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July 20, 2017

Daniel P. Wolf, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

***Subject: Dakota Electric Association Section C Comments in
Response to Notice of Comment Period on
Distribution System Planning Efforts and Considerations
Docket No. E-999/CI-15-556***

Dear Mr. Wolf:

On April 21, 2017, the Minnesota Public Utilities Commission (Commission) issued a Notice of Comment Period on Distribution System Planning Efforts and Considerations (Notice) in the above-referenced docket. This Notice included a questionnaire on matters related to distribution system planning with questions divided into the following three sections:

- A. How do Minnesota utilities currently plan their distribution system?
- B. What is the status of each utility's current plan?
- C. Are there ways to improve or augment utility planning processes?

The Notice requires responses from regulated investor-owned electric utilities and encourages responses from municipal and cooperative utilities.

Enclosed are Dakota Electric Association (Dakota Electric or Cooperative) responses to questions raised in Section C of the questionnaire.

Dakota Electric looks forward to these continuing discussions on distribution system planning. If there are any questions about these comments, please contact Craig Turner at 651-463-6337 or me at 651-463-6258.

Sincerely,
/s/ Douglas R. Larson
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Certificate of Service

I, Cherry Jordan, hereby certify that I have this day served copies of the attached document to those on the following service list by e-filing, personal service, or by causing to be placed in the U.S. mail at Farmington, Minnesota.

Docket No. *E-999/CI-15-556*

Dated this 20th day of July, 2017

/s/ Cherry Jordan

Cherry Jordan

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange
Dan Lipschultz
Matthew Schuerger
Katie Sieben
John Tuma

Chair
Commissioner
Commissioner
Commissioner
Commissioner

NOTICE OF COMMENT PERIOD ON
DISTRIBUTION SYSTEM PLANNING
EFFORTS AND CONSIDERATIONS

DOCKET NO. E-999/CI-15-556
JULY 20, 2017

**COMMENTS OF DAKOTA ELECTRIC ASSOCIATION
QUESTIONNAIRE SECTION C**

Section C

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

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?

Given the short response time required for a utility to meet the needs of cities, developers, and other governmental agencies, Dakota Electric believes that requiring short range distribution plans to be reviewed and approved by the Commission, is not feasible. The forces driving the development of the distribution system are fluid and dynamic. The lead times for acquiring major electrical distribution equipment are long and the changes in the electrical usage for a given portion of the electrical system can be dynamic. Utilities are given little time to respond to requirements for rebuilding portions of the distribution system, due to forces such as roadway modifications or adding new loads. Therefore, utilities and their consumers require flexibility in order to quickly respond to these needs.

Long Range planning studies which are looking out over the next 10-20 years would be the only type of distribution planning which could allow a sufficient time frame for Commission review and public discussion. The problem with an approval process for long range planning studies is while we strive to predict the future development and growth within our service

territory, our forecasts are just that, forecasts. Our long range planning studies only provide a framework for development of the distribution system, but the specifics of what is eventually constructed, is in response to actual development and events. What would be the review & approval process if the load serving requirements changed significantly from the long range forecast? This could quickly result from a single new large commercial load or from a rezoning of a portion of the service territory. Once the utility understood the requirements of the new load and then analyzed and identified the distribution system changes required to support the load, would the Commission's review and approval process provide timely review and approval?

The utility is already required to obtain conditional use permits from the governmental authority for construction of electrical substations and other significant facilities, would the utility first file with the Commission for approval and then file for a permit with the city? This would result in many months for each process and the new load could be requiring power within a few months. Utilities have an obligation to serve within their service territory and this must be met in a timely manner. Presently the timeline to obtain conditional use permits from the cities can easily take several months, so there is little time available to construct the distribution facilities necessary to supply the loads. One concern would be what if the Cities approval process was in conflict with what was approved by the Commission? How would this be resolved?

As the Commission works through the review of distribution planning to identify ways to help support grid modernization, Dakota Electric recommends that the focus is on outcomes rather than creating a prescriptive process. Utilities require flexibility to allow them to be responsive to the needs of their consumers and to support the changes driven by the cities, counties and other governmental agencies.

b. How specifically should an approved distribution system plan be integrated with other planning activities: resource planning, interconnection, transmission, or others?

Distribution system planning is detailed and local, where resource planning and transmission studies are more regional and general by nature. Dakota Electric does not see any benefits in changing from our existing integration between the transmission and distribution studies. They are separate studies with completely different needs, study processes and tools. When either the transmission or distribution studies are completed the most recent information from the other studies is utilized as a base for the study. The transmission and distribution studies are so different from each other that it would not be feasible to complete a joint transmission and distribution planning study. Also the level of detail required within a distribution study, would make a joint regional transmission and distribution study impossibly large and complex.

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?

Dakota Electric is always looking for new ideas to make our distribution system better for our members. We look for ways to lower our costs and to make the system more reliable. We believe stakeholder participation in the planning process could best be achieved through

the development of standard solutions, which utilities could select and utilize to meet the short term and/or long term needs of our consumers. A good example would be standardized vendor offerings of energy storage systems, for residential, commercial or utility scale that utilities could apply as a solution. A great example of energy storage systems is utility controlled electric water heaters which could help manage the local electrical loads.

We are constantly engaging with vendors and looking at the solutions they are offering. One of the issues that a utility engineer faces, is how does one separate the good solutions from the others? There are many great ideas out there, but which solutions actually work and will last for 30-40 years (the typical lifecycle of utility facilities)? Utilities continue to present and share their ideas and experiences at conferences and other venues. The sharing of effective solutions among utilities, especially ones which have been installed and are operating, need to be encouraged. The operational issues and benefits as well as the costs involved with the application of any new technology are the key pieces of information required to understand the true benefits of that solution. As the complexity of the electrical system has increased, the amount of engineering time required to study and support the electrical system has also increased. To deal with this issue, many utilities have banded together in research organizations, such as Electric Power Research Institute (EPRI) and Cooperative Research Network (CRN).

Part of the planning engineer's decision making process is that presently there is no incentive to take a chance on an untried and untested solution. If the new idea is selected and it does not work, that engineer and the utility now have a problem. The other part of the decision making process is that there is limited funding and limited labor available. Using a solution which is proven and already designed involves less labor and does not need to be justified to management and walked through the regulatory process for capital recovery. If the planning engineer would select a new solution, say battery storage to delay rebuilding a substation, the additional labor and time involved with getting this reviewed and approved within the utility and the regulatory process becomes a significant disincentive.

d. Criteria or metrics the Commission should use in evaluating proposed distribution plans?

Dakota Electric's members are looking for a highly reliable system at a reasonable cost. So, Dakota Electric would use economics and reliability as key criteria for review of any solution.

Another criterion is risk, while this is part of reliability, the overall risk of an application performing to the level required to provide a reliable solution needs to be considered. One possible example of this would be the use of load management for reducing peak demand for a specific area. While it may be possible to get enough of the consumers in that area to sign up for the demand control option, so that over peak demand periods their load can be turned off; what is the risk of a large portion of the population deciding to quickly drop from the load control program? This could be from outside aggregators taking over load control of the appliances for a different benefit.

A part of the risk criterion, selection of a non-wires solution implies that the wired solution was not built. If at some point in the future, the non-wired solution is no longer effective or

even available, will the utility be able to then construct the necessary wired solution? Dakota Electric uses the long range plan to identify where substations and the supporting transmission lines may be required. Dakota Electric has found that locating and constructing the substations and transmission lines in conjunction with development occurring is preferred over trying to site and build substations and transmission lines after the homes and business have been built. This is similar to how the transportation system for an area is developed, where it is also very difficult and disruptive to put in or expand a road in an area which is already developed.

e. How often should a utility distribution plan be submitted for Commission review?

Dakota Electric does not believe a Commission review and approval process would allow for the flexibility required to meet the needs of our Members and be responsive for the requirements of the local governmental authorities with which we interact.

2) *Feasibility of planning enhancements. Discuss:*

a. Whether all investor-owned utilities should adopt uniform planning processes.

All utilities have unique characteristics and processes; while there could be some general uniform planning requirements there needs to be flexibility for each utility to allow them to meet the needs of their consumers.

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)

No comment at this time.

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.

Dakota Electric is unsure how best to include forecasts of the many forms of DER with our long range planning process. It is clear that the economics for some forms of DER are making those solutions more economically feasible. What is unclear is what will be the adoption rate for DER? What type of DER will be adopted and where on each of the substations and feeders will the adoption occur? How will future legislation affect adoption rates? On a companywide level, there can be some reasonable forecasting of DER penetration, but distribution planning is local, substation by substation. Presently even at a companywide forecasting level there are many different opinions and a very wide range of reasonable outcomes.

A good example of the questions which are asked about the future of DER is around aggregation of demand reduction by non-utilities within Minnesota. Presently parties other than the local utility are not allowed to aggregate and sell demand reduction to the electrical

system within Minnesota. This has allowed Dakota Electric to invest in and operate a robust load control system, which provides our Members with many options to save on their electric bill. Can Dakota Electric count on this existing or any new load management solution for the future or will the State of Minnesota change the rules to allow aggregators to take over control of these loads and control the loads for a different economic business case? In some cases, Dakota Electric has not constructed wired solutions because of its ability to control large amounts of load over system peaks.

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.

Probabilistic analysis of the failure rates or risks of DER being unable to provide the support as intended are important. The risk analysis of any proposed solution needs to be considered.

4) Scenarios. Discuss:

At this time Dakota Electric does not have comments for all the questions within section 4, 5 & 6. Much of this discussion depends upon many of the other discussion topics and how those are resolved. Dakota Electric would be glad to participate in the future discussions which develop on this topic.

a. What type of input should stakeholders have into the selection of planning scenarios?

No comment at this time.

b. What criteria should be used by utilities to identify relevant planning scenarios?

Reliability and adequacy are two key criteria.

c. Should all utilities use common planning scenarios, or should they be tailored to the circumstances of individual utilities?

Dakota Electric believes that there are significant differences between the utilities and even differences within a utility which require different planning process and standards. For example, local governmental authorities may have requirements which dictate if distribution lines can be installed overhead or may require undergrounding of all distribution facilities. This requirement alone changes the options available for a distribution planning engineer. Also, permitting of some non-wired solutions may not be allowed by zoning ordinances. The planning process needs to be flexible to take into account all of these local requirements.

d. Should planning scenarios be common across multiple planning cycles, or should planning scenarios be redefined with each new planning cycle?

No comment at this time.

e. What are reasonable timeframes for each use and consideration of a scenario, and how often should they be reevaluated?

No comment at this time.

5) *Standards. Discuss:*

a. Standards and codes that will be applicable to the enhanced integration of DER into distribution system planning and operations.

There are many operating standards, local and national standards which may apply to different forms of DER. Each type of DER may have a different set of standards and codes which are applicable. Without defining or identifying the type of DER it not possible to list all of the standards and codes which are applicable for every type of DER integration.

6) *Access to grid and planning data by customers and third parties. Discuss:*

Public access to distribution configurations needs to be tightly controlled. It is very important to the security of the electrical system to ensure the distribution network infrastructure configuration does not get into hands of ones who will misuse that information. Knowing how the local school is supplied electricity or the police station, hospital, shopping mall, sporting facility needs to be strictly protected. It was not many years ago that we would not be as concerned about allowing this information to be release to a larger audience, but as we are learning, this information can easily fall into the wrong hands and be used for the wrong purpose.

a. To what level should distribution planning data of Minnesota utilities be accessible to third parties?

There are many pieces of information which must be protected and not released. It would be incomplete to attempt to list all of the categories of data within this document. Dakota Electric believes that we need to be very conservative with any information which is released. The security requirements for tomorrow may be much different than today, but once the information is released it is not possible to un-release that data. For example, we have large commercial members, with regional, national and world wide businesses for which their electrical supply is critical to their business operation. Details about the interconnection between this member and the distribution system could reveal details that could expose them to added risk that could affect their business. Dakota Electric must safeguard their electrical supply reliability.

b. Identify any categories of data that may be unsuitable for access, e.g. for reasons of security, trade secret, customer privacy, or burdensomeness.

Similar answer to question 6) a.

c. Discuss categories of data needed by third parties to:

Dakota Electric would be interested in learning how DER vendors would use information that is provided and what data about the distribution system they would find critical for their business? Would vendors working on small residential solar what the same system information as vendors working on larger utility scale solar garden installations?

Dakota Electric would also be interested in how vendors would be certified to receive critical infrastructure data?

- 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.

No comment at this time.

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?

The discussion of hosting capacity is an interesting topic. The term “Hosting Capacity” is a vague and uncertain number. For us to have any useful discussion on the topic the term needs to be defined and the details of how the results of a hosting capacity study are to be used needs to be resolved. Dakota Electric has been watching the discussions about hosting capacity which are occurring throughout the nation. What has been occurring, over and over, is the utility has completed some form of a hosting capacity study and published the results. The next part of this process is the information produced by the utility is considered either not complete or not useful. There does not appear to be a clear requirement for why the hosting capacity study is being completed and in many cases there are many different needs by the different entities wanting to interconnect with the distribution system. For an entity looking to site a solar garden, the information from a hosting capacity study is much different than an entity looking to sell solar to individual home owners along a feeder.

As is widely understood, the interconnection location and size of the distributed generator will greatly affect the resultant hosting capacity results. Dakota Electric is most concerned about what will occur when we reach the level when the feeder / substation has enough distributed generation such that the transmission system will be back fed at minimum loads. At this point the “hosting capacity” would be used up, even though the distribution system capability to host more DG is not used up. It would require the next interconnecting DG applicant to complete an expensive transmission study.

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.

The answer to this question depends upon what is a hosting capacity study and what data is to be presented to the general public. The answer is different, if hosting capacity is simply the maximum amount of solar generation system (kW) which can be added at some point along the feeder or if hosting capacity is defined as how many 10 kW solar systems can be added to

the feeder. Another question is hosting capacity only looking at solar generation or solar plus storage or?

There are significant efforts going into developing tools to analyze the distribution systems to identify the locations and economics of DER adoption on distribution feeders. What is the question we are trying to answer? The question Dakota Electric most often gets is; at my home or business can I interconnect without significant cost? The ideal solution for this would be a computer system which would allow a member to submit the size and type of DER generation they want to interconnect at their home or business. They could use the service address or account number to identify the specific location. This system would then automatically apply that type of DER generation to an engineering model of the distribution system and through additional automation, run a quick series of studies to identify if any code, operating standards, equipment loading violations, etc. are identified. The model would include all of the prior approved DER generation interconnections. Once the results of the tests are known and if all of the tests were passed, the member would then be given the option to submit an official interconnection application to hold their spot in the interconnection queue. Presently there is not such a system, but several vendors and research organizations are working towards tools which will help make this ideal system possible.

The nice part of the above idealized solution is the protection of the distribution system configuration information from the general public. Dakota Electric believes how our schools, police stations, hospitals and other critical facilities are supplied electrical service should not be available to the public.

c. How should and in what format should the results of a hosting capacity analysis be made available?

It is unclear what hosting data would be useful to provide to the general public. Dakota Electric has met with utility scale solar developers and provided them with information to help them identify the lowest cost areas to look at for utility scale solar system integration. When working with smaller solar installations the issues are typically with the secondary wire size from the transformer to the home and the size of the local distribution transformer. So, feeder level hosting capacity would not be of much benefit to the smaller solar installations. When we talk about hosting capacity analysis we need to identify who is going to use the information and how will it be used. As the substation's and feeder's ability to absorb DER generation resources becomes fully utilized and any additional DER generation will cause back feeding of the transmission, what will the process be?

8) Strawman distribution planning outlines and/or processes are welcome.

As the Commission works through the review of distribution planning to identify ways to help support grid modernization, Dakota Electric recommends that the focus is on outcomes rather than creating a prescriptive process. A prescriptive process would be rigid and not allow the utilities to adopt new ideas and solutions as they become available. A formal review and approval process would duplicate existing state, county and city permitting processes and could result in conflicting requirements.

As discussed throughout Dakota Electric's responses, utilities require flexibility to allow them to be responsive to the needs of their consumers and to support the changes driven by the cities, counties and other governmental agencies. Depending upon the outcomes which are chosen by the Commission, documentation of real-life non-wired solutions which support those outcomes should be developed. Documenting the best non-wire solutions which are reliable, economical and are able to be applied by the utilities and their consumers would help the adoption of those solutions.

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?*

The following three areas have been discussed or at least touched upon within the Dakota Electric comments, but we feel that these three key points are the most important points to remember when looking at distribution planning.

Distribution system reliability is an important driver for Distribution planning. Failure to design and operate an electrical distribution system which can reliably supply the Members of Dakota Electric is not an option. As such, electrical utilities must plan and design for the expected worst case scenario. On average, Dakota Electric provides very reliable electrical service for our Members and we continue to be challenged to improve our reliability. For Dakota Electric, a typical member will experience much less than 1 hour of outage time per year. The reliability of some of the alternative solutions proposed for meeting the demand of our members is not 100%. It is important to fully understand the risk of any solution and the potential for that solution to not be able to supply the load when required. Some alternative solutions have been proposed which are reported to be able to meet the demand requirements 99% of the time. While that sounds like an excellent and a reliable solution, it is important to note that 99% reliability would imply that a Member would experience 87.6 hours per year of outage time. This is significantly worse than the 30 minutes - 1 hour per year for our existing delivered reliability.

Being able to plan and construct the distribution system without delay is also a key requirement. Dakota Electric needs this flexibility to be able to meet the electrical needs of our members and to be able to respond to the requests of our cities and counties. Together with reliability, the system must be sized and designed to be adequate to supply the electrical demands of the consumers for all hours of every day. This is not optional.

Ensuring that electrical infrastructure is sited and constructed before or at least concurrent with local development is paramount. Attempting to build transmission lines and electrical substations within an existing developed area is not what the public wants and faces serious restrictions. Utilities must be able to plan, permit and build the electrical infrastructure at least concurrent with the development of the roads and the developments.

So understanding these three issues is important when considering alternative non-wired solutions. One would think that with these significant hurdles to adoption of DER solutions that there would be little use of DER on our distribution system. The opposite is true and Dakota Electric is no stranger to DER. Dakota Electric has utilized DER solutions such as demand management of member's loads, through the use of load control devices; encouraged

member owned, utility controlled generation systems; promoted energy conservation in homes and businesses; and is keeping our eye out for new ideas and new technology that will reduce our costs of delivering electricity and to provide options for our members.

Dakota Electric believes that many forms of DER have a future to support and improve the distribution system. As costs continue to decline and technology evolves (or improves) , additional applications of DER will and should be reviewed and adopted. Dakota Electric looks forward to working with the Commission and others to identify ways to improve the electrical service for our members.