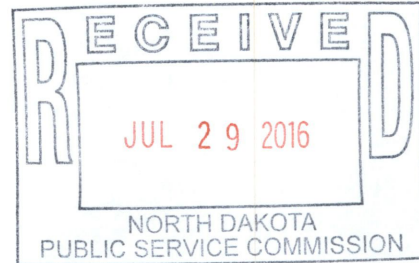


June 29, 2016

Darrell Nitschke, Executive Secretary  
North Dakota Public Service Commission  
600 E. Boulevard, Dept. 408  
Bismarck, ND 58505



RE: MRES Ten-Year Plan

Dear Mr. Nitschke:

Missouri River Energy Services (MRES) for itself and as agent for Western Minnesota Municipal Power Agency (Western Minnesota) submits this Ten-Year Plan, pursuant to NDCC 49-22-04. This report was prepared in accordance with the North Dakota Public Service Commission's Guidelines for compliance with the requirements of NDCC 49-22-04.

Enclosed is an original and ten copies of the plan. If you have any questions regarding this Ten-Year Plan, please contact me at 605-338-4042 or [tasha.altmann@mrenergy.com](mailto:tasha.altmann@mrenergy.com).

Sincerely,



Tasha Altmann, CP  
Certified Paralegal, Legal

Cc: NDPSC (10 + Original)



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# Missouri River Energy Services North Dakota Ten-Year Plan

## 2016

Submitted to the  
North Dakota Public Service Commission

June 29, 2016

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## **INTRODUCTION**

Missouri Basin Municipal Power Agency, doing business as Missouri River Energy Services (MRES), is a not-for-profit, joint-action agency that provides power, energy, transmission, and related services to its 60 Member communities in Iowa, Minnesota, North Dakota, and South Dakota. All 60 of the MRES Members have long-term power sales agreements with MRES and also are entitled to receive a wide range of energy-related services. MRES is governed by a 13-member Board of Directors elected by and from its Member communities.

Western Minnesota Municipal Power Agency (Western Minnesota) owns fossil-fuel electric generating facilities in Iowa, South Dakota and Wyoming and wind generation in Minnesota. Pursuant to a long-term contract between Western Minnesota and MRES, MRES has exclusive rights to the output of these facilities to meet its power supply obligations to its Members.

MRES for itself and as agent for Western Minnesota submits this Ten-Year Plan, pursuant to NDCC 49-22-04. MRES prepared this Ten-Year Plan in accordance with the North Dakota Public Service Commission's (Commission) Guidelines for compliance with the requirements of NDCC 49-22-04.

### **SECTION A: Existing Energy Conversion Facilities**

MRES does not own or operate any energy conversion facilities in North Dakota. Currently, the largest MRES generation resources are a 281 MW share of Laramie River Station (LRS), a coal plant located near Wheatland, Wyoming, and the three-unit Exira Station located near Atlantic, Iowa, with a total rating of 140 MW. MRES energy conversion facilities also include the Watertown Power Plant (WPP), an oil-fired combustion turbine located in Watertown, South Dakota, with a summer rating of 48.8 MW. Lastly, MRES operates and purchases output from four wind turbines located just west of Worthington, Minnesota. The rated output of the units totals 3.7 MW.

MRES has no plans to retire any of its existing energy conversion facilities within the next ten years.

### **SECTION B: Energy Conversion Facilities Under Construction**

MRES does not have any energy conversion facilities under construction in North Dakota. MRES is currently working on development of the Red Rock Hydroelectric Project (RRHP), an electric generating plant at the existing Red Rock Reservoir and Dam on the Des Moines River in Iowa. The dam is owned by the federal government and operated by the U.S. Army Corps of Engineers. The project is owned by Western Minnesota and will be operated by MRES. When completed in 2018, RRHP will be capable of generating 36 MW of base load electricity under normal spring and summer water levels, and up to 55 MW at times of high reservoir levels. RRHP is an attractive option for MRES because it will generate clean,

renewable, and reliable baseload energy. Hydropower is the only demonstrated renewable resource that is able to add much-needed inertia to the electric grid as a baseload resource. This investment in hydropower is the first in this region in decades, and further diversifies the MRES generation portfolio with even more capacity from another non-emitting resource. In addition, RRHP also adds to the ability of MRES to comply with state renewable energy mandates and goals

**SECTION C: Proposed Energy Conversion Facilities on Which Construction is Intended Within the Ensuing Five Years**

MRES does not propose to start construction on any energy conversion facilities in North Dakota within the ensuing five years. MRES is in the process of developing the Pierre (South Dakota) Solar Project, which will be the first MRES utility-scale solar energy resource. The project was recently announced and will begin construction in July 2016. When completed at the end of 2016, it will be capable of providing up to 1 MW of solar energy, making it the largest solar project in the state of South Dakota. MRES will purchase all of the output from Pierre Solar, LLC, a subsidiary of Geronimo Energy.

**SECTION D: Proposed Energy Conversion Facilities During the Next Ten-Year Time Period**

Other than the Pierre Solar Project noted in Section C, MRES has no other proposed energy conversion facilities as defined by Chapter 49-22-03 of the North Dakota Century Code.

MRES continues to evaluate opportunities for additional renewable resources to ensure continuing compliance with the Renewable Energy Objective goals of North Dakota and South Dakota and the requirements of the Minnesota Renewable Energy Standard.

**SECTION E: Existing Transmission Facilities (Electric)**

MRES is a joint owner in the CapX2020 Fargo-Monticello transmission line project.<sup>1</sup> The Fargo-Monticello project is a 345 kV transmission line between the expanded Monticello substation near Monticello, Minnesota, the new Quarry Substation northwest of St. Cloud, Minnesota, the expanded Alexandria Substation near Alexandria, Minnesota, and the new Bison Substation west of Fargo, North Dakota. The facilities were fully energized in 2015. About 34.9 miles of the Fargo-St. Cloud project is in North Dakota.

Additional information can be found at [www.capx2020.com](http://www.capx2020.com).

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<sup>1</sup> MRES held rights to as much as 11% of the Fargo Project. MRES chose to assign its rights to Western Minnesota Municipal Power Agency (Western Minnesota). While Western Minnesota will be the owner of the 11% share of CapX Fargo Phase 1, it will continue to be associated with MRES and the overall utility operations are unchanged.

**SECTION F: Existing Transmission Facilities (Pipeline)**

Not applicable to MRES.

**SECTION G: Proposed Transmission Facilities on Which Construction is Intended Within the Ensuing Five Years (Electric)**

None known at this time.

**SECTION H: Proposed Transmission Facilities on Which Construction is Intended Within the Ensuing Five Years (Pipeline)**

Not applicable to MRES.

**SECTION I: Proposed Transmission Facilities During the Next Ten-Year Period (Electric and Pipeline)**

See response to Section G.

**SECTION J: Regional Coordination**

MRES closely coordinates its transmission planning with other organizations to ensure cost-effectiveness and electric-service reliability in the region. MRES is a member of and participates directly in several regional entities:

- The Midcontinent Independent System Operator (MISO), which administers a tariff providing for regional transmission services, energy and ancillary services markets, and resource adequacy requirements. MISO also has responsibilities for regional transmission planning, coordination, and expansion. MRES is a transmission owning member and market participant. MISO conducts Sub-regional Planning Meetings (SPMs) three times each year to provide a forum for coordination and discussion of transmission concerns and proposed projects among utilities and other interested stakeholders. MISO's transmission expansion plans (MTEP-2015 being the most-recent approved plan) are also available at their website under the "Planning" tab and contained in the "Transmission Expansion Planning (MTEP)" link. Further information about MISO is available on-line at [www.misoenergy.org](http://www.misoenergy.org).
- The Southwest Power Pool (SPP), which administers a tariff providing for regional transmission services, energy and ancillary services markets, and resource adequacy requirements. SPP also has responsibilities for regional transmission planning, coordination, and expansion. MRES became a transmission owner in SPP on October 1, 2015. MRES participates in the SPP Integrated Transmission Planning process and other planning processes. Further information about MISO is available at [www.spp.org](http://www.spp.org).

- The Midwest Reliability Organization (MRO), a non-profit organization of regional utilities has as its “*primary responsibilities to ensure compliance with mandatory reliability standards by entities who own, operate, or use the interconnected, international Bulk Power System, conduct assessments of the grid’s ability to meet electricity demand in the region, and analyze regional system events*” [from MRO web-site]. Further information about MRO is available on-line at [www.midwestreliability.org](http://www.midwestreliability.org) and about NERC at [www.nerc.com](http://www.nerc.com).
- The Minnesota Transmission Owners (MTO) group, a consortium of 16 sponsoring utilities and three participating government agencies, fulfills the utilities’ statutory obligations for transmission planning in the state of Minnesota. These obligations include the development of the Minnesota Biennial Transmission Plan, as well as studies associated with meeting the Minnesota Renewable Energy Standard (RES) requirements. Further information about the MTO group is available at [www.minnelectrans.com](http://www.minnelectrans.com).
- CapX2020, a joint initiative of eleven regional transmission utilities to develop a long-range vision and transmission expansion projects to ensure that load in the region can be served reliably, provide outlet capability for renewable and other generation additions and support regional reliability of the transmission system. MRES continues to participate in this group with the intent to support the region’s needs.

MRES has no other recommended measures for regional coordination beyond the activities described here in Section J.

## **SECTION K: Environmental Information**

### **a. Impact of Changing Environmental Regulations**

Environmental sensitivity is a basic component of the MRES mission, and compliance with statutory and regulatory requirements applicable to generation resources and future transmission facilities is a priority. MRES constantly monitors state and federal environmental matters and developments, particularly those in the areas of air quality and emissions from generating resources, to assess potential impacts to MRES operations and ensure compliance with applicable laws and regulations. MRES takes a comprehensive approach to monitoring statutes and regulations applicable to the various generating facilities within its power supply portfolio, as well as proposed laws, regulations, and judicial decisions that may alter the regulatory regime for existing resources, potential generation portfolio additions, and transmission issues. To ensure comprehensive coverage of issues, MRES actively collaborates with several engineering and legal professional consultants, as well as state and national industry associations. In addition, MRES manages operations of its resources to ensure that the generating plants are in compliance with current and known future requirements.

## **b. General Environmental Matters**

Air, water, and land quality are all of keen interest to MRES, and the staff manages a wide range of environmental issues regarding the generation and delivery of electricity. MRES regularly monitors air quality topics including those governed by the Clean Air Act (CAA) to reduce carbon dioxide (CO<sub>2</sub>) emissions from existing and new power plants, Regional Haze, the Startup, Shutdown, Malfunction (SSM) Rules, the Cross-State Air Pollution Rule (CSAPR) formerly the Clean Air Interstate Rule (Transport Rule), Mercury and Air Toxics Standards, rules relating to the operation of Reciprocating Internal Combustion Engines (RICE Rules), the rules and revisions to Ozone Standards, regulations relating to Particulate Matter (PM<sub>2.5</sub>), and other such matters.

Equally important, MRES also actively follows developments relating to surface and ground water, including those related to the National Pollutant Discharge Elimination System for both the nationwide and individual permit processes administered by states, recent updates under Clean Water Act Section 316(b) for cooling water intake structures (impingement/entrainment), coal combustion residual (CCR) (also known as coal ash) regulations, and other substantive environmental issues. The final rules on the Waters of the United States developed by the EPA and the United States Army Corps of Engineers promise to impact both land use as well as water quality matters, and MRES is following the litigation in the various federal district courts and circuit courts of appeals relating to this rule. MRES also closely monitors litigation challenging any of these measures, as well as the remands and subsequent rulemakings (if any) that might result.

As a transmission-owning member of MISO and SPP, MRES also participates in regulatory matters governed by the Federal Energy Regulatory Commission (FERC), the North American Electric Reliability Corporation (NERC), the Midwest Reliability Organization, Electricity Information Sharing & Analysis Center, and other national and regional entities. Actions of these organizations could potentially directly or indirectly impact environmental issues, and MRES utilizes both staff and consultants to monitor and participate in these organizations.

## **c. Regional Haze Litigation**

Since the previous Ten-Year Plan was filed, there have been significant developments related to the application of the Regional Haze rules under the CAA as they apply specifically to Laramie River Station (LRS), the only coal-fired generating resource in the MRES portfolio. These developments will have a significant impact on the physical operations, and both the capital and operating expenses of LRS.

The Regional Haze provisions of the CAA require facilities that began construction between 1962 and 1977, which includes LRS, to identify and apply Best Available Retrofit Technology (BART) to control sulfur dioxide and NO<sub>x</sub> if their emission rates for those pollutants exceed a certain designated level. LRS has installed over-fire air technology, and low-NO<sub>x</sub> burners for all three units to address these BART requirements.

On January 23, 2014, EPA partially disapproved that portion of the Wyoming State Implementation Plan (SIP) for NO<sub>x</sub> removal, and issued its own final rule imposing a Federal Implementation Plan (FIP) with more stringent emission limits, which imposes a more restrictive emission limit on the operation of LRS. Specifically, the FIP a) imposes NO<sub>x</sub> emissions limits of 0.07 pounds per MMBtu (30 day rolling average); b) applies to all three units; and c) requires the installation of Selective Catalytic Reduction (SCR) technology, in addition to the previously installed low-NO<sub>x</sub> burners and over-fire air. The difference in visibility improvement for the FIP's SCRs versus the Selective Non-Catalytic Reduction (SNCR) technology called for in the SIP adopted by Wyoming is less than one deciview (a deciview is the lowest measurable increment perceptible by the human eye). However, the cost difference to install three SCRs as opposed to three SNCRs is greater than \$500 million for the entire project.

Under the FIP, the owners of LRS<sup>2</sup> are required to install SCR equipment on LRS Units 1, 2 and 3 by March 4, 2019. Basin Electric, as Operating Agent of LRS and on behalf of all the owners, appealed this decision to the United States Court of Appeals for the Tenth Circuit.<sup>3</sup> The State of Wyoming, PacifiCorp, and Powder River Basin Resource Council also appealed the FIP.<sup>4</sup> On September 9, 2014, the Tenth Circuit granted a stay of enforcement pending appeal, extending the deadline for compliance with the FIP for the duration of the stay for LRS (and other utility units that are the subject of the appeal). The appeal is ongoing, and oral arguments are expected to occur later this year. It is unknown when the Tenth Circuit will consider the cases, or the ultimate outcome when a decision is finally issued.

The MBPP is actively evaluating SCR technology necessary for compliance with the final rule, and is moving forward to install SCR technology on Unit 1. The installation of a single SCR requires not only a major capital investment, but it also imposes a significant parasitic load that will reduce the net output of the unit, and require that the unit is taken out of service for a substantial period of time.

#### **d. Carbon Dioxide regulations**

EPA's New Source Performance Standards (NSPS) for CO<sub>2</sub> mandate reductions of CO<sub>2</sub> emissions from existing and new power plants, and will significantly impact LRS, and thus MRES and its Member municipal utilities. The rules are in the form of federal emission guidelines that establish a detailed framework according to which each state must adopt

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<sup>2</sup> The Missouri Basin Power Project (MBPP) consists of Laramie River Station and associated facilities, and is owned by six consumer-owned electric utilities. The MBPP participants include Western Minnesota, which owns a 16.47% share of MBPP (as tenants in common). Western Minnesota sells its entitlement to capacity, energy, and transmission and MRES purchases all of its resources pursuant to an exclusive contract between the parties.

<sup>3</sup> *Basin Electric Power Coop. v. EPA*, No. 14-9533, U.S. Circuit Court of Appeals for the Tenth Circuit.

<sup>4</sup> See *State of Wyoming v. U.S. Environmental Protection Agency*, No. 14-9529; *Powder River Basin Resource Council v. EPA*, No. 14-9530; *PacifiCorp v. EPA*, No. 14-9534.

enforceable measures and requirements for reducing CO<sub>2</sub> emissions from power plants within each particular state. EPA's final Clean Power Plan (CPP) regulations aim to reduce CO<sub>2</sub> emissions from existing fossil-fueled power plants by 32 percent from 2005 levels by 2030. The reduction is to be achieved by states meeting state-by-state CO<sub>2</sub> "goals," under either a mass-based or rate-based limit. LRS is the only MRES resource that is designated as an affected electric generating unit (EGU) under these rules.

In August 2015, EPA finalized the CPP regulations to reduce CO<sub>2</sub> from existing power plants, as well as those applicable to new, modified, and reconstructed sources. The regulations have been appealed. The United States Supreme Court issued a stay of enforcement, barring implementation of the CPP pending the final outcome of the litigation. Given the extraordinary significance of these regulations, the appeal will be considered by the entire Circuit Court of Appeals for the District of Columbia in September 2016. A decision is expected in 2017, which is likely to be appealed to the Supreme Court. The final outcome of the CPP is unlikely to be known for several years.

MRES actively engaged in the EPA rulemaking process, and is also engaged in the corresponding state efforts to develop compliance plans. MRES regularly discusses with federal and state regulators – including Wyoming state agencies – and industry stakeholders to address important interstate issues of the CPP and related model trading rules given that the only MRES affected EGU is located in Wyoming, and the Members' load is located in Iowa, Minnesota, North Dakota, and South Dakota. Engagement involves one-on-one meetings with agency staff, participation in state, regional and national stakeholder and forum discussions, as well as participation in and monitoring of activities of National Association of Regulatory Utility Commissions, National Association of Clean Air Agencies, RTOs, and other influential thought leaders and trade associations.

MRES is undertaking a systematic analysis of the proposed CO<sub>2</sub> rules to understand the potential impact of different scenarios, given that it is unlikely that the five states in which it operates will develop the same implementation plans. MRES is performing internal analysis, and is engaging a consultant to conduct additional modeling to inform its planning efforts. Regardless of the stay of enforcement of the CPP or whether the CPP is ultimately invalidated on appeal, MRES continues its efforts to address mandates to reduce CO<sub>2</sub>. MRES acknowledges that the Supreme Court has ruled that CO<sub>2</sub> is a pollutant that must be regulated, whether that is based on the CPP or another law or regulation, and it has a fiduciary responsibility to the Members and their customer-owners to prepare for this significant change.

## **SECTION L:           Projected Demand for Service**

### ***Projected Demand.***

MRES forecasted peak demand and energy requirements are provided in Exhibit 2.

### ***Manner and Extent of Meeting Projected Demand.***

During the next ten years, MRES will need to continue its efforts to address its capacity shortfall in the MISO market. This includes completion of the Red Rock Hydroelectric Project, and obtaining additional peaking capacity. Efforts to secure peaking capacity will include pursuing agreements with potential capacity suppliers, and investigating ownership of new peaking capacity projects to evaluate the most appropriate alternative(s).

Another important task in the short term is to continue assisting Members with implementing their Demand-Side Management (DSM) and conservation activities, to contain overall load growth. For the Minnesota Members, this means maintaining concerted activities to pursue DSM measures to meet the Minnesota Conservation Improvement Program requirements.

Wind or other renewable resources will continue to be obtained as needed to continue to enhance the clean energy portion of the MRES resource mix. These renewable additions will ensure that MRES will meet the goals established by the Board of Directors of achieving both the Minnesota RES as it expands and meeting any renewable energy objectives established in Iowa, North Dakota, and South Dakota.

Further, MRES will continue its active efforts to participate in activities at both the federal and state levels to develop enforceable and workable regulations to reduce CO<sub>2</sub> in an effort to minimize the potential reliability and economic impacts of such emission regulations. MRES is committed to active and constructive engagement on this vital issue to ensure a reasonable approach to carbon reduction and environmental stewardship, while also balancing the needs of consumers for reliable and affordable electricity to power the clean energy future.

In summary, during the next ten years MRES has a need for additional capacity – including a small amount of additional renewable capacity. Once that need is met, under both SPP and MISO Base Case conditions, additional needs may be met through further development of DSM and conservation activities.

### ***Load Centers.***

MRES is a member-based, joint-action agency that provides power supply, transmission, and related services to its Member municipalities in Iowa, Minnesota, North Dakota, and South Dakota. Fifty-seven of the sixty Members receive power supply under identical long-term Power Sale Agreements (S-1 Agreement).<sup>5</sup> All MRES S-1 Members purchase power supply from MRES in an amount necessary to supplement the fixed amount of their respective allocations of federal hydroelectricity based on individual long-term contracts between each S-1 Member and the Western Area Power Administration (WAPA). The three remaining

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<sup>5</sup> “S-1 Members” are the 57 Member cities of MRES that have each executed a Power Sale Agreement (S-1) under which MRES has the obligation to provide all the supplemental power needs of those Members, that is, each Member’s power supply needs in excess of their allocation of federal hydropower from WAPA.

Members each have individual and distinct long-term power supply agreements with MRES,<sup>6</sup> and only one of those Members also has an allocation of federal hydropower and a WAPA contract.

Twenty seven Members, representing about half of the MRES energy sales, are located within MISO. The remaining 33 Members are located within SPP, as of October 1, 2015. In regard to the 24 MRES Members located in Minnesota, three are within SPP, and the remaining 21 are within MISO. Most MRES and WAPA generation resources are within SPP.

### ***Fuel Sources and Transportation.***

Laramie River Station burns Powder River Basin sub-bituminous coal that is transported to the plant by rail.

Exira Station has three combustion turbines used for peaking purposes. These units use natural gas as their primary fuel and No. 2 fuel oil as a back-up fuel. Natural gas is transported to the plant by pipeline and fuel oil is transported by truck.

The Watertown Power Plant is an electric power generating facility utilizing a simple cycle combustion turbine that uses No. 2 fuel oil. The fuel oil is transported to the plant by truck.

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<sup>6</sup> "Non S-1 Members" are the three member cities of Atlantic and Pella, Iowa, and Hutchinson, Minnesota. Atlantic has a WAPA contract and associated hydropower allocation.

**Exhibit 1**

U.S. Department of Energy  
Energy Information Administration Form EIA-767

(Forms supplied upon request.)

**Exhibit 2**

Projected Load Growth  
and  
Forecast Methodology

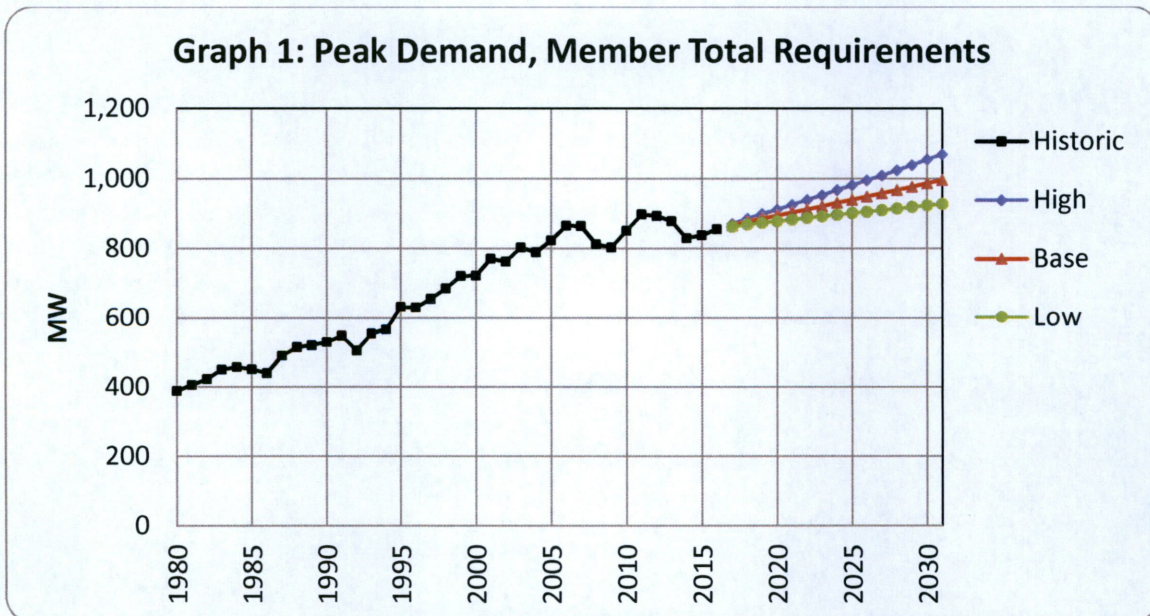
### ***Demand and Energy Forecasts***

MRES recently filed its 2017-2031 Integrated Resource Plan with the Minnesota Public Utilities Commission. In the resource plan, MRES created load forecasts for the total load of each of its S-1 Members, as well as for Atlantic and Pella, Iowa. These forecasts are of the expected loads assuming normal weather, before any reduction efforts to meet Minnesota's Conservation Improvement Program (CIP) or any additional DSM programs. DSM and CIP effects on the loads are calculated in a later step of the planning process to enable load and DSM forecasting to be separately evaluated on an ongoing basis.

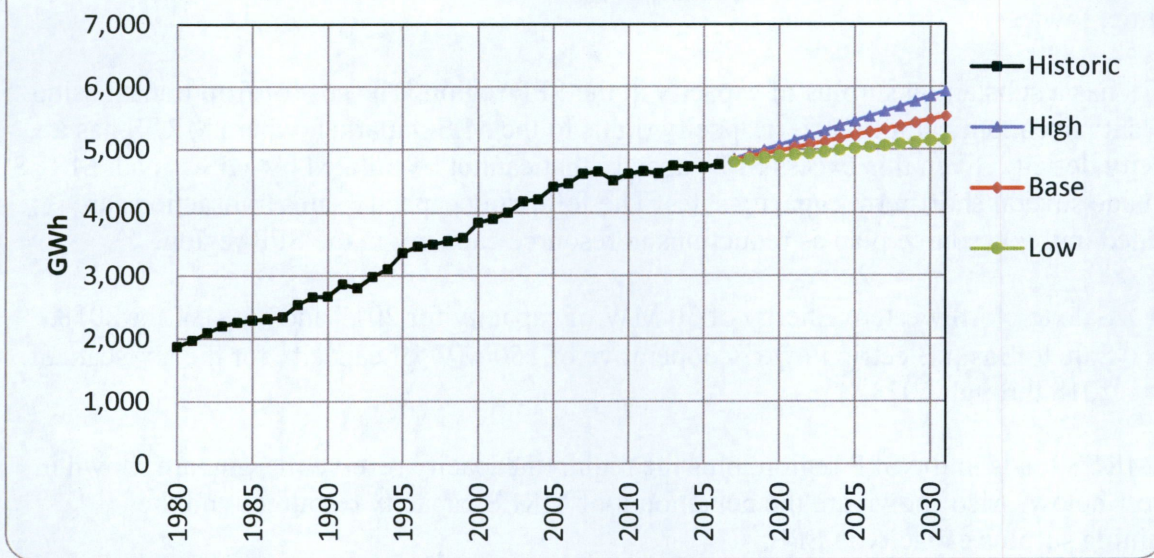
Based on the WAPA contract extensions beyond 2020, the individual Member load forecasts assume the WAPA contract deliveries remain at present levels for each community with slight (1%) reductions in 2021 and 2031.

The total loads for the 57 S-1 Members plus Atlantic and Pella, Iowa, are forecasted to increase from a historic peak of 855.5 MW in the summer of 2016, to 995.7 MW in the summer of 2031. In addition, MRES also is responsible for a sale of 25 MW to Hutchinson, Minnesota through the modeling period.

Graphs 1 and 2 show the load forecast totals for the base, low-, and high-growth forecasts.



**Graph 2: Annual Energy, Member Total Requirements**



***Separate Analysis for SPP vs MISO Areas***

On October 1, 2015, WAPA merged its transmission system into the SPP market area, including facilities that serve MRES Member load. As a result, all MRES loads and resources are located within either the MISO or the SPP markets.

The resource plan assumes the planning reserve requirement as defined by SPP for all MRES load in SPP, along with the MISO resource adequacy requirements for load in MISO. Only resources within the same RTO, or that have appropriate firm transmission in place from another RTO, may be used to meet the capacity requirements in an RTO. MRES has very limited transmission rights between the two RTO regions. In order to calculate the overall resource requirements, the capacity expansion modeling was divided into separate models for each RTO region.

As a first step, the total load forecasts for MRES Members, as well as the DSM potential results, were divided between the SPP and MISO regions. Current as well as potential resources were identified for each region as well before performing the capacity expansion modeling.

***MRES Resources – SPP Region***

The MRES generation resources in SPP total 495.8 MW and consist of the following:

1. MRES share of LRS: 281.8 MW
2. Exira Station: 140.0 MW
3. Watertown Peaking Plant: 45.9 MW
4. Municipal Capacity: 28.1 MW

The largest resources are the MRES share of LRS, the only MRES coal resource, located near Wheatland, Wyoming, and Exira Station, a natural gas peaking plant located near Atlantic, Iowa.

MRES has a substantial surplus of capacity in the SPP region. The cost of firm transmission makes it uneconomical to transfer capacity rights to the MISO market, where MRES has a capacity deficit. Given this excess SPP capacity that cannot be utilized by MISO load, MRES has made several short-term capacity sales. The following capacity sales transactions are included in this resource plan as reductions in resource capacity in the SPP region:

- Sale to Northwestern Energy of 30 MW of capacity for 2017 and 35 MW for 2018.
- Sale to Basin Electric Power Cooperative of 150 MW of capacity for the six years of 2018 through 2023.

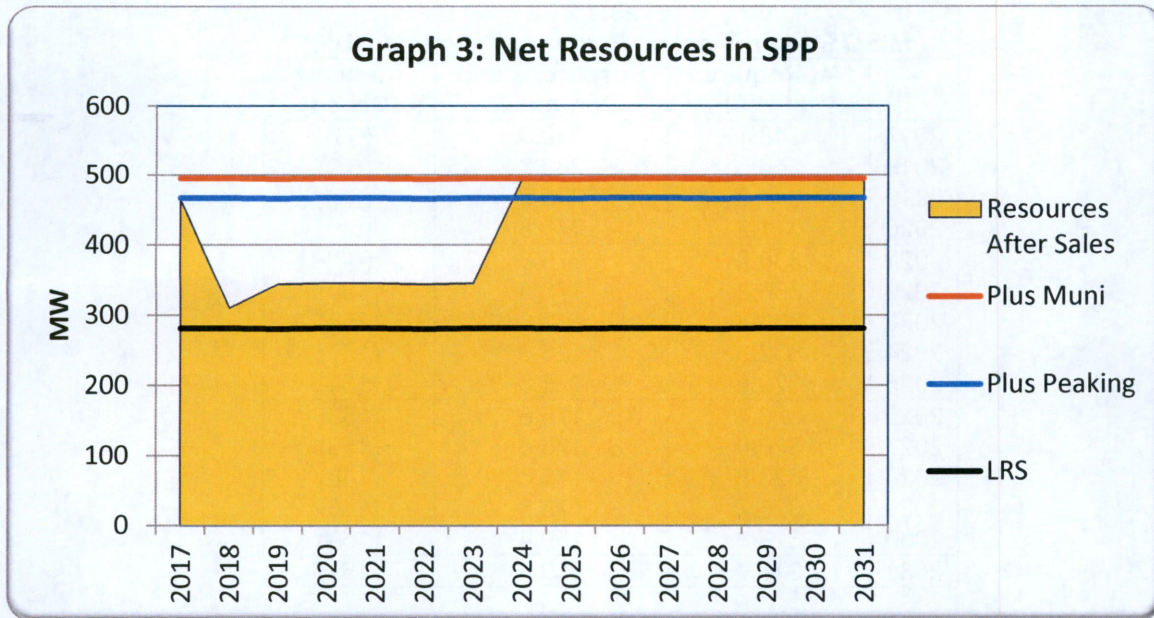
The MRES loads in the SPP region, plus the required capacity reserve margin, are shown in Table 1 below. Also shown are the net amount of MRES capacity resources and the remaining surplus capacity in SPP.

<b>Year</b>	<b>Load Plus Reserve Requirement</b>	<b>Resources After Sales</b>	<b>Surplus Capacity</b>
2017	254.5	465	210.5
2018	255.5	311	55.5
2019	255.7	346	90.3
2020	255.3	346	90.7
2021	257.9	345	87.1
2022	258.0	346	88.0
2023	258.2	346	87.8
2024	258.7	496	237.3
2025	258.9	495	236.1
2026	259.1	496	236.9
2027	259.4	496	236.6
2028	262.0	496	234.0
2029	265.1	495	229.9
2030	268.2	496	227.8
2031	273.5	496	222.5

Future wind resources are modeled in the expansion plan cases as needed to meet both the Minnesota RES, as well as a 10% renewable goal for Iowa (assumed<sup>7</sup>), North Dakota, and South Dakota. MRES has no existing wind resources located in the SPP region.

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<sup>7</sup> Iowa has no renewable energy mandates or goals applicable to MRES or its Members. However, MRES has chosen to plan its resources to provide Iowa members with 10% renewable energy, similar to goals of North Dakota and South Dakota.



### ***MRES Resources – MISO Region***

The MRES generation resources in MISO have a total ICAP rating of 281.6 MW and consist of the following:

1. Municipal Capacity: 106.3 MW
2. Point Beach Nuclear Purchase: 32.8 MW
3. Red Rock Hydro Project (2018): 55.0 MW
4. Wind Capacity: 85.7 MW

The estimated UCAP rating for those resources, which accrues towards the planning reserve requirements, is 175.8 MW. MRES has no coal resources in the MISO region.

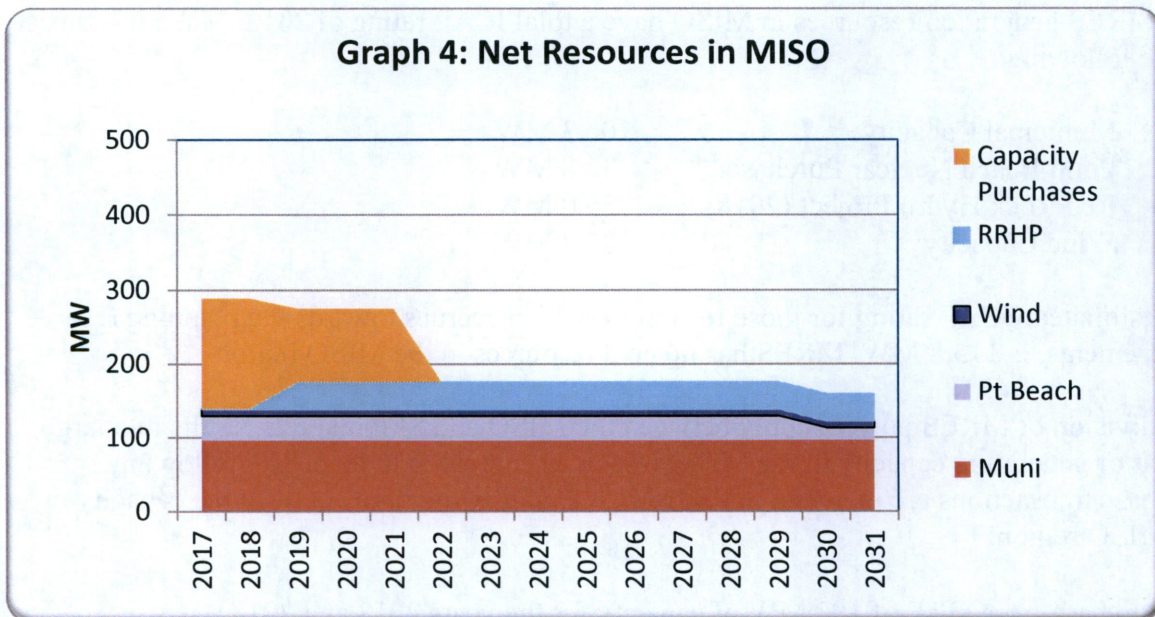
The division of MRES power supply between the MISO and SPP markets results in a large deficit of generating capacity in the MISO region as compared to load. The following purchase transactions are included in this resource plan as increases in resource capacity in the MISO region:

- Purchase from GRE of 100 MW of capacity for the years 2017 and 2018.
- Purchase from Morgan Stanley Capital Group, Inc. of 50 MW of capacity for the years 2017 and 2018.
- Purchase from Morgan Stanley of 100 MW of capacity for the years 2019 through 2021.

The MRES loads in the MISO region, including the required capacity reserve margin and any received credit WAPA capacity, are shown in Table 2 below. Also shown are the net amount of MRES capacity resources including purchases, and the remaining capacity deficit in MISO.

Year	Net Required After WAPA	Resources and Purchases	Capacity (Deficit)
2017	348.1	289.3	(59)
2018	346.5	289.3	(57)
2019	344.3	275.8	(69)
2020	341.2	275.8	(65)
2021	338.9	275.8	(63)
2022	336.2	175.8	(160)
2023	333.8	175.8	(158)
2024	332.3	175.8	(157)
2025	329.8	175.8	(154)
2026	328.4	175.8	(153)
2027	326.0	175.8	(150)
2028	323.8	175.8	(148)
2029	321.7	175.8	(146)
2030	319.8	159.4	(160)
2031	318.7	159.4	(159)

The Strategist model adds wind resources as needed to meet both the Minnesota RES, as well as a 10% renewable goal for Iowa (assumed), North Dakota, and South Dakota.



***Current Supply vs. Demand***

The bifurcation of MRES capacity resources was caused by the division of MRES Members into two RTO markets and the decision not to purchase firm transmission capacity across SPP for delivering MRES resources into MISO.

The graphs below illustrate MRES demand in comparison to supply resources, in both SPP and MISO. The final adjusted demand forecast for SPP and the net resources in SPP are graphed against one another in Graph 5. This illustrates that, when considering demand in comparison to current resources and transactions only, MRES has surplus capacity in all years in SPP. The numeric values are shown in Table 3.

A similar illustration for MISO is set forth in Graph 6. When considering current resources and transactions only, MRES is deficit in capacity in all years in MISO. The numeric values are shown in Table 4.

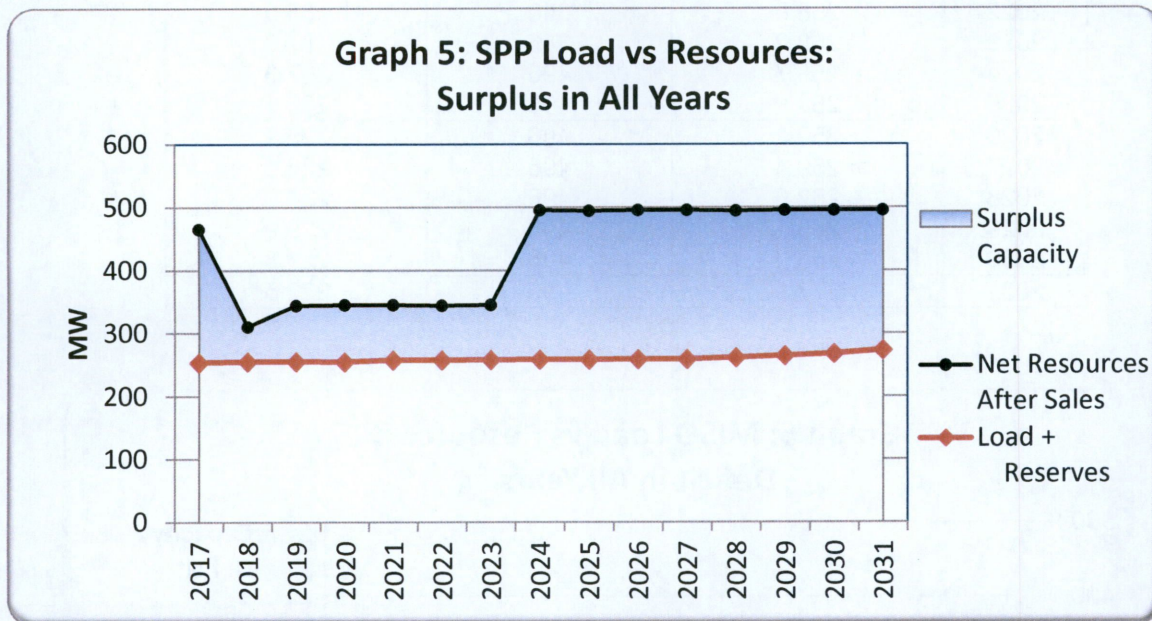
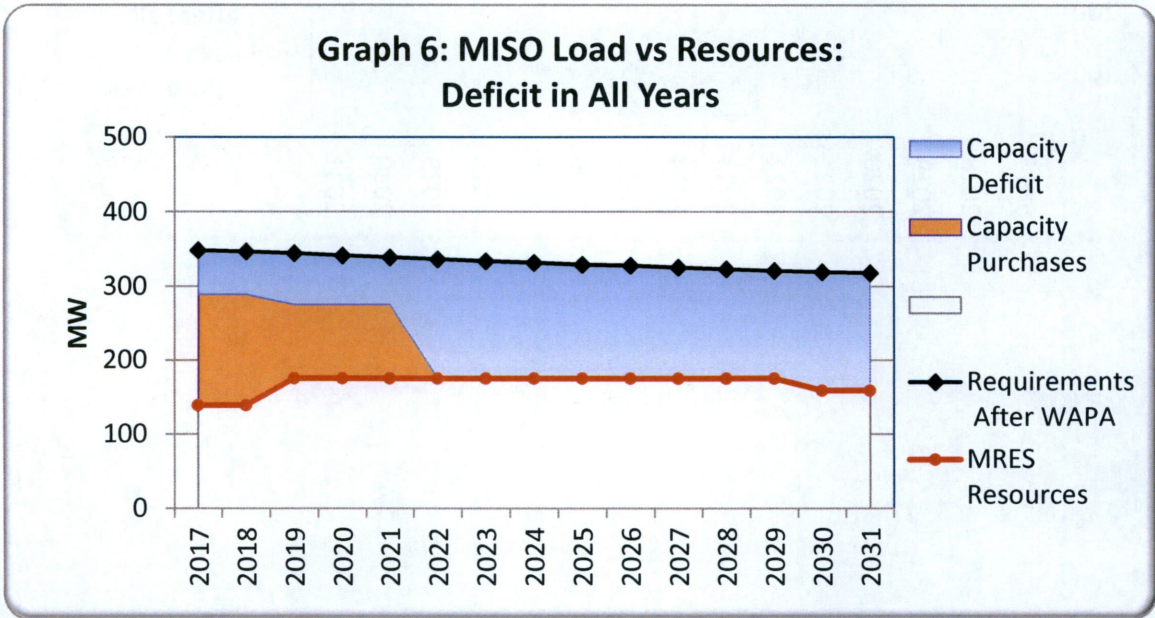


Table 3 SPP Requirements vs Resource Amounts (MW)			
Year	Load Plus Reserve Requirement	Resources After Sales	Surplus Capacity
2017	254.5	465	210.5
2018	255.5	311	55.5
2019	255.7	346	90.3
2020	255.3	346	90.7
2021	257.9	345	87.1
2022	258.0	346	88.0
2023	258.2	346	87.8
2024	258.7	496	237.3
2025	258.9	495	236.1
2026	259.1	496	236.9
2027	259.4	496	236.6
2028	262.0	496	234.0
2029	265.1	495	229.9
2030	268.2	496	227.8
2031	273.5	496	222.5



<b>Table 4</b>			
<b>MISO Requirements vs Resource Amounts (MW)</b>			
<b>Year</b>	<b>Net Required After WAPA</b>	<b>Resources &amp; Purchases</b>	<b>Capacity (Deficit)</b>
2017	348.1	289.3	(59)
2018	346.5	289.3	(57)
2019	344.3	275.8	(69)
2020	341.2	275.8	(65)
2021	338.9	275.8	(63)
2022	336.2	175.8	(160)
2023	333.8	175.8	(158)
2024	332.3	175.8	(157)
2025	329.8	175.8	(154)
2026	328.4	175.8	(153)
2027	326.0	175.8	(150)
2028	323.8	175.8	(148)
2029	321.7	175.8	(146)
2030	319.8	159.4	(160)
2031	318.7	159.4	(159)

MRES continues to pursue opportunities to purchase firm capacity in MISO.

To the extent MRES remains capacity deficit in each upcoming year, the deficiency must be purchased in the annual MISO capacity auction. The cost of such auction capacity could be very low, as it has been in recent years, or very high. It is the intent of MRES to increase its firm capacity in MISO over time to eliminate most or all of its annual capacity auction purchases. Specifically, the Red Rock Hydroelectric Project will become available in 2018, and capacity purchases have been made from GRE and Morgan Stanley for 2017 through 2021.

The remaining MISO capacity deficiency in the short term (2017 through 2021) is relatively small, approximately 60 to 70 MW. This limited amount of exposure to the capacity auction presents a manageable short-term cost risk and allows flexibility in the event of greater-than-anticipated reduction in demand. MRES actively manages its energy risk by evaluating whether to lock in additional bilateral capacity purchases or pay the auction price for this shortfall for every year. MRES has a formalized policy to manage such risks, and the implementation of that policy is subject to monthly review by its Risk Oversight Committee. The actual amount of shortfall will be affected by any load forecast error or the loss (or gain) of retail customers.

The resource plan assumes that new resources can be added (through ownership of new or purchase of existing capacity) to avoid all forecasted capacity deficits from 2022 forward. After 2021, the MISO deficit is approximately 160 MW.

STATE OF NORTH DAKOTA  
PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE FILING OF A  
TEN-YEAR PLAN BY MISSOURI RIVER  
ENERGY SERVICES

AFFIDAVIT OF SERVICE  
CASE NO. PU-16-\_\_\_

AFFIDAVIT OF SERVICE

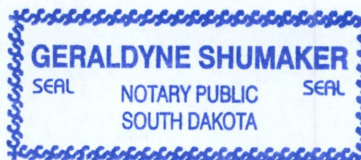
I, Tasha Altmann, being first duly sworn, depose and state that on the 29 day of June, 2016, I served a true and correct copy of the **Ten-Year Plan**, on behalf of Missouri River Energy Services, to the North Dakota Public Service Commission, 600 E. Boulevard, Dept. 408, Bismarck, ND 58505-0480, by depositing the same in the US Mail at Sioux Falls, South Dakota.

Tasha Altmann  
Tasha Altmann

Subscribed and sworn to before me

this 29 day of June, 2016

Geraldine Shumaker  
Geraldine Shumaker  
My commission expires: \_\_\_\_\_



Geraldine Shumaker  
Notary Public, South Dakota  
My Commission Expires Nov. 16, 2016