

**NOTICE OF COMMENT PERIOD ON
DISTRIBUTION SYSTEM PLANNING EFFORTS AND CONSIDERATIONS**

Issued: April 21, 2017

In the Matter of the Commission Investigation into Grid Modernization: Focus on Distribution System Planning

PUC Docket Number/s: E999/CI-15-556

Comment Period: For comments to Sections A and B

Initial comment period closes June 20, 2017 at 4:30 PM

Reply comment period closes July 20, 2017 at 4:30 PM

For comments to Section C

Initial comment period closes July 20, 2017 at 4:30 PM

Reply comment period closes August 20, 2017 at 4:30 PM

Topic/s Open for Comment:

- See the attached questionnaire.

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Grid Modernization: Distribution System Planning Questionnaire

I. Introduction and Purpose

The Commission opened this proceeding in May 2015 to investigate what is needed to advance grid modernization of the electric distribution grid to the benefit of Minnesota’s customers, utilities, and other stakeholders. The Commission seeks to continue this investigation through the issuance of this notice and questionnaire.

As noted elsewhere, changing customer and industry expectations, technological advancements, and the growth in distributed energy resources¹ (DER) will provide new benefits and opportunities, but also new challenges for Minnesota. Grid modernization and DER adoption will continue to develop and adoption rates will increase even without distribution system planning,² however, Minnesota can improve forecasting, planning and reliability by taking proactive actions to address these changes. Distribution system planning is anticipated to help the utilities be increasingly resilient and accommodating to these evolutions and to allow for more transparent evaluation of utility decisions.

In order to accomplish this, the Commission seeks information about the utility planning operations, both currently and prospectively. The purpose of the questionnaire is to inform the Commission and stakeholders as to the current status of utility planning processes and results, to provide utilities and stakeholders an opportunity to identify potential improvements in planning processes, and to support a distribution system planning process and filing requirements. For that reason, complete answers to these questions will help the Commission accomplish these objectives and establish any future requirements appropriate to each individual utility system.

II. Questionnaire Overview and Instructions

The questionnaire is divided into three sections:

Section A – How do Minnesota utilities currently plan their distribution systems?

This section is to be completed by Xcel Energy, Minnesota Power, and Otter Tail Power; municipalities and cooperatives are encouraged to respond. It is intended to provide a transparent view of current planning processes used by the state’s investor-owned utilities.

Section B – What is the status of each utility’s current plan?

This section is to be completed by Xcel Energy, Minnesota Power, and Otter Tail Power; municipalities and cooperatives are encouraged to respond. It is intended to inform the Commission and stakeholders, in detail, of the current state of distribution system plans developed using the processes described in Section A.

¹ For purposes of this questionnaire, DER is defined as any measure that may have an effect on load at or beneath the substation level, including all forms of distributed generation, storage, demand response, and energy efficiency.

² Staff Report at 6, 15.

Section C – Are there ways to improve or augment utility planning processes?

This section invites responses from all interested parties and stakeholders, including utilities; it provides an opportunity to suggest improvements in planning processes and to comment on related matters.

Xcel, Minnesota Power, and Otter Tail are requested to respond fully to this questionnaire, to the extent they are able, based on their current practices and current knowledge. We encourage the municipal and cooperative utilities interested in this topic to also respond, if willing, to better inform the Commission on how other Minnesota utilities are working on these issues.

Questions posed may involve activities, processes, or technologies that utilities do not currently employ, and as such, these questions do not imply that utilities should be undertaking those activities; they are designed to provide a clear understanding of the boundaries of current practices. Utilities may respond to such questions by simply stating that each question is not applicable to its system.

This questionnaire contains a number of very specific questions. That approach is not intended to be exclusive; i.e., utilities or other stakeholders are encouraged to provide additional information or suggestions that are relevant to the general purpose of this document.

Due to the detailed nature of the questions, the due dates for the comments will be split into different schedules. Upon review of the comments, the Commission will take further action as warranted, potentially including holding additional workshops or seeking additional comments. Parties are also welcome to provide comments on next steps.



Grid Modernization: Distribution System Planning (M999/CI-15-556)

Section A

How do Minnesota utilities currently plan their distribution systems?

*Due From: Xcel Energy, Otter Tail Power, and Minnesota Power
Municipalities and cooperatives are encouraged to respond*

Initial Comments Due: June 21, 2017 Reply Comments Due: July 21, 2017

In order to better ascertain the current state of utility distribution planning, the Commission requests the regulated utilities respond to the following questions. The Commission understands there are differences in planning, needs, and capabilities between the utilities; these questions are merely to understand the current planning process. It is entirely possible that the utility may not be able to answer a question for any number of reasons. The Commission seeks a baseline understanding of each utility, which will then inform any potential decisions about next actions on distribution system planning.

Please describe the following items with respect to current distribution system planning efforts:

- 1) The distribution planning resources utilized by utilities, including:
 - a. Types of modeling software used and for what specific purpose
 - b. Applicable engineering standards
 - c. Personnel commitment: including utility personnel as well as contracted services and an overview of their roles and responsibilities
 - d. System visibility and data availability: At what circuit levels and over what time intervals is data collected? If possible, provide an example of the range of data collected and available.
 - e. Percentage of substations and feeders are equipped with SCADA
 - f. Form of hosting capacity software or analysis, if any, used in the planning process and to conduct interconnection

- 2) An overview of planning schedules and process, including:
 - a. Frequency in which the utility conducts distribution system planning
 - b. Frequency of planning updates or revisions: Are updates dependent on a set timing frequency (i.e. every 2, 5, or 10 years) or are there events that may trigger a more frequent planning cycle or revision? If so, please explain.
 - c. Iterative updates and/or new plans: Are planning processes based on continuations of past plans, new planning cycles, or some combination? How long is each planning cycle's time horizon?
 - d. Planning elements or considerations included (or not included) in regular updates and revisions and a description of each: For example: circuit or substation data, power flow analysis, power quality analysis, fault analysis, load and demand forecasts, external policy and regulations, etc.

- e. Integration of existing planning processes: Explain to what extent existing planning processes, including resource planning, transmission planning and others studies (i.e. interconnection) are used in the formulation of distribution plans.
 - f. Timing of associated distribution system budgeting processes: Is distribution system budgeting performed on an annual basis or on some other schedule?
 - g. Process of developing capital budgets for distribution infrastructure
 - h. Process for developing operating budgets for distribution operating changes or projects
- 3) Demand and system loading forecast methodologies, including:
- a. Granularity of load forecasting: To what extent is the collected system data reflected in load forecasts; e.g., does the utility employ an 8760-hour forecast at the substation level?
 - b. Use of company-wide peak forecasts versus aggregation of substation or other circuit-level peaks: Does the utility use a top-down forecasting approach versus a bottom-up approach, or some combination of these approaches?
 - c. Comparison of actual asset loading against past forecasts: Does the utility employ backcasting or ex post true-up to assess the accuracy of its forecasting process?
 - d. Minimum load assessments and forecasts: Does the utility utilize minimum load to assess potential impacts of distributed generation on power flows? Are minimum loads measured during peak hours or during night hours?
 - e. Impact on load forecasts of the projected availability of DER: How is utility forecasting impacted by utility assessments on adoption and penetration of DER?
- 4) Capital investments and operational projects
- a. Assessment criteria and assessment process for feeder and substation reliability, condition of grid assets, and asset loading
 - b. Alternative analysis protocols for identified needs:
 - i. Capital versus operating solutions: How does the utility determine whether an assessed need is best met through a capital project or through operational solutions?
 - ii. Near-term versus long-term: Similar to the question above, with the additional factor that some less expensive capital projects may provide a shorter term solution than more comprehensive projects; how does the utility compare these alternatives?
 - iii. Non-monetized benefits: Apart from reliability and other traditional planning criteria, are other benefits (e.g., economic development, emission reduction) taken into account in considering alternative approaches to resolving system needs?
 - iv. Non-wires-alternative (NWA) versus traditional solutions: Does the utility consider the potential for DER or other non-wires solution to address an assessed need, to defer or eliminate the need for a traditional capital or operating solution?
 - v. Assessing DER or NWA alternatives: What criteria or metrics are in assessing whether a DER or NWA can meet an identified need?
 - vi. Scenario analysis: In developing solutions to an assessed need, does the utility consider multiple scenarios, including factors such as load forecasts and DER penetration? If so, what scenarios are standard?

- c. Metrics for deciding among competing proposals: For any of the applicable categories described above, what specific metrics are used to conduct a comparison of alternative solutions? Are there examples of cost benefit studies or reports the utilities have conducted that can be provided with the responses?
 - d. Historical distribution system spending: Please provide historical spending over the past five years for capital projects, operating changes or projects, information technology, communications and shared services
- 5) Locational assessment of DER in long-term planning
- a. Describe how the utility uses analytical criteria for assessing potential alternatives to capital and operating improvements during the planning process, if at all, including:
 - i. Locational DER assessments: Whether locational DER assessments are a part of the planning process or if a DER solution is only considered once a need has arisen
 - ii. Time sensitivity of the system need: Does the system allow time to develop a potential DER solution? Are there short term traditional projects that can address imminent needs while a longer term DER solution is considered?
 - b. Where DER or non-wires alternatives are on par with traditional projects, based on the analytic criteria described above, is there a mapping of those geographic areas in which DER could replace or defer specific capital or operating projects?
- 6) Security
- a. What controls and processes are used to secure consumer and system data, IT/communication systems, and physical infrastructure?
 - b. What protocols and cooperative arrangements with NERC, NIST or other entities are used to identify threats and available defense measures?



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Section B

What is the status of each utility's current distribution system plans?

*Due From: Xcel Energy, Otter Tail Power, and Minnesota Power
Municipalities and cooperatives are encouraged to respond*

Initial Comments Due: June 21, 2017 Reply Comments Due: July 21, 2017

As compared to the section above, this section seeks information on each utility's current distribution system plan, as opposed to the process to develop the plans. Please describe information on any existing distribution system plan, including (where applicable):

- 1) The date initiated, completed, and the planning timeframe used: For each planning component, the number of years to which it is applicable should be specified
- 2) Scenarios: the range of any scenarios that were considered should be identified, e.g. high/low load forecast, high/low DER penetration
- 3) System constraints and needs:
 - a. At a high level, what system constraints and needs are anticipated to develop or occur within the planning period? (Further detail is requested below)
 - b. How have these constraints and needs been prioritized based on assessment criteria, time sensitivity, budget impact, or other criteria?
- 4) The current and forecasted extent of DER deployment by type, size, and geographic dispersion
- 5) Currently planned distribution capital projects and operating changes, including:
 - a. Capital and operating budgets over the applicable planning period, and to the extent possible, breakdowns of categories of expenses and budgets
 - b. Where individual budget categories contain a substantial increase or decrease from historical levels, please explain the rationale for the change
 - c. Any analysis of alternatives, mitigation, or deferrals of capital or operating projects that were conducted
 - d. Identification of any future capital or operating projects that could reasonably be considered for substitution, mitigation, or deferral using DER alternatives
 - e. Identification of any non-monetized benefits of planned projects
 - f. Identification of any projects that will enhance the company's future ability to integrate DER into system operations
 - g. Identification of any other projects, or investments, not specifically identified pursuant to (f) above, that support grid modernization as defined in the [Staff Report](#) on Grid Modernization (March 2016)



Grid Modernization: Distribution System Planning (M999/CI-15-556)

Section C

Are there ways to improve or augment Minnesota utilities' distribution system planning processes?

Due From: All Stakeholders

Initial Comments Due: July 21, 2017 Reply Comments Due: August 21, 2017

This section is open to all stakeholders. Please discuss the following subjects or any others that relate to the efficient and economic investment in technological advancements, infrastructure and integration of DER into distribution system planning and operations:

- 1) Evaluation of utility plans. Discuss:
 - a. How utility distribution plans should be used in other proceedings: Should distribution plans be approved by the Commission? If so, what are the implications for cost recovery, i.e., to what extent would Commission approval of a plan constitute a finding of prudence?
 - b. How specifically should an approved distribution system plan be integrated with other planning activities: resource planning, interconnection, transmission, or others?
 - c. What are reasonable options for stakeholder participation in the planning process: direct engagement in the development of plans, the review of draft and final plans, other?
 - d. Criteria or metrics the Commission should use in evaluating proposed distribution plans
 - e. How often should a utility distribution plan be submitted for Commission review?

- 2) Feasibility of planning enhancements. Discuss:
 - a. Whether all investor-owned utilities should adopt uniform planning processes
 - b. Taking resource concerns into account, what are the events or system conditions that should trigger the adoption of enhanced planning processes by an individual utility? (e.g., high distributed generation interconnection requests, high DER penetration, high capital/operating budget needs, other)

- 3) Forecasting. Discuss whether demand forecasting and DER modeling may be improved by:
 - a. Integrating system-wide forecasts, circuit-level forecasts, and forecasts of geographic dispersion of DER to map potential impacts, both beneficial and detrimental, of increased DER, or other
 - b. Using probabilistic analysis for availability of DER in high-DER-penetration scenarios, i.e. considering the likelihood of coincident failure or unavailability of multiple DER assets

- 4) Scenarios. Discuss:
 - a. What type of input should stakeholders have into the selection of planning scenarios?
 - b. What criteria should be used by utilities to identify relevant planning scenarios?

- c. Should all utilities use common planning scenarios, or should they be tailored to the circumstances of individual utilities?
 - d. Should planning scenarios be common across multiple planning cycles, or should planning scenarios be redefined with each new planning cycle?
 - e. What are reasonable timeframes for each use and consideration of a scenario, and how often should they be reevaluated?
- 5) Standards. Discuss:
- a. Standards and codes that will be applicable to the enhanced integration of DER into distribution system planning and operations
- 6) Access to grid and planning data by customers and third parties. Discuss:
- a. To what level should distribution planning data of Minnesota utilities be accessible to third parties
 - b. Identify any categories of data that may be unsuitable for access, e.g. for reasons of security, trade secret, customer privacy, or burdensomeness
 - c. Discuss categories of data needed by third parties to:
 - i. Participate in developing system plans
 - ii. Critically review proposed plans
 - iii. Prepare commercial projects in response to plans
 - d. Discuss the availability and importance of a standard, downloadable format for customers and third parties to assess planning opportunities
- 7) Hosting Capacity. Discuss:
- a. What information should be made available to developers and the public, such as voltage, current generation, queued generation, peak and minimum load, and limiting factor criteria violations?
 - b. Provide a description, method, and technological and personnel resources necessary, including security or password requirements, for conducting hosting capacity and making the data/output of the analysis available to the public
 - c. How should and in what format should the results of a hosting capacity analysis be made available?
- 8) Strawman distribution planning outlines and/or processes are welcome.
- 9) Are there other issues or topics not covered here that are relevant to discuss in distribution system planning? If so, what are they and why are relevant?