



3724 West Avera Drive
PO Box 88920
Sioux Falls, SD 57109-8920
Telephone: 605.338.4042
Fax: 605.978.9360
www.mrenergy.com

February 28, 2017

Filed via E-Dockets

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

RE: In re Missouri River Energy Services 2016 Integrated Resource Plan
Docket ET10/RP-16-509

Dear Mr. Wolf,

Attached for filing in the above-referenced docket, please find the Reply Comments of Missouri River Energy Services in this matter. Also attached is an Affidavit of Service.

Please do not hesitate to contact me by email at mrg.simon@mrenergy.com or by phone at 605-338-4042 if you have any questions.

Sincerely,

/s/ Mrg Simon

Mrg Simon
Director, Legal

Attachments

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Nancy Lange	Chair
Dan Lipschultz	Commissioner
Matt Schuerger	Commissioner
Katie Sieben	Commissioner
John Tuma	Commissioner

In the Matter of the
Missouri River Energy Services
2016 Integrated Resource Plan

Docket ET10/RP-16-509
Date: February 28, 2017

REPLY COMMENTS OF
MISSOURI RIVER ENERGY SERVICES

Missouri Basin Municipal Power Agency, doing business as Missouri River Energy Services (MRES) offers these Reply Comments in response to the Comments of the Minnesota Department of Commerce, Division of Energy Resources (DOC or Department) regarding the MRES Integrated Resource Plan (IRP), filed on December 1, 2016. These Reply Comments respond first to the Department's requests for additional information contained in their Comments, and second, to their recommendations regarding information requirements in future filings. The Department recommends that the Public Utilities Commission (Commission) accept the Integrated Resource Plan for filing, and requests the Commission enter its order accepting this MRES filing. MRES appreciates the Department's ultimate recommendations, and requests the Commission adopt the recommendation and approve the MRES 2016 IRP for filing.

Introduction

MRES is a not-for-profit municipal power agency that provides wholesale power, energy, transmission, and energy services to its 60 Member municipal utilities in the states of Iowa, Minnesota, North Dakota, and South Dakota. MRES was created by the municipalities it serves as a means to jointly provide power supply and transmission to meet the needs of their growing communities. Twenty-four municipal electric utilities in Minnesota¹ are Members of MRES, and they are generally rural and residential. They are located primarily in western Minnesota, and range in size from a population just over 700 in Westbrook to our largest MRES community,

¹ The Minnesota Members of MRES are the municipal electric utilities of Adrian, Alexandria, Barnesville, Benson, Breckenridge, Detroit Lakes, Elbow Lake, Henning, Hutchinson, Jackson, Lakefield, Lake Park, Luverne, Madison, Marshall, Melrose, Moorhead, Ortonville, Saint James, Sauk Centre, Staples, Wadena, Westbrook, and Worthington. In its Comments, the Department counted only 23 Members in Minnesota, and inadvertently omitted Hutchinson (the only Minnesota Member that does not have an S-1 Agreement for power supply, as described below). See "Comments of the Minnesota Department of Commerce, Division of Energy Resources," *In re Missouri River Energy Services 2016 Integrated Resource Plan*, Docket ET10/RP-16-509, filed Dec. 1, 2016 (DOC Comments), page 7.

Moorhead, with a population approaching 40,000. The Minnesota Members of MRES serve a total population base of about 80,000.

Only a handful of MRES Member communities have more than 5,000 meters, or have heavy commercial and industrial customers. As Public Power entities, MRES and its municipal utility Members are locally regulated by public officials elected (or appointed, in some cases) by the very consumers who own the electric utility. In establishing MRES, the Members required a 13-member Board of Directors – each elected from among the Members – to govern the joint action agency.

Under the resource planning statute, Minn. Stat. §216B.2422, subd. 1(b), neither MRES nor Western Minnesota is within the definition of a “utility,” nor are they public utilities, as defined by Minn. Stat. §216B.02, subd. 4. MRES files its resource plan with the Commission for advisory purposes, to ensure that both the Commission and Department are informed regarding plans to meet the needs of MRES Members well into the future – including the customer-owners of the 24 MRES Member municipal utilities in Minnesota. The Department conducted its review of the MRES 2017-2031 IRP with the understanding that the Commission’s role is advisory, and that the analysis in the IRP may have a significant bearing on future MRES regulatory proceedings.²

Power Supply Arrangements with Members

MRES has 60 Member municipal utilities, 57 of which are S-1 Members.³ These 57 Members purchase power from the Western Area Power Administration (WAPA) and receive allocations of federal hydroelectricity pursuant to contracts with WAPA. For these municipalities, MRES provides all supplemental power requirements over and above their WAPA allocations pursuant to power sale agreements (S-1 Agreements) that extend to 2057.⁴ The S-1 Agreements are long-term contracts among each individual S-1 Member, MRES, and Western Minnesota Municipal Power Agency (Western Minnesota). Western Minnesota is a municipal power agency, created under Minn. Stat. §453.41, et seq. It owns most of the generating resources and some transmission resources, and it sells the entire capacity to MRES pursuant to an exclusive contract. MRES uses these resources to provide most of the firm capacity to serve MRES Members’ power supply needs.

The three remaining Members of MRES each have long-term power supply agreements with MRES that are different in individual respects from the S-1 Agreements. Those Members are

² DOC Comments, page 7.

³ Twenty-three of the MRES Members in Minnesota are S-1 Members. Hutchinson is a Non S-1 Member, and it does not have a contract with WAPA.

⁴ Note that as of January 2, 2017, the term of the S-1 Agreements now extends to 2057, based on the recent amendment to the agreements. Previously, the term of the S-1 Agreements ran through 2046 (not 2030, as indicated in the Department’s comments; only the Atlantic Non S-1 Agreement has a term ending in 2030). See *id.*, page 2.

Atlantic (Iowa), Pella (Iowa), and Hutchinson (Minnesota). All MRES sales are wholesale sales to serve its municipal utility Members, or wholesale transactions in organized markets and/or bilateral agreements with other wholesale utilities. Additionally, MRES does not own generating resources. Western Minnesota, on the other hand, owns generating resources. However, it has only one wholesale customer, MRES.

As of October 2015, the MRES Member load was split between two Regional Transmission Organizations: the Midcontinent Independent System Operator (MISO) and the Southwest Power Pool. Twenty-seven Members, representing about half of MRES energy sales, are located within the MISO market area, and the remaining 33 Members are located within SPP. All Minnesota Members, except Luverne, Madison, and Moorhead, are in MISO. This market shift had the effect of stranding most of the capacity resources to serve MRES load in SPP, creating a capacity deficit in MISO. Although MRES has sufficient capacity overall to meet Member needs, the MISO/SPP split created an imbalance geographically. For this reason, the MRES 2016 Integrated Resource Plan reflects the first time that MRES has had to separately plan for the future needs of its Members on a geographic basis.

Discussion

This is the sixth time MRES has filed an IRP in Minnesota. MRES staff has appreciated the opportunity to consult with Department staff in preparing the IRP to ensure it provides useful information in a format generally consistent with similar plans. Over the years, this collaboration has given MRES the insight to become an early adopter of capacity expansion modeling through the use of the Strategist[®] software tool, and provide meaningful and concise facts to inform the planning processes and provide continuous improvement. As indicated, the Department recommends that the Commission accept for filing the MRES 2016 Integrated Resource Plan (IRP), and MRES joins in asking the Commission to accept our IRP.

While the Department recommends acceptance of the MRES IRP for filing, it has also included several requests for supplemental information (in addition to both informal and formal information requests exchanged between staff subsequent to the initial filing), and provided a number of recommendations for MRES to consider in future planning, either in the short-term or long-term. As the DOC stated, “Given the advisory nature of MRES’ IRP, the Department decided to suggest steps that may improve the Agency’s modeling rather than [comment] on developing a specific alternative expansion plan[.]”⁵ The Department asks the Commission to include its recommendations in its order accepting the MRES IRP. We appreciate the suggestions, and find most to be practical. Given the unique nature of MRES and its Members, however, there are some recommendations for which MRES asks the Commission to defer action or to decline.

In these Reply Comments, MRES first responds to each of the Department’s requests that additional information be provided in this filing. Then, MRES discusses each Department recommendation, in the order presented in their comments. For the convenience of the reader, this Discussion is organized in the following manner:

⁵ *Id.*, page 19.

A. Department Requests for Additional Information	6
1. Forecasting	6
2. Demand Side Management Resources	7
a. Historical energy savings	8
b. Historical incremental energy savings as percent of wholesale sales	8
c. Projected lifetime energy savings and costs	11
d. Contingency plans if unable to meet 1.5% energy savings goal	12
3. Greenhouse Gas Reduction Goals	13
a. Additional load added since 2005	14
b. Analysis of projected statewide CO ₂ emissions over planning period	15
B. Department Recommendations	19
1. Energy and demand forecasting	20
a. Short-term energy forecast	20
b. Short-term demand forecast.....	20
2. Modeling and supply-side recommendations	21
a. Additional conservation contingencies	22
b. Modeling more contingencies for all resource options.....	22
c. Make generic units with varying characteristics available in different years.....	23
d. Limit exposure to spot market prices	24
e. Model all costs for generic wind and solar as single, per MWh charge.....	26
f. Model price per MWh where wind and solar additions are least cost	26
3. DSM Resources.....	26
C. Conclusion	28

Tables and Graphs

Table R-1: Minnesota S-1 Members' Historical Incremental Energy Savings, As a Percent of MRES Minnesota Member Sales	8
Table R-2: All S-1 Members and Pella Historical Incremental Energy Savings, As a Percent of those MRES Member Sales	9
Table R-3: MRES DSM Projected Lifetime Energy Savings and Lifetime Costs	12
Table R-4: Historical and Projected Minnesota CO ₂ Emissions Levels, MRES Base Case.....	16
Table R-5: Historical and Projected Minnesota CO ₂ Emissions Levels, MRES Expected Conservation Case	17
Graph R-1: MRES System Incremental Savings (kW).....	10
Graph R-2: MRES System Incremental Savings (Million kWh)	10

A. Department Requests for Additional Information

The Department asked that MRES include in these Reply Comments supplemental information regarding three general matters. Those areas involve Forecasting of wind and solar, Demand Side Management and Greenhouse Gas Reduction Goals. Below, MRES responds to those requests.

1. Forecasting:

“The Department requests that MRES update its analysis of wind and solar additions by modeling all costs for generic wind and solar units as a single, per MWh charge; with a goal of determining the price per MWh at which additions of wind and solar capacity are least cost for MRES’s system.”⁶

In its summary of its Recommendations, the Department asked that MRES update its modeling for wind and solar additions. The DOC suggests that additional price contingencies should be constructed with and generic units having different characteristics available in different years, ‘similar to the way public utilities conduct their modeling.’ These suggestions are qualified by the Department’s acknowledgement that MRES “modeling of fixed and variable costs accurately portrays how actual costs are incurred by a utility for a utility-owned power plant,” although it argues that doing so makes it more difficult to review.⁷

In its original casework, MRES modeled cases with wind and solar at a flat price per MWh for additions in 2019. As indicated in its Strategist modeling files provided to the Department, generic wind and solar units were available for selection as resources for capacity expansion, and MRES used both fixed and variable costs to calculate the costs for these generic units, in the same way MRES models other resource options. The generic units represent either MRES-owned units or long-term purchases from units owned by others.

The Department asked MRES to construct new models to use different pricing for each plan year for generic wind and solar resources because, for example, the recently renewed federal renewable energy production tax credit (PTC) has a phase-out which creates different costs for each year through 2020, when the PTC expires. MRES respectfully declines to do so for several reasons. First, at the time MRES constructed its models for this IRP, the PTC had expired, and there was no “phase-out” of the credit to model.⁸ MRES constructs its models and cases based on

⁶ DOC Comments, page 41. *See also*, pages 20-21.

⁷ *Id.*, page 21.

⁸ When MRES identified the inputs to construct its modeling, the PTC had expired as of January 1, 2015. In late 2015 Congress retroactively extended the PTC from the end of 2014. In an unusual move, Congress also authorized the PTC for 5 years, unlike the usual 1- or 2-year credit. This legislation also included a phase-out by 2020 at a rate of 20% per year, a feature that has not been in previous renewable energy tax credit legislation. Tax Increase Prevention Act of 2014 (P.L. 113- 295).

the laws and regulations at the time of the modeling. In addition, the single pricing structure is based on accurate data, accepted modeling practices, and historic experience.

Second, the benefit of developing this additional data is outweighed by the limited value and the burden of constructing new models. While MRES appreciates that this approach might be justified for large, investor-owned utilities that add resources in large increments, it is not useful for MRES to develop at this point in the planning process. (It may be appropriate to do so in future resource plan filings.) Also, given the small staff of MRES, the limited resources for constructing new models are better utilized to meet ongoing operational priorities.

Third, the ability of intermittent resources to provide capacity on demand is presently limited (by the inability to store that energy). The inherent value of wind and solar generation is that they are energy resources, and not primarily capacity resources.⁹ MRES does believe that wind and solar have a valuable role to play in minimizing cost risks, and providing an effective energy hedging resource to minimize exposure to market price spikes. However, the usefulness of constructing new modeling for this resource plan to build out year-by-year pricing for both MISO and SPP is negligible.

The models constructed by MRES for this resource plan are valid for planning purposes. As reported in the IRP, the modeling concluded that \$76 was the breakeven point for wind and \$95 for solar. This result shows that wind units are slightly above the price per MWh at which additions of wind capacity are least cost for the MRES system, and establishes the data point for comparison purposes. This data meets the Department's goal to identify the price per MWh at which additions of wind and solar capacity are least cost for MRES.

2. Demand Side Management Resources

The Department's review of MRES Demand Side Management (DSM) Resources acknowledges that DSM is a priority for MRES. The IRP describes the additional specific efforts MRES has undertaken to achieve its goals, the new DSM potential study that analyzes potential energy saving opportunities during the study period of 2015-2039, and plans to achieve those energy savings. While the DOC acknowledges these highlights, it asked MRES to provide supplemental information regarding four additional details in these Reply Comments. Each request and the MRES response is detailed below.

⁹ The large amount of wind in this region and the likelihood of significant additional wind capacity have an established impact on energy market prices. When large amounts of wind generation are available, market prices are low. Generators even experience negative wind pricing, which can be economically sustained only given the income from the federal Production Tax Credit (which is not available to MRES or Western Minnesota because they are both not-for-profit, tax-exempt entities). Conversely, when there is little or no wind generation, market prices spike to significantly higher levels.

a. *“Please explain why the historical energy savings shown in Table 3-2 of the Petition differ from the MRES energy savings shown in the Department’s Electric Savings Program.”*¹⁰

The historical energy savings shown in Table 3-2 of the IRP represent only the savings achieved through the MRES[®] Bright Energy Solutions[®] (BES) program. Some MRES Members offer their own separate load management or additional energy efficiency programs that are not part of or integrated into the BES offerings. These activities increase the energy savings for those communities. The savings from those additional programs are not reported to MRES. So, when MRES Members file their individual reports for the Conservation Improvement Program (CIP), they report energy savings from BES, as well as savings from any individual load control efforts or energy efficiency programs. Thus, the savings reported by MRES in Table 3-2 of the IRP reflect only MRES BES program savings, and the higher amounts in the annual energy savings reported in the Department’s online Energy Savings Platform reflect additional efforts undertaken on the initiative of individual Member municipal utilities.

b. *“Please present the Agency’s historical incremental energy savings as a percent of wholesale sales, both for Minnesota only sales and for total system-wide sales.”*¹¹

The historical incremental energy savings as a percent of wholesale sales are shown in Table R-1 for MRES Minnesota Members, and Table R-2 for MRES 57 S-1 Members and Pella.

Table R-1 Minnesota S-1 Members’ Historical Incremental Energy Savings As a Percent of MRES Minnesota Member Sales			
Year	Energy Savings (million kWh)	Town Gate Load (MWh)	Energy Savings as Percent of MN Town Gate Load
2008	4.1	1,068,404	0.4%
2009	9.8	1,013,479	1.0%
2010	18.0	1,050,981	1.7%
2011	18.8	1,095,501	1.7%
2012	15.2	1,073,545	1.4%
2013	14.3	1,136,896	1.3%
2014	21.7	1,121,707	1.9%

¹⁰ DOC Comments, pages 25 (footnote 22), 30.

¹¹ *Id.*, pages 30, 41.

Table R-2
All S-1 Members and Pella Historical Incremental Energy Savings
As a Percent of those MRES Member Sales

Year	Energy Savings (million kWh)	Town Gate Load (MWh)	Energy Savings as Percent of Total Town Gate Load
2008	6.2	2,064,710	0.3%
2009	16.5	1,954,557	0.8%
2010	26.5	2,050,157	1.3%
2011	29.8	2,113,076	1.4%
2012	24.3	2,222,997	1.1%
2013	28.2	2,364,383	1.2%
2014	32.9	2,357,785	1.4%

In addition, the DOC also asks MRES to “*explain why both total cumulative and incremental DSM savings fell from 2011 through 2013 both in MRES system-wide and in Minnesota only.*”¹² Program savings fluctuated over the years primarily because these savings depend on customer decisions on when to make energy efficiency upgrades; those decisions include factors that relate to BES Program design and those over which utilities have no control. In addition to making available projects and financing, the overall costs, general economic conditions, and a customer’s past investments also influence customer adoption. The dips in 2012 and 2013 were atypical and do not reflect changes in MRES activities or support for DSM.

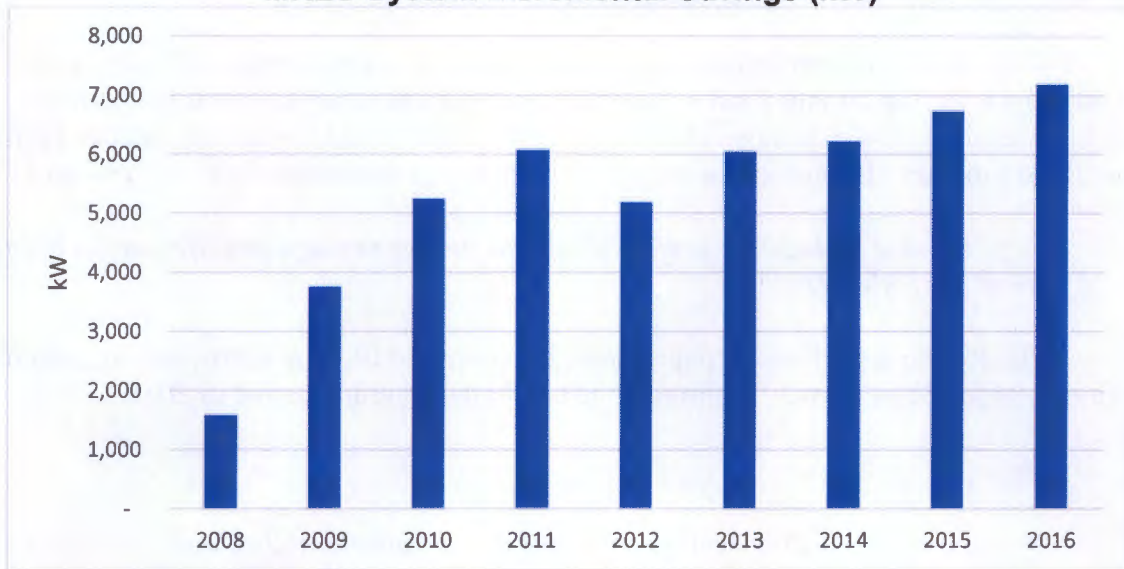
The MRES BES Program incentives and requirements do not change significantly from year to year. Each year, we review all measures in the program, and make minor changes. The Manager of Energy Services and her staff monitor changes to the Minnesota Technical Resource Manual (TRM) and work closely with consulting engineers at Franklin Energy when gauging possible changes. They also hold strategic planning sessions with Members about every three years to identify programs that are working well in their communities and those that are not. MRES then conducts a new economic analysis to find the cost-effectiveness of each measure using updated efficiency requirements, baseline savings, and incentives (in some cases), using both DSMore® software and the insight of Franklin Energy. These updated economic analyses have resulted in minor changes to the overall BES Program, and only occasionally supported discontinuing an individual measure when, for example, there is minimal additional potential savings because the baseline efficiency requirements of federal standards have changed.¹³

¹² *Id.*, page 26.

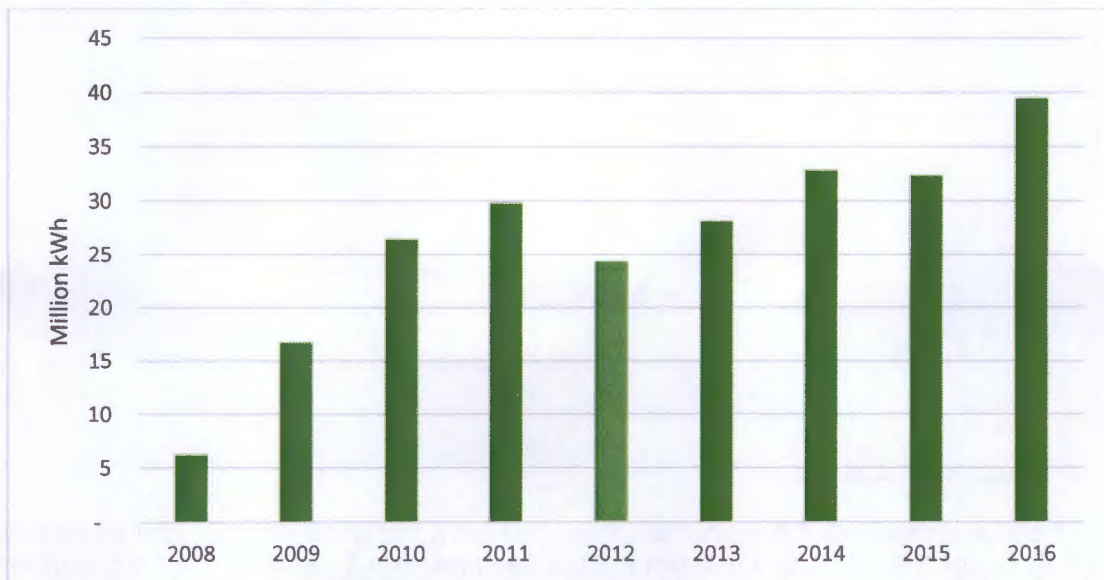
¹³ For example, MRES eliminated rebates for NEMA Premium motors in 2012 when new federal regulations required all new motors be NEMA Premium. (Motors had been a relatively small part of our savings, and the change does not explain the 2012 dip in savings.) DSMore analysis identified a few other programs as no longer cost-effective, and those were eliminated (*i.e.*, residential dishwashers). One small rebate was ended because it only resulted in minor savings (LED holiday light strings). The administrative

Despite the decreases in 2012 and 2013, MRES incentives and savings have trended upward since the program was rolled out. Graphs R-1 and R-2 illustrate this progress.

**Graph R-1
MRES System Incremental Savings (kW)**



**Graph R-2
MRES System Incremental Savings (Million kWh)**



burden for customers, Members, and MRES was simply not cost-effective. Finally, in 2017, CFL rebates were discontinued because the LED market has rendered CFLs obsolete.

This upward trend indicates that the continuing efforts over time to educate retail customers about energy efficiency and to promote the BES Program are paying off. MRES and its Members are in this for the long run, continually planting seeds with customers and encouraging them to invest in energy-efficiency improvements (efficiency education). Some years, more customers with high load factors participate and some years, fewer participate.¹⁴

MRES strives to keep incentives constant or even to increase them. Ultimately, the choices of customers drive the savings results. An occasional decrease from one year to another is probable over time. The reductions observed in 2012 and 2013 do not correspond to a scaling back of the DSM program offerings or incentives, or a change in the commitment to these goals.

c. "Please include the projected lifetime energy savings and lifetime \$/kWh for each year of MRES's IRP."¹⁵

Table R-3 on the following page details the projected lifetime energy savings and projected lifetime costs for DSM from 2015 through the end of the planning period in 2031.

*[The remainder of this page is intentionally blank.
The Table and discussion continue on the following page.]*

¹⁴ For some, especially C&I customers, it can take many months or even years of educational efforts before they decide the time is right to invest in those improvements. In addition, when customers do go forward with a project, the customer's load shape can have a dramatic impact on the amount of savings achieved. As an example, a lighting retrofit in a 3-shift/24-hour per day manufacturing facility will have substantially more savings than the same lighting retrofit in 1 shift/8-hour per day facility.

¹⁵ *Id.*, pages 25-26, 30.

**Table R-3
MRES DSM Projected Lifetime Energy Savings and Lifetime Costs**

Year	Lifetime Energy Savings (kWh)	Lifetime Costs (\$2015)	Lifetime Costs (\$/kWh)
2015	28,032,474	\$ 3,794,063	\$0.135
2016	87,324,260	\$ 8,385,407	\$0.096
2017	177,575,404	\$13,082,357	\$0.074
2018	298,338,801	\$17,896,666	\$0.060
2019	449,140,533	\$22,664,467	\$0.050
2020	627,369,374	\$27,877,669	\$0.044
2021	832,653,775	\$32,922,301	\$0.040
2022	1,064,811,711	\$37,812,223	\$0.036
2023	1,323,686,716	\$42,558,139	\$0.032
2024	1,609,121,498	\$47,165,577	\$0.029
2025	1,920,965,273	\$51,640,966	\$0.027
2026	2,259,126,281	\$55,999,252	\$0.025
2027	2,623,502,827	\$60,243,157	\$0.023
2028	2,991,571,527	\$62,185,026	\$0.021
2029	3,363,242,786	\$64,069,259	\$0.019
2030	3,738,443,750	\$65,900,257	\$0.018
2031	4,117,127,713	\$67,683,211	\$0.016

d. "Please describe the Agency's contingency plan in the event that MRES is unable to achieve the larger level of energy savings specified in its Total Base Case scenario."¹⁶

MRES is aware of the challenges of attaining the statutory 1.5 percent CIP goal. As with its prior plan, this plan includes a sensitivity case evaluating the possibility that MRES might not achieve the full 1.5% per year energy savings target.¹⁷ The 'Expected Conservation Sensitivity Cases' (for SPP and for MISO) modeled only achievable program potential amounts of DSM deemed feasible under Market Potential results of the Morgan/Cadmus DSM Potential Study

¹⁶ *Id.*, page 31.

¹⁷ See "Missouri River Energy Services 2017-2031 Integrated Resource Plan," *In re Missouri River Energy Services 2016 Integrated Resource Plan*, Docket ET10/RP-16-509, filed June 30, 2016 (MRES IRP), pages 17, 111, and Table 3-6 (page 43).

finalized in 2014.¹⁸ The Expected Conservation Sensitivity Cases would require an additional 83 MW of Combustion Turbine resources (a total of 251 MW rather than 168 MW), and an additional 4.5 MW of renewable resources (30 MW of wind) over the Base Case.

3. Greenhouse Gas Reduction Goals

Since its previous IRP, both the Legislature and Commission have established a more formal process to monitor the greenhouse gas (GHG) reduction goals in Minn. Stat. §216H.02, subd. 1. The MRES Mission emphasizes the importance of environmental sensitivity in our generation – both in terms of supply and demand side resources. The MRES power supply program has steadily moved toward both low and no emission resources (like DSM and hydro).

In particular, the statute provides no guidance on whether the emissions-reduction targets are based on the total mass emitted annually (in tons of CO₂) or the rate of the emissions (in lbs/MWh) in comparison to a percentage of the baseline of 2005 emissions. MRES staff has worked with the Department to develop quantitative reporting approaches to evaluate progress toward the goals. The Department's request for additional information relating to the GHG goals reflects the fact that MRES has experienced significant load growth since the prior IRP. While MRES emissions demonstrate a dramatic decrease in the emission rate of CO₂, the added load means that the mass of CO₂ emitted has not dropped at a corresponding percentage.

Since 2005 (the baseline year for measuring the GHG goals), four new Members joined MRES, and MRES began supplying Marshall's entire supplemental load (when its prior contract with another supplier for part of its supplemental needs expired), an existing Member community. These additions represent pre-existing electric load served by other wholesale sources. Thus, more than 130 MW of "growth" is not due to greater Member electric consumption but, instead, a result of communities joining MRES to provide their long-term wholesale power supply and other energy services in a more economical and environmentally sensitive manner.¹⁹

Also, the growth realized in existing Member loads has a unique impact on MRES. Given that WAPA allocations are in fixed amounts, and do not serve any load growth, an increase in Member load has a multiplier effect on overall CO₂ emissions for MRES. Nearly all Members have two suppliers – both WAPA and MRES – but MRES is solely responsible for supplying all load growth. (Increases are not split between MRES and WAPA, as might be done in other cases of multiple wholesale suppliers.) To illustrate, on average an MRES Member's power supply is divided equally between WAPA and MRES. Member load growth of 1% will correspond to an

¹⁸ See MRES IRP, pages 101 (SPP), 108-109 (MISO), and 109-111 (conclusions).

¹⁹ As noted, this 130 MW of load "growth" for MRES is more accurately described as pre-existing load in Minnesota that was removed from the portfolio of other utilities and added to the MRES portfolio. As such, those utilities realized corresponding load reductions that are artificially low. The reductions do not represent a shift in emitting resources or significant gains in efficiency; those utilities simply no longer serve the wholesale load of entire communities. MRES recognizes that measurement of changes in GHG emissions in the existing format is somewhat inexact and does not provide the ability to analyze the absolute difference when pre-existing loads move from one reporting entity to another.

increase of 0% for WAPA's share, while for MRES it corresponds to 2% of the Member's supplemental load. Further, WAPA allocations are Member resources and not MRES resources, so there is no "blending" of the MRES and WAPA resources in calculating MRES emissions. Even though MRES has reduced its CO₂ emissions rate, load growth limits total mass reductions. Thus, the ability to achieve significant percentage decreases in the mass of annual emissions is limited.

a. "Please describe (including amounts and locations) of the additional load added to its system since 2005." ²⁰

Since 2005, MRES has added four new Member communities, Atlantic and Pella, Iowa, and Hutchinson and Melrose, Minnesota. Also, there has been significant growth in several existing loads. The new Member communities that joined MRES since 2005, and the additional load increase in Marshall are:

- Melrose, MN: In January 2006, MRES began providing supplemental power to Melrose to meet all needs in excess of its WAPA allocation, pursuant to an S-1 Agreement. As of 2016, the Melrose load is 5.6 MW of capacity, and 82,658 MWh of energy.
- Atlantic, IA: In June 2008, Atlantic joined MRES to increase its power supply resources. Atlantic signed a Non S-1 Agreement under which MRES provides 1 MW at 100% load factor. As of 2016, the Atlantic sale represents 1 MW of capacity each month, and 8,784 MWh of energy.
- Hutchinson, MN: In September 2010, Hutchinson and MRES entered into a Non S-1 Agreement pursuant to which MRES provided 15 MW of capacity at 100% load factor beginning September 2010, which increased to 25 MW in January 2013. As of 2016, the Hutchinson sale represents an impact of up to 25 MW of capacity each month, and approximately 219,600 MWh of energy.
- Pella, IA: In January 2012, MRES began supplying Pella about half of its load, and by April 2012 was supplying its full requirements. (Pella does not have a WAPA contract.) As of 2016, Pella load is up to 43.3 MW of capacity, and 192,381 MWh of energy.
- Marshall, MN: On July 1, 2016, MRES began supplying Marshall's entire supplemental load (when its prior contract with another supplier for part of its supplemental needs expired). Specifically, MRES began supplying additional load of about 58 MW at about 80% load factor. The expected ongoing impact of now serving 100% of the supplemental needs of Marshall represents about 58 MW of capacity and 410,000 MWh of energy.

These four new Members and the addition of the entire supplemental requirements for Marshall represent a total increase *to MRES* of 133 MW. This entire load existed previously; other utilities supplied the load. It does not reflect an increase in electric load.

²⁰ DOC Comments, page 40.

Other Member load growth: In the 11 years from 2005 through 2016, energy sales to the other 55 MRES Members increased 17.3%. This corresponds to about 295 GWh of energy and 57 MW of capacity. The total load of the Members (in addition to the five new loads) increased by 9.0% (less than 1% per year increase), which is about 303 GWh of energy, and 50 MW of capacity. Because MRES is responsible for all load growth, however, Member growth of 9% resulted in an increase for MRES of 17.3% in energy over that period.

b. "Please provide an analysis that compares 2005 statewide power sector carbon dioxide emissions (total annual emissions of carbon dioxide from MRES's generation of electricity within Minnesota and all emissions of carbon dioxide from the generation of electricity imported from outside the state and consumed by MRES's customers in Minnesota) with projected statewide power sector carbon dioxide emissions over the length of the planning period, assuming both Total Base Case and Expected Conservation achievement scenarios." ²¹

As noted in the MRES 2016 IRP, most Members of MRES that are in the MISO region are in Minnesota (*i.e.*, 21 of the 27 Members in MISO). The remaining 33 MRES Members are in the SPP footprint, primarily Members in the states of Iowa, North Dakota, and South Dakota. However, three Minnesota Members of MRES are in SPP. This diversity both geographically and by RTO required separate Strategist models for MISO and for SPP. As a result, the existing modeling did not contain a single data set that contained only the 24 Minnesota Members to identify easily the statewide CO₂ emissions associated with only the Minnesota-specific load.

In discussions with Department staff relating to this specific request, it was determined that MRES planners would extract from Strategist the Minnesota Member-specific data from each individual model and the separate Base Case and Expected Conservation case within the model to create a single Minnesota-only data set to evaluate the statewide power sector carbon dioxide emissions.²² Table R-4 provides the data for MRES historical and projected emissions associated with the Base Case. It includes analysis of emissions on both a mass (Tons) and a rate (lbs/MWh) basis, because Minn. Stat. §216H.02, subd. 1, does not specify whether the goals are based on mass or rate. It appears on the following page.

²¹ *Id.*, pages 40-41.

²² In the course of responding to this DOC request, MRES informed the Department that its prior responses on CO₂ emissions had used MRES system-wide data, rather than statewide, Minnesota data. As a result, some prior information responses related to MRES emissions (in particular to Information Request 15) were based on the entire MRES Member load in all four states, not only Minnesota Member load. The ongoing dialogue with the DOC enabled MRES to identify this miscommunication, and to coordinate directly with DOC staff to ensure that the information provided in these Reply Comments is meets the Department's expectations and corresponds to the statewide CO₂ emissions associated with only Minnesota Member load.

**Table R-4
Historical and Projected Minnesota CO₂ Emissions Levels
MRES Base Case**

Year	MN CO₂ Tons	MN Load MWh	MN CO₂ Emissions lbs/MWh	MN CO₂ Ton Reduction Since 2005	MN lbs/MWh Reduction Since 2005	MN Reduction Goal
2005	1,098,363	891,976	2,462.8			
2014	828,616	1,340,707	1,236.1	25%	50%	
2015	766,437	1,305,059	1,174.6	30%	52%	15%
2016	934,324	1,514,526	1,233.8	15%	50%	15%
2017	1,117,275	1,753,792	1,274.1	-2%	48%	15%
2018	1,092,282	1,758,368	1,242.4	1%	50%	15%
2019	972,385	1,758,472	1,105.9	11%	55%	15%
2020	996,227	1,754,409	1,135.7	9%	54%	15%
2021	975,846	1,767,053	1,104.5	11%	55%	15%
2022	968,163	1,766,704	1,096.0	12%	55%	15%
2023	974,014	1,766,779	1,102.6	11%	55%	15%
2024	943,064	1,765,116	1,068.6	14%	57%	15%
2025	959,793	1,767,463	1,086.1	13%	56%	30%
2026	980,783	1,774,627	1,105.3	11%	55%	30%
2027	949,577	1,774,312	1,070.4	14%	57%	30%
2028	967,187	1,774,963	1,089.8	12%	56%	30%
2029	986,697	1,774,842	1,111.9	10%	55%	30%
2030	960,033	1,779,457	1,079.0	13%	56%	30%
2031	1,070,857	1,800,143	1,189.7	3%	52%	30%

As a comparison, the data for historical and projected emissions associated with the Expected Conservation Case for the duration of the 2017-2031 planning period appears in Table R-5 on the next page. Like the Base Case, Table R-5 also includes analysis of emissions on both a mass (Tons) and a rate (lbs/MWh) basis, given the fact that Minn. Stat. §216H.02, subd. 1 does not specify whether the reduction goals are based on mass or rate.

**Table R-5
Historical and Projected Minnesota CO₂ Emissions Levels
MRES Expected Conservation Case**

Year	MN CO ₂ Tons	MN Load MWh	MN CO ₂ Emissions lbs/MWh	MN CO ₂ Ton Reduction Since 2005	MN lbs/MWh Reduction Since 2005	MN Reduction Goal
	1,098,363	891,976	2,462.8			
2014	828,616	1,340,707	1,236.1	25%	50%	
2015	774,422	1,315,828	1,177.1	29%	52%	15%
2016	949,659	1,534,912	1,237.4	14%	50%	15%
2017	1,139,977	1,783,881	1,278.1	-4%	48%	15%
2018	1,122,254	1,798,274	1,248.1	-2%	49%	15%
2019	1,009,685	1,808,400	1,116.7	8%	55%	15%
2020	1,041,419	1,815,322	1,147.4	5%	53%	15%
2021	1,028,878	1,838,836	1,119.1	6%	55%	15%
2022	1,023,177	1,849,429	1,106.5	7%	55%	15%
2023	1,033,099	1,860,503	1,110.6	6%	55%	15%
2024	1,009,799	1,869,712	1,080.2	8%	56%	15%
2025	1,024,442	1,882,965	1,088.1	7%	56%	30%
2026	1,046,113	1,901,066	1,100.6	5%	55%	30%
2027	1,022,677	1,911,549	1,070.0	7%	57%	30%
2028	1,040,005	1,931,188	1,077.1	5%	56%	30%
2029	1,064,099	1,949,359	1,091.7	3%	56%	30%
2030	1,050,335	1,972,768	1,064.8	4%	57%	30%
2031	1,173,007	2,012,283	1,165.8	-7%	53%	30%

This shows that MRES CO₂ emission rate reductions are about 50% below 2005 levels, far in excess of the goals of both 15% from 2015-2024, and 30% from 2025-2031. This 50% reduction level in the emissions rate is about the same in both the Base Case and the Expected Conservation Case. In terms of the statutory goal “to reduce statewide greenhouse gas emissions . . . to a level at least 15 percent below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025,” MRES meets and is projected to far exceed the reduction goals based on the rate at which MRES resource technologies emit CO₂.

On the other hand, if the reduction goals are evaluated in terms of mass emissions, the Base Case shows that MRES mass reductions roughly average 10% below 2005 levels for the period of 2015-2024, and roughly 12% for 2025-2031. For the Expected Conservation case, the mass reductions over the period from 2015-2024 are roughly 6.5%, and from 2025-2031 are roughly 3%. Thus, MRES falls short of the targets if the state GHG goal is measured in mass.

The quantitative data does not provide the complete picture, however. The unique circumstances of MRES load and resources affect the ability of MRES to achieve GHG mass reductions. MRES has not realized an absolute reduction in mass emissions since 2005 because it has experienced significant added load as new Members turned to MRES to provide for their long-term energy and capacity, rather than a previous supplier. This load existed previously and is not “new” load in the state. However, MRES is now responsible to account for this load in its GHG goals, while other utilities may have artificially reduced their emissions due to the loss of load.

The GHG statute’s base year against which reductions are measured is 2005. Implicit in the statute is an assumption that loads remain constant, even if the economy continues to grow. In 2005, however, MRES had fewer Members, and the load it is now obligated to serve has increased by more than 130 MW. MRES is supplying significantly more electricity in the state now than it was in the base year. The mass of CO₂ emitted in conjunction with supplying electricity is directly related to the MWh supplied. Consequently, MRES is unable to meet the GHG goals when measured by mass despite a significant reduction in the CO₂ emission rate because it is now serving more of the state’s electric load.

The other key element to appreciate all of the MRES efforts to reduce CO₂ emissions to meet the state’s GHG ongoing reduction goals is the emissions profile of its current and future resources that serve its load. Admittedly, current data indicates that MRES will not achieve the GHG reduction goals measured on a mass basis. In fact, mass emissions will increase in the final year of the planning period after the expiration of the contract from the Point Beach nuclear power plant. While the modeling used for this plan indicates an inability to meet the goals when measured by mass, the resulting plan does not reflect the ability or willingness of MRES to replace existing power purchase agreements with resources that have low or no emission profiles. As existing capacity resources and long-term agreements expire, MRES will have the opportunity to diversify its portfolio even more.

This point is borne out by the fact that Western Minnesota has recently obtained preliminary permits from the Federal Energy Regulatory Commission to pursue the development of a hydroelectric project on the Coon Rapids Dam in Minnesota, and a pumped hydro storage project on the Missouri River in South Dakota. These projects (which were not part of the resource plan) demonstrate real potential to develop non-emitting resources in Minnesota²³ and the region that can provide long-term, reliable baseload generation. MRES actively seeks out innovative opportunities and devotes significant effort to assess projects that can provide non-emitting, baseload capacity for the long term. Over the planning period, it is likely other opportunities for

²³ MRES has no fossil fuel baseload resources in Minnesota.

renewable resources will develop that may be viable and cost effective, further reducing the CO₂ profile of the MRES portfolio.

Aside from constructing new resources, MRES actively researches the potential to enter into fixed term contracts with the owners of existing generating resources in MISO and SPP to not only reduce the price exposure to the markets but also to minimize emissions. The Point Beach contract is an example of the MRES initiative to seek out non-emitting resources for long-term agreements, and we are committed to doing so as we move forward. We are constantly alert to identify future opportunities both in the professional relationships staff maintain with other wholesale providers and the services of The Energy Authority which provides a national market perspective to identify such opportunities. The MRES Board of Directors is committed to a balanced power supply program, and does not restrict its options based on whether the opportunity presented is one for purchase of power or ownership.

The Board of Directors is committed to supplying Members with reliable, cost-effective, and environmentally sensitive electricity, and works diligently to minimize risks that might stand in the way of that mission. As noted in the IRP, the relative costs of the MRES power supply are expected to be highly influenced by CO₂ emission costs.²⁴ As a not-for-profit municipal power agency, the MRES Board of Directors and staff are focused on the importance of maintaining low rates and minimizing those risks over which it has control. Because CO₂ emission costs are a significant cost driver in both SPP and MISO, all future resource decisions will have as a key objective reducing the exposure to CO₂ costs. The current plan results demonstrate that future resource needs will rely heavily on growing DSM and non-emitting generating resources, and the only carbon-based resource additions identified as economical rely on low-emitting natural gas.²⁵ It is also worthy of note that 21 of the 24 MRES Members in Minnesota are located in the MISO region, and MRES no longer has transmission to serve the majority of its Minnesota load with its base-load coal resource, LRS.

B. Department Recommendations

In its Comments, the Department also offered recommendations on ways that MRES might improve its future resource planning efforts. MRES appreciates the constructive dialogue it has enjoyed with Department staff, and recognizes these contributions have helped to improve our overall planning efforts. In that vein, MRES appreciates the DOC's constructive advice. Given the unique nature of MRES and its Members, however, there are some recommendations for which MRES suggests that it would be most appropriate for the Commission to defer action or to decline the suggested change.

²⁴ MRES IRP, pages 109-110.

²⁵ *Id.*, page 112.

1. Energy and Demand Forecasting

The Department recommends that the Commission accept the MRES short-term and long-term forecasts for energy and demand as filed. Going forward, it has suggested some changes in methodology. These suggestions are discussed below.

*a. Short-Term Energy Forecast: “[T]here is no reason to adjust the forecast provided by MRES. However, MRES may wish to consider simplifying its forecast methodology going forward, as it does not appear to result in a more accurate forecast.”*²⁶

The DOC suggests that MRES use a single model form for all Members to simplify the short-term energy forecasts forecast methodology. The DOC review of the longstanding methodology used by MRES found it to be complex, but nonetheless accurate. Staff has reviewed the simplified approach proposed by the Department and, while it may be less complex, it omits important data MRES requires for other purposes. Specifically, including the calculation of the split between energy supplied by WAPA and MRES in the methodology used for the short-term energy forecast is essential for other purposes. MRES also uses this information for budget projections and billing for each individual member. While it might not be strictly essential for forecasting short-term demand, this methodology enables MRES to more efficiently carry out business analysis for multiple purposes. Thus, while MRES appreciates the Department’s suggestion to simplify the method for calculating the short-term energy forecast, it would undermine the accuracy of MRES business planning to change this long-standing methodology. For this reason, MRES respectfully requests that the Department withdraw its recommendation and the Commission not accept this suggestion.

*b. Short-Term Demand Forecast: “The Department recommends that the Commission accept MRES’s short-term demand forecast for planning purposes. Also, the Department recommends that the Commission advise MRES to construct and file a regression model of demand for its Minnesota members within six months of the Commission Order in this proceeding.”*²⁷

The Department’s request that MRES construct and file a regression model of demand for its Minnesota Members is unnecessary, and creates additional complexity that does not improve the integrity of the demand forecast. The Department criticizes the use of the algebraic approach but concedes that its own regression analysis does not result in a significant difference.²⁸ It acknowledges the MRES methodology is adequate for planning purposes, and does not identify a tangible benefit to requiring additional analysis for this advisory IRP.

²⁶ DOC Comments, page 14.

²⁷ DOC Comments, pages 15, 42.

²⁸ *Id.*, page 15.

The regression modeling performed by the Department in its analysis does not take into account important principles to maintain the integrity and accuracy of the results. Its demand model did not include a requirement that a positive relationship exist between demand and the monthly degree-day variables. In all but four models, the resulting coefficients were negative for cooling degree-days and/or heating degree-days, making the outcomes invalid. The advice of the Department in this recommendation is contrary to the Comments it made in the 2001 MRES IRP²⁹ that are the reason MRES employs its current methodology.

Further, it is important to note that the Department's short-term demand forecast developed with its regression modeling resulted in demand for the shoulder months that is too high for a majority of the Member communities. MRES uses its short-term demand forecast for billing and budgetary purposes, and tailors its methodology to the unique circumstances of MRES as a whole, and our Members in the four state region.

If the Department's method were used it would lead MRES to overestimate its sales to our members. Such a regression analysis would not be useful for any practical purposes, and MRES would still need to use its existing methodology to conduct a short-term demand forecast for the purposes of budgeting and billing. This administrative burden would create inefficiencies, consume valuable resources, and provide no added usefulness. For these reasons, it is with due deference that MRES respectfully requests that the Department withdraw its recommendation and the Commission not accept this suggestion.

2. Modeling and Supply-Side Recommendations

The Department's review of MRES modeling and supply-side resources confirmed the results MRES reported in the IRP.³⁰ In its Comments, the DOC explained that "[g]iven the advisory nature of MRES' IRP, the Department decided to suggest steps that may improve the Agency's modeling[.]"³¹ MRES values its ongoing dialogue with the Department and its insight gained by evaluating many resource plans of other utilities. At the same time, it is also important to balance the desire for additional information with the fact that the 24 Minnesota Members are a part of the entire MRES membership that includes 60 Member communities located in four states. MRES planning efforts need to be representative of its entire membership, especially given that this is an advisory plan. It is the goal of MRES to develop an accurate and rigorous resource plan to provide the Commission the ability to monitor the planning obligations for the state's electric consumers. In this spirit, the Department's suggestions are addressed below.

²⁹ "Statistically, the models must produce results that satisfy the basic assumptions of the linear regression models MRES specifies and show the expected (positive or negative) relationships between the independent (explanatory) and dependent variables." *In re Missouri River Energy Services 2001 Integrated Resource Plan*, Docket ET10/RP-01-1058, filed Dec. 3, 2001, page 7.

³⁰ DOC Comments, page 19.

³¹ *Id.*

a. ***“[The Department recommends the Commission advise MRES to consider] additional conservation achievement under a variety of contingencies, similar to how supply units are studied[.]”***³²

When developing the IRP, MRES consulted with the Department and, based on that discussion, developed an Expected Conservation case that has a reduced amount of conservation in comparison to the Base Case. The Base Case (for both MISO and SPP) assumes that all Minnesota Members achieve the statutory 1.5% goal, while the Expected Conservation Case assumes Minnesota Members achieve the full Program Potential identified in the Morgan/Cadmus DSM Study of about 0.6% energy savings. These two conservation achievement scenarios were selected by MRES because they illustrate the range of the likely impacts of conservation, while avoiding the significant labor-intensive exercise of developing additional scenarios.

MRES values the Department’s suggestion to consider evaluating multiple conservation scenarios using additional variables. As we move forward, MRES expects to continue its dialogue with the Department to discuss the usefulness of expanding its casework for the next IRP to identify additional variables and likely scenarios to inform the planning process in a meaningful way. Here, MRES limited its analysis based on past IRP practices and given the fact that this was the first plan that required separate modeling for both MISO and SPP (doubling the amount of casework required in previous IRPs). While MRES recognizes that more scenarios will offer a greater range of information, it is important to balance the volume of additional casework and the value of the greater number of results.

b. ***“[The Department recommends the Commission advise MRES to consider] modeling a greater number of contingencies, including modeling price contingencies for all resources options that are presented to the Agency’s IRP model[.]”***³³

This recommendation would undoubtedly add a higher degree of rigor for the capacity expansion options, and it would require an extraordinary volume of casework. Currently, MRES modeling includes variable prices for the cost of natural gas. This fuel price variable has a significant and predictable impact on resource options. For this reason, this variable has consistently been an element of planning for all resource expansion options.

The Department’s suggestion to model additional contingencies, particularly price contingencies for capital costs of each resource option is impractical here. MRES develops the capital cost inputs for its modeling based on actual data from consultants for current resource-specific project costs. Regardless of whether the resource is a traditional, fossil-fuel generator or renewable resource, MRES uses its best available cost data for capital costs of each resource.

MRES recognizes that changes in capital costs will necessarily change the outcome of resource selection. Creating cost input variables for every resource would have an exponential

³² *Id.*, page 42. See also page 19.

³³ *Id.*, page 42. See also page 20.

impact on the volume of casework to be developed. That is further magnified by the need to run separate models for MISO and SPP. MRES strives for continuous improvement in its planning process to ensure its efforts further the need to identify reliable, cost-effective, and environmentally sensitive options to meet its power supply obligations. However, the additional administrative burden is so great that it outweighs the value of more granular inputs.

In addition, development of the long-term resource plan is distinct from the operational realities of actual resource-specific acquisition decisions. MRES does not enter into purchase power agreements or make decisions to invest in new resources without conducting actual project-specific analysis of its options at the time. The resource plan provides useful insight and general indications for future investment decisions, but specific capacity additions will continue to be based on the best information available at the time the additions are needed, and based on the size and scope of the capacity need that actually exists. MRES will continue to work with the Department when developing its modeling inputs. We respectfully request this recommendation be withdrawn by the Department and rejected by the Commission. MRES commits to continue to consult with the Department to strike a balance that meets reasonable resource planning needs.

c. “[The Department recommends the Commission advise MRES to consider] making generic units with varying characteristics available in different years if it would aid in the Agency’s modeling[.]”³⁴

The common theme in the Department’s several modeling recommendations appears to be a desire for more variables and inputs. Without question, more data inputs hold the potential for analysis that is more rigorous and, at the same time, will create greater complexity, take longer time for computational processing, and significantly more staff time. As with all modeling, the output depends on the variables and values used in constructing the model.

In reviewing the Department’s recommendation to make available in the model generic units with varying characteristics, MRES revisited the prices and design used in its modeling. The values used were the best estimate of prices for each resource type available to MRES when the IRP was produced, using actual contract prices, documented sources, and employing consultants to provide the most accurate estimates available. Like the Department, MRES is always considering the addition of more contingency variables and scenarios as we pursue continuous improvement to inform the planning process.

There are undoubtedly countless variables that could be added to evaluate the many uncertainties inherent in efforts for models to accurately predict the future. As MRES approaches each IRP, it is our goal to identify those variables that represent the most significant contingencies at that point in time. For the current IRP, if MRES were to add more variables to its modeling, there are likely different variables that would provide more meaningful information than modeling these price contingencies or varying unit characteristics. In the next IRP, however, that might not be the case, and those price contingencies and unit characteristics might have much greater significance. In fact, the revival of the previously-expired federal PTC after the MRES modeling

³⁴ *Id.*, page 42. See also page 20.

was initiated is an example of an external development that will influence the cost of wind resources (which MRES will evaluate for future planning).

MRES respects the suggestions of the Department on matters of methodology and design. We have come to rely on staff's input to identify the most current resource planning issues of concern. Given the limited staff of MRES and the long lead-times to develop inputs and allow for computational time for forecasting and modeling, MRES believes the better approach is to maintain active discussions between MRES and the Department to identify the most significant variables for modeling the next IRP. It is entirely possible that in the next few years, variables for inflation, fuel prices, emission costs, technology development (in generation, storage, and demand-side resources, for example), and energy policy may vary significantly and have a more dramatic influence in the modeling. In that event, it is important to maintain the flexibility to address those issues at that time.

d. "[The Department recommends the Commission advise MRES to consider] ways to further limit the Agency's exposure to spot market prices[.]"

MRES is acutely aware of the economic risks presented by spot market prices, and it continuously works to limit this exposure. MRES agrees with the Department that it should be vigilant to reduce this risk. MRES wishes to clarify its current exposure and mitigation strategies to ensure that the Department and Commission appreciate the proactive measures MRES has taken to integrate mitigation strategies into its operations, and its commitment to future efforts. The general nature of capacity expansion planning does not typically involve a thorough analysis of energy market hedging, and thus it was not discussed in the IRP filing. MRES addresses this issue here to provide the Department and Commission insight into the manner in which MRES addresses this important issue to provide cost-effective energy and capacity to its Members.

In the Department's analysis of modeling and supply side resources, it expresses concern that MRES will rely on MISO spot market purchase for 45 percent or more of its energy needs.³⁵ Given that the modeling outputs include significant market purchases, and the tendency to assume those purchases will occur regardless of the market price, the Department's concern is understandable. However, the Department's analysis overstates the true exposure of MRES to both energy and capacity market variations in MISO and SPP. The market purchases identified in the modeling outputs were selected as the least cost option because the market price at those times is expected to be below the cost of utilizing other available resources. Those MRES resources serve as economic hedges against high market prices.

The MRES Board of Directors is acutely aware of the financial risks presented by over-reliance on energy and capacity markets. It has addressed this issue specifically in its Future Power Supply Criteria Policy, R-1.1.3, in paragraph 2 on Resource Diversity. It provides, in relevant part:

³⁵ DOC Comments, pages 21-23.

d. Given that 100 percent (100%) of the energy to serve S-1 members is purchased from the Day-ahead or Real-time energy market(s), MRES will limit its exposure to these energy markets through the use of short and long-term hedges. MRES will limit its market exposure to a maximum of 20 percent (20%) on an energy basis using a 3-year rolling average;

e. MRES will limit its market capacity purchases to 20% on a capacity basis using a 3-year rolling average. Annual auctions are classified as market purchases for the purpose of this policy; and

f. A hedge, whether relating to capacity or to energy, refers to the acquisition of the right to resources (whether through ownership, PPA, financial product, or otherwise), or to the acquisition of other rights intended to provide revenue to offset market costs and to reduce the potential for adverse price risks in such market(s).³⁶

The governing body of MRES has taken an active approach to minimize exposure to the energy and capacity markets by adoption of this policy that limits exposure to no more than 20%, providing staff the operational parameters for daily operations.

In addition, the Chief Executive Officer chairs the internal Risk Oversight Committee (ROC) (which also includes the Director of Power Supply and Operations, the Director of Administration and Finance/Chief Financial Officer, and the Director of Legal). ROC meets monthly to regularly review energy and capacity transactions and performance, compliance with Board policies, adherence to management's energy risk program, and other key metrics of enterprise risk management. ROC reports directly to the Board of Directors each month to ensure regularly communication and oversight on this and other mission-critical matters. The MRES Board, in its capacity as the regulator, exercises active oversight of market exposure and efforts to mitigate risks.

The Department's Figure 2 on page 22 illustrates the wide range of market purchases included in the modeling outputs. Its conclusion that this represents market exposure for 45% or more of energy costs, and that a revision to the modeling for wind and solar should be conducted to minimize this risk fails to appreciate the balance between hedged and unhedged market risks. As stated, market purchases were selected because the market price at those times is expected to be below the cost of utilizing other available resources, what is referred to as "economy purchases." In the event market prices are higher, MRES has resources – such as the 106 MW of municipal capacity – available at a fixed cost. While this capacity was too expensive to be dispatched for energy using the forecasted prices, it serves as a hedge against potential high energy market prices and limiting exposure to price spikes. Most of the economy purchases shown in Figure 2 are hedged by the municipal capacity.

³⁶ Missouri River Energy Services Board of Directors Policies, Future Power Supply Criteria, Policy R-1.1.3 (June 10, 2015).

In addition, MRES uses other hedging techniques to cover its exposure related to the energy market. This includes purchasing energy in the futures market at hub locations, for sale back to the market at daily prices, to offset price risk. In the past, MRES has also used unit outage insurance products.

Finally, the DOC discussion concerning zonal export limits³⁷ is misplaced. The zonal limits are related to the annual capacity auction and have little to do with daily energy transmission limits, or energy or capacity market prices. Also, adding more wind resources as an energy hedge is unlikely to affect the capacity auction results.³⁸ Although the price of wind can be quite economical, wind-generating resources are inherently ineffective price hedges. Energy market prices tend to be depressed when wind production is high and, conversely, market prices tend to be high when wind generation is at its lowest (which often coincides with high customer loads). Thus the production from one MW of wind produces revenues much lower than the corresponding cost of energy needed to serve one MW of load, even after taking into consideration the low average plant factor for wind (30% to 40% typically).

In summary, MRES recognizes the importance of minimizing exposure to energy and capacity market price risks. It has developed a comprehensive strategy to manage these risks in both the short-term and the long-term. MRES will continue to identify ways to ensure its Members and their customer-owners are protected from unreasonable market risks and can rely on stable and cost-effective electricity prices. We use a wide variety of methods of hedging the hourly market prices, and do not rely solely on new generation resources.

e. “[The Department recommends the Commission advise MRES to consider] modeling all costs for generic wind and solar units as a single, per MWh charge; and

f. “[The Department recommends the Commission advise MRES to] reconsider the Agency’s analysis of wind and solar additions with a goal of determining the price per MWh at which additions of wind and solar capacity are least cost for MRES’s system.”³⁹

These two recommendations of the Department relate directly to its first request “that MRES update its analysis of wind and solar additions by modeling all costs for generic wind and solar units as a single, per MWh charge[,] with a goal of determining the price per MWh at which

³⁷ See DOC Comments, pages 22-23.

³⁸ The primary objective of the capacity expansion analysis is to identify the timely addition of cost-effective additions of supply and demand-side resources to meet MRES obligations. Wind and solar have low capacity values during the MRES peak, and it would take large amounts of wind and solar additions to displace a thermal unit. For example, over 1,100 MW of wind capacity would be required to displace the 168 MW CT in the Base Case; that is financially infeasible for a company of the size of MRES. Wind and solar still have value in delaying or partially reducing capacity requirements, and providing energy to partially offset or hedge market purchases.

³⁹ DOC Comments, page 42.

additions of wind and solar capacity are least cost for MRES's system."⁴⁰ As noted in the discussion under section A.1. above, the modeling performed by MRES does, in fact, result in the conclusion that \$76/MWh was the breakeven point for wind, and \$95/MWh was the breakeven cost for solar on the MRES system. The discussion above is equally applicable to these two recommendations.

In regard to modeling for future resource plans, MRES recognizes that the analysis of wind and solar may require additional or different inputs depending on the facts regarding those technologies when the next plan is prepared. It is premature to order these changes now. The benefit of developing the additional data requested by the Department is outweighed by the limited value of the outputs and the burden of constructing new models. Likewise, the inability of wind and solar to provide capacity on demand demonstrates that heaping on additional data points does not provide qualitative improvement for capacity expansion modeling. There is little usefulness in constructing the suggested modeling for future resource plans to build out year-by-year pricing for both MISO and SPP given what is known today.

In its own analysis, the Department conceded that the MRES "modeling of fixed and variable costs accurately portrays how actual costs are incurred."⁴¹ Requiring future modeling to add more data points will needlessly complicate the construction of each model and scenario (in both MISO and SPP), and will extend the length of time needed to complete the capacity expansion modeling. MRES respectfully requests that the Commission reject these recommendations.

3. *DSM Resources*

"The Department recommends that the Commission advise MRES to continue to strive to meet the energy savings of the Total Savings Base case."

As noted earlier, MRES is aware of the challenges of attaining the statutory 1.5 percent CIP goal, and has an established program and staff who work diligently to encourage customer participation to achieve the energy savings goal in the Base Case. Likewise, the Department is familiar with the MRES efforts and the trials involved in meeting this annual goal. MRES is committed to doing its utmost to maximize the value of demand side resources. Historical results demonstrate that meeting the full 1.5% per year reduction is very difficult, and the challenge becomes more difficult once customers have adopted the most cost-effective measures available. Advances in technology, implementation, and customer education will be important to maximize the efforts of MRES and its Members to strive to meet these goals.

⁴⁰ *Id.*, page 41.

⁴¹ *Id.*, page 21.

C. Conclusion

The Department has conducted a thorough review of the MRES 2017-2031 Integrated Resource Plan, and it recommends the Commission accept the plan for filing. MRES concurs in this recommendation, and asks the Commission to enter its order accepting the MRES IRP for filing.

In response to the Comments of the Department, MRES has provided additional information requested by the Department regarding DSM and GHG goals, although it has declined to conduct the extensive additional modeling that would be required to develop the requested forecasting data for wind and solar additions.

MRES asks the Commission to accept the Department's recommendations for future resource plans regarding Energy and Demand Forecasting, with the exception of regression modeling for the short-term forecast for Minnesota Members, which we ask the Commission to reject. In regard to the Department's Modeling and Supply-Side Recommendations, MRES asks the Commission to reject those recommendations that prematurely identify specific modeling requirements or variables, and that would create a significant volume of additional work without adding substantial value to the qualitative output of the planning process. MRES accepts the suggestion that it maintain vigilance to minimize unreasonable exposure to spot market prices for capacity and energy. Finally, MRES also accepts the Department's recommendation that it maintain its efforts to achieve the DSM savings goals of the Base Case.

Based on the record in this proceeding, MRES respectfully requests that the Commission concur in the Department's recommendation, and accept for filing the MRES 2017-2031 Integrated Resource Plan.

Dated February 28, 2017

MISSOURI RIVER ENERGY SERVICES,
on behalf of itself and its
MINNESOTA MEMBER MUNICIPAL UTILITIES,
and WESTERN MINNESOTA MUNICIPAL
POWER AGENCY

/s/ Mrg Simon

By: Mrs. Mrg Simon
Director, Legal
PO Box 88920
Sioux Falls, SD 57109-8920
(605) 338-4042
mrg.simon@mrenergy.com

