



UTILITIES CO.

A Division of MDU Resources Group, Inc.

400 North Fourth Street

Bismarck, ND 58501

(701) 222-7900

November 3, 2017

Executive Secretary
North Dakota Public Service
Commission
State Capitol Building
Bismarck, ND 58505

Re: Case No. PU-17-267
Integrated Resource Plan
Biennial Filing

Update

Montana-Dakota Utilities Co. (Montana-Dakota), a Division of MDU Resources Group, Inc., herewith submits eight (8) copies of an update to its Electric Integrated Resource Plan submitted on June 30, 2017 in the above referenced case.

The attached Update addresses a change in the Company's load forecast and additions to the Commercial Demand Response Program that have occurred since the IRP was submitted on June 30, 2017.

Please contact me if you have any questions at 701.222.7856 or by email at tamie.aberle@mdu.com.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Tamie A. Aberle', is written over a light-colored background.

Tamie A. Aberle
Director of Regulatory Affairs

Enclosure

CHAPTER 9

2017 IRP UPDATE

This chapter provides an update to the integrated resource plan since the filing of the North Dakota Integrated Resource Plan filing on July 1, 2017. Several things have changed with the slight reduction in the new load forecast for 2018 and growing the commercial demand response program to 25 MW by the end of 2017 as described below.

Load Forecast

The load forecast used in the North Dakota 2017 IRP and referenced in Chapter 2 of the Montana IRP was developed and finalized in late 2016, and since then a new load forecast has been developed. The new load forecast has total sales increasing by 1.23% over the first five-years compared to the load forecast in the North Dakota 2017 IRP of 1.65% for the same period. The primary drivers for lower total sales is the decline in the five-year growth rate of the residential sales sector from 1.2% to 0.62%, and the Small C&I sales sector going from 3.1% to 2.22%. The total energy requirements for 2018 in the new load forecast is 3,342.6 GWh compared to the North Dakota 2017 IRP total energy requirements for 2018 of 3,401.3 GWh, a decrease of 58.7 GWh or 1.73%.

The summer peak demand also had a decrease in the five-year average from 1.36% in the North Dakota 2017 IRP to 1.17% in the new load forecast. The peak demand for 2018 in the new load forecast is 604.0 compared to 606.4 in the North Dakota 2017 IRP load forecast, which results in a decrease of approximately 0.4%. The comparison of the two forecasts can be seen in Table 9-1.

The change in the load forecast was one of the drivers for the A/C cycling program to not be selected in the updated Base Case modeling results.

Table 9-1
Comparison of the 2017 IRP load forecast and the new load forecast

	North Dakota 2017 IRP Load Forecast		New Load Forecast	
	Demand (MW)	Total Energy Requirements (GWh)	Demand (MW)	Total Energy Requirements (GWh)
2016	588.0	3206.7		
2017	597.9	3344.6	597.1	3302.0
2018	606.4	3401.3	604.0	3342.6
2019	614.9	3458.1	611.2	3383.6
2020	623.6	3515.8	618.4	3425.6
2021	631.6	3567.8	625.5	3467.1
2022	639.7	3619.6	632.9	3511.0
2023	647.2	3665.1	639.8	3549.8
2024	654.9	3713.2	647.0	3591.7
2025	662.0	3755.5	654.1	3632.4
2026	669.4	3800.0	661.4	3675.4
2027	676.7	3843.9	668.8	3719.1
2028	683.9	3888.3	676.1	3763.4
2029	691.3	3933.4	683.6	3808.4
2030	698.8	3979.0	691.2	3854.0
2031	706.3	4025.3	698.9	3900.2
2032	713.9	4072.1	706.6	3947.1
2033	721.6	4119.7	714.3	3994.7
2034	729.3	4167.8	722.2	4043.0
2035	737.1	4216.7	730.1	4092.0
2036	745.0	4266.4	738.1	4142.0
2037			746.2	4192.7

Commercial Demand Response Program

The original plan for the Commercial Demand Response program was to potentially grow the program from a current total of 10 MW to 15 MW by 2019. Since the original modeling was completed, a current customer in the Commercial Demand Response program has decided to add an additional 15 MW of demand response. With this addition of demand response, the Commercial Demand Response program would grow to a total of 25 MW by the end of 2017. The additional 10 MW to the Commercial Demand Response program was the other main factor in driving the A/C cycling program to not be selected as part of the updated Base Case modeling results.

Updated Base Case Results

The North Dakota 2017 IRP Base Case was run under two scenarios along with the new load forecast. The first scenario which is labeled “Original” in Table 9-2 assumes the Commercial Demand Response program was growing to a total of 15 MW by 2019 as was the case in the North Dakota 2017 IRP Base Case. The other scenario, labeled “25 MW Commercial,” takes into account the addition of the extra 15 MW of Commercial Demand Response that will be available by the end of 2017. In both scenarios, the A/C cycling program was not selected in the Base Case scenario. The model was run again forcing in the A/C cycling program to see what the increase in the Net Present Value (NPV) would be in each scenario with the results shown in Table 9-2. The need for the Thunder Spirit Wind expansion and combined cycle combustion turbine continued to be selected as part of both the Base Cases.

With these updated results, the action plan going forward has changed since the original modeling of the North Dakota 2017 IRP. Based on these results, Montana-Dakota’s recommended resource plan is to pursue the following resources to meet the requirements identified for the 2017-2026 period:

- Continue the commercial demand response program to achieve 25 MW by the end of 2017 and achieve 20 MW from Montana-Dakota’s interruptible rates by 2019;
- Purchase the additional 48 MW at the existing Thunder Spirit Wind; and
- Continue the design and engineering work on a natural gas-fired combined cycle combustion turbine resource to be online in or after 2025.

The load and capability can be seen in Figure 9-3 that shows these additions along with the potential retirement of the coal units and the wind farms at their twenty year life.

Table 9-2
Updated Base Case Results

	2018 Load Forecast			
	Original		25 MW Commercial Demand Response	
	Base Case	Base Case AC Cycling	Base Case	Base Case AC Cycling
2017				
2018		AC Cycling		AC Cycling
2019	TSW	TSW	TSW	TSW
2020				
2021				
2022				
2023				
2024				
2025	Heskett CC	CC-SGT-800(140)	CC-SGT-800(140)	CC-SGT-800(140)
2026				
2027				
2028				
2029				
2030		PP(10)	PP(10)	
2031		PP(20)	PP(20)	PP(10)
2032				PP(20)
2033		RICE(36)	RICE(36)	PP(20)
2034	PP(10)	PP(10)	PP(10)	RICE(36)
2035	CT(41)	CT(41)	CT(41)	CT(41)
2036				
NPV (\$M)	\$2,937.44	\$2,946.23	\$2,945.98	\$2,955.66

Resources:

PP(x) - Purchased Capacity with number representing MW value

AC Cycling - 10 MW phased in over 5 years

TSW - 48 MW Phase II of Thunder Spirit Wind

Heskett CC - Another GE 7EA added with a steam turbine and heat recovery steam generator - 180 MW additional

CC-7FA(323) - 323 MW GE 7FA (1x1) combined cycle combustion turbine

CC-SGT-800(140) - 139.8 MW Siemens SGT-800 (2x1) combined cycle combustion turbine

CT(41) - 41.3 MW GE LM6000PH simple cycle combustion turbine

CT(78) - 78.4 MW GE 7EA simple cycle combustion turbine

WIND(x) - Self-built wind option

BIOMASS - 9.3 MW Biomass

RICE(36) - 36.5 MW Wartsila Reciprocating Internal Combustion Engine (4 units)

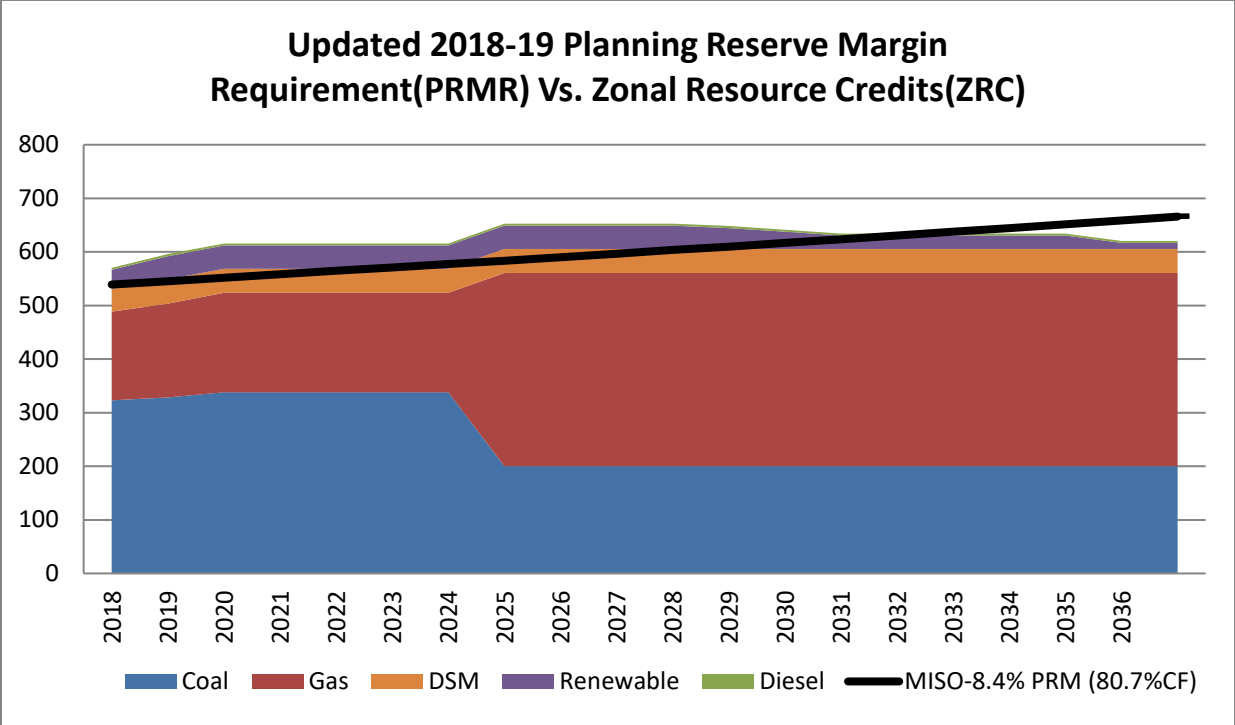


Figure 9-3: The load and capability with new load forecast