

# Alternative to OTP's Revised Minnesota Preferred Plan with AME

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### 1.1 CLEAN ENERGY ORGANIZATIONS' ("CEO") ENCOMPASS MODELING

Energy Futures Group was asked to review Otter Tail Power's ("OTP") EnCompass modeling<sup>1</sup> in support of the Available Maximum Emergency ("AME") supplemental filing made on December 15, 2023. As part of this filing, OTP put forward the idea of designating the Minnesota share of Coyote Station as an AME resource as an alternative to withdrawing from Coyote in 2028. If Coyote is designated as an AME resource, the following conditions would apply:

- 1. The approximately 70 MW of Coyote capacity attributable to the Minnesota customers would dispatch only in emergencies;<sup>2</sup>
- 2. The AME designation would begin March 1, 2029, and continue until a withdrawal from Coyote or its retirement in 2040;<sup>3</sup>
- 3. Minnesota ratepayers would be responsible for the jurisdictionally-allocated share of the fixed costs of Coyote and the variable costs of operation during emergency events.<sup>4</sup>

The modeling performed by OTP was on a bifurcated system and only represented the Minnesota share of OTP's load, resources, and costs. Table 1 below shows the supply-side resource additions for Minnesota prior to 2032 proposed in OTP's new Minnesota Preferred Plan with AME.

Year	Resource	MW
2025	Surplus Solar	200
2026	Generic Wind	100
2032	Generic Wind	50

#### Table 1. Resource Additions (pre-2032) Proposed in OTP's Minnesota Preferred Plan with AME (MW)⁵

CEOs sought to evaluate the cost effectiveness of OTP's AME Plan compared to using batteries to replace the capacity of Coyote in 2029, assuming a withdrawal from the Minnesota share of Coyote in that year. In order to develop a comparable alternative plan to starting AME for Coyote in 2029 and continuing until the retirement in 2040,

<sup>&</sup>lt;sup>5</sup> Docket No. E017/RP-21-339. OTP Supplemental Filing on December 15, 2023, Table 1 at 8.



<sup>&</sup>lt;sup>1</sup> EnCompass modeling files were provided in response to IR CEO-090.

<sup>&</sup>lt;sup>2</sup> Docket No. E017/RP-21-339. OTP Supplemental Filing on December 15, 2023, at 3-4.

<sup>&</sup>lt;sup>3</sup> Docket No. E017/RP-21-339. OTP Supplemental Filing on December 15, 2023, at 5.

<sup>&</sup>lt;sup>4</sup> Docket No. E017/RP-21-339. OTP Supplemental Filing on December 15, 2023, at 7.

the CEOs' developed a plan that includes the same new supply side resources as contained in OTP's AME Plan, but includes withdrawal from the Minnesota share of Coyote in 2029 and replaces that capacity with 75 MW of battery storage resources. We call this the "Alternative CEO Plan with Battery." Based on OTP's assumptions made in its Supplemental Preferred Plan regarding surplus resources,<sup>6</sup> 50 MW of the battery storage resources in the Alternative CEO Plan with Battery are assumed to be available as surplus resources that would qualify for the 10% additional investment tax credit ("ITC") under the energy community bonus adder and 25 MW would be a generic battery resource.

Table 2 below highlights the modeling changes that the CEOs' made to the OTP Minnesota Preferred Plan with AME and the Alternative CEO Plan with Battery.

Modeling Changes	OTP MN Preferred Plan with AME	Alternative CEO Plan with Battery
Add 200 MW surplus solar in 2025	✓	✓
Add 100 MW generic wind in 2026	$\checkmark$	$\checkmark$
Add 50 MW generic wind in 2032	$\checkmark$	$\checkmark$
CEO renewable and battery storage cost	$\checkmark$	$\checkmark$
assumptions		
Revised curtailment costs	✓	$\checkmark$
Battery storage with minimum capacity	$\checkmark$	$\checkmark$
Withdraw from Coyote after 2028	-	$\checkmark$
Minnesota portion of Coyote withdraw costs	-	$\checkmark$
Production cost modeling	$\checkmark$	$\checkmark$
Add 50 MW of surplus battery in 2029	-	$\checkmark$
Add 25 MW of generic battery in 2029	-	✓

#### Table 2. Modeling Changes

Modeling both plans in EnCompass with the same modeling assumptions shows that on a Present Value of Revenue Requirements ("PVRR") basis, the Alternative CEO Plan with Battery is slightly lower cost compared to the OTP Preferred Plan with AME. It is important to note that OTP's EnCompass database for the AME modeling was configured without *any* assumptions for externalities or the Regulatory Cost of Carbon. In order to keep the CEO modeling runs consistent with and comparable to OTP's approach, and to limit the number of new modeling runs to present in these

<sup>&</sup>lt;sup>6</sup> OTP Supplemental Preferred Plan, March 31, 2023, p. 7 (see the resource build for the "base case" scenario.



supplemental comments, the CEOs did not change that assumption and the PVRRs presented here do not factor in either externalities or the Regulatory Cost of Carbon.

Table 3. Present Value of Revenue Requirements ("PVRR") (no CO2 regulatory cost)

Plan	PVRR (\$000)
OTP Preferred Plan with AME	\$1,446,232
Alternative CEO With Battery	\$1,423,420

## **1.2 WINTER ACCREDITATION**

Table 4 and Table 5 below show the winter accredited capacity for OTP's existing and new resources under the Alternative CEO Plan with Battery and the OTP Preferred Plan with AME, respectively for the eight years 2025-2032. This calculation utilizes OTP's accreditation assumptions as shown in the Company's AME modeling. The accredited values are nearly identical across the two plans, with the 2029 difference being 1 MW.

Existing Resources:	2025	2026	2027	2028	2029	2030	2031	2032
Coal	185	185	185	185	118	118	118	118
Combustion Turbine	179	179	179	179	179	179	179	179
Contract	4	4	4	4	4	4	4	4
Hydro	1	1	1	1	1	1	1	1
Wind	74	74	74	74	70	70	64	64
Solar	3	3	3	3	3	3	0	0
Demand Response	60	61	62	62	63	64	64	66
Total Existing	506	507	507	508	438	439	431	433
New Resources:								
Solar	9	9	9	9	9	9	2	2
Wind	0	40	40	40	40	40	37	56
Battery Storage	0	0	0	0	66	66	66	66
Total New	9	50	50	50	115	115	104	123
Total	516	556	557	558	554	554	535	555

Table 4. Existing and New Resources in Alternative CEO Plan with Battery(Winter Accreditation, MW)



<b>Existing Resources:</b>	2025	2026	2027	2028	2029	2030	2031	2032
Coal	185	185	185	185	185	185	185	185
Combustion Turbine	179	179	179	179	179	179	179	179
Contract	4	4	4	4	4	4	4	4
Hydro	1	1	1	1	1	1	1	1
Wind	74	74	74	74	70	70	64	64
Solar	3	3	3	3	3	3	0	0
Demand Response	60	61	62	62	63	64	64	66
Total Existing	506	507	507	508	505	505	498	499
New Resources:								
Solar	9	9	9	9	9	9	2	2
Wind	0	40	40	40	40	40	37	56
Battery Storage	0	0	0	0	0	0	0	0
Total New	9	50	50	50	50	50	39	57
Total	516	556	557	558	555	555	536	556

Table 5. Existing and New Resources in OTP Preferred Plan with AME (WinterAccreditation, MW)

# **1.3 HOURLY ANALYSIS**

Similar to the supplemental production cost analysis that was performed for the CEO modeling runs presented in the EFG report filed in September 2023, we reviewed the hourly detailed output for the year 2029 for the Alternative CEO Plan with Battery to assess its performance under winter peak conditions.

Since we wanted to focus this hourly look at how OTP's system would dispatch during periods of higher wintertime demand, we made a couple of modifications to the modeling inputs to ensure that all of OTP's resources would dispatch before the model turned to market purchases. In order to execute this in EnCompass, we allowed OTP's demand response resources to be called on and we also modified the market price forecast to raise the market price to ensure that it would be higher than the highest-cost unit in OTP's fleet of resources.

It is also important to note that this EnCompass modeling was performed on only the Minnesota portion of OTP's system, so it only considers the Minnesota share of Otter Tail's existing resources. This means that the model is dispatching resources with no consideration for potential periods where Minnesota-specific demand could be met with excess generation from the Dakota portions of OTP's resources.



In 2029, there are four winter peak days that occur in January (the 5<sup>th</sup>, 12<sup>th</sup>, 19<sup>th</sup>, and 26<sup>th</sup>). Under the Alternative CEO Plan with Battery, OTP is able to meet the hourly demand of the Minnesota jurisdiction on each of these peak days without needing to turn to market purchases. The graphs below show two different dispatch patterns during these peak days. Figure 1 illustrates the dispatch of generators on OTP's system on January 12, 2029, and Figure 2 shows the dispatch of OTP's system on January 26, 2029.

On January 12, 2029, there is more generation from wind and solar resources compared to January 26, 2029, which results in lower dispatch of the CT fleet on January 12. In addition, the battery storage resources are able to charge during periods of excess renewable generation on January 12. On January 26, 2029, a day with low forecasted renewable generation, the new battery resources and OTP's Minnesota demand response resources are dispatched to help meet peak demand.



Figure 1. Hourly Demand and Generation on January 12, 2029





Figure 2. Hourly Demand and Generation on January 26, 2029

