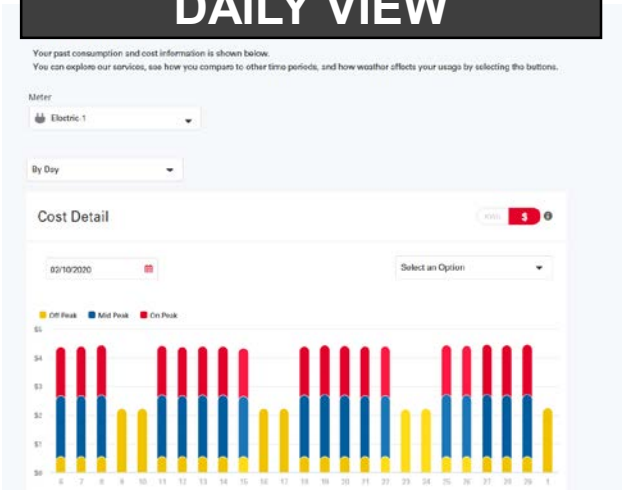
HOME AREA NETWORK AND DATA CONSIDERATIONS

Drew Quirk –
Manager, Advanced Grid Customer Solutions

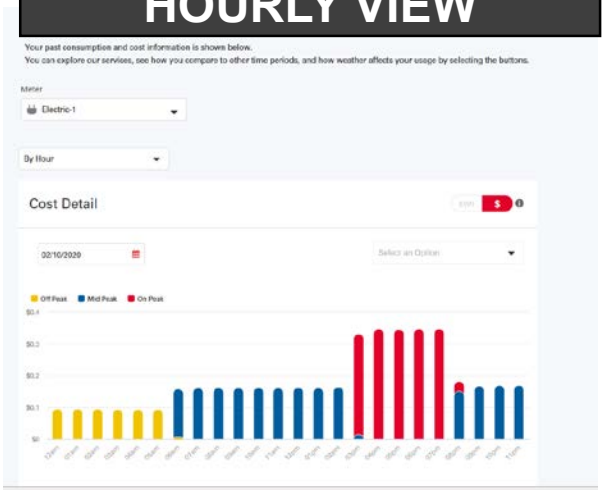
Day 1 Customer Data Availability and Access

Data Type	Latency	Access Path
15 min Historical Interval Usage Data	Updated every four hours	Customer Portal
	Updated overnight	Green Button Connect
<1min usage data (kW and kWh)	Near real time	HAN via Company Mobile App

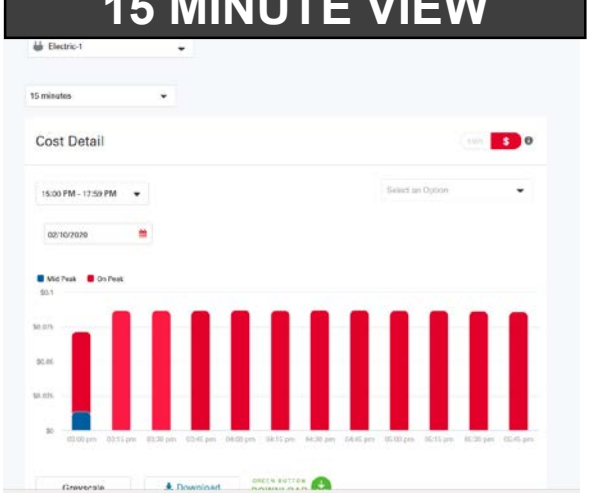
DAILY VIEW



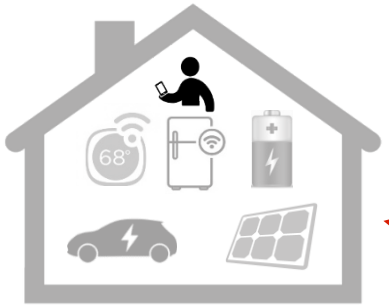
HOURLY VIEW



15 MINUTE VIEW



HAN / DI Communication Overview



Meter and apps interact with home devices via WiFi radio, IEEE2030.5, and TCP/IP

Meters interact with ADMS (via FAN) for network and grid-based app functionality

ADMS

Metering w/ Network Interface

Extended Edge Processor

Customers access Portal to subscribe to apps and view data.

Customer Portal

Customer apps loaded on meter via FAN.

Xcel Grid Edge Application Platform

App Platform interacts with ADMS for network and grid-based app functionality

Xcel Energy Customer Data Access Practices

- Policies are rooted in the principle of Customer Control and consistent with the Minnesota Commission's framework for treatment of personally identifiable information and energy usage data
- Provides all customers direct access to their information
- Allows all customers to share their usage information multiple ways
  - With written consent
  - Download in spreadsheet format
  - Download in Greenbutton Download My Data format
  - *With AMI* – share with Greenbutton Share My Data
  - *With AMI* – via an optional Home Area Network (HAN) service
- Expecting the Commission to examine and possibly make changes to framework for energy usage data
  - Will adapt policies and practices accordingly

QUESTIONS?

Overview of AMI In Review: Informing the Conversation

A report funded by the United States Department of Energy,

Advanced Grid Research Program

Before Stakeholder Workshop on Xcel Energy's

Advanced Metering Infrastructure and Field Area Network

Docket No. E999/DI-20-627

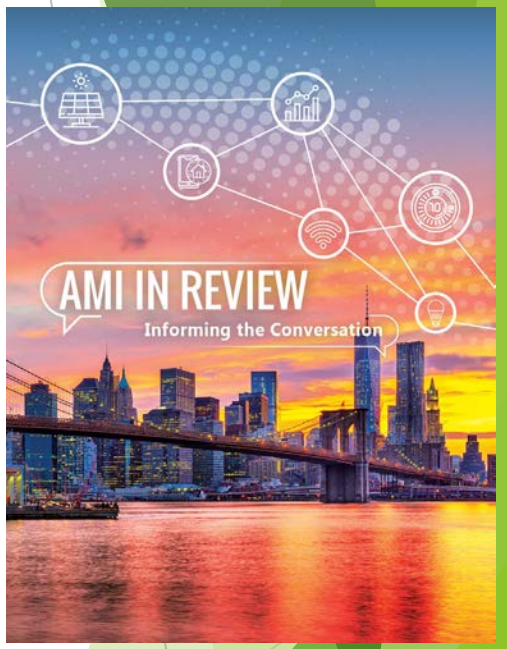
Chris Villarreal

Plugged In Strategies

October 23, 2020

Overview

- Research looked at states and utilities that have submitted AMI applications within past 8 years
- DOE has an interest in AMI, notably funding via EISA and ARRA
- Initial question- why was AMI still considered controversial and being rejected?
- Met with commissions, utilities, consumer advocates, and others to get perspectives
- The report is organized around five main chapters:
    - How are utilities approaching the strategic plan for AMI?
    - What analysis factors into an AMI justification?
    - How are benefits discussed and presented?
    - How expectations around collaboration and transparency are changing?
    - What is the interaction between AMI and the customer?
- Each chapter provides findings and captures the collective insights and perspectives of participants.
- The report also includes a set of elements utilities and state commissions can consider when developing or evaluating an AMI investment proposal.



What were the drivers for this research?

As Environmental Respondents, Sierra Club and Consumer Counsel point out, Dominion has failed to include in its Petition a well-developed and comprehensive plan to maximize the potential of AMI.[24] Dominion promises to do so in the future,[25] but it asks us to approve hundreds of millions of dollars in spending on smart meters *now,* money Dominion will ultimately seek to recover from its customers in one form or another.[26] This we will not do. Rather, we find that, since the record proves that Dominion's Petition lacks a sound plan to maximize the potential of AMI, the cost of its Plan is therefore not reasonable and prudent with regard to the AMI-related elements of its Petition.

Virginia SCC 2019 Order on Dominion AMI

In its current Petition, Dominion has not submitted a comprehensive plan to maximize the potential of AMI. In particular, while Dominion wants approval to collect from its customers the substantial costs of *full* deployment of AMI technology, it has failed to submit a comprehensive proposal to roll out TOU rate design across its entire territory and make such rates available to all its customers.[20] Rather, on December 12, 2019 and February 14, 2020, in a proceeding

Virginia SCC 2020 Order on Dominion AMI

Louisville Gas and Electric Company and Kentucky Utilities Company
Response to Commission Staff's First Request for Information
Dated April 2, 2018

Case No. 2018-00005

Question No. 41

Witness: John P. Malloy

Q-41. Explain whether the Companies' traditional distribution planning using power flow modeling anticipates extracting AMS data in conjunction with GIS data to improve distribution system planning.

A-41. Yes, the Companies anticipate using AMS data to complement existing efforts to improve distribution system and maintenance planning.

NM PRC Hearing Officer's Recommendation on PNM AMI 2018

ratemaking treatment. Most support the benefits that can potentially be achieved with smart meters, but they complain about the narrow focus of PNM's plan, its cost, its unfair balancing of investor and ratepayer interests, and its inflexibility in addressing the concerns of PNM's customers. They ask that PNN come back with a better plan, after obtaining input from the public.

The primary justification PNM offers for the project is the net savings it says the project would produce for ratepayers. PNM acknowledges that the immediate impact would be rate increases. But it says that, over the 20 year expected life of the AMI meters, it would eventually produce savings.

AMI Provides Benefits, but……

- Most AMI proposals show benefits and are cost-effective
- Increasingly, stakeholders and commissions are seeking more details
- AMI is part of a culture shift at utilities and commissions, which requires changes by the utility and commissions
- The cultural shift that AMI portends, and the significant amount of new data AMI generates, is raising expectations of regulators, advocates, and the utility about the types and timing of benefits.

- The objective was to understand concerns, investigate how investments are being evaluated, and determine if there was additional data or information that could assist in the development or evaluation of AMI proposals going forward. Recognizing the transformative potential of AMI, DOE AGR also wanted to explore whether AMI and other grid modernization investments are resulting in a different regulatory approach from other more traditional utility investments.

Conversations with participants

- Met with nearly 125 individuals from over 50 entities
  - Commissions
  - Utilities
  - Consumer Advocates
  - Third parties
- Conversations focused on these questions:

  • Do investments in AMI and other foundational technologies require a different approach than traditional utility investments? If so, what do utilities need to show in order to justify the investment?

  • Are traditional cost-benefit analyses capturing the benefits appropriately?

  • What is the importance of intangible benefits (e.g., reduced outage times, increased customer convenience, etc.)?

  • How can costs be specified for multi-state implementation to help satisfy concerns about equitable distribution of costs across states for back office systems?

  • Can a collaborative process help educate stakeholders and address key concerns? What are the important components for the process and what are the main issues that can derail the application?

Findings and Observations- 1

- There is no standard regulatory template for AMI applications.
  - Proposals for investment in AMI systems were presented in a wide range of regulatory flings, from rate cases to grid modernization proposals to stand-alone applications. In some instances, investments in AMI were reported after the utility had installed the new equipment.
- There are no consistent evaluation criteria.
  - there is no standard approach to determining the costs and benefits
  - Some proposals didn't include a cost-benefit analysis
- Quantified benefits were dominated by operational benefits.
  - Not visible to customer
  - Of those identified benefits, more than 70% were operational benefits, most notably reduction in meter reading and service calls. The remaining 30% were attributed to capital benefits such as deferred investments or financial benefits such as recovery of bad debt or reduced theft.

Findings and Observations- 2

- Inconsistent implementation results have increased review scrutiny.
  - The value that can be achieved from AMI varies
  - There are utilities that have deployed AMI and are realizing benefits for customers and across the utility enterprise. There are also examples of utilities that have not achieved the benefits included in the business case or that are using AMI solely to measure and bill consumption.
- Lack of a sufficient record hampers approval and increases frustration.
  - Commissions, advocates, and other stakeholders, along with the inconsistent results, are increasing expectations around the level of details and specificity needed from utilities in a proposal.
  - AMI's multiple value streams that depend on where the utility put its focus and how AMI is implemented, are leading to the need for more specifics in the initial proposal and not in response to questions in the rebuttal phase of the proceeding.
- AMI is a big project that needs a multidisciplinary team with executive support.
  - AMI's potential to revolutionize operations of the electric grid while simultaneously transforming the relationship between utilities and their customers means that AMI will reverberate throughout the organization and touch more departments than just metering. Justifying future or speculative benefits can require cross-departmental conversations to consider future scenarios and opportunities.

Findings and Observations- 3

> **"A bad proposal for a good technology is still a bad proposal."**
>
> *-Commission*

- Value is being left on the table.
  - Experience from utilities has seen the emergence of new AMI value streams.
  - Commissions and others want to understand the initial value the utility will achieve, as well as future value streams that will be pursued, as opposed to only being provided with enough value to justify the business case.
- A cost-benefit analysis is a decision tool and is not necessarily a means in and of itself.
  - Different commissioners perceive AMI and grid modernization technologies differently and have different expectations for what needs to be included in a utility application.
- Pre-application stakeholder processes can be valuable but depend on approach.
  - Can be a beneficial mechanism for providing transparency and explaining the technology and implementation plans.
  - Must be a two-way street and utilities should make technical experts available at the meetings
- Experience from AMI Investments funded through the American Reinvestment and Recovery Act (ARRA) have had mixed results in informing regulatory proceedings.

Strategic Planning for AMI

- Many commissions indicated that a well-articulated vision and transparency about potential future investments, even when in a stand-alone AMI proposal or rate case, can help to alleviate concerns and reduce speculation about the full cost and value of AMI.
- Application must reflect sufficient planning for prudent implementation and instill confidence that value will continue to be realized over time.
- Insufficient details upfront, that require the record to be built on commission data requests during the rebuttal phase, can give the impression of a poorly planned investment or lack of commitment to future value.
- Commissions and advocates expressed interest in having an application make a direct connection between operational benefits and benefits to customers – putting them at the forefront rather than relying on the commission to infer or hear it during exploratory questions
- Mix of types of applications for AMI approval
  - Rate Case
  - Grid Modernization
  - Stand-alone

Elements that can help provide context

1. The role of AMI for the utility's future business
2. Other systems that will integrate with AMI or use AMI
3. Future investments that will be necessary to realize benefits (e.g., new customer system)
4. New capabilities needed to achieve benefits (e.g., data storage and analytics)

Commitments and Allocation of Risk

- Need for Commitments
  - Many value streams are forward-looking and depend on specific operational characteristics, organizational changes, or changes in customer behavior, and that is creating uncertainty.
- Commissions looking for utilities to bear some amount of upfront risk on investment and not push it into ratebase quickly
- Front-loading cost recovery may send signal to regulator about utility's belief in value of the technology
- Utilities noted that they are following traditional rate-making practices

AMI Analysis

- AMI review often includes two components: a specific cost-benefit analysis and a technical review.
- While AMI benefits include operational components, which indirectly benefit the customer through reduced fees or added conveniences, AMI can also include direct benefits to the customer, such as access to more detailed information about their energy use and the ability to participate in new programs and services.
- Starting point matters
  - Moving from AMI to AMI has a different technical and CBA than moving from analog to AMI
- A positive cost-benefit analysis is not necessarily enough.
- Prioritizing customer value.
  - Commissions and advocates are looking for details about both near- and long-term benefits, a timeline for when those benefits will be realized, and what it will take to achieve them.
  - They emphasized the importance of achieving benefits for customers sooner rather than later.

"I expect to see an AMI application that is as detailed as something a utility manager would provide to the utility's financial officer."

– Commission

Need for more technical information

- There is a need for regulators to understand AMI's functionality to properly evaluate a proposal.
  - Providing details can address concerns about cost recovery, obsolescence, and useful life of the asset.
- Regulators and advocates need a baseline understanding of the technology to determine if the investment will perform as described and accomplish the proposed utility and state goals.
- This can be a challenge for utilities who may not historically provided such information to regulators and stakeholders
- If part of a grid modernization filing, utility should be clear up-front what other technologies will be needed or will be relied upon so that stakeholders and regulators can assess current and future costs and technology

Presenting Costs and Benefits

- Among the AMI applications that included quantified benefits, on average more than 70% of the benefits were operational in nature, with the remaining benefits split roughly evenly between deferred capital investments and customer service benefits.
- Commissions, advocates, and other parties emphasized that they want to know how the consumer – not just the utility – will benefit directly and recognized that intangible benefits can be a significant factor for an AMI business case.
- Some benefits take longer to realize than others.
- Intangible benefits can tip the scale to achieve a positive cost-benefit analysis.
- Some benefits may be difficult to achieve or not accrue directly to the utility.
  - Customer enablement benefits may accrue only to the customer or market
- Think about benefits through the lens of the consumer.
- A clear timeline for realizing benefits can help to align expectations.

Collaboration and Transparency

- A collaborative process can allow a utility to share their plans, to educate about the technology's capabilities and limitations, to communicate the complexities and interdependencies, to hear stakeholder feedback and concerns, and to level set expectations around benefits.
- A collaborative process that fosters two-way dialog can increase understanding and bridge perspectives.
- Who manages the process can make a difference.
- Allow engineers and technology experts to present, not only lawyers
- Greater need for reporting through and beyond AMI implementation.
  - Utilities are looking for public information about AMI benefits from other utilities for their applications
  - Reporting can also build trust and show progress status or challenges in an open manner

AMI and the Customer

- AMI is not viewed by regulators and stakeholders as merely another traditional utility investment. Instead, they are weighing the significant cost of an AMI investment against the potential to improve the customer experience, enable new customer programs, and integrate a widening array of consumer devices.
- Four broad classes of issues were most prominent in the analysis of proceedings and conversations with the various parties, including:
  1. Enabling customer capabilities and technology
  2. Customer choice and opt-out
  3. Impacts to vulnerable or disadvantaged customers
  4. Education and engagement
- These have the potential to derail utility applications if not addressed

Enabling customer capabilities and technology

- Availability of customer energy usage data to support customer choices
  - Regulators and advocates are increasingly interested in specific utility plans to provide customers access to their usage information in an easily accessible, standardized format. They want to understand what the process will be, in what format, and how customers can provide consent to third parties in order to access the customer's data?
  - Providing a set of clear expectations, specifics about the implementation, and a time-frame for allowing customers to access their data and the process for authorizing third parties access can show a responsiveness to customer needs.
  - A clear data access plan demonstrates a commitment to direct customer value.
  - A well-articulated data policy framework can facilitate the data privacy and access discussion.
- Enabling the Home Area Network

Customer Options and Education

- Customer education and engagement is critical for participation.
- AMI can enable new customer interaction, but it requires education and engagement
  - A detailed customer education and engagement plan can demonstrate the changes and involvement that will be required to achieve customer value from AMI.
- Consumer protections are essential.
  - Remote disconnect/re-connect
- Explaining rate design changes
  - Pre-pay
  - TOU
- AMI Opt-Outs

Elements to consider when developing a proposal

Elements to Consider When Developing a Proposal

A clearly articulated, well laid out plan with sufficient detail can make an application easier to evaluate. The compiled list below reflects the overarching elements expressed during discussions with commissions, advocates, and other stakeholders.

- ☐ **Put your best foot forward by pulling together individuals from across the organization to develop the proposal.** CEO or upper management buy-in is critical because developing a robust proposal requires a vision for the future as well as input and collaboration from multiple departments across the utility enterprise.
- ☐ **Do your homework.** Perform focus groups, conduct demographic surveys, get bids for technology costs, talk to other utilities about the value they are achieving, and ask stakeholders what benefits are important to them. This might seem like excessive detail, but details can give commissions and other parties assurance in the plan.
- ☐ **Include the rationale or reasoning for decisions.** Other parties don't have the benefit of knowing what trade-offs were made or the reasoning behind a given decision. If it's not in the application, they won't know.
- ☐ **Remember that what may seem clear, might not be.** Make sure information is clear and easy to understand for those outside the utility.
- ☐ **Present alternatives and different scenarios.** Explain other options or what the alternative might be and what this will mean for the customer. Understanding tradeoffs can help demonstrate future value.
- ☐ **Be clear if additional investments will be required to realize a specific benefit.** Commissions and advocates don't like surprises that come up at a later time and expressed frustration when the realization of a benefit in the original application depends on a future capital investment that was not included at the outset.
- ☐ **Address those 'lingering stories' or unfavorable reports.** Acknowledging areas where there have been actual – or perceived – missteps can help to calm concerns.
- ☐ **Think through customer engagement plans.** A detailed customer education and engagement plan can emphasize commitment to consumer value and responsiveness to consumer needs. Customer engagement plans were often required in settlement agreements.
- ☐ **Support decisions with benchmarks or examples from other utilities.** Look at how long the implementation took, the value they achieved, and what was the timeline for achieving benefits. But remember that what was convincing to one commission might not be apparent or relevant for another case.
- ☐ **Use data from pilots.** Explaining how data was used or what lessons or insights it provided can demonstrate a commitment to future value. It can help substantiate assumptions, provide insights into data storage or management needs, offer lessons learned about customer engagement, or analyzed to investigate future use cases (like informing planning or the development of new rates).
- ☐ **Input from focus groups can help show a utility understands customers' needs.** It also demonstrates commitment to the technology and willingness to accept some risk by performing work prior to commission approval.
- ☐ **Assign values to intangible benefits can show a well thought-out plan.** Savings from reduced truck rolls can be easy to justify; calculating more intangible benefits can be difficult. Thinking through what might happen or how data might be used can be challenging but it can uncover how departments will need to work together and interdependencies or new system requirements. It can demonstrate an understanding of what will be required to achieve future value.
- ☐ **Be clear on the timeline between meter installation and customer benefits.** Regulators and advocates expect customers to see benefits soon after meters are installed. Articulating and providing a clear timeline for when different benefits will be achieved and why some might take longer than others can help level-set expectations.
- ☐ **Talk about data.** Commissions and other stakeholders know AMI generates vast amounts of data. They want to know how the data will be handled, stored, and utilized. Will it be used across departments? How will it be made available?
- ☐ **Consider whether the proposal addresses questions others might have.** For example, what is the incremental cost of going to AMI rather than swapping out an old meter kind–for-kind? What are the incremental benefits associated with the upgrade?
- ☐ **Think about the interest areas of different commissioners.** Do they like numbers? Are they more focused on customer benefits? A proposal that doesn't satisfy commission questions in a way that aligns with their priorities can make approval more difficult.
- ☐ **Identify risks and plan to mitigate them.** Explain the impact and the overall technology value for customers if some assumptions don't work out as expected or if customer behavior is different than anticipated.
- ☐ **Consider commitments in the face of uncertainty.** It's difficult to make commitments based on future projections, but commissions and advocates both expect a utility to include a plan and commitments about the benefits to be pursued and a timeline for achieving them.

Questions for regulators and stakeholders

Questions for Regulators or Advocates When Reviewing an AMI Investment

Below is a list of potential questions a regulator or advocate may ask when reviewing a utility AMI application. The list, while not exhaustive, represents the many questions or concerns discussed in conversations with various parties.

- What is the vision for AMI? How will it support future utility plans and state or commission policy goals?
- Is there sufficient reasoning, analysis, and substantial record evidence to support the investment and why it is needed?
- What will be the impact to customer rates across all customer classes?
- Does the proposal provide details about how AMI and its data will be utilized and implemented? How will data be managed and stored?
- Does the proposal describe how AMI will integrate with other systems (e.g., Customer Information System or Advanced Distribution Management System) and how data will be used across the enterprise? Are challenges related to integration or use of data explained?
- Does the proposal contain an identifiable set of costs and benefits? Are a full range of benefits presented including future use cases and integration with other technologies that provide customer value?
- Does the proposal include a timeline for achieving customer benefits in the near term, mid-term, and long-term, including a timeframe for additional capital investments that might be needed to enable those benefits?
- If AMI will replace aging meters and is seen as a technology upgrade, what will be the incremental cost to customers above an in-kind replacement? What associated benefits will customers see for the additional cost?
- If the proposal replacing analog meters or AMR meters, what is the remaining useful life of those meters?
- If AMI will enable new rates, how will those alternate rate structures be developed? Will rate designs benefit customers while simultaneously providing system benefits? Will new systems or systems be needed to implement the rate designs?
- What will proposed operational improvements mean for the customer? Will AMI enhance the ability of the utility to respond to new and evolving customer needs?
- How are consumer protections addressed and safeguarded if proposing remote connect/ disconnect?
- Is there a mechanism for communicating delays or technology difficulties with stakeholders after the filing/application has been approved?
- How does the utility plan to engage and educate customers so they understand the technology and the benefits it will provide so they can fully access value?
- What are the utility plans for customer access to usage for both utility and non-utility programs, services, and technologies? What will be the process for a customer to authorize access to their data by a third party?
- What communication standards will be used to provide access or to support a Home Area Network or other customer technology choices? Are the standards proprietary or open?
- Does the application identify how the utility will address interoperability of the AMI system with its existing systems, such as, for example, billing, outage management, and geographic information systems?

Additional Materials

- Report can be found here:

https://smartgrid.gov/files/documents/AMI_Report_7_8_20_final_compressed.pdf

- Report includes a more detailed compendium that lists all the reviewed AMI applications and status of AMI roll-out

https://smartgrid.gov/files/documents/Compendium_compiled.pdf

Questions?

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Tanya Burns
Arara Blue Energy

Cameron Brooks
E9 Insights

MISSION DATA

empowering energy savings

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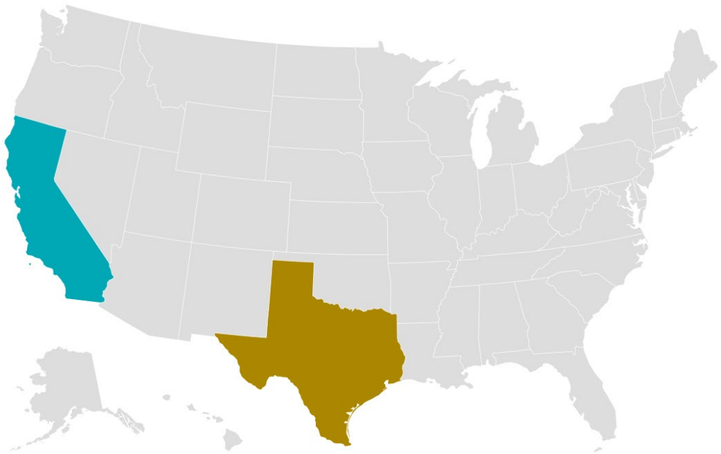
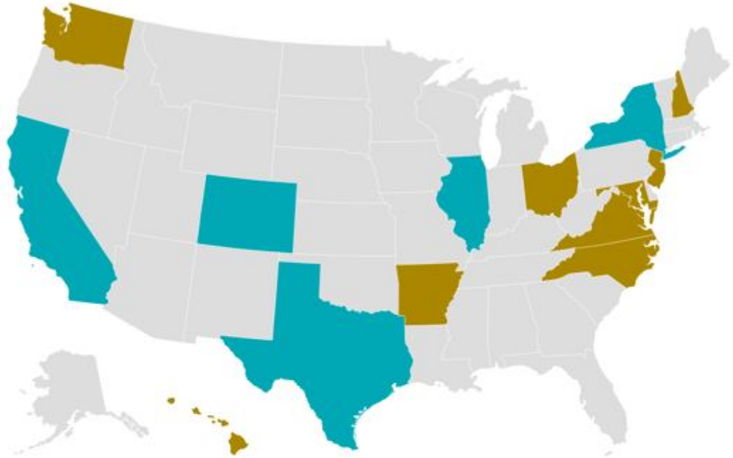
2014



2020

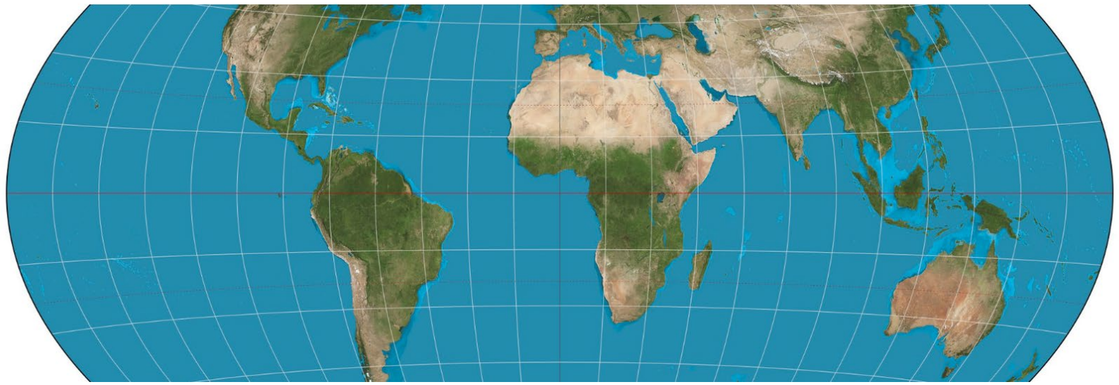


Data portability policy in place

Under consideration

36 million meters and growing…

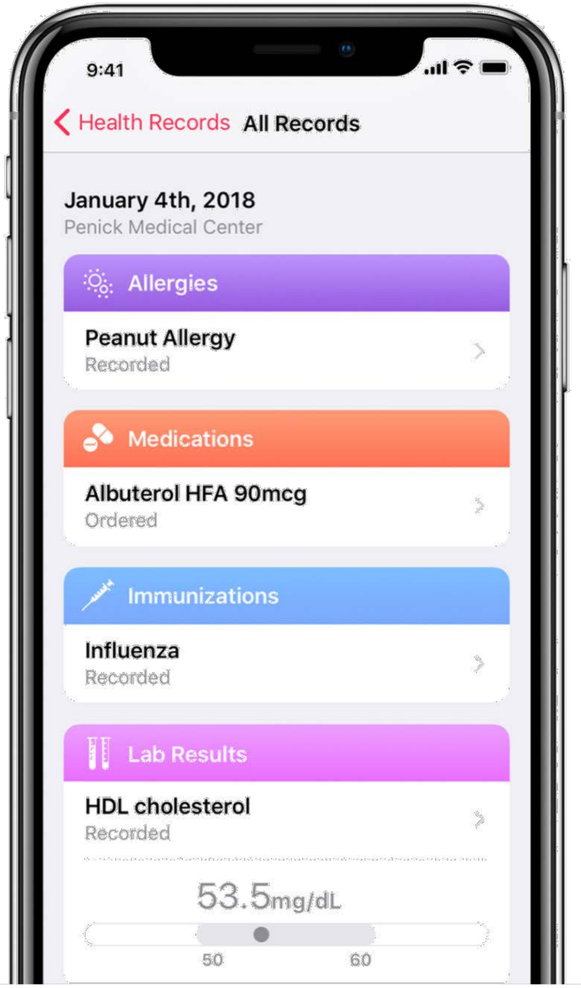
Global movement toward data portability



Data Transfer Project

European Commission

Payment Services Directive (PSD2)



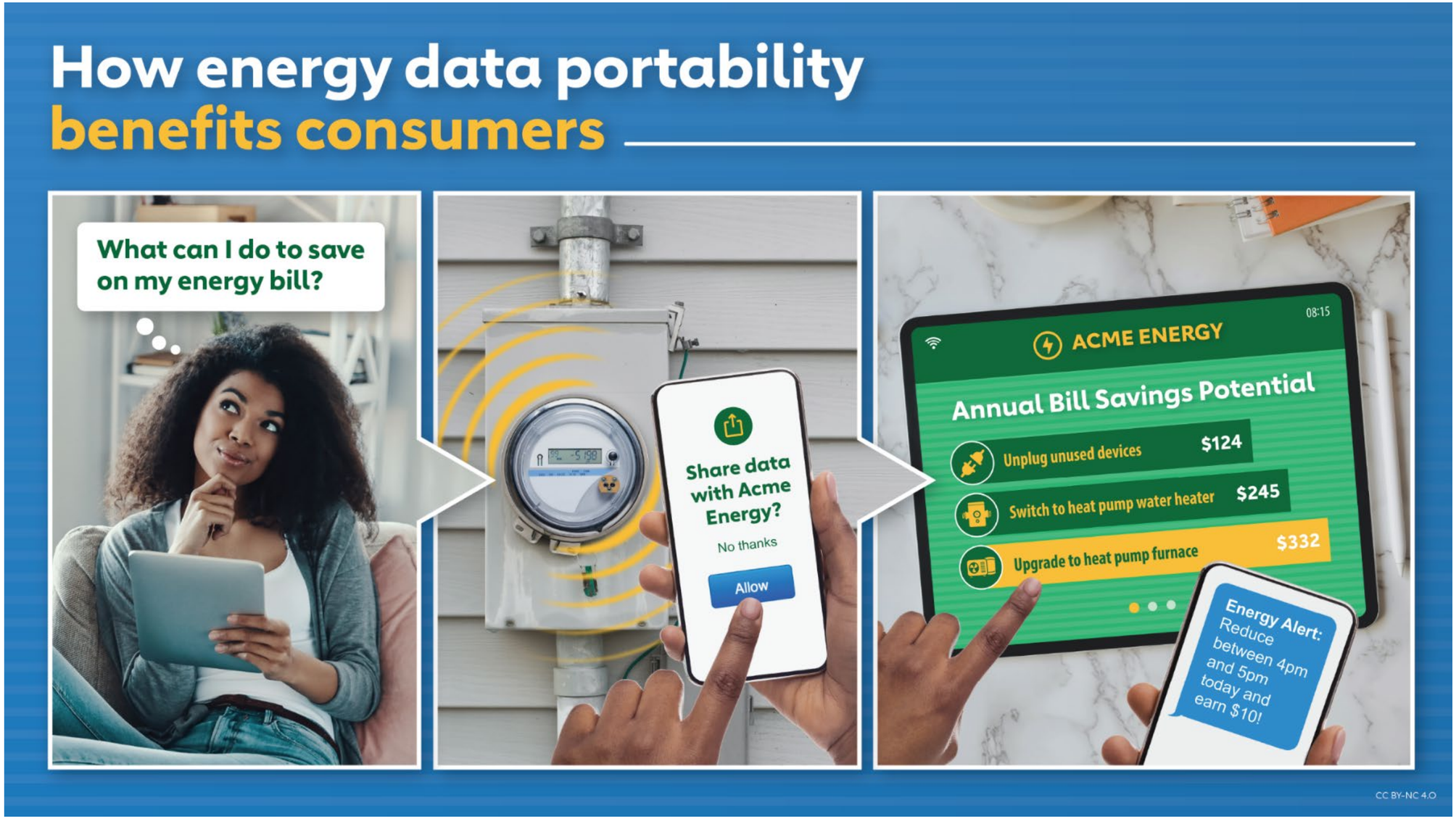
More info: https://bit.ly/2yVCHPv

What’s energy data portability **for**?

GRESB®

CDP™

How would you use it?



Three Ways Customers Benefit from AMI Meter Data

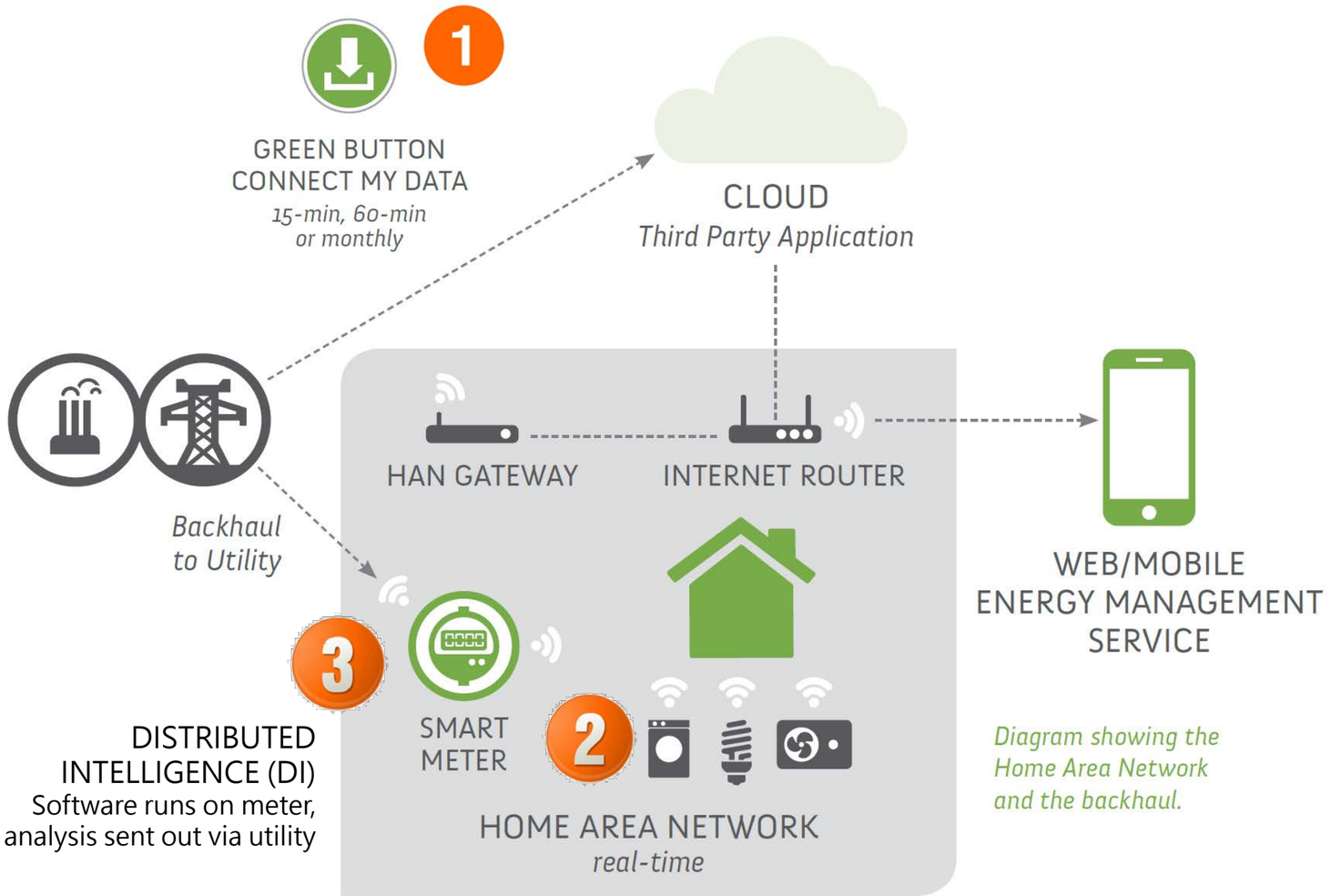
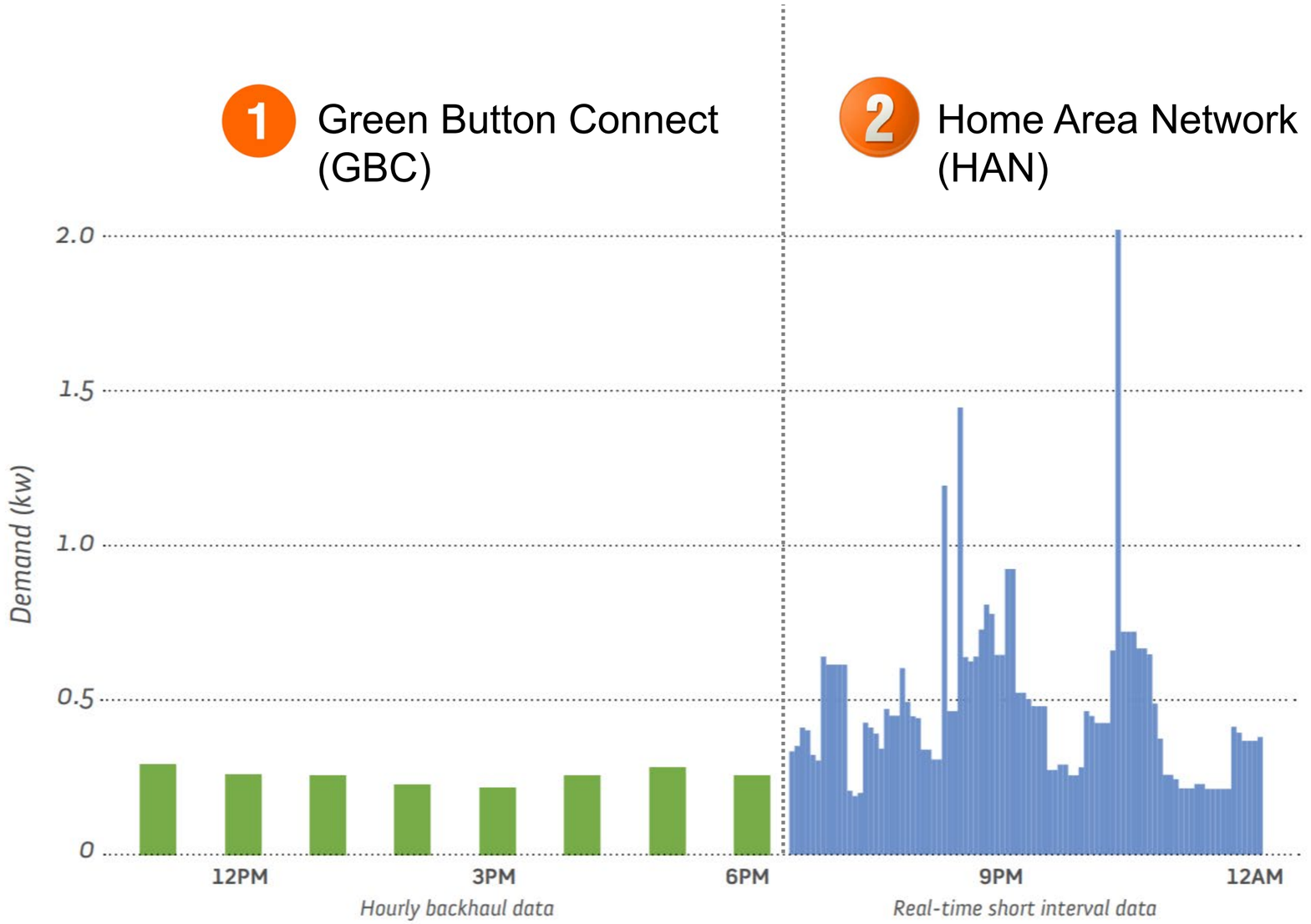


Diagram showing the Home Area Network and the backhaul.

1. Green Button Connect (GBC)
2. Home Area Network (HAN)
3. Distributed Intelligence (DI) Apps

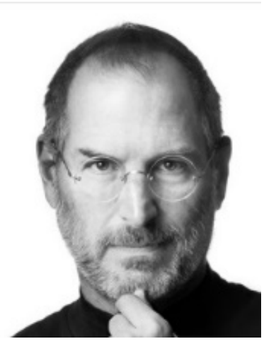
MISSION:DATA
empowering energy savings

Granularity of usage data



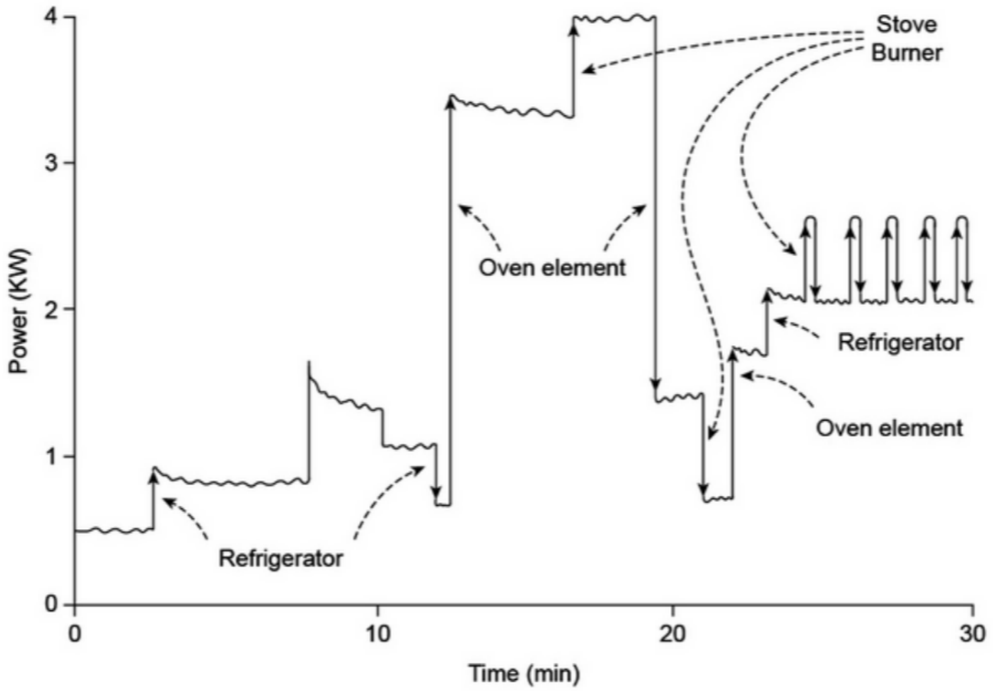
Smart Meter

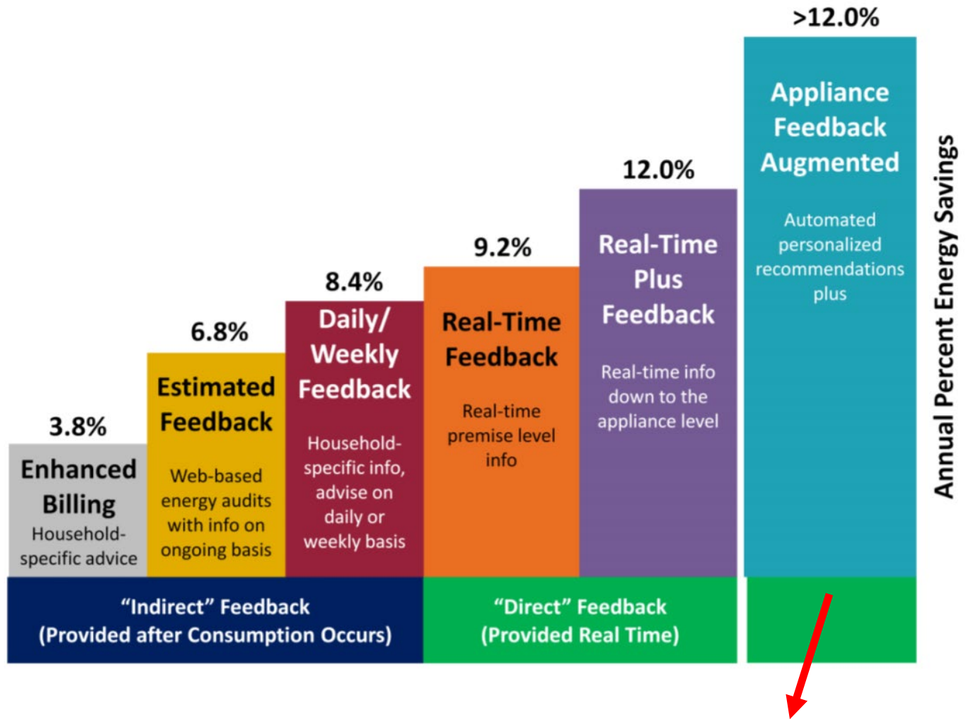
Smart Meter + Computer



Sample frequency	5 seconds - 15 minutes	1/10,000th of a second or less
Measurements	energy (kWh)	energy (kWh), voltage, current
End-use identification accuracy	40% - 80%	90%+
Example recommendations	“Your heating system needs attention”	“You left the porch light on”
Appliance-level insight	-Overall heating -Overall cooling -Large loads such as EVs	

DI: shorter intervals = greater accuracy

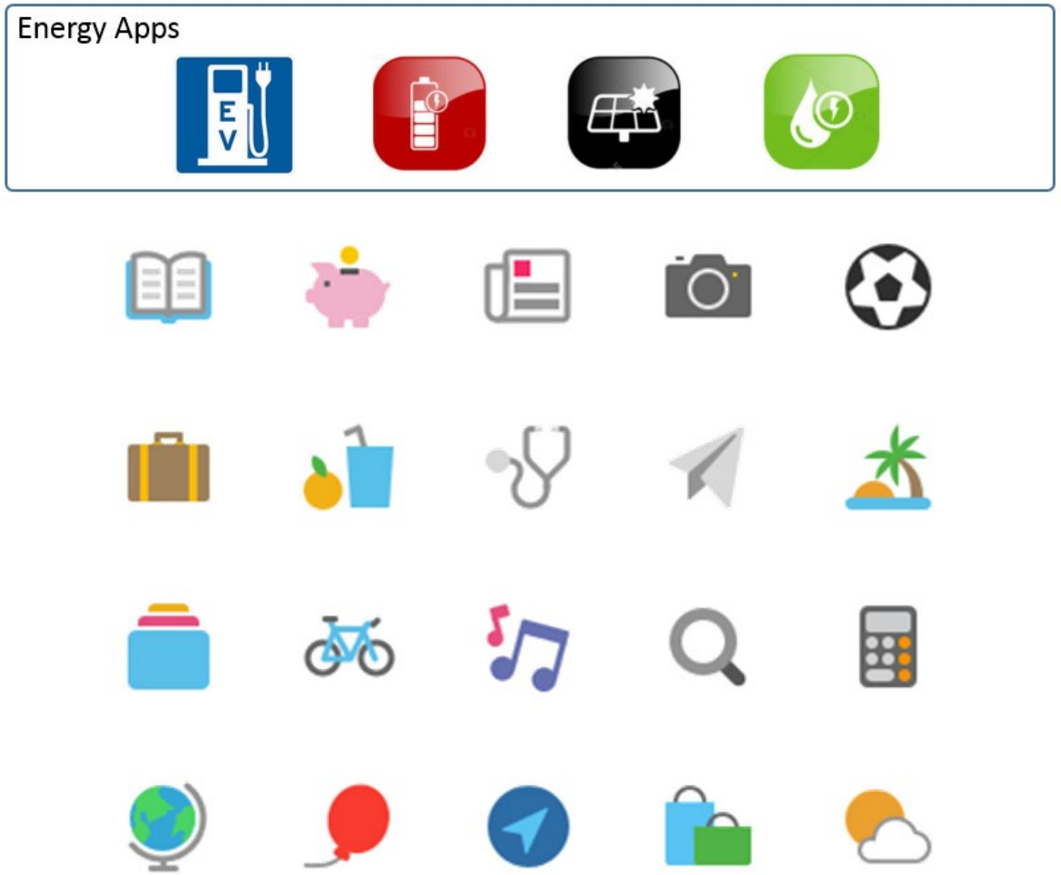




With DI apps, appliance-specific feedback could yield household energy savings (and bill savings) of 12% or more

Source: *Is disaggregation the holy grail of energy efficiency?* Carrie Armel et al. Stanford University Precourt Institute (2013). https://web.stanford.edu/group/peec/cgi-bin/docs/behavior/research/disaggregation-armel.pdf

App Stores



New functionality – great!

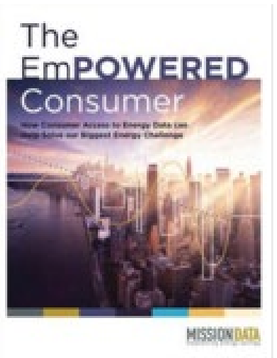
But:

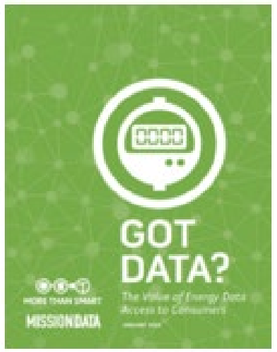
- Utility is gatekeeper
- Utility can capriciously reject apps
- Utility can extract rents
- Utility can set the terms
- Utility can cripple certain features
- Utility can surveil third party apps

Principles of Digital Platform Regulation

1. App Store policies should be Fair, Reasonable and Non-Discriminatory (FRAND)
   a) PUC must approve terms
   b) No crippling
   c) No self-preferencing
2. Due process rights for DERs/third parties
   a) Rapid adjudication of disputes
   b) PUC must approve apps
3. Fair competition
   a) Transparent of features + documentation
   b) No snooping
   c) Prohibition on use until policies are established

Thank You





Michael Murray
President
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☐ **Not Public Document – Not For Public Disclosure**
☐ **Public Document – Not Public Data Has Been Excised**
☒ **Public Document**

Xcel Energy		Information Request No.	5
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleecker, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DER Interconnection Costs
Reference(s): 20-606 MN PUC IR 1 – Installation Charges for DER

Response to MN PUC IR 1: The Company also separately bills actual labor and material costs associated with connecting the DER to the Company's distribution system. This includes, but is not limited to, the labor and material cost associated with installing underground or overhead service to the DER. These costs are also billed separately because the costs are dependent the requirements of the specific customer and/or DER site.

Request:
Provide a reference to which tariff or docket the 'separately billed actual labor and material costs associated with connecting the DER to the Company's distribution system' are outlined.

Response:
The context of our response to MN PUC IR-1 was to show that, in addition to metering equipment costs, the Company invoices customers for those additional actual costs (both labor and material) that the Company incurs associated with connecting the DER to the Company's distribution system. As we discuss in more detail below, recovery of these costs is consistent with cost-causation principles and supported by Minnesota statutes and the Commission's Rules and actions.

Our intended meaning of "separately billed" is that the actual costs for this are not part of the set tariffed rate, but are project-specific costs – and in this context, are separately billed apart from the specific rates included in the tariff. In this way, actual costs would be recovered. This is consistent with a fundamental tenet of utility regulation – the principle of cost-causation. Simply, cost-causation means that an entity that causes a particular cost or benefits from a particular use of the system

should bear the corresponding cost. Some costs that broadly benefit a class of customers, or all classes of customers are socialized – and those benefiting customers pay their share of those costs. In Minnesota, the cost-causation tenet is grounded in statute, embedded in utility tariffs and practices, and has been reinforced in Commission Orders. (*See* for example, Minn. Stat. § 216B.03 and § 216B.07.)

We also note the following Minnesota Statute and Minnesota Administrative Rule, which are consistent with our recovery of these costs from interconnecting customers

> Minn. Stat. §216B.164
> Subd. 8. **Interconnection required; obligation for costs.**
> (a) Utilities shall be required to interconnect with a qualifying facility that offers to provide available energy or capacity and that satisfies the requirements of this section.
> (b) Nothing contained in this section shall be construed to excuse the qualifying facility from any obligation for costs of interconnection and wheeling in excess of those normally incurred by the utility for customers with similar load characteristics who are not cogenerators or small power producers, or from any fixed charges normally assessed such nongenerating customers.
>
> Minn. R. 7835.0100 DEFINITIONS.
> Subp. 12. **Interconnection costs.** "Interconnection costs" means the reasonable costs of connection, switching, metering, transmission, distribution, safety provisions, and administrative costs incurred by the utility that are directly related to installing and maintaining the physical facilities necessary to permit interconnected operations with a qualifying facility. Costs are considered interconnection costs only to the extent that they exceed the corresponding costs which the utility would have incurred if it had not engaged in interconnected operations, but instead generated from its own facilities or purchased from other sources an equivalent amount of electric energy or capacity. Costs are considered interconnection costs only to the extent that they exceed the costs the utility would incur in selling electricity to the qualifying facility as a nongenerating customer.

Additionally, Minn. R. 7835.9910 includes the Uniform Statewide contract, which includes the following provision: "... The QF is responsible for the actual, reasonable costs of interconnection."

The Commission's October 16, 1984, Findings of Fact, Conclusions of Law and Order Adopting Rules in in Docket No. 84-105, *In the Matter of the Proposed Adoption of Amendments to the Rules of the Minnesota Public Utilities Commission Governing Cogeneration and Small Power Production*, at pages 12-13, explained the reasoning for this and cited to its Statement of Reasonableness that stated in part:

> It is reasonable and necessary to establish in this contract the obligation of the QF to

> pay actual Interconnection costs and the method of payment for interconnection costs in order to establish an orderly procedure to govern the parties' transaction.

Consistent with this, Staff Briefing Papers of October 7, 2015 in Docket No. E002/M-13-867 stated:

> Under federal and state law and implementing rules [(footnote citation to: 16 U.S. Code § 824a–3; 18 CFR Part 292; Minn. Stat. §216B.641; Minn. Rules, Chapter 7835)], utilities must interconnect with qualifying facilities (QFs), and undertake the upgrades needed to do so, provided the QF is willing to pay the related costs.

Also consistent with this, Minn. Stat. § 216B.1641 requires Xcel Energy to file with the Commission a plan to operate a community-solar-garden program. Among other requirements, any plan approved by the Commission must "establish uniform standards, fees, and processes for the interconnection of community solar garden facilities that allow the utility to recover reasonable interconnection costs for each community solar garden." Minn. Stat. § 216B.1641(e)(2).

In its orders, the Commission also has long-supported utility recovery of DER related costs from the DER seeking to interconnect. For example, see *In the Matter of the Complaint of Darlene Abraham Against Lyon-Lincoln Electric Cooperative, Inc.* and, *In the Matter of the Complaint of Louis Taveirne Against Lyon-Lincoln Electric Cooperative, Inc.*, Order of May 21, 1993, Docket Nos. E125/C-92-1207 and E125/C-92-1208, at pages 4-5:

> Complainants suggested that, in lieu of deciding whether transformer and line upgrade costs are nondiscriminatory interconnection costs, the Commission should order Lyon-Lincoln to charge these costs to its supplier. Minn. Stat. § 216B.164, subd. 3 (d) (1992) gives a nongenerating utility such as Lyon-Lincoln the right, at its option, to be reimbursed by its supplier for any costs incurred due to purchasing power from a QF. However, the statute clearly leaves it to the utility's discretion whether it will exercise this right. Moreover, it is doubtful that interconnection costs are the kind of costs a utility may shift to its supplier. The Commission is disinclined to explore the range of the Company's authority to seek reimbursement of the interconnection costs (or the Commission's authority to require the Company to seek such reimbursement) in view of Minn. Rules, Part 7835.9910 which states: "...the QF is responsible for the actual, reasonable costs of interconnection."

The following excerpt from the Commission's February 18, 1993 order, page 8, in *In the Matter of the Complaint of Darlene Abraham Against Lyon-Lincoln Electric Cooperative, Inc.* and, *In the Matter of the Complaint of Louis Taveirne Against Lyon-Lincoln Electric Cooperative, Inc.*, Docket Nos. E125/C-92-1207 and E125/C-92-1208, is also informative:

Minn. R.7835.0100, subp. 12 on the other hand, defines "interconnection costs" as:

> the reasonable costs of connection, switching, metering, transmission, distribution, safety provisions, and administrative costs incurred by the utility that are directly related to installing and maintaining the physical facilities necessary to permit interconnected operations with a qualifying facility .... (Emphasis added.) [(emphasis in Commission order)]

What costs are thus "directly related" to the QF's operation? In the Order adopting rules governing QFs, the Commission stated that the need to define "interconnection costs" was to identify the:

> costs which would not be incurred if the utility did not engage in the Interconnected operations with cogenerators and small power producers. In the Matter of the Proposed Adoption of Rules Governing Cogeneration and Small Power Producers, Docket No. E-999/R-80-550, ORDER ADOPTING RULES (March 7, 1983).

In other words, the Commission uses a strict "but for" analysis to determine whether a cost may be properly viewed as an Interconnection cost. If a cost is incurred as a result of the QF's request for interconnection, it is an interconnection cost.

The general provisions of our Section 10 interconnection tariff at sheet 10-78 also reflects the cost-causer responsibility for DER costs:

> 4. Customer is responsible for any applicable study fees and interconnection costs. The customer must pay all such costs as specified in the Interconnection Agreement.
>
> 5. The customer shall be responsible for all costs associated with the installation, operation, and maintenance of the facility.

There is also more specific authorization to recover these actual costs both the pre-MN DIP portion of our interconnection tariff, as well as in the MN DIP portion of the interconnection tariff. The pre-MN DIP interconnection tariff provisions apply to all interconnection applications deemed complete prior to June 17, 2019.

For pre-MN DIP interconnection applications, support is shown in the following provision from the pre-MN DIP Interconnection Agreement (at tariff sheets 10-116 and 10-117):

> V.A: The Interconnection Customer is responsible for the actual costs to interconnect the Generation System with Xcel Energy, including, but not limited to any Dedicated Facilities attributable to the addition of the Generation System, Xcel Energy labor for installation coordination, installation testing and engineering review of the Generation System and interconnection design. Estimates of these costs are outlined in Exhibit B. While estimates, for budgeting purposes, have been provided in Exhibit B, the actual costs are still the responsibility of the Interconnection

Customer, even if they exceed the estimated amount(s). All costs, for which the Interconnection Customer is responsible for, must be reasonable under the circumstances of the design and construction.
...

V.A.(2)(b):
2) Payments
a) The Interconnection Customer shall provide reasonable adequate assurances of credit, including a letter of credit or personal guaranty of payment and performance from a creditworthy entity acceptable under Xcel Energy credit policy and procedures for the unpaid balance of the estimated amount shown in Exhibit B.
b) The payment for the costs outlined in Exhibit B, shall be as follows:
i. 1/3 of estimated costs, outlined in Exhibit B, shall be due upon execution of this agreement.
ii. 1/3 of estimated costs, outlined in Exhibit B, shall be due prior to initial energization of the Generation System, with Xcel Energy.
iii. Remainder of actual costs, incurred by Xcel Energy, shall be due within 30 days from the date the bill is mailed by Xcel Energy after project completion.

For MN DIP interconnection applications, support is shown in the following provision from the MN DIP at tariff sheets 10-197 through 10-199:

5.6.1 The Interconnection Customer shall pay for the actual cost of the Interconnection Facilities and Distribution Upgrades as described and itemized pursuant to the Interconnection Agreement and its attachments. If Network Upgrades are required, the actual cost of the Network Upgrades, including overheads, shall be borne by the Interconnection Customer pursuant to the Transmission Provider and associated agreement(s). As indicated in the Interconnection Agreement, the Area EPS Operator shall provide a good faith cost estimate, including overheads, for the purchase and construction of the Interconnection Facilities, Distribution Upgrades, and Network Upgrades, and provide a detailed itemization of such costs.

...

5.6.4 At the option of the Area EPS Operator, either the "Traditional Security" or the "Modified Security" method shall be used.

5.6.4.1 Under the Traditional Security method, the Interconnection Customer shall provide reasonable adequate assurances of credit, including a letter of credit or personal guaranty of payment and performance from a creditworthy entity acceptable under the Area EPS Operator credit policy and procedures for the unpaid balance of the estimated amount shown in Interconnection Agreement for the totality of all anticipated work or expense incurred by the Area EPS Operator associated with the Interconnection Application. The payment for these estimated costs shall be as follows:

5.6.4.1.1 1/3 of estimated costs shall be due no later than when the Interconnection Customer signs the Interconnection Agreement.

5.6.4.1.2 An additional 1/3 of estimated costs shall be due prior to initial energization of the Generation System with the Area EPS Operator.

5.6.4.1.3 Remainder of actual costs, incurred by Area EPS Operator, shall be due within 30 days from the date the bill is mailed by the Area EPS Operator after project completion.

...

5.6.6 Within eighty (80) Business Days (approximately four (4) calendar months) of completing the construction and installation of the Area EPS Operator's Interconnection Facilities and/or Upgrades described in the interconnection agreement and its attachments, the Area EPS Operator shall provide the Interconnection Customer with a final accounting report of any difference between 1) the Interconnection Customer's cost responsibility for the actual cost of such facilities or Upgrades, and 2) the Interconnection Customer's previous aggregate payments to the Area EPS Operator for such facilities or Upgrades. If the Interconnection Customer's cost responsibility exceeds its previous aggregate payments, the Area EPS Operator shall invoice the Interconnection Customer for the amount due and the Interconnection Customer shall make payment to the Area EPS Operator within twenty (20) Business Days. If the Interconnection Customer's previous aggregate payments exceed its cost responsibility under the Interconnection Agreement, the Area EPS Operator shall refund to the Interconnection Customer an amount equal to the difference within twenty (20) Business Days of the final accounting report.

The MN DIA (the interconnection agreement associated with MN DIP applications) also provides for cost recovery for metering-related costs and states at tariff sheet 10-253:

1.9. Metering
As described in MN DIP 5.4, the Interconnection Customer shall be responsible for the Area EPS Operator's reasonable and necessary cost for the purchase, installation, operation, maintenance, testing, repair, and replacement of metering and data acquisition equipment specified in Attachments 2 and 3 of this Agreement. ...

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Xcel Energy		Information Request No.	6
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: FAN/Wireless Data Charges to DER Systems
Reference(s): 20-606 MN PUC IR5 - Wireless Data Charges / FAN

MN PUC IR5 - Please provide citation to where this monthly charge was previously approved. If not, what are the cost components that make up the monthly $25 mobile network service charge? How does this proposed monthly charge compare to current charges to this type of DER for required telemetry?

Xcel Response: The mobile network service is a service provided by Verizon and it enables the communication of meter readings to the Company. The monthly charge from Verizon is $25 for up to 1 GB of data for each meter with a cellular modem. To our knowledge, this is the first instance of the Company seeking approval for the mobile network service as the Company's existing tariff does not have a provision for mobile network service as the existing DER tariffs were not specifically designed for systems or 250 kW and greater. The Company's comprehensive meter charge request in this docket is in part a response to relatively recent customer interest in installing DER system greater than 250 kW.

Request:

1. How could future FAN systems reduce this cost or negate the need for the additional wireless charge?
2. Could existing communication networks provide this communication service, in lieu of a 3rd party (Verizon) and if not, why not?
3. What parameters are needed for a communication system to allow for use of a utility-owned communication network to provide the service?
4. What level of bandwidth or other communications capacity is necessary to have sufficient capacity to provide this service and will the proposed FAN (WiMAX, WiSUN, or LTE) systems provide this service or function, and if not, why not?

Response:

1. The Company has not estimated the cost to transition the DER telemetry from public carrier (Verizon) to the FAN, and as such cannot speculate if the costs would be more or less. However, as the FAN is deployed across the Minnesota service area, we will consider this as an alternative to the current practice of using public carrier for DER telemetry.

2. We use a public carrier because we are not aware of an alternative solution to a public carrier for providing DER telemetry.

3. For the DER telemetry to communicate over the FAN network, at minimum it would require a new network card in the modem that connects to the Wi-SUN network; other modifications may also be needed, which we would need to further study. In addition to these technical considerations at the DER-level, upgrades to the FAN infrastructure may also be required.

4. The FAN will provide the necessary capacity to support Xcel Energy's deployment of Advanced Metering Infrastructure (AMI) for electric meters in Minnesota, as well as provide the foundation for a scalable field radio network to meet Xcel Energy's growing field automation initiatives. The FAN consists of both wireless (RF radio) and wireline (copper, fiber) communications. *Wi-SUN* based wireless communications are used between Field Access Points and Field Devices. Varying wireless and wireline *backhaul* (the former Wi-MAX portion) communications technologies (LTE wireless, Cellular wireless, copper and/or fiber) are utilized between Field Access Points, and Xcel Energy *backbone* Layer-3 networks (Routers, Switches, and Circuits).

   For the FAN to properly handle the communications needs from DER Systems, the Company would need to further study the communication requirements in order to properly anticipate the traffic levels. As noted above, each DER site would require a new network card at minimum, (along with potential upgrades to our FAN to support the traffic levels of the DER systems.

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Xcel Energy		Information Request No.	7
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: LTE and WiMaX Change
Reference(s): Docket 19-666, IDP Petition, Attachment M3 - Harkness Direct, p. 110-113; 20-627 Xcel Initial, p. 1

Request:
Provide an updated analysis on Xcel's new proposed use of LTE technology (instead of WiMax) in light of the cellular network concerns expressed in Harkness Direct Testimony. Include the potential for the need to use cellular modems, monthly service fees, or private internet protocols.

Response:
The effort to analyze a fully private LTE network (versus WiMAX or cellular) is still underway. We expect to have initial results in the first half of 2021 and intend to update the Commission as we complete our analysis.

As also outlined in our response to DOC-6, there are three primary components associated with our Field Area Network: (1) *Wi-SUN* based wireless communications between Field Access Points and Field Devices, (2) *backhaul* (the former Wi-MAX portion), which is comprised of varying wireless and wireline communications technologies (LTE wireless, Cellular wireless, copper and/or fiber), which facilitates communications between Field Access Points and the *backbone*, and (3) the Xcel Energy *backbone* Layer-3 networks (Routers, Switches, and Circuits), which delivers data to and from the Company's systems. With the change to our *backhaul* communication needs necessitated by the FCC action with WiMAX, we chose to deploy a public (cellular) LTE solution for the *backbone* that would provide necessary connectivity between the WiSUN network and the Company's back office solutions in Xcel Energy data centers. We did this to ensure that we would meet the key milestones and benefits associated with the planned AMI electric meter deployment.

The primary benefits of a private network are having more control over security and resiliency. While not fully private, we have designed the updated FAN to be segmented, which allows us to keep the WiSUN portion private and the data secure. Further, from a security standpoint, whether public or private LTE, the data is encrypted as it traverses through the cellular providers' networks. We are working with the cellular provider(s) to understand their security controls and work with their security event teams to ensure appropriate monitoring and action plans are in place to respond to any security incidents or threats.

With respect to resiliency, we plan to work with another cellular provider to provide dual network connections at the cellular modems, as many other utilities are doing to ensure the loss of one provider's network in one area does not completely shut down our communications. An important consideration in our FAN design strategy is that the WiSUN network we are deploying from Itron is a self-healing network that will *reroute* traffic to different access points (AP) and cellular modems if it detects a loss of communication. This will help in reducing the potential impact of an outage by cellular providers and their network. We have also implemented alternate routing of cellular traffic at our data centers in the event the connection between the cellular provider and our data centers is lost. As with any network – including a private network – there is the risk that failures will occur. We will continuously work with our providers to reduce the likelihood and any impact those outages might have on our networks and our customers – especially during storms and other significant events that can have broad impact on networks in a region.

This solution will meet the needs of AMI while the Company continues to research and evaluate a private network solution for connecting the WiSUN network and back office applications. We are continuing to research and analyze private network solutions that are evolving in the industry for potential use at Xcel Energy that could meet the needs of our advanced grid strategy as well as the Company's other communication needs. Where we believe those solutions would reduce or resolve issues and risks, and are cost-effective, we will look to implement them.

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Xcel Energy		Information Request No.	8
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: AMI Meter Comparison
Reference(s): Docket M-19-666, IDP Petition, Attachment M2 Bloch Direct and Schedule 10

Provide a table showing the price per meter of: 1) the originally selected AMI (Landis + Gyr) meter, 2) the available comparable meter alternatives received at that time, 3) the Itron Riva Gen 4.2, and 4) all other AMI-DI (or DI-equivalent) meters received. Note any differences in price or major factors considered.

Response:
See Attachment A to this response for the requested meter cost data.

Major factors considered included total cost (including meter, installation, project management, and edge technology/distributed intelligence ("DI")), metrology capabilities, DI capabilities, schedule, and commercial terms and conditions (including warranty).

There were three meters evaluated that offered DI: **[PROTECTED DATA BEGINS**

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PROTECTE DATA ENDS].

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

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

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

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Date:	October 19, 2020

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

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

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

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Xcel Energy		Information Request No.	9
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Customer Notice Plan – AMI Installation
Reference(s): Docket M-20-592 Xcel Reply and M-19-666

Has the AMI customer information notice plan changed since the 19-666 filing? Has it been further developed or is intended to be further developed? If changes have been made, provide a current draft.

If no changes have been made since the 19-666 filing, is the customer notice plan anticipated to change by November 6, 2020?

Response:
No, we have not changed the customer notice plan since our 2019 IDP filing. We intend to include the notice plan in our upcoming AMI and FAN cost recovery request. We also intend to discuss the notice plan as part of one of the stakeholder workshops we outlined in our procedural proposal in Docket No. E002/M-20-680. To the extent we receive comments or feedback, we are open to revising the plan in advance of AMI deployment.

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Xcel Energy		Information Request No.	10
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Additional Plans – AMI Installation
Reference(s): Docket M-20-627 Xcel Comments, p. 15

All of this was part of information we provided with our request for certification and considered by the Commission. Specifically, we provided our initial notice plan, customer data rights and protection (all of which follow and comply with the Commission's framework for customer data access and protection), cybersecurity considerations, discussion of our plans for HAN functionality and many other design elements with our certification request – and would expect to provide comparable information again with our request for Transmission Cost Recovery (TCR) rider recovery. One reason for this is to keep the Commission informed on prominent aspects of our implementation, but another would be because our cost recovery request will include the costs of some of these, for example, the deployment-related customer communications.

Additional design elements may require Commission approval and others may be more informational. We are committed to keeping the Commission informed on our plans as they progress, whether that takes the form of Petitions seeking approval or informational filings outlining the status of our development of various customer programs, services, or technology capabilities. To the extent there are costs associated with any of these that we seek to specifically recover, we would provide the relevant details either in a separate filing seeking approval and cost recovery, or in conjunction with other AMI and FAN costs – for example, through the TCR Rider.

Request:
Will Xcel seek further Commissioner or stakeholder input on its initial customer notice plan, customer data rights and protections, cybersecurity considerations or discussions on HAN functionality and other design elements? If so, under what docket or filing and when does Xcel anticipate making such a filing?

Response:
Please see our response to Department of Commerce Information Request No. 9 regarding the customer notice plan. We intend to take a similar approach to customer data rights and protections, and the details regarding Home Area Network (HAN) functionality and design. With respect to cybersecurity considerations, however, we note that we will only provide general information publicly, so as to not compromise the security of the system.

We have identified several aspects either directly or indirectly related to our proposed AMI implementation plan that require Commission approval, and for which we have or intend to seek approval, as we outlined on page 248 of our 2019 IDP – copied below for easy reference:

- 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 customers; and
- Future service quality reporting under Minnesota Rules (beginning April 1, 2022) and the Company's Quality of Service Plan (QSP) (beginning May 1, 2022) to address any impacts to service quality metrics as a result of AGIS implementation.

This list is based on our assessment of operative Minnesota statutes, rules, and Commission orders. We recognize that the Commission may decide that other aspects of our AMI and implementation plans require approval, and should it do so, we would intend to comply with any such order.

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Xcel Energy		Information Request No.	11
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Anticipated Non-RF Based Opt-Out Customers
Reference(s): Xcel Reply Docket M-20-592, M-19-666, DI-20-627

Xcel 20-592 Reply: The primary focus of the Petition was to create a path for AMI to comply with billing rules and to present a proposed solution for a small set (approximately 0.5 percent) of our customers who we expect, based on the experience of other utilities, to object to a RF-equipped AMI meter. We believe we have presented sufficient information in this docket for the Commission to consider in assessing our proposal. There is not a wide array of alternatives to AMI that will both allay customer RF concerns and meet our requirements for billing. One might be installing a more limited version of nonstandard, non-RF communicating meter, which might be somewhat lower cost. However, we have demonstrated that our proposed costs compare favorably to the industry – and the meter we intend to use for these customers under our proposed AMI Opt-Out Tariff will be equipped with as closely as possible to the equivalent capabilities as our standard AMI meter – however, without the RF communication module.

Request:
What is Xcel's expected opt-out rate for customers who have data privacy concerns (or more generally, not-RF concerns)? How did Xcel arrive at that number? What other states, utilities, or studies were evaluated in that analysis?

Response:
The current estimate of 0.5 percent of opt-out customers includes customers opting out for any reason. Based on our discussions with other utilities that have deployed AMI meters, most customers opt out due to concerns of RF exposure. The customers that opt out due to privacy concerns are usually concerned with the near real-time access to data over the RF network. In our response to Department of Commerce Information Request No. 11 in Docket No. E002/M-20-592, we outlined the states of

the utilities we engaged with to understand their opt-out experiences and the framework of their customer opt-out option. For easy reference, there were nine utilities who responded to our request for information in Texas, Illinois, Kansas, Missouri, Florida, North Carolina, Maryland, and Oklahoma.

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Xcel Energy		Information Request No.	12
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: AI versus DI Definitions
Reference(s): Xcel Response to DOC IR4 in DI-20-627
How does Xcel differentiate between artificial intelligence (AI) and distributed intelligence (DI)? Does Xcel anticipate using AI for any future programs or services? And if so, what and how?

Response:
Distributed Intelligence refers to the architectural concept of distributing computing processing power, as contrasted to centralized processing. Artificial Intelligence is the ability of machines or computers to mimic cognitive functions and is a capability that Xcel Energy will continue to explore with respect to DI and AGIS and may seek to leverage regardless of architecture.

AI comprises multiple sub-categories such as Machine Learning, Robotics, Computer Vision, etc. Two examples of where Xcel Energy is leveraging AI capabilities to improve its field and back office operations are:

- Transmission operations uses eSmart Systems' computer vision analytics to rapidly detect and identify infrastructure anomalies.
- Gas operations use of Urbint's machine learning to predict when and where gas odor calls are most likely.

Xcel Energy plans to monitor developments in AI, and to develop and deploy as appropriate and beneficial for our customers.

Preparer:	Brian Amundson	Al Choi
Title:	Director, Advanced Grid Strategy	Manager, Next Generation
Department:	Distribution – Electric Engineering	Innovation & Transformation
Telephone:	715.737.4645	303.571.7746
Date:	October 19, 2020	

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Xcel Energy		Information Request No.	13
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: FAN Infrastructure for Gas Meters
Reference(s): Docket M-19-666, IDP Petition, Attachment N4, p. 71

6.1.2 Network Design

1. In areas where the Company serves both electric and gas, the network shall be designated to support both electric and gas metering.
2. In areas where the Company serves gas exclusively, the network shall be designated to support gas metering.

Is the FAN designed to accommodate Xcel gas meters? If so, how are those costs included or separated from the electric meter infrastructure costs?

Response:
The initial deployment and configuration of the FAN network is specific to the electric meters being deployed as part of the AMI and FAN certification. It is capable of being used by other devices, including natural gas meters, but would need to be scaled-up to accommodate other such uses. To be specific, the WiSUN portion of the network is designed to be used by any device that can communicate with the WiSUN network being deployed and the network is designed to grow accordingly to support other devices, which could include gas meters that communicate over WiSUN network.

As such, there are no costs to separate out at this time. To the extent we bring a proposal forward where the FAN would support the Company's natural gas meter reading, we will include a cost sharing proposal for FAN costs between our electric and natural gas business lines.

Preparer:	Wendall Reimer
Title:	Director, AGIS Delivery
Department:	IT – Advanced Grid
Telephone:	651.639.4448
Date:	October 19, 2020

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Xcel Energy		Information Request No.	14
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DI-Application Development
Reference(s): Docket 19-666 Generally, Itron Website

Is there a potential for Xcel to share, or sell usage of, any applications it may create via the Itron store to other users of Itron products and services?

Response:
Yes. There is potential to share or sell usage of applications created by or with the Company to other users of the same application platform.

Preparer:	Roopesh Aggarwal
Title:	Senior Director
Department:	Business Innovation
Telephone:	303.571.2855
Date:	October 19, 2020

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Xcel Energy		Information Request No.	15
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DI-Application Development
Reference(s): Docket 19-666 Generally, Itron Website

Is Itron developing applications for use in its Itron application store?

Response:
Yes, Itron is developing applications for use in its application store.

Preparer:	Roopesh Aggarwal
Title:	Senior Director
Department:	Business Innovation
Telephone:	303.571.2855
Date:	October 19, 2020

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Xcel Energy		Information Request No.	16
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DI-Application Development
Reference(s): Itron Website

What applications are current available at the Itron app-store?

Response:
Per recent communications with Itron, the following applications are currently available at their app-store:

- High Impedance Detection
- Broken Neutral Detection
- Bypass Theft Detection

Preparer:	Roopesh Aggarwal
Title:	Senior Director
Department:	Business Innovation
Telephone:	303.571.2855
Date:	October 19, 2020

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Xcel Energy		Information Request No.	17
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DI-Application Development
Reference(s): Itron Website

Do contractual provisions exist around use of Itron applications and use by Xcel in executed contracts?

Response:
Yes, contractual provisions exist around the use of Itron applications by the Company. See the Distributed Intelligence Platform Agreement between Xcel Energy and Itron, dated September 1, 2020, submitted with our response to DOC IR No. 2.

Preparer:	Mark Raak
Title:	Manager, Commercial Services
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Date:	October 19, 2020

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Xcel Energy		Information Request No.	18
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DI-Application Development
Reference(s): Itron Website

Is there a maximum number of applications the Itron Riva Gen 4.2 meter can utilize, if so, what is the maximum number, or does it depend on the number and type of applications?

Response:
The number of applications will be limited only by the available memory, the memory requirements of given applications (for both application code and any data storage required), and potentially by the capability of the application processor.

Preparer:	Brian Amundson
Title:	Director, Advanced Grid
Department:	Distribution – Electric
Telephone:	715.737.4645
Date:	October 19, 2020

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Xcel Energy		Information Request No.	19
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DI-Application Development
Reference(s): Docket 19-666, IDP Petition, Harkness Direct, et.al.

Has Xcel purchased certain applications to date? If so, what application has Xcel purchased for use?

Response:
No, the Company has not yet purchased any applications.

Preparer:	Roopesh Aggarwal
Title:	Senior Director
Department:	Business Innovation
Telephone:	303.571.2855
Date:	October 19, 2020

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Xcel Energy		Information Request No.	20
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DI-Application Development
Reference(s): Docket 19-666, IDP Petition, Harkness Direct, et.al.

Is Itron working with any third party developers to create applications for its app-store?

Response:
Yes, Itron is working with a variety of third party developers to create applications.

Preparer:	Roopesh Aggarwal
Title:	Senior Director
Department:	Business Innovation
Telephone:	303.571.2855
Date:	October 19, 2020

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Xcel Energy		Information Request No.	21
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DI-Application Development
Reference(s): Docket 19-666, IDP Petition, Harkness Direct, et.al.

Does Xcel have any contractual provisions pertaining to Itron's terms and conditions for application development and offerings in its app- store?

Response:
Yes, Xcel Energy has contractual provisions pertaining to Itron's terms and conditions for application development and offerings. See the Distributed Intelligence Platform Agreement between Xcel Energy and Itron, dated September 1, 2019, submitted with our response to DOC IR No. 2.

Preparer:	Mark Raak
Title:	Manager, Commercial Services
Department:	Supply Chain
Telephone:	612.330.6667
Date:	October 19, 2020

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Xcel Energy		Information Request No.	22
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: DI-Application Development
Reference(s): Docket 19-666, IDP Petition, Harkness Direct, et.al.

What review would Xcel conduct before use of any application from the app store?

Response:
Like any new product development and introduction activity, the Company would perform market and customer and/or system research to understand the impact and benefits of the prospective application. These benefits would be compared to the costs for acquiring the application and subsequently supporting customer use of the application after initial deployment. In parallel, the Company would confirm that the application conforms to both Itron and Xcel Energy technical architecture requirements, cybersecurity requirements, and data privacy and confidentiality standards.

Preparer:	Roopesh Aggarwal
Title:	Senior Director
Department:	Business Innovation
Telephone:	303.571.2855
Date:	October 19, 2020

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Xcel Energy		Information Request No.	23
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: HAN to AMI Connection
Reference(s): Docket 19-666, IDP Petition, Attachment N2

1. Explain the current communications protocol anticipated to connect the AMI meter to the HAN.
2. Has the protocol changed since the issuance of the RFP attached to Docket 19-666 IDP filing, Attachment N2?
3. If the protocols have changed, explain why.
4. Explain the considerations given to this communications protocol, compare to other available protocols.

6.3.19 Meter Support for Home Area Network (HAN)

1. All Meters shall be certified to operate as an Energy Service Portal (ESP) as detailed in the ZigBee® Alliance Smart Energy Profile (SEP 1.x) specification (ZigBee® Document Numbers 07-5356-19 and revisions).
2. All Meters shall be certified to operate as ESP as detailed in the ZigBee® Alliance Smart Energy Profile (SEP 2.x) specification (ZigBee® Document: Smart Energy Profile 2, 13-0200-00, April 2013 and revisions).
3. All direct connected AMI Meters shall be certified to operate as ESP as detailed in the ZigBee® Alliance Smart Energy Profile (SEP) specification (ZigBee® Document Numbers 075356r14 and 084914r03).

Response:
In summary, the current planned communications protocol to connect the AMI meter to a customer HAN is IEEE2030.5. This is an evolution of the SEP 1.x specification that was noted in Attachment N2 in our November 1, 2019 IDP in Docket 19-666,. This change is responsive to industry advancements and momentum to enable greater access to HAN services: namely, to address a larger spectrum of HAN devices by decoupling the communication protocol from the physical technology required to accomplish the communication.

We discuss the protocols in more detail below:

There will be a series of communications protocols used to connect the AMI meter to the HAN. IETF protocols will form the basis of the Transport and Network layers of communications, with Wi-Fi forming the Data Link and Physical layers. This is simply referred to as a TCP/IP based Wi-Fi HAN. Additionally, both IETF and IEEE application layer protocols will form the Application layer. Common UDP Internet services such as DNS, and DHCP will be used, as well as TCP services such as HTTP, and TLS will be used. Additionally, Zigbee SEP2.0 (in the form of IEEE2030.5) will be used as the primary energy services application layer protocol.

The IEEE2030.5 standard fully incorporates Zigbee SEP2.0 and adds requisite elements to enable communications that are link-layer agnostic and run over the Internet Protocol. Zigbee SEP2.0 fully incorporates the SEP1.1 Profile, but does not require any of the underlying Zigbee protocol stack for communications across an IEEE802.15.4 mesh radio network.

IEEE2030.5 fully adopted the Zigbee SEP2.0 specification and it became an IEEE standard in 2013. The 2018 version specification is the current standard. The 2018 version includes California Rule 21 and IEEE 1547 revisions for DER.

The industry has a robust set of options for Utility energy management of DER and DR. Many of the options are driven by specific user communities, along with regulators, to solve point solutions. These include solutions such as OpenADR, DNP-3, IEC61850, SunSpec/ModBus, HomePlug, Zigbee on IEEE802.15.4, Z-Wave, and ANSI/CTA-2045 and more. The IEEE2030.5 standard, however, addresses the widest variety of Utility/Customer interaction Use Cases that Xcel Energy would need to address. Xcel Energy will continue to utilize point solutions based on industry adoption and how we believe we can best meet customer needs. We are also committed to working within the industry to support a robust set of Utility energy management capabilities, helping to reduce customer cost, and driving adoption of Smart Grid standards.

Preparer:	Randy Huston
Title:	Senior System Architect
Department:	IT - Architecture
Telephone:	303.571.6526
Date:	October 19, 2020

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Xcel Energy		Information Request No.	24
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: HAN Communication Protocols
Reference(s): Docket 19-666, IDP Petition, Generally

1. What are the benefits, costs, and limitations of Zigbee-based protocols versus wifi-based protocols or any other option considered?
2. What limitations on communication protocols were dictated by selection of the Itron Riva Gen 4.2 meter?

Response:
1. In terms of communication mediums, Xcel Energy selected the Itron RIVA 4.2 meter with Wi-Fi capability because our research indicates that most of our customers already use Wi-Fi technology in their homes. By selecting a meter that uses the same technology our customers are currently using, costs to participants are lower, and we theoretically can more easily expand the number of participants because it removes a potential barrier for them. Zigbee or other communication mediums did not have the same level of customer adoption or market penetration and therefore do not offer the same customer cost benefits nor participation potential as Wi-Fi. Regarding protocols, the SEP 1.0 protocol was not communication-layer agnostic and had security concerns. The RIVA 4.2 meter will use the IEEE 2030.5 protocol, which is a standard based on the SEP 2.0 protocol and expands to include the many function sets (capabilities).

   The industry has other options, such as OpenADR, DNP-3, IEC61850, SunSpec/ModBus, HomePlug, Zigbee on IEEE802.15.4, Z-Wave, and ANSI/CTA-2045 and more. We are committed to a Smart Meter connection with the customer HAN via TCP/IP on Wi-Fi, as this is has become the dominant technology. We have plans to move forward with IEEE2030.5 as one of the primary application protocols for energy management with continued review of industry trends and standards adoption of other application protocols.

2. See the Company's response to part 1 of this request.

   Xcel Energy was not, by design, limited to specific protocols dictated by the selection of the Itron Riva Gen 4.2 meter. Rather, one of our selection criteria for the Riva 4.2 meter was its support of the Wi-Fi radio network. We favored a service model based on Wi-Fi enabled HAN networks due to its emergence as the dominant and prevailing technology. This allows Xcel Energy to capitalize on Wi-Fi enabled networks and support the Zigbee SEP2.0 profile (in the form of the IEEE2030.5 standard) for smart energy management.

Preparer:	Randy Huston
Title:	Senior System Architect
Department:	IT – Architecture
Telephone:	303.571.6526
Date:	October 19, 2020

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Xcel Energy		Information Request No.	25
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Customer Data Availability
Reference(s): Docket 19-666, IDP Petition, Harkness Direct, p. 116

11 Q. CAN YOU DISCUSS FURTHER THE TYPES AND VOLUME OF DATA YOU WILL BE
12 RECEIVING FROM THE FIELD AND MANAGING AS A RESULT OF AGIS
13 IMPLEMENTATION?
14 A. Yes. The volume of data will increase by orders of magnitude. Related to
15 AMI metering, we will have the capability to obtain data from meters many
16 times a day – and will be able to provide this data to customers on a daily basis
17 (or more frequently) via the customer data web portal or smartphone
18 application. Not only will the advanced meters provide energy usage data,
19 they can also measure voltage, current, frequency, and power quality.
20 Additionally, these meters can detect outage events, restoration events,
21 tampering, energy theft events, and perform meter diagnostics. This is in
22 contrast to our current metering system which generally provides energy usage
23 data once per month for billing purposes.

What is the full list of data and at what time intervals will Xcel be able to see or read from the customers home, on what time interval on Day 1? What level of data will be available to the customer on Day 1?

Response:
On Day 1, Xcel Energy will collect the following data from the meters:

- Interval Data, collected every 4 hours
  - kWh delivered
  - kWh received
  - kVARh delivered
  - kVARh received
  - Temperature

For residential and small business customers, we will measure usage in 15-minute intervals; for customers on demand rates, we will measure usage in 5-minute intervals.

- Register Data, collected once per day
  - kWh delivered
  - kWh received
  - kVARh delivered
  - kVARh received
  - Max Demand kW w/ timestamp
  - Max Demand kVAR w/ timestamp

- Event data, collected as part of interval read or provided at time of event, includes but is not limited to meter, tamper and outage events.

On Day 1, the customer will have access via the customer portal to see their interval usage data, updated to the most recent interval read that has been collected and processed by the Company's systems.

Preparer:	William (Paul) Davis
Title:	Director
Department:	Meter Reading
Telephone:	715-737-5603
Date:	October 19, 2020

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Xcel Energy		Information Request No.	26
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Customer Data Availability
Reference(s): Docket 19-666, IDP Petition, Harkness Direct, p. 116

Will a customer have non-discriminatory access to all its own data via wifi protocols? Could a customer have non-discriminatory access to their data via wifi protocol?

Response:
We understand this question as wanting to understand what data customers will have access to via the HAN and over what medium and protocol. We intend to make certain data available via the Wi-Fi communication medium that will utilize the IEEE2030.5 communication protocol. The Company will make near real-time energy consumption information (kW/kWh) available to customers. There are additional data that can be communicated to the customer using IEEE2030.5; we are still exploring what we believe will provide the most benefit to our customers, and will include any changes to our current plans to provide usage information in the periodic updates we have committed to make regarding our customer strategy and programs.

For customers that do not choose to use the HAN service, consumption data access (kW/kWh) will be available in the customer portal through either the Xcel Energy mobile app or Xcel Energy website. Customers can connect to this portal via any device (mobile, desktop, etc.) that can connect to the internet.

Preparer:	Drew Quirk
Title:	Manager, Business Solutions
Department:	Advanced Grid Customer Solutions
Telephone:	612.337.2024
Date:	October 19, 2020

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Xcel Energy		Information Request No.	27
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Customer Data Availability
Reference(s): Docket 19-666, IDP Petition, Block Direct, p. 145

> Q. WHAT ARE THE COMPONENTS OF ADVANCED METERS?
> A. The components of the advanced meter include: (1) the meter itself (responsible for measurements and storage of interval energy consumption and demand data); (2) an embedded two-way radio frequency communication module (responsible for transmitting measured data and event data available to backend applications); (3) embedded Distributed Intelligence capabilities (described below); and (4) an internal service switch (to support remote connection and disconnection).

Provide an overview of the four components of the meter and each individual meter component, list all physical components make up each of the four parts; provide specification sheets as available.

Response:
Please see our response to DOC IR No. 31.

Preparer:	William (Paul) Davis
Title:	Director
Department:	Meter Reading
Telephone:	715-737-5603
Date:	October 19, 2020

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Xcel Energy		Information Request No.	28
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Customer Data Availability
Reference(s): Docket 19-666, IDP Petition, Block Direct, p. 145

Can the Itron Riva Gen 4.2 meter be used without engaging in use with any of the DI components?

Response:
Yes. The meter functions, except Home Area Network (HAN), will operate without engaging the DI components. Please also see our response to DOC IR No. 31 for further information regarding the meter components.

Preparer:	William (Paul) Davis
Title:	Director
Department:	Meter Reading
Telephone:	715-737-5603
Date:	October 19, 2020

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Xcel Energy		Information Request No.	29
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Customer Data Availability
Reference(s): Docket 19-666, IDP Petition, Block Direct, p. 145

Can the Itron Riva Gen 4.2 meter be functional if the DI-NIC card is not used?

Response:
For clarity, the Itron RIVA 4.2 meter does not have a physically separate network interface card (NIC) from the meter register board. RIVA 4.2 meter incorporates billing registers, DI Platform, Wi-Fi radio, Mesh radio on a single register board.

If the DI platform is not enabled via firmware changes, the meter will continue to function in measuring the customer's usage data and providing it to the AMI back-office system. Please also see our response to DOC-31 for further information regarding the meter components.

Preparer:	William (Paul) Davis
Title:	Director
Department:	Meter Reading
Telephone:	715-737-5603
Date:	October 19, 2020

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Xcel Energy		Information Request No.	30
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Customer Data Availability
Reference(s): Docket 19-666, IDP Petition, Block Direct, p. 145

Can the meter and radio portions of the meter function independently from the distributed intelligence/computer?

Response:
Yes, the meter has basic register firmware that enables meter and radio functions independent of DI.

Preparer:	William (Paul) Davis
Title:	Director
Department:	Meter Reading
Telephone:	715-737-5603
Date:	October 19, 2020

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Xcel Energy		Information Request No.	31
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Customer Data Availability
Reference(s): Docket 19-666, IDP Petition, Block Direct, p. 145

Provide an overview of the functionalities and interdependencies between each meter component (including at a minimum the meter, radio/NIC, switch, and DI).

Response:
1. *Meter Register* – Core metrology for billing and basic operational support. Energy consumption data, outage reporting, diagnostics data for remote troubleshooting, etc. These values and data can be read locally, are stored locally, and can be transmitted via the meter's communication function.

   Independent function – but utilizes Communication for remote access.

2. *Communication* – Network Interface Card (NIC) / radio functions. While the RIVA 4.2 does not have a physically separate NIC hardware card, it has network functionality embedded in meter register firmware. Wireless communication is supported for remote network or local access via multiple firmware controlled protocols in the ISM 900MHz band or Wi-Fi band and provides access for all command and control of meter functions (data transmission, switch operation, DI apps, etc).

   Wireless Communication Function – gateway to device operations and transmission of data

3. *Service Switch* – mechanical device embedded in residential meters to remotely disconnect / reconnect service. Commands to operate this switch are securely provided via the network or locally.

Independent function – but utilizes Communication for remote access.

4. *Distributed Intelligence (DI)* – interaction via the secure Linux operating system running on the meter and transmitting data via the embedded communications function. Architecture is a containerized design to protect core metrology from DI applications. DI applications use information acquired locally ("at the edge") and processes that information to derive predetermined actions. DI apps can be created by third parties or Xcel Energy to address operational needs. DI apps are tested and certified prior to being securely transmitted to the meter for use. Sample DI apps may include:
    a. Load Disaggregation
    b. High Impedance Detection
    c. Broken Neutral Detection
    d. Bypass Theft Detection
    e. Diversion Theft Detection

Data dependent function – utilizes core device processor with secure Linux operating system to acquire read only access to meter data. Communication for functionality of Apps is dependent on the remote network access.

Preparer:	William (Paul) Davis
Title:	Director
Department:	Meter Reading
Telephone:	715-737-5603
Date:	October 19, 2020

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Xcel Energy		Information Request No.	32
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Contingencies
Reference(s): Docket 19-666, Attachment M3, Harkness Direct, p. 80

Legacy interfaces – For AMI, we have a reasonable estimate of the type of interface work that will be necessary for Minnesota based on our previous experience with implementation in Colorado. However, the Minnesota-specific functionality will be dependent on final Minnesota requirements once approved.

Provide a list of potential Minnesota requirements that were anticipated that may change the estimated interface price estimate included in the AMI budget what amount of the contingency budget was allocated for these potential specifications.

Response:
We have just started the process of analyzing the full requirements for Minnesota and the differences from Colorado. The anticipated areas that could have differences in requirements include, but are not limited to, the following:

- Customer opt-out program and costs
- Remote Reconnect and Disconnect, including Minnesota's cold weather rule protocols
- Rates, including 5-minute calculated demand
- Customer Contact and Communications
- Meter installation processes

The contingency budget does not contain any considerations for Minnesota-specific requirements. Please refer to DOC IR No. 33 for further explanation.

Preparer:	William (Paul) Davis	Nick Paidosh
Title:	Director	Principal Rate Analyst
Department:	Meter Reading	Regulatory Affairs
Telephone:	715.737.5603	612.342.9034
Date:	October 19, 2020	

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Xcel Energy		Information Request No.	33
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Contingencies
Reference(s): Xcel Reply Comments, Docket M-20-592

To the extent we will need to alter enterprise-wide plans to, for example, capture meter register reads that are not needed for billing purposes but are needed to meet a Minnesota specific billing content rule, there are resource, timeline, and cost implications. We will need to develop the Minnesota-specific information systems requirements and complete the programming to be ready for the first customer who receives an AMI meter – which in the case of our opt-out proposal could be as early as 90 days before we plan to install the first AMI meter. We will also need to build any incremental costs associated with Minnesota-specific requirements into our project plans for cost recovery purposes.

Are these Minnesota-specific changes included in the contingency budgets that are described in the testimonies of Harnkness, Bloch, and Durrigula's relating to contingencies for state-specific functions or requirements?

Response:
As with any project plan, it is necessary to determine and manage to a set of assumptions. In this case, the project budgets were developed assuming the Company would have an opt-out framework like we have proposed – i.e., implementing information systems and business processes to support an AMI opt-out/manual read option for customers, an up-front and final bill equipment charge, and a monthly service charge. Similarly, the project budgets contemplate presenting only the usage information that we used to calculate the customer's bill on customer bills. That said and as noted in the testimony, we are not able to fully anticipate the full extent of the work that will be required to implement an initiative at the outset. This could be due to required filings – such as we made for opt-out and the billing content variance request – technology advances or changes, and the potential need for other changes in response to technology advances over time.

That said, the contingency amounts built into the project budgets do not factor-in specific potential outcomes from known filings, for example. To the extent the requirements for Minnesota vary from the assumptions we made for project planning purposes, we will utilize contingency amounts to cover any additional work that needs to be performed as result. Depending on the extent of the contingency that work consumes, we may need to adjust the contingency going forward to properly account for other factors that may come into play.

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Xcel Energy		Information Request No.	34
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: ADMS Configuration
Reference(s): Docket M-19-666, Attachment M2, Bloch Direct, p. 43

ADMS is configured on a 5-minute basis of communications, will greater communication and software programming modifications be needed to change the ADMS connectivity to something more granular than on a five-minute basis?

Response:
ADMS recalculates the load flow every 5 minutes or when triggered by an unanticipated change in load or configuration. The primary SCADA inputs (substation or primary feeder monitoring) are provided in real time.
Bellwether meters will provide data every 5 minutes. This frequency will be adequate for the current purpose, which is to fine-tune the system. ADMS is capable of higher bellwether data rates, should we find it beneficial to increase the frequency.

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Xcel Energy		Information Request No.	35
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Communication Systems
Reference(s): Docket M-19-666 Generally

What is the communication system bandwidth and latency at each segment of the information steam (from home wireless system/HAN connection to the utility)? Provide an overview at each segment of the communications network of the system constraints and operating parameters. At each segment provide the expected usage percentages including usage of high and low traffic; including descriptions of what communication need is expected to use the bandwidth.

Response:
The AMI communications stream consists of multiple layers identified as the Wi-SUN network, Backhaul and enterprise Backbone. Each layer has different bandwidth and latency requirements. They are determined by network traffic engineering, which takes into account end-to-end traffic shaping, Quality-of-Service (QOS) and total payload.

Wi-SUN, Backhaul and Backbone network capacity is managed through traffic engineering and optimization for each network technology. It is based on a deployment and growth model associated with applications (Meter-2-Bill, Distribution Automation, Distributed Intelligence, etc.) generating traffic. Network size and scale is anticipated ahead of deployments and/or applications growth. Each of the components of the FAN is individually scalable and optimized based on network monitoring (Layer2 stats, interface stats, meter interrogation performance, resilience, and routing table information) and traffic shaping (prioritization, scheduling, etc.). Network design and optimization addresses bandwidth, latency, packet loss and jitter. QOS prioritization assists with a system-wide balance for bandwidth allocation. AMI provides granular QOS for latency-sensitive commands from the back-office through all network elements to Field Devices.

Wi-SUN network elements, such as Field Access Points and Relays are proportionally scaled to meet the network traffic requirements for the quantities of Field Devices served and the local services provided. There are two very separate activities to design the Wi-SUN network: (1) initial design, and (2) network optimization.

An initial design is determined by the specific payloads and usage models anticipated by the Utility. This data, along with an extensive RF study of the target service territory, is used to provide a deployment model. Wi-SUN is a radio mesh network based on the IEEE802.15.4 standard. The radio network uses frequency hop spread spectrum (FHSS) as the physical channel for node-to-node (that is, device-to-device) RF communications. In the case of North America, the network is divided into 83 channels within the 902-928MHz band. In a mesh network, devices discover different paths to the Access Points for both sending and receiving data. Accordingly, bandwidth varies widely, across node-to-node communications.[1] Xcel Energy's initial Wi-SUN based implementation bandwidth varies from 50Kbits/sec to 600 Kbits/sec depending on direct meter-to-meter and/or meter-to Field Access Point signal strength. Xcel Energy's Wi-SUN implementation design includes expected ~10ms latency between node hops. Average node depth is expected to be ~5 to 8 nodes deep. Access Point to nodes are deployed at 1:6K. Access points can manage 12K nodes in event of failover.

The second activity is Network Optimization. Optimization looks at all empirical data to update the network design-based performance metrics. Access Point to nodes are optimized at 1:5K.

Backhaul technologies are purpose selected based on Field Access Point proximity to Xcel Energy facilities/plants (copper/fiber) or remote field location (LTE, Cellular). Backhaul bandwidth and latency requirements are satisfied through spectrum licensing and Field device ratios per Access Point. Five channels of meter interrogation data based on five Residential channels of 15-minute interval data and five Commercial channels of 5-minute interval data. Access Point daily payload data <20MB daily. LTE spectrum of 1.4MHz (minimum requirement).

Backbone technologies aggregate FAN traffic with all other Xcel Energy facility/plant network traffic which is engineered and managed with industry best practices for enterprise networks.

[1] The technology, as needed, can be licensed for modes up to 2.4Mbits/sec (requiring only licensing).

HAN technologies are engineered for minimal traffic and are provided by the Customer. The meter joins the existing customer HAN formed by the customer Wi-Fi router. The Wi-Fi uses a 2.4MHz network.

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Xcel Energy		Information Request No.	36
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Itron Riva Gen 4.2
Reference(s): Docket M-19-666, Attachment M3, Harkness Direct, p. 54

Are there contractual payment provisions and protections (i.e. pay for performance) for software integration of the AMI, DI, ADMS, or any component of the communications systems and/or related AMI components including items in the list outlined in Docket 19-666 IDP Petition, Attachment M3, Harkness Direct, pg 54?

If so, provide an overview of those protections and intended risk minimization strategy.

Provide an overview of any other interoperability contract provisions or citation available to minimize integration and interoperability risk of any AGIS, or AGIS-related components.

Response:
Company's contract with Itron relates to the design and deployment of AMI, including the advanced meters, communications networks, and the headend software applications necessary to transmit and receive data from the advanced meters and other devices forming part of AMI. Referring to the list outlined in Docket 19-666 IDP Petition, Attachment M3, Harkness Direct, pg 54, Itron is only responsible for integration of some of the items on that list. Specifically, Itron is responsible for the integration of the Distributed Intelligence platform and integration of the FAN. The Company has not yet entered into an Individual Statement of Work (ISOW) with Itron for meter installation in the Minnesota service area, but expects to do so. Therefore, our response will also address meter installation integration.

With respect to the remaining systems identified on page 54, Itron is not responsible for integrating AMI with those systems. The integration of such systems will be

handled by the Company, with supplementation by external contractors as needed. (See Harkness Direct, p. 63, lines 20-26). Accordingly, the Itron contract does not include contractual provisions relating to the integration of such systems, and we therefore do not address those in this response.

Integration with DI Platform

Pursuant to the Distributed Intelligence Platform Agreement, Itron is obligated to provide the software platform necessary to enable Distributed Intelligence functionality on the AMI meters. (See Attachment A-11, Form of Distributed Intelligence Platform Agreement.) Itron is obligated to provide the essential functionality of the DI Platform. (See Attachment K-2, Milestone Deliverable #5). The complete functionality of the DI Platform is subject to standard acceptance testing.

The DI Platform Agreement is separate from the Meter Supply Agreement. However, there are cross-default provisions allowing termination of the Meter Supply Agreement due to default in the DI Platform Agreement (see Exhibit B. section 25.1.2) and vice versa (see DI Platform Agreement, Section 19.3). Accordingly, any failure of the DI Platform due to vendor's default will allow Company to terminate both agreements and seek remedies for breach of contract.

FAN Integration

To ensure maximum interoperability, the Contract requires that all AMI equipment provided by the vendor is required to adhere to the WiSUN standard. (See Attachment B-8, Industry Standards, Sections 1.2 and 1.5. See also Exhibit F, Individual Statement of Work for Network and DA for PSCo, Sections 2.5.2 and 2.9.6 for language in the PSCo ISOW, which we would expect to also be included in any ISOW applicable to the Minnesota service area). If vendor supplies any Goods that fail to meet the WiSUN standard, such Goods would be non-conforming. Accordingly, the Company would be entitled under Section 8.6 of Exhibit A, Amended and Restated General Conditions for Major Supply Agreement (MSA) to reject such Goods, and Vendor would be obligated to repair and/or replace such Goods, at its cost. To the extent the vendor breaches its obligations to do so, the Company would be entitled to seek remedies for breach of contract.

Integration with Meter Installation Vendor

The Company has not yet executed an ISOW for the installation of meters in Minnesota. Accordingly, the present contract with Itron does not specifically address the integration of Company's systems with Itron's systems for the purposes of meter installation in Minnesota. However, the Company's affiliate Public Service Company of Colorado (PSCo) has contracted with Itron to perform meter installation in PSCo's territory. (See Exhibit K, Individual Statement of Work for Electric Meter Installation

for Public Service Company of Colorado (PSCo)). Exhibit K requires PSCo and Itron to jointly integrate Itron's (or its subcontractor's) work order management system with the company's systems. (See Section 2.2.25.) Any delay in the integration efforts will impact the meter installation schedules, and any delay in the meter installation schedule may be subject to liquidated damages. (Id.; Attachment K-2.) Furthermore, to the extent the Vendor breaches its obligation to integrate its systems with the company's systems, PSCo may seek remedies for breach of contract.

Given the Xcel Energy's ISOW relating to PSCo, we expect that any integration efforts relating to meter installation will be completed in the context of the PSCo deployment, and that no further integration efforts will be required for meter installation in Minnesota. Furthermore, we expects to utilize similar contractual provisions for meter installation in Minnesota, which will mitigate any risk.

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Xcel Energy		Information Request No.	37
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Itron Riva Gen 4.2
Reference(s): Docket M-19-666, Attachment M2, Bloch Direct, generally
Has Itron installed the Itron Riva Generation 4.2 meter for any other utilities? If so, please provide the names of all utilities that have in use the Itron Riva Gen 4.2 meters.

Response:
No, the Itron RIVA Generation 4.2 meter has not been installed at other utilities at this time. We note that the RIVA 4.2 meter is the third generation in the RIVA product line of meters and includes hardware improvements, including increased memory – and improved power supply and firmware improvements including compatibility with IEEE 2030.5 communications protocol and improved power quality functions.

Several million of the previous generation RIVA 4.1 meter have been deployed at several utilities including the following:

- Avangrid
- Avista Corp
- Northwestern Energy
- Tampa Electric Company
- Vectren
- Several Municipal Utilities in North America

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Xcel Energy		Information Request No.	38
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: Itron Riva Gen 4.2
Reference(s): Docket M-19-666, Attachment M2, Bloch Direct, generally

1. Are there any utilities currently using the DI-capabilities of the Itron Riva Gen 4.2 meter? If so, please list.
2. Are there other utilities that have purchased, but not yet used, the Itron Riva Gen 4.2 meter? If so, please list.
3. Has Itron demonstrated success with its DI-platform and use outside of a test-laboratory? If so, how and provide any document available on a showing of successful integration and use of the Itron DI-platform.

Response:
1. We are aware of three utilities that have tested DI capabilities similar to those of the Itron Riva Gen 4.2 meter.
    - Tampa Electric Co. (TECO)
    - ACTEWAGL Australia
    - North American utility not disclosed by Itron, still in negotiations
2. We are not aware of other utilities that have purchased, but not yet used, the Itron RIVA 4.2 meter.
3. TECO conducted a test of two Itron apps (High Impedance, Theft Detection) on the RIVA 4.1 meter, including the end-to-end DI platform in 2018. They have kicked off a rollout of three Itron apps (High Impedance, Theft Detection and Broken Neutral) to 200,000 production meters that they are using to evaluate the business case for a full rollout. ACTEWAGL in Australia has tested Itron apps (High Impedance, Broken Neutral, Theft Detection) and hope to deploy these and their own in-house developed DI apps to meters for testing and confirmed end-to-end processes and operation.

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Xcel Energy		Information Request No.	39
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: FAN/WiMAX
Reference(s): FCC Ruling on WiMAX, Docket 20-627, Xcel Comments

Provide the FCC Filings and case or docket numbers referenced in this article:
https://www.lightreading.com/security/utility-giant-xcel-to-test-private-lte-network-with-motorola-solutions/d/d-id/764059

Response:
The article infers reference to the Xcel Energy experimental license request file number: 0663-EX-CN-2020

Also mentioned in the article is the below document:
https://docs.fcc.gov/public/attachments/DOC-363915A1.pdf

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Xcel Energy		Information Request No.	40
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: FAN/WiMAX
Reference(s): FCC Ruling on WiMAX, Docket 20-627, Xcel Comments

The FCC ruled in late 2018, with an implementation date of April 2020, that the use of a network spectrum (frequency) called Citizen Band Radio Spectrum was going to be controlled by third parties to minimize congestion and interference, particularly for the U.S. Coast Guard and Navy, which also used this spectrum for operations. This is the spectrum that the WiMAX technology was designed to use when Xcel Energy selected it in 2014 as a part of the FAN.

As a result, in 2020, Xcel Energy replaced all WiMAX supported technology with public cellular data technology to support continued connectivity to the WiSUN mesh network to support the AMI meters that have been deployed to-date. This is a reasonable interim solution because it is a proven technology in use by other utilities with similar needs and will ensure Xcel Energy meets its commitments to our customers as well as position the Company to potentially convert to private LTE in the future.

What was the cost to replace all WiMAX supported technology with public cellular data technology and where will or have those costs be sought to be recovered?

Response:
The initial investment for WiMAX in Minnesota was for three sites to support the Minnesota Time-of-Use (TOU) pilot. These sites provided support to the MN TOU pilot effort up to October 2020. The costs for FAN WiMAX to support the TOU pilot totaled approximately 1.2 million and were recovered in base rates as part of the Company's most recent multi-year rate case in Docket No. E002/GR-15-826.[1] The

[1] See DOC IR No. 4 submitted on January 19, 2018 in Docket No. E002/M-17-775.

infrastructure associated with this limited deployment can and will be repurposed for internal communications within Xcel Energy if a private FAN is deployed.

With the Minnesota project timeline and change in strategy to initially deploy public LTE there were no more WiMAX sites deployed and all new and planned deployments will be with cellular capabilities. The cellular devices (modems) being deployed on distribution poles for the cellular solution can be reused if a private network strategy is adopted in the future. The costs of the cellular modems is relatively similar to the costs estimated for the WiMAX CPE devices on the distribution poles ($556 for cellular compared to $446 for WiMAX CPE's); the materials and labor to install the cellular modems is approximately 2/3 the cost for material and labor to install a WiMAX CPE on a distribution pole. We intend to submit a Petition seeking cost recovery of FAN and AMI costs through the Transmission Cost Recovery Rider in early November 2020.

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Xcel Energy		Information Request No.	41
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: FAN/WiMAX
Reference(s): FCC Ruling on WiMAX, Docket 20-627, Xcel Comments

Despite the shift away from WiMAX, the FAN functions will be the same with our near-term LTE strategy. the FAN specifically provides two-way communication, which in the case of AMI, is to the meters being deployed for AMI.

The primary uses/functions of the FAN are to support specific capabilities and functionalities as described in the AMI section of our 2019 IDP and certification request. Further use of the FAN will depend on Company deployment of expanded AMI or other technologies beyond AMI, as well as the Company's longer-term plans with respect to FAN technology, which we have discussed are currently in flux.

Please explain in detail, the previous, current, and long-term plans for the WiMAX/LTE portion of the communications network. Including how they will change, what it means from a short-term perspective (with the interim equipment and costs associated with cellular equipment) and how Xcel views those plans and changes in relation to how it anticipates seeking cost recovery or whether it is currently obtaining cost recovery for those actions.

Response:
Xcel Energy's current network strategy and that associated with the previous plans to deploy WiMAX technology is based on the benefits associated with a private network based on industry standards; it is based on the desire to have a single network solution that serves multiple business needs for reliable and secure two-way communication to and from field devices such as meters. Primary considerations are capabilities to meet solution requirements (AMI, SCADA, etc.), security, reliability/resiliency/redundancy and cost. The private solution provided by WiMAX and the use of the CBRS (Citizen Band Radio Spectrum which was "free" and shared) allowed Xcel Energy to provide a

private network connection that met the requirements mentioned at a reasonable cost. With the change in FCC requirements for the CBRS spectrum that changed the costs and complexity of utilizing that spectrum for Xcel Energy's purposes and costs to consumers.

As we have noted in other responses, the long-term strategy and plans associated with connecting the WiSUN network to Xcel Energy's data centers and back office applications is still being researched and developed. We continue to believe a private network is beneficial for the described purposes, but we need to ensure the solution that meets all of our requirements is cost-effective. This involves researching other options such as other spectrum (ex. 900MHz versus CBRS), other technology (LTE for example) and other connectivity options such as private fiber. The long-term solution could be any of these or a hybrid approach of several options. Also, as we have noted otherwise, we expect the timing of our decision to be in the mid-2021 timeframe.

The near-term decision to utilize cellular for the connection between the WiSUN network and Xcel Energy's data centers and back office applications allows the Company to provide the connectivity needed for the deployment of AMI meters on the project timeline to ensure the objectives and benefits of the AMI effort are realized as planned. This decision did not change the cost of deployment of the WiSUN network in any way, and it will be deployed as planned. The costs of the cellular modems and their installation to support the cellular solution for backhaul are very similar to the costs associated with the WiMAX devices that would have been deployed on the distribution poles. Please see our response to DOC-40 regarding cost recovery.

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Xcel Energy		Information Request No.	42
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: FAN and AMI Costs and Implementation By Year
Reference(s): Docket 20-627, Xcel Comments

Provide in a table the following, by year:

1. Xcel's expected AMI and FAN costs to be sought for recovery by year, including its anticipated Nov. 6, 2020 Transmission Cost Recovery costs sought for recovery;
2. The percentage of expected in-service aspects of its AMI and FAN for the years 2018 (or beginning when AMI and FAN costs began to be accrued) through 2035
3. Indication of the anticipated year of first use of DI-aspects of the meter
4. Expected percent utilization of the DI-aspects as a percent of total potential of the DI-capabilities (provide a definition of what a fully utilized DI-meter would entail or some measurable benchmark that could indicate full utilization)
5. Year of expected available baseline data for establishment of metrics

In light of Xcel's position on the timing for the establishment of metrics (based on actual system data) how would Xcel propose cost recovery be established if metrics and performance evaluations are not established until 1) equipment is installed (2022-2024) and 2) utilized and ready for providing baseline data (2025-2028)?

Response:
1. We outline the AMI and FAN costs that we expect to include in our upcoming Petition for cost recovery in Table (DOC-42) 1 below. We note that these amounts are preliminary and may vary from our pending Petition.

Table (DOC-42) 1: AMI and FAN Expenditures[1] – Preliminary Summary of 2020 Cost Recovery Request

Investment	Pre-2020	2020	2021
AMI	$1,932,498	$4,763,929	$24,599,208
FAN	$1,702,566	$510,037	$7,333,688
Total	$3,635,064	$5,273,966	$31,932,896

2. See the below table.

Table (DOC-42) 2: Planned AMI Meter Deployment – Minnesota

Planned AMI Meters Deployed by Year in Minnesota						
Year	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Meters	9,065	7,552	0	450,000	590,000	360,000

3. Xcel Energy plans to deploy initial applications in 2022.

4. Xcel Energy's goal is to maximize the benefits we can generate for customers using the full spectrum of capabilities on the meter.

5. The metrics we outlined in Michael Gersack's Direct Testimony (Schedule 11 in Attachment M to our 2019 IDP) are what we expect to report on starting with the first year of mass deployment. We proposed these metrics so the Commission can track performance of our AMI and FAN implementation, and believe they provide appropriate information on the progress of the project. Any additional metrics would have to be identified and defined so that we can begin collecting baseline data sets. We are collecting data today, and so to the extent metrics are identified that can be measured from that data, the first year of availability may be sooner than if we need to start tracking or collecting new data. As such, the first year of availability of baseline data for metrics will depend on the metric. As we noted in our response to the Notice in this docket, we believe the framework the Commission adopted in the Performance Metrics and Reporting Docket No. E002/CI-17-401 establishes a solid foundation to identify and develop any metrics or other performance reporting. As such, we suggest metrics and performance reporting for AMI and FAN follow a similar process, starting with the Commission establishing Goals and Objectives.

   Cost recovery for AMI and FAN is no different than any other investment the Company would make, such as a power plant or a transmission line. In general,

[1] Capital expenditures and O&M costs, less internal labor.

cost recovery is based on the timing of the investments, the assets being used and useful, and a determination that the costs incurred are prudent. More specifically in the case of AMI and FAN and our intent to seek recovery of those costs through the Transmission Cost Recovery rider, Minn. Stat. § 216B.16, subd. 7b allows for recovery through an automatic adjustment mechanism of charges, the Minnesota jurisdictional costs of certain new transmission facilities, facilities and planning investments that support grid modernization efforts, and certain Midcontinent Independent Transmission System Operator (MISO) charges associated with regionally planned transmission projects.

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Xcel Energy		Information Request No.	43
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic: AMI and FAN Capabilities
Reference(s): Docket 20-627, Xcel Comments, p. 14

As explained above, the Company's recommended product and service roadmap was informed by extensive customer research, industry research, technology assessment, and internal product development activities. We believe these are important and appropriate foundations on which to build such a timeline. That said, we do not view this as a comprehensive statement of the capabilities of AMI and FAN, and we intend to continue developing customer experiences and benefits over time.

Does Xcel intend to articulate the comprehensive statement of capabilities of the AMI and FAN at the time of filing for initial cost recovery?

Response:
We intend to submit similar information with our cost recovery request compared to what we submitted with our request for certification. Specifically, with respect to the technical capabilities, we intend to submit the same level of information, which is the best information we have at this time. We expect we will continue to learn more and perhaps even stretch the technical capabilities of AMI and FAN as time progresses and as we continue to define and develop customer programs, services, and operational abilities.

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Xcel Energy		Information Request No.	44
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere, Matt Landi		
Date Received:	October 7, 2020		

Question:
Topic:
Reference(s): Docket 20-627, Xcel Comments, p. 15

DOC Question: 12. At what point should design elements (notice plans for AMI installation, AMI customer data rights and protection, Home Area Network activation plan requirements, cybersecurity impacts, etc.) be considered by the Commission or stakeholders, if at all? Are there any design elements that should be explicitly considered or approved by the Commission?

Xcel Response: All of this was part of information we provided with our request for certification and considered by the Commission. Specifically, we provided our initial notice plan, customer data rights and protection (all of which follow and comply with the Commission's framework for customer data access and protection), cybersecurity considerations, discussion of our plans for HAN functionality and many other design elements with our certification request – and would expect to provide comparable information again with our request for Transmission Cost Recovery (TCR) rider recovery. One reason for this is to keep the Commission informed on prominent aspects of our implementation, but another would be because our cost recovery request will include the costs of some of these, for example, the deployment-related customer communications.

Additional design elements may require Commission approval and others may be more informational. We are committed to keeping the Commission informed on our plans as they progress, whether that takes the form of Petitions seeking approval or informational filings outlining the status of our development of various customer programs, services, or technology capabilities. To the extent there are costs associated with any of these that we seek to specifically recover, we would provide the relevant details either in a separate filing seeking approval and cost recovery, or in conjunction with other AMI and FAN costs – for example, through the TCR Rider.

1. Itemize all past, current, and planned investments, and/or technologies, and/or plans mentioned or referenced in its Integrated Distribution Plan filed Nov. 1, 2019.

2. For each item:
    - Summarize the details of the items mentioned or referenced in the 19-666 filing (including as applicable: scope, definition, timing, functions, vendor, model, related dockets, and if applicable, cost);
    - Indicate whether Xcel views each list item, or aspects of each item, as having been 'approved' by the Commission as part of certification;
    - if so, what document demonstrates that approval;
    - define whether the item, as listed, in the 19-666 filing was 'firm' or is subject to change;
    - indicate whether or not the item or aspects of the item will be subject to future review and approval whether as part of a future program or petition or stand alone;
    - provide the docket or program type for review;
    - if an item is subject to future approval provide the timing and docket venue expected to be used.
3. Define what Xcel means by the statement: "All of this was part of information we provided with our request for certification and considered by the Commission." What weight or level of approval does Xcel derive from that statement?

Response:
We respond to this question after discussing with Department Staff, who clarified that with this question they seek a better understanding of how our AMI and FAN cost recovery filing will compare to the project information provided in our certification request, whether we will be seeking specific approvals in addition to cost recovery of the investments, and how we envision the implementation of AMI and FAN occurring over the next several years.

With that context, generally, we expect to provide the same information as was included in our certification request – however updated with current project cost information and the latest project implementation timing. The approval we will seek is cost recovery of the certified investments – AMI, FAN, and the advanced planning tool (APT). This compares to our request in the E002/M-19-666 IDP filing, where we requested the Commission to certify specific AGIS investments under Minn. Stat. § 216B.2425, subd. 2, which makes them eligible for a subsequent request for cost recovery through the TCR Rider.

1. The investments the Company included in its certification request in the E002/M-19-666 docket were AMI, FAN, APT, Fault Location Isolation and Service Restoration (FLISR), and Integrated Volt Var Optimization (IVVO). The Commission certified AMI, FAN, and APT. Because we submitted our certification request concurrently with a rate case in which we sought cost recovery

of certain AGIS investments, we included extensive additional information that met all of the filing requirements for *cost recovery*. As such, the information we will provide in our upcoming cost recovery request will largely be the same, with the main plans aside from the AMI and FAN technologies being:

- Advanced Grid Customer Strategy
- AGIS Implementation and Customer Experience Timeline
- Customer Products and Services Enhanced by AGIS
- Customer Communication and Education Plan
- AGIS Progress Metrics Summary

These plans have not changed since our certification request and thus will be the same as what we will include with our cost-recovery request. We expect to get feedback from stakeholders on these through the procedural process, and we have proposed to hold a series of technical workshops where we would outline these and other aspects of our cost recovery filing for the purpose of educating stakeholders on our proposal and to gather feedback.

We also identified several future filings requesting Commission approvals and eliciting stakeholder input, as follows:

- 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, and
- Future filing to request approval of a pre-pay option for customers.[1]

We submitted a proposed customer opt-out tariff and request for a variance from the Billing Content Rule on July 10, 2020 in Docket No. E002/M-20-592, which is currently pending Commission action. While these are the programs or services we are certain will require Commission approval, there may be other customer programs or services that may also require approval by the Commission or – to the extent they fall into our Conservation Improvement Program – approval of the Department of Commerce.

[1] *See* Cardenas Direct at page 45 of 50 of Attachment M4 to the Xcel Energy IDP (November 1, 2019). Please note that we also identified potential timing to address 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.

We recognize that the Commission may also want to further review or approve other aspects of our implementation plans. To that end, we have committed to keep the Commission informed on our plans as they progress, whether that takes the form of Petitions seeking approval, or informational filings outlining the status of our development of various customer programs, services, or technology capabilities. We note that this type of approach would be consistent with AMI implementations that have taken place in other jurisdictions, which – in some cases as part of a cost recovery determination, the Commission specifies that certain aspects of the implementation should be further developed as part of a workgroup or procedural processes – some of which may come back to the Commission for approval and some may take the form of an informational filing. These could include details such as customer communication plans or materials, metrics development or performance reporting, or the parameters of specific programs or services.

2. To clarify, the Company did not receive any approvals in the 19-666 IDP filing. IDPs and the investments and action they outline are not subject to approval. As we discuss above, the Commission certified AMI, FAN, and the APT – making them eligible for a subsequent cost recovery request through the TCR Rider. With that said, we would expect all aspects of our plan to be subject to change until approved by the Commission.

   Specific to the future filings we identified in the E002/M-19-666 docket and also referenced in Part 1 above, the Opt-Out proposal and Variance request are pending in Docket No. E002/M-20-592. We expect the next program approval we will seek will be for remote disconnect, after initiating a stakeholder process, in early- to mid-2021. We expect it would be 2022 or after before we would propose or explore with stakeholders a potential customer pre-pay option. We expect these filings would be miscellaneous docket types, as they would not have an impact on Company revenues.

3. Our intent with the referenced statement was to convey that we included substantial information with our certification request – in fact, we provided all of the information required to be part of a cost recovery request. We believe the additional information provided helpful context to our planned implementation of significant advanced grid investments. As we have explained, we will submit the same information, with limited updates to costs, with our upcoming cost recovery request. We look forward to receiving stakeholder feedback on all aspects of our plan through the Commission's procedural process, as well as through the stakeholder technical workshops that we have proposed be part of the process.

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Title:	Director, Regulatory & Strategic Analysis
Department:	Regulatory Affairs
Telephone:	612.330.6064
Date:	October 19, 2020

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NOT PUBLIC DATA HAS BEEN EXCISED

☐ **Not Public Document – Not For Public Disclosure**
☒ **Public Document – Not Public Data Has Been Excised**
☐ **Public Document**

Xcel Energy		Information Request No.	45
Docket No.:	E999/DI-20-627		
Response To:	Minnesota Department of Commerce		
Requestor:	Tricia DeBleeckere		
Date Received:	November 18, 2020		

Question:
Topic: Xcel Contractual Relationships
Reference(s): Petition, generally
Request: Does Xcel or any of its affiliates have contractual relationships with the following companies for any services? Please indicate yes or no for each.

1. Arcadia	12. Innowatts	23. Sense
2. Attivo Networks	13. Marketing Evolution	24. SmartRent
3. AutoGrid	14. Mosaic	25. Sparkfund
4. BHI Energy	15. NS1	26. Spire Power Solutions
5. CIMCON Lighting	16. Opus one solutions	27. Swimlane
6. DRAGOS	17. Palmetto	28. Tenere
7. DERIVE Systems	18. Particle	29. Tesco
8. Ecobee	19. Powerphase Generation Smart	30. Trifacta
9. Enchanted Rock Technology Energy	20. Rangeforce	31. Uplift
10. eSmart Systems	21. Rapidsos	32. Urbint
11. Finite State	22. Remix	33. Viriciti
		34. Volta

Response:
See Attachment A to this response which is intended to respond to this information request as well as DOC IR No. 46. Specifically, Attachment A is a list of all of the above companies, as well as an indication of those companies we do have contractual relationships with, the type of contractual relationship, a description of services, and the services' use case within Xcel Energy's system.

Portions of Attachment A to this response have been designated as Trade Secret information pursuant to Minn. Stat. § 13.37, subd. 1(b). In particular the documents

contain confidential information relating to commercial dealings. The information designated as Trade Secret derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

Preparer:	Mark Raak
Title:	Manager, Commercial Services
Department:	Supply Chain
Telephone:	612-330-6667
Date:	November 30, 2020

		Does Xcel Energy have a contractual relationship?	Type of contractual relationship	Description of services (if any)	Describe services use case within Xcel Energy's system
1	Arcadia	No			
2	Attivo Networks	No			
3	AutoGrid	No	Other	[PROTECTED DATA BEGINS PROTECTED DATA ENDS]	No longer in use at Xcel Energy since 2019
4	BHI Energy	Yes	Service	Maintenance services at Xcel Energy nuclear generating facilities and wind farms	Maintenance Services at nuclear generating plants and wind farms
5	CIMCON Lighting	No			
6	DRAGOS	Yes	Other	OT Monitoring software and implementation services	Cyber security monitoring platform
7	DERIVE Systems	No			
8	Ecobee	Yes	Service	Residential Smart Thermostat DR Program in Xcel Energy service territory, designed to deliver demand response (DR) benefits via smart, wi-fi connected thermostats	Demand response
9	Enchanted Rock Technology Energy	No			
10	eSmart Systems	Yes	Service	eSmart Systems US, Inc. currently provides drone imagery inspection/processing services for Xcel Energy	Imagery processing vendor
11	Finite State	No			
12	Innowatts	Yes	Service	Financial services software and implementation services	Financial data analysis
13	Marketing Evolution	No			
14	Solar Mosaic (DBA Mosaic)	No		Xcel Energy does not have a contractual relationship with Solar Mosaic, DBA Mosaic. Xcel Energy does have a contractual relatioship with Media Mosaic, Inc, DBA The Mosaic Company. Media Mosaic, Inc. provides training services related to ADMS at our control centers.	
15	NS1	No			
16	Opus one solutions	No			
17	Palmetto	No			
18	Particle	No			
19	Powerphase Generation Smart	Yes	Other	[PROTECTED DATA BEGINS PROTECTED DATA ENDS]	N/A
20	Rangeforce	No			
21	Rapidsos	No			
22	Remix	No			
23	Sense	No			
24	SmartRent	No			
25	Sparkfund	No		[PROTECTED DATA BEGINS PROTECTED DATA ENDS]	
26	Spire Power Solutions	No			
27	Swimlane	No			
28	Tenere	No			
29	Tesco	Yes	Material Supply	Safety clips, gap indicators, small voltage measurement tools, some transformer services	N/A - Material Supply
30	Trifacta	No			
31	Uplift	No			
32	Urbint / Off-Market Data, Inc.	Yes	Other	Xcel Energy has a contractual relationship with Off-Market Data, Inc., DBA Urbint. The contract is for gas emergency response / gas odor prediction	Gas safety
33	Viriciti	No			
34	Volta	No			

AMI and FAN Related Metrics				
Category	**Description**	**Baseline**	**Target**	
Customer Outreach and Education	Survey results of customer on the adequacy and clarity of communications prior to installation of advanced meters	NA	TBD	Quarterly
Installation and Deployment	Number of advanced meters installed	NA	TBD	Quarterly
Installation and Deployment	Percentage of advanced meters deployed compared to planned installation	NA	TBD	Quarterly
Installation and Deployment	Percentage of customers with advanced meters	NA	TBD	Quarterly
Installation and Deployment	Percentage of FAN deployed	NA	TBD	Quarterly
Installation and Deployment	Percentage of FAN deployed compared to planned installation	NA	TBD	Quarterly
Installation and Deployment	Number of customers electing to opt-out of AMI installation	NA	TBD	Annually
Installation and Deployment	Number of calls to Customer Contact Center and meter installation vendor regarding meter installation	NA	TBD	Quarterly
Installation and Deployment	Number of complaints regarding AMI installation	NA	TBD	Quarterly
Installation and Deployment	Number of intelligent field devices enabled by the FAN	NA	TBD	Quarterly
Installation and Deployment	Number of missed installation appointments	TBD	TBD	Quarterly
Financial	Total AMI project capital spend to-date vs. total AMI project capital budget	TBD	100% or less	Quarterly
Financial	Total FAN project capital spend to-date vs. total FAN project capital budget	TBD	100% or less	Quarterly
Financial	Total AMI project O&M spend to-date vs. total AMI project O&M budget	TBD	100% or less	Quarterly
Financial	Total FAN project O&M spend to-date vs. total FAN project O&M budget	TBD	100% or less	Quarterly
Financial	O&M cost savings from aovided field visits	TBD	NA	Annually
Financial	Avoided distribution capital costs due to reduced peak load from TVR programs	TBD	NA	Annually
Post-Deployment	Percentage of customers with advanced meters that receive estimated bills	TBD	NA	Quarterly
Post-Deployment	Total number of AMI meters use for billing (activated)	TBD	NA	Quarterly
Post-Deployment	Percentage of customers with an advanced meter that have made a complaint of inaccurate meter readings	TBD	NA	Annually

Post-Deployment	Suvey of customer satisfaction with outage related communications	TBD	NA	Annually
Post-Deployment	Number of customers with an advanced meter with an active web portal account	TBD	NA	Annually
Post-Deployment	Number of monthly, unique visits to the web portal (My Account)	TBD	NA	Annually
Post-Deployment	Percentage of customers with an advanced meter with Home Area Network (HAN) functionality	TBD	NA	Annually
Post-Deployment	Number of customers with an advanced meter with Home Area Network (HAN) functionality	TBD	NA	Quarterly
Post-Deployment	Percent of customers with an advanced meter with Green Button Connect My Data (CMD) functionality	TBD	NA	Quarterly
Post-Deployment	Number of customers with an advanced meter with Green Button Connect My Data (CMD) functionality	TBD	NA	Quarterly
Post-Deployment	Number of customer/account inquiries regarding AMI or time-varying rates	TBD	NA	Annually
Post-Deployment	Number of customers enrolled in time-varying rate programs	TBD	NA	Annually
Post-Deployment	Number of customers enrolled in other AMI-enabled demand management programs	TBD	NA	Annually
Post-Deployment	Number of avoided truck rolls/field visits	TBD	NA	Annually
Post-Deployment	Meter accuracy test percentage	TBD	NA	Annually
Post-Deployment	Percentage of interval reads received	TBD	NA	Annually
Post-Deployment	Number of remote meter disconnect operations	TBD	NA	Annually
Post-Deployment	Number of remote meter connect operations	TBD	NA	Annually
Post-Deployment	Percentage of interval reads received	TBD	NA	Annually
Customer Engagement	Percentage of customers with advanced meter at least 30 days that are targeted with energy savings messanging	NA	NA	Quarterly
Customer Engagement	Percentage of low-income customers with advanced meters at least 30 days that are targeted with energy savings messanging	NA	NA	Quarterly
Customer Engagement	Percentage of customers aware of AMI	NA	NA	Quarterly
Customer Engagement	Understanding of AMI technology and benefits	NA	NA	Quarterly
Customer Engagement	Percentage of low-income customers aware of AMI	NA	NA	Quarterly

Customer Engagement	Adequacy and clarify of communications prior to AMI installation	NA	NA	Quarterly
Customer Engagement	Number of customers with advanced meters that adopt an advanced rate option (e.g. TOU) tariff, expressed as a number and percentage by each rate	NA	NA	Quarterly
Customer Engagement	Number of organizational events attended where information on AMI presented, by region	NA	NA	Quarterly
Customer Engagement	Demand Response: percentage participation by class	NA	NA	Quarterly
Customer Engagement	DER: percentage adoption, by class	NA	NA	Quarterly
Customer Engagement	Storage: percentage adoption, by class	NA	NA	Quarterly
Customer Engagement	Customer access to hourly or sub-hourly data	NA	NA	Quarterly
Customer Engagement	Third-party service access to customer data	NA	NA	Quarterly
Customer Engagement	Variety, quality, accessibility of customer data available (consistent with privacy and CEUD requirements)	NA	NA	Quarterly
Customer-Site Asset Effectiveness	Demand Response: annual max MW reduction as a percentage of load, by class	TBD	NA	Annually
Customer-Site Asset Effectiveness	Demand Response: MW enrolled as percentage of load, by class	TBD	NA	Annually
Customer-Site Asset Effectiveness	DER: MWh generated as percentage of sales, by class	TBD	NA	Annually
Customer-Site Asset Effectiveness	DER: MW installed as percentage of load, by class	TBD	NA	Annually
Customer-Site Asset Effectiveness	Storage: MWh installed energy capacity as percentage as percentage of sales, by class	TBD	NA	Annually
Customer-Site Asset Effectiveness	Storage: MW installed capacity as percentage of load, by class	TBD	NA	Annually
Customer-Site Asset Effectiveness	Non-Wires Alternatives (NWA): MW as percentage of (peak) load	TBD	NA	Annually
Customer-Site Asset Effectiveness	NWA: percentage of customers participating, by class	TBD	NA	Annually
Customer-Site Asset Effectiveness	NWA: savings ($) per year	TBD	NA	Annually
Customer-Site Asset Effectiveness	Percentage of grid supporting services provided by DER vs. traditional solutions	TBD	NA	Annually
AMI (Capital)	Capex for Asset Health/Reliability, Capacity Projects	TBD	1% reduction	Annually
AMI (Capital)	Storm related captial restoration costs	TBD	10% reduction	Annually
AMI (Capital)	AMI meter failure rate (avoided meter purchases)	N/A	0.5% reduction	Annually
AMI (O&M)	Annual trips for damaged customer equipment	1,796 trips	50% reduction	Annually
AMI (O&M)	Annual trips for residential manual disconnection	TBD	70% reduction	Annually

AMI (O&M)	Annual trips for residential manual reconnection	TBD	95% reduction	Annually
AMI (O&M)	Annual "OK for Arrival" field visits	7,464 trips	50% reduction	Annually
AMI (O&M)	Annual voltage investigation field visits	2,858 trips	50% reduction	Annually
AMI (O&M)	O&M for Asset Health/Reliability, Capacity Projects	TBD	0.1% reduction	Annually
AMI (O&M)	O&M for storm related activity	$2.1 million	10% reduction	Annually
AMI (Other)	Customer-minutes of outage (CMO) - major events	$115 million	0.5% reduction	Annually
AMI (Other)	CMO-single customer events	$1.05 million	20% reduction	Annually
AMI (Other)	CMO-tap level events	TBD	TBD	Annually
AMI (Other)	Cost of consumption on inactive meters	TBD	20% reduction	Annually
AMI (Other)	Commodity bad-debt expense	TBD	8% reduction	Annually
AMI (Other)	Residential demand shift from TOU rates	TBD	161 MW	Annually
AMI (Other)	Medium C&I demand shift from TOU rates	TBD	52 MW	Annually
AMI (Other)	Residential peak demand reduction from Critial Peak Pricing	TBD	164 MW	Annually
AMI (Other)	Medium C&I peak demand reduction from Critial Peak Pricing	TBD	90 MW	Annually

CERTIFICATE OF SERVICE

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

Minnesota Department of Commerce
Public Report

Docket No. E002/M-19-666 and E999/DI-20-627

Dated this **15th** day of **March 2022**

/s/Sharon Ferguson

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Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1400 St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_19-666_Official
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Jason	Burwen	jburwen@cleanpower.org	Energy Storage Association	1155 15th St NW, Ste 500 Washington, DC 20005	Electronic Service	No	OFF_SL_20-627_DI-20-627
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Kenneth A.	Colburn	kcolburn@symbioticstrategies.com	Symbiotic Strategies, LLC	26 Winton Road Meredith, NH 32535413	Electronic Service	No	OFF_SL_20-627_DI-20-627
Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1400 St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_20-627_DI-20-627
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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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George	Crocker	gwillc@nawo.org	North American Water Office	PO Box 174 Lake Elmo, MN 55042	Electronic Service	No	OFF_SL_20-627_DI-20-627
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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
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