

December 9, 2013

Dr. Burl Haar  
Minnesota Public Utilities Commission  
121 Seventh Place East  
Suite 350  
St. Paul MN 55101-2147

Re: **2013 Minnesota Biennial Transmission Projects Report**  
**PUC Docket No. E9099/M-13-402**

Dear Dr. Haar:

On November 1, 2013, sixteen utilities that are part of the Minnesota Transmission Owners filed the 2013 *Minnesota Biennial Transmission Projects Report* with the Public Utilities Commission. On November 21, 2013, in accordance with Minnesota Rules part 7848.1800, subpart 3, the Department of Commerce filed comments with the Commission on the completeness of the Report. No other comments were filed.

The Department of Commerce reviewed the 2013 Biennial Report to determine whether it contained the information required by Minnesota Rules part 7848.1300. The only piece of information the Department thought should be included in the Biennial Report was a load and capability report from a regional reliability council, required under part 7848.1300, item B. The Department recommended that the MTO submit a copy of the Midwest Reliability Organization's load and capability report found in the North American Electric Reliability Corporation's (NERC) 2012 Long-Term Reliability Assessment.

Accordingly, the MTO is submitting the load and capability report (pages 129-134) from the 2012 NERC Assessment. In addition, the 2013 NERC Long-Term Assessment was just issued on December 9, 2013, and a copy of that load and capability report (pages 77-79) is also filed. The entire NERC Assessments for 2012 and 2013 and other years are hundreds of pages long and can be found here: <http://www.nerc.com/pa/RAPA/ra/Pages/default.aspx>

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The Department also recommended that the Commission follow its standard practice of establishing a comment and reply comment period. The MTO supports that recommendation. Pursuant to Minnesota Rules part 7848.1800, subparts 5 and 7, initial comments are due by January 15, 2012, and reply comments are due by March 1, 2012.

Thank you very much.

Sincerely,

*/s/ Alan R. Mitchell*

Alan R. Mitchell

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ARMkas

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# 2012 Long-Term Reliability Assessment

November 2012

**RELIABILITY | ACCOUNTABILITY**



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# MRO-MAPP

## Planning Reserve Margins

MAPP is projecting adequate Planning Reserve Margins during the 2013–2022 assessment period. All Planning Reserve Margin categories (Anticipated, Prospective, and Adjusted Potential) exceed the NERC Reference Margin Level of 15 percent due to the area’s strong generation portfolio and Demand-Side Management programs through 2019 (MRO-MAPP-Table 1 and MRO-MAPP-Figure 1).

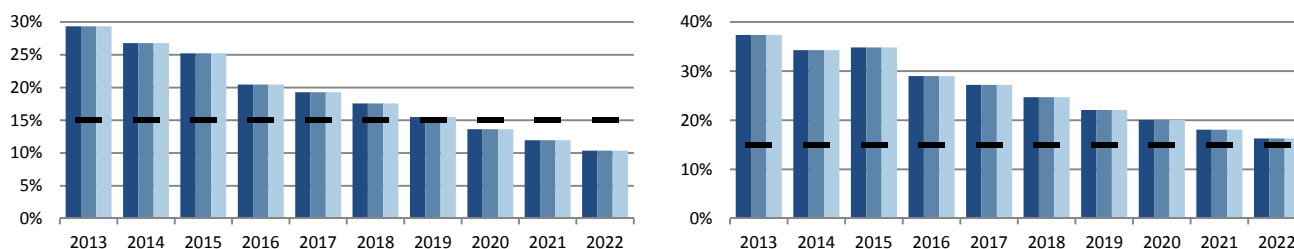
**MRO-MAPP-Table 1: Planning Reserve Margins**

MAPP-Summer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
ANTICIPATED	29.36%	26.79%	25.21%	20.46%	19.28%	17.57%	15.50%	13.65%	11.97%	10.36%
PROSPECTIVE	29.36%	26.79%	25.21%	20.46%	19.28%	17.57%	15.50%	13.65%	11.97%	10.36%
ADJUSTED POTENTIAL	29.36%	26.79%	25.21%	20.46%	19.28%	17.57%	15.50%	13.65%	11.97%	10.36%
NERC REFERENCE	-	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%

MAPP-Winter	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
ANTICIPATED	37.37%	34.28%	34.82%	29.00%	27.20%	24.70%	22.11%	20.07%	18.10%	16.29%
PROSPECTIVE	37.37%	34.28%	34.82%	29.00%	27.20%	24.70%	22.11%	20.07%	18.10%	16.29%
ADJUSTED POTENTIAL	37.37%	34.28%	34.82%	29.00%	27.20%	24.70%	22.11%	20.07%	18.10%	16.29%
NERC REFERENCE	-	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%

**MRO-MAPP-Figure 1: Summer (Left) and Winter<sup>191</sup> (Right) Planning Reserve Margins**



The Anticipated Reserve Margin falls below the NERC Reference Margin Level in 2020 and reaches 10.36 percent in 2022. This is a common situation in MAPP, which has traditionally planned to meet the NERC Reference Margin Level at least five to six years in advance, without considerations for additional Firm contracts or new peaking capacity units that have less certainty in the final years of the 10-year assessment. MAPP will provide more accurate plans for 2020–2022 in future long-term assessments, as load projections become more accurate, long-term contracts are executed, and new generation resources are planned. MAPP does not anticipate any scenarios that would lead to a significant detraction from these projections for this assessment period.

## Demand

The forecasted 10-year compound annual growth rate for Total Internal Demand remains flat at 2.09 percent for the summer and 2.19 percent for the winter, increasing from 4,995 MW in 2013 to 6,015 MW in 2022 for the peak season (MRO-MAPP-Table 2). This amounts to a 2.09 percent CAGR for the summer demand.

**MRO-MAPP-Table 2: Demand Outlook**

MRO-MAPP-Summer	2013	2022	10-Year Change		CAGR
NET INTERNAL DEMAND	4,904	5,906	1,002	20.4%	2.09%
Load-Modifying Demand Response	91	109	18	19.3%	1.98%
<b>TOTAL INTERNAL DEMAND</b>	<b>4,995</b>	<b>6,015</b>	<b>1,020</b>	<b>20.4%</b>	<b>2.09%</b>

MRO-MAPP-Winter	2013/14	2022/23	10-Year Change		CAGR
NET INTERNAL DEMAND	4,858	5,904	1,047	21.5%	2.19%
Load-Modifying Demand Response	0	0	0	0.0%	0.00%
<b>TOTAL INTERNAL DEMAND</b>	<b>4,858</b>	<b>5,904</b>	<b>1,047</b>	<b>21.5%</b>	<b>2.19%</b>

<sup>191</sup> Each year represents the initial year of the winter season. For example: 2013 represents the 2013/2014 winter season.

Certain load-centers (e.g., large cities) are no longer included in the MRO-MAPP Assessment Area. These changes to the assessment area did not have much of an impact on demand growth, which remained essentially unchanged since the *2011LTRA*. There were no changes or enhancements this year to the forecasting methods used by MAPP last year. Most of the MAPP utilities report annual demand growth near the composite MAPP annual growth demand. One localized area of greater load growth is Rochester Public Utilities, which serves the greater Rochester, Minnesota Area and has a forecast 10-year annual growth rate of 6.9 percent for Total Internal Demand. This growth rate is primarily due to the downtown area development of City of Rochester and the expansion of the Mayo Clinic. MAPP continues to monitor the potential impact to demand that may be attributed to the increasing development in the oil and gas production in the Bakken Formation in western North Dakota and eastern Montana. In April 2008, the U.S. Geological Survey (USGS) estimated that the Bakken Formation is larger than all other current USGS oil assessments of the lower 48 states and is the largest “continuous” oil accumulation ever assessed by the USGS.

### Demand-Side Management

The total on-peak amount of Demand Response and Energy Efficiency/Conservation projected to be available for 2013 is 129 MW. The total on-peak amount of Demand Response and Energy Efficiency/Conservation projected to be available during the tenth year of the assessment (2022) is 190 MW. The growth pattern for Demand Response is a flat 1 percent throughout the assessment period. The growth pattern for Energy Efficiency / Conservation has more than triple during this assessment period, growing from approximately 22 MW in 2013 to 66 MW in 2022 (MRO-MAPP-Table 3).

**MRO-MAPP-Table 3: Demand-Side Management**

MRO-MAPP-Summer	Short-Term				10-Year Change	2022 Share of Total Internal Demand
	2013	2014	2015	2022		
Direct Control Load Management (DCLM)	5	5	5	5	0	0.09%
Contractually Interruptible (Curtailable)	10	10	10	10	0	0.17%
Critical Peak-Pricing (CPP) with Control	0	0	0	0	0	0.00%
Load as a Capacity Resource	0	0	0	0	0	0.00%
<b>TOTAL RESOURCE-SIDE DEMAND RESPONSE</b>	<b>16</b>	<b>16</b>	<b>16</b>	<b>16</b>	<b>0</b>	<b>0.26%</b>
Direct Control Load Management (DCLM)	86	88	90	104	18	1.73%
Contractually Interruptible (Curtailable)	5	5	5	5	0	0.08%
Critical Peak-Pricing (CPP) with Control	0	0	0	0	0	0.00%
Load as a Capacity Resource	0	0	0	0	0	0.00%
<b>TOTAL LOAD-MODIFYING DEMAND RESPONSE</b>	<b>91</b>	<b>93</b>	<b>95</b>	<b>109</b>	<b>18</b>	<b>1.81%</b>
<b>TOTAL ENERGY EFFICIENCY</b>	<b>22</b>	<b>26</b>	<b>31</b>	<b>66</b>	<b>44</b>	<b>1.10%</b>
<b>TOTAL DEMAND-SIDE MANAGEMENT</b>	<b>129</b>	<b>135</b>	<b>142</b>	<b>190</b>	<b>61</b>	<b>3.16%</b>

There have not been any significant changes regarding dispatchable and controllable Demand Response, or Demand Response used for ancillary services in MAPP. The amount of DSM in these areas remains flat.

### Generation

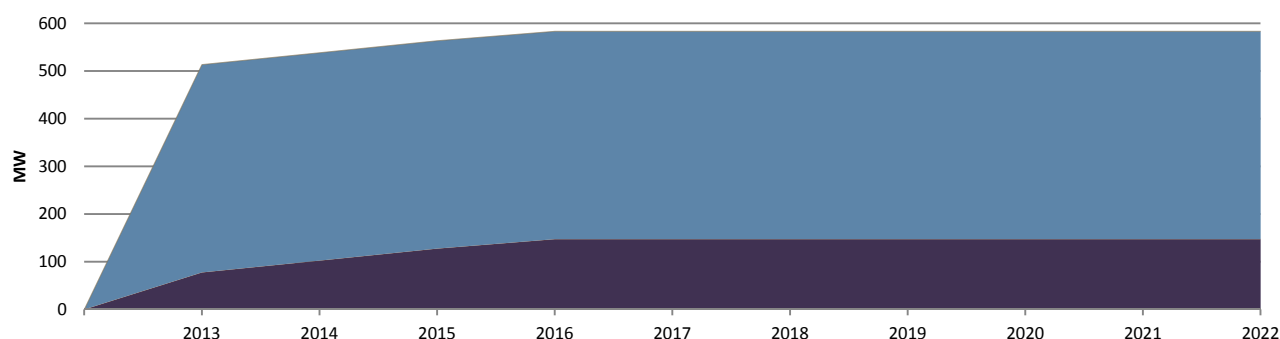
Current capacity amounts to 7,319 MW. There is currently no capacity categorized as Existing-Other or Existing-Inoperable. The primary fuel sources in MAPP are coal, hydro, natural gas, followed by oil and wind. Added capacity since the *2011LTRA* amounts to only about 50 MW.

There are 584 MW of Future-Planned and Conceptual resources projected to come on-line throughout the assessment time frame (MRO-MAPP Table 4 and MRO-MAPP Figure 2).

**MRO-MAPP-Table 4: Capacity Outlook<sup>192</sup>**

MRO-MAPP-Summer	Current		2022 Planned			2022 Planned & Conceptual		
	Capacity	Share	Capacity	Share	Change	Capacity	Share	Change
Coal	3,174	43.4%	3,322	42.0%	148	3,322	42.0%	148
Petroleum	597	8.2%	597	7.6%	0	597	7.6%	0
Gas	999	13.7%	1,435	18.2%	436	1,435	18.2%	436
Nuclear	60	0.8%	60	0.8%	0	60	0.8%	0
Other/Unknown	41	0.6%	41	0.5%	0	41	0.5%	0
Renewables	2,448	33.4%	2,448	31.0%	0	2,448	31.0%	0
<b>TOTAL</b>	<b>7,319</b>	<b>100.0%</b>	<b>7,903</b>	<b>100.0%</b>	<b>584</b>	<b>7,903</b>	<b>100.0%</b>	<b>584</b>

**MRO-MAPP-Figure 2: Summer Net Capacity Change**



There have been no significant unit retirements, deferments, derates, or other negative impact to Existing-Certain capacity in the prior year.

MAPP is not projecting any significant new generation, generator uprates, units taken out of service, units brought back in service, or long-term outages over the assessment period. There has been no change in behind-the-meter generation, or changes in other “non-traditional” resources in the previous year.

Of the total existing capacity, 251 MW of wind generation is expected on-peak, with a nameplate rating of 1,100 MW. To determine wind expected peak, MAPP utilizes a methodology that is based on a median of actual wind output. The same four peak hours per day for each day of the month are used. The four peak hours may change from month to month. This data set consists of 10 years of data or the life of the wind farm. Additionally, there are 2,193 MW of hydro and 3 MW of biomass Existing-Certain Capacity Resources in MAPP (MRO-MAPP-Table 5).

**MRO-MAPP-Table 5: Renewable Capacity Outlook<sup>193</sup>**

MRO-MAAP-Summer	Current		2022 Planned			2022 Planned & Conceptual		
	Capacity	Share	Capacity	Share	Change	Capacity	Share	Change
Hydro	2,193	89.6%	2,193	89.6%	0	2,193	89.6%	0
Pumped Storage	0	0.0%	0	0.0%	0	0	0.0%	0
Geothermal	0	0.0%	0	0.0%	0	0	0.0%	0
Wind	251	10.3%	251	10.3%	0	251	10.3%	0
Biomass	3	0.1%	3	0.1%	0	3	0.1%	0
Solar	0	0.0%	0	0.0%	0	0	0.0%	0
<b>TOTAL</b>	<b>2,448</b>	<b>100.0%</b>	<b>2,448</b>	<b>100.0%</b>	<b>0</b>	<b>2,448</b>	<b>100.0%</b>	<b>0</b>

No abnormal operating conditions or restrictions due to the integration of variable resources are expected to impact reliability during the assessment period. Hydro conditions are expected to be normal, with reservoir levels back to a normal level after several seasons of low water (MRO-MAPP-Table 6).

**MRO-MAPP-Table 6: Renewable Capacity Outlook**

Current	2022 Planned
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<sup>192</sup> “Current” represents Existing-Certain and Future-Planned projections for the 2012 summer (for summer-peaking assessment areas) or 2012/2013 winter (for winter-peaking assessment areas). “Share” represents the share (percent) of total Existing-Certain and Future-Planned capacity projected for the peak season.

<sup>193</sup> *Ibid.*

MRO-MAPP-Summer	Wind	Solar	Hydro	Biomass	Wind	Solar	Hydro	Biomass
Installed Capacity	1,104	0	2,357	3	1,104	0	2,357	3
On-Peak Derate	853	0	164	0	853	0	164	0
<b>EXPECTED ON-PEAK OUTPUT</b>	<b>251</b>	<b>0</b>	<b>2,193</b>	<b>3</b>	<b>251</b>	<b>0</b>	<b>2,193</b>	<b>3</b>

### Capacity Transactions

MAPP is projecting total Firm imports of 307 MW in 2013, increasing to 318 MW by 2022. Additionally, MAPP is projecting total Firm exports of 1,517 MW in 2013, decreasing to 1,424 by 2022. Net capacity transactions remain negative throughout the assessment period (MRO-MAPP-Table 7).

**MRO-MAPP-Table 7: Projected Capacity Transactions**

MRO-MAPP-Summer	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Expected Imports	0	0	0	0	0	0	0	0	0	0
Firm Imports	307	313	319	312	314	316	318	318	318	318
<b>TOTAL IMPORTS</b>	<b>307</b>	<b>313</b>	<b>319</b>	<b>312</b>	<b>314</b>	<b>316</b>	<b>318</b>	<b>318</b>	<b>318</b>	<b>318</b>
Expected Exports	0	0	0	0	0	0	0	0	0	0
Firm Exports	1,517	1,522	1,493	1,424	1,424	1,424	1,424	1,424	1,424	1,424
<b>TOTAL EXPORTS</b>	<b>1,517</b>	<b>1,522</b>	<b>1,493</b>	<b>1,424</b>	<b>1,424</b>	<b>1,424</b>	<b>1,424</b>	<b>1,424</b>	<b>1,424</b>	<b>1,424</b>
<b>TOTAL NET CAPACITY TRANSACTIONS</b>	<b>-1,210</b>	<b>-1,209</b>	<b>-1,174</b>	<b>-1,112</b>	<b>-1,110</b>	<b>-1,108</b>	<b>-1,106</b>	<b>-1,106</b>	<b>-1,106</b>	<b>-1,106</b>

No emergency MW imports are required to meet the reserve margin target in MAPP.

### Transmission

MAPP has 230 miles of greater-than-100 kV transmission line under construction and 716 miles of planned transmission projects above 100 kV that are expected to be in service within five years (MRO-MAPP-Table 8). These projects are anticipated to come into service during the 2013–2022 study period to enable reliable and efficient transmission service for the MAPP Assessment Area. There is no potential reliability impact in not meeting target in-service dates of transmission identified. MAPP does not anticipate any existing, significant transmission lines or transformers being out of service through the assessment period. MAPP does not have any transmission constraints that could significantly impact reliability. One transmission project was noted to have permitting delays, but the delays are not expected to impact reliability. Sufficient transmission is being built to support its Future-Planned generation. During the assessment period, several significant transformers are also planned to be upgraded.

**MRO-MAPP-Table 8: Existing and Projected Transmission**

MRO-MAPP	AC (Circuit Miles)	DC (Circuit Miles)	Total (Circuit Miles)
<b>EXISTING</b>	<b>10,266</b>	<b>0</b>	<b>10,266</b>
Currently Under Construction	230	0	230
Planned - Completed within First Five Years	716	0	716
Planned - Completed within Second Five Years	0	0	0
<b>2022 TOTAL (UNDER CONSTRUCTION &amp; PLANNED)</b>	<b>11,211</b>	<b>0</b>	<b>11,211</b>
Conceptual - Completed within First Five Years	107	0	107
Conceptual - Completed within Second Five Years	0	0	0
<b>2022 TOTAL (UNDER CONSTRUCTION, PLANNED &amp; CONCEPTUAL)</b>	<b>11,318</b>	<b>0</b>	<b>11,318</b>

### Vulnerability Assessment

With MAPP’s current generation capacity margin and average to high water levels, there are no resource adequacy or operational concerns. Renewable Portfolio Standards (RPS) are not projected to impact reliability in the assessment period.

There are no expectations to install additional Under-Voltage Load Shedding (UVLS) schemes in MAPP. MAPP does not have a regional UVLS requirement. Although Special Protection Systems or Remedial Action Schemes are sometimes utilized in MAPP, none are projected to be installed in lieu of planned bulk power transmission facilities.

MAPP relies on the Balancing Authorities to plan for catastrophic/hi-impact, low-frequency (HILF) events. Currently, there is no regional plan in place.

MAPP and MAPP members continue to research new technologies and tools to improve BPS reliability (e.g., smart grids or FACTS). There is no timeline on deploying new technologies or smart grid programs during the assessment period.

MAPP and MAPP Members continue to work with the MRO and its Subject Matter Expert (SME) teams and their application guides for protection and control to reduce the amount of relay protection misoperations.

The pending future environmental regulations may have an impact on reliability in the MAPP Assessment Area. However, the extent of the reliability impact on the MAPP Assessment Area is unknown until all impacted Generator Owners have announced their plans for compliance with the EPA regulation. MAPP continues both internally and in collaboration with stakeholders to maximize preparedness for the impact of this and other regulations.

#### **Plans for Accommodating Generator Retirements and Environmental Control Retrofits**

MAPP generators report that they are in compliance with current EPA regulations and Existing Units will be in compliance by the required dates for newly finalized EPA regulations. A few smaller IC units have been retired due to the new regulations, since it would have been cost prohibitive to retrofit the units to meet the regulations.

Generally, MAPP generators are already in compliance or plan to be so by the effective date of EPA regulations. One member reports, emission control technologies have been recently installed and mercury control technology will be optimized 4<sup>th</sup> quarter 2012 to determine if additional controls will be needed.

One MAPP member has reported it already made the required preparations for integrating its future generation additions. All physical onsite preps have been completed and the permitting and licensing requirements are in process.

MPC reports, the completion of a new 345 kV transmission line at the end of 2013 will allow additional energy from a compliant unit to be brought into Minnkota's service area.

As stated, HUC has retired old generation and new generation is being installed currently.

Heartland has sufficient resource to meet all of its demand and planning margin requirements for the foreseeable future. No new resources, supply or demand side, are planned at this time.

WAPA reports there are plans to uprate the Fort Randall units, which would result in a 28% increase in capacity/unit. However at this time it is unfunded.

Minnkota reports its units are in compliance (earlier than the required date), and is not aware of the need for the assessment.

HUC has done its own internal assessment as to the reliability impact of the new environmental regulations and the current generation plan is the result of that assessment. HUC will perform its own assessments if necessary. Any/all plans are discussed through coordinated meetings with HUC's balancing authority (GRE) prior to implementation.

### **Standing and Emerging Reliability Issues**

#### **Integration of Variable Resources – Planning Perspective**

One of the emerging issues within MAPP is the integration of variable resources, such as wind turbines. Many states in MAPP have a renewable energy mandate or goal. It is expected that the primary source of new renewable energy will come from intermittent resources, including wind. The integration of intermittent resources presents new challenges in the Region. The integration does not cause undo reliability issues on its own, but it does change the nature of how the BPS is operated.

As the amount of wind resources increases, its contribution to resource adequacy will also increase. This may introduce additional uncertainty in maintaining system reliability. New wind resources will have an impact on the transmission system and may increase the potential for congestion on the system. Intermittent resources also have an impact on the operation of the system generation fleet as resources will need to be dedicated into meeting the potential ramp and minimum generation issues that could occur.



Currently, wind development is focused around meeting the existing state renewable energy mandates. However, resource adequacy may become a concern if additional regulations or rules (clean energy standards, carbon reduction) are implemented. Additionally, economic factors may increase the amount of intermittent resources found on the system, such as higher gas prices or lower construction costs for the intermittent resources.

**Transmission In-Service Dates**

Another emerging issue that impacts MAPP as well as other Assessment Areas is the complex process for getting transmission projects built. Transmission projects that do not get built, or get delayed, may impact reliability through congestion on the existing BES. This could impact the amount of transmission loading relief (TLR) used. Currently, this issue is not impacting resource adequacy as reported through the LTRA. A Loss of Load Expectation (LOLE) study may reveal constrained interfaces within MAPP. Siting and permitting issues could be barriers to transmission in-service dates, which may constrain the existing BES and affect real-time operations.

**NERC**

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

# 2013 Long-Term Reliability Assessment

December 2013

**RELIABILITY | ACCOUNTABILITY**



# MRO-MAPP

The Mid-Continent Area Power Pool (MAPP) is an association of electric utilities and other electric industry participants operating in all or parts of Iowa, Minnesota, Montana, North Dakota, and South Dakota. Currently, the MAPP Planning Authority includes entities in two BAs and 13 LSEs. The MAPP Planning Authority covers an area of approximately 200,000 square miles and serves a population of about 3.5 million. MAPP typically experiences its annual peak demand in summer. There have not been any changes to the MAPP Assessment Area footprint in the last two years, and no changes are expected in the future.

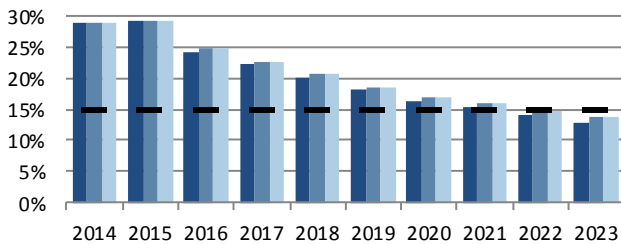


## Planning Reserve Margins

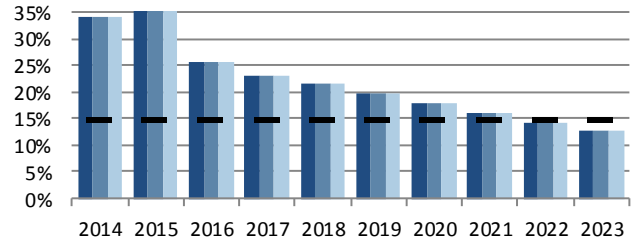
MRO-MAPP-Summer	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ANTICIPATED	29.01%	29.15%	24.36%	22.20%	20.15%	18.10%	16.29%	15.49%	14.22%	12.98%
PROSPECTIVE	29.01%	29.15%	24.76%	22.64%	20.64%	18.64%	16.87%	16.11%	14.88%	13.68%
ADJUSTED POTENTIAL	29.01%	29.15%	24.76%	22.64%	20.64%	18.64%	16.87%	16.11%	14.88%	13.68%
<b>NERC REFERENCE</b>	-	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>

MRO-MAPP-Winter	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
ANTICIPATED	34.20%	36.08%	25.76%	23.18%	21.58%	19.62%	17.86%	16.09%	14.40%	12.66%
PROSPECTIVE	34.20%	36.08%	25.76%	23.18%	21.58%	19.62%	17.86%	16.09%	14.40%	12.66%
ADJUSTED POTENTIAL	34.20%	36.08%	25.76%	23.18%	21.58%	19.62%	17.86%	16.09%	14.40%	12.66%
<b>NERC REFERENCE</b>	-	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>	<b>15.00%</b>

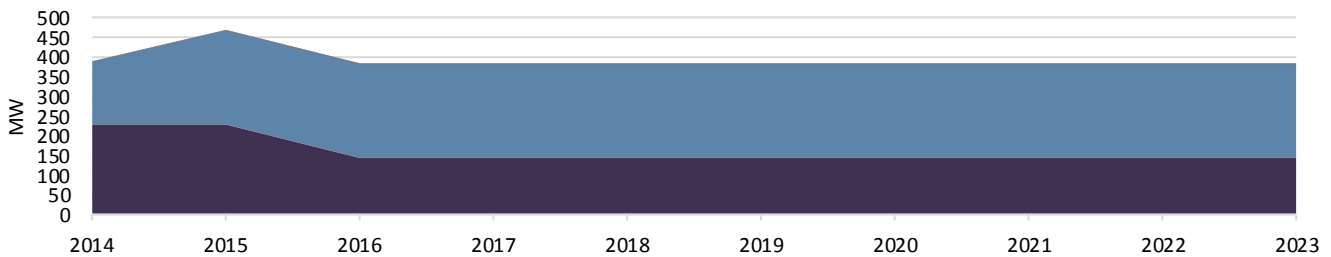
Summer



Winter



## Cumulative 10-Year Planned Capacity Change



	2013 Existing		2023 Planned			2023 Planned & Conceptual		
	Capacity (MW)	Share (%)	Capacity (MW)	Share (%)	Change (MW)	Capacity (MW)	Share (%)	Change (MW)
MRO-MAPP								
Coal	3,205	44.1%	3,347	43.7%	142	3,347	43.7%	142
Petroleum	564	7.8%	564	7.4%	0	564	7.4%	0
Gas	1,059	14.6%	1,299	17.0%	240	1,299	17.0%	240
Nuclear	60	0.8%	60	0.8%	0	60	0.8%	0
Hydro	2,135	29.4%	2,135	27.9%	0	2,135	27.9%	0
Pumped Storage	0	0.0%	0	0.0%	0	0	0.0%	0
Geothermal	0	0.0%	0	0.0%	0	0	0.0%	0
Wind	247	3.4%	247	3.2%	0	247	3.2%	0
Biomass	3	0.0%	3	0.0%	0	3	0.0%	0
Solar	0	0.0%	0	0.0%	0	0	0.0%	0
<b>TOTAL</b>	<b>7,273</b>	<b>100.0%</b>	<b>7,656</b>	<b>100.0%</b>	<b>382</b>	<b>7,656</b>	<b>100.0%</b>	<b>382</b>

## Demand, Resources, and Planning Reserve Margins

All Planning Reserve Margins exceed the target reference margins (NERC Reference Margin Level) of 15 percent through 2021. The Anticipated Reserve Margin falls below 15 percent in 2022 and reaches 12.7 percent in 2023. Falling short of the target reserve margin in the final two years is not a new trend in MAPP. MAPP has traditionally met its target reserve margin through the mid-term planning horizon, but beyond that time frame, firm contracts or new peaking capacity units may not yet be known. MAPP will have a more accurate picture of 2020–2023 in the next few years as load projections become more accurate, long-term contracts are executed, and new generation resources are planned.<sup>106</sup>

In the *2012LTRA* reference case, MAPP forecasted 10-year annual growth rates of 2.0 percent for Total Internal Demand and 2.2 percent for Net Energy for Load. In the *2013LTRA*, the forecasted 10-year annual growth rate for Total Internal Demand decreased slightly to 1.9 percent over the assessment period, while the forecasted 10-year annual growth rate for Net Energy for Load decreased to 2.0 percent.

Most of the MAPP utilities report annual demand growth near the composite MAPP annual growth demand. One localized area of greater load growth is Rochester Public Utilities, which serves the greater Rochester, Minnesota area and has a forecasted 10-year annual growth rate of 6.5 percent for Total Internal Demand. This growth rate is primarily due to the development of downtown Rochester and the expansion of the Mayo Clinic. Another area of strong load growth is attributed to the increasing development in the oil and gas production in the Bakken Formation in western North Dakota and eastern Montana. Western Area Power Administration (WAPA) and Basin Electric Power Cooperative (BEPC) performed studies of the northwestern North Dakota region to evaluate the impact of the load growth in this area. Transmission and system enhancements are noted in the sections below as a result of these studies.

The growth pattern for DR is a flat 1.0 percent throughout the assessment period, with the amount of available DR increasing from 102 MW in 2014 to 122 MW in 2023. The growth pattern for Energy Efficiency and conservation increases 300 percent throughout the assessment period from 18.9 MW in 2014 to 56.6 MW in 2023.

A wide variety of programs, including direct load control (such as electric appliance cycling) and interruptible load, may be used to reduce peak demand during the assessment period. Minnkota's DR—which accounts for a majority of DR in the MAPP Assessment Area—is treated as load modifying.

There are 382 MW of Future-Planned and Conceptual resources projected to come on-line throughout the assessment time frame, with 85.2 MW of projected retirements. Rochester Public Utilities plans to retire Silver Lake units 1–4 in 2016, accounting for all 85.2 MW of retirements. The retirement of these units is not expected to have a significant impact on reliability during the assessment period. Regarding existing capacity resources, 250 MW of wind generation is expected on peak, with a nameplate rating of 1,100 MW. There are 2,135 MW of hydro and 3 MW of biomass Existing-Certain capacity resources in MAPP.

MAPP is traditionally a net capacity exporting area and is projecting total firm imports of 398 MW and firm exports of 1,458 MW. For both imports and exports, firm contracts exist for both the generation and the transmission service.<sup>107</sup>

## Transmission and System Enhancements

MAPP has 502 miles of greater than 100-kV transmission lines under construction. Additionally, there are 396 miles of planned projects and 84 miles of conceptual projects greater than 100-kV expected to be in service within five years. These

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<sup>106</sup> MAPP has not received any notice from neighboring areas about issues that could impact operations during the assessment period. MAPP is part of the MISO RC footprint and operating issues are coordinated through the RC.

<sup>107</sup> Firm contracts are at least one year in length, and some extend out 10 years or more. Capacity transactions projected beyond the length of firm contracts may be based on extensions of those contracts. Transmission providers within MAPP handle Liquidated Damage Contracts (LDC) according to their tariff policies. Most MAPP LSEs are within nonretail access jurisdictions and therefore liquidated damages products are not typically used. MAPP is forecasted to meet the various reserve margin targets without needing to include Energy-only, uncertain, or transmission-limited resources.

projects are anticipated to come into service during the 2013–2017 time frame to enable reliable and efficient transmission service for the MAPP Region. Significant 345-kV projects include Center–Prairie, Antelope Valley Station–Neset, and Brookings County–Hampton. Basin Electric is monitoring voltage stability performance in its Bakken Area studies, which could identify any static reactive limits in the area. One of the transmission projects was identified to have permitting delays but this delay is not expected to impact reliability.

In December 2012, a temporary UVLS scheme was installed at the Williston 57-kV bus due to unforecasted load growth in that area attributed to the increasing development in the oil and gas production in the Bakken Formation. The UVLS prevents low post-contingent voltages in the local area for the loss of certain transmission facilities. Approximately 70 MW of peak load can be tripped by the UVLS in three stages. In April 2014, a parallel 230/115-kV transformer is scheduled to be energized at Williston, at which time the temporary UVLS will be removed. Additional transmission projects are being reviewed and planned to address the needs of the unforecast demands of the Bakken Formation (e.g., the Antelope Valley Station–Neset 345-kV line noted above).

MAPP and its members continue to research new technologies and tools (e.g., smart grids or FACTS) to improve BPS reliability. There is no timeline on deploying new technologies or smart grid programs during the assessment period.

### **Long-Term Reliability Issues**

Several states in MAPP have a renewable energy mandate or goal, creating the expectation that the primary source of new renewable energy will come from intermittent resources, including wind. The integration of intermittent resources presents new challenges in the Region. As the amount of wind resources increases, their contribution to resource adequacy will also increase. This may introduce additional uncertainty in maintaining system reliability. New wind resources will have an impact on the transmission system and may increase the potential for congestion on the system. Intermittent resources also have an impact on the operation of the system generation fleet as resources that will need to be considered in meeting the potential ramp and minimum generation issues that could occur.

Currently, wind development is focused around meeting the existing state renewable energy mandates. However, if additional regulations (e.g., clean energy standards, carbon reduction) are pushed forward, more resources may be required. Additionally, economic factors such as higher gas prices or lower construction costs may increase the amount of intermittent resources found on the system.

MAPP has not conducted any assessment area-wide studies around environmental or regulatory restrictions that could impact reliability, including from minimum demand or over-generation situations.

Another emerging issue that impacts MAPP, as well as other Regions, is the complex process building transmission projects. Transmission projects that do not get built or are delayed may impact reliability through congestion on the existing BES. This could impact the amount of transmission loading relief (TLR) used. Currently, this issue is not impacting resource adequacy as reported through the LTRA. Siting and permitting issues could be barriers to transmission in-service dates, which may constrain the existing BES and affect real-time operations.

**STATE OF MINNESOTA  
MINNESOTA PUBLIC UTILITIES COMMISSION**

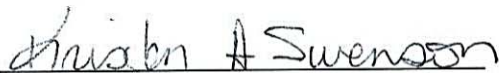
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In the Matter of the 2013 Minnesota Biennial  
Transmission Projects Report

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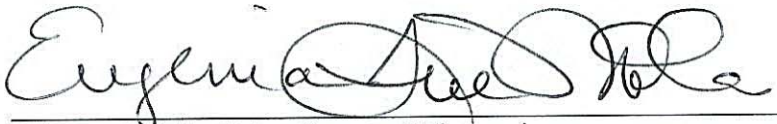
**AFFIDAVIT OF SERVICE**

I, Kristen Swenson, being first duly sworn on oath say that in the Village of Prentice, County of Price, in the State of Wisconsin, on the 9<sup>th</sup> day of December, 2013 served by email, pages 129 – 134 of the 2012 NERC Long-Term Assessment and pages 77 – 79 of the 2013 NERC Long-Term Assessment, to those persons listed on the attached service list.

  
Kristen A. Swenson

Subscribed and sworn to before me this 9<sup>th</sup> day of December, 2013.



  
Notary Public, Price County, Wisconsin  
My Commission Expires 06-05-2016  
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