APPENDIX N6 – RENEWABLE ENERGY STANDARD (RES) RATE IMPACT REPORT

Renewable Energy Standard (RES) Rate Impact Report

Northern States Power Company
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I. REGULATORY CONTEXT

A. Procedural History

Minn. Stat. §216B.1691 (Renewable Energy Objectives) identifies the eligible renewable generation technologies, the percentage of retail sales that must come from renewables, and the reporting requirements that each electric utility shall undergo with regard to the statute's objectives. In 2011, subd. 2(e) was enacted to require electric utilities to file reports with the Commission estimating the rate impacts resulting from utility actions taken to comply with the renewable energy objectives of the state. During the 2013 legislative session, Minn. Stat. §216B.1691 subd. 2(e) was amended to require the Commission, in consultation with the Department of Commerce, to devise a uniform rate impact reporting system.

On November 6, 2013, the Commission issued a Notice of Comment Period that included a staff proposal for a format for a uniform reporting system. The Notice also proposed four "general guiding principles" to assist the Commission with developing the uniform reporting system. The general guiding principles were to: 1) Foster transparency; 2) Support consistency, coordination, and non-burdensome administration; 3) Provide realistic representation of baseline, actual-to-date and future expected costs for achieving and maintaining standard compliance; and 4) Enable comparison across utilities.

On October 2, 2014 in Docket E999/CI-11-852, the Commission deliberated regarding the matter of utility renewable energy cost impact reports required by Minn. Stat. § 216B.1691, subd.2e. During these deliberations, the Commission decided on a variety of motions regarding the information that utilities were to provide when reporting on the estimated rate impacts resulting from actions taken to comply with the Renewable Energy Standard (RES) and Solar Energy Standard (SES) established in Minn. Stat. § 216B.1691, including the requirement that utilities file the report as an appendix in their Integrated Resource Plan.

On January 6, 2015 the Commission issued an Order establishing a uniform report system for estimating the rate impact of complying with the RES and SES.

II. FORMAT USED FOR RATE IMPACT CALCULATIONS

The RES and SES rate impacts provided in this report incorporate a general template format consistent with Commission's January 6, 2015 Order. This report:

a. Includes direct costs including payments under PPAs and revenue requirements associated with utility-owned renewable energy projects;

b. Provides a narrative discussion about the cost impacts that adding generators powered by renewable sources could have on a utility (See Appendix Q: NSP Wind & Solar Integration Study (Enernex);

c. Includes estimates of transmission costs attributable to renewables;

d. Includes direct avoided costs, including avoided energy and capacity costs, and/or avoided costs of facilities the utility could have added to its system instead of renewable resources as necessary to meet RES/SES;

e. Includes consideration of indirect avoided SO2 and NOx permit costs and avoidance of future CO_2 emissions based on costs set by Minn. Stat. § 216H.06;

f. Calculates separate rate impacts for the RES and SES;

g. Provides rate impacts on both annualized and levelized formats;

h. Includes rate impact calculations consistent with those outlined on page 21 of the Briefing Papers;

i. Includes all facilities used to comply with the RES and SES, regardless of when they were constructed.

III. METHODOLOGY

As required by the statute, we calculated separate rate impacts for the RES and for the SES. The RES rate impact calculations were performed for two different time frames: Historic Years 2005-2019 and Future Years 2020-2034. Recognizing that the SES was adopted in 2013, the first full calendar year was 2014. However, there was minimal solar on our system prior to 2017. Therefore, the SES rate impact we present herein uses Historical Years 2017-2019 and Future Years 2020-2034.

A. Historic RES Rate Impact (2005-2019)

We determined historic rate impacts by comparing the actual direct costs associated with all the Company's renewable generation each year with an estimate of the direct costs that would have been incurred had we acquired the same accredited generation capacity (MW)[1] and energy (MWh) from non-renewable resources. We used historic Midcontinent Independent System Operator (MISO) cost of new entry (CONE) values from 2005-2013, with updates to align with Strategist assumptions[2] to estimate avoided capacity costs. We estimated avoided energy costs using historic MISO locational marginal prices (LMPs) for the NSP market node.[3] For 2019, we estimated avoided energy costs using the Minnesota Hub forward curve. Included in the cost of renewables are estimates of transmission costs directly attributable to renewable resources. Tables 9 and 10 in Part III.D of this report identify transmission projects that, from the Company's perspective, are directly attributable to renewable generation resources. Three of the identified transmission projects are MISO multi-value projects[4] (MVPs). Since MVP transmission projects provide a variety of benefits to the electric system, 70 percent of the MVP transmission projects costs that are allocated to NSP customers were included as a direct cost of renewables for purposes of this report. For all other transmission projects identified in Tables 9 and 10, we included 100 percent of the project costs allocated to NSP customers as a direct cost of renewables.

In developing the historic RES rate impact calculations, the Company focused its efforts on estimating and reporting impacts to retail customers. The Tables below show only retail customer impacts of complying with the RES and SES. These costs are reflective of the entire NSP System.

1 MW in this instance refers to the aggregate MW of MISO accredited capacity NSP claimed for its fleet of renewable generation resources (both owned and purchased).
2 See Appendix F2: Strategist Assumptions and Inputs for additional detail
3 See Table 10 in this report for historical MISO values used in these calculations.
4 The MVPs are Lacrosse-Madison, Big Stone-Brookings, and CAP X 2020-Brookings.

B. Future RES Rate Impact (2020-2034)

Future RES rate impacts were derived by comparing NSP electric system cost projections within the Strategist computer model for two different futures: 1) a "RES" future that reflects the Reference Case in the 2020-2034 Resource Plan, and, 2) a "No RES" future in which only RES resources existing on the system today are removed, and instead are replaced with an equivalent amount of our new generic wind and solar resource options at current pricing levels. In doing so, the Company was able to isolate the cost of bringing early RES and SES resources onto the system for compliance purposes rather than economics.

It is important to note that we slightly modified our approach to the future RES rate impact in this analysis as compared to previous reports, in which we replaced all existing RES resources with thermal generation. Unlike in previous years, new wind and solar resources are now least-cost options relative to thermal replacement resources – and as a result, wind are solar are selected ahead of thermal options in the Strategist Expansion Plan Optimizations. Therefore, the future rate impact calculations contained herein isolate the higher costs of early wind and solar additions made to satisfy RES requirements, as opposed to adding the equivalent amount of renewables at current, economic cost levels.

For biomass resources, the "No RES" case assumes market energy and capacity replacement costs. We used the Minnesota Hub forward curve to forecast replacement energy costs and our generic CT capacity costs to forecast replacement capacity costs. Comparing the costs of the existing biomass resources to market pricing allowed us to identify the above market costs of these resources. For hydro resources, we opted to include the costs associated with existing resources in both the "RES" and "No RES" scenarios. Our small hydro resources were not added for RES compliance purposes or due to any mandates, and therefore do not contribute to any RES related rate impacts.

As stated, the "RES" case is represented by the "Reference Case" that is discussed throughout this Resource Plan document. Details as to the major assumptions contained in the "Reference Case" (e.g., fuel prices, sales forecast, resource additions, resource retirements, CO_2 costs/values, etc.) can be found in Appendix F2 of this Resource Plan. The "Reference Case" assigns a cost to CO_2 emissions of $25.00/ton starting in 2025 and escalates annually at the inflation rate; this value also represents the avoided costs of CO_2 attributed to renewables. As existing renewable

resources are now being replaced with new lower cost generic renewables instead of thermal resources in this rate impact analysis, the carbon impacts between the two scenarios are not impactful.

By taking the difference between the annual system costs of the "RES" and "No RES" cases, we estimated the future costs (or savings) associated with all of the Company's actions to comply with the RES. It is important to emphasize that this comparison of a "RES" future and "No RES" future focuses exclusively on existing RES resources, as we are able to meet the RES requirements during the planning period with existing resources alone. We excluded any of the new 1,850 MW of wind, and also excluded additional future renewables contained in the "Reference Case," as these renewable additions are driven by economics as opposed to RES compliance. As a result, the future rate impacts identified in this report are not inclusive of all renewables and may be markedly different from rate impacts calculated for incremental renewable resources.[5]

For future years in the "RES" scenario, we included transmission costs associated with RES wind resources using the same methodology as described above for the historical rate impact. For the "No RES" scenario, future wind avoided transmission costs were derived using an average of the transmission costs associated with owned projects in our 1,850 MW wind portfolio. Since in the "No RES" scenario, we are assuming that existing RES resources are replaced with new generic wind additions in 2020, we felt the timing coincided well with the 1,850 MW of wind additions and therefore that using transmission cost assumptions informed by those projects was appropriate. We did not assume any transmission costs or avoided transmission costs for biomass or hydro resources in either the "RES" or "No RES" scenario.

C. Historical SES Rate Impact (2017-2019)

Historical SES rate impacts were derived using the same methodology as described above for the historical RES rate impact. The historical rate impact report starts in 2017. This is because there were minimal amounts of solar on the system in years prior. Counting these prior years would dilute the overall historical rate impact on a levelized basis.

[5] Incremental in this instance refers to additional renewables added to the system in the future.

D. Future SES Rate Impact (2020-2034)

Future SES rate impacts were derived in a manner similar to that described above for future RES rate impacts. We made comparisons between Strategist computer model runs for two different futures: (1) a "SES" that includes all existing renewables as well as additional renewables (including solar) that the optimization selects based on economics, and (2) a "No SES" future in which existing solar generation resources contained in the "SES" case are stripped out and replaced with equivalent amount of our new generic solar resource options priced at current market levels starting in 2020. The difference in annual system direct costs between these analyses represents the future year costs or savings associated with the Company's future actions to comply with the SES. The "SES" case is identical to the "Reference Case" discussed throughout this Resource Plan.

We assumed that no transmission costs were attributable to SES resources, given the relatively smaller quantities of solar that are currently interconnected to our system. The MISO MVP and CAPX2020 buildouts were primarily driven by wind, and thus solar additions are assumed to have not yet prompted any major transmission expenditures. Given this, we also assumed no avoided transmission costs for the generic replacement solar that was included in the "No SES" future.

E. Conclusions

Our analysis shows that the RES and SES mandates have generally increased costs for customers, as they prompted renewable adoption before these resources were economic. In past Resource Plans, removing the RES and SES resources generally resulted in higher thermal generation adoption. We have now reached a point, however, where wind and solar resources are the most economic options, and therefore are selected in portfolio optimization modeling ahead of thermal resources. Because of this new reality, we had to slightly modify our approach to calculating the RES/SES rate impact, as discussed above. Modifying the analysis to include renewable replacement, as opposed to thermal replacement, reveals higher rate impacts caused by RES and SES resources over time, driven the reality that new wind and solar resources are now much lower cost resource options than they were in the past.

Table 1: Annualized Historic RES Rate Impact (2005-2012)[6]

	Historic Period							
RES Generation	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
[7]Total RES Generation PPA & Owned (GWh)	2,755	2,556	3,852	5,083	5,297	5,735	6,739	7,115
Costs Associated with RES Generation	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
[7]Purchased Power (PPA) & Owned (millions)	$120	$123	$183	$266	$303	$321	$378	$421
RES attributable transmission (millions)	$35	$51	$76	$87	$90	$93	$91	$89
Total RES Costs (millions)	$155	$175	$260	$353	$394	$413	$469	$509
[8]Total cost for RES generation ($/MWh)	$56.27	$68.28	$67.41	$69.48	$74.31	$72.09	$69.56	$71.59
Avoided Costs Due to RES	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Avoided energy costs PPAs & Owned (millions)	$128	$115	$206	$242	$135	$168	$181	$182
Avoided capacity cost PPAs & Owned (millions)	$34	$34	$41	$38	$40	$30	$40	$43
Avoided transmission cost (millions)	$10	$10	$12	$11	$12	$9	$12	$13
Avoided emission cost PPAs & Owned (millions)	$0	$0	$0	$0	$0	$0	$0	$0
Total avoided costs PPAs & Owned (millions)	$172	$159	$259	$291	$188	$208	$233	$239
[8]Total avoided costs PPAs & Owned ($/MWh)	$62.30	$62.35	$67.35	$57.34	$35.41	$36.21	$34.51	$33.58
Total RES Premium/Discount (millions)	-$17	$15	$0	$62	$206	$206	$236	$270
Total RES Premium/Discount ($/MWh)	-$6.03	$5.94	$0.06	$12.14	$38.90	$35.87	$35.05	$38.02
	Historic Period							
Annualized RES Rate Impacts	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
NSP total retail sales (GWh)	41,800	42,096	43,021	42,573	41,080	42,186	42,318	41,879
% Retail Sales	100%	100%	100%	100%	100%	100%	100%	100%
NSP retail rate impact ($/MWh)	-$0.40	$0.36	$0.01	$1.45	$5.01	$4.88	$5.58	$6.46
NSP retail rate impact (cents/kWh)	-.04¢	.04¢	.00¢	.14¢	.50¢	.49¢	.56¢	.65¢

[6] Total amounts may not be exact due to rounding.
[7] Category has been updated over the historical period to reflect the exclusion of RES resource that the Company does not receive RECs from, overall impacts were minimal
[8] GWh-to-MWh calculations assume a factor of 1,000 (1 GWh = 1,000 MWh).

Table 2: Annualized Future RES Rate Impact (2013-2019)[6]

	Historic Period						
RES Generation	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019[9]**
[7]Total RES Generation PPA & Owned (GWh)	7,551	8,376	8,341	10,223	11,692	10,743	11,365

Costs Associated with RES Generation	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
[7]Purchased Power (PPA) & Owned (millions)	$424	$456	$479	$480	$546	$504	$650
RES attributable transmission (millions)	$87	$85	$83	$81	$78	$75	$75
Total RES Costs (millions)	$511	$541	$563	$561	$624	$580	$725
[8]Total cost for RES generation ($/MWh)	$67.62	$64.62	$67.48	$54.83	$53.35	$53.98	$63.76

Avoided Costs Due to RES	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Avoided energy costs PPAs & Owned (millions)	$238	$291	$195	$223	$292	$306	$331
Avoided capacity cost PPAs & Owned (millions)	$50	$30	$33	$40	$53	$58	$74
Avoided transmission cost (millions)	$13	$15	$16	$20	$26	$35	$44
Avoided emission cost PPAs & Owned (millions)	$0	$0	$0	$0	$0	$0	$0
Total avoided costs PPAs & Owned (millions)	$301	$336	$244	$283	$371	$398	$448
[8]Total avoided costs PPAs & Owned ($/MWh)	$39.88	$40.10	$29.23	$27.70	$31.74	$37.07	$39.44
Total RES Premium/Discount (millions)	$209	$205	$319	$277	$253	$182	$276
Total RES Premium/Discount ($/MWh)	$27.74	$24.52	$38.25	$27.13	$21.61	$16.91	$24.32

	Historic Period						
Annualized RES Rate Impacts	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
NSP total retail sales (GWh)	41,854	41,861	41,267	41,263	40,793	41,896	40,555
% Retail Sales	100%	100%	100%	100%	100%	100%	100%
NSP retail rate impact ($/MWh)	$5.00	$4.91	$7.73	$6.72	$6.19	$4.34	$6.82
NSP retail rate impact (cents/kWh)	.50¢	.49¢	.77¢	.67¢	.62¢	.43¢	.68¢

[9] 2019 resembles the same methodology as the historic period using the forward Minn Hub price curve to estimate avoided energy costs

Table 3: Annualized Future RES Rate Impact (2020-2026)[6]

	Future Period						
RES Generation	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
[7]Total RES Generation PPA & Owned (GWh)	9,791	9,102	9,113	8,491	8,256	8,024	7,781

Costs Associated with RES Generation	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
[7]Purchased Power (PPA) & Owned (millions)	$670	$689	$689	$659	$650	$648	$689
RES attributable transmission (millions)	$71	$68	$66	$63	$61	$59	$57
Total RES Costs (millions)	$742	$757	$754	$722	$711	$708	$746
[8]Total cost for RES generation ($/MWh)	$75.74	$83.17	$82.76	$85.05	$86.10	$88.18	$95.93
Avoided Costs Due to RES	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Avoided energy costs PPAs & Owned (millions)	$282	$285	$290	$286	$287	$284	$284
Avoided capacity cost PPAs & Owned (millions)	$6	$6	$6	$5	$5	$5	$5
Avoided transmission cost (millions)	$19	$24	$22	$22	$23	$21	$20
Avoided emission cost PPAs & Owned (millions)	$0	$0	$0	$0	$0	$0	$0
Total avoided costs PPAs & Owned (millions)	$307	$315	$318	$313	$314	$310	$309
[8]Total avoided costs PPAs & Owned ($/MWh)	$31.33	$34.65	$34.94	$36.88	$38.08	$38.64	$39.70
Total RES Premium/Discount (millions)	$435	$442	$436	$409	$396	$398	$438
Total RES Premium/Discount ($/MWh)	$44.41	$48.52	$47.82	$48.17	$48.02	$49.54	$56.23

	Future Period						
Annualized RES Rate Impacts	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
NSP total retail sales (GWh)	40,607	40,318	40,284	40,151	40,171	40,010	40,024
% Retail Sales	100%	100%	100%	100%	100%	100%	100%
NSP retail rate impact ($/MWh)	$10.71	$10.95	$10.82	$10.19	$9.87	$9.94	$10.93
NSP retail rate impact (cents/kWh)	1.07¢	1.10¢	1.08¢	1.02¢	.99¢	.99¢	1.09¢

Table 4: Annualized Future RES Rate Impact (2027-2034)[6]

	Future Period							
RES Generation	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
[7]Total RES Generation PPA & Owned (GWh)	7,491	7,258	7,076	7,037	6,822	6,662	5,682	5,385
Costs Associated with RES Generation	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
[7]Purchased Power (PPA) & Owned (millions)	$701	$680	$662	$641	$670	$670	$580	$530
RES attributable transmission (millions)	$56	$55	$53	$52	$50	$48	$47	$45
Total RES Costs (millions)	$758	$735	$715	$693	$720	$718	$626	$575
[8]Total cost for RES generation ($/MWh)	$101.12	$101.20	$101.06	$98.43	$105.50	$107.84	$110.22	$106.81
Avoided Costs due to RES	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Avoided energy costs PPAs & Owned (millions)	$284	$280	$277	$283	$285	$286	$258	$234
Avoided capacity cost PPAs & Owned (millions)	$5	$2	$2	$2	$2	$2	$2	$2
Avoided transmission cost (millions)	$19	$17	$17	$16	$15	$11	$10	$9
Avoided emission cost PPAs & Owned (millions)	$0	$0	$0	$0	$0	$0	$0	$0
Total avoided costs PPAs & Owned (millions)	$308	$299	$295	$300	$301	$298	$270	$245
[8]Total avoided costs PPAs & Owned ($/MWh)	$41.07	$41.16	$41.70	$42.65	$44.16	$44.77	$47.47	$45.49
Total RES Premium/Discount (millions)	$450	$436	$420	$393	$418	$420	$357	$330
Total RES Premium/Discount ($/MWh)	$60.05	$60.04	$59.35	$55.78	$61.34	$63.07	$62.75	$61.32
	Future Period							
Annualized RES Rate Impacts	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
NSP total retail sales (GWh)	40,214	40,758	40,644	40,784	40,816	41,262	41,457	41,781
% Retail Sales	100%	100%	100%	100%	100%	100%	100%	100%
NSP retail rate impact ($/MWh)	$11.19	$10.69	$10.33	$9.62	$10.25	$10.18	$8.60	$7.90
NSP retail rate impact (cents/kWh)	1.12¢	1.07¢	1.03¢	.96¢	1.03¢	1.02¢	.86¢	.79¢

Table 5: Annualized SES Rate Impact (2017-2026)[6]

	Historic Period			Future Period						
SES Generation	**2017**	**2018**	**2019**[9]	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Total SES Generation (GWh)	592	1,092	1,450	1,715	1,742	1,773	1,803	1,836	1,861	1,890
Costs associated with SES generation	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
SES Generation (millions)	$48	$110	$162	$201	$208	$215	$223	$231	$238	$246
SES attributable transmission (millions)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total SES Costs (millions)	$48	$110	$162	$201	$208	$215	$223	$231	$238	$246
[8]Total cost for SES generation ($/MWh)	$81	$101	$112	$117	$119	$121	$124	$126	$128	$130
Avoided Costs due to SES	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Avoided energy costs due to SES (millions)	$17	$35	$39	$57	$59	$61	$64	$66	$68	$71
Avoided capacity cost due to SES (millions)	$11	$15	$32	$0	$0	$0	$0	$0	$0	$0
Avoided transmission cost (millions)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Avoided emission cost due to SES (millions)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total avoided costs due to SES (millions)	$28	$49	$71	$57	$59	$61	$64	$66	$68	$71
[8]Total avoided costs SES ($/MWh)	$48	$45	$48.65	$33.36	$33.93	$34.61	$35.29	$36.09	$36.75	$37.46
Total SES Premium/Discount (millions)	$20	$61	$92	$144	$149	$154	$159	$165	$170	$175
Total SES Premium/Discount ($/MWh)	$33	$56	$63.23	$83.73	$85.31	$86.78	$88.25	$89.60	$91.11	$92.53
	Historic Period			**Future Period**						
Annualized SES Rate Impacts	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
NSP total retail sales (GWh)	40,793	41,896	40,555	40,607	40,318	40,284	40,151	40,171	40,010	40,024
% Retail Sales	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NSP retail rate impact ($/MWh)	$0.48	$1.45	$2.26	$3.54	$3.69	$3.82	$3.96	$4.10	$4.24	$4.37
NSP retail rate impact (cents/kWh)	.05¢	.15¢	.23¢	.35¢	.37¢	.38¢	.40¢	.41¢	.42¢	.44¢

Table 6: Annualized SES Rate Impact (2027-2034)[6]

	Future Period							
SES Generation	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Total SES Generation (GWh)	1,919	1,952	1,976	2,004	2,032	2,065	2,086	2,112
Costs Associated with SES Generation	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
SES Generation (millions)	$254	$263	$270	$279	$288	$298	$307	$317
SES attributable transmission (millions)	$0	$0	$0	$0	$0	$0	$0	$0
Total SES Costs (millions)	$254	$263	$270	$279	$288	$298	$307	$317
[8]Total cost for SES generation ($/MWh)	$132	$134	$137	$139	$142	$144	$147	$150
Avoided Costs Due to SES	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Avoided energy costs due to SES (millions)	$73	$76	$79	$81	$84	$87	$90	$93
Avoided capacity cost due to SES (millions)	$0	$0	$0	$0	$0	$0	$0	$0
Avoided transmission cost (millions)	$0	$0	$0	$0	$0	$0	$0	$0
Avoided emission cost due to SES (millions)	$0	$0	$0	$0	-$1	$0	$0	$0
Total avoided costs due to SES (millions)	$73	$77	$79	$82	$83	$87	$90	$93
[8]Total avoided costs SES ($/MWh)	$38.29	$39.20	$39.79	$40.68	$41.06	$42.33	$43.04	$43.95
Total SES premium/discount (millions)	$180	$186	$191	$197	$204	$211	$217	$224
Total SES premium/discount ($/MWh)	$93.95	$95.26	$96.82	$98.32	$100.54	$101.99	$104.21	$106.27
	Future Period							
Annualized SES Rate Impacts	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
NSP total retail sales (GWh)	40,214	40,758	40,644	40,784	40,816	41,262	41,457	41,781
% Retail Sales	100%	100%	100%	100%	100%	100%	100%	100%
NSP retail rate impact ($/MWh)	$4.48	$4.56	$4.71	$4.83	$5.01	$5.10	$5.24	$5.37
NSP retail rate impact (cents/kWh)	.45¢	.46¢	.47¢	.48¢	.50¢	.51¢	.52¢	.54¢

Table 7: Levelized RES Rate Impact[6]

6.53% discount rate used in levelization calculations	Historic Period	Future Period
Levelized RES Generation	**2005-2019**	**2020-2034**
Total RES Generation (GWh)	6,395	7,916
Levelized Costs associated with RES generation	**2005-2019**	**2020-2034**
RES Generation (millions)	$337	$662
RES attributable transmission (millions)	$77	$59
Total RES Costs (millions)	$413	$720
[8]Total cost for RES generation ($/MWh)	$65	$91

Levelized Avoided Costs Due to RES	2005-2019	2020-2034
Avoided energy costs due to RES (millions)	$202	$281
Avoided capacity cost due to RES (millions)	$41	$4
Avoided transmission cost (millions)	$15	$19
Avoided emission cost due to RES (millions)	$0	$0
Total avoided costs due to RES (millions)	$258	$304
[8]Total avoided costs RES ($/MWh)	$40	$38
Levelized Total RES premium/discount (millions)	$156	$417
Levelized Total RES premium/discount ($/MWh)	$24	$53

	Historic Period	Future Period
Levelized RES Rate Impacts	**2005-2019**	**2020-2034**
NSP total retail sales (GWh)	41,870	40,519
NSP retail sales as % of total sales (%)	100%	100%
NSP retail rate impact ($/MWh)	$3.72	$10.28
NSP retail rate impact (cents/kWh)	.37¢	1.03¢

Table 8: Levelized SES Rate Impact[6]

6.53% Discount Rate Used in Levelization Calculations	Historic Period	Future Period
Levelized SES Generation	**2017-2019**	**2020-2034**
Total SES Generation (GWh)	1,027	1,884
Levelized Costs associated with SES generation	**2017-2019**	**2020-2034**
SES Generation (millions)	$104	$246
SES attributable transmission (millions)	$0	$0
Total SES Costs (millions)	$104	$246
[8]Total cost for SES generation ($/MWh)	$102	$131

Levelized Avoided Costs due to SES	**2017-2019**	**2020-2034**
Avoided energy costs due to SES (millions)	$30	$71
Avoided capacity cost due to SES (millions)	$19	$0
Avoided transmission cost (millions)	$0	$0
Avoided emission cost due to SES (millions)	$0	$0
Total avoided costs due to SES (millions)	$48	$71
[8]Total avoided costs SES ($/MWh)	$47	$38
Levelized Total SES Premium/Discount (millions)	$56	$175
Levelized Total SES Premium/Discount ($/MWh)	$54	$93

	Historic Period	**Future Period**
Levelized SES Rate Impacts	**2017-2019**	**2020-2034**
NSP total retail sales (GWh)	41,086	40,519
NSP retail sales as % of total sales (%)	100%	100%
NSP retail rate impact ($/MWh)	$1.36	$4.32
NSP retail rate impact (cents/kWh)	.14¢	.43¢

Table 9: Transmission Projects Attributable to the RES

2003 RCR	2004 RCR	2005 RCR	2007 TCR, RCR Compliance
M-02-474	M-03-1882	M-05-289	M-06-1505
425MW Throughput from SW MN	Chanarambie Substation and 115kV System Improvements Between Pipestone, Chanarambie, Lake Yankton, and Lyon County Substation	Alexandria to Douglas County 115kV	825 Wind Upgrade - Main Project
Split Rock / Lakefield Junction 345 kV	Black Dog Substation Transformer Replacement	Willmar to Kerkhoven Tap 115 kV	*Split Rock-Nobles Co- Lakefield Junction 345 kV line*
825MW Buffalo Ridge / White / Heron	345 kV Line Clearance Improvements from Wilmarth Substation to Lakefield junction Substation	Minnesota Valley to Franklin 115 kV	*Buffalo Ridge- Yankee- Brookings Co 115 kV line*
825MW Lyon / Franklin / Ft. Ridge	69 kV Line Upgrade from Bird Island Substation to Franklin Substation	Paynesville to Wakefield 115 kV	*Brookings Co- White 345 kV line*
825MW Reconductor Only	115 kV Line Upgrade from Summit Substation to Loon Tap to West Faribault Substation	Upgrades to Marshall Municipal Utilities 115 kV System	*Chanarambie- Fenton- Nobles Co 115 kV line*
	Troy Switching Substation	Lakefield Junction to Fox Lake 161 kVLine	*Red Wood Falls Junction- Franklin 115 kV upgrade*
	GM, LLC Project		*Brookings Co Substation*
	Wind Generator Interconnects on the 35 kV System in Southwestern Minnesota		*Split Rock Substation*
			Lakefield Junction Substation
			White Substation
			Nobles Co Substation
			Chanarambie Substation
			Buffalo Ridge Substation
			Yankee 200 MW Wind Generation Collector Station
			Fenton Wind Generation Collector Station
			Series Capacitor Station
			Nobles County Collector
			Rock County Collector

2008 TCR	2010 TCR	2011 TCR	2012 TCR
M-07-1156	M-09-1048	M-10-1064	M-12-050
BRIGO Transmission Lines	Blue Lake - Wilmarth - Lakefield Transmission	CAPX2020 - Brookings	161 kV Line Pleasant Valley Sub to Byron (SE MN - RIGO)
Spare Wind Transformer	Nobles Wind Farm Network Upgrade Transmission Project		

2016 TCR
LaCrosse - Madison
Big Stone - Brookings

Table 10: Transmission Project Costs Attributable to the RES
(70% of MPV Project Annual Revenue Requirements Assigned to RES)

Year	M-02-474	M-03-1882	M-05-289	M-06-1505	M-07-1156	M-09-1048	M-10-1064	M-12-050	2016 TCR	Total Project Revenue Requirements Assigned to RES
	All Costs in $ millions									
2005	$27.5	$6.8	$0.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	**$35.2**
2006	$43.6	$6.1	$1.7	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	**$51.4**
2007	$50.6	$5.9	$1.5	$18.4	$0.0	$0.0	$0.0	($0.0)	$0.0	**$76.4**
2008	$50.4	$5.7	$1.5	$28.4	$1.1	$0.0	$0.0	$0.0	$0.0	**$87.0**
2009	$48.8	$5.5	$1.4	$28.2	$6.1	$0.3	$0.0	$0.0	$0.0	**$90.4**
2010	$47.3	$5.4	$1.4	$27.2	$8.7	$1.4	$1.4	$0.0	$0.0	**$92.8**
2011	$45.8	$5.2	$1.3	$26.2	$8.3	$1.8	$2.4	$0.0	$0.0	**$91.1**
2012	$44.4	$5.1	$1.3	$25.3	$8.0	$1.8	$2.3	$0.5	$0.0	**$88.6**
2013	$43.1	$4.9	$1.2	$24.4	$7.7	$1.7	$2.2	$1.5	$0.0	**$86.7**
2014	$41.7	$4.7	$1.2	$23.6	$7.4	$1.7	$2.1	$2.9	$0.0	**$85.3**
2015	$40.4	$4.6	$1.1	$22.7	$7.2	$1.6	$2.0	$3.8	$0.0	**$83.4**
2016	$39.0	$4.4	$1.1	$21.9	$6.9	$1.6	$2.0	$3.7	$0.0	**$80.6**
2017	$37.7	$4.3	$1.0	$21.0	$6.6	$1.5	$1.9	$3.6	$0.1	**$77.7**
2018	$36.3	$4.1	$1.0	$20.2	$6.3	$1.5	$1.8	$3.5	$0.7	**$75.4**
2019	$35.0	$4.0	$0.9	$19.4	$6.1	$1.4	$1.7	$3.7	$2.5	**$74.6**
2020	$33.6	$3.8	$0.9	$18.5	$5.8	$1.4	$1.7	$3.3	$2.4	**$71.4**
2021	$32.3	$3.6	$0.9	$17.7	$5.5	$1.3	$1.6	$3.2	$2.3	**$68.4**
2022	$30.9	$3.5	$0.8	$16.9	$5.3	$1.3	$1.5	$3.1	$2.3	**$65.6**
2023	$29.7	$3.3	$0.8	$16.4	$5.0	$1.2	$1.4	$3.0	$2.2	**$63.1**
2024	$28.5	$3.2	$0.8	$16.1	$4.8	$1.2	$1.4	$2.9	$2.2	**$60.9**
2025	$27.4	$3.1	$0.7	$15.7	$4.7	$1.1	$1.3	$2.8	$2.2	**$59.1**
2026	$26.5	$3.0	$0.7	$15.4	$4.6	$1.1	$1.3	$2.7	$2.1	**$57.5**
2027	$25.8	$2.9	$0.7	$15.1	$4.4	$1.1	$1.2	$2.6	$2.1	**$56.1**
2028	$25.2	$2.9	$0.7	$14.8	$4.3	$1.1	$1.2	$2.5	$2.1	**$54.7**
2029	$24.6	$2.8	$0.7	$14.4	$4.2	$1.0	$1.2	$2.4	$2.1	**$53.4**
2030	$23.8	$2.7	$0.6	$14.0	$4.1	$1.0	$1.1	$2.3	$2.0	**$51.7**
2031	$23.0	$2.6	$0.6	$13.5	$4.0	$1.0	$1.1	$2.3	$1.9	**$50.0**
2032	$22.3	$2.5	$0.6	$13.1	$3.8	$0.9	$1.1	$2.2	$1.9	**$48.3**
2033	$21.5	$2.4	$0.6	$12.6	$3.7	$0.9	$1.0	$2.1	$1.8	**$46.7**
2034	$20.8	$2.3	$0.6	$12.2	$3.6	$0.9	$1.0	$2.1	$1.7	**$45.2**
Total (millions)	**$1,027.3**	**$121.4**	**$28.9**	**$533.3**	**$148.3**	**$32.8**	**$39.0**	**$63.0**	**$34.7**	**$2,028.8**

Table 11: MISO Data Used in RES Avoided Energy and Capacity Calculations

	Future Period							Future Period							
Avoided Capacity Cost Details	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
MISO Accredited Capacity of Renewables (MW)[10]	87	87	87	63	63	63	63	63	22	22	22	22	22	22	22
Avoided Capacity ($000/MW-Year)	$69	$71	$72	$74	$75	$77	$78	$80	$81	$83	$85	$86	$88	$90	$92
Total Avoided Capacity Costs due to RES (millions)	$6	$6	$6	$5	$5	$5	$5	$5	$2	$2	$2	$2	$2	$2	$2

Avoided Energy Cost Details	Future Avoided Energy Costs determined using Strategist model

[10] Only biomass is calculated for future avoided capacity costs, No avoided capacity costs calculated due to generic renewable costs being accounting for in avoided energy

Table 12: MISO Data Used in SES Avoided Energy and Capacity Calculations[6]

	Future Period							Future Period							
Avoided Capacity Cost Details	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
MISO Accredited Capacity of Renewables (MW)[11]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avoided Capacity ($000/MW-Year)	$69	$71	$72	$74	$75	$77	$78	$80	$81	$83	$85	$86	$88	$90	$92
Total Avoided Capacity Costs due to SES (millions)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Avoided Energy Cost Details	Future Avoided Energy Costs determined using Strategist model

[11] No avoided capacity costs calculated due to generic renewable costs being accounted for in avoided energy