

APPENDIX D – NON-TECHNICAL SUMMARY

I. INTRODUCTION

Northern States Power Company-Minnesota is a wholly-owned operating subsidiary of Xcel Energy, Inc. that owns and operates, in conjunction with its affiliate Northern States Power Company-Wisconsin, the integrated NSP System of generation and transmission assets that serves more than 1.8 million electric customers in Michigan, Minnesota, North Dakota, South Dakota, and Wisconsin. This 2020-2034 Upper Midwest Integrated Resource Plan builds on our strong foundation of cost-effective environmental performance and the generating fleet transition we began in our last Resource Plan.

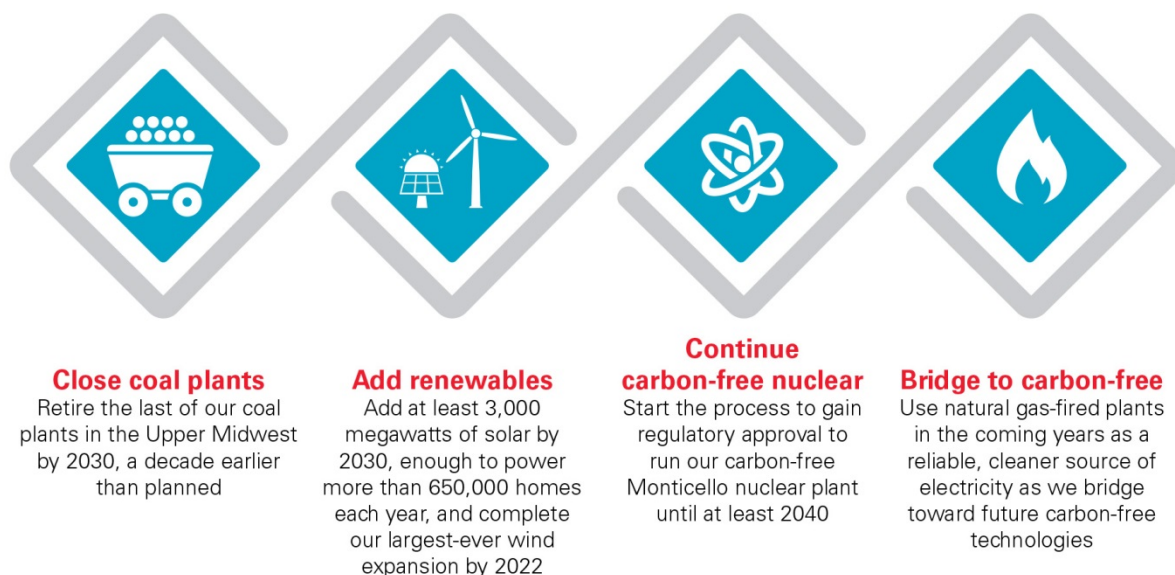
Our Resource Plan is founded on unprecedented levels of stakeholder engagement and technical analyses that examined an orderly retirement of our baseload generating units. We engaged a national expert on energy policy and economics, Dr. Susan Tierney with Analysis Group. Dr. Tierney not only brought a national perspective, but was also an independent third party that helped facilitate engaging and productive dialogue with stakeholders. We also retained Energy and Environmental Economics, Inc. (E3), to perform independent modeling and analysis of our system in order to ensure transparent work and access to the data and models for stakeholders. E3 is a recognized industry-leading firm based in San Francisco and consults extensively with utilities, developers, government agencies, and environmental groups on clean energy issues.

To develop our plan, we analyzed numerous assumptions and sensitivities to identify the plan that best meets customer needs, achieves our obligations and goals, and ensures we maintain a resilient and reliable grid. Our Preferred Plan represents the set of generation and conservation resources that we propose to meet our customers' needs over the next 15 years, which we believe is the best suite of resources that meets our planning objectives.

Figure 1: Xcel Energy Integrated Resource Plan Objectives



Our Preferred Plan includes the elimination of coal-fired generation from our system by 2030, the acquisition of at least 3,000 megawatts (MW) of utility-scale solar, a substantial increase in energy efficiency (EE) programs and Demand Response (DR), an operating extension of our carbon-free Monticello nuclear plant, and a proposal to construct a new combined cycle at our Sherco site. In total, we have an ambitious plan that supports the Company’s goal of reducing carbon emissions 80 percent by 2030, and it moves us toward our ultimate vision of 100 percent carbon-free energy by 2050.

Figure 2: Preferred Plan Highlights

Our Preferred Plan will be evaluated based on its ability to: maintain or improve the adequacy and reliability of utility service; keep the customers' bills and the utility's rates as low as practicable, given regulatory and other constraints; minimize adverse socioeconomic effects and adverse effects upon the environment; enhance the utility's ability to respond to changes in the financial, social, and technological factors affecting its operations; and limit the risk of adverse effects on the utility and its customers from financial, social, and technological factors that the utility cannot control.¹

II. A CHANGING PLANNING LANDSCAPE

There are key internal and external market contexts that affect how we have developed, and plan to execute on, our Preferred Plan. Below provide a contextual discussion of the planning landscape within which we developed and are presenting the results of our current resource planning efforts.

A. Regional Reliability and Market Constructs

While the regional system operator that designs many of our market and planning requirements continues to examine the effects of high renewable adoption on the grid, it has not yet developed robust and forward-looking capacity accreditation constructs to account for how renewables' contributions to peak demand will change

¹ Minn. R. 7843.0500, subp. 3

over time. This introduces complexity to designing a plan far into the future, and how we carry out those plans.

Likewise, while we are committed to substantially increasing renewables on our system to achieve our carbon reduction goals, we also anticipate facing challenges to integrating this new clean generation, given the delayed interconnection studies and current limited state of open transmission availability. Our ability to connect these new renewables in a cost-effective manner depends materially on constructs that enable careful management of our interconnection rights in the near-to-medium term as well as new transmission in the long term.

B. Distributed Energy Resources (DER)

At the same time as we work to clean our grid mix, we also recognize that customers are now exercising more choice around how and from where they consume energy. Our customers' adoption of DER and new types of load mean that consumption patterns from our centralized power system are changing. The opportunities are exciting; however, customer adoption of DER and new types of load behind the meter introduces uncertainties in our planning processes – particularly if we do not have adequate visibility into how and when that new DER or demand is coming onto our system.

Fortunately, we have made progress integrating distribution planning into our resource planning. As with other aspects of the industry that are transitioning and advancing, we are on the forefront of integrated distribution planning, and evaluating and procuring the next generation of distribution planning tools. These tools are needed to increase our forecasting and analysis capabilities and impact the integration of planning processes. Thus, while work continues to incorporate these planning processes and DER on our system, additional work and tools are needed.

C. Community and Employee Considerations

As we move forward with our carbon reduction goals, we are cognizant that phasing out some of our legacy generation assets has a significant impact not only on our energy mix, but on the economies of communities where those plants are located and the employees who work in those plants. This is particularly true of our coal facilities, where the plants are prominent places of employment and contributors to the property tax base in the community.

As we continue toward achievement of our aggressive carbon goals, we will continue to make significant clean energy investments in the states we serve. As we do so, we

will look for opportunities to create fair access to clean energy programs, jobs and economic development opportunities. Going forward, we continue to be dedicated to working with employees, communities, and stakeholders to manage community impacts throughout our clean energy transition.

D. Customer Preferences

We are increasingly hearing from our customers that they have a growing interest in increasing their energy management capabilities and desire a more customized energy mix than has been traditionally available. Residential customers tell us that they value choice and clean, affordable, and reliable energy. At the same time, municipalities within our service territory are expressing changing expectations to address their citizens' interests in achieving sustainability goals and engage residents around energy issues.

Our customers also are interested in various types of self-generation. This includes increased small-scale solar penetration through behind the meter installations or community solar gardens. Industrial customers are also interested in exploring the addition of larger scale Combined Heat and Power (CHP) installations at their facilities. The installation of self-generation on our system impacts our resource needs, planning goals, and ultimate resource mix.

We also know that customers are sensitive to rate changes. For example, our large industrial customers are energy-intensive and thus highly-sensitive to energy rates, with less sensitivity to other terms of service. These are key considerations as we plan our resource mix to meet the needs of our customers over the planning period.

E. Supply and Technology Trends

The rapid pace of advancement in energy technologies has impacted and will continue to impact the future of our industry. Emerging technologies related to grid modernization, energy storage, electric vehicles, resource extraction, renewable energy and other alternative fuels and generation methods are enabling a smarter and more resilient energy system.

While this new technology provides opportunities for a modernized energy system, operating that system is a complex matter. We are taking a measured approach to identify new and better ways to provide our customers with high quality service, meet increasing environmental requirements, and implement advancements and standardized processes that enhance the safety of our operations and overall value to customers. Our approach to these emerging technologies is to learn from the current

deployments, both internal to Xcel Energy and within the industry, and implement initiatives at the pace of value to our customers and operations.

F. Five State Integrated System

Our integrated Upper Midwest system provides service on a multi-jurisdictional basis to 1.8 million customers across five states. Through this integration, we have historically leveraged economies of scale to support needed investments. Each resource on the Upper Midwest system – whether generation or transmission – was developed in consideration of the whole system, to take advantage of the economies of scale available through integrated system planning. Indeed, planning for the varied needs of each of these five states was critical to the formation of our Preferred Plan.

G. The Evolving NSP System

This accelerated transition away from coal requires the Company to plan for the retirement of 2,400 MW of coal-fired generation in the next decade, which represents almost one-fourth of the total capacity in our current generation fleet. We will also experience a reduction in energy resources due several purchase power contracts expiring.

At the same time, we are increasing the amount of renewable generation on our system. Yet, these resources cannot alone reliably provide customers the energy they demand every hour of every day, or maintain the stability of the grid. Until such time as new technologies develop to fully transition the grid to carbon-free resources, some level of load-supporting, firm dispatchable resources is necessary for grid resilience and customer reliability. As such, our plan incorporates a Reliability Requirement as a bridge until the current planning processes adapt to recognize the transition that is underway.

Taken together, the impact of these system changes was critical to our resource planning analysis as we evaluated meeting our capacity and energy needs while maintaining reliability, retaining flexibility, and avoiding over-reliance on any one fuel source.

The planning landscape underlying this Resource Plan has greatly informed our planning efforts. We continue to believe that proactive leadership in the face of evolving industry, new and proposed environmental regulation, customer expectations, emerging technologies, and changes to the NSP System will allow us to affirmatively address these trends rather than being shaped by them. These evolving

factors also call for sufficient flexibility that allows us to adjust and react as we gain more clarity on the planning landscape.

III. KEY CONSIDERATIONS OF THE PREFERRED PLAN

Resource Planning is a complex and integrated process of planning for the capacity, energy, and emission requirements of the electric system. The process incorporates a number of key assumptions or industry projections that helps all participants develop a common vision of what the future planning environment may look like. This ongoing planning process requires utilities to examine and establish a long-term proposal for management, operation, and expansion or contraction of their generating and demand management resources to meet customer needs.

Traditionally a primary focus of resource planning has been to identify the least-cost approach to provide reliable service and meet growing demand. While this is still a part of our foundation, this Plan begins to move away from a more concentrated view of traditional thermal generation to incorporating new generation technologies, increasing carbon-free energy, reducing emission profiles, and thereby positioning the NSP System for the future.

The Preferred Plan we present was developed to address the planning landscape in which it was developed and in consideration of our four key planning objectives: (1) Environmental Benefits and Innovation (2) Reliability (3) Cost (4) Risk Mitigation and Flexibility. Underscoring all of these objectives is our commitment to our employees and the communities within which we operate.

A. Environmental and Innovation

Environmental benefits and the technological innovations that will help us achieve them are front and center in this Resource Plan process. We have made a bold commitment to achieve 80 percent carbon reduction from 2005 levels by 2030, and have considered this target a modeling pillar for all of our potential scenarios. Our Preferred Plan achieves this goal in several ways. First, our Preferred Plan eliminates coal from our system by 2030, extends our carbon-free Monticello plant to 2040, adds at least 4,000 MW of new renewable resources, including substantial new solar capacity additions, and maintains the wind levels committed to in our previous Resource Plan by replacing renewables with renewables when they reach the end of their operating lives.

Many of these resource additions are not needed for a number of years. We therefore expect technological advancements and innovations will create opportunities in

future planning and procurement processes if we are able to retain the flexibility we seek with this plan.

B. Reliability

Our responsibility to ensure a reliable electricity supply for our customers is a fundamental underpinning of our Preferred Plan. We therefore developed a Reliability Requirement that establishes a minimum level of firm dispatchable resources that is required to serve our customers' needs in every hour of every day. We developed the Reliability Requirement through analysis of industry trends and careful study of our system's performance and the broader Midcontinent Independent System Operator (MISO) system's performance during both winter and summer days when renewables were unavailable – sometimes for lengthy durations.²

This Requirement does not drive any firm dispatchable load supporting resource additions in our Preferred Plan until after 2030. Prior to 2030, our Preferred Plan relies on two primary sources to ensure reliability: (1) combined cycle (CC) generating plants – specifically the Mankato Energy Center (MEC) that we have proposed to acquire, one at our Sherco location near Becker, Minnesota (Sherco CC), and (2) our Monticello and Prairie Island nuclear units. Combined cycle generating units are intermediate natural gas resources that efficiently address reliability challenges associated with the variability of wind and solar and customer needs, because they can vary their output to adapt as demand for electricity changes over the course of the day and year. With respect to nuclear generation, our proposed extension of the Monticello operating license not only represents a carbon-free workhorse of a resource, it also enhances fuel diversity and provides a generation resource that is not subject to seasonal fuel supply limitations.

C. Cost

Along with leading the clean energy transition and enhancing the customer experience, keeping customer costs low is one of Xcel Energy's central, guiding objectives. Since our last Resource Plan, renewable technology costs – and in particular, solar costs – have continued to decline; we expect this trend to continue

² MISO is an independent, not-for-profit organization that delivers safe, cost-effective electric power across 15 U.S. states and the Canadian province of Manitoba. The NSP System is part of MISO, which is part of the Eastern Interconnection that connects the generation and transmission assets of the electrical grids from the Rocky Mountains to the East Coast and from Canada to the Gulf of Mexico. This interconnected network of generating resources and transmission infrastructure works together to seamlessly respond and adjust to dynamic and sometimes adverse circumstances to provide an adequate and reliable supply of electricity to customers.

going forward. Taking advantage of technological advancements is one reason that we can deliver a Preferred Plan that achieves deep carbon reductions for a nominal customer cost of just over one (1) percent Compound Annual Growth Rate (CAGR) over the planning period. And over the long run, our Preferred Plan is expected to yield net present value savings – yielding \$203 million of benefits on present value revenue requirements (PVRR) basis and \$461 million of benefits on a present value societal costs (PVSC) basis.

D. Risk and Flexibility

Finally, we also seek to mitigate customer risk by ensuring fuel diversity, maintaining appropriate capacity length in our portfolio, and maintaining flexibility in our plans. Portfolio fuel diversity is essential to risk mitigation – especially so, as we transition away from coal. Incorporating a mix of nuclear, load management, intermediate and peaking natural gas capacity, and renewables into our long-term plans ensures that our portfolio is adequately diverse – mitigating the risk associated with overdependence on any one fuel source. Further, the proposed resource additions identified in our Preferred Plan result in a capacity position that is between 500-1,000 MW long in any given year. We believe this modest length is prudent, particularly as we propose to substantially increase renewable resources – adding more than 4,000 MW of incremental new renewable capacity, in addition to our already large wind fleet.

Both MISO and independent analyses suggest that capacity accreditation for solar in particular will decline substantially as more capacity is added. We expect MISO will ultimately recognize this conclusion from its ongoing study of issues associated with integration of high levels of renewables in its planning construct.³ Therefore, what we believe today to be a long capacity position may actually erode over time.

Maintaining a significant amount of flexibility in our future plans is essential to reliably and affordably navigating the transition of our fleet. To that end, we are deferring a decision on pursuing a license extension at the Prairie Island nuclear plant to subsequent resource plans, thereby preserving flexibility to respond to market conditions at that time.

Underscoring all four of our objectives is our commitment to our employees and the communities within which we operate. We do not make plant closure decisions lightly, and we are committed to supporting our employees at the Sherco and King plants as we prepare to retire these facilities. We also know that the Company is a

³ We discuss MISO's *Renewable Integration Impact Assessment* (RIIA) in more detail in our Baseload Study, provided as Appendix J1.

major presence in terms of employment and local tax revenues in Becker and Oak Park Heights and the surrounding areas. We also have partners at our Sherco site with Liberty Paper and SMMPA (Southern Minnesota Municipal Power Agency). We are currently participating, alongside Minnesota Power, in a Host Community Impact study, to better understand the potential impact of power plant retirements on host communities. We are committed to continue to work with our employees and communities to navigate this transition together.

IV. THE PREFERRED PLAN

To develop the Preferred Plan, we first developed a Reference Case plan that continues the path we set out in our 2015 Resource Plan, with respect to operation of our baseload generating units. This Reference Case provides an opportunity to at least achieve the carbon reduction goals set-out in our previous Resource Plan, while meeting our minimum system needs and compliance obligations. Our Reference Case provides a base line from which we measured the emission reduction benefits, renewable and other energy additions and estimated cost impacts of our Preferred Plan.

A. Determining Customer Needs

Determining our customers' needs for electricity is a key component of any resource plan, and provides the foundation for determining the type and amount of resources that will be needed over the 15 year planning period. To this, we forecast of customers' needs starts in terms of capacity, or peak demand, which informs the total amount of generating capacity (in megawatts, or MW) needed to meet our customers' needs in the highest demand hour (i.e. peak-hour) in each year of the planning period. We also assess the amount of total energy (measured in megawatt hours or MWh) we expect customers to consume in each year of the planning period. Together, the peak demand and total energy needs inform the type of generating resources that will best meet customer needs.

To this, we add a "reserve margin" prescribed by MISO, which is intended to cover potential uncertainties in the availability of resources or level of demand. We then subtract the resources we already have or expect to have, to determine our net surplus or need. We illustrate this concept and discuss each of the components below.

Figure 3: Net Resource Need/Surplus Calculation

$$\begin{array}{l} \text{Customer Needs Forecast} \\ \text{Plus MISO Reserve Margin} \\ \hline \text{Equals Total Capacity Obligation} \\ \text{Minus Demand Response Capability} \\ \text{Minus Generation Capacity (measured by UCAP)} \\ \text{Minus Generation Adjustments} \\ \hline \text{Equals Net Resource Need/Surplus} \end{array}$$

This analysis yields our net generation capacity surplus or deficit over the planning period, shown below:

**Table 1: Reference Case Load and Resources⁴
2020-2034 Planning Period**

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
System needs (MW)															
Forecasted gross load	10,499	10,559	10,621	10,684	10,755	10,820	10,886	10,954	11,140	11,232	11,320	11,418	11,518	11,619	11,717
Forecasted EE⁵ (reduction to load)*	(1,386)	(1,472)	(1,517)	(1,609)	(1,707)	(1,822)	(1,921)	(1,992)	(2,125)	(2,215)	(2,278)	(2,366)	(2,352)	(2,324)	(2,415)
Forecasted net load	9,112	9,087	9,103	9,075	9,048	8,998	8,965	8,963	9,014	9,016	9,042	9,052	9,166	9,295	9,301
MISO System Coincident	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Coincident Load	8,657	8,633	8,648	8,621	8,595	8,548	8,517	8,514	8,564	8,565	8,590	8,599	8,708	8,831	8,836
MISO PRM NSP Obligation	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%	8.40%
	9,384	9,358	9,374	9,345	9,317	9,266	9,232	9,230	9,283	9,285	9,312	9,321	9,439	9,572	9,579
Reference Case resources (MW, unforced capacity)⁶															
Load Management (existing)	940	955	970	989	1,007	1,023	1,038	1,053	1,066	1,054	1,043	1,032	1,021	1,010	1,000
Load Management* (potential study)	270	290	312	322	339	380	392	406	421	438	456	476	497	527	550
Coal	2,390	2,390	2,390	2,390	1,699	1,699	1,699	1,017	1,017	1,017	1,017	1,017	1,017	1,017	1,017
Nuclear	1,603	1,603	1,603	1,603	1,603	1,603	1,603	1,603	1,603	1,603	1,603	992	992	992	484
Natural Gas/Oil	3,295	3,295	3,295	3,295	3,141	2,829	2,624	2,136	2,018	2,018	2,018	2,018	1,765	1,765	1,765
MEC*	627	627	627	627	627	627	627	627	627	627	627	627	627	627	627
Sherco CC*	0	0	0	0	0	0	0	727	727	727	727	727	727	727	727
Biomass/RDF	110	110	110	86	86	63	63	63	22	22	22	22	22	22	22
Hydro	877	997	989	989	989	162	162	162	162	162	162	162	156	152	152
Wind	596	650	696	670	659	642	637	622	616	594	593	578	575	511	492
Grid-scale solar	182	182	181	180	179	178	177	176	175	174	174	173	172	171	170
Solar*Rewards	335	339	344	348	352	356	360	365	369	373	377	381	385	389	393
Community Solar															
Distributed Solar	42	48	55	60	66	72	78	83	89	95	100	105	111	116	121
Existing Resources	11,267	11,486	11,571	11,559	10,746	9,634	9,460	9,040	8,913	8,905	8,920	8,311	8,066	8,026	7,521
Net Resource (Need)/Surplus	1,884	2,128	2,196	2,213	1,429	368	228	(190)	(370)	(380)	(392)	(1,010)	(1,373)	(1,546)	(2,058)

From this point, the modeling underlying our resource planning identifies the best combination to meet any net resource deficiencies and the resulting energy mix.

⁴ In addition to existing and approved resources, those indicated with a * include pending or proposed resources that we have included across all Scenarios, including the Reference Case.

⁵ Includes EE savings from historically installed measures, as well as future EE from bundles modeled in this Resource Plan, achieving 2-3% savings levels. Also includes minimal EV and coincidence adjustments.

⁶ Unforced Capacity (UCAP) is a measure of resource adequacy value that we use in modeling to ensure we have sufficient resources to cover our full obligation. These values are discounted based on actual or expected average performance, per MISO, relative to the installed capacity values presented in our expansion plans.

B. Reference Case Expansion Plan and Energy Mix**Table 2: Reference Case Annual Expansion Plan (MW)**

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Grid-Scale Solar	0	0	0	0	0	500	0	1000	500	500	0	1000	500	0	0
Battery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CC	0	0	0	0	0	0	0	835	0	0	0	0	0	0	0
Firm Dispatchable	0	0	0	0	0	0	0	0	0	0	0	0	232	374	374
DR	270	20	21	10	17	41	12	14	15	17	19	20	21	22	23
EE	115	130	116	133	143	145	154	157	155	140	138	136	129	126	126
Wind	0	0	0	126	45	70	66	72	10	107	16	56	31	523	1581
Distributed Solar	154	22	22	21	21	21	21	20	20	20	20	20	20	20	19
Total	540	172	159	290	226	777	252	2,098	700	784	193	1,232	932	1,065	2,123

C. Developing the Preferred Plan

We use a modeling tool called Strategist, which allows us to explore how we best meet our customer and policy requirements under a variety of conditions and at a reasonable cost. We work with internal and external subject matter experts to develop starting assumptions that reflect their expert opinion of likely future conditions. We then test the robustness of the plans through sensitivity analyses by individually changing key assumptions and re-running the plans under these changed assumptions.

Beginning with our Reference Case to meet our minimum system needs, we created 15 scenarios. Because one of our requirements with this Plan was to examine a potential schedule for a cost-effective and orderly retirement of baseload generating units not already scheduled to retire early (King, Sherco 3, Monticello, and Prairie Island Units 1 and 2), we performed technical studies as part of an overall Baseload Study that informed these scenarios and their costs.

These scenarios examined different combinations and timing of baseload unit retirements, and the resulting size, type, and timing of new resources we would need to add in order to continue meeting customers' needs, achieve our 2030 carbon reduction goals, and maintain affordable rates. Key scenario groupings analyzed include:

- *Early Coal.* Analyses to evaluate the economics (i.e. revenue requirement impacts) of retiring King and/or Sherco 3 early.
- *Early Nuclear.* Analyses to test the economics of retiring Monticello and/or Prairie Island early, either alone or together and with the combination of early coal retirements.

- *Extend Nuclear.* Analyses to test the economics of re-licensing Monticello and/or Prairie Island and extending the operational life by ten years over the current retirement date.

Based on these analyses, we believe that our Preferred Plan meets all of our key planning objectives, positions us well to meet customers' needs, reasonably balances outcomes and costs – all while providing us with the necessary strategic flexibility to address the planning landscape.

D. Preferred Plan

Key components of our Preferred Plan include:

- ***Coal Resources*** – Retire our last two units early: King in 2028 (nine years early) and Sherco 3 in 2030 (ten years early). Additionally, continue our plan to retire Sherco 1 and 2 in 2026 and 2023, respectively, and commit to offering Sherco Unit 2 into MISO on a seasonal basis until its retirement.
- ***Nuclear Resources*** – Operate our Monticello unit through 2040 (10 years longer than its current license) and operate both Prairie Island units through the end of their current licenses (PI Unit 1 to 2033 and PI Unit 2 to 2034).⁷
- ***Renewable Resources*** – While the exact wind and solar mix could vary based on a variety of reasons, at this time we propose to add 4,000 MW of cumulative utility scale resources by 2034 (the first being in 2025) and approximately 1,200 MW of cumulative wind by 2034 to replace wind that is set to retire from our system during that period.
- ***Combined Cycle Resources*** – Acquire and operate MEC and build, own and operate Sherco CC to satisfy significant capacity and operational needs created by coal closures.
- ***Firm Load Supporting Resources*** – Starting in 2031, add approximately 1,700 MW of cumulative firm dispatchable, load-supporting resources by 2034.
- ***Demand Side Management*** – Include energy efficiency (EE) programs representing an approximately 780 GWh of savings annually through 2034 (compared to average annual energy savings of 444 GWh in our last Resource Plan) and the addition of 400 MW of incremental Demand Response (DR) by 2023, achieving a total of over 1,500 MW DR by 2034.

⁷ Given that our operating licenses for Prairie Island run until 2033 and 2034, we believe there is sufficient time to address the future of that plant in upcoming resource plans.

Table 3 below outlines the proposed timing, type, and size of resource additions comprising our Preferred Plan.

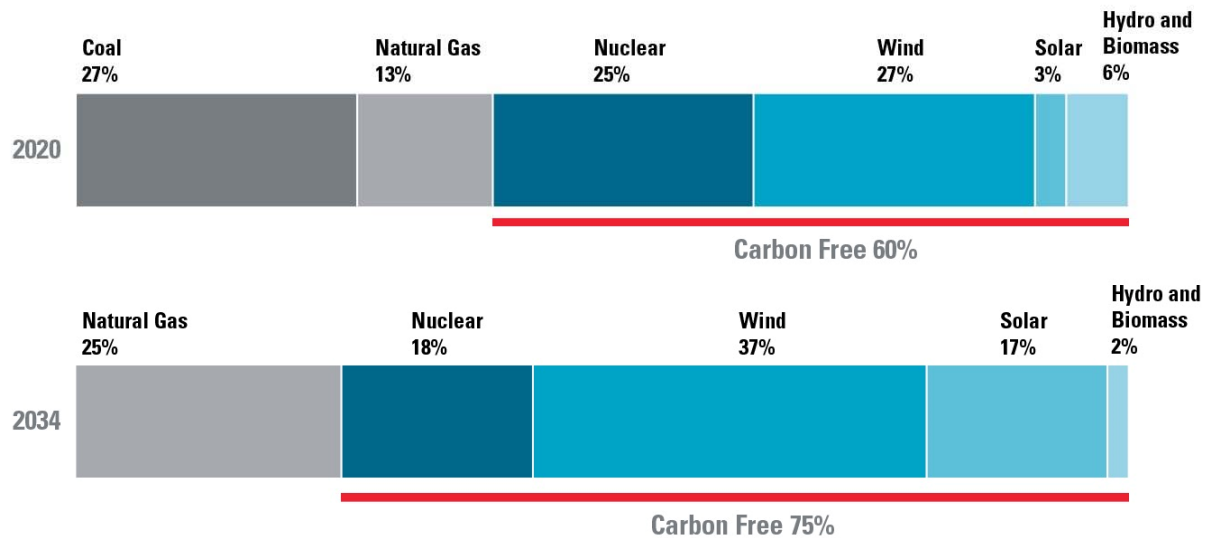
Table 3: Preferred Plan Resource Additions (MW)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Grid-Scale Solar	0	0	0	0	0	500	500	1000	500	500	500	0	500	0	0
Battery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CC	0	0	0	0	0	0	0	835	0	0	0	0	0	0	0
Firm Dispatchable	0	0	0	0	0	0	0	0	0	0	0	606	0	374	748
DR	270	20	21	10	17	41	12	14	15	17	19	20	21	22	23
EE	115	130	116	133	143	145	154	157	155	140	138	136	129	126	126
Wind	0	0	0	126	45	70	66	72	10	107	16	56	31	523	81
Distributed Solar	154	22	22	21	21	21	21	20	20	20	20	20	20	20	19
Total	540	172	159	290	226	777	752	2,098	700	784	693	838	700	1,065	997

Our Preferred Plan outlined above would result in the energy mix shown in Figure 4 below.

Figure 4: Preferred Plan Energy Mix

Preferred Plan energy mix
% of total generation



Our Preferred Plan achieves several important goals:

Reliability. Our Preferred Plan maintains the safe and reliable service we have been providing for many years, and ensures that the NSP System has sufficient capacity and energy available during the planning period.

Environmental Outcomes. Implementing our Preferred Plan will allow us to reduce our carbon emissions over 80 percent from 2005 levels by 2030. Additionally, our Preferred Plan adds significant renewable energy to the NSP System.

Strategic Flexibility. Our Preferred Plan positions the Company well in the current planning landscape – meeting near-term needs and creating flexibility for the future. As we have described, planning constructs, policies, and technology costs are all creating uncertainty, which leads us to prioritize strategic flexibility in our plans to preserve the most value for our customers

Affordability. As discussed below in the Rate Impact section, we estimate that our Preferred Plan can be implemented at reasonable cost to our customers.

V. FIVE-YEAR ACTION PLAN

Our Preferred Plan does not identify any incremental capacity needs through 2024. Thus, our actions in the next five years primarily address previously approved or pending resource additions and retirements, wind repowering and procurement to meet specific customer needs, and continuing to achieve reductions in energy demand and load through ambitious DSM programs. We also plan to make targeted investments in supporting infrastructure to accommodate increased renewable energy and DER on the grid, and to gain operational experience with technologies that may play a larger role on our grid in the future. Key highlights are as follows:

Wind. We expect that the 1,850 MW of wind generation resulting from our recent acquisitions and RFPs will achieve commercial operation by 2022. We expect to replace wind capacity that will expire, and we are committed to pursuing repowering and/or contract extension opportunities for this capacity, as part of our “no going back” renewables strategy. Further, we intend to pursue incremental renewable resources as needed to meet customer needs in growing customer programs like Renewable*Connect.

Solar. Our Preferred Plan includes significant amounts of large scale solar, with the initial addition of 500 MW occurring in 2025 – just outside of the five-year Action Plan window. We expect to implement a competitive acquisition process in the 2023 to 2024 timeframe and bring these resources online by the end of 2025. On the distributed solar side, we have included forecasted growth in our plan. If actual distributed solar capacity additions exceed our expectations, we anticipate this will displace a portion of our proposed utility-scale solar resources.

Nuclear. Our Preferred Plan includes a request to operate our Monticello nuclear unit for an additional 10 years beyond its current license. While the license does not end until 2030, we expect to begin a proceeding with the Commission within the next five years and also begin working toward license extension with the Nuclear Regulatory Commission during this timeframe.

Natural Gas/Oil Peaking. We anticipate extending the life of Blue Lake Units 1-4 through 2020-2023,⁸ which provides 153 MW of peaking capacity to the NSP System. Our Preferred Plan further includes our acquisition of MEC, which is currently pending Commission consideration. Finally, we plan to continue development activities associated with the Sherco CC during the next five years.

In addition, as discussed in our last Resource Plan, system retirements will impact our current blackstart plans and we are currently analyzing our blackstart path to determine the best fit for our system needs. While we do not propose any action related to the system blackstart at this time, we anticipate addressing this in our next Resource Plan or earlier, if system needs dictate the need to do so.

Coal. As approved in our last Resource Plan, we will take action with MISO and retire Sherco Unit 2 in 2023, and intend to offer it into MISO on a seasonal basis until that time. Though outside the five-year action window, we are proposing to retire the remainder of our coal units (Sherco 2, Sherco 3 and King) before 2030. As with our previous plant retirements, we plan to begin working with our employees and host communities to prepare for this transition.

Demand Response. Our Preferred Plan proposes to acquire 400 MW of DR resources by 2023.

Supporting Infrastructure. Aside from the grid-scale and DER additions included in our Plan, sufficient supporting infrastructure is essential to facilitate our fleet transformation, ensure grid resilience and reliability, and to enable greater DER and DR resources on our system. We expect further and substantial transmission infrastructure development will be necessary over the long-term, which will involve planning in the near-term. We also are continuing to refine our advanced grid strategy and intend to propose implementation of foundational grid modernization investments – and continue our work to integrate planning processes at all levels of the grid.

Resource treatment across states. We continue to explore options with the North Dakota

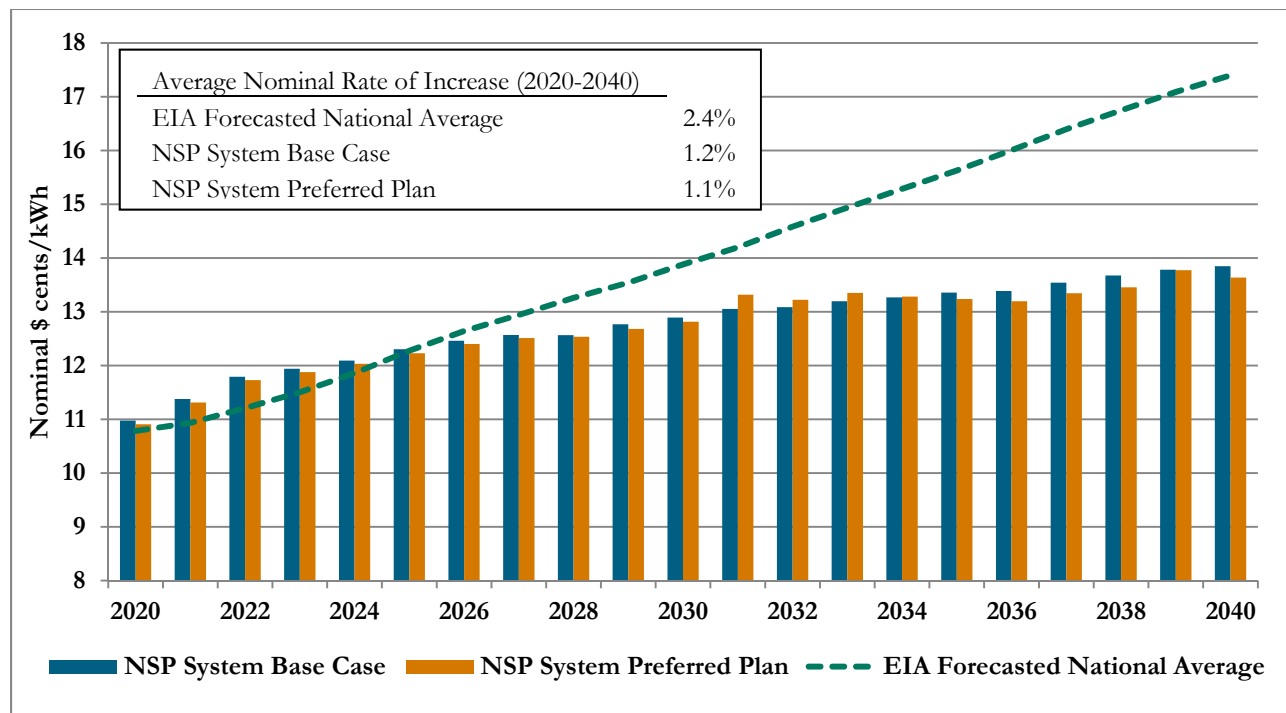
⁸ Pending decision in Docket E,G002/D-19-161

Public Service Commission to create a resource planning process can more formally accommodate generation portfolio preferences. We believe additional discussions with all of our state Commissions will be necessary during the five-year action planning period to address differing energy policies and changes in cost allocations that may result.

VI. RATE IMPACTS

Overall, our Preferred Plan results in an estimated average annual increase in revenue requirements less than the Reference Case and just over 1 percent overall. In other words, we can achieve significant CO₂ emissions reductions, with cost impacts that are roughly half the expected national average increase in electricity prices. This is demonstrated in Figure 5 below.

**Figure 5: Preferred Plan Average Nominal Cost Comparison
NSP System**

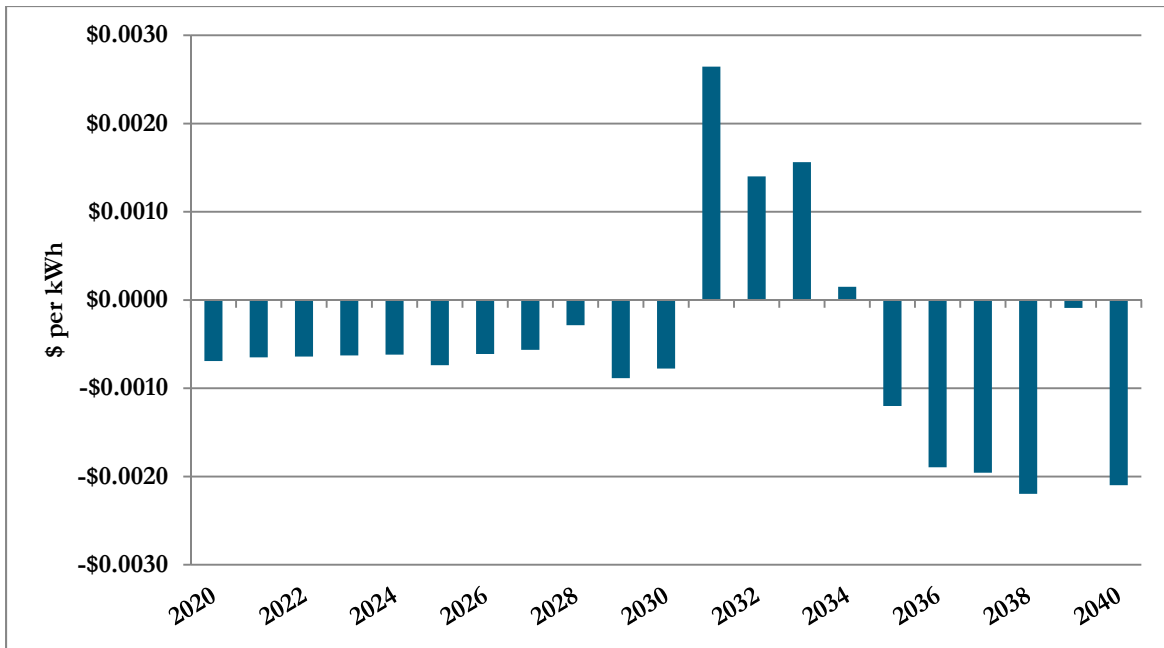


* Notes: National energy cost forecast from Energy Information Administration (EIA) Annual Energy Outlook 2019, Table Energy Supply, Disposition, Prices and Emissions – Reference Case. End use prices, all sector average.⁹ The Preferred Plan and Reference Plan lines include the costs of Solar Rewards*Community.

⁹ See <https://www.eia.gov/outlooks/aeo/data/browser/#/?id=8-AEO2019®ion=0-0&cases=ref2019&start=2017&end=2050&f=A&linechart=~ref2019-d111618a.70-8-AEO2019&ctype=linechart&sid=ref2015-d021915a.70-8-AEO2015~ref2019-d111618a.70-8-AEO2019&sourcekey=0> The EIA’s Annual Energy Outlook was published in January 2019. The report is available at <https://www.eia.gov/outlooks/aeo/pdf/aeo2019.pdf>.

Figure 6 below demonstrates the actual impact implementation of our Preferred Plan would have on our customers’ bills. We note that the Preferred Plan’s average estimated rate impact, relative to the Reference Case, in any given is well under \$0.01 per kWh.

**Figure 6: Incremental Rate Impact of Preferred Resource Plan
 State of Minnesota – All Customers**



VII. CONCLUSION

The Preferred Plan we propose in this 2020-2034 Upper Midwest Resource Plan reflects extensive collaboration with stakeholders as well as independent expert analysis. Our Preferred Plan proposes to eliminate coal, add even more renewables, and continue our industry-leading energy efficiency and demand response programs, all while preserving reliability and affordability for our customers. It also meets the varied interests of our five-state Upper Midwest region. By planning ahead and charting an orderly, gradual transition of our generation fleet, we believe we can achieve all of these goals while managing the impacts to our host communities and employees, preserving the reliability and stability of our system, and maintaining affordability for our customers. For these reasons, as discussed throughout this filing, we believe our Preferred Plan is in the public interest and merits Commission approval.