COMMERCE DEPARTMENT

March 26, 2018

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

RE: **Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. ET9/RP-17-753

Dear Mr. Wolf:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

> Southern Minnesota Municipal Power Agency's (SMMPA) 2018-2032 Integrated Resource Plan.

The petition was filed on December 1, 2017. The petitioner is:

> Mark S. Mitchell
> Director of Operations and Chief Operating Officer
> Southern Minnesota Municipal Power Association
> 500 First Avenue SW
> Rochester, MN 55902-3303

The Department recommends that **the Minnesota Public Utilities Commission accept SMMPA's integrated resource plan for planning purposes**. The Department's analytical team of Chris Davis, Sue Peirce, Steve Rakow and Michael Zajicek is available to answer any questions the Minnesota Public Utilities Commission may have.

Sincerely,

/s/ CHRISTOPHER T. DAVIS
Rates Analyst

CTD/lt
Attachment

COMMERCE DEPARTMENT

Before the Minnesota Public Utilities Commission

Comments of the Minnesota Department of Commerce

Docket No. ET9/RP-17-753

I. INTRODUCTION

A. OVERVIEW OF THE FILING

Minnesota Rules parts 7843.0100-7843.0600 require electric utilities to file proposed integrated resource plans (IRPs) every two years. The present filing is Southern Minnesota Municipal Power Association's eighth resource plan and covers the period of 2018 through 2032.

B. AGENCY BACKGROUND

Southern Minnesota Municipal Power Agency (SMMPA or the Agency) is a collectively-owned electric generation and transmission joint action agency established under Chapter 453 of Minnesota Statutes.[1] SMMPA has 18 members and its main source of electricity is its 41 percent share of the 884-megawatt (MW) Sherco 3 coal generating unit located near Becker, Minnesota. SMMPA has achieved impressive levels of energy savings since 2010. In 2016, Energy Star honored SMMPA and its 18 Members with the Partner of the Year Award for Energy Efficiency Program Delivery, honoring SMMPA for its outstanding efforts to increase the adoption of energy-efficient products.[2]

Figure 1 below shows SMMPA's current resource capacity mix and Figure 2 illustrates SMMPA's 2016 energy mix.

[1] Other joint action agencies in Minnesota include Central Minnesota Power Agency/Services, Minnesota Municipal Power Agency, Missouri River Energy Services, and Northern Minnesota Municipal Power Agency. Services provided by SMMPA, and other joint action agencies, are equivalent to services provided to distribution cooperatives by generation and transmission cooperatives such as Great River Energy.

[2] Energy Star has honored SMMPA three other times:

- 2003 ENERGY STAR Award for Leadership in Energy Efficiency
- 2004 ENERGY STAR Award for National Campaign Promotion
- 2010 ENERGY STAR Award for Excellence in ENERGY STAR Promotion

Figure 1: SMMPA's Current Resource Capacity Mix

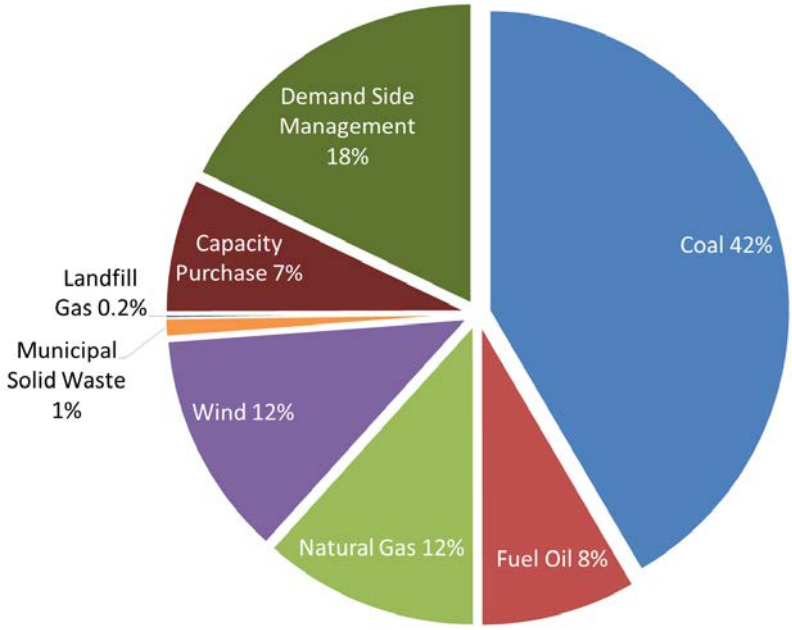
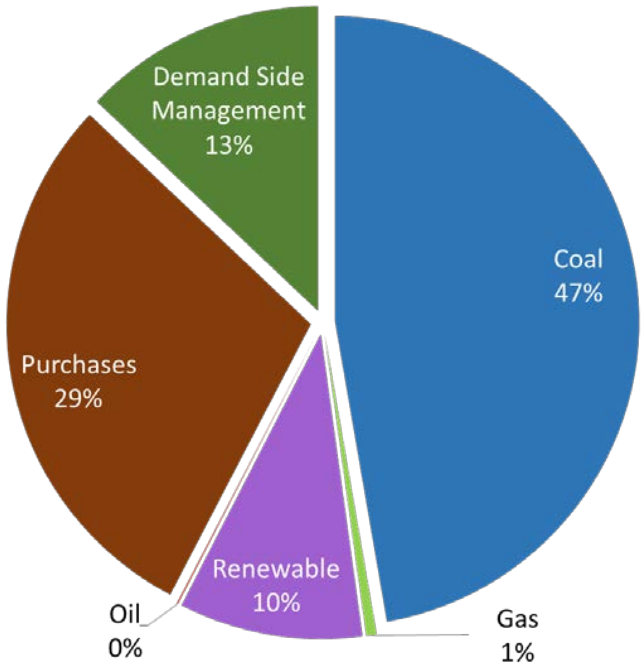


Figure 2: SMMPA's Energy Mix in 2016



SMMPA's power supply requirements change significantly in 2030. Although 16 of the Agency's eighteen members have contracts that extend to 2050, two of the Agency's members, the cities of Austin and Rochester, which combine to represent over fifty percent of the Agency's resource requirements, currently have contracts that terminate on March 31, 2030. After that date, SMMPA has no obligation to provide capacity and energy to those two members. The change in resource requirements will reduce SMMPA's projected peak demand from approximately 610 MW in 2018 to approximately 250 MW in 2032.

C. SMMPA'S PLANNING PROCESS

1. SMMPA's IRP Planning Process

SMMPA used the following approach in its 2018-2032 IRP planning process:

a. Contracted with nFront Consulting, LLC to work with the Agency and its members to forecast SMMPA's energy and demand for years 2017 to 2032. The forecast included an upward adjustment to account for cumulative demand-side management (DSM) impacts, assuming no further DSM is undertaken.

b. Evaluated current resource capabilities including thermal, renewable, purchased power agreements, and DSM and subtracted member curtailments to determine future resource needs. SMMPA assumed a 7.8 percent capacity reserve based on current Midcontinent Independent System Operator (MISO) requirements. SMMPA considered the Agency's future 100-MW wind power purchase agreement as a prerequisite resource starting in 2020 because this contract has already been executed by both parties. SMMPA's modeling also treated the Agency's future 3-MW community solar project as a prerequisite resource.

c. Determined resource needs based on parts a and b.

d. Assumed that SMMPA would continue to achieve energy savings of at least 1.5 percent of retail sales throughout the planning period.

e. Used the AURORAxmp Electric Market Model to determine the least-cost capacity expansion plan. The AURORA model was allowed to choose between the following supply-side resource options:
   - 50-MW share of a new or upgraded coal facility;
   - 50-MW share of a new or upgraded nuclear facility;
   - Two options for a new simple cycle combustion turbine;
   - 50-MW share of a new combined cycle (CC) facility;
   - 40-MW reciprocating engine plants;
   - 25-MW wind generation facility, and

- 5-MW solar facility.

f. Conducted sensitivity analyses, including evaluating:
   - Load forecast – base, low, high
   - Externality costs – low, high
   - Locational marginal prices (LMP) – base, low, high
   - Natural gas prices – base, low, high
   - No future demand-side management (DSM)
   - No renewable resources
   - No future renewable resources
   - Sudden loss of a generating resource
   - Sudden large load addition

g. Identified a five-year expansion plan with the only action being to continue to offer DSM programs to meet Minnesota's Conservation Improvement Program (CIP) annual energy savings goal of 1.5 percent.

D. SMMPA'S RESOURCE NEEDS

SMMPA's resource needs prior to inclusion of additional DSM during the planning period is shown in Table 1 below.

Table 1: SMMPA's Resource Needs (Surplus/(Deficits))

Year	MW
2018	46
2019	40
2020	9
2021	3
2022	(4)
2023	(10)
2024	(15)
2025	(22)
2026	(28)
2027	(36)
2028	(42)
2029	(65)
2030	124
2031	119
2032	114

Table 1 shows that prior to implementing new DSM, the Agency has a growing need starting in 2022 and ending in 2030 when Rochester and Austin's contracts terminate.

II. DEPARTMENT ANALYSIS

In its analysis, the Department reviewed:

a. SMMPA's forecast;
b. SMMPA's estimate of its future needs;
c. Whether SMMPA's proposed plan would provide a reliable system;
d. SMMPA's historical DSM achievements,
e. SMMPA's compliance with the Minnesota Renewable Energy Standard (RES), and
f. SMMPA's progress in meeting Minnesota's greenhouse gas reduction goal.

A. ASSESSMENT OF ENERGY AND DEMAND FORECAST

1. Overview

SMMPA forecasted its energy requirements for 2013-2028 in several steps.

First, SMMPA forecasted the annual retail load served across its members using econometric forecasts of customer counts and average energy use for the residential, commercial, industrial, and other customer sectors using annual data created from monthly member records. SMMPA then adjusted these estimates to account for the historical impact of DSM programs on the growth rates of electricity demand while allowing SMMPA to estimate savings of new DSM programs on future growth in electricity demand.

Next, SMMPA adjusted for distribution losses, which yields the total delivered energy requirements across all of SMMPA's members. SMMPA then allocated the total delivered energy requirements to the members based on separate econometric forecasts of total delivered energy requirements for each member. SMMPA used these individual forecasts to determine the ratio of the Agency's total delivered energy requirements that each member represents.

Using an econometric forecast of load factor and the forecasted energy requirements for each member, SMMPA estimated the contribution to its summer peak from each member using monthly data. From the perspective of SMMPA's members, this would be the SMMPA system coincident peak.

Finally, to develop an accurate picture of what resources SMMPA will need in the coming years, SMMPA netted from the total energy requirements resources such as conservation measures, direct load control, interruptible load, the Western Area Power Administration (WAPA) capacity and energy allocations, and generation resources located behind the wholesale meter. In addition, two SMMPA members, Austin Utilities (Austin) and Rochester Public Utilities (Rochester), operate under a partial requirements arrangement with SMMPA whereby Austin agreed to a Contract Rate of Delivery (CROD) of 70 MW and Rochester agreed to a CROD of 216 MW. Under a CROD agreement, SMMPA serves load only up to the CROD value, with the local utility covering any excess demand. To provide the most accurate forecast, SMMPA removed any load growth for these members above the CROD.

For its forecast, SMMPA used monthly historical utility system data provided by SMMPA's member utilities and load data maintained by SMMPA. This data includes retail-billing data by customer class, system metered energy requirements, system metered peak demand, the timing of peak demand, curtailment data, DSM impacts, load-side generation, and WAPA entitlements. Further, SMMPA used historical and projected economic and demographic data provided by IHS Global Insight and Woods & Poole Economics. Historical weather data was provided by the National Oceanic and Atmospheric Administration (NOAA). SMMPA notes that the Agency adjusted down the economic data provided to represent a less optimistic future based on the historical errors in Woods & Poole's projections.

2. SMMPA's Forecast Results

SMMPA forecasted its energy requirements, as described above, from 2017-2032 using econometric models. SMMPA then adjusted these forecasts for the impacts of DSM and transmission losses. The results indicate that SMMPA expects energy needs to grow at an annual average rate of 1.8 percent from 2017-2032, however this rate excludes SMMPA's expected loss of two large members in April 2030. In terms of Summer Peak Demand, SMMPA estimates growth rates substantially lower than its energy requirements forecast, or around 0.5 percent from 2017-2016, and -4.9 percent from 2017-2032 once the two members that are expected to leave are included. SMMPA's energy and demand forecasts are presented in Table 2 below.

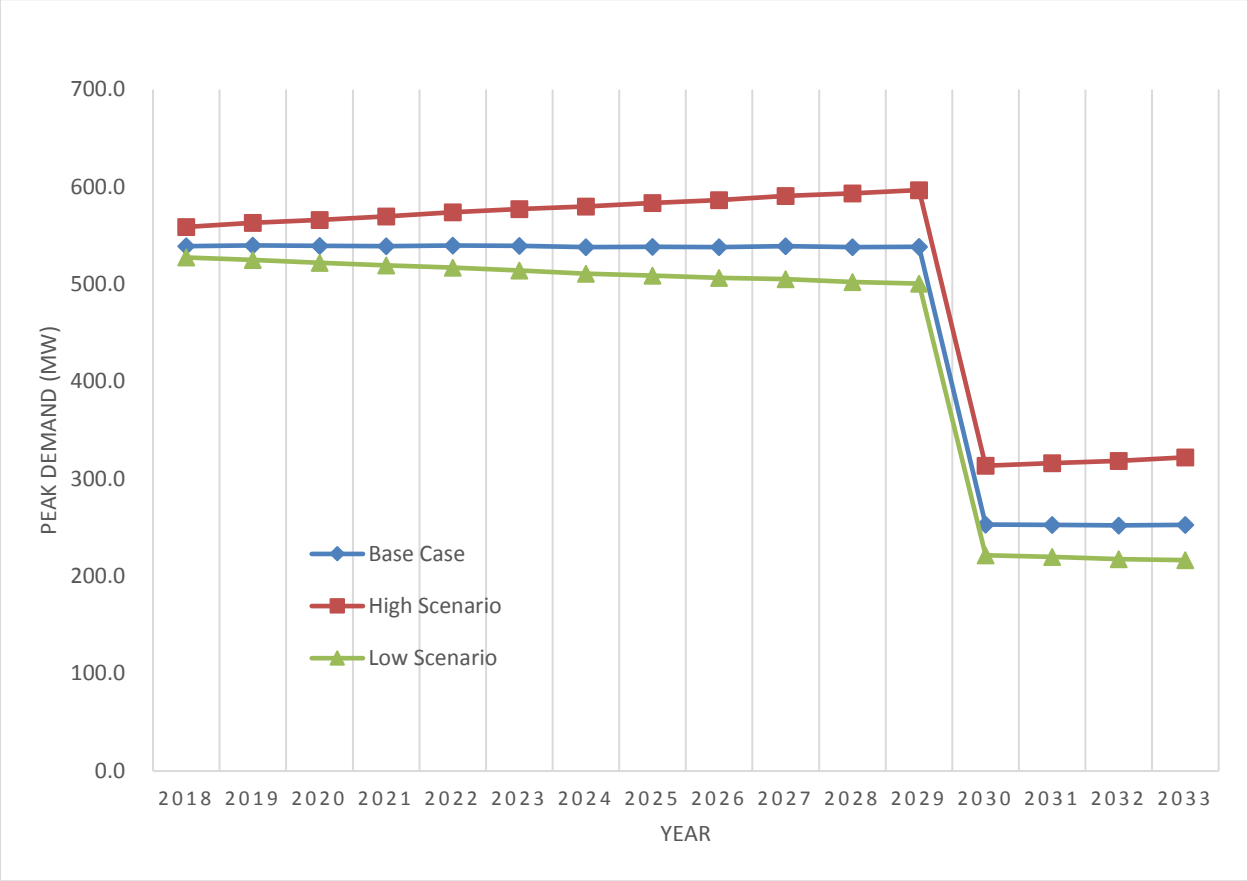
Table 2: Adjusted Base Case Total Energy Requirement and Peak Demand

	Energy (MWh)	High Growth Scenario (MWh)	Peak Demand (MW)
2017	2,949,908	2,949,908	543.4
2018	2,967,068	3,151,229	539.0
2019	2,989,387	3,225,627	539.9
2020	3,010,217	3,292,830	539.4
2021	3,014,515	3,337,162	539.3
2022	3,041,629	3,403,120	539.7
2023	3,050,778	3,448,844	539.4
2024	3,069,059	3,502,930	538.3
2025	3,074,607	3,541,261	538.6
2026	3,084,324	3,582,993	538.2
2027	3,095,074	3,625,709	539.0
2028	3,112,750	3,675,831	538.2
2029	3,117,856	3,709,526	538.5
2030	1,816,623	2,202,252	253.3
2031	1,414,817	1,729,652	253.0
2032	1,421,871	1,752,228	252.3

Table 2 shows the expected energy demand for SMMPA's system after making adjustments for DSM, SMMPA's CRODs, direct load control, interruptible load, WAPA capacity allocations, generation resources located behind the wholesale meter, and transmission losses.

SMMPA also created a high forecast by varying its economic assumptions. SMMPA relied on statistics published by Woods & Poole on the variation from 1984 through 2015 of various economic projections from actual results, as data was not available from IHS Global Insight comparing its previous forecasts with actual outcomes. SMMPA developed ranges for these trends of economic activity and population that represented 90 percent of potential outcomes. Using these estimations, SMMPA adjusted the Base Case Assumptions through 2032 to develop High and Low Economic Scenarios. SMMPA used these new forecast scenarios to estimate new summer peak demand values for each case. Figure 3 below shows the range of adjusted Inlet to Member Systems (IMS) peak demand forecasts using the values from Woods & Poole. SMMPA developed these scenarios so the Agency could create contingencies for the possibility of load growth differing from the base case.

Figure 3: Range of Adjusted IMS Peak Demand Forecasts



3. Department's Analysis and Recommendation

The Department concludes that SMMPA's energy and peak demand forecasts are satisfactory for planning purposes. The statistical model, input data, and the econometric models used are all reasonable.

B. RESOURCE NEEDS ASSESSMENT

Two principal reasons for integrated resource planning are to: 1) ensure that a utility will have adequate resources to cover future demand, and 2) will be able to do so in a cost-effective manner. The first objective is necessary to ensure that service is reliable for the utility's ultimate customers and to avoid negative effects on other utilities and their customers. Table 3 below shows SMMPA's surplus/(shortfall) both before and after implementation of new DSM activity.

Table 3: SMMPA's Estimated Resource Needs (Peak MW)*

Year	Without New DSM (MW)	With New DSM (MW)
2018	46	57.9
2019	40	58.5
2020	9	34
2021	3	34.1
2022	(4)	33.7
2023	(10)	34.1
2024	(15)	35.2
2025	(22)	34.9
2026	(28)	35.3
2027	(36)	34.4
2028	(42)	35.4
2029	(65)	18.6
2030	124	195.5
2031	119	195.7
2032	114	196.5

* *A negative number indicates a capacity deficit*

As can be seen, before implementation of new DSM, SMMPA projected a capacity deficit beginning in 2022 and has a capacity deficit of 65 MW by 2029. However, after adjusting for planned DSM additions, SMMPA would have no deficits throughout the planning period.

C. DEMAND-SIDE MANAGEMENT

1. Introduction

Minnesota's Conservation Improvement Program (CIP) statutes (Minn. Stat. §216B.2421) were changed in 2007 to require utilities to meet an energy-savings goal equal to 1.5 percent of a utility's retail sales.

In addition, Minn. Stat. §216B.2401 states:

> It is the energy policy of the state of Minnesota to achieve annual energy savings equal to 1.5 percent of annual retail energy sales of electricity and natural gas directly through energy conservation improvement programs and rate design, and indirectly through energy codes and appliance standards, programs designed to transform the market or change consumer behavior, energy savings…

In the Minnesota Public Utilities Commission's (Commission) Order accepting SMMPA's 2014-2028 IRP,[3] the Commission accepted energy savings approximating 1.3 percent of SMMPA's retail sales.

2. Historical Performance

Since the creation of an energy savings goal through the 2007 Next Generation Energy Act, SMMPA's annual energy savings as a percent of total retail sales has increased significantly. Table 4 below shows SMMPA's historical energy savings (2005-2016).

[3] Docket No. ET9/RP-13-1104.

Table 4: SMMPA's Historical DSM Conservation Achievements

Year	Annual Incremental Savings (MWh)	% of Retail Sales	Aggregated Savings Lifetime (Years)	First Year Cost Per MWh	Lifetime Cost per MWh
2005	14,157	0.48%	12.2	$232	$19.05
2006	17,769	0.61%	12.2	$203	$16.63
2007	27,966	0.95%	12.2	$161	$13.19
2008	26,226	0.89%	12.1	$187	$15.55
2009	38,923	1.33%	12.2	$152	$12.50
2010	49,674	1.70%	12.3	$153	$12.42
2011	47,944	1.64%	11.9	$145	$12.11
2012	48,748	1.70%	11.9	$150	$12.57
2013	58,984	2.08%	13.0	$117	$9.03
2014	57,965	2.02%	12.2	$124	$10.14
2015	43,009	1.50%	11.6	$176	$15.15
2016	43,317	1.52%	11.6	$177	$15.35

As shown above, SMMPA has surpassed Minnesota's 1.5 percent of retail sales energy savings goal every year since 2010. At the time of filing its IRP, SMMPA projected that it would meet the energy savings goal in 2017 as well.

The Department notes that SMMPA provided helpful information by providing both the first year and lifetime cost per MWh of energy savings. SMMPA's lifetime cost per kWh of energy savings was approximately 2 cents per kWh in 2005. The Department calculates that from 2007 to 2016 SMMPA's achieved lifetime energy savings costs averaged 1.24 cents per kWh.

3. SMMPA's Proposed Energy Savings for 2018-2032

SMMPA plans to continue to meet Minnesota's 1.5 percent energy savings goal over the planning period as shown in Table 5 below.

Table 5: SMMPA's Proposed Energy Savings Achievements

Year	Annual Incremental Savings (MWh)	Percentage of Retail Sales	Aggregated Savings Lifetime (Years)	First Year Cost Per MWh	Lifetime Cost per MWh
2018	44,629	1.50%	12.1	$177	$14.66
2019	44,821	1.50%	12.1	$179	$14.81
2020	45,393	1.51%	12.1	$180	$14.85
2021	46,093	1.52%	12.1	$180	$14.84
2022	46,979	1.54%	12.1	$179	$14.78
2023	47,730	1.56%	12.1	$179	$14.76
2024	48,472	1.57%	12.1	$179	$14.76
2025	49,079	1.59%	12.1	$179	$14.79
2026	49,768	1.60%	12.1	$179	$14.81
2027	50,319	1.61%	12.1	$180	$14.86
2028	50,868	1.62%	12.1	$181	$14.92
2029	50,875	1.62%	12.1	$183	$15.14
2030	34,227	1.62%	12.1	$183	$15.12
2031	22,785	1.62%	12.1	$183	$15.12
2032	22,785	1.62%	12.1	$183	$15.12

SMMPA's proposed energy savings levels average 43,655 MWh per year over the planning period.

The Department appreciates SMMPA's approach to its energy and demand savings goals; the Agency recognizes the challenges that lie ahead, but proposes to work hard to continue to achieve them. The Department recommends that the Commission accept SMMPA's proposed energy savings averaging 43,655 MWh per year.

4. SMMPA's Actual and Projected Demand Savings for 2005-2032

Table 6 below shows SMMPA's annual incremental demand savings achievements for 2005-2016 and projected demand savings for 2017-2032.

Table 6: SMMPA'S Actual and Projected Demand Savings 2005-2032

	Incremental DSM-Conservation Savings (MW)	Incremental Member Direct Load Control Savings (MW)	Incremental Energy Management Program Savings (MW)	Incremental Member Other Peak Shaving[4] (MW)	Total Annual Incremental Peak Demand Savings (MW)
2005	3.2	13.0	8.3	NA	**24.5**
2006	7.9	12.0	5.0	NA	**25.0**
2007	7.6	12.8	5.3	NA	**25.7**
2008	10.1	26.3	7.0	NA	**43.4**
2009	13.2	29.7	10.4	NA	**53.3**
2010	14.6	23.7	9.8	NA	**48.1**
2011	14.5	25.2	9.9	NA	**49.6**
2012	14.2	32.5	9.7	NA	**56.5**
2013	13.8	27.9	11.3	NA	**53.0**
2014	13.0	26.5	10.5	NA	**50.0**
2015	6.7	12.4	3.2	NA	**22.4**
2016	5.9	12.4	2.3	NA	**20.7**
2017	10.0	10.3	2.3	3.8	**26.3**
2018	10.4	10.6	6.9	3.8	**31.7**
2019	10.6	10.9	6.9	3.8	**32.2**
2020	10.7	10.9	6.9	3.8	**32.3**
2021	10.9	10.9	6.9	3.8	**32.4**
2022	11.1	11.0	6.9	3.8	**32.7**
2023	11.4	11.0	6.9	3.8	**33.0**
2024	11.6	11.0	6.9	3.8	**33.2**
2025	11.7	11.0	6.9	3.8	**33.4**
2026	11.7	11.0	6.9	3.8	**33.4**
2027	11.8	11.1	6.9	2.5	**32.3**
2028	12.0	11.1	6.9	2.5	**32.5**
2029	12.0	11.1	6.9	2.5	**32.5**
2030	5.3	8.2	6.5	2.5	**22.4**
2031	5.3	8.2	6.5	2.5	**22.4**
2032	5.3	8.2	6.5	2.5	**22.5**

D. MODELING AND SUPPLY-SIDE RESOURCES

1. Introduction

The Petition states that SMMPA used "a detailed hourly production cost model AURORAxmp Electric Market Model" to evaluate resource needs and alternatives for this proceeding. EPIS, LLC is the developer of AURORAxmp. SMMPA described AURORAxmp as follows:

[4] Some SMMPA members also operate municipal facilities emergency generation for load reduction during peak periods. The estimated demand reductions from those activities are shown in the "Member Other Peak Shaving" column since those demands are included in SMMPA's 2017 Load Forecast (the source of the projected 2017-2032 demands) and IRP modeling.

> The model also determines if there is enough total generating capacity to serve the peak demand plus reserve requirements every year. When the model encounters a year with insufficient reserves, it will choose additional generation from a pool of resource options … The model searches for the lowest overall cost resource option by performing multiple iterations using each resource option until it achieves the lowest overall cost.

Based upon this information, the Department concludes that AURORAxmp can be used as a capacity expansion model and AURORAxmp's use will allow SMMPA to potentially determine the least-cost expansion plan in the IRP, including the size, type, and timing of resource additions. SMMPA's use of AURORAxmp will also allow future certificate of need proceedings to focus on which alternative best meets the IRP-determined size, type and timing rather than revisiting the issues of the least-cost level of renewables and DSM.

Figure 4 below illustrates the Commission's processes as they apply to a cooperative such as SMMPA. Briefly, the three steps are:

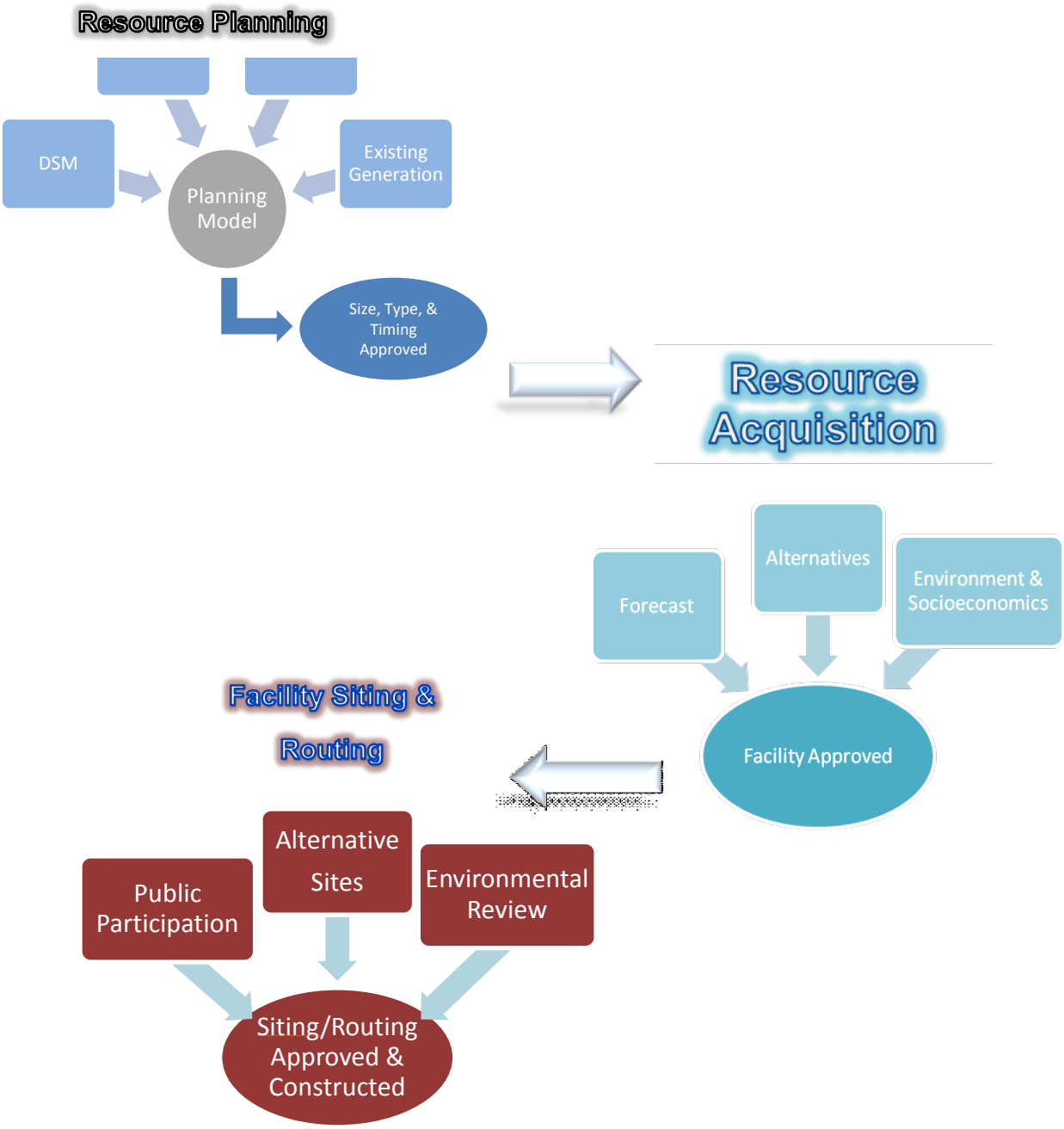
1. resource planning:
   - determine the least cost size, type, and timing of the expansion units, including renewable and demand-side resources;

2. certificate of need:
   - determine least cost facility to meet the IRP-determined size, type, and timing;

3. energy facility permitting:
   - determine best site/route for the CN-determined facility.

The Department notes that one of the chief differences between the Commission processes for an investor-owned and a municipal generation and transmission (Municipal G&T) utility is that the Commission does not determine the rates for a Municipal G&T utility. In addition, the Commission's authority over the IRP of a Municipal G&T utility is limited to providing advice.

Figure 4: Commission Process for Municipal G&T Utility



SMMPA's five-year action plan includes:

- add the 100-MW Stoneray Wind Project in 2020;
- contract for 3 MW of solar from a new facility if at least 25 percent of the new facility is subscribed to by retail customers of participating SMMPA members for the full twenty-five year term of the anticipated purchase power agreement by October, 2018;
- continue to operate and maintain the Agency's existing fleet of generation resources; and
- offer demand-side management (DSM) and energy conservation programs in order to meet Minnesota's Conservation Improvement Program (CIP) annual energy savings goal of 1.5 percent.

The long-term action plan is to use the MISO capacity market and bilateral purchases/sales to manage the Agency's capacity surplus/deficit. This is because the Agency's power sales contracts with Austin Utilities (AU) and Rochester Public Utilities (RPU) end on March 31, 2030. The departure of AU and RPU reduces the Agency's load by more than 50 percent. Thus, committing to long-term resource additions is unlikely to be cost effective.

Since SMMPA will not be adding non-renewable resources as part of the five-year action plan—and does not plan to add such resources for the 15-year planning period—the Department did not create its own model of SMMPA's system using Strategist. However, the Department briefly reviewed SMMPA's modeling efforts.

2. Review of SMMPA's Modeling

a. Review of model inputs

The first step of the Department's analysis of SMMPA's modeling was to determine the goal of the various modeling runs (*i.e*., what AURORAxmp attempted to minimize). On page 2-2 of the Petition SMMPA stated that the AURORAxmp "searches for the lowest overall cost resource option by performing multiple iterations using each resource option until it achieves the lowest overall cost." The Department concludes that minimizing total system costs is reasonable as long as the calculations include the Commission's externality values and CO_2 internal cost estimate in some of the modeling; given the limited nature of the current IRP, the Department did not explore the details of AURORAxmp's operation or SMMPA's modeling efforts.

In the second step, the Department reviewed SMMPA's modeling inputs as provided in the Petition's Exhibits 1 and 2. Information on SMMPA's modeling inputs for existing units is included in Exhibit 1 of the Petition. Information on SMMPA's modeling inputs for expansion

alternatives is included in Exhibit 2 of the Petition. The Department compared SMMPA's data to information provided by Northern States Power Company d/b/a Xcel Energy in Docket No. E002/RP-15-21 (for Sherco 3), by SMMPA in EIA Form 923, by the Agency's annual filing under Minnesota Rules 7610, and other sources.

The items of note from this review are as follows. First, while SMMPA's cost for new wind is somewhat high, it would be a reasonable price after the PTC expires. Also, SMMPA included shares of a new coal plant and a nuclear plant among the future supply-side resources. The Department considers it unlikely that SMMPA would be able to find a share of a new coal or nuclear plant. However, it might be possible to find a share of an existing plant. Also, one purpose of an IRP is to explore alternatives. Therefore, the Department concludes that inclusion of a share of a coal or nuclear plant among the options is reasonable. The Department notes that, per the Petition's Table 8-1, these units were not selected in any case. Overall, based upon review of this information the Department concludes that SMMPA's modeling inputs regarding existing and future generation resources are reasonable.

b. Review of scenarios modeled

Table 8-1 on pages 8-2 and 8-3 of SMMPA's IRP contain a summary of the scenarios modeled by SMMPA. In all, SMMPA modeled a base case and 10 scenarios. SMMPA ran relatively few scenarios and sometimes varied multiple inputs with each scenario. For example, Case 1 changed externality values from low (in the base case) to high, LMPs from base to high, and natural gas prices from base to high. It is reasonable to link LMPs and natural gas prices because natural gas, along with coal, is a common marginal fuel in MISO. It is also reasonable to link LMPs and CO_2 prices because the marginal unit often emits CO_2.[5] The approach of changing multiple inputs has the benefit of enabling the modeler to create multiple overall futures. However, the approach of changing both natural gas prices and externality values in the same scenario has the cost of making it difficult to determine the impact of any one change on the expansion plan.

The Department notes that SMMPA labeled some scenarios (Cases 6 through 9). This label enables the reader to more easily understand what SMMPA is attempting to do with each scenario. In future IRPs SMMPA should consider labeling all of the cases so as to better communicate the goal of each scenario.

[5] Recent data from MISO indicates that CO_2-free resources such as wind are sometimes marginal (following load), but account for less than 20 percent of the hours a fuel is marginal.

c. Review of model outputs

SMMPA's modeling results indicate that peaking purchases and solar additions are the Agency's marginal units. That is, when inputs change, the expansion plan adapts by changing the number of peaking purchases and solar units added.[6] Thus, decreases in load forecast or increases in DSM can cause solar additions to decrease. This phenomena regarding solar additions was observed by the Department in other recent resource plans such as those for Otter Tail Power Company (E017/RP-16-386) and Minnesota Power, an operating division of ALLETE, Inc. (E015/RP-15-690). Furthermore, the large loss of load late in the IRP makes the addition of any permanent resources a higher risk option.

Based upon review of AURORAxmp's outputs, the Department concludes that SMMPA's five-year action plan is reasonable. Potential actions beyond the five-year action plan can be reviewed in future IRPs.

E. COMPLIANCE WITH THE RENEWABLE ENERGY STANDARD

1. Background

Prior to the 2007 Legislative Session, Minn. Stat. §216B.1691 required utilities to make a good faith effort to obtain 15 percent of their Minnesota retail sales from eligible energy technologies by 2015, and to obtain 0.5 percent renewable energy from biomass technologies. The 2007 Minnesota Legislature amended Minn. Stat. §216B.1691 to include a Renewable Energy Standard (RES) beginning in 2010. As amended, Minn. Stat. §216B.1691, Subd. 2 sets forth the Renewable Energy Objective in place through 2010 and requires that:

> Each electric utility shall make a good faith effort to generate or procure sufficient electricity generated by an eligible energy technology to provide its retail customers or the retail customers of a distribution utility to which the electric utility provides wholesale electric service so that commencing in 2005, at least one percent of the electric utility's total retail electric sales to retail customers in Minnesota is generated by eligible energy technologies, and seven percent of the electric utility's total retail electric sales to retail customers in Minnesota by 2010 is generated by eligible energy technologies.

[6] For examples, see cases 2, 5, 6, 9, and 10 in Table 8-1.

Minn. Stat. §216B.1691, Subd 2a established the Renewable Energy Standard utilities must meet through 2025 and specifically requires that:

> Each electric utility shall generate or procure sufficient electricity generated by an eligible energy technology to provide its retail customers in Minnesota, or the retail customers of a distribution utility to which the electric utility provides wholesale electric service, so that at least the following standard percentages of the electric utility's total retail electric sales to retail customers in Minnesota is generated by eligible energy technologies by the end of the year indicated:
>
> - 2012 12 percent
> - 2016 17 percent
> - 2020 20 percent
> - 2025 25 percent

The statute no longer requires that a portion of the renewable energy generation come from biomass technologies. An eligible energy technology is defined by Minn. Stat. §216B.1691, Subd. 1 as an energy technology that:

> Generates electricity from the following energy sources: (1) solar; (2) wind; (3) hydroelectric with a capacity of less than 100 megawatts; (4) hydrogen, provided that after January 1, 2010, the hydrogen must be generated from the resources listed in this clause; or (5) biomass, which includes without limitation, landfill gas, an anaerobic digester system, and an energy recovery facility used to capture the heat value of mixed municipal solid waste or refuse-derived fuel from mixed municipal solid waste as a primary fuel.

Minn. Stat. §216B.1691, subd. 2(d) directs the Commission to "issue necessary orders detailing the criteria and standards by which it will measure an electric utility's efforts to meet the renewable energy objectives of subdivision 2 to determine whether the utility is making the required good faith effort."

The Commission set forth the criteria for determining compliance with the RES Statute after taking comments from affected parties in a number of Orders.[7] Among the resources the Commission has determined ineligible for meeting the RES are resources used for green pricing, resources that do not meet the statutory definition of eligibility, and generation assigned to compliance for other regulatory purposes such as another state's Renewable Portfolio Standard Requirements (RPS)

The 2007 amendment to Minn. Stat. §216B.1691, Subd. 4 required the Minnesota Public Utilities Commission to establish a program for tradable Renewable Energy Credits (RECs) by January 2008, and to require all electric utilities to participate in a Commission-approved REC tracking system once such a system was in operation.

The Commission subsequently adopted the use of the Midwest Renewable Energy Tracking System (M-RETS), a multi-state REC tracking system, as the REC tracking system under Minn. Stat. §216B.1691, Subd. 4(d) and required Minnesota utilities to participate.[8] Specifically, the Commission required utilities to complete the online registration process and sign the Terms of Use agreement with the M-RETS system administrator APX, Inc., and receive account approval from APX by January 1, 2008. In addition, the Commission directed utilities to make a substantial and good faith effort to create a system account and sub-accounts for its organization, and to register its generation units/facilities in the M-RETS system by March 1, 2008.

In its December 18, 2007 *Order Establishing Initial Protocols for Trading Renewable Energy Credits,* the Commission adopted a four-year shelf life for all renewable energy credits to be used for compliance with the Minnesota RES. A four-year shelf life allows a REC to be retired

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[7] *In the Matter of Detailing Criteria and Standards for Measuring an Electric Utility's Good Faith Efforts in Meeting the Renewable Energy Objectives Under Minn. Stat. §216B.1691,* Docket No. E999/CI-03-869, Initial Order Detailing Criteria and Standards for Determining Compliance with Minn. Stat. §216B.1691 and Requiring Customer Notification by Certain Cooperative, Municipal, and Investor-Owned Distribution Utilities. (June 1, 2004) *In the Matter of Detailing Criteria and Standards for Measuring an Electric Utility's Good Faith Efforts in Meeting the Renewable Energy Objectives Under Minn. Stat. §216B.1691,* Docket No. E999/CI-03-869; *In the Matter of a Commission Investigation into a Multi-State Tracking and Trading System for Renewable Energy Credits,* Docket No. E999/CI-04-1616, Second Order Implementing Minn. Stat. §216B.1691, Opening Docket to Investigate Multi-State Program for Tracking and Trading Renewable Credits and Requesting Periodic Updates from Stakeholder Group; (October 19, 2004) *In the Matter of Detailing Criteria and Standards for Measuring an Electric Utility's Good Faith Efforts in Meeting the Renewable Energy Objectives Under Minn. Stat. §216B.1691,* Docket No. E999/CI-03-869, Order After Reconsideration (August 13, 2004)

[8] *In the Matter of a Commission Investigation into a Multi-State Tracking and Trading System for Renewable Energy Credits,* Docket No. E999/CI-04-1616, Order Approving Midwest Renewable Energy Tracking System (M-RETS) Under Minn. Stat. §216B.1691, Subd. 4(d), and Requiring Utilities to Participate in M-RETS (October 9, 2007)

towards MN RES compliance in the year of generation and during the four years following the year of generation.

Finally, in its December 3, 2008 *Third Order Detailing Criteria and Standards for Determining Compliance under Minn. Stat. §216B.1691 and Setting Procedures for Retiring Renewable Energy Credits*, the Commission directed utilities to begin retiring RECs equivalent to one percent of their Minnesota annual retail sales for the 2008 and 2009 compliance year by May 1st of the following year. Upon retirement, RECs are transferred into a specific Minnesota RES retirement account and, once retired, are not available to meet other state or program requirements, thus addressing the statutory prohibition against double counting the RECs and promoting the environmental benefits of renewable energy. The Commission further directed the utilities to submit a compliance filing demonstrating their compliance with the RES by June 1 of each year.

In addition to amending the RES Statute, Minn. Stat. §216B.241, Subd. 1c(b) was added to establish an energy-savings goal as part of a utility's conservation improvement plan (CIP), and states:

> Each individual utility and association shall have an annual energy-savings goal equivalent to 1.5 percent of gross annual retail energy sales unless modified by the commissioner under paragraph (d). The savings goals must be calculated based on the most recent three-year weather normalized average.

The attainment of the 1.5 percent energy savings goal will reduce a utility's forecasted retail sales, and consequently lower the amount of renewable generation required to meet RES obligations.

2. SMMPA's RES

Table 7, below, summarizes SMMPA's RES requirement in MWh's over the forecast period. SMMPA's forecasted retail sales have been adjusted to reflect the impact of demand-side management programs.

Table 7: SMMPA's Renewable Energy Objective

Year	MN Retail Sales	RES Percentage	RES Requirement (MWhs)
2017	3,007,399	17	511,258
2018	3,025,112	17	514,269
2019	3,047,773	17	518,121
2020	3,068,848	20	613,770
2021	3,074,221	20	614,844
2022	3,101,862	20	620,372
2023	3,111,428	20	622,286
2024	3,130,514	20	626,103
2025	3,136,496	25	784,124
2026	3,147,099	25	785,775
2027	3,158,386	25	789,597
2028	3,176,191	25	794,048
2029	3,182,352	25	795,588
2030	1,831,117	25	457,773
2031	1,417,696	25	354,424
2032	1,424,750	25	356,188

SMMPA's RES requirement over the planning period initially increases from 511,258 RECs in 2017 to 795,588 RECs in 2029, but drops sharply with the loss of load from Austin and Rochester Public Utilities in 2030.

3. Renewable Generation Resources

a. Existing and Planned Resources

SMMPA has registered its renewable generation facilities in the Midwest Renewable Energy Tracking System (M-RETS). At present, SMMPA has approximately 366,299 MWh in annual renewable generation. As noted above, RECs have a four-year shelf life for compliance use. Currently, SMMPA has an unretired REC balance of approximately 1,398,187 MWh that may be carried forward and used for future RES compliance. With the unretired REC balance, SMMPA has sufficient renewable generation to meet its RES requirements through 2023. In addition to its existing facilities, SMMPA has entered into a 20-year power purchase agreement for the energy from a 100-MW wind facility beginning in 2020. With the additional wind generation, SMMPA will have sufficient renewable resources to meet its RES requirement throughout its planning period.

Table 8: RES Compliance with Existing & Planned Resources

Year	REO/RES Requirement MWh	SMMPA Existing Renew. Generation (MWh)	Planned Wind Addition 100 MW	Cumulative Surplus/ (Deficit)
				Beg. Balance: 1,398,187
2017	511,258	366,299		1,543,146
2018	514,269	366,299		1.395.176
2019	518,121	366,299		1.243.353
2020	613,770	366,299	350,400	1.346.283
2021	614,844	366,299	350,400	1.448.138
2022	620,372	366,299	350,400	1.544.464
2023	622,286	366,299	350,400	1.638.878
2024	626,103	366,299	350,400	1.729.474
2025	784,124	366,299	350,400	1.662.049
2026	785,775	366,299	350,400	1.591.973
2027	789,597	366,299	350,400	1.519.076
2028	794,048	366,299	350,400	1.441.727
2029	795,588	366,299	350,400	1.362.838
2030	457,773	366,299	350,400	1.621.758
2031	354,424	366,299	350,400	1.984.033
2032	356,188	366,299	350,400	2.344.544

F. ENVIRONMENTAL ISSUES

The Department generally reviews utility resource plans for compliance with pending state and national environmental legislation that impacts the electric utility's operations. SMMPA provided information on the environmental regulations to which it is subject, and stated that it complies with these regulations.

In its IRP, SMMPA addressed its efforts to meet the Acid Rain Program, Cross State Air Pollution Rule, Mercury and Air Toxics Standards, and Minnesota's greenhouse gas reduction goals.

1. Reductions in Sulfur Dioxide (SO_2) and Nitrous Oxide (NO_x)

The Acid Rain provisions of the federal Clean Air Act (CAA) Amendments established fixed allowances for SO_2 and limits for emission rates on NO_x. The Cross State Air Pollution Rule also focuses on reductions in SO_2 and NO_x. Sherco 3 is the only SMMPA unit subject to allowance limits, and is jointly owned by SMMPA (41% ownership) and Xcel Energy (59% ownership). SMMPA indicated that it expects Sherco 3 to meet SO_2 emission rates without major modifications. In 2008, low-NO_x burners were installed in Sherco 3 to bring Sherco 3 into compliance with NO_x emissions requirements.

2. Mercury

The Minnesota Mercury Emission Reduction Act of 2006 targeted reductions in mercury emissions from the largest facilities owned by Xcel Energy and Minnesota Power. Although SMMPA was not specifically subject to the Act, as part owner of Sherco 3, the Agency worked with Xcel to comply with the mercury reduction requirements. SMMPA stated that at the time it submitted its current IRP, the Minnesota Pollution Control Agency (MPCA) had not yet set a final mercury emission level for Sherco 3.

3. Greenhouse Gas Emissions

a. Introduction

Minnesota Statutes §216H.02 subd. 1 states that Minnesota has a goal to reduce statewide greenhouse gas (GHG) emissions across all sectors to a level at least 15 percent lower than 2005 levels by 2015, at least 30 percent below 2005 levels by 2025, and at least 80 percent below 2005 levels by 2050.

In 2013, the Minnesota Legislature passed amendments to Minnesota Statutes §216B.2422, subd. 4. The newly amended legislation now states (new language underlined):

> The commission shall not approve a new or refurbished nonrenewable energy facility in an integrated resource plan or a certificate of need, pursuant to section 216B.243, nor shall the commission allow rate recovery pursuant to section 216B.16 for such a nonrenewable energy facility, unless the utility has demonstrated that a renewable energy facility is not in the public interest. <u>The public interest determination must include whether the resource plan helps the utility achieve the greenhouse gas reduction goals under section 216H.02, the renewable energy</u>

> standard under section 216B.1691, or the solar energy standard under section 216B.1691, subdivision 2f.

On August 5, 2013, the Minnesota Public Utilities Commission issued a Notice of Information in Future Resource Plan Filings (Commission's Letter). The Commission Letter states, in part:

> **PLEASE TAKE NOTICE** that the Commission expects utilities to include in their resource plans filed after August 1, 2013 an explanation how the resource plan helps the utility achieve the greenhouse gas reduction goals, renewable energy standard, and solar energy standard as listed in the above-referenced legislation. Parties should also be prepared to discuss the matter in comments.

On pages 9-3 through 9-5 of its IRP, SMMPA discussed how its preferred resource plan would help the utility achieve the greenhouse gas reduction goals under 216H.02.

SMMPA calculated its CO_2 emissions using the following approach:

- Totaled the GHG emissions from all SMMPA generation resources for each year;
- Added emissions from utility purchases for each year (using the actual Midwest Reliability Organization (MRO) West pool emissions rate for each year and using the projected MRO West emissions rate for 2025; and
- Subtracted CO_2 emissions from sales from utility-owned generation.

Table 9 below provides a summary of SMMPA's actual and projected CO_2 emissions levels.

Table 9: Comparing SMMPA's Projected 2015 and 2025 CO_2 Emissions to 2005 CO_2 Emissions

Year	Energy Production (GWh)	Emissions (Tons CO_2)	% Reduction From 2005 Emissions
2005	2,866,214	2,941,479	NA
2015	2,782,183	2,384,505	19%
2025	2,957,290	2,013,386	32%

From 2005 to 2015, SMMPA's CO_2 emissions declined by 19 percent. On page 9-4 of its IRP SMMPA lists six steps that led to the reductions, including a 100-MW wind power purchase agreement, the success of its DSM projects, and retirement of a 30-MW coal fired facility. By 2025, SMMPA projects a CO_2 reduction of 32 percent, by continuing its DSM programs, adding 100 MW more of wind, and potentially by purchasing the output of a 3-MW solar plant. It appears that SMMPA is on track to meet the State's GHG reduction goal for 2025.

4. Reciprocating Internal Combustion Engine Rules

SMMPA has a number of facilities using reciprocating internal combustion engines (RICE). New standards for RICE resources have been established by the Environmental Protection Agency (EPA). Rather than retire these facilities, SMMPA chose to implement the standards for its members with generators under contract to SMMPA for which SMMPA has operation and maintenance (O&M) responsibility. Meeting the standards required installation of oxidation catalysts on each engine to remove in excess of 70 percent of carbon monoxide emissions. Additional changes included replacing the silencer and exhaust stacks, adding crankcase ventilation, and implementing formal operations and maintenance procedures designed to optimize operations and minimize emissions. SMMPA states that the cost of the upgrades was approximately $3.3 million.

The Department concludes that SMMPA is reasonably monitoring environmental regulations.

III. RECOMMENDATIONS

The Department recommends that the Commission accept SMMPA's 2018-2032 IRP for planning purposes.

/lt

CERTIFICATE OF SERVICE

I, Sharon Ferguson, hereby certify that I have this day, served copies of the following document on the attached list of persons by electronic filing, certified mail, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

Minnesota Department of Commerce
Comments

Docket No. ET9/RP-17-753

Dated this 26th day of March 2018

/s/Sharon Ferguson

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