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All Energy Solar
Information Request

Docket No.: 16-521	
Requestor:	Sarah Whebbe, Policy Analyst, All Energy Solar.
Requested From:	Adam J. Heinen, Vice President of Regulatory Services for Dakota Electric.
Date of Request: January 2nd 2024	
Response Requested: January 17th 2024, or sooner.	Information Request No. 1

Request:

Please reference Dakota Electric's proposal to create a "Make Ready" process for distribution upgrades beginning on Page 11 of the November 1st Filing. Dakota Electric proposes that it would (except in limited, unique circumstances) consider making necessary distribution upgrades with no upfront payment requirement for facilities under 40kW, and instead would assess a flat monthly charge to each new DER Interconnection under 40kW.

Dakota Electric states that one utility benefit of assessing a "Make Ready" fee to all DER interconnection customers is that it would allow the utility to move away from the current piecemeal approach to distribution upgrades and instead focus on holistic system upgrades that provide greater benefit for the entire distribution system and optimize operational and cost efficiencies.

Dakota Electric stated in its filing "The Cooperative notes that we already cover a significant portion of interconnection upgrade costs; in other words, it is our current practice not to bill our members the full upgrade cost."

Response:

- Dakota Electric states that under its current practice it does not bill DER interconnection members for full upgrade costs.
    - What portion of interconnection upgrade costs for DER customers does Dakota Electric pay for today?

Please note that to avoid confusion between a one time "Make Ready" charge and a "Make Ready" monthly fee, we will refer to the one time "Make Ready" charge as 'One-Time kW Charge,' and the "Make Ready" monthly fee as "Monthly Distribution Fee".

Under a full cost compensation model, a utility requires the DER applicant to pay for the entire cost of replacing or adding any equipment to support the DER interconnection. For many of the smaller, less than 40kW systems, this make ready work involves upgrading the local distribution transformer with a larger nameplate capacity unit. For DER interconnections requiring a larger distribution transformer, utilities charge the DER applicant the entire cost of all new materials. A utility typically then provides a small credit, reflecting the salvage value or remaining undepreciated value of any removed equipment. Instead of a small salvage or depreciated value credit, Dakota Electric provides a full dollar credit, based upon the cost of a new equivalent nameplate capacity transformer for the existing unit. This provides a higher credit to the member than the salvage value that Dakota Electric receives in the retirement of that unit. Thus, the total make ready cost to the DER applicant does not reflect the total expenditures for upgrading that transformer capacity. To simplify, the member pays the material cost of new upsized transformer minus the material cost of the existing transformer as if it was new transformer and the cost of installation. Dakota Electric employs this approach because we assume that the existing transformer is older and fully depreciated, and the cost of that older unit has already been recovered under the existing rates paid by the member.

- Why is it Dakota Electrics current practice to not bill DER Interconnection customers for full upgrade costs?

Dakota Electric's process for upgrade compensation is designed to avoid duplicate compensation or double recovery of costs. In the case of a transformer upgrade, the existing transformer has been partially or totally depreciated and the depreciated cost has been recovered within the existing rate structure. Also, if the transformer removed has useful life remaining, it will be reused at another location. Therefore, a full credit, based upon a new transformer with the same nameplate capacity as the removed transformer, ensures there is no duplicate compensation or over-recovery of costs. The overall goal of our process is to

reasonably estimate the cost of upgrades associated with the DER and allocate these costs in a manner that minimizes costs for the installing member and the system as a whole.

Dakota Electric, for most installations, provides a firm cost estimate to the DER applicant, which they pay before the upgrade is started. The estimates are calculated based upon typical, historical costs and Dakota Electric absorbs any cost overruns. This firm cost allows the DER applicant to know what the costs will be before they commit to the project. This eliminates the risk of additional cost for the applicant due to unexpected issues. This practice also reduces internal project management costs and accounting costs for Dakota Electric because it eliminates the cost of additional project cost analysis and administrative costs resulting from distribution upgrade cost change coordination between the utility and applicant. Once the utility and the applicant agree to the upgrade costs, then, if there are surprise changes, everything continues to flow smoother and faster. These internal management and administrative labor costs are not trivial and avoiding these saves Dakota Electric members and the DER applicant.

For large DER interconnections, which involve significant upgrades and/or complex interconnections, an estimate of the interconnection costs is provided to the DER applicant. In these cases, however, we do not provide a firm cost estimate given the additional complexities associated with these projects. Although we do not provide a firm cost estimate, Dakota Electric's goal is to manage the interconnection effort, so as not to exceed the original estimated interconnected costs provided and to avoid any surprise costs for the DER applicant.

- Are Dakota Electric's feeder and substation ratings known today?

The ratings of all the equipment, which make up the Dakota Electric feeders and substations, are recorded in the GIS and are known. The loading on each of the feeders is continuously monitored by our control center using SCADA monitoring system and there are alarms triggered when the loading on a feeder reaches its current carrying capacity.

Although these ratings are known, Dakota Electric believes it is important to provide some additional context about how ratings work on our system. Unlike

the circuits in a home, which are clearly rated (such as 15 amps or 20 amps), utility feeder ratings are not rated in a similar way. Many of the Dakota Electric feeders are programmed to trip open if the load is above some value, such as 600 amps; however, this does not mean that the feeder is rated for 600 amps. In most cases, while the protective breaker is set to trip once the current exceeds 600 amp, the rating of the cables to carry continuous current is less than 600 amps. Furthermore, the maximum capacity is not a firm number but changes with weather conditions. For overhead wires, the ambient temperature has a significant effect upon the current carrying capacity of the wire. Also cables and wires are not immediately overloaded at a set value, so very brief loading above the current ratings is possible. The increased variability caused by the operation of DER systems, and the new operating conditions caused by the two-way flow of energy, has increased the complexity of feeder loading management by the control center.

The ability for a feeder to supply a level of power to a load is dependent upon many factors, such as the length of the feeder, the location of the many different services on the feeders, coincident nature of the multiple loads. This is not a simple linear relationship between the many multiple variables; as such, the feeder rating, albeit known, is not firm number.

- Would additional feeder and substation capacity supported by the "Make Ready" fee also provide benefits to member-owners who have not Interconnected DER systems but are utilizing the grid for charging electric vehicles and powering electric heating/cooling resources?

Completing make ready upgrades for DER interconnection does not provide cost reduction for other members who utilize the grid for EV charging or other additional energy uses. Dakota Electric is required to meet the electrical needs of members wanting to use electrical energy and our rates are designed to recover the cost of supplying their electrical requirements.

At the outset, it is important to use caution when examining the concept of make ready capacity (either for DER or additional load) because the resulting capacity needs in each scenario are different and may or may not help with the capacity to support flow in the other direction. There is more to supporting new load, or supporting new DER interconnection, than simply the size of the wire or equipment to support the flow of electrical current. In some cases, the increased

capacity from the make ready for a DER interconnection could support more electrical load, but in some cases it will not. The make ready discussion we provided in our proposal is specifically *designed to support a local DER system*.

Below are two examples to help illustrate this concept.

Example 1) The existing protective equipment (a fuse or recloser) installed within a local residential development, which has 20-30 homes connected to the distribution wires, needs to be upgraded to support additional backflow from DER proposed to be interconnected downstream of the protective equipment. At the time when the protective equipment is being back-fed, the DER output is supplying the local load on all the services in the development and also generating excess energy to back feed and overload the protective equipment. Since an overload occurs, a larger fuse or protective device must be installed. This provides more capacity in the upstream direction. For the loads in that development, the existing peak load is most likely limited by voltage drop. As more load is added, the voltage drop from the substation to the load is increased. The replacement of the protective element does not improve the voltage at the services and thus may not increase the downstream capacity.

Example 2) A homeowner adds solar to their home, and the existing transformer must be upgraded to a larger nameplate capacity. Around the same time, their neighbor installed a new EV charger. The new larger transformer has more capacity, but this change alone may not support the neighbor's EV charger. The typical limitation to EV charging for a home is the size of the secondary wire connecting the premise to the transformer and/or the electrical panel in the home. Either, or both, may not have sufficient capacity to support the EV charger. The replacement of the transformer does provide more energy capacity for EV charging, but, depending on the existing transformer loading, it may not have been required for the EV charging and was only needed for the DER interconnection.

- Would additional feeder and substation capacity supported by the "Make Ready" fee benefit DER Interconnections for systems sized larger than 40KW?

This is very unlikely as <40kW systems are typically not full feeder upgrades but are incremental upgrades. Larger, multi megawatt DER systems require a step change in feeder capacity utilization. These large DER systems are not typically associated with local load, rather a majority of their production is back fed throughout the feeder and substation that it is interconnected to. Also, due to their size, they are able to create large power swings on the feeder, which impact the feeder voltage. Thus, the make ready improvements for a large DER, tend to require a different magnitude of upgrades vs the upgrades required for smaller DER interconnections.

- Please provide more detail on Dakota Electric's perspective on whether and how currently used allocation methodologies could be updated to more transparently and accurately allocate the costs of grid upgrades across all member-owners benefitting from upgrades paid for by DER Interconnection customers paying the proposed monthly "Make Ready" fee.

The long-term goal for DER interconnections should be to have stable and transparent interconnection costs, which support the addition of more DER systems. The current cost causation method is neither transparent nor stable. The future of the existing model is also not sustainable as once the penetration of DER interconnections on the feeders reaches higher levels, the incremental costs to make ready for DER, especially small DER, will be cost prohibitive.

Moving to a one-time, interconnection charge, for all interconnections, which is designed to compensate the utility for projected interconnection costs, also has sustainability issues over the long term. Except for a short period of time, say one year, this is also not a stable interconnection price signal. For years where the utility interconnection expenditures are large, the following year the "One-Time kW Charge" would jump, since the annual "One-Time kW Charge" would be based upon an estimate of the number of DER which will be interconnected in the following year. However, if the increase in the charge is significant, then the actual number of interconnections in the following year could be greatly reduced, which would result in a carryover of costs into the third year. This cascading effect (negative feedback loop) could result in significant increases to the upfront make ready costs. This is just one example of the transparency and stability issues with this method.

Instead, a stable and consistent process, much like how electrical rates are established today, should be considered for DER interconnections such that all users of the distribution system share in the costs of building, owning, maintaining, and operating the distribution system. If one class of members is the only one paying for the system and another class of members is not paying their share, this is neither fair nor sustainable.

Currently, the costs involved with "make ready" are not optimized. Each DER interconnection that requires distribution improvements is paying for an incremental, non-optimized upgrade of the distribution system. Imagine, adding a single bedroom to the house, each time a new bedroom is required. The total cost of adding 2 or three bedrooms, one at a time, would be much larger than simply building the house to have 3 or 4 bedrooms to start. On the other hand, we cannot simply build the distribution system to have a large amount of spare capacity everywhere, as this would be cost prohibitive. This would be much like building all homes to have 4-5 bedrooms. Most of the homes would only be using one or two bedrooms but required to pay for building and heating /cooling a much larger home than is required. Instead, people select a home that is sized to their needs. Although this home example is illustrative of deficiencies with the current system, it is important to remember that with the distribution system, if we outgrow the system, we cannot simply move loads and DER installations. We must build the system to meet the needs of the interconnected services. The more accurate the future electrical needs can be forecasted, the ability to optimize the design of the distribution system will be improved.

As we look to the future, we need to design a process to allow the utility engineers to forecast and provide for new DER interconnections, using a process like the existing method used to forecast and support new electrical loads. The costs for supporting new loads are allocated to all users of the distribution system. We also need an allocation method to allow recovery of the expenditures occurred by the utility to upgrade the distribution system to support additional DER interconnection, in a non-piece meal fashion. There are many possible allocation methods and cost recovery methods which should be explored. In general, this could be simply taking the cost of the total utility plant and allocating X% towards the electrical consumption use of the distribution system and Y% towards the use of the distribution system by DER users. Then using either kW,

kWhr or a combination there, of these utility costs are allocated to the consumer based upon their individual use of the distribution system.

- Would the calculation of a "Make Ready" fee include depreciation of the assets the fee has paid for overtime?

As stated in the answer to the previous question, how the make ready fees are calculated is open for discussion. The main point is to have an on-going cost recovery method to allow the utility to recover its costs of providing and operating the distribution system and to allow the utility engineers to optimize upgrades to the distribution system, with the goal of providing a reliable distribution service with optimized costs. This would then replace the current incremental upgrade process where the utility is required to only do the minimum required to support that one individual DER interconnection. Overall, this process will ensure that costs are adequately and fairly allocated, that costs are minimized, and that DER interconnections can occur in an efficient and cost effective manner.

- For how many years would the monthly "Make Ready" fee be paid for by DER Interconnection customers?

In general, the "Monthly Distribution Fee" would continue for the life of the DER interconnection. Since the distribution system is required for the DER operation, it is appropriate that the DER pay for the reasonable costs of using the distribution system. The discussion is then what share should DER systems pay and what share should be assigned to other system users. Again, this is policy decision that requires significant analysis and discussion.

- How does the monthly "Make Ready" fee differ from the monthly "DG Grid Access Fee" permitted to cooperative utilities by Minnesota Statute 261B.164, Subd. 11?

The make ready fee Dakota Electric discusses differs slightly from the DG Grid Access Fee permitted in Minnesota Statute 216B.164, Subd. 3(a) because it is related to the costs associated with upgrades to the system to facilitate DER. Dakota Electric's understanding of the DG Grid Access fee is that it is meant to recover fixed costs associated with using the distribution system that the DER

consumer does not pay as a result of installing a system. Dakota Electric does not currently assess a DG Grid Access Fee.

- Would the monthly "Make Ready" fee be assessed in addition to the monthly "DG Grid Access Fee" permitted by Minnesota Statute 261B.164, Subd. 11, or in place of it?

As noted in the previous question, Dakota Electric does not currently charge a DG Grid Access Fee. In theory, the make ready fee could be charged in addition to the DG Grid Access fee. However, Dakota Electric notes if a utility were to consider assessing both fees, it would likely necessitate a detailed analysis of both the upgrade and lost fixed cost components of each charge/fee.

Preparer: Adam Heinen/Alex Nelson
Title: Vice President, Regulatory Services/Electrical Engineer
Department: Regulatory Services/Engineering Services
Telephone: 651-463-6258
Date: January 11, 2023

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All Energy Solar
Information Request

Docket No.: 16-521		
Requestor:	Sarah Whebbe, Policy Analyst, All Energy Solar.	
Requested From:	Adam J. Heinen, Vice President of Regulatory Services for Dakota Electric.	
Date of Request:	January 2nd, 2024.	
Response Requested:	January 17th, 2024, or sooner.	Information Request No. 2

Request:

Please reference Dakota Electric's proposal to create a "Make Ready" process for distribution upgrades beginning on Page 11 of the November 1st Filing.

Dakota Electric proposes that it would (except in limited, unique circumstances) consider making necessary distribution upgrades with no upfront payment requirement for facilities under 40kW, and instead would assess a flat monthly charge to each new DER Interconnection under 40kW.

On Page 13 at footnote 5, Dakota Electric notes another possible charge option that could be used as the basis for a "Make Ready" fee is peak kW backfeed/export of a DER unit, noting that this would encourage matching system size to load and/or the installation of energy storage.

On Page 14 at footnote 7, Dakota Electric notes that the rate calculation it proposed in its November 1st filing does not include an export component because "this mechanism should be recovered from all DER, not just new DER."

Response

- Please describe in more detail the potential drawbacks and benefits of the alternative approach of assessing a "Make Ready" charge based on peak kW backfeed/export of a DER unit.

To avoid confusion between a one time "Make Ready" charge and a "Make Ready" monthly fee we will refer to the one time "Make Ready" charge as 'One-Time kW Charge', and the "Make Ready" monthly fee as "Monthly Distribution Fee".

In general, a "Monthly Distribution Fee" which reflects the impact upon, or maximum capacity utilization of, the distribution system would drive consumers to reduce their needs for upgrading the distribution system to support excess DER output. This impact could be measured by the maximum exported kW during the billing period. Using the maximum kW for allocating make ready charges would send a price signal to the consumer to align the DER output with the electrical utilization of the load. A DER system designed to not export would have the lowest make ready charge, if any.

Currently there is no additional cost to a member with a solar system which has large excess generation during the day. Without any cost, there is no penalty (apart from higher installation and material costs) for a member to install a larger DER than what would be required for their electrical usage. Assuming many similar installations across the distribution system, this results in high DER export levels and excess energy generated during the daytime hours and likely normal electrical demand during the evening or non-production hours in the day. The result is higher distribution system capacity requirements and more required distribution upgrades to support both the DER and system load. This is the current situation and results in the highest overall Make Ready and system cost solution.

If, instead, the DER output was aligned, as close as possible, with electrical consumption, then the impact on the distribution system would be minimized. This results in lower overall costs for the distribution system and the ability for more DER to be interconnected with fewer upgrades.

A possible recovery method for distribution costs could be the use of either a kW or kWhr, or a combination, value measuring the amount that is back fed into the distribution system. Using either of these determinants, or combination thereof, would have the similar effect of financially incentivizing the reduction of distribution system utilization by the DER system. This would potentially facilitate the construction and interconnection of additional DER.

- Please describe in more detail why a "Make Ready" charge based on backfeed/export of a DER unit would need to be recovered from all DER, not just new DER.

We see this as a fairness issue. Even if a DER were installed in the past, if the existing facility is not sized properly, it is placing additional strain on the distribution system and increasing the risk of upgrades being required. All members who use the distribution system need to help cover the reasonable costs involved with providing and maintaining the distribution system. Dakota Electric acknowledges that there are current DER consumers who made a decision to install facilities based on an assumption that ongoing charges did not exist, which is why we noted that there should be a transition period where these existing facilities are not assessed this export charge.

Preparer: Adam Heinen/Alex Nelson
Title: Vice President, Regulatory Services/Electrical Engineer
Department: Regulatory Services/Engineering Services
Telephone: 651-463-6258
Date: January 11, 2024

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Information Request

Docket No.: 16-521		
Requestor:	Sarah Whebbe, Policy Analyst, All Energy Solar.	
Requested From:	Adam J. Heinen, Vice President of Regulatory Services for Dakota Electric.	
Date of Request:	January 2nd 2024	
Response Requested:	January 17th 2024, or sooner.	Information Request No. 3

Request:

Please reference Dakota Electric's proposal to create a "Make Ready" process for distribution upgrades beginning on Page 11 of the November 1st Filing.

Dakota Electric proposes that it would (except in limited, unique circumstances) consider making necessary distribution upgrades with no upfront payment requirement for facilities under 40kW, and instead would assess a flat monthly charge to each new DER Interconnection under 40kW.

On Page 13 at footnote 5, Dakota Electric notes another possible "Make Ready" charge option is assessing a one time either by system or per kW size of system. Dakota Electric further explains that one potential drawback of this method is that it does offer a chance to cover maintenance and is not able to be increased as costs increase. It can also shift high costs to other future DER consumers.

Response

- Please describe in more detail the potential drawbacks and benefits of the alternative approach of assessing a one time "Make Ready" charge based on a per kW calculation of size of system.

To avoid confusion between a one time "Make Ready" charge and a "Make Ready" monthly fee we will refer to the one time "Make Ready" charge as 'One-Time kW Charge', and the "Make Ready" monthly fee as "Monthly Distribution Fee".

One benefit of a "One-Time kW Charge" is that all developers know what the cost will be to interconnect a DER system with that utility for a given year. This reduces cost surprises and simplifies the utility invoicing for any make ready cost, as there is no estimating, communication, waiting for agreement with the estimate, etc.

A drawback of using a "One-Time kW Charge" is the dynamics involved with setting the make ready cost. Today, with the low level of DER penetration on the Dakota Electric system, the per kW value to be charged is low. However, the expectation is that over time the average distribution system upgrade cost to interconnect and support additional DER interconnection will increase as the number of DER facilities connected to the distribution system also increase. This relationship will likely increase costs significantly, if not exponentially, as the distribution system becomes capacity constrained. When this scenario occurs, the kW value assessed to DER installations could be a large impediment to interconnecting new DER systems. In addition, depending on how the value is calculated, the actual costs of make ready projects could experience large swings in the recovery value from year to year.

- Please clarify what is meant by the statement "one potential drawback of this method is that it does offer a chance to cover maintenance".

This statement should have been that it "does *not* offer." This was an inadvertent typographical error.

- If the intention was to state that one potential drawback is that a one time charge does **not** offer a chance to cover maintenance costs, please provide a more detailed explanation of what grid maintenance costs Dakota Electric would anticipate allocating to DER Interconnection customers paying a "Make Ready" fee.

Besides the lack of stability for a "One-Time kW Charge," another drawback of a one-time charge is the lack of an ability to recover other long-term costs for owning, maintaining, and operating the upgraded equipment. There are additional long-term costs for a utility to maintain and operate additional distribution system equipment or equipment with greater electrical capacity. For example, a larger transformer uses more energy, 24/7, simply to stay energized. Even with no power flowing through the transformer, the electrical core must maintain the magnetic

field. This takes energy and, the larger the transformer, the greater the energy needed to maintain the magnetic field. There are also on-going costs, such as personal property tax, which is based upon the value of utility assets. With a larger, and/or newer piece of equipment, there is increased asset value, and this can result in increased personal property values and increased annual property taxes. If additional equipment is required to support DER operation, this equipment will need to be maintained and replaced at some point in its lifetime. With a "One-Time kW Charge," it would be difficult to place a value on that future maintenance.

Another reason a "One-Time kW Charge" does not cover maintenance costs is that the current electrical rates for the entire membership have been designed and calculated to recover costs associated with purchasing power, maintenance, operations, and system improvement upgrades. A member with a DER typically decreases the cost associated with the purchasing of power for the cooperative. These costs are significant and are generally 70% to 75% of annual operating expenses. In addition to power costs, the member simultaneously decreases their contribution to cost recovery associated with maintenance and system improvements, and, as discussed in our responses to other discovery, may increase the cost of the distribution system when they export energy by increasing the load flow on the system. Additional losses and faster degradation of equipment do occur because of this additional load flow on the distribution system. There is currently no method for Dakota Electric to recover the costs associated with the additional expenses that DER apply to the distribution system or lost cost recovery. A "One-Time kW Charge" may cover the cost associated with the immediate upgrades needed to allow the DER to interconnect to the distribution system, but it would not cover the long-standing maintenance and operational cost associated with the equipment. A "Monthly Distribution Fee" would give Dakota Electric a recovery method to recoup the costs associated with DER and, ideally, allow Dakota Electric to make holistic upgrades to the system to allow more DER. When designed correctly, as DER penetration increases, the value of the fee could be adjusted similar to how standard electrical rates are adjusted across the membership so that members with DER pay their fair share of the costs that they contribute to the distribution system. It is also possible that this fee could be adjusted to account for potential benefits from the DER interconnection.

Preparer: Adam Heinen/Alex Nelson
Title: Vice President, Regulatory Service/Electrical Engineer
Department: Regulatory Services/Engineering Services
Telephone: 651-463-6258
Date: January 11, 2024