Minnesota Public Utilities Commission

Staff Briefing Papers

Meeting Date: October 23, 2014 ..... Agenda Item:#4

Company: Otter Tail Power Company

Docket No. E017/RP-13-961

In the Matter of Otter Tail Power Company's Application for 2014-2028 Integrated Resource Plan Approval

Issue(s): Should the Commission approve Otter Tail's 2014 Integrated Resource Plan?

What modifications, if any, should Otter Tail make to its Resource Plan?

When should Otter Tail file its next Resource Plan?

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Relevant Documents

Otter Tail, Resource Plan Petition ..... December 2, 2013
Department of Commerce, require for extension to initial comment deadline ..... March 11, 2014
Department of Commerce, initial comments ..... May 2, 2014
Environmental Intervenors, initial comments ..... May 2, 2014
Otter Tail, request for extension to reply comment deadline ..... June 10, 2014
Environmental Intervenors, reply comments ..... August 1, 2014
MISO, comments ..... August 1, 2014
Otter Tail, reply comments ..... August 1, 2014
Department of Commerce, supplemental comments ..... August 29, 2014
Environmental Intervenors, supplemental comments ..... August 29, 2014
Midwest Large Energy Customers, comments ..... August 29, 2014
Otter Tail, supplemental comments ..... August 29, 2014

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I. Introduction

In this introduction, Staff first raises the issue that is typically addressed last, which is the deadline for Otter Tail's next Integrated Resource Plan (IRP). The reasons for this are twofold. First, the parties generally agree that Otter Tail's instant IRP should be approved, with various recommended modifications. Second, Minnesota's, as well as Otter Tail's, compliance with the U.S. Environmental Protection Agency (EPA) 111(d) rule–carbon emissions at existing facilities–is in a state of significant uncertainty. Thus, as the Commission reviews the docket record and this briefing paper, the Commission could keep in mind how Otter Tail's resource planning proceedings could or should fit together with the State of Minnesota's 111(d) compliance plan.

As Otter Tail explains in its reply comments, excerpted below, EPA's proposed 111(d) rulemaking is an evolving situation with many issues yet to be determined, including whether an individual- or multi-state compliance approach is preferable and how those plans will affect not only when, but where Otter Tail will site its future renewables additions:

> Otter Tail plans to continue to monitor the rulemaking process and assess the potential impact this rule could have on the Company and its customers. The amount, location and timing of possible generation additions may be very dependent on the outcome of this rulemaking....Depending on the outcome of these Rules and other related proceedings, such as state implementation plans and any multi-state compliance proceedings, there may be significant benefits if certain generation projects are located within certain states.[1]

Otter Tail's instant IRP was filed on December 3, 2013. The Company proposes a December 2016 deadline for its next IRP–a three-year span in-between resource plans–which would be a significant variance from the two-year schedule identified in Chapter 7843 of Minnesota Rules. Presumably, Otter Tail proposed this deadline so the Company can complete a fuller picture of 111(d) compliance, although the Commission can ask Otter Tail to explain why December 2016 is appropriate.

The Minnesota Pollution Control Agency (PCA) is the state permitting authority tasked with submitting the State's 111(d) compliance plan to EPA by June 30, 2016.[2] In considering the deadline for Otter Tail's next IRP, the Commission could contemplate the following question: should Otter Tail's next IRP inform Minnesota's 111(d) compliance plan, or should the compliance plan inform Otter Tail's next IRP?

Staff prefers the former because Otter Tail's instant IRP does not include any modeling insights into 111(d) compliance specifically, which is understandable given the sequence of events. EPA's proposed 111(d) rule was published in the Federal Registrar on June 18, 2014, which was during the latter stages of Otter Tail's IRP process and long after Otter Tail modeled its action plan. Staff is unaware of any modeling the Company may have performed since EPA

[1] Otter Tail Power, reply comments, p. 10.
[2] PCA could request a one-year extension, or a two-year extension if states file a multi-state plan.

published its proposed rule. Nevertheless, it would be useful if Otter Tail, whose service territory is uniquely multi-jurisdictional, could include some modeling in this or subsequent IRP proceedings which contemplates least-cost approaches to comply with all environmental rules, including uncertain ones such as 111(d). In fact, that is in part the point of resource planning.

In their own unique way, each resource plan before the Commission will contribute to the broader goal of developing a reasonable, reliable, and least-cost 111(d) compliance plan for the State of Minnesota. Staff believes IRP is a useful forum for the Commission, utilities, the Department of Commerce (the Department), PCA, and intervening parties to regularly and iteratively discuss compliance issues in advance of, as well as after, PCA submits a state implementation plan.

When Otter Tail's previous IRP came before the Commission, there was lingering dispute and uncertainty over whether Hoot Lake Plant should be replaced, retrofitted with emissions controls, or retired to comply with newly promulgated EPA rules, specifically the EPA Mercury and Air Toxics Standards (MATS). In that proceeding, the Commission directed the Company to develop a study within nine months to further evaluate options at Hoot Lake, while allowing several parties to provide comment.

In Staff's view, that extra round of analysis turned out to be very productive and time-efficient, and the Commission could pursue a similar modeling exercise here to incorporate 111(d) modeling into the record. However, it is Staff's opinion that a similar route to measure 111(d) impacts is much more complicated and would likely be less fruitful than the Hoot Lake study. First, the 111(d) rule will not be finalized until June 2015. Second, as Otter Tail notes, the rule could be subject to potential litigation, further extending the uncertainty. Third, 111(d) compliance would affect Otter Tail's entire fleet in three separate states, not just a particular facility.

Still, the Commission has the option to pursue an interim modeling approach before Otter Tail's next IRP, if not only to model Otter Tail's resource plan with Minnesota in isolation from the rest of its service territory. Otter Tail's Minnesota-only carbon intensity is not presently part of this IRP record; as with other multi-jurisdictional resource plans, the modeling is system-wide.

In considering whether to vary the two-year IRP schedule, it should be noted that 111(d) compliance is not the only issue in this proceeding. Thus, the deadline for Otter Tail's next IRP could depend on the Commission's decisions in several other aspects of the resource plan. Issues disputed among the parties are discussed in the Parties' Comments section and Staff Analysis section of this briefing paper. These issues include, among others: the size, type, and timing of Otter Tail's next generating resource; the appropriate level of wind, beyond the amount needed to comply with the RES, as a cost competitive resource in Otter Tail's portfolio; Otter Tail's plan to procure solar energy resources to meet the Minnesota Solar Energy Standard (SES); and the most reasonable level of energy savings.

II. Company Background

A. Existing Resources

Table 1 below lists Otter Tail's resources by capability, fuel type, and location. The facilities' capacity ratings are based on the Midcontinent ISO (MISO) ratings under Module E's resource adequacy requirements in effect for the 2013 Planning Year. As of 2013, Otter Tail owns and purchases approximately 771 MW of accredited unforced capacity (UCAP).

Table 1. Otter Tail Power, 2013 Generating Facilities

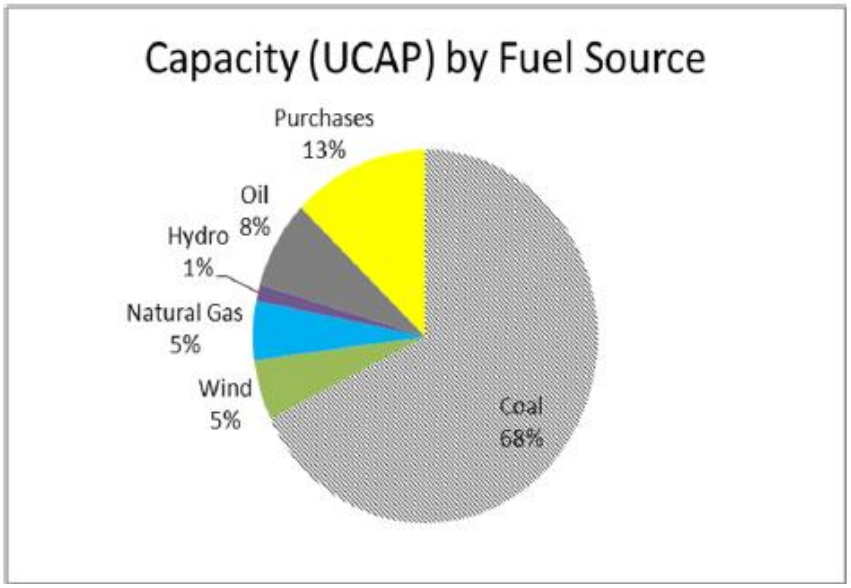
Facility	Dependable capacity (MW)	UCAP (MW)	Location
Coal			
Big Stone	256.7	240.5	Milbank, SD
Coyote Station	149.0	141.9	Beulah, ND
Hoot Lake #2	60.9	59.7	Fergus Falls, MN
Hoot Lake #3	88.0	86.4	Fergus Falls, MN
Natural Gas			
Solway CT	42.4	39.8	Solway, MN
Oil			
Jamestown #1 CT	20.6	17.9	Jamestown, ND
Jamestown #2 CT	20.4	15.7	Jamestown, ND
Lake Preston CT	18.2	14.8	Lake Preston, SD
Wind			
Ashtabula	48.0	10.1	Barnes County, ND
Langdon	49.5	13.5	Langdon, ND
Luverne	40.5	13.5	Griggs & Steel Counties, ND
Hydro	2.6	2.6	
Purchased Contracts[3]	149	115.9	
TOTAL	949.1	**771.2**	

[3] "Purchased contracts" include contracted wind. OTP has roughly 250 MW of (nameplate) wind on its system.

Capacity

Figure 1-1 below (from Appendix C of Otter Tail's IRP) shows that, of the Company's total UCAP, about 68 percent of Otter Tail's capacity is coal-fired, 13 percent is purchased through bilateral contracts, 8 percent is available from oil-fired peaking plants (Jamestown and Lake Preston), and 5 percent each is generated from natural gas (Solway) and wind (owned and contracted). Additionally, Otter Tail owns several small hydroelectric plants in Minnesota, which collectively constitute less than 1 percent of the Company's UCAP.

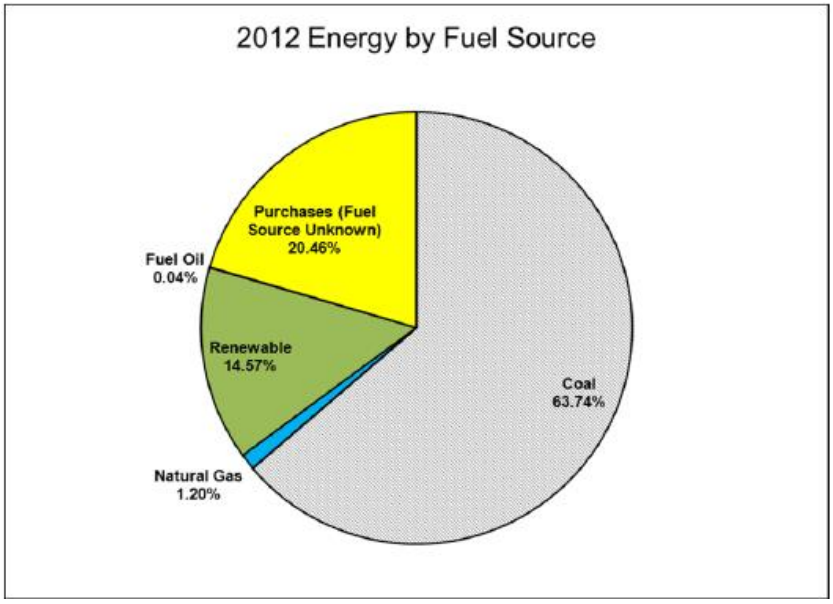
2013 Planning Year Accredited Capacity Resources Fuel Source Percent of Total



Energy

The sources of energy used to serve customer loads in 2012 are shown in Figure 1-2, below (also from Appendix C of Otter Tail's Petition). According to Figure 1-2, about 64 percent of Otter Tail's 2012 energy was generated by coal, about 20 percent was purchased from unknown sources (market purchases), and about 15 percent of total energy was generated or purchased from renewable resources. Since the Solway peaking facility is Otter Tail's only natural gas resource, natural gas provides only 1.2 percent of the Company's energy.

Figure 1-2: 2012 Energy By Fuel Source 4,513,758 MWh for Retail



B. Depreciation and Remaining Economic Life

Depreciation accounting permits a utility to recover the cost of tangible capital assets plus the cost of decommissioning the asset over its useful life. The Commission's Order in Otter Tail's 2012 Depreciation docket required the Company to include in its future depreciation filings a table comparing asset lives used for resource planning purposes with the remaining lives proposed in the depreciation filings, explaining any differences.[4] On September 3, 2013, Otter Tail filed its 2013 Five-Year Review of Depreciation. Staff grouped some of Otter Tail's generating units which had IRP/depreciation differences or changes into the table below:

Generating Unit	**Year Online**	**IRP Retirement Year**	**Depreciation Study Retirement Year**
Big Stone Plant *(SD)*	1975	2046	2027
Coyote Station *(ND)*	1981	2041	2041
Hoot Lake #2 & 3 *(MN)*	1959, 1964	2020	2020
Jamestown #1 & 2 *(ND)*	1976, 1978	2029	2023
Lake Preston CT *(SD)*	1978	2029	2023

Big Stone Plant. Big Stone is co–owned by Otter Tail (53.9 percent), NorthWestern Energy (23.4 percent), and Montana–Dakota Utilities (22.7 percent). Otter Tail's previous resource plan included the addition of an Air Quality Control System (AQCS) in 2016. This AQCS project affects the retirement date of Big Stone in the IRP and in Otter Tail's depreciation study.

[4] Docket No. E017/D-12-933

In the 2013 Depreciation docket, the Company proposed to extend the economic life at Big Stone until 2046. However, the Commission ultimately decided to delay extending the economic life of Big Stone until the AQCS is completed. Thus, Otter Tail was required to retain its previously anticipated year of final retirement of 2027, for accounting purposes. For IRP purposes, however, the life of the plant extends throughout the planning period.

Coyote Station. Coyote Station is operated by Otter Tail (35 percent) and jointly owned with Montana–Dakota Utilities (25 percent), Northern Municipal Power Agency (30 percent) and NorthWestern Energy (10 percent). Otter Tail recently entered into a new 25 year coal contract at Coyote Station, resulting in a new plant remaining life calculation of 2041, which is reflected in the IRP and depreciation filings.

Hoot Lake. The Commission's April 7, 2014 order in the 2013 Depreciation docket allowed the Company to decrease the remaining life of Hoot Lake from 10.4 years to 7.4 years, to coincide with the expected 2020 retirement date. In Otter Tail's previous IRP, the Commission approved Otter Tail's proposal to retrofit Hoot Lake units 2 and 3 in 2015 with emissions controls to comply with MATS, and then retire both units in 2020.[5]

Jamestown and Lake Preston. The resource plan assumes operation of Jamestown and Lake Preston through the entire planning period, although the units will reach the end of their economic lives before that time. Otter Tail's depreciation study proposes the units to be retired in 2023, for accounting purposes. Otter Tail's explanation for the difference is provided below:

> The resource plan assumes operation of these low cost resources through the entire IRP time line. The Depreciation filing extends the plant life an additional year per policy to maintain a 10 year minimum operating window until a unit is no longer prudent to operate.[6]

In the Department's comments to this resource plan, the Department considered a scenario in which Jamestown Units 1 & 2 and the Lake Preston CT are retired at the end of 2022, consistent with the Company's most recent depreciation study. In all contingencies under this scenario, the Department found that retiring these units is slightly more cost effective than keeping them in operation. However, the Department does not recommend these units to be retired in this IRP, instead recommending that Otter Tail evaluate retiring them in the Company's next IRP.

[5] Docket No. 10-623, Commission Order, In the Matter of Otter Tail Power's 2011-2025 Resource Plan.
[6] Docket No. 13-795, *In the Matter of Otter Tail's Five Year Depreciation Study*, September 3, 2013

III. Otter Tail's Integrated Resource Plan Petition

Before the parties' comments and before the 111(d) rule was proposed, Otter Tail anticipated its 2014 resource plan to be rather uncontroversial. For the most part, this is because Otter Tail proposes no new resources in its five-year action plan. Additionally, the plan meets the 1.5 percent energy savings goal, and Otter Tail demonstrates Renewable Energy Standard (RES) compliance through the entire study period, with a significant surplus of RECs (3.33 million RECs) at the end of the study period.

Thus, Otter Tail's preferred expansion plan is fairly straightforward. The five-year action plan basically amounts to several already-secured bilateral contracts and ongoing construction of the Company's environmental upgrades, the $405 million Big Stone AQCS Project and its $8.6 million Hoot Lake MATS compliance project.

Table 2-4 below shows Otter Tail's five-year action plan activities:

Table 2-4: Five-Year Action Plan Activities

Year	Activity
2013	June 1 Triennial CIP filing for 2014, 2015, 2016 On-going construction of Big Stone Plant AQCS Project On-going construction of Hoot Lake MATS upgrade
2014	On-going construction of Big Stone Plant AQCS Project On-going construction of Hoot Lake MATS upgrade
2015	On-going construction of Big Stone Plant AQCS Project
2016	June 1 Triennial CIP filing for 2017, 2018, 2019
2017	Preliminary engineering for permit support and interconnection request (Hoot Lake replacement unit)
2018	File interconnection request, Certificate of Need for 2021 combustion turbine (Hoot Lake replacement unit) Environmental permitting for 2021 combustion turbine; initiate detailed design and procurement for 194 MW turbine (Hoot Lake replacement unit) Initiate work on utility-scale solar project to meet the Minnesota Solar Mandate by 2020

All plant outages are scheduled with the Midcontinent ISO (MISO). When Otter Tail filed its resource plan in December 2013, Otter Tail noted at the time that the Company has communicated with MISO to prepare for the planned outage at Hoot Lake to install the MATS upgrade. The Hoot Lake MATS upgrade was completed in Spring 2014. According to Otter Tail, no potential reliability issues have been brought forward by MISO or are anticipated by the Company in construction of its Big Stone AQCS Project.

Otter Tail has secured the following capacity and/or energy contracts to meet its needs to 2020:

- A 50 MW capacity-only contract with Great River Energy from December 1, 2010 – December 31, 2014.

- A capacity-only contract with Great River Energy for 50 MW capacity in 2014, increasing to 100 MW from January 2015 through May 31, 2017.

- A capacity-only contract with Great River Energy that begins with 25 MW on June 1, 2017 through May 31, 2019 and increases to 50 MW for June 2019 through May 31, 2021.

- An energy-only contract with Xcel Energy from November 1, 2013 through August 31, 2016. The amount varies by month and by on-peak and off-peak. This contract was structured to meet Otter Tail's varying monthly need.

- An energy-only contract with Xcel Energy for 50 MW on-peak 5 X 16 energy for years 2016-2018.

- Filed on October 8, 2014, a 50 MW on-peak 5 X 16 energy-only contract for 2019-2020.

Otter Tail's Preferred Plan does not require the Company to procure additional generation resources within the five year action plan. A capacity deficit will emerge after 2020, when Otter Tail expects to retire its coal-fired Hoot Lake Plant. To address this shortfall, the Company proposes a 211 MW natural gas-fired, simple cycle combustion turbine in 2021. No other supply-side resources are proposed in Otter Tail's Preferred Plan.

Otter Tail believes the specific size, type, and timing of its next resource can be more precisely addressed in the Company's next resource plan. Some sensitivities added the simple cycle combustion turbine as early as 2019, which still falls outside of the Company's five-year action plan. Moreover, in the Company's reply comments, Otter Tail notes it "continues to explore potential partnering arrangements with other utilities" that would consider a small share in a large combined cycle (CC) unit.[7]

Since CC gas units are relatively high capital cost resource options, the small size of Otter Tail's capacity deficit did not result in CC units being a cost-effective option. To capture the economies of scale and more efficient heat rates associated with larger CC units, Otter Tail believes its resource need would have to be much larger to make the economics work. Otter Tail's modeling showed that using smaller CC units were not cost effective options. Again, Otter Tail expects this issue of "type" will be a major focus of the Company's next IRP.

A. Load and Capability

Otter Tail calculates its capacity need by taking the difference between the planning reserve obligation—which is the "coincident peak" demand forecast plus the planning reserve margin and transmission losses—and the sum of accredited generating capability, net transaction

[7] Otter Tail reply comments, p. 25.

capacity, and demand side resources. Table 3-1 from Otter Tail's IRP, below, shows this calculation, which is commonly referred to as a utility's load and capability (or L&C).

Table 3-1: Otter Tail's 2014-2028 Load and Capability

Planning Year	Coincident 50/50[8] Forecasted Demand (MW)	Reserve Obligation Net of Demand Response (MW)	Total Accredited Capacity (MW)	Projected Deficiency (-MW)
2014	603.6	641.6	777.8	136.2
2015	628.5	664.8	777.8	113.0
2016	657.0	684.2	777.8	93.6
2017	658.5	688.2	702.8	14.6
2018	664.7	695.1	702.8	7.7
2019	687.2	715.6	727.8	12.2
2020	695.4	724.7	727.8	3.1
2021	708.2	731.1	542.4	**-188.7**
2022	722.9	746.4	542.4	**-204.0**
2023	730.5	754.8	542.4	**-212.4**
2024	738.2	763.4	542.4	**-221.0**
2025	746.0	772.0	542.4	**-229.6**
2026	754.0	775.3	542.4	**-232.9**
2027	762.0	784.3	542.4	**-241.9**
2028	770.2	793.4	542.4	**-251.0**

As shown in Table 3-1, Otter Tail's reserve obligation, net of demand response, grows from about 640 MW in 2014 to about 800 MW by the end of the planning period. The Company's total accredited capability is presently about 770 MW, giving it a current surplus. However, Otter Tail expects its surplus will erode close to zero in 2018-2020, and its need for capacity will increase substantially after Hoot Lake is retired in 2020.

In 2012—when Otter Tail's previous IRP was considered by the Commission—MISO utilities were required to carry planning reserves of about 4.5 percent. For the 2013/2014 planning year, MISO made two noteworthy modifications to its Resource Adequacy construct per Module E. First, MISO based its resource adequacy requirements on the aggregate peak usage *at the MISO peak hour* (the MISO coincident peak), instead of the aggregate of all utilities' individual, non-

[8] The MISO Module E Tariff requires that each load-serving entity submit a "50/50" forecast of its non-coincident peak load– that is, a forecast number such that the actual LSE peak has a 50 percent chance of being more and a 50 percent chance of being less than the forecast peak.

coincident peaks, plus a system-wide diversity adjustment. Second, MISO changed its 2013/2014 planning reserve margin to 6.2 percent, in unforced capacity, or UCAP, terms. (For the 2014/2015 planning year, MISO increased the PRM_{UCAP} from 6.2 to 7.3 percent.)

Coincident Peak

An LSE's (load serving entity) coincident peak is the LSE's load at the time of the MISO system-wide peak. MISO has always used MISO-coincident peak demand values when determining planning reserve margins for the overall footprint, only prior to 2013, MISO adopted the LSE's non-coincident peak demand forecast and computed an overall MISO coincident peak factor adjustment, thus allocating the same diversity to all LSEs.

Under the current approach, MISO requires LSEs to forecast their MISO-coincident peak demands directly, eliminating the need for MISO to make adjustments. The coincident peak method credits those LSEs whose individual peaks occur at different times than the MISO peak hour. This is because "diverse" LSEs like Otter Tail do not contribute to the MISO peak to the same extent as LSEs whose individual peaks coincide with MISO's coincident peak. Since Otter Tail's MISO-coincident peak demand diversity factor is approximately 8 percent of its non-coincident peak demand, the Company requires fewer resources to meet MISO reserve requirements. As shown in the table below (from Table 3 of the Department's initial comments), this adjustment reduces Otter Tail's needs by about 60 MW. (To edit for space, Staff only includes years through 2021, the year after Hoot Lake is retired.)

Planning Year	OTP Capacity Surplus/(Deficit), Coincident Peak Method (MW)	OTP Capacity Surplus/(Deficit), Non-Coincident peak (MW)	Difference (MW)
2014	136	81	55
2015	113	57	56
2016	94	37	57
2017	15	**(43.1)**	58.1
2018	7	**(51.2)**	58.2
2019	12	**(46.9)**	58.9
2020	3	**(56.7)**	59.7
2021	**(189)**	**(249.3)**	60.3

Changes to MISO's resource adequacy construct respond to the LSEs' relative load diversity to the MISO system overall, as well as the forced outage rates (UCAP) of resources in the regional footprint. Together, these changes effectively drive Otter Tail's reserve obligation down, thus delaying its need to procure resources.

B. Strategist Modeling

Strategist is specifically designed to represent the many characteristics of an electric utility's power supply system and to simulate economic dispatch of the generating resources in that

system to meet customer demand in a least-cost manner. Strategist incorporates a wide range of variables–such as size, operational parameters, and performance–to represent the various types of generating facilities. Strategist tracks and reports capital costs (and the associated revenue requirements), operations and maintenance costs, fuel costs, and emissions, and it ranks all of the expansion plans by cost.

Resource Options Considered

Table 2-2 from Otter Tail's IRP, below, shows the resource options Otter Tail considered in its Strategist modeling:

Table 2-2: List of Resource Alternatives Included in Strategist

Resource Alternative	Description
Hoot Lake coal-to-gas conversion	122 MW conversion of Hoot Lake #2 & 3 from coal to natural gas
Natural Gas (NG) Combined Cycle	Generic 311 MW NGCC unit
NG Simple Cycle – Small	Generic 49 MW Aeroderivitive type SC unit
NG Simple Cycle – Medium	Generic 101 MW Aeroderivitive type SC unit
NG Simple Cycle – Large	Generic 211 MW frame type SC unit
NG Combined Heat/Power	Generic 96 MW nameplate capacity frame type combined cycle unit
Solar PV	Solar generation was available in 1 MW blocks throughout the study period, modeled as a purchased power transaction.
Wind	Wind was available in 50 MW blocks, modeled as a purchased power transaction.
Conservation	1.5% energy savings (MN load only)
Load Control (DSM)	15 MW of additional load control by the end of the planning period

Otter Tail's resource plan assumes the operation of Hoot Lake as a coal fired plant through 2020. In 2021, a natural gas conversion alternative for Hoot Lake 2 and 3 is available to the model, which assumes a $54.8 million investment in the facility. Although the conversion is not selected, Otter Tail notes that the Hoot Lake site is advantageous because it already has an established workforce, transmission interconnection rights, water supply, and existing generation facility infrastructure. Otter Tail states, "No matter what the ultimate fate of the current coal facility is, continued generation from the site will be a consideration into the future."[9]

[9] Otter Tail IRP Petition, Appendix D, p. 2.

Strategist was given three options of simple cycle natural gas-fired combustion turbines: a 50 MW aeroderivative gas turbine, a 100 MW aeroderivative gas turbine, and a 211 MW heavy-duty frame unit. Heavy-duty frame CTs have a lower capital cost per kW, lower maintenance cost, and a higher heat rate than aeroderivative units.

Otter Tail also considered a generic 311 MW combined cycle (CC) unit, which would be a large resource addition for Otter Tail, whose total system capability is about 770 MW. Otter Tail is open to considering alternatively sized CC units in future resource plans, although for this plan, smaller-scale CC units are not a reasonable alternative. However, Otter Tail did mention it would explore possible partnering arrangements with other utilities that could allow the Company to capture the economies of scale associated with larger CC units.

Results / Scenario Analysis

Otter Tail separates its scenario analysis into two distinct paths related to the availability of the wholesale energy market. The Energy Market Off scenario restricts access to the energy market after five years, as required by the Commission's Order in Otter Tail's last resource plan.[10] The Energy Market On scenario allows energy market purchases throughout the study period. The two scenarios evaluate 39 sensitivities each, for a total of 78 sensitivities in the resource plan.

Otter Tail's "Preferred Plan" is Sensitivity 22, which uses base assumptions for load growth, fuel, and externalities, and the energy market is available. As noted earlier, the only supply-side addition in the Preferred Plan is a 211 MW simply cycle natural gas CT in 2021. On the demand-side, the Preferred Plan achieves the 1.5 percent Conservation Improvement Program (CIP) energy savings goal, and it includes the addition of 15 MW of new, summer season demand response by 2028.

Of note, Otter Tail's Preferred Plan does not include any environmental externalities or CO_2 values. Additionally, the Preferred Plan does not include any solar resources. Instead, compliance with the Solar Energy Standard (SES) is measured as three solar price sensitivities, which assume levelized costs of $75/MWh, $133/MWh, and $150/MWh, escalating over time.

The expansion plan for each of the sensitivities is provided in Appendix I of the resource plan. Interestingly, the impact of the Market On versus Market Off scenarios depends on the application of externalities. If no externalities are assumed, the Market On scenario kicks out the wind. If externalities are included, more wind is selected in the Market On scenario, probably because Otter Tail applies externality values to market energy. Furthermore, the Market On selects capacity-only market purchases instead of larger natural gas units, and the capacity-only purchases do not provide any energy, thereby leaving wind a least-cost energy resource.

Some sensitivities select the natural gas combined cycle alternative, but not many. The low natural gas price, high coal price, high load growth, low capital cost, and high externality

[10] Docket No. 10-623

sensitivities all select a CC unit in 2019. However, when externality values and CO_2 values are removed, there are no sensitivities which select a CC unit.

Market Purchases

Wholesale energy prices remain low following the economic recession. Increasing amounts of wind generation and low natural gas prices further contribute to depressed market prices.[11] Otter Tail provides annual average Locational Marginal Prices (LMPs) at the OTP.OTP load zone from the previous four years:

- 2010: $28.00/MWh
- 2011: $24.80/MWh
- 2012: $23.84/MWh
- 2013 $27.33/MWh (as of September 30, 2013)

Capacity values in MISO have remained at or near zero since 2010 due to excess reserves. However, Otter Tail believes reserve margins likely will tighten due to pending coal plant retirements associated with MATS compliance. MISO has recently projected the possibility of capacity shortfalls ranging from 3 GW to 7 GW starting in 2016.

Otter Tail's Market Off scenario is a result of the Commission's order in the Company's previous IRP, which found that Otter Tail's long-term reliance on the market was excessive. Thus, in the Market Off scenario, Otter Tail restricts Strategist from selecting market energy and generic wholesale capacity beyond the five-year action plan.

Otter Tail opposes restricting access to the market after five years, and requests the Commission make a specific finding that Otter Tail's use of bilateral energy contracts and the MISO day-ahead energy market does not put its customers at risk and should not be limited to the first five years of the planning period. Otter Tail has typically purchased approximately 10 to 20 percent of its annual energy needs from the MISO market, and Otter Tail believes a long-term action plan which includes this range is reasonable and in line with the Company's experience.[12] .

Otter Tail also opposes the characterization of market utilization as "market reliance" because the Company's resources are sufficient to serve its load. The Company believes it only pursues market opportunities when doing so reduces system costs. In Strategist, market purchases are made when market prices are lower than the costs of dispatching its existing generation.

Staff Comment on Market Purchases

The market purchases issue will be discussed later in this briefing paper, in both the Parties Comments and Staff Analysis sections. However, there may have been a miscommunication or misunderstanding of the Commission's previous IRP order concerning market purchases; therefore, Staff includes some historical background to contextualize the market purchases issue.

[11] Otter Tail IRP Petition, p. 3-3 (Current Outlook)
[12] Otter Tail reply comments, p. 8.

There was a dispute in Otter Tail's previous IRP over Otter Tail's proposed long-term operation of Hoot Lake coupled with generic, 75 MW capacity purchases. An excerpt of Otter Tail's proposed 2010-2025 action plan, starting with Year 2019, is shown below.

Table 2-4: Preferred Resource Plan Summary, From OTP's 2010 IRP

Resource Plan (MW) - Based on Summer Ratings, except Wind which is shown as Nameplate		
2019	127.1 MW Hoot Lake Project	Installation of Hoot Lake Plant Project
	60.0 MW Frame 5s Project	Installation of Frame 5 Oil Peaker Project
	<75 MW 1-Yr Capacity	Purchase balance of capacity in short-term contracts.
2020	<75 MW 1-Yr Capacity	Purchase balance of capacity in short-term contracts.
2021	<75 MW 1-Yr Capacity	Purchase balance of capacity in short-term contracts.
2022	<75 MW 1-Yr Capacity	Purchase balance of capacity in short-term contracts.
2023	<75 MW 1-Yr Capacity	Purchase balance of capacity in short-term contracts.
2024	<75 MW 1-Yr Capacity	Purchase balance of capacity in short-term contracts.
2025	<75 MW 1-Yr Capacity	Purchase balance of capacity in short-term contracts.

Parties, Staff, and the Commission disagreed with Otter Tail's proposed plan, which extended the life of Hoot Lake and perpetually relied on the market to meet the remaining balance of its ***capacity*** deficit. Thus, the Commission's order from Otter Tail's 2010 IRP, paragraph 5, stated:

> 5. In the modeling conducted in its next resource plan, [Otter Tail] shall adopt a cut-off year to restrict the Strategist model from selecting market purchases. That plan shall include market purchases only in the short term, for fewer than five years, and as a bridge to delay the need for other resources.

In the previous IRP, the term "bridge" was used to characterize a handful of years in which market purchases could delay new resource acquisition, but it would be unreasonable to extend the bridge indefinitely. Staff acknowledges that the order could be interpreted to restrict the market completely, so decision options in this IRP differentiate between energy and capacity.

In general, as long as utilities are resource adequate, it is reasonable to include some market energy when it is economical to do so. The issue in this proceeding, which is commonly before the Commission, is how energy market access influences the type of resources selected. Otter Tail is correct that if market energy costs exceed the cost of producing energy by Otter Tail's own resources, then Otter Tail will dispatch its existing units instead. However, the issue with unrestricted energy market access is that different types of resources provide different cost cushions (or caps) for market volatility. For example, Solway and Big Stone both enable Otter Tail to be resource adequate. However, the cost cap for Solway is much higher than for Big Stone. In the event market prices are high, a reasonable resource plan should ensure that a utility is not baseload- or intermediate-deficient to protect ratepayers from market volatility.

C. Renewable Energy Objectives

1. Renewable Energy Standard

Including banked RECs and assuming no REC sales, Otter Tail expects to comply with its RES requirements throughout its three-state service territory. By the end of the planning period, Otter Tail expects a surplus of 3.33 million RECs. In its supplemental comments, the Department also concluded that, assuming the four-year shelf life for RECs, "Otter Tail has the ability to meet its Minnesota RES and other state renewable obligations over its planning horizon."

Otter Tail's Preferred Plan does not include any additional wind, since the Company expects to comply with all of its jurisdictions' RES requirements. The Department recommends the Commission require Otter Tail to modify its resource plan to include 100 MW in 2017. In reply comments, Otter Tail stated it is not opposed to an order allowing the addition of new wind to its five year action plan. However, Otter Tail requests the flexibility to wait until 111(d) is finalized to determine if a procurement process is reasonable.

2. Solar Energy Standard

In 2013, legislation was passed which was codified as Minn. Stat. §216B.1691, subd. 2f, Minnesota's Solar Energy Standard (SES). The SES requires electric investor-owned utilities in Minnesota to procure 1.5 percent of their annual retail sales from solar energy.

Otter Tail expects that the installed solar capacity needed for SES compliance to be between 20 MW and 30 MW, depending on the location and type of solar installation/technology selected. For modeling purposes, Strategist adds 21 MW of solar in Otter Tail's three SES compliance sensitivities, all of which is added in 2019. Solar generation was available to the model in 1 MW blocks, although no solar resources are part of the Company's Preferred Plan.

There is a small-scale solar carve-out that requires 10 percent of the SES to come from systems less than 20 kW in size. Otter Tail notes that the Company "is researching factors that may suggest that meeting its 10 percent small solar requirement by 2020 may be a challenge."[13]

Subdivision 2f(g) of the SES requires that, beginning in 2014 and through 2020, each utility subject to the SES shall file a report with the Commission "reporting its progress in achieving the solar energy standard established under this subdivision."

On May 30, 2014, Otter Tail filed its 2013 Annual Report on Progress in Achieving the Solar Energy Standard.[14] Staff grouped information from Otter Tail's Annual SES Compliance Report into the table below. Otter Tail reported 11 customer-owned solar facilities with a nameplate capacity totaling 114 kW with generation of 99 MWh for the year 2013.

[13] Otter Tail reply comments, p. 13.
[14] Docket No. 14-321.

Otter Tail Power – Annual Report on SES Progress	**MWh's**
Annual Minnesota retail sales for the previous year	2,164,446
Estimated excluded customer sales for the previous year	75,520
Annual solar generation on the utilities' system for the previous year	99
Estimated amount of solar generation (expressed as capacity) a utility would be required to obtain in 2020	28 (MW)
Estimated solar energy requirements to meet the SES in 2020	36,561

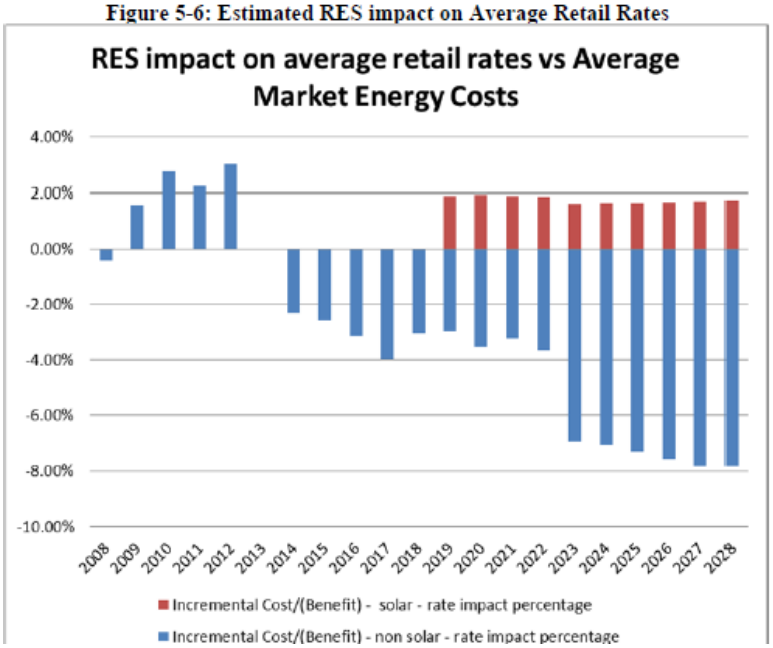
Of note, Otter Tail includes estimates for excluded customer sales. According to its SES report, no customers have requested to be excluded from the SES thus far. However, Otter Tail's estimate is based on its list of potential customers believed to qualify for the exclusion.

3. Rate Impacts of Renewables

Minn. Stat. §216B.1691, Subd. 2(e), requires electric utilities subject to the RES and SES to file reports with the Commission estimating the rate impact of activities necessary to comply with the State's renewable energy objectives.

Figure 5-6, below, shows Otter Tail's rate impact estimates of the RES and SES. The solar portion (shown by the red bar) is estimated to have a 2 percent increase in rates, while the remainder of Otter Tail's RES (the blue bar) is estimated to have an 8 percent reduction in rates by the end of the planning period.

Figure 5-6: Estimated RES impact on Average Retail Rates



D. Distributed Generation and DSM

The Commission's March 25, 2013 order approving Otter Tail's baseload diversification study included a requirement for the instant IRP to "evaluate greater potential for additional energy efficiency, demand response, renewable distributed generation, and combined heat and power resources."[15]

Combined Heat and Power

A combined heat and power (CHP) facility is similar to a combined cycle plant except that a CHP facility uses the steam for processing or heating applications, thus improving the overall efficiency. Otter Tail currently has one large CHP customer, the POET Bio-refining ethanol plant, which is located at the site of the Big Stone Plant. Steam is extracted during the electrical production process and provided to the ethanol plant, thus using the steam for two different purposes.

Appendix J of Otter Tail's IRP includes the Company's CHP analysis of possible CHP opportunities. Otter Tail identifies four key factors it considers when evaluating potential CHP candidates: (1) the overall timing of the steam customer and the electric utility (whether the steam customers and utility are a match); (2) the needed steam load, (3) the daily, monthly, and seasonal steam need profile, and (4) whether the steam supply could be interruptible.

The general conclusion of Otter Tail's CHP analysis is that it is difficult to justify the economics of CHP projects at this time. Overall, CHP projects are not a good fit with high capacity factor natural gas-fired generation when MISO market prices are low or highly variable.

Also in Appendix J, Otter Tail includes a 2001 report from the Minnesota Environmental Quality Board titled "Inventory of Cogeneration Potential in Minnesota." Section 4.4 of that report lists potential cogeneration prospects in Minnesota, and the report lists these prospects by four categories—Good, Potential, Unlikely, and Poor. The only Otter Tail customers listed—the Fergus Falls Regional Treatment Center (now closed) and Ag Processing (Dawson)—are both listed in the fourth category, Poor Prospects. While Otter Tail acknowledges this study is rather dated, the Company believes "it is likely that the number of potential CHP prospects has not changed drastically over the last 12 years and that the economics that make a CHP project feasible are still relevant."[16] Large commercial and industrial customers with a significant steam need are typically fairly stable in quantity and type.

Energy Efficiency and DSM

On May 31, 2013, the Company filed its 2014 – 2016 Triennial Conservation Improvement Program (CIP) filing in Docket No. 13-277. The CIP filing included the Company's conservation goals for the upcoming three years, and these energy savings are listed in Table 2 below.

[15] Commission Order, March 25, 2013, p. 9.
[16] Appendix J, Otter Tail Resource Plan, p. 1.

Table 2: Proposed Savings Goals as a Percentage of Retail Sales, 2014-2016

Year	Proposed Energy Savings (kWh)	% of Avg. Adj. Retail Sales
2014	31,405,290	1.50%
2015	31,762,333	1.52%
2016	32,476,419	1.55%

Otter Tail's CIP filing was approved in the Department's Deputy Commissioner Decision on October 10, 2013. Otter Tail stated that its resource plan reflects the 1.5 percent annual energy savings goal as filed in the Minnesota CIP Triennial filing, which achieves savings at or above its statutory requirements.

The Department recommends the Commission modify Otter Tail's IRP to add an incremental 0.2 percent energy savings, which would result in a 1.7 percent savings level in total. Otter Tail disagrees with the Department's recommendation, in part because Otter Tail does not believe it should have an IRP objective that varies from a budgeted CIP plan. Moreover, according to Otter Tail, Department Staff has indicated that Otter Tail does not need to refile its 2014-2016 CIP plan, and that future CIP goals will not be dictated by the IRP energy savings objectives.

Otter Tail calculates that the difference between 1.5 percent and 1.7 percent would be more than 4,182 MWhs, or, roughly the energy savings of its single largest CIP program. Otter Tail claims such a significant impact cannot be obtained easily, nor should it be assumed to be achievable without appropriate consideration and analysis.

IV. Parties' Comments

A. Department of Commerce

On page 36 of its initial comments, the Department states:

> The main issue in this plan is how to fill approximately 1,000 GWh of energy needs, 20 percent of Otter Tail's system energy requirement. The Department's proposed plan addresses the energy deficit through short term purchases in the near future and additions of wind and gas units starting in 2017 and gradually increasing until a stable resource mix is reached in 2021.[17]

The Department noticed a heavy reliance on the wholesale energy market in Otter Tail's Preferred Plan. Table 2 below, from the Department's supplemental comments, shows the amount of total energy supplied by the market in Otter Tail's Preferred Plan. Staff highlights years 2021 and 2022, the years immediately following the Hoot Lake retirement, which show Otter Tail's day-ahead purchases amounting to one quarter of total energy.[18]

Table 2
Summary of Market Purchases in
Otter Tail's Preferred Expansion Plan

	Total Energy Needs	Contracted Purchases		Day-Ahead Purchases		Total Market Purchases	
Year	(MWh)	MWh	as % of Total	MWh	as % of Total	MWh	as % of Total
2014	4,801.6	171.2	3.57%	481.9	10.04%	653.1	13.60%
2015	4,972.1	432.7	8.70%	997.6	20.06%	1,430.3	28.77%
2016	5,120.8	204.0	3.98%	773.2	15.10%	977.2	19.08%
2017	5,075.5	203.2	4.00%	600.2	11.82%	803.4	15.83%
2018	5,070.8	204.0	4.02%	551.4	10.87%	755.4	14.90%
2019	5,198.9			932.4	17.94%	932.4	17.94%
2020	5,210.1			716.0	13.74%	716.0	13.74%
2021	5,250.8			1,140.8	21.73%	1,140.8	21.73%
2022	5,313.1			1,301.6	24.50%	1,301.6	24.50%
2023	5,314.3			901.5	16.96%	901.5	16.96%
2024	5,315.4			1,005.6	18.92%	1,005.6	18.92%
2025	5,315.0			969.4	18.24%	969.4	18.24%
2026	5,300.2			859.4	16.21%	859.4	16.21%
2027	5,299.6			843.8	15.92%	843.8	15.92%
2028	5,304.7			838.2	15.80%	838.2	15.80%
2014-2018	25,040.8	1,215.1	4.85%	3,404.3	13.60%	4,619.4	18.45%
2014-2028	77,863.0			12,913.0	16.58%	14,128.1	18.14%

As shown in the Contracted Purchases column, Otter Tail currently has bilateral contracts in place for 2014-2018, which supply 4.85 percent of the Company's energy needs on average. Including day-ahead market energy, total market purchases supply 13.60 percent of Otter Tail's

[17] Department of Commerce, initial comments, p. 36.
[18] Staff note: Staff believes Table 2 should reflect GWh, not MWh, which does not affect the Department's point.

energy needs in the 2014-2018 timeframe. Over the entire planning period (2014-2028), market purchases supply over 18 percent of Otter Tail's energy needs on average.

Otter Tail and the Department agree that a system with enough capacity to cover its load provides some level of ratepayer protection from high market energy prices. This is because existing resources set a price cap on market prices; if market energy prices are extremely high, the utility can dispatch its own resources instead. Moreover, both Otter Tail and the Department agree that it is reasonable to purchase energy from the MISO market when doing so is less expensive than generating that energy from the Company's owned facilities.

However, the Department disputes a long-term planning approach which includes unrestricted access to the market, especially if market price assumptions unreasonably impact the types of units chosen in expansion plans. According to the Department:

> If market energy is more expensive than energy generated by native resources, then native resources can be dispatched instead. However, different types of generation units will set different price caps; in Strategist, market price assumptions can impact the types of units chosen in expansion plans.[19]

Hoot Lake Plant is a baseload unit designed to operate at a high capacity factor. In Otter Tail's Preferred Plan, Hoot Lake is retired in 2020 and replaced with a 211 MW natural gas peaking unit in 2021. In Otter Tail's Strategist modeling, "MISO market purchases make up a significant part of the difference between Hoot Lake's year round operation and a CT's much lower operation."[20] In the Department's view, since peaking units cannot be expected to provide energy on an annual basis like Hoot Lake, and since the market purchases fill in much of the difference, Otter Tail's Preferred Plan is not reasonable and incurs too much market risk.

In the Department's Table 2, above, market purchases jump from 13.7 percent of total energy in 2020 to 21.7 percent of total energy in 2021 and 24.5 percent of total energy in 2022. This suggests that Otter Tail is assuming market energy is priced low and will stay low (and available) throughout the planning period, which inappropriately skews the expansion plan toward selecting only a peaking CT.

The Department's modeling identifies a combination of new wind and a 200 MW CT, providing both energy and peaking capacity, as the optimal mix of resources to replace Hoot Lake. Additionally, the Department's modeling suggests the need for this replacement in 2019, not 2021 as Otter Tail proposes.

Otter Tail's Preferred Plan is driven by a capacity need, while the Department's recommendations are driven by a need for energy. Specifically, the Department has the following concerns regarding market risk embedded within Otter Tail's Preferred Plan:

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[19] Department of Commerce, supplemental comments, p. 13.
[20] *Id*.

1. There are times in 2019 when Otter Tail's existing generation operates at maximum capacity but is not capable of meeting Otter Tail's load, particularly during the winter months;
2. There could be insufficient winter availability of natural gas-fired generating units in the MISO footprint; and
3. A system with too many capacity-only resources satisfying its reserve requirements exposes ratepayers to unreasonable risk associated with day-ahead energy prices.

As a matter of practice, the Department altogether opposes long-term reliance on a generic wholesale market to meet resource adequacy requirements. However, regarding the energy market, the Department considers risk management and, ultimately, what constitutes the best resource plan overall when making recommendations. In this instance, the Department believes Otter Tail's market utilization for its energy need is excessive, and the Commission should modify Otter Tail's plan to include additional wind resources to meet this energy need.

Wind Additions

Otter Tail's market purchases are priced so low that, in the Company's model, Strategist is selecting market purchases rather than dispatching Otter Tail's generating units because the market purchases are less expensive. In Otter Tail's Preferred Plan, the Company does not face a capacity need until 2021. Because of this lack of capacity need, Strategist does not even attempt to add new generating units to the Company's system before 2021.

In the Department's analysis, the Department made additional wind units available in Strategist as alternatives to supply energy through 2021. By allowing more wind to be selected as an energy resource, Strategist considers adding the wind even in the absence of a capacity need, and ultimately selects the unit if its addition results in lower system costs.

The Department modeled wind as a 20-year, fixed price, 100 MW PPA, and allowed only one unit to be selected every other year beginning in 2017. To set the fixed prices for the wind PPAs, the Department assumed a base price of $45/MWh in 2014, which then increased by three percent per year. The Department then ran contingencies with the price of wind increasing from $30/MWh to $80/MWh in five-dollar increments.

These assumed prices account for the all-in costs of wind, including transmission costs, as well as the additional services imposed on Otter Tail's system by wind's lack of dispatchability. Additionally, the Department set the hourly production profile of the generic wind alternative equal to the average hourly profile of Otter Tail's existing wind units.

Strategist ranks each expansion in order of least-cost. A common result among the Department's Strategist runs is the selection of large amounts of wind, often 200 to 400 MW. In the Department's analysis, Strategist's "top ten expansion plans" commonly select some wind when wind is priced at $70/MWh or less, as shown below in Table 10. At $55/MWh or less, at least 100 MW of wind is selected in all ten least cost expansion plans. When wind is priced at

$40/MWh or less, all ten least-cost expansion plans include 300 MW of wind, added in alternate years starting in 2017.

Table 10: Wind Units Selected When Externalities Not Considered

2014 Price of Wind	# of Top Ten Expansion Plans with at least: Three 100 MW Wind Units	Two 100 MW Wind Units	One 100 MW Wind Unit	# of Top Ten Expansion Plans with: Wind Added in 2017	Wind Added in 2019	Wind Added in 2021
$30/MWh	10	10	10	10	10	10
$35/MWh	10	10	10	10	10	10
$40/MWh	10	10	10	10	10	10
$45/MWh	1	9	10	6	7	7
$50/MWh	0	4	10	4	5	5
$55/MWh	0	0	10	2	4	4
$60/MWh	0	0	8	1	3	4
$65/MWh	0	0	5	0	2	3
$70/MWh	0	0	2	0	0	2
$75/MWh	0	0	0	0	0	0
$80/MWh	0	0	0	0	0	0

Overall, according to the Department's analysis, "the addition of 300 MW of new wind over the period 2017-2021 was a robust result." Given the timing of the need for the additional wind, the Department recommends the Commission only needs to make a decision on the first 100 MW wind addition in 2017. A decision on the other 200 MW of wind can be deferred until Otter Tail's next IRP. However, Otter Tail does have a significant need for energy in the near future, and cost-effective wind will reduce Otter Tail's dependency on market purchases.

Resource Adequacy

The new wind is the major difference between Otter Tail's Preferred Plan and the Department's proposed modifications. An additional difference is the timing of the natural gas CT. Otter Tail's modeling selects this CT in 2021, but the Department's modeling indicates a need for the CT in 2019. The reason for this discrepancy is the energy need and accessibility to the wholesale market. Because the Department's position is to not rely on the market for emergency events, the Department's model selects a CT instead of market purchases. Thus, the Department recommends the Commission modify Otter Tail's action plan to add a CT in 2019, not 2021.

The Department also considered a scenario in which Otter Tail's oil-fired peaking units, Jamestown 1 and 2 and Lake Preston, are retired at the end of 2022. This is consistent with the Company's most recent depreciation study. In all contingencies, retiring Jamestown 1 and 2 and Lake Preston is slightly more cost effective than not. Otter Tail includes a $2 million investment in each of these three units in 2019, reflecting the amount needed to extend their lives beyond 2020. The Department believes retiring these peaking units is cost-effective, and, furthermore, retiring them in 2022 could avoid additional investments. While the Department does not

recommend retiring Jamestown and Lake Preston in this IRP, the Department recommends the Commission require Otter Tail to run scenarios which consider retiring them in its next IRP.

Solar Energy Standard

The SES requires utilities to generate at least 1.5 percent of the energy sold to its retail customers in Minnesota by 2020. The SES also sets a goal that 10 percent of retail electric sales in Minnesota be generated by solar energy by 2030. The Department estimates that Otter Tail would have to install 21 MW of solar to meet the 2020 requirement and 135 MW of solar to meet the 10 percent goal.

As shown in Table 8, below, all three price sensitivities–$75/MWh, $133/MWh, and $150/MWh–would increase system costs, under base case conditions. In order for the 10 percent goal to be cost-effective, the cost of solar energy would have to be less than $75/MWh.

Table 8
Cost of Achieving 10% of
Energy from Solar by 2028

	PVSC ($000s)	% Increase from Dept. Base
Department Base	3,971,851	
Solar Base $133/MWh	4,109,110	3.46%
Solar High $150/MWh	4,115,764	3.62%
Solar Low $75/MWh	4,008,558	0.92%

The Department's analysis estimates that SES compliance costs increase total plan costs from 1 to 3.6 percent above the Department's base case. However, the Department recommends the Commission approve a plan in this proceeding which meets the 2020 SES requirement. Thus, the Department recommends the Commission modify Otter Tail's proposed plan to include 21 MW of solar by 2019. The 21 MW number is only an estimate, though, of the capacity-equivalent of Otter Tail's 1.5 percent of energy from solar.

Energy Savings Goals

The Department also recommends the Commission approve a 1.7 percent annual energy savings target for resource planning purposes, which would be a modification to Otter Tail's proposed 1.5 percent savings. According to the Department's analysis, "the net present value difference over the 15-year planning period between the base case and the incremental 0.2 percent energy savings scenario is $19,249,000."[21]

[21] Department of Commerce, initial comments, p. 19.

Since the creation of an energy savings goal through the 2007 Next Generation Energy Act, Otter Tail's annual energy savings as a percent of total retail sales has increased significantly. From 2009 to 2013, Otter Tail averaged annual energy savings of 1.46 percent of total retail sales, at a lifetime energy cost of 1.3 cents per kWh (CIP Expenditures / Lifetime Savings = $0.013).

Table: Otter Tail Power's Historical CIP Achievements and Costs

Year	CIP Expenditures	Annual Credited Savings (MWh)[7]	Annual Savings Cost ($/kWh)	Percent Savings	Lifetime savings (MWh)	Lifetime Energy Cost ($/kWh)
2009	$4,093,050	33,028	$0.12	1.60%	444,052	$0.009
2010	$5,043,317	30,626	$0.17	1.50%	370,117	$0.014
2011	$4,344,576	25,861	$0.17	1.20%	305,746	$0.014
2012	$4,816,995	28,484	$0.17	1.30%	319,928	$0.015
2013	$5,253,935	35,792	$0.15	1.70%	435,075	$0.012
Average	**$4,710,375**	**30,758**	**$0.16**	**1.46%**	**374,984**	**$0.013**

According to the Department, Otter Tail's historical lifetime conservation cost per kWh is significantly below the average energy cost. Furthermore, $19 million cost difference between the 1.5 percent and 1.7 percent annual savings scenarios demonstrate that additional conservation is cost effective.

Otter Tail's Triennial CIP was approved in the Department's Deputy Commissioner on October 10, 2013, in savings levels shown below:

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Table 5: 2014 – 2016 Otter Tail Triennial CIP Goals

Year	Proposed Energy Savings (MWh)	Percent of Average Adjusted Retail Sales
2014	31,405	1.50%
2015	31,762	1.52%
2016	32,476	1.55%

Even though Otter Tail achieves savings equal to or greater than 1.5 percent, the Department does not believe an energy savings level approved in IRP should be dependent on whether an equal (or greater) CIP energy-savings goal exists. A fundamental purpose of resource planning is to estimate the optimal amount of demand-side resources for meeting the Company's customer future needs. It is also a statutory goal, and the Department references Minn. Stat. 216B.2401:

> The legislature finds that energy savings are an energy resource, and that cost-effective energy savings are preferred over all other energy resources.

In its supplemental comments, the Department emphasizes the difference in how energy savings goals are calculated differently in the CIP and IRP processes. In general, CIP energy-savings

goals are calculated using weather normalized average sales of a utility **in the previous three years prior** to the utility submitting its CIP triennial plan. In contrast, when the Department reviews DSM goals in the IRP, it reviews proposed energy savings levels with the **forecasted energy requirements and retail sales** in the year the energy savings are procured.

The Department also noted that in EPA's proposed guidelines (the Clean Power Plan) for 111(d) compliance, energy efficiency is one of the four building blocks used to establish state goals and will likely be part of any state implementation plan. Although the value of additional DSM in complying with the Clean Power Plan was not part of the Department's analysis, the Department reasoned that there will likely be additional benefits to the Department's proposed 1.7 percent of cost effective DSM beyond what was considered in its analysis.

Greenhouse Gas Reduction Goal

In SMMPA's 2014 IRP proceeding, the Department requested parties and other utilities to submit comments on how to best analyze how a utility's resource plan is helping a utility meet the greenhouse gas emissions goal.[22] The Department solicited comments on three questions: the formula for calculating emissions reductions, how emissions from purchased generation would be calculated, and whether other greenhouse gases should be included in the emissions calculations. Based on these discussions, the Department recommended that each utility calculate its CO_2 emissions using the following approach:

- Start with emissions from utility-owned generation;
- Add emissions from utility purchases; and
- Subtract CO_2 emissions from sales from utility-owned generation

Otter Tail's CO_2 modeling in its IRP is similar to the Department's methodology. Table 16 of the Department's comments, below, shows Otter Tail's CO_2 reductions under its Preferred Plan:

Table 16: Comparing Otter Tail's Projected 2015 and 2025 CO_2 Emissions to 2005 CO_2 Emissions

	Energy Production (MWh)	CO_2 Emissions (Tons CO_2)	% Reduction From 2005 Emissions	Lbs of CO_2 per MWh	Percentage Reduction in CO_2 Emission Intensity From 2005
2005	4,393,148	4,653,930		2,119	
2015	4,972,900	4,250,551	9%	1,709	19%
2025	5,314,900	4,388,417	6%	1,651	22%

Depending on the outcome of SMMPA's IRP Docket, an agreed-upon CO_2 reduction goal calculation methodology may help inform future IRP proceedings. The Department will presumably request the Commission approve a methodology in the SMMPA IRP docket for the

[22] SMMPA 2014 IRP, Docket No. 13-1104

utilities to apply uniformly. Otter Tail can then update its CO_2 reduction estimates in future resource plans using this new method.

B. Environmental Intervenors

The Environmental Intervenors (EI) assert that Otter Tail's proposed IRP fails to achieve compliance with the SES or Minnesota's Greenhouse Gas Goal. EI stated that consideration of how a utility plans to meet these standards must be included as part of a statutorily required public interest determination for any IRP that includes a new or refurbished facility.

The Commission is prohibited from approving "a new or refurbished nonrenewable energy facility" in an IRP unless the utility first demonstrates that a renewable energy facility is not in the public interest. Additionally, a public interest determination must include "whether the resource plan helps the utility achieve the greenhouse gas reduction goals under section 216H.02, the renewable energy standard under section 216B.1691, or the solar energy standard under section 216B.1691, subdivision 2f." EI's position is that Otter Tail's Preferred Plan does not comply with either of these standards.

In addition, EI disagrees with several modeling assumptions that they believe have created a bias against renewable energy sources and in preference of natural gas to meet the Company's projected needs. If corrected, the bias against renewables would be removed, which would select solar resources to meet the needs of its customers, while working toward compliance with both the SES and the state's GHG emission reduction goals.

Greenhouse Gas Reductions Goal

Minn. Stat. § 216H.02 states: "It is the goal of the state to reduce greenhouse gas emissions to a level of at least 15 percent below 2005 levels by 2015, to a level at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050." EI states that Otter Tail's IRP will fail to meet the 15 percent reduction in 2015 goal, and, as proposed, it will not meet the 30 percent reduction goal in 2025 either. Consistent with the Department's modeling, EI observes that Otter Tail's Preferred Plan will only reduce CO_2 emissions by 9 percent below 2005 levels by 2015. In 2025, Otter Tail's CO_2 emissions will only be reduced by 6 percent below 2005 levels.

Otter Tail did conduct an analysis of a scenario that would meet the 2025 GHG emissions reduction goal, "Sensitivity 21," and EI argues this expansion plan is in the public interest. Not only would Sensitivity 21 meet the GHG Goal, but there is less than a 1 percent difference in Present Value Revenue Requirements than Otter Tail's Preferred Plan. In order to conclude that Otter Tail sufficiently demonstrated that a renewable facility is not in the public interest, EI stated the Commission would need to find that a 0.8 percent cost difference is significant enough to justify approving a plan that does not meet the state's GHG reduction goals.

In addition, EI states that the Department's proposed modification would not meet the statewide GHG reduction goals either. Although the Department did model the necessary GHG reductions,

the Department's modeling shows that it is 2.73 percent less expensive, in present value of societal costs terms, than the Department's base case. Therefore, EI states it was unclear why the Department would instead prefer a higher-cost plan that does not meet Minnesota's GHG reduction goals. According to EI, the only difference in the resources selected during the planning period is that Scenario 1, Contingency 36, adds three wind units in 2015.

According to EI, it is not sufficient for utilities to merely calculate progress toward the GHG Goal; utilities should also be required to select the expansion plan which provides the greatest opportunity to actually achieve compliance with these goals. Furthermore, it is not in the public interest (and contrary to clear legislative intent) to allow a utility to choose a plan that fails to achieve levels of emissions reductions contained in Minnesota Statute section 216H.02, subdivision 1. Otter Tail should either be required to select a preferred plan that attains the GHG Goal or demonstrate why compliance is either technically infeasible or not in the public interest. Similarly, EI states that the Department proposed modifications should also reflect compliance with the GHG reduction goals.

Solar Energy Standard

EI claims Otter Tail's analysis of solar resources is flawed, which makes SES compliance appear more costly than it is. The Commission should not approve an IRP that contains no solar—even after the SES is in place—without a significant showing of why solar is not in the public interest.

EI identifies several modeling flaws in Otter Tail's IRP. For example, Otter Tail's base cost assumption is $133 per MWh for a solar array. EI calculated a levelized cost of $115 per MWh for a 1 MW facility using the National Renewable Energy Laboratory's mean installed cost for a 1-10 MW system as of August 2013, assuming a 30 percent solar Investment Tax Credit (ITC).

A primary difference between the two calculations seems to be whether the 30 percent ITC is included or not. EI claims that an important window of opportunity for Otter Tail to most cost-effectively install solar power is coming to a close, and the solar ITC will reduce from 30 percent to 10 percent of eligible property at the end of 2016. Since projects must come online prior to that date in order to qualify, EI believes there should be more urgency to acquire solar resources.

Another flawed assumption is Otter Tail's modeling approach to meet the SES with 21 x 1 MW blocks. EI argues that, despite perhaps needing 21 MW, there is no economy of scale built into the cost assumptions, and it is unrealistic to assume that there will be no decrease in cost as the number of installations rises. Moreover, the base cost escalates at 3 percent per year, further exacerbating this problem. Recent experience demonstrates that solar prices have come down dramatically over the past few years, and that near-term expectations are that solar prices will continue to decline. At a minimum, EI states that Otter Tail should have modeled solar resources at a steady or even declining price.

The primary bias against solar and in favor of natural gas is the assumed capacity accreditation. In Otter Tail's modeling, the assumption is that solar can be accredited at only 40 percent of its nameplate value, and Otter Tail has offered no basis for this assumption. According to recent

studies which are cited in EI's comments, the capacity credit of tracking systems is more likely 60 percent or greater.

EI disagrees with the Department's solar assumptions as well, thereby leading the Department to draw erroneous conclusions regarding the cost-effectiveness SES compliance. Particularly, EI believes the Department's conclusion that achieving 10 percent of energy generated from solar is only cost effective at $75/MWh is not supported with reasonable cost assumptions. Even if it were, EI cautions the Commission to keep in mind that the Department only modeled Otter Tail's system, and the "cost-effectiveness" of solar for Otter Tail should not be generalized to other utilities and the statewide solar goal.

EPA's Clean Power Plan

EI stated that, although it agrees with Otter Tail that the details of the final Clean Power Plan are uncertain at this time, it is certain that the Minnesota Legislature has established state greenhouse gas reduction goals and has required utilities to assess compliance with the state goals in resource planning. Therefore, EI ultimately disagrees with Otter Tail that the uncertainty of a final EPA rule should delay the Company's clean energy commitments needed to comply with state GHG objectives. Adding more wind power to Otter Tail's portfolio is cost-effective irrespective of the Clean Power Plan at the federal level.

According to EI, the date of a final EPA 111(d) rule, the effective date of Minnesota's State Implementation Plan, or even possible U.S. Supreme Court review are not valid excuses for Otter Tail to stall cost-effective wind power additions that are essential to meeting the GHG reductions the Minnesota Legislature has already established.

C. Midwest Large Energy Consumers

The Midwest Large Energy Consumers (MLEC) is an ad hoc group of some of Otter Tail's largest ratepayers and many of the largest employers in its service territory and its members account for over 20 percent of Otter Tail's total Minnesota and North Dakota load.

MLEC supports Otter Tail's Preferred Plan, since it is the scenarios which results in the least cost plan. According to MLEC, the Company has appropriately considered its demand and energy growth needs within the context of MISO's resource adequacy construct and concluded that it does not require additional resources within the next five years. Therefore, MLEC recommends the Commission approve Otter Tail's Preferred Plan, with no additional generation resources in the next five years.

MLEC identifies four specific assumptions in the Department's analysis which contribute to excessive investments in resources which are not needed in the next five years. MLEC recommends the Commission not accept these assumptions as reasons to require Otter Tail to procure additional resources. First, it is a flawed approach to assume absolutely no diversity from the MISO peak. Instead, the Commission should base Otter Tail's resource need on its MISO coincident peak method. Second, it is unrealistic to assume the Company will have no

access to the broader regional market to procure cost-effective resources. Third, the Department's analysis includes a $21.50/ton CO_2 value and externalities. MLEC notes that using environmental cost assumptions does not result in lowest rates for Minnesota ratepayers or a least cost plan from North Dakota's perspective, which prohibits the use of such assumptions. Fourth, the Department incorrectly assumed Otter Tail's RES compliance. (Staff note: the RES compliance issue has been resolved through comments.)

D. Midcontinent Independent System Operator

In its August 1st Comments the Midcontinent Independent System Operator (MISO), took no position on Otter Tails IRP, but MISO did provide clarifying comments in response to the Department's invitation to provide information on the methodology and calculation of MISO's coincident peak forecasts and Planning Reserve Margin.

E. Clean Up the River Environment / MPIRG

Clean Up the River Environment (CURE) and the Minnesota Public Interest Research Group (MPIRG), in separate comments, express concern for environmental and economic risks associated with the Otter Tail's Preferred Plan, as well as the lost opportunity to develop renewable energy resources.

While they were appreciative that Otter Tail is willing to shutter its coal plant at Hoot Lake in 2020, CURE and MPIRG argue that replacing it with a natural gas plant alone is outside the public interest. Natural gas alone would bring further detriment to the environment, and it would also not comply with the SES and Minnesota's Greenhouse Gas Reduction Goal.

CURE states that in order to proceed with a nonrenewable energy future, the IRP must outline why a renewable project is outside of the public interest. CURE claimed this is a requirement which Otter Tail has not met.

Further, MPIRG objects to Otter Tail's plan due to the economic risks. MPIRG notes that once the investment is made and the resources are secured, there will be no incentive to transition away from natural gas during the plant's lifespan, which means more carbon emitted and more pollution via fracking. Additionally, using natural gas as a source of energy will only exacerbate unstable natural gas prices.

In addition to existing market trends, MPIRG states the Commission should also consider potential future regulations on natural gas procurement and a federal carbon tax that would further drive up the cost of the commodity. According to MPIRG, once initial investments and maintenance are accounted for, harvesting energy from the wind and sun is virtually costless, and even those upfront costs for renewables are decreasing rapidly.

V. Staff Analysis

A. Relevant Statutes and Rules

The Commission's role in resource plans is defined by Minn. Stat. §216B.2422 (the IRP Statute) and Chapter 7843 of Minnesota Rules. According to Minn. Stat. §216B.2422, Subd. 1:

> "Resource plan" means a set of resource options that a utility could use to meet the service needs of its customers over the forecast period, including an explanation of the supply and demand circumstances under which, and the extent to which, each resource option would be used to meet those service needs.

Minn. Stat. §216B.2422, Subd. 2, states that the Commission shall approve, reject, or modify a resource plan, consistent with the public interest. Subd. 3 requires the utility use environmental values established by the Commission when evaluating and selecting resource options.

Minn. Stat. §216B.2422, Subd. 4 (Preference for renewable energy facility), states:

> The commission shall not approve a new or refurbished nonrenewable energy facility in an integrated resource plan…unless the utility has demonstrated that a renewable energy facility is not in the public interest.

Furthermore,

> The public interest determination must include whether the resource plan helps the utility achieve the greenhouse gas reduction goals under section 216H.02, the renewable energy standard under section 216B.1691, or the solar energy standard under section 216B.1691, subdivision 2f.

Minn. Rule 7843.0500, Subpart 3, authorizes the Commission to make findings of fact and conclusions. In doing so, "the Commission shall consider the characteristics of the available resource options and of the proposed plan as a whole." IRPs must be evaluated on their ability to:

A. maintain or improve the adequacy and reliability of utility service;

B. keep the customers' bills and the utility's rates as low as practicable, given regulatory and other constraints;

C. minimize adverse socioeconomic effects and adverse effects upon the environment;

D. enhance the utility's ability to respond to changes in the financial, social, and technological factors affecting its operations; and

E. limit the risk of adverse effects on the utility and its customers from financial, social, and technological factors that the utility cannot control.

If the Commission concludes that a set of resource options would be optimal, particularly with regards to the factors to consider listed in Minn. Rule 7843.0500, Subpart 3, it may identify that set of resource options as a preferred resource plan. A preferred resource plan "need not have been specifically proposed or advocated by the utility, an intervening party, or other interested person."[23]

In addition to the IRP statute and Chapter 7843 of Minn. Rules, the Commission typically considers in its decision several other statutes relevant to the State's energy policy requirements, goals, and targets. Some of these statutes are listed as Attachment #1 of this briefing paper.

Staff believes that Otter Tail's resource plan reasonably complies with all relevant statutes and rules, with the exception of two: the Solar Energy Standard (SES) and the Minnesota Greenhouse Gas Reduction Goal (the GHG Goal). To be fair, not all relevant statutes and rules fit together comfortably. Resource plans must maintain or improve reliability of service, but they also specifically prefer renewable resources that are less predictable. Resource plans must "keep rates as low as practicable" while balancing long-term planning concerns such as portfolio diversification, risk management, and carbon mitigation strategies.

In addition, Otter Tail must balance statutes and rules among three state jurisdictions. Otter Tail's Preferred Plan includes no environmental externalities, no CO_2 values, and no solar energy because this is the Company's position of what most appropriately accommodates its entire service territory. Otter Tail evaluates the SES, the GHG Goal, and environmental costs as sensitivities, thereby leaving it up to the Commission to determine the appropriate weight of each sensitivity.

It is a question disputed among the parties and contemplated by the Commission in each resource plan: in the context of whether a utility submits a reasonable resource plan on the whole, what is the difference between a utility's Preferred Plan versus a sensitivity comparison?

Staff believes the answer, in part, is that the Commission's resource plan order should leave no ambiguity that a utility's action plan will result in compliance with all generation-related requirements that reflect the energy policy of the State, which includes compliance with the RES, SES, 1.5 percent energy savings goal, and, broadly speaking, carbon reduction measures.

Solar Energy Standard

Otter Tail is required to comply with the SES, and the Company's Preferred Plan contains no solar in it. While the resource plan as a whole includes three solar price sensitivities which add 21 MW of solar–the estimated capacity-equivalent of 1.5 percent solar energy–this is not really a plan as much as it is a forced modeling result. The solar compliance expansion plans, for the most part, add all SES capacity into a single year at the back end of the compliance period.

The Department recommends the Commission modify Otter Tail's action plan to include 21 MW solar by 2019. The Commission could adopt this recommendation to acknowledge that Otter

[23] Minn. Rule 7843.0500, Subpart 2.

Tail's Preferred Plan needs to comply with the SES. However, Staff believes the Commission has more actionable, immediate options at its disposal to advance SES compliance.

The federal production tax credit (PTC) for wind expired on December 31, 2013. Before that time, several Minnesota utilities, including Otter Tail, filed wind PPAs with the Commission in order to secure these tax benefits, even though many were ahead on their RES compliance. Additionally, several Minnesota utility resource plans initiated wind RFP processes–also including Otter Tail, which resulted in Ashtabula 3–because doing so was a reasonable means to not only meet the RES, but to procure cost-effective resources.

The solar Investment Tax Credit (ITC) is a 30 percent tax credit for solar systems on residential and commercial properties. Under current law, the ITC will remain in effect through December 31, 2016. One difference between the tax benefit qualifications for the wind PTC versus the solar ITC is the requirement for solar projects to be "placed in service" by the tax credit expiration, while the wind PTC required projects to be "under construction" by the deadline. In this way, solar development may have more urgency to start moving than the wind projects proposed in 2012-2013 because of the stipulation for solar projects to be operational to qualify.

Otter Tail's next IRP may not come before the Commission until late-2016, or even late-2017, depending on the deadline for Otter Tail's next IRP filing. Therefore, it is questionable what role the Commission would have, if any, in Otter Tail's SES compliance plan if no action is taken before the next round of IRP decision-making. More importantly, this schedule disregards the availability of the solar ITC, which may be important to the economics of adding cost-effective solar resources. An ITC extension is uncertain, if not unlikely, and it is debatable whether any potential technology improvements would outweigh the currently available ITC benefit. At least according to Otter Tail's IRP, since the Company's assumed all-in solar prices escalate over time, the pre-2017 ITC benefit would indeed outweigh the solar prices assumed for 2017-2020.

The Commission could require Otter Tail to modify its action plan such that some amount of solar is added prior to 2017. As one option, in addition to modifying the plan to include 21 MW of solar to be added by 2019, the Commission could further direct Otter Tail to procure some amount of solar before the expiration of the solar ITC. This would balance the tax credit benefit versus technological improvements question, and it would still leave Otter Tail flexibility to wait until the 2017-2020 timeframe to procure its remaining balance. The Commission could then revisit Otter Tail's progress in the Company's Annual SES Reports, which could work to integrate the annual SES filing requirement with IRP. (This is decision option #13.)

If the Commission wishes to take a more actionable route, it has the option to direct Otter Tail to initiate a solar RFP process for some amount of utility-scale solar to be placed into service by the end of 2016. According to the Department's analysis, the cost of solar would have to be less than $75/MWh to be cost-effective. EI disputes this breakeven point, so the Commission may consider not adopting this value for future determinations regarding whether solar proposals are cost-effective. Nevertheless, it is plausible that the cost of solar in Minnesota is somewhat close to the Department's threshold number. For example, Xcel Energy recently filed a public letter

with the Commission and provided a summary of Minnesota-based solar bids offered into an all-solar RFP. In this letter, Xcel noted:

> One hundred eleven proposals totaling over 2100 MW of solar photovoltaic generating capacity were submitted by 36 developers. Individual projects range in size from 5 MW to 100 MW. Based on our initial screening, 11 companies have proposed 15 projects, in aggregate totaling 630 MW of electric generation capacity, each at a levelized energy cost of $85/MWh or less.[24]

Given the statutory preference for renewable energy, the statutory requirement to procure solar specifically, the fact that the price point of solar is so unsure, and the fact that the solar ITC is scheduled to expire at the end of 2016, Staff believes this proceeding warrants further exploration into solar procurement on Otter Tail's system. Whether this is via a solar RFP or some other means is up to the Commission. However, only modifying Otter Tail's plan to include 21 MW by 2019, as recommended by the Department, does not give much specificity to SES compliance moving forward, nor does it contain much Commission input into Otter Tail's solar procurement strategy.

Due to Otter Tail's broader position to wait to add renewables until 111(d) becomes finalized, the Company would presumably oppose any Commission decision which triggers a solar procurement proceeding. Thus, Staff invites the parties to bring additional options for addressing SES compliance before the Commission which might be a middle ground between a modeling finding and an RFP process.

Minnesota Greenhouse Gas Reduction Goal

On August 5, 2013, the Commission issued a Notice of Information in Future Resource Plan Filings. The Notice states, in part:

> **PLEASE TAKE NOTICE** that the Commission expects utilities to include in their resource plans filed after August 1, 2013 an explanation how the resource plan helps the utility achieve the greenhouse gas reduction goals, renewable energy standard, and solar energy standard as listed in the above-referenced legislation. Parties should also be prepared to discuss the matter in comments.

Otter Tail's Preferred Plan does not reduce GHG emissions by an amount commensurate with 216H.02. In fact, as shown in Figure 5-12 of Otter Tail's Petition, below, Otter Tail's Preferred Plan increases total CO_2 emissions relative to 2014 and reduces CO_2 emissions relative to 2005 by about 6 percent by 2025.[25] As shown in Figure 5-12, Otter Tail estimates its 2005 emissions level was 4.6 million tons CO_2, indicated by the purple line. Its Preferred Plan CO_2 emissions level is approximately 4.5 million tons by the end of the planning period.

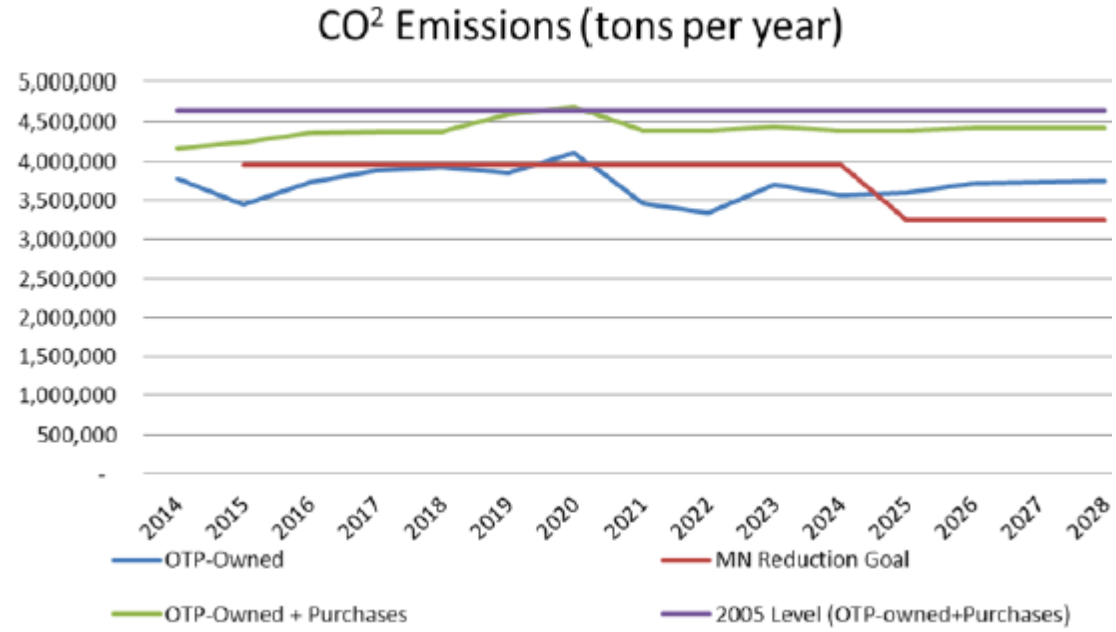
[24] Xcel Energy, Docket 14-162, Solar Update Letter, September 12, 2014
[25] Environmental Intervenors, initial comments, p. 3.

To explain in further detail, Figure 5-12 contains four color-coded lines:

- Purple: Otter Tail's 2005 CO_2 levels, owned and purchased (the flat line at the top)
- Green: Otter Tail's CO_2 emissions from its Preferred Plan, owned and purchased
- Red: the Minnesota GHG Goal (the flat line at 4 million tons, which staggers in 2025)
- Blue: CO_2 emissions from Otter Tail's owned facilities only (i.e. excluding purchases)

Looking closely at years 2019-2020, CO_2 emissions shown by the green line, the Preferred Plan, actually increase above 2005 CO_2 levels (the flat, purple line) before Hoot Lake Plant is ultimately retired at the end of 2020. Then, as a result of higher utilization of Big Stone and Coyote Station, much greater utilization at Solway, and the addition of a natural gas unit in 2021, Otter Tail's system CO_2 emissions increase above 2014 levels by the end of the planning period.

Figure 5-12: Preferred Plan CO_2 Emissions and the CO_2 reduction Goal



Of particular importance, Staff believes Otter Tail's system CO_2 emissions must be considered on the basis of emissions from owned plus purchased generation. For the most part, this is because the GHG progress reports which the Minnesota Pollution Control Agency submits to the Legislature "include net imported electricity in Minnesota."[26] Thus, reporting GHG emissions from out-of-state sources, including market purchases, would be consistent with PCA's methodology. Secondly, Otter Tail expects to purchase around 15-20 percent of its energy from the market on average. It would be misleading to exclude purchases from the calculation, since market purchases are the second-largest contributor of the Company's energy needs, after coal.

Otter Tail modeled the Minnesota GHG Goal as a sensitivity comparison, referred to as "Sensitivity 21." This sensitivity includes externality costs and carbon values in the Present

[26] Minnesota Pollution Control Agency, 2014 Pollution Report to the Legislature, p. 38.

Value Revenue Requirements calculation, whereas the Preferred Plan does not. The expansion plan for Sensitivity 21 is shown in the table below. In short, the GHG Goal sensitivity would add 450 MW of wind in total, including 200 MW of wind by 2016. Furthermore, the GHG Goal sensitivity would add 300 MW of natural gas resources instead of the 211 MW peaking CT in the Preferred Plan.

Greenhouse Gas Reduction Goal Expansion Plan (Sensitivity 21): Energy Market Off, w/ Externalities

Plan Year	***GHG Goal (MW)***
2014	
2015	Wind (150)
2016	Wind (50)
2017	
2018	
2019	Simple Cycle-Large (194) Wind (100)
2020	Wind (50)
2021	Simple Cycle-Medium (94)
2022	
2023	
2024	
2025	Wind (50)
2026	Wind (50)
2027	
2028	

Otter Tail's Preferred Plan, which consists only of a 211 MW natural gas peaking unit in 2021, is obviously quite different than the expansion plan which meets the GHG Goal. Staff requested via Information Request that Otter Tail provide the Strategist results which show capacity factors from existing facilities under the GHG Goal Sensitivity. This was to see what effect the GHG Goal had on existing units. Staff grouped the Strategist results into the tables below:

Otter Tail Preferred Plan (Sens. 22) – Capacity Factors in Strategist

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Solway	5%	6%	6%	6%	7%	10%	10%	22%	21%	29%	29%	29%	30%	30%	30%
Big Stone	59%	46%	62%	62%	63%	64%	68%	74%	74%	79%	73%	80%	79%	80%	80%
Coyote	83%	82%	75%	85%	85%	77%	86%	88%	79%	89%	88%	80%	89%	89%	89%
HLP 2	59%	60%	60%	60%	60%	62%	62%	0%	0%	0%	0%	0%	0%	0%	0%
HLP 3	59%	60%	59%	60%	60%	63%	63%	0%	0%	0%	0%	0%	0%	0%	0%

According to the Strategist results from Otter Tail's Preferred Plan, Big Stone typically runs at a capacity factor range of 60-80 percent. Coyote Station is projected to run in the range of 80-90 percent capacity factor. However, as shown below, in the GHG Goal sensitivity, Big Stone and Coyote Station are ramped down significantly with the introduction of new wind. In the GHG

Goal expansion plan, Big Stone typically operates at around 45 percent capacity factor, and Coyote Station runs at about 65 percent capacity factor.

Otter Tail GHG Reduction Goal (Sens. 21) – Capacity Factors in Strategist

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Solway	5%	5%	4%	1%	2%	3%	2%	3%	3%	6%	6%	6%	6%	6%	5%
Big Stone	59%	41%	54%	44%	45%	44%	46%	43%	42%	48%	44%	46%	46%	46%	46%
Coyote	82%	78%	68%	67%	68%	63%	68%	65%	58%	69%	65%	61%	66%	66%	65%
HLP 2	59%	59%	59%	57%	57%	58%	56%	0%	0%	0%	0%	0%	0%	0%	0%
HLP 3	58%	59%	58%	55%	55%	56%	55%	0%	0%	0%	0%	0%	0%	0%	0%

The GHG Goal sensitivity would add a total of 450 MW of wind during the planning period, including 200 MW of wind over 2015-2016. These wind additions would largely displace a significant amount of Otter Tail's existing coal generation. Together, Big Stone and Coyote Station amount to approximately half of Otter Tail's total UCAP, and, after Hoot Lake is retired, all of Otter Tail's baseload. Moreover, Big Stone and Coyote Station are out-of-state coal plants which are dispatched regionally. Thus, the GHG Goal sensitivity is probably not an action plan indicative of unit-level operations which would realistically occur outside of a modeling result.

However, depending on the price of wind and with the inclusion of externality values, the GHG Goal expansion plan could reduce system costs. According to Table 9 of the Department's initial comments, shown below, "meeting the CO_2 reduction goal becomes cost neutral at a wind price of approximately $50/MWh."[27]

Table 9
Cost of Complying with
Greenhouse Gas Emissions Goal

	PVSC ($000s)	% Increase from Dept. Base
Dept Base.	3,971,851	0.0%
Cost of Meeting CO_2 Goal		
Wind $35/MWh	3,667,616	-7.7%
Wind $40/MWh	3,765,583	-5.2%
Wind $45/MWh	3,863,550	-2.7%
Wind $50/MWh	3,958,033	-0.3%
Wind $55/MWh	4,037,657	1.7%
Wind $60/MWh	4,117,283	3.7%
Wind $65/MWh	4,188,890	5.5%
Wind $70/MWh	4,251,910	7.1%
Wind $75/MWh	4,312,226	8.6%
Wind $80/MWh	4,372,541	10.1%

[27] Department of Commerce, initial comments, p. 31.

As an added layer, EPA's 111(d) rule is at least partially intended to achieve the very type of modeling result reflected by Sensitivity 21, which is to ramp down coal and add renewables. Otter Tail notes that 111(d) will be subject to further analysis in future IRP proceedings. The Commission could contemplate how to address the GHG Goal plan in this 111(d) context, which, in terms of actions taken, means the addition of more wind. According to Otter Tail's reply comments, excerpted below, Otter Tail is amenable to such changes to its wind expansion plan:

> Otter Tail would not be opposed to an order allowing the addition of up to 200 MW of wind to its five year action plan assuming prices at the time of acquisition are cost-effective. However, it would be opposed to a requirement to initiate an RFP proceeding or build a specific amount of new wind until the outcome of the EPA 111(d) rules are more clear.

The SES is a requirement, and the GHG Goal is a goal, and there is a difference, in Staff's view. Accordingly, Staff believes Otter Tail's resource plan should be modified such that it complies with the SES, and the Commission could initiate the process to compel Otter Tail to meet it. With regard to the GHG Goal, Staff agrees with EI that the Company's Preferred Plan does not comply with the Goal. However, for reasons previously discussed, the GHG Goal may not reflect the most practical resource plan either, considering the multi-jurisdictional nature of the utility and the regionally dispatched nature of its generation. The Commission could still take steps to make progress toward the Goal, though, which would include adding wind and solar.

B. Size and Timing of Resource Need

One of the main issues raised during this proceeding is whether the finding of need should be based on the MISO-coincident peak (CP), or the utility's non-coincident peak (NCP) for resource adequacy.[28] In short, the NCP method would increase Otter Tail's need by about 60 MW by removing the load diversity factor adjustment incorporated into Otter Tail's planning reserve margin. Otter Tail strongly opposes using the NCP method for IRP.

According to Otter Tail, the NCP method would require the Company to "build resources in excess of those required to meet its MISO resource adequacy requirements at a cost of approximately $112 million."[29] Moreover, using the NCP method "would neither improve reliability nor increase Otter Tail's ability to meet its resource adequacy requirements."[30] This is, in part, because Otter Tail would be procuring excess capacity built for the purposes of serving the broader MISO region. Otter Tail is not sure whether it could even be able to designate its excess reserves for the Company's own purposes. Otter Tail may be required to sell the excess reserves through either the bilateral market or MISO's annual capacity auction.

The Department's concern is based in risk management. MISO's resource adequacy construct, while important, may not be appropriate for being the exclusive means to consider long-term

[28] Staff note: The difference between the two is discussed earlier in the MISO Comments section of this document.
[29] Otter Tail reply comments, p. 2.
[30] Otter Tail reply comments, p. 3.

reliability, particularly in light of expected retirements of existing resources within the MISO footprint. MISO's role is to ensure reliability the bulk transmission system, and it is the state commissions' role to determine the appropriate amount of generation reserves for each utility.

In its initial comments, the Department recommended the Commission require Otter Tail to modify its action plan to reflect using the NCP method for resource adequacy. In supplemental comments, however, the Department withdrew its recommendation to use the NCP "because the record regarding the costs and benefits of choosing the more expensive use of NCP has not been adequately developed for the Commission to require the Company to use this standard."[31]

Instead, "the Department recommends that the Commission **open a generic docket** that examines the probability and potential costs of a blackout, and the costs of potential solutions."[32] Because it is not clear whether the Department means a generic docket should be opened in this proceeding, or someplace else, Staff does not include this recommendation in the decision options, but the Department can certainly re-clarify its position at the Commission hearing.

As with the range of natural gas prices and the range of carbon values, the Commission is not under any obligation to take a position on a particular input assumption, but rather, consider the plan as a whole and, in particular, determine whether it will "maintain or improve the reliability of service" (Minn. Rule 7843). In Staff's view, it does not appear that Otter Tail's ability to maintain reliability of service will be jeopardized by using the CP method. However, Staff's confidence in the application of the CP method is largely attached to Otter Tail's current capacity position. This IRP record suggests Otter Tail will have a minimal capacity deficit, if any, until Hoot Lake is retired, so the Commission can revisit the load diversity issue in the Company's next IRP without making a precedent-setting finding on CP versus NCP one way or another.

On the one hand, Staff agrees with the Department in concept that one-year planning criteria are not satisfactory for a 15-year planning process which is intended to err on the side of reliability. On the other, Staff agrees with Otter Tail that load diversity should be taken into account to some degree, as it has been even before changes to Module E. The essence of MISO's shift from a system-wide diversity factor adjustment to a LSE-specific diversity factor adjustment is important and appropriate to acknowledge, but how to implement it long-term is still uncertain.

Staff includes a decision option which reflects a size and timing finding of need suggested by the record. In this case, given Otter Tail's short-term capacity surplus, while recognizing that its reserve requirements may fluctuate year-to-year, the Commission could find that Otter Tail will need to procure approximately 200 MW of additional net summer capacity in the 2019-2021 timeframe.

Otter Tail's Preferred Plan does not add resources until 2021, but Staff believes a range of identified need which uses 2019 as the start year is more appropriate than 2021. A "timing" finding which starts with 2019 instead of 2021 factors in some possibility for changes to MISO's reserve requirements, and it also considers that resources should be added before Hoot Lake is

[31] Department supplemental comments, p. 9.
[32] Department supplemental comments, p. 8. (Emphasis added.)

retired, not after. The exact language of that decision option will be discussed in the next section, which includes the "type" component of size, type, and timing.

C. Type

The "types" of supply-side resources Strategist normally considers include peaking, intermediate, baseload, and wind. Generally, these types of resources are categorized by their capacity factor, or, the percentage of time they operate. In resource plans, peaking units are often gas-fired combustion turbines (CT), and an intermediate plant commonly refers to natural gas combined cycle (CC) units.

However, in Strategist, gas-fired peaking CTs and wind can be packaged together to provide the characteristics of an intermediate unit. Thus, gas-fired CC units or the combination of a CT plus wind or market energy can each be considered an "intermediate" facility. (Because of its relatively low capacity accreditation, wind is generally considered an energy resource, and wind units generally compete with the wholesale energy market to fill an energy need.)

Otter Tail's requirement for capacity is minimal until 2020, when Hoot Lake is retired. At this point, Otter Tail's capacity deficit spikes until it reaches a height of 251 MW by the end of the planning period. Because the only CC option Otter Tail allows Strategist to accept is a 311 MW CC unit, which would be a very big (and overly sized) unit for a system such as Otter Tail's, few expansion plans include a CC. However, most expansion plans include some variation of simple cycle CTs packaged together with wind or an increased share of market energy.

As discussed in the Department Comments section of this briefing paper, Otter Tail's modeling indicates that market purchases will serve about 18 percent of Otter Tail's energy needs on average, reaching levels as high as 28.8 percent in 2015 and 24.5 percent in 2022. Because Otter Tail has no bilateral energy contracts after 2020, all of the market purchases in 2021 and beyond are made from the day-ahead market. In Staff's view, Otter Tail's exposure to the day-ahead energy market in the latter years of its plan is curiously high, and market purchases in the amount of one quarter of total energy reflects a significant exposure to market risk.

In addition, Staff questions the reasonableness of the Company's proposal to replace Hoot Lake – a baseload facility – with a peaking gas plant only. As shown below, Otter Tail's Preferred Plan assumes its Solway CT will run at 5 percent capacity factor in 2014, a reasonable expectation for a peaking unit. However, Solway's capacity factor escalates to 22 percent once Hoot Lake is retired, ultimately reaching 30 percent capacity factor by 2027.

OTP Preferred Plan - Projected Capacity Factors

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Solway	5%	6%	6%	6%	7%	10%	10%	22%	21%	29%	29%	29%	30%	30%	30%

As the Department explains, a peaking unit "cannot be expected to provide energy on an annual basis like Hoot Lake. In Otter Tail's Strategist modeling, MISO market purchases make up a

significant part of the difference between Hoot Lake's year round operation and a CT's much lower operation, as evidenced by the increase in market purchases in 2021."[33]

To the question of what "type" of resource Otter Tail needs, the Commission could look at it as if Otter Tail's Hoot Lake replacement proposal is a generic 211 MW peaking unit, plus more market energy, plus increased utilization of Solway. Staff believes this is an unreasonable replacement for Hoot Lake, and the Commission's decision regarding "type" could consider more appropriate alternatives. Additional wind, a smaller-sized CC unit, or a partnership share of a CC are some alternatives to over-utilizing existing CTs and the day-ahead market for the energy component of Otter Tail's system needs.

This issue arose in Minnesota Power's (MP) 2013 IRP. In that instance, there was a dispute over whether MP should add a natural gas CC, a package of wind plus a CT, or secured bilateral contracts, not generic market purchases. The Commission ultimately decided that, instead of a specific combination, MP should procure "200 MW of intermediate capacity (and associated energy)…by constructing the resource itself, by sharing in the ownership of the resource, or by procuring the resource through bilateral contracts, whichever option is most cost-effective."

Using the exact same language as the Commission order in MP's IRP (with, of course, changes to the company name and planning years), decision option #7 states:

> Otter Tail Power shall obtain approximately 200 MW, subject to need, of intermediate capacity (and associated energy) in the 2019 – 2021 timeframe by constructing the resource itself, by sharing in the ownership of the resource, or by procuring the resource through bilateral contracts, whichever option is most cost-effective.

The next section of this briefing paper will discuss whether the Commission should explicitly state that wind is the most appropriate resource to fill Otter Tail's energy need, instead of leaving the issue open-ended and left to interpretation over what "intermediate" need means. According to the Department's analysis, a significant amount of wind is consistently selected when the price is less than $50/MWh. Moreover, it is selected earlier than Otter Tail's capacity deficiency.

D. Wind Additions

While Otter Tail's capacity deficit begins to emerge in approximately 2019-2021, the Department's analysis suggests that wind additions earlier than 2019 are prudent because they would reduce Otter Tail's system costs. In total, the Department's analysis shows that an additional 300 MW of wind is cost-effective by 2021. However, because the wind additions are staggered, the Department recommends waiting until the next IRP to procure wind resources that are selected outside of Otter Tail's five-year action plan. Thus, the Department recommends the Commission require Otter Tail to procure 100 MW of wind by 2017.

[33] Department of Commerce, August 29, 2014 Supplemental Comments, p. 15.

Otter Tail agrees that potential changes to its short-term wind expansion plan could be forthcoming, but the Company would oppose a requirement to initiate an RFP proceeding until EPA's 111(d) rule is finalized. In Otter Tail's reply comments, the Company requests flexibility in any Commission finding related to wind additions, in part because Otter Tail believes the state in which future projects are constructed might have an impact to the 111(d) compliance plans.

The problem with not including some amount of wind in the Commission's order is due to Otter Tail's significant need for energy, evidenced by the higher utilization of Solway and the increase of day-ahead purchases, even before Hoot Lake is retired. According to the Department, wind is cheaper and comes with less risk than the alternative embedded in Otter Tail's Preferred Plan. Furthermore, not referencing wind in some way in the Commission's order may not reflect a complete picture of the record, which shows a large number of expansion plans adding wind.

A problem with waiting to initiate the wind procurement process is, again, the request from Otter Tail to wait until December 2016 for another IRP process. Given the robustness of the Department's modeling result that *at least* 100 MW wind is cost-effective in the five-year action plan, it is not clear whether the value added from waiting until 111(d) is finalized comes at the expense of pursuing cost-effective resources in the short-term.

While it is less certain what the price of wind actually is in the post-PTC marketplace, the Commission could still modify Otter Tail's action plan to add more wind on the basis of any of the following: 1) the Department's analysis, 2) Otter Tail's need for energy, 3) progress toward the GHG Goal and 111(d) compliance, and 4) reducing exposure to market risk.

Alternatively, the Commission could make a general finding consistent with the modeling in the record. Decision option #11 takes this approach, stating the evidence in the record demonstrates that, in addition to Otter Tail's 200 MW capacity need in 2019-2021, up to 300 MW of wind in the 2017-2021 timeframe is cost-effective when the price of wind is $45/MWh or less.

E. Energy Savings

As noted earlier, the Department approved Otter Tail's 2014-2016 triennial CIP in October 2013, which includes energy savings at or above 1.5 percent in each year. In this IRP, the Department recommends the Company procure an additional 0.2 percent savings, resulting in energy savings levels of 1.7 percent. On page 21 of the Department's May 2, 2014 comments, the Department recommends this higher energy savings level for the following reasons:

1. Otter Tail achieved 1.7 percent energy savings in 2013. Their achievements in the last five years suggest that a 1.7 percent energy savings goal is achievable.

2. Otter Tail's historical lifetime conservation cost per kWh is significantly below the average energy cost of $0.04 per kWh.

3. The cost difference between the Company's proposed 1.5 percent annual energy savings goal and a 1.7 percent annual energy savings target demonstrate that the additional conservation is likely cost effective.

Staff issued Information Request #4 requesting that Otter Tail specifically respond to the Department's three reasons. To summarize, Otter Tail disagreed with the Department's justifications for the following reasons:[34]

1. One year of significant energy savings does not justify an assumption that these savings can continue year-after-year. Historical averages of energy savings fall well short of the 1.7 percent savings level recommendation.

2. The 1.7 percent savings level is higher than the achievable market potential for energy efficiency identified in the Company's 2010 DSM Potential Study. Otter Tail does not believe it is realistic to plan for savings in excess of the DSM Study's market potential.

3. It is not appropriate to plan around a goal that has never been achieved or sustained, and it is difficult to forecast with any confidence the costs of doing so. Additionally, overall costs to achieve higher goals are increasing.

For these reasons, Otter Tail recommends the Commission find "Otter Tail's 1.5 percent energy efficiency goal as submitted and approved in its current triennial CIP plan is the appropriate and achievable level of energy efficiency for the Company."[35]

From Staff's perspective, the difficulty with the energy savings goal issue is partly process-based and partly enforcement-based. For example, if the Commission requires Otter Tail to procure 1.7 percent savings, per the Department's recommendation, will this incremental energy savings level occur inside CIP or outside CIP? According to the Department, the answer seems to be inside CIP, as the Department notes that "should a higher DSM level be approved in an IRP…there are budget flexibility and program modification processes to allow a utility to exceed its approved CIP budgets."[36] According to Otter Tail, though, the Company will not have to re-file its approved 2014-2016 CIP as a result of a Commission order approving more savings.

Here, the issue seems somewhat circular. The Department responds to Otter Tail's objection to use DSM numbers in excess of CIP, in part because the CIP goal "is not a ceiling on energy conservation."[37] However, if to capture these savings, the CIP budget would need to be modified, the fact would still stand that CIP is not a ceiling, and the Company is arguing that 1.7 percent cannot be achieved or sustained. Therefore, it is not clear what the Commission's role is in finding the 1.7 percent is cost-effective, which leads to Staff's enforcement-based concern: what implications exist for the Company if Otter Tail cannot achieve the 1.7 percent level?

[34] Otter Tail response to PUC Information Request #4, May 27, 2014.
[35] Otter Tail reply comments, p. 26.
[36] Department of Commerce, supplemental comments, p. 18.
[37] *Id*.

Similar questions were before the Commission in Minnesota Power's 2013 resource plan. In that docket, MP proposed a savings level of 1.67 percent, and the Commission, to the Company's objection, adopted the Department's recommendation that an incremental 0.2 percent was cost-effective. The Commission could make a similar finding in the instant docket that Otter Tail could cost-effectively achieve 1.7 percent energy savings. Staff takes no position on the decision between 1.5 versus 1.7 percent, simply due to the information asymmetry which exists between Commission Staff and that of the Department and Otter Tail. However, Staff does note that the Commission has in prior IRPs directed utilities with similar concerns as Otter Tail's to attempt to capture higher savings and come back in the next IRP with scenarios which "achieve greater energy savings beyond those in the base case."[38]

F. EPA 111(d) Compliance Issues

There are several complexities and uncertainties layering Otter Tail's 111(d) compliance, including 111(d)'s relationship to the Minnesota GHG Goal. For example, 111(d) takes a state boundary approach to generation, while the GHG Goal contemplates total system emissions. So even though Otter Tail's system-wide CO_2 emissions may fall short of the Minnesota GHG Goal, Otter Tail could be well-positioned for 111(d) compliance in Minnesota because its only two "affected units" in the state, Hoot Lake #2 and #3, will be retired by 2020. (This is assuming that rate-based standards are applied utility-by-utility, which is also unclear at this time.)

Where Otter Tail may encounter significant compliance hurdles is South Dakota, specifically with its Big Stone Plant. South Dakota compliance issues are important for Minnesota reliability because of the possible ripple effect from curtailing Big Stone to meet an aggressive emissions rate. South Dakota's rate-based standard, according to EPA's proposed rule, requires a 34 percent CO_2 reduction. This is largely a result of EPA's assumption that South Dakota's only natural gas CC unit, which operated at 1 percent capacity factor in 2012, can be ramped up to 70 percent capacity factor to displace a significant amount of generation from Big Stone. It is not clear what flexibility or modifications EPA will have on its natural gas re-dispatch assumption, but this part of 111(d) obviously raises significant reliability issues for Minnesota, and presumably it will be paramount to South Dakota's compliance with 111(d) as well.

An additional 111(d) issue includes the fact that Otter Tail's largest affected coal units, Coyote Station and Big Stone, are jointly owned with utilities operating in different states. It is not clear at this time how permitted emissions from jointly-owned facilities will be allocated not only to the state but to the utility. (Of note, Otter Tail owns 100 percent of Hoot Lake.)

Staff expects all of these issues will be addressed with more clarity in Otter Tail's next resource planning process, as EPA's 111(d) rule is finalized and Otter Tail continues its analysis of the Rule while discussing compliance with its regulators and other utilities. Given the present uncertainty, Otter Tail's request to delay the wind procurement process is reasonable, but only to

[38] Commission Order, paragraph 12.c., Minnesota Power's 2013 IRP.

the extent that another planning process begins soon after 111(d) is finalized. For the same reasons Otter Tail wishes to wait, Staff wishes to keep the planning processes closer together.

Whatever Otter Tail expects to do with Big Stone, however Otter Tail expects to meet the Minnesota GHG Goal, and whatever Otter Tail may propose as a Hoot Lake replacement, this record suggests the answer to all three uncertainties point toward some amount of wind procurement. The question is where and when. Particularly since the record demonstrates a significant need for energy emerging, Staff's preference is to avoid turning uncertainty into a standstill. Even if wind procurement is delayed temporarily, the existence of 111(d) should not overshadow Otter Tail's resource needs and Minnesota's energy policy goals and requirements.

G. Deadline for Otter Tail's Next Resource Plan

To bookend this briefing paper with the deadline for Otter Tail's next resource plan, Staff notes again that the Company has requested a December 2016 deadline for the Company's next IRP. Staff would prefer Otter Tail stay on the two-year schedule defined in the IRP Rule, both to inform the 111(d) compliance process and to revisit the Hoot Lake replacement issue. Thus, Staff prefers December 2015 as a deadline for Otter Tail's next IRP, although the Commission can discuss with the parties what date is most reasonable and why.

Staff agrees with certain recommendations to delay actionable measures until the next IRP, such as the wind procurement process, while other decisions warrant a more immediate approach, such as SES compliance. While 111(d) is important, it is not the only issue to this resource plan, and Otter Tail has statutory requirements in Minnesota that go beyond 111(d), some of which could only benefit Otter Tail's 111(d) compliance position.

If Otter Tail's next resource plan stays on the two-year schedule (which would make the next filing date December 2015), the language of the Commission's order can include more flexibility. This could mean using more open-ended terminology like "intermediate" need or adding wind "up to 300 MW of wind in the 2017-2021 timeframe." If, however, it may be several years before Otter Tail's next IRP is in front of the Commission, more actionable steps might be necessary, such as initiating a wind procurement process now to ensure Otter Tail's need for energy will be met.

Otter Tail's previous IRP concluded with a Commission order that the "specific size, type, and timing of the Hoot Lake replacement units would be revisited in Otter Tail's next resource plan" (Commission ordering paragraph #1). Furthermore, the Commission required Otter Tail to "include expected timelines for retrofitting Hoot Lake (including installation and outage schedules) and for filing the necessary permitting documents for replacement natural gas facilities" (ordering paragraph #3.d.).[39]

Otter Tail complies with the Commission's previous IRP order by proposing a 211 MW simple cycle CT in 2021 (the size, type, and timing component). However, Staff has concerns with

[39] Commission order approving Otter Tail's Baseload Diversification Study, March 25, 2013.

replacing a baseload unit with a peaking CT. If the Commission agrees, the Commission can modify Otter Tail's Preferred Plan to include additional wind, or make a finding of intermediate need starting in 2019, or both. Otter Tail also complies with the second part of the Commission order to provide a schedule for Hoot Lake replacement, which is perhaps most clearly presented in Table 2-4 of its Petition (also on page 9 of this document).

Even taken together, Otter Tail's compliance with these two components of the Commission's prior order does not necessarily equate to a concrete proposal to replace Hoot Lake. Otter Tail's Preferred Plan is more likely a placeholder as the Company contemplates further wind additions and potential partnership arrangements with combined cycle facilities.[40] It could be that Otter Tail replaces Hoot Lake with a CT, but Staff believes this is only reasonable if the lost energy from Hoot Lake is recovered by alternative means than exists in the Preferred Plan.

If the Commission is interested in more specificity on the Hoot Lake replacement issue, it could take a similar route as in MP's baseload diversification study. In that order, the Commission directed Minnesota Power to file "a proposal to address the viability of Laskin Energy Center, Units 1 and 2, and Taconite Harbor Energy Center, Unit 3."[41] Decision option #24 uses similar language, and the Commission could go that route if it wishes more specificity into exactly how Hoot Lake Plant will be replaced.

[40] Otter Tail's reply comments, on page 25, states: "Otter Tail continues to explore potential partnering arrangements with other utilities…to capture the economies of scale associated with larger CC units."
[41] Docket 09-1088, Commission order approving MP's Baseload Diversification Study, September 13, 2012.

VI. Commission Options

Approval

1. Approve Otter Tail Power Company's 2014-2028 resource plan.

2. Approve Otter Tail Power Company's 2014-2028 resource plan with modifications.

3. Reject Otter Tail Power Company's 2014-2028 resource plan.

Deadline for the Next Resource Plan

4. Require Otter Tail Power to file its next resource plan on December 1, 2016 *(Otter Tail)*

5. Require Otter Tail Power to file its next resource plan on December 1, 2015 *(Staff)*

6. Some other date

Size, Type, and Timing of Need

7. Otter Tail Power shall obtain approximately 200 MW, subject to need, of intermediate capacity (and associated energy) in the 2019 – 2021 timeframe by constructing the resource itself, by sharing in the ownership of the resource, or by procuring the resource through bilateral contracts, whichever option is most cost-effective. *(Staff)*

Wind Additions[42]

8. Authorize Otter Tail to construct up to 200 MW of wind by 2021 if cost-effective and if clarity on how such resource additions will be treated under the EPA's proposed 111(d) rules has been obtained. (*Otter Tail*)

9. Modify Otter Tail's resource plan to include 100 MW of wind in 2017, 100 MW of wind in 2019, and 100 MW of wind in 2021. *(Department)*

10. Require Otter Tail to procure 100 MW of wind by 2017. *(Department)*

11. The evidence in this record demonstrates that, in addition to Otter Tail Power's 200 MW capacity need in 2019-2021, up to 300 MW of wind in the 2017-2021 timeframe is cost-effective when the price of wind is $45/MWh or less. *(Staff)*

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[42] Staff note: There is likely no material difference among 8, 9, or 11. Staff proposes #11 so the record would show (1) the wind is in addition to the identified capacity need and (2) the price at which wind is generally cost-effective.

Solar Energy Standard

12. Modify Otter Tail's action plan to add 21 MW solar by 2019. *(Department)*

13. Direct Otter Tail to explore procuring at least half of its SES compliance by December 2016 to secure potentially expiring tax credits for solar resources. Otter Tail shall include progress toward this December 2016 goal in each of its Annual SES Reports required under Minn. Stat. §216B.1691, Subd. 2f.(g) *(Staff)*

14. Require Otter Tail to initiate a competitive bidding process specific to utility-scale solar resources located in Minnesota, for commercial operation by December 2016. *(Staff)*

15. Some other option.

Energy Savings Goals

16. Find that Otter Tail's 1.5 percent energy savings goal as submitted and approved in its current triennial CIP plan is reasonable for resource planning purposes. *(Otter Tail)*

17. Modify Otter Tail's plan to include 1.7 percent energy savings. (*Department*)

18. For the next resource plan, Otter Tail Power shall evaluate additional conservation scenarios that would achieve greater energy savings beyond those in the base case. Otter Tail shall provide cost assumptions for achieving every 0.1 percent of savings above 1.5 percent retail sales. *(Staff)*

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Additional Clarifications

19. Otter Tail's use of the MISO resource adequacy construct and its method to estimate coincident peak is reasonable. (*Otter Tail*)

20. Otter Tail's use of bilateral energy contracts and the MISO day-ahead energy market does not put its customers at risk and should not be limited to the first five years of the planning period. *(Otter Tail)*

Requirements for the Next Resource Plan

21. For the Company's next resource plan, require Otter Tail to assume only minimal purchases from market energy after five years. *(Department)*

22. For the Company's next resource plan, require Otter Tail to restrict Strategist from selecting generic, wholesale capacity purchases after the first five years of the planning period, unless a specific, known contract exists. *(Staff)*

23. For the Company's next resource plan, require Otter Tail to include an analysis of the effects of retiring its Jamestown and Lake Preston peaking units *(Department)*

24. For the Company's next resource plan, require Otter Tail to file a proposal to replace Hoot Lake Plant, to include expected dates for filing: a Certificate of Need with the Commission, an Attachment Y with MISO, and an interconnection request with MISO for its proposed new facility. *(Staff)*

25. Direct Otter Tail to monitor the discussion regarding Minnesota's greenhouse gas reduction goal in the pending SMMPA 2014 resource plan docket, Docket No. 13-1104, and provide an analysis in the Company's next resource plan. *(Staff-variant of Department recommendation)*

Staff recommendations: 2, 5, 7, 11, 12, 13, 18, 21, 22, 23, 24, 25.

VII. Attachment #1: Relevant Resource Planning Statutes

Carbon values. Minn. Stat. §216H.06 requires the Commission to annually update an estimate of the likely range of costs of future carbon dioxide regulation on electricity generation. The CO_2 values "must be used in all electric generation resource acquisition proceedings."

Minnesota Greenhouse Gas Reduction Goal. Minn. Stat. §216H.02 established goals of achieving a 15 percent reduction in greenhouse gas emissions from 2005 levels by 2015, a 30 percent reduction by 2025, and an 80 percent reduction by 2050.

Conservation. Minn. Stat. §216B.2421, Subd. 1c(d), requires that the Commissioner of the Department of Commerce may not approve a CIP (Conservation Improvement Program) plan that provides for an annual savings goal of less than one percent of gross annual retail energy sales. Minn. Stat. §216B.2401 states that it is the energy policy of the state to achieve annual energy savings of 1.5 percent.

Renewable energy. Minn. Stat. §216B.1691 establishes renewable energy obligations and standards. Minn. Stat. §216B.2422 requires a resource plan to include scenarios that evaluate meeting 50 percent and 75 percent of future resource needs using demand-side management and renewable resources.

Distributed Generation. Under Minn. Stat. §216B.2426, the Commission is obligated to ensure opportunities for distributed generation are considered "in any proceeding" under 216B.2422.

RES Rate Impact. Minn. Stat. §216B.1691, Subd. 2e, requires utilities to provide information on the rate impact of the RES and Solar Energy Standard in their resource plans.

Solar Energy Standard. Under Minn. Stat. §216B.1691, Subd. 2f, a utility shall generate or procure sufficient electricity generated by solar energy to serve its retail electricity customers in Minnesota so that by the end of 2020, at least 1.5 percent of the utility's total electric sales to retail customers in Minnesota is generated by solar energy. At least ten percent of the 1.5 percent goal must be met by solar energy generated by or procured from solar photovoltaic devices with a nameplate capacity of 20 kilowatts or less.