

December 1, 2022

—Via Electronic Filing—

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

RE: RESILIENT MINNEAPOLIS PROJECT ANNUAL REPORT
INTEGRATED DISTRIBUTION PLAN
DOCKET NO. E002/M-21-694

Dear Mr. Seuffert:

Northern States Power Company, doing business as Xcel Energy, submits the enclosed Resilient Minneapolis Project (RMP) Annual Report in compliance with the Commission's July 25, 2022 Order in Docket No. E002/M-21-694.

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 Nick Martin at nicholas.f.martin@xcelenergy.com or me at monsherra.s.blank@xcelenergy.com if you have any questions regarding this filing.

Sincerely,

/s/

MONSHERRA BLANK

Enclosure
c: Service List

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Katie Sieben
Joseph K. Sullivan
Valerie Means
Matthew Schuerger
John Tuma

Chair
Commissioner
Commissioner
Commissioner
Commissioner

IN THE MATTER OF XCEL ENERGY'S
2021 INTEGRATED DISTRIBUTION
SYSTEM PLAN AND REQUEST FOR
CERTIFICATION OF DISTRIBUTED
INTELLIGENCE AND THE RESILIENT
MINNEAPOLIS PROJECT

DOCKET NO. E002/M-21-694

**COMPLIANCE
ANNUAL REPORT**

INTRODUCTION

Northern States Power Company, doing business as Xcel Energy, submits this Resilient Minneapolis Project (RMP) Annual Report in compliance with the Minnesota Public Utility Commission's July 26, 2022 Order in the Company's 2021 Integrated Distribution Plan (IDP), Docket No. E002/M-21-694. Order Point 7 certified the RMP and required annual reporting. Order Points 8 through 11 also address the RMP. We discuss each Order Point in turn, after providing a summary.

SUMMARY

The Resilient Minneapolis Project seeks to improve Black, Indigenous, and People of Color (BIPOC) communities' resilience to crises by installing solar/battery microgrids at three community center locations: the North Minneapolis Community Resiliency Hub, Sabathani Community Center, and the Minneapolis American Indian Center (collectively referred to as the "RMP hosts").¹ At each site, the Company will work with the hosts to install rooftop solar, battery energy storage systems (BESS), microgrid controls, and necessary distribution system modifications to integrate these

¹ For the North Minneapolis Community Resiliency Hub, the lead implementing partner is Renewable Energy Partners and the host (owner of the buildings at which the microgrid will be installed) is the Minneapolis Public School District. For the other two locations, the lead partner and host are one and the same. For simplicity, we here refer to all three or our implementing partners as the RMP hosts, while noting that Renewable Energy Partners is not technically the host.

technologies.² The microgrids when operating in “island” mode (i.e., during an electric system outage) will provide power for services critical to the communities the RMP hosts serve. Recognizing that outages are generally infrequent and brief, and the need to fully utilize RMP assets to benefit all customers, the RMP BESS systems will also be dispatched on a routine basis to provide a variety of grid services and learnings to benefit all the Company’s customers.³

Since the Commission’s certification decision, we have collaborated closely with the three RMP hosts in project planning. Our efforts have focused on collecting load data, identifying physical locations for the BESS at each site, and working with the hosts to understand in more detail the emergency services – such as food provision, gathering and sleeping areas with heating/cooling, communications, and medical needs – they would prioritize in an outage. With this information, the Company developed and in November 2022 issued a request for proposals (RFP) to select a contractor to engineer, procure, and construct the three microgrid systems. We anticipate receiving RFP responses in January 2023, at which time we will have more certainty on the commercial operation date (COD) of the systems. As we discussed at the Commission’s June 1, 2022 hearing on certification, due to supply chain challenges throughout the industry, we believe the COD will likely be later than our original estimate of late 2023. Once we receive RFP bids, we also will have a better understanding of the magnitude to which inflationary pressures are increasing the cost of the project. As required, we will update the Commission as appropriate after RFP results provide more insight into project timing and costs.

Beyond these planning steps, the Company has also worked with the RMP hosts to support other energy needs, invest in these organizations as long-term partners, and lay the groundwork for successful RMP resilience hubs. Our efforts have included:

- Collaborating with hosts individually, along with their architects and consultants where applicable, to prioritize emergency service capabilities that the microgrids should support. In addition, the Xcel Energy Foundation provided a grant to Sabathani Community Center to begin developing an

² Note that the cost of solar is not included in the RMP request for certification, since the solar arrays will be owned and operated by the hosts, but the Company will be working with the hosts to assist in the interconnection process, encourage use of available Solar*Rewards or other incentives, and integrate the solar and BESS components operationally.

³ A microgrid is “a group of interconnected loads and distributed energy resources that acts as a single controllable entity with respect to the grid. It can connect and disconnect from the grid to operate in grid-connected or island mode.” See <https://www.nrel.gov/grid/microgrids.html>. “Island mode” refers to the state where the microgrid is disconnected from the larger grid and balancing electrical loads and generation resources within the microgrid. This could be the case during an outage of the larger grid in the vicinity of the buildings where the microgrid is installed.

emergency operations plan for different phases of operation (normal, disruption, recovery) of its Resilience Hub, as well as conducting community outreach to better understand community needs in an emergency. These capabilities and plans will help ensure that the BIPOC communities the RMP hosts serve can safely access food, shelter, and other critical services during times of crisis.

- Supporting the RMP hosts' successful proposal for a Communities LEAP technical assistance award from the National Renewable Energy Laboratory (NREL), and working with NREL to prioritize technical assistance needs.
- Supporting energy efficiency (lighting retrofit, smart thermostat) retrofits at Sabathani using existing Conservation Improvement Program rebates; sharing the cost of an engineering study of HVAC retrofit options; and working with Sabathani to lay the groundwork and recruit additional partners for an ambitious plan to replace existing heating and cooling systems with a central geothermal heat pump system.
- Supporting Sabathani with letters of support for a Minneapolis Foundation grant for energy efficiency measures and a proposal to CenterPoint Energy for inclusion of Sabathani's geothermal project in its Natural Gas Innovation Act plan.
- Guiding the RMP hosts on how to take advantage of Xcel Energy and City of Minneapolis cost-sharing incentives for rooftop solar. We will continue to guide the hosts through the interconnection process, help them use all available solar incentives, and integrate the solar and BESS components operationally.
- Providing financial support and Xcel Energy volunteers for a Career Fair at Sabathani as part of the Company's annual Day of Service. Company staff and other workforce development organizations attended to connect with neighborhood residents about careers in the energy industry.
- Inviting all three RMP hosts to serve on Xcel Energy's Equity Stakeholder Advisory Group, created under Docket No. E002/M-22-266, to help the Company work in partnership with BIPOC communities to design equitable energy programs and broaden participation in energy decisions.

On one level, the RMP provides an opportunity to integrate and test new technologies that support resilience for vulnerable communities in times of crisis, as well as provide valuable lessons learned for the benefit of all customers. On another level, it enables Xcel Energy to work hand-in-hand with our BIPOC community partners, deepening our relationship and understanding of their energy priorities and needs in ways that support much broader goals to advance equity in the clean energy transition, improve energy affordability, grow clean energy careers, and increase BIPOC representation in

the new energy economy. We look forward to continuing our work on this project, and provide the required information in the remainder of this report.

I. ORDER POINT NO. 7

The Order reads:

7. *The Commission certifies the Resilient Minneapolis Project and limits cost recovery to a cost cap of \$9 million unless Xcel can show by clear and convincing evidence that the costs were reasonable, prudent, and beyond the Company's control. Xcel shall file reports annually on December 1 through 2026. The first report is due on December 1, 2022, and must contain the following information...* [subparts addressed separately below]

Cost cap

The estimated capital budget of \$8,938,878 in the Company's 2021 Request for Certification included capital costs for BESS, islanding switches, medium voltage work, site evaluation/surveying/preparation, business systems integration, project management and labor, and miscellaneous items.⁴ Based on these capital cost estimates, the Commission ordered a \$9 million cost cap in Order Point 7. At the time of our November 1, 2021 filing, we also estimated an additional \$62,043 per year of annual Operation & Maintenance (O&M) costs over the assumed ten-year life of the RMP microgrids.⁵ This O&M budget is a necessary part of delivering and supporting the project.

As the Company explained in the June 1, 2022 hearing on our IDP, supply chain issues and inflationary pressures have had a significant impact on the costs of several microgrid components. While we will not have updated pricing until we receive RFP responses in early 2023, we expect the costs of those components – including at least BESS, islanding switches, and transformers – to increase relative to our previous estimate, which was based on NREL's Annual Technology Baseline costs as of 2020.⁶ As the Commission is aware, unfortunately these cost increases are common across many projects and the industry at large, and these increases are beyond the Company's control. We expect these cost increases will increase the budget for the three RMP microgrids beyond the initial \$9 million capital cost estimate. At the hearing, the Commission asked the Company to make a filing once we have better information,

⁴ Northern States Power Company, doing business as Xcel Energy. *Integrated Distribution Plan*. Docket No. E002/M-21-694. November 1, 2021 (2021 IDP). See Table 10 on page 37, Table 4 on page 31 of Appendix H, and Table 5 on page 35 of Appendix H.

⁵ *Id.*

⁶ <https://www.nrel.gov/analysis/data-tech-baseline.html>.

updating our original cost estimates and discussing any increases which affect our ability to construct all three RMP microgrids within the cost cap.⁷ Since we expect the updated costs to exceed \$9 million, we understand the Commission may wish to have the opportunity to revise its cost cap, rather than having the Company forego one of the project sites, while of course still expecting the Company to make prudent investments and proactively manage costs that are within our control. We do not have any budget updates at this time, since we do not yet have concrete updated pricing from the RFP, but we expect to do so once we have RFP responses.

RFI and RFP

Since the Commission's certification decision, the Company has been working closely with the three RMP leads – Sabathani Community Center, Minneapolis American Indian Center, and Renewable Energy Partners – on initial project implementation steps. So far, those efforts have focused primarily on the design of an RFP to select a Contractor to engineer, procure, and construct the three microgrids. This has required close coordination with the RMP hosts to collect data on current and anticipated electrical loads, which loads would be deemed critical and which could be curtailed in an extended outage (discussed below), and available physical locations at each site for the BESS and associated microgrid infrastructure.

For Contractor selection we decided on a two-step process, first releasing a Request for Information (RFI) in October 2022 to identify a short list of bidders for the subsequent RFP. The RFI sought to identify bidders interested in the project and capable of meeting a COD of June 30, 2024 or earlier. Eight potential bidders responded to the RFI. After reviewing RFI responses, we issued an RFP to seven potential bidders in November 2022, requesting responses by early January 2023. Following technical and commercial evaluation of bids, we aim to award the contract by the end of March 2023.

We plan to select one engineer/procure/construct (EPC) Contractor to build all three microgrids. We have built into the RFP requirements to meet the prevailing wage and qualified apprenticeship requirements of the Inflation Reduction Act of 2022, in order to ensure the RMP microgrids qualify for an Investment Tax Credit of at least 30%. We have also included a preference for bids in which a portion of the work is performed by women- and/or minority-owned suppliers or subcontractors. Table 1 below shows the estimated BESS sizing for each site included in the RFI/RFP.

⁷ June 1, 2022 hearing on Xcel Energy's *Integrated Distribution Plan*. Docket No. E002/M-21-694.

Once a Contractor is chosen, we will work with that Contractor and the RMP hosts to develop detailed project designs and operational strategies for dispatch of the three BESS to support resilience at those community centers, as well as several other grid services discussed in our November 1, 2021 filing.

Table 1: BESS sizing for each RMP microgrid

Name	Sabathani	MAIC	North Mpls Resilience Hub
Address	310 East 38th Street Minneapolis, MN 55409	1530 Franklin Avenue Minneapolis, MN 55409	1501 Aldrich Av N Minneapolis, MN 55411
Estimated Power Requirement (kW)	500	500	1,500
Estimated Energy Requirement (kWh)	1,000	1,000	3,000
Estimated Energy Reserved for Backup Power (kWh)	400	290	1,150

We now address the subparts of Order Point 7.

- a. Define and quantify the emergency service capabilities and capacity in more detail and in more concrete terms than Xcel has hitherto provided in its proposal and via discovery responses.*

For our November 1, 2021 filing, in order to estimate capital costs, we created a preliminary sizing (kW and kWh) for each BESS, based on the assumption that at all times, enough energy should be stored in the BESS to sustain 50% of the winter peak electrical load of the building for 4 hours. The rest of the BESS capacity could be dispatched for the other grid services we identified in that filing.

To define the emergency service capabilities and capacity of the RMP microgrids in more detail than hitherto, we worked with the RMP hosts to identify which specific services they deem critical to the community they serve in an emergency, and which electrical loads and/or parts of their building are needed to deliver those emergency services. This helped the Company and hosts to create a distinction between “critical” loads necessary for emergency services, and “curtailable” loads that could be turned off to extend BESS life, in the event of an outage longer than the BESS can sustain

the building's full load. Since most outages are far shorter than 4 hours, most would not require the curtailment of electrical loads.

In a rare extended outage, the duration the BESS can sustain a building's load before being depleted can be extended in three ways: first, by prioritizing the electrical loads needed to deliver emergency services while curtailing non-critical loads and areas of the building. Our conversations with each host on critical vs. non-critical loads are summarized below. Second, if an extended outage should occur during a time when there is good solar generation during the day (e.g., in a summer heat wave), the battery would be recharged each day. Third, if an outage comes with some advance warning – e.g., a winter ice storm or summer heat wave – the Company could discontinue any use of the BESS for grid services other than resilience, bringing it up to full charge just in case an outage occurs, which would increase the duration the BESS can sustain building loads even without recharging.

Sabathani

We met with Sabathani on September 1, 2022 to identify emergency service capabilities that would need to be sustained if the microgrid were operating in island mode during an outage, and the associated parts of the building and electrical loads needed to provide these services. The services Sabathani prioritized are food provision, gathering/sleeping areas for community members, and communications.

Sabathani's gymnasium, Banquet Center, and auditorium would be used as community gathering spaces, so would need to be lit and heated or cooled depending on the season. The main office should also have power since it would be needed as an emergency operations center. Refrigeration in the Food Shelf (walk-in cooler, freezer, and six commercial refrigerators) should continue to operate in order to provide food to people sheltering at Sabathani and/or to the community. The gymnasium does not currently have air conditioning, but Sabathani is installing this with funds from the City of Minneapolis. The remainder of Sabathani, including portions of all floors of the building, as well as rented office spaces, could be curtailed to extend BESS life.

In early 2022, Sabathani completed CFL-to-LED lighting retrofits throughout the building, and all lights are now on motion sensors. They have installed 90 Ecobee smart thermostats, so can now control heating and cooling in individual rooms.

The air conditioning units are:

- Two new 10-ton units that will be added to serve the gymnasium and Banquet Center. These would need to operate in an emergency if it occurs during hot weather.
- Two existing 10-ton units, serving the third floor and auditorium. One of these could be curtailed in an emergency.
- Eighty-four 4-ton units, primarily serving tenant offices. All but three of these – those serving the Food Shelf – could be curtailed in an emergency.
- Three 8-ton units, serving tenant offices and conference rooms on the third floor. These could all be curtailed, except in a scenario where more than about 1,500 people (the number that could be hosted in the gymnasium, Banquet Center, and auditorium) gather at Sabathani. In that scenario, the conference rooms may need to be used, so those air conditioning units would be needed (but only if the emergency occurs in hot weather).

Sabathani is in the process of evaluating a comprehensive HVAC retrofit project that would install a central geothermal heat pump system, replacing its current air conditioning units and natural gas boilers. This and other options have been evaluated in an August 2022 engineering study by Apex Facility Solutions, LLC, partially funded with a rebate from Xcel Energy. This project, if implemented, would significantly change the electrical loads at Sabathani. Because it is still in the feasibility study and fundraising phase at this point, we have designed the RMP microgrid assuming current electrical loads.

Minneapolis American Indian Center

We met with MAIC and its architect, Cuningham, on August 29, 2022 to identify emergency service capabilities that would need to be sustained if the microgrid were operating in island mode during an outage, and the associated parts of the building and electrical loads needed to provide these services. The services MAIC prioritized are food provision and gathering/sleeping areas for community members.

Cuningham’s architectural drawing below shows the MAIC, post-renovation, with building spaces color-coded by function. In an emergency in which power is out and community members are gathering at MAIC, staff would envision using the right (east) half of the building, outlined in red, to provide emergency services. The gymnasium (dark blue) would be a gathering, dining, and sleeping area. Additional dining would be in the room with tables just south of the gymnasium. The kitchen (orange) would need to have power for refrigeration and cooking. The new meeting rooms (medium blue, on the south end of the building) would be used for community gathering, phone charging, and additional sleeping space if needed. The new fitness

Figure 1: MAIC Facility Architectural Drawing
Red outline denotes building area that would provide emergency services.



North Minneapolis Community Resiliency Microgrid

We met with Renewable Energy Partners (REP) on September 1, 2022 to identify emergency service capabilities that would need to be sustained if the microgrid were operating in island mode during an outage, the associated parts of the three Minneapolis Public Schools District (MPSD) buildings that would be utilized, and electrical loads needed to provide these services.

The North Minneapolis Community Resiliency Hub – as conceived originally by a team that attended Rocky Mountain Institute’s eLab Accelerator in May 2018 – would prioritize the Nutrition Center as a means to provide food to the community, recharge medical devices, refrigerate medicines, and provide the City with a base of operations for emergency response. It could also function as a place to provide community members with important information and triage to other services available in the vicinity. Unlike the other two sites, the North Minneapolis Community Resiliency Hub was not primarily conceived as an emergency shelter to house community members. REP plans to evaluate, through additional grant funding, the potential for Hall and Franklin schools to serve as community shelters to a limited extent, but the primary objective of the microgrid would be to maintain at least 70% of the load of the Nutrition Center. The Nutrition Center has a peak demand of about 500 kW in summer, driven by air conditioning and refrigeration. This falls to 200-250 kW on nights and weekends. Air conditioning loads could be curtailed in favor of sustaining refrigeration.

The preliminary sizing of the BESS, at 1.5 MW/3 MWh, was designed to support the summer peak load of all three buildings (assumed to be coincident) for two hours. Sufficient capacity would be reserved in the BESS at all times to sustain 50% of the aggregate winter demand for four hours. With advance notice of a weather event that could cause an outage, the BESS could be brought up to a full state of charge (i.e., stop using BESS for other use cases) to extend this operating window.

Through a partnership between REP and the University of Saint Thomas, a team of four undergraduate engineering students conducted a Senior Design Clinic in 2021-22.⁸ We evaluated the students’ final report, which focused only on Hall Elementary School. Our critical loads exercise, by contrast, needed to focus on the Nutrition Center and all three buildings in aggregate.

⁸ See <https://engineering.stthomas.edu/ug-experience/activities-opportunities/senior-design-clinic/>.

- b. Report on the status of the emergency service capacity to ensure that the benefits are or can be realized, and to develop a process and a plan for demonstrating that the benefits can be realized.*

As of this annual report, the microgrids are not yet installed, so we cannot report on the status of emergency services they support – only on plans to support those services and the potential benefits of those services. Once we have selected a Contractor to install the microgrids and identified the technical specifications of the BESS, we will develop operational set-ups both to sustain the critical loads the RMP hosts identify as critical for emergency services (i.e., when in island mode) and to provide a range of grid services when the grid is functioning normally. This process will help ensure the emergency services benefits will be realized.

One potential approach would be to work with the hosts to develop an emergency operations plan for each site, which would identify how the microgrid would operate in an outage anticipated to be of short duration and in an outage anticipated to last longer than the BESS can sustain the full building load. In the latter case, the host would need – either via pre-programming in its building automation system, or manually – to turn off loads and areas of the building identified as non-critical for emergencies.

We highlight here two other sources of funding and/or technical assistance that could help the RMP hosts in emergency planning, and help in the design of the BESS dispatch strategy for resilience in outages as well as grid services in routine operation.

First, REP has received, on behalf of a “Community Coalition” including all three RMP hosts, a Communities LEAP technical assistance award from NREL.⁹ Xcel Energy provided a letter of support for this grant application, indicating our readiness to support the RMP hosts and collaborate with NREL if successful. Included in the technical assistance Scope of Work are activities to engage community members on resilience hub service prioritization, and techno-economic analysis of grid services for each of the three resilience hub sites.

The Company will support this work as technical advisors, which we believe will help the hosts develop an operations plan for resilience hubs both during island mode and in “blue-sky” mode.

⁹ See <https://www.energy.gov/communitiesLEAP/leap-communities>. The award is described under “Minneapolis, Minneapolis.”

Second, the Xcel Energy Foundation in 2022 awarded a \$30,000 grant to Sabathani Community Center to support creation of a South Minneapolis community Resilience Hub. The goal of the Resilience Hub is to:

“... support residents, coordinate communication, and distribute resources to the South Minneapolis area during a crisis. Resilience Hubs serve to effectively improve emergency management during a climate-related emergency and facilitate community resilience and healing space during social unrest and trauma triggering events. [...]

Resilience Hubs function in three modes: Normal, Disruption, Recovery. Under normal circumstances, Hubs provide congregate space for residents, businesses, and organizations to gather for events, meals, and training opportunities that benefit a range of community needs, including resilience. Resilience Hubs function in Normal Mode most often, meaning there are no hazards present and all infrastructure is functioning properly, but they are intended to be trusted centers for preparedness, response, and recovery. During a disruption, Hubs will switch from Normal Mode into responding to the disruption and will enhance operations to better support immediate community needs such as emergency assistance, shelter, fresh food, and access to communication with those outside the disruption. With enhanced systems and capacity, Hubs can help reduce the need of emergency services and better connect residents and businesses with supplies, information, and support during a disruption. After disruption, Hubs are intended to switch into Recovery Mode. Resilience Hubs play a critical role in post-disruption recovery and ongoing community needs: re-connection to family members and food or healthcare supplies, for example. We have learned the same inequities frontline communities experience before and during a disaster tend to impact their ability to recover after a disruption.”¹⁰

The Xcel Energy Foundation grant will enable Sabathani to conduct community outreach (three community information events and two community surveys) to better understand the community’s needs in an emergency and determine corresponding priorities for the Resilience Hub.

Taken together, the work discussed above demonstrates a strong likelihood that the benefits of emergency services will be realized.

¹⁰ *Sabathani Community Center’s Emergency Preparedness and Resiliency Hub*. Proposal to Xcel Energy Foundation, April 2022.

- c. *Define a process for identifying and addressing the potential situation in which either or both of the following conditions arise: the project fails to deliver all, or a large portion of Xcel's claimed quantified benefits and / or the claimed unquantified benefits cannot or are unlikely to materialize.*

Quantified benefits

In our November 1, 2021 filing, the Company quantified (i.e., assigned monetary value to) four benefits of the RMP microgrids: resilience/value of lost load, bulk system capacity value, carbon dioxide emissions avoidance, and arbitrage. See Table 5 of Appendix H of that filing. We continue to emphasize that this picture is incomplete, since the project delivers many unquantifiable – but no less important – benefits to the RMP hosts and/or the Company's customers at large.¹¹

The Company will annually monitor the value of these benefits relative to the values provided in Table 5 of Appendix H. Note that the benefits in that table represent the net present value of aggregate benefits over the assumed ten-year life of the BESS. So to be considered “on track” in this sense, the project should generate about one tenth of the value each year. However, as we will discuss below, some year-to-year fluctuation is expected, and project progress or success should not be gauged solely based on these values.

For bulk system capacity value, we will monitor the MISO capacity values (\$/kW-mo and \$/kW-yr) and compare them to our original assumptions. For arbitrage value, we will compare the marginal energy price differential in MISO to our original assumptions. For both of these values, the actual value may be greater or less than projected; the Company will describe causes of any deviations in annual reports, as needed. If the actual value is less than projected, we may to a limited extent be able to “catch up” by dispatching the BESS to attempt to generate greater capacity, or greater energy discharge during peak pricing, in later years. However, if the deviation is driven not by capacity or energy provided by the BESS, but rather by lower MISO capacity prices or energy price differentials than assumed, that would be outside the Company's control.

The carbon dioxide (CO₂) emissions avoidance value in Table 5 of Appendix H¹² is calculated based on the predicted sizing (MW) of RMP solar arrays, predicted

¹¹ Northern States Power Company, doing business as Xcel Energy. *Integrated Distribution Plan*. Docket No. E002/M-21-694. November 1, 2021. See pages 34-35.

¹² Labeled “Generation & Carbon Emissions.” The calculated benefit is for carbon dioxide (CO₂) emissions avoidance. Estimated solar generation is not itself assigned a value here, but is simply used to calculate CO₂ avoidance.

generation (MWh, assuming approximately 20% capacity factor), and predicted annual emission rate (lb CO₂/MWh) for the NSP system for a given year based on our resource plans. The resulting estimate of CO₂ avoidance was multiplied by the Commission’s High CO₂ environmental cost value for that year to derive a societal benefit of the avoided emissions.¹³ This value could be more or less than projected if the RMP hosts install solar arrays sized differently than we assumed, actual solar generation varies from estimates, or the actual NSP system CO₂ rate is higher or lower than forecast in our IRP. As we discuss further in Section II below, the solar arrays will be owned and operated by the hosts. As such, we may not have access to solar generation data. That said, to the extent we are able to gather the solar generation data, in future annual reports we will compare each of these actual values to assumptions and discuss any deviation.

Finally, the resilience/value of lost load in Table 5 of Appendix H is based on an assumed number and duration of outage events (we assumed 1 outage of 4 hours duration per year) and an assumed value of lost load (\$/minute). If there are more and/or longer outages than assumed, the RMP microgrids will deliver greater resilience value than predicted, and vice versa. The resilience/value of lost load could fall short of the value assumed in our cost/benefit analysis if there are relatively few or relatively brief outages in the initial years of RMP microgrid operation, but could quickly “catch up” if this was followed by even one extended outage during which the RMP hosts continue to have power. Each year, the Company will report actual compared to one-tenth of the value assumed our cost/benefit analysis. We emphasize that a large part of the value of resilience microgrids is as a sort of “insurance policy”: like insurance, backup power has no value as long as an outage does not occur, but suddenly has great value – particularly for disproportionately vulnerable populations such as those served by the RMP hosts – if an emergency does occur.

Unquantified benefits

Our November 2021 filing left some RMP microgrid benefits unquantified but emphasized their importance to the RMP hosts, the Company, our customers, and our communities. These benefits include:

- Training and job creation;
- Value of learning for future resiliency and/or non-wires alternative projects;

¹³ We used the High CO₂ environmental cost value, rather than Low or Midpoint, in view of the State’s position that “environmental justice” communities bear disproportionate impacts of pollution and climate change. All three RMP host sites are in census tracts classified as areas of increased concern for environmental justice by the Minnesota Pollution Control Agency. See <https://www.pca.state.mn.us/about-mpca/environmental-justice>.

- Energy equity benefits, including enhancing equitable access to clean energy alternatives, using clean energy to build community wealth, energy sovereignty, improving energy affordability and reducing energy burden, and advancing environmental justice in communities historically disproportionately impacted by pollution and marginalized in energy decision-making.¹⁴

Some of these qualitative benefits – notably job creation, training, and energy savings to the hosts from net-metered solar – we now plan to quantify in the items proposed below (see Table 2, items 8.b, 8.c, and 8.h.6, respectively). This quantification and reporting will enable the Company to identify potential challenges in achieving the stated benefits.

Other benefits will remain difficult to quantify. The RMP has significant value in supporting equity, resilience, and increased participation in energy decision-making for BIPOC communities who are disproportionately vulnerable to climate change-related and other emergencies, and who have had historically less participation in energy decisions. The Commission has signaled the importance it places on incorporating equity in a broad range of energy programs and increasing participation in energy decision-making.¹⁵

Based on the Minnesota Pollution Control Agency’s environmental justice mapping tool, all three RMP sites are considered areas of increased concern for environmental justice – i.e., they are located in census tracts where at least 40% of people reported income less than 185% of the federal poverty level, and where at least 50% of people identify as people of color.¹⁶ Delivering equity benefits in these areas of environmental justice concern, even if some of those benefits are difficult to quantify, is consistent with State of Minnesota policy objectives.

The Company has instituted a practice of monthly calls with the three RMP hosts, to update them on our progress and hear whether participation in the RMP is delivering the benefits they anticipate. This will help the Company to know if the RMP is delivering the anticipated benefits from the host perspective, allowing us to adjust course if needed.

¹⁴ See 2021 IDP Appendix H, pages 33-34.

¹⁵ See for example *In the Matter of Efforts to advance workforce diversity, inclusive participation, and equitable access to utility services for Xcel Energy*. Docket No. E002/M-22-266.

¹⁶ See <https://mpca.maps.arcgis.com/apps/MapSeries/index.html?appid=f5bf57c8dac24404b7f8ef1717f57d00>. All three RMP sites are in the areas of overlapping shading indicating at least 40% of people reporting income less than 185% of federal poverty level, and 50% or more people of color.

We do not anticipate challenges achieving the estimated quantified and unquantified benefits. If, through the processes discussed above, we identify a potential risk of the project not achieving the projected quantified or unquantified benefits and determine that we need to make adjustments to our approach, we would inform the Commission.

II. ORDER POINT NO. 8

The Order reads:

8. *Xcel shall consult with stakeholders, including RMP site partners, on the development of a set of evaluation metrics that allow comparison to other resilience offerings. This set of evaluation metrics shall be included in Xcel's December 1 annual reports. Xcel shall provide the following information and data to the greatest extent practicable. Where the Company is not able to do so, it shall explain why. Where applicable, Xcel must include data in spreadsheet (.xlsx) format. In consultation with stakeholders Xcel shall consider the following reporting elements when developing evaluation metrics:*
 - a. *Xcel shall include optional feedback from site hosts and community partners, using a form Xcel distributes on an annual (or more frequent) basis, which invites partners to discuss their experience participating in the project, its impact on the organization or community, or other information partners wish to share with the Commission.*
 - b. *Xcel shall file a spreadsheet reporting, for each RMP site, the number of union labor jobs or contracts and the number of contracts awarded to women- and minority-owned businesses.*
 - c. *Xcel shall file a spreadsheet reporting, for each RMP site, the number of workers trained in the operation of energy systems and the number of energy-related jobs created.*
 - d. *Xcel shall record in a spreadsheet any instances of natural events or Company-orchestrated simulations in which RMP systems switch to "islanded mode" and how the system performs.*
 - e. *Xcel shall track in a spreadsheet or in narrative form how RMP sites' rooftop solar, BESS, and microgrid are dispatched and optimized daily to mitigate system peaks, manage and shape demand, and integrate more solar generation.*
 - f. *Xcel shall report in a spreadsheet, for any of the RMP site, when a generator is used, for how long, and the generator power capacity and fuel source.*
 - g. *Xcel shall quantify in a spreadsheet the number and type of HVAC upgrades, building envelope upgrades, energy efficiency measures, and/or demand response programs undertaken at any of the RMP sites, shared at the discretion of RMP site hosts and partners.*
 - h. *Xcel shall develop metrics related to resiliency benefits and energy equity and data collection on those topics.*

The Company views subparts a through g to be metrics the Commission requires we include in RMP annual reports, while subpart h directs us to work with the RMP hosts and other parties to develop additional resiliency and equity metrics that the Commission did not specify in its Order. In this annual report we focus on defining the RMP metrics, as opposed to reporting data on the metrics, since the RMP microgrids have not yet been installed. The evaluation items included here are those we propose to report on once the microgrids are operational.

To develop new metrics on resiliency and equity for subpart h of Order Point 8, the Company took a series of steps:

- We first reviewed literature on resiliency microgrids, including, in particular, *The Value of Resilience for Distributed Energy Resources: An Overview of Current Analytical Practices* (National Association of Regulatory Utility Commissioners, April 2019) and *Valuing Resilience for Microgrids: Challenges, Innovative Approaches, and State Needs* (National Association of Regulatory Utility Commissioners and National Association State Energy Officials, February 2022).
- We evaluated a list of 58 resiliency metrics developed by the Chicago utility ComEd for its microgrid in the Bronzeville neighborhood.¹⁷ A subset of these metrics became our starting point for discussions based on applicability. Note that the Bronzeville microgrid is technically and contextually different from the RMP microgrids, based on size, types of generation, and types of load.
- In August 2022, we met with colleagues at Portland General Electric to learn about resilience metrics used in its Distribution System Plans, and incorporated some of these ideas into our list.
- Based on this initial research, we developed a preliminary spreadsheet of resiliency and equity metrics for discussion with the RMP hosts and other parties to the IDP docket. We shared this list first with the RMP hosts in two of our recurring monthly calls, discussing with them which metrics seem most relevant to their operations and (for those that would rely on data from the hosts) would be feasible for them to track on an ongoing basis. The resulting metrics reflect their feedback.
- We also shared the preliminary metrics with the City of Minneapolis and Fresh Energy, who had both discussed metrics in their comments on the Company's 2021 IDP filing. Both parties had feedback.

¹⁷ See https://www.comed.com/News/Pages/NewsReleases/2017_07_28.aspx.

- We shared the preliminary metrics with the NREL team that will be providing technical assistance to the RMP hosts via the Communities LEAP award, and received additional suggestions from NREL.

This research and feedback from multiple parties resulted in a long list of metrics – more than would be feasible for the Company, and in particular the RMP hosts, to track on an ongoing basis. With this in mind, as a final step, we pared the list down to the seven metrics required in the Commission’s order, and six additional resiliency and equity metrics that we view as most relevant, meaningful, and measurable. In developing the final list, we have sought to balance the value added by any metric with the practicability of tracking that metric – in particular keeping in mind the limited time and resources of the RMP hosts. The resulting list of RMP evaluation metrics is provided in Table 2 below.

Note: the Company received a request from two parties on November 30, 2022 for additional time to review the proposed metrics. We have agreed with those parties that given the imminent filing deadline for this Annual Report, we will hold additional discussion of metrics with the RMP hosts and City of Minneapolis subsequent to this filing and, if necessary, make a supplemental filing in early 2023 amending Table 2.

Table 2: Evaluation Metrics for Resilient Minneapolis Project

No.	Item	Description	Related to Resiliency or Equity	How Measured/ Reported	Data Source(s)
<i>Metrics required in Order Point 8</i>					
8.a	Hosts’ experience of RMP	Optional feedback from site hosts and community partners, using a form distributed on an annual (or more frequent) basis, which invites partners to discuss their experience participating in the project, its impact on the organization or community, or other information partners wish to share with the Commission.	Both	Survey feedback	RMP site hosts
8.b	Union jobs/contracts and contracts to women/minority businesses	Spreadsheet for each RMP site: number of union labor jobs or contracts and the number of contracts awarded to women- and minority-owned businesses.	Equity	# of jobs or contracts	Xcel Energy for microgrids; RMP site hosts for solar
8.c	Trainees	Spreadsheet for each RMP site: number of workers trained in the operation of energy systems and the number of energy-related jobs created.	Equity	# of individuals provided training	RMP site hosts

No.	Item	Description	Related to Resiliency or Equity	How Measured/ Reported	Data Source(s)
8.d	Islanding events	Record of any instances of natural events or Company-orchestrated simulations in which RMP systems switch to “islanded mode” and how the system performs.	Resiliency	# and description	Xcel Energy
8.e	Use of BESS for identified use cases	In a spreadsheet or narrative: how RMP sites’ rooftop solar, BESS, and microgrid are dispatched and optimized daily to mitigate system peaks, manage and shape demand, and integrate more solar generation.	Resiliency	Narrative description and quantitative data	Xcel Energy
8.f	Fossil-powered backup generation	Spreadsheet for each RMP site: when a generator is used, for how long, and the generator power capacity and fuel source.	Both	Narrative description and quantitative data	RMP site hosts
8.g	HVAC and energy efficiency	Spreadsheet with the number and type of HVAC upgrades, building envelope upgrades, energy efficiency measures, and/or demand response programs undertaken at any of the RMP sites, shared at the discretion of RMP site hosts and partners.	Both	Narrative description and quantitative data	RMP site hosts
<i>Additional resiliency and equity metrics, based on discussion with site hosts and other parties (Order Point 8.h)</i>					
8.h.1	Frequency of sustained interruptions at customer level	Comparison of # of sustained interruptions (i.e., longer than microgrid takes to switch to island mode) pre- vs. post- microgrid	Resiliency	# of sustained interruptions	Xcel Energy
8.h.2	Duration of sustained interruptions at customer level	Comparison of duration of sustained interruptions (i.e., longer than microgrid takes to switch to island mode) pre- vs. post- microgrid	Resiliency	Minutes of sustained interruptions	Xcel Energy
8.h.3	CO ₂ emission reductions	Tons of carbon dioxide avoided by operation of RMP solar arrays	Equity	Tons CO ₂	Xcel Energy and/or RMP site hosts
8.h.4	Criteria pollutant emission reductions	Pounds of pollutant avoided by operation of RMP solar arrays	Equity	Pounds NO _x , SO ₂ , particulate matter	Xcel Energy and/or RMP site hosts
8.h.5	Protection of vulnerable populations	Number of residents provided services (e.g. shelter, cooling/heat, food services, communications etc.) at resilience hub during outages	Equity	#	RMP site hosts
8.h.6	Electricity cost savings from solar	Savings to RMP hosts from net-metered solar installations, based on metered generation	Equity	Annual savings (\$)	Xcel Energy and/or RMP site hosts

We note that three of the above metrics (8.h.3, 8.h.4, and 8.h.6) will depend on data on solar production from solar arrays that are owned and operated by the RMP hosts.

This data may only be available if a second meter (PV production meter) is installed, or if the hosts' solar developer provides a different source of solar data. If the hosts take advantage of Solar*Rewards incentives, a PV production meter will be installed to calculate incentive payments, which will also enable tracking of metrics 8.h.3, 8.h.4, and 8.h.6. If the hosts enroll in net metering but do not use Solar*Rewards, a bidirectional net meter will record the flow of electricity in two directions, and whether in a given month the customer is a net user or net producer of electricity – but will not necessarily provide data on solar production needed to calculate those three metrics. The Company has and will continue to support the hosts in taking advantage of Solar*Rewards.

III. ORDER POINT NO. 9

The Order reads:

- 9. Xcel shall file a letter in this docket to notify the Commission and stakeholders if the Company encounters any significant procurement challenges related to RMP, including delays, low bid numbers, or unexpected costs.*

Regarding potential delays, we anticipate that supply chain challenges for both BESS and transformers will likely result in the COD for the RMP microgrids being delayed from the late 2023 estimate included in our original filing. In addition, we anticipate inflationary pressures will result in a higher project cost than initially anticipated in our 2021 certification request. We expect to have more information on the COD and project costs once we receive RFP responses in January 2023. We would subsequently make a filing to notify the Commission and stakeholders of any significant procurement challenges as outlined by this Order Point.

IV. ORDER POINT NO. 10

The Order reads:

- 10. Xcel shall include a discussion of the RMP program in comparison to battery and microgrid programs/projects in Xcel's service territories in other states, lessons learned from these programs as they move through construction and into operation, and specific details how these lessons are informing RMP project decisions, reducing costs, and/or improving efficacy. a. Xcel shall include this information in Xcel's 2023 IDP filing. b. Xcel shall include this information in each of Xcel's annual reports filed in Docket No. E-002/M-21-694.*

In this section, we provide a brief description of the Company's resilience microgrid initiatives in Colorado and Wisconsin, including relevant lessons learned. Note that

we are not attempting to provide comprehensive lessons learned from these projects – rather, lessons that apply to the current stage of RMP implementation. We will continue to take this approach as RMP implementation progresses.

Community Resilience Initiative (Colorado)

The Community Resilience Initiative (CRI) project seeks to support communities in Xcel Energy's Colorado service area by providing BESS-enabled microgrids in community center locations. As with RMP, the Company-owned BESS will provide back-up power to critical infrastructure during outage events while allowing for the energy storage asset to provide grid services during non-emergency operation. The BESS were sized to meet each facility's load and to provide grid value at the interconnection point. Working with our partner communities, the Company selected six sites for deployment of the CRI microgrids: the Alamosa Recreation Center, the Arvada Center for Arts and Humanities, Denver International Airport, the Denver Rescue Mission, the National Western Center, and the Nederland Community Center. CRI is currently in various stages of permitting to construction on four of our six sites, with the remaining two in the permitting process with the City of Denver.

During this process several important lessons were learned and incorporated into the RMP RFP and how this team is carrying out the work:

- *Developing relationships and technical understanding with hosts.* We learned from CRI that multiple site visits and virtual meetings can help clarify host organization goals. Based on this learning, we have met repeatedly with the RMP hosts to understand how their facilities are used and their goals as a resilience hub. Additionally, we have worked on the physical site location with the hosts to ensure understanding of what the microgrid will look like and how it will work.
- *Choosing an Engineering, Procurement, and Construction (EPC) contract setup.* Based on our CRI experience, we chose an EPC approach for the RMP. This is to reduce the number of handoffs between parties, help to streamline work and reduce costs.
- *Extended manufacturing lead times driven by utility demand.* Timelines for both technical (e.g., BESS and electrical equipment) and non-technical project components (e.g., BESS enclosures) can be affected by supply chain challenges and labor shortages.
- *Evolving fire safety codes for BESS.* Proximity of BESS sites to other infrastructure or underground utilities can slow the siting and permitting process. In addition, the Company has been meeting regularly with a fire safety consultant to discuss site layouts and configurations, equipment clearances, vendor equipment

specifications, fire safety plans, and points of egress. RMP planning will benefit substantially from these learnings.

- *Permitting requirements and review times.* These projects are relatively unfamiliar to City permitting departments, and the process to answer questions and complete administrative reviews can be longer than anticipated.¹⁸
- *Increased focus on material procurement.* We are asking potential RMP bidders to verify where their equipment is made, how much is on hand, and which protocols and method they are proposing for site communications. These factors are critical to keeping the project moving forward and reducing costs due to delays.

Empower Resiliency (Wisconsin)

Empower Resiliency is a pilot project approved by the Wisconsin Public Service Commission (PSC) in July 2021.¹⁹ The project provides a new option, oriented primarily to commercial, government, and industrial customers seeking increased energy resiliency and very high reliability levels. The Company provides a turnkey resiliency service, tailored to the customer and including analysis, design, construction, maintenance, and financing if desired. Equipment is owned and maintained by the Company, but operated according to customer requirements. The customer pays for the resiliency improvements on their bill over an agreed-upon period, typically 10 years, at the conclusion of which ownership of assets transfers to the customer. The program is technology-agnostic, providing funding for any technology that enhances resiliency including standby generators (natural gas, diesel, or other), BESS, solar PV (ground-, roof- or carport-mounted), microgrid controls, and electrical distribution equipment.

The PSC order approving Empower Resiliency requires the Company to report annually on the number of customers participating, each customer's contribution in aid of construction, any received construction allowances, and a list of resiliency projects in development along with estimated costs. As of the Company's latest annual report (July 25, 2022), there were no customers with in-service resiliency assets as yet, but the Company provided a table with 14 resiliency projects in development. These include a broad range of project hosts (local government, water/wastewater treatment, healthcare, higher education, airport, brewery, manufacturing facility, food processing, and a commercial business campus) and microgrid assets (solar PV, diesel

¹⁸ For further details, see *Community Resiliency Initiative Compliance Report*. June 15, 2022. Filed in Colorado Public Utilities Commission Proceeding No. 19A-0225E.

¹⁹ PSC Docket 4220-TE-106 (PSC REF# 416900).

and natural gas gensets, BESS, flywheel).²⁰ Some of these projects have moved further, and additional projects have been added to the development queue, since the July 2022 report.

Implementation of Empower Resiliency remains in early stages. We have received strong interest in the program, and a wide variety of customers have signed up to undergo scoping studies. Initial bids for the first two Empower Resiliency microgrids are expected in late 2022. As Empower Resiliency moves forward, we expect to gain additional insights on microgrid technologies and system configurations, different use cases of interest to customers, procurement approaches, delivery timelines, permitting, and other aspects of implementation. While the customers are different, the technologies and some of the desired applications are very similar to RMP, so we expect some learnings to be transferable to RMP. We will continue to report as Empower Resiliency grows.

V. ORDER POINT NO. 11

The Order reads:

11. Xcel shall report on the Resilient Minneapolis Project in its quarterly reports in Docket No. E, G-999/M-20-492.

The Company included information on the RMP in our second and third quarter reports filed in Docket No. E,G999/CI-20-492. We note that since the RMP microgrids are not yet installed, there has been limited information to report thus far, but our continued reporting in the above-mentioned docket will expand as the project moves forward.

CONCLUSION

Xcel Energy submits this compliance information to the Commission in fulfillment of Order Points 7 through 11 in the Commission's July 26, 2022 Order in Docket No. E002/M-21-694. We look forward to continuing our partnership with the RMP hosts and our progress on project implementation.

Dated: December 1, 2022

Northern States Power Company

²⁰ Northern States Power Company, a Wisconsin Corporation. July 25, 2022 Annual Report Compliance Filing in Docket No. 4220-TE-106, *Request for Approval of a Resiliency Services Pilot*.

CERTIFICATE OF SERVICE

I, Joshua DePauw, hereby certify that I have this day served copies of the foregoing document on the attached list of persons.

xx by depositing a true and correct copy thereof, properly enveloped with postage paid in the United States mail at Minneapolis, Minnesota

xx electronic filing

Docket No. E002/M-21-694

Dated this 1st day of December 2022

/s/

Joshua DePauw
Regulatory Administrator

[illegible]

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