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January 21, 2014

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VIA E-FILING AND U.S. MAIL

Dr. Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 East Seventh Place, Suite 350
St. Paul, MN 55101

RE: In the Matter of the Petition of Northern States Power Company d/b/a Xcel Energy for Approval of Competitive Resource Acquisition Proposal and Certificate of Need
MPUC Docket No. E-002/CN-12-1240

Dear Dr. Haar:

Enclosed please find Invenergy Thermal Development LLC's Exceptions to the Findings of Fact, Conclusions of Law and Recommendation of the Administrative Law Judge in the above-referenced docket. This document has been filed with the E-Docket system and served on the attached service list. Also enclosed is our Affidavit of Service.

Very truly yours,

WINTHROP & WEINSTINE, P.A.

/s/ Eric F. Swanson

Eric F. Swanson

Enclosures

8694085v1

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION
121 Seventh Place East, Suite 350
St. Paul, Minnesota 55101-2147

In the Matter of the Petition of Northern States Power Company d/b/a Xcel Energy for Approval of Competitive Resource Acquisition Proposal and Certificate of Need	MPUC Docket No. E-002/CN-12-1240 **AFFIDAVIT OF SERVICE**

STATE OF MINNESOTA)
) ss.
COUNTY OF HENNEPIN)

Mary G. Holly, of the City of Lake Elmo, County of Washington, the State of Minnesota, being first duly sworn, deposes and says that on the 21st day of January, 2014, she served the attached **Exceptions to the Findings of Fact, Conclusions of Law and Recommendation of the Administrative Law Judge** to all said persons on the attached Service List, true and correct copies thereof, by e-filing and/or by depositing the same enclosed in an envelope, postage prepaid in the United States Mail in the post office at Minneapolis, Minnesota.

/s/ Mary G. Holly
MARY G. HOLLY

Subscribed and sworn to before me this
21st day of January, 2014.

/s/ Jane E. Justice
Notary Public

My Commission Expires: January 31, 2015

8694057v1

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BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION
121 Seventh Place East, Suite 350
St. Paul, Minnesota 55101-2147

Beverly Jones Heydinger	Chair
David C. Boyd	Commissioner
Nancy Lange	Commissioner
J. Dennis O'Brien	Commissioner
Betsy Wergin	Commissioner

In the Matter of the Petition of Northern States Power Company d/b/a Xcel Energy for Approval of Competitive Resource Acquisition Proposal and Certificate of Need	MPUC Docket No. E-002/CN-12-1240 **EXCEPTIONS TO THE FINDINGS OF FACT, CONCLUSIONS OF LAW AND RECOMMENDATION OF THE ADMINISTRATIVE LAW JUDGE**

INTRODUCTION

Having reviewed the Findings of Fact, Conclusions of Law and Recommendation ("Recommendation") of the Administrative Law Judge ("ALJ") in the above-captioned docket, Invenergy Thermal Development LLC ("Invenergy") files these Exceptions to the ALJ Recommendation.[1] Fundamentally, the Recommendation errs when it ignores and overturns this Commission's prior finding of need, including its finding of the proper size, type and timing of the necessary resource additions. The Recommendation overturns that Commission decision without substantial evidence supporting this reversal. By reversing the Commission's prior determination of the size, type and timing of resource needed, the ALJ Recommendation effectively changes the rules mid-game and

[1] This document provides Invenergy's general discussion of the ALJ Recommendation. Invenergy attaches its specific Exceptions and recommended Findings and Conclusions to replace certain Findings and Conclusions contained in the ALJ Recommendation as Exhibit A, hereto.

undercuts the integrity of the bidding process, impacting not just this docket but potentially future dockets as well. The purpose of this docket was not to select an intermittent solar resource but to select a dispatchable peaking or intermediate resource to serve the need identified by the Commission. Varying from that purpose now will send a chilling message to potential future bidders. Moreover, even if the Commission agrees with the ALJ that a solar acquisition is now desirable, both the bidding process and Xcel ratepayers will be best served by selecting that resource after a competitive solar bidding process.

In addition to dramatically changing the purpose of this proceeding, the Recommendation fails to fully and accurately reflect the record regarding the various resource proposals, their costs, their benefits and their ability to best match the identified needs of the Xcel system. Instead, the Recommendation relies on a fatally flawed economic analysis that provides no probative evidence of the comparative costs or benefits of the competing resource proposals in this proceeding.

For all of these reasons and as discussed below and in its Initial and Reply Briefs, Invenergy respectfully requests that the Commission modify the ALJ Recommendation to conform with the Commission's prior Orders and to properly reflect the record of the contested case proceeding.

I. THE COMMISSION HAS ALREADY DETERMINED THE SIZE, TYPE AND TIMING OF RESOURCE NEEDED.

The Commission initiated this docket following years of debate and analysis of the resource needs of Northern States Power Company d/b/a Xcel Energy ("Xcel") in

multiple other dockets, including the Prairie Island Extended Power Uprate docket,[2] Xcel's 2010 Integrated Resource Plan[3] and Xcel's Black Dog repowering docket[4] (collectively, the "Related Dockets"). Through its work in the Related Dockets, the Commission established the need for new capacity on the Xcel system in the 2017-2019 time frame. Specifically, in the 2010 IRP Docket, the Commission found: "Xcel will need an additional 150 MW in 2017, increasing up to 500 MW by 2019. . . . Xcel should invite proposals for adding peaking resources, intermediate resources, or a combination of the two."[5] The Commission then initiated the current docket to utilize a competitive bidding process to fill this need. The Commission did *not* initiate the current docket to re-litigate or re-determine the size, type and timing of resources needed by Xcel.

Indeed, in its Notice and Order for Hearing in this docket, the Commission specifically stated:

> On March 5, 2013, in a separate docket, the Commission issued an order declaring that Xcel had demonstrated the need for an additional 150 megawatts (MW) by 2017, increasing up to 500 MW by 2019. And in the current docket, the Commission issued an order designating April 15, 2013, as the deadline for developers to file proposals to meet some or all of Xcel's need.[6]

The ALJ Recommendation now states that this need no longer exists, effectively rendering the competitive resource acquisition process unnecessary. The record cannot support such a sweeping reversal of the Commission's prior findings. Certainly,

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[2] MPUC Docket No. E-002/CN-08-509 ("EPU Docket").
[3] MPUC Docket No. E-002/RP-10-825 ("2010 IRP Docket").
[4] MPUC Docket No. E-002/CN-11-184 ("Black Dog Docket").
[5] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 6.
[6] Notice and Order for Hearing, June 21, 2013, p. 2.

developments since the Commission's finding of need may indicate the wisdom of moving cautiously and maintaining maximum flexibility as either peaking or intermediate resources are added to the system, but those developments do not indicate that no new peaking or intermediate resources are needed.

First, it is undisputed that Xcel will add dramatically greater Intermittent Resources to its system than envisioned by the Commission at the time it initiated this proceeding. At that time, the Commission and Xcel both anticipated that Xcel would add 200 MW of wind energy to its system through a wind acquisition proceeding.[7] Instead, Xcel ultimately acquired 750 MW of wind. As a result of dramatically increasing its acquisition of wind resources, Xcel will have significantly more Intermittent Resources on its system in the 2017-2019 time frame than assumed at the time of the Commission Order. With such resources, Xcel must accept power deliveries except when curtailment issues arise.[8] However, given wind's unpredictable nature, Xcel must simultaneously maintain sufficient amounts of flexible and efficient quick-starting resources to balance the system,[9] a point absent from the ALJ Recommendation. As the record discusses, "combustion turbines in particular can be used as fast-start, fast-ramp resources, and provide net-load-following capability in off-line and on-line mode."[10] The Invenergy proposal provides such resources. The Invenergy combustion turbines have the ability to

[7] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 4.
[8] Ex. 65, p. 23, fn. 1 and p. 27 (Ewan Direct); Ex. 73, p. 4, fn. 4 and pp. 16-20 (Norman Rebuttal).
[9] Ex. 65, p. 27 (Ewan Direct); Ex. 73, pp. 16-20 (Norman Rebuttal).
[10] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).

start quickly (achieving minimum load within 20 minutes and full load within 30 minutes) and then can be ramped up and down to follow load as needed.[11] In contrast, a solar resource such as that proposed by Geronimo – since it is neither a peaking nor an intermediate resource – has no such "quick start" capability and cannot be counted on to supply needed capacity at system peak.[12]

The ALJ Recommendation fails to discuss the two central concerns with Xcel's increasing levels of Intermittent Resources – the need to manage for the variability of those resources on a continual basis and the need for quick-starting Capacity Resources in the event of an extreme and unexpected drop off in generation.[13] These concerns typically lead utilities to add peaking facilities as they add Intermittent Resources.[14] However, the record shows that Xcel lags far behind its own subsidiary Public Service Company of Colorado ("PSCo") in this regard. Indeed, the record demonstrates that PSCo has nearly twice as much peaking capacity as wind capacity – capacity that proved beneficial when PSCo experienced an unexpected wind ramp down of nearly 800 MW within 30 minutes last year.[15] In contrast, Xcel's current peaking capacity fails to even match its existing wind capacity.[16] After the addition of another 750 MW of wind,

[11] Ex. 65, p. 7 (Ewan Direct).
[12] Ex. 65, p. 23, fn. 1 (Ewan Direct).
[13] Ex. 73, pp. 16-17 (Norman Rebuttal).
[14] *Id*.
[15] *Id*., pp. 17-18.
[16] *Id*.

Xcel's peaking capacity will decrease to only two-thirds of its wind capacity,[17] leaving it particularly vulnerable to wind ramp down events.

The ALJ Recommendation also focused significant attention on Xcel's most recent forecast. That forecast was discussed but not fully vetted in this record due to the time constraints. Notably, in this newer forecast the Xcel system continues to show a declining load factor, further influencing the choice of resource in this proceeding. As the Department noted:

> Xcel predicts a significant change in the overall load factor of its system. Specifically, Xcel's prediction that customers will use less energy overall while making *higher demands on Xcel's peak* means that Xcel predicts that its load factor will decrease significantly over time, with customers demanding ever more from Xcel's peak while using less energy overall.[18]

The declining load factor in this most recent update continues a trend for Xcel dating back to 2004 and mirrors the trend seen nationwide over that same time span.[19] Further, Xcel's September 2013 update to its forecast suggested a capacity need of just 93 MW in 2017, as compared to the 2010 IRP Docket forecast showing a 150 MW need.[20]

While the ALJ Recommendation seizes on the possibility of lower overall need, it ignores the impact of the continuing trend of a declining load factor. As Invenergy discussed, a lower load factor indicates a system where supply resources will sit idle for periods of time until higher load conditions occur.[21] On such systems, ratepayer costs are minimized with peaking resources such as a combustion turbine, that impose significantly

[17] Ex. 76, p. 10 (Shah Direct) (emphasis added).
[18] Ex. 76, p. 10 (Shah Direct).
[19] Ex. 65, pp. 23-24 (Ewan Direct).
[20] Ex. 44, p. 7 (Wishart Direct).
[21] *Id*., p. 11.

lower capacity costs on the system than intermediate resources such as combined cycle facilities.[22]

Not only do peaking facilities minimize ratepayer costs in such circumstances, they maximize the utility's flexibility as well. As Mr. Norman testified in response to questions from Judge Lipman:

> maintaining or procuring capacity in a way that minimizes fixed commitments or minimizes capacity payments is also a way of protecting yourself from things not turning out quite the way you expect it to or need it to. . . . The Invenergy proposal capacity payments are, I would say, materially lower than capacity payments proposed from Calpine.[23]

Instead of recommending a resource or resources to meet the needs already identified by the Commission, the ALJ Recommendation defers any decision beyond adding further intermittent resources. Instead, the Recommendation relies on a possible future proceeding to meet Xcel's and its ratepayers' needs. The Commission should reject such a risky approach. The better solution and the solution supported by the record is to move forward to address Xcel's short term need for peaking capacity, but to do so in way that maintains maximum flexibility, imposes least cost, and does so in manner compatible with socioeconomic and natural environments. As discussed below, in its Exceptions and in its Initial and Reply Briefs, the record demonstrates that the Invenergy proposals provide that solution.

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[22] *Id*.
[23] Transcript Vol. 2, p. 26 (Norman).

II. THE ALJ RECOMMENDATION RELIES ON A DISCREDITED ECONOMIC ANALYSIS.

In addition to rejecting the Commission's prior determination of need, the ALJ Recommendation relies on a faulty economic analysis. Specifically, the ALJ Recommendation states that for this case "a levelized cost of electricity (LCOE) points to a better prediction of costs and impacts to ratepayers" than other analyses.[24] The record cannot support this Finding and this Finding infects multiple other ALJ Findings, suggesting that the Geronimo proposal (the most expensive from a simple cost to ratepayers perspective) may actually be more cost-effective than the other proposals submitted. Contrary to these Findings, the record shows that the Geronimo proposal simply cannot compete on cost with the other proposals.[25] As the Department noted, for the current docket, "if Geronimo had been closer, state policy preferences regarding renewables may have been a consideration, but it was too far removed [from the other proposals] to be considered."[26] The LCOE analysis does not change that fact.

In fact, the LCOE analysis offered nothing of probative value to this proceeding. That analysis was overly simplistic, fundamentally flawed and designed to skew the results to favor certain resources.[27] In part due to those drawbacks, Xcel explained that an LCOE analysis "is only appropriately used when comparing very similar resources of the same type where cost is the principal, if not only, distinguishing factor between the

[24] ALJ Recommendation, Finding 253.
[25] See Ex. 45, HIGHLY SENSITIVE TRADE SECRET ATTACHMENT 2 (Wishart Direct) (showing the year-by-year direct costs of the various proposals).
[26] Transcript Vol. 2, p. 56 (Rakow).
[27] Ex. 73, pp. 5-6 (Norman Rebuttal).

resources."[28] The Energy Information Administration provides an even more direct and blunt assessment of the value of LCOE analyses, stating that: "the direct comparison of the levelized cost of electricity across technologies is often problematic and can be misleading as a method to assess the economic competitiveness of various generation alternatives."[29] Simply put, the LCOE analysis cannot assist the Commission in making a wise resource choice when deciding among various generation alternatives.

III. MINNESOTA'S NEW SOLAR MANDATE SHOULD NOT INFLUENCE THE OUTCOME OF THIS PROCEEDING.

In addition to the dramatic increase in wind now planned for Xcel's system, Xcel will be adding new solar energy resources. Minnesota enacted its first-ever solar energy mandate after the Order initiating this docket. Under that mandate, investor owned utilities such as Xcel must provide one and one-half percent of their retail electric sales to retail customers in Minnesota with solar energy resources.[30] As such, the solar energy mandate will add even more Intermittent Resources to the Xcel system. Solar resources, like wind resources, require the utility to accept delivery except in curtailment events.[31] However, solar resources too are not always available, again requiring the utility to maintain sufficient peaking or other resources to ensure the integrity of the overall system and to maintain system balance.[32]

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[28] Ex. 47, p. 15 (Wishart Rebuttal).
[29] *Id*., p. 16.
[30] Minn. Stat. § 216B.1691, subd. 2f; *see also* Transcript Vol. 2, p. 10 (Ewan).
[31] Ex. 65, p. 23, fn. 1 (Ewan Direct).
[32] *Id*.

The ALJ Recommendation relies on the mandate to recommend approval of the Geronimo proposal. According to the ALJ, while Xcel may or may not need the resources already identified by the Commission as needed, Xcel will certainly need to acquire solar resources. However, the recommendation to approve the Geronimo bid, if adopted, would award approximately one-third of the overall Xcel solar mandate to a single proposal, without the benefit of a competitive solar bidding process, as recommended by both Invenergy and the Department.[33] While Geronimo may argue that other solar developers could have bid into the current docket, the Commission had identified the need in this docket for peaking or intermediate resources – not intermittent resources. Thus, it is unsurprising that no other solar developers stepped forward. In order to minimize ratepayer costs of Xcel's solar energy mandate, the Commission should initiate an all-solar RFP after the close of this proceeding. Without such a process, the Commission may well be exposing Xcel ratepayers to unnecessary costs.

IV. THE ALJ FINDINGS FAIL TO FULLY ADDRESS CRITICAL FEATURES OF THE VARIOUS PROPOSALS.

As discussed above, the ALJ Recommendation overturned the Commission's determination of the need for 150 MW or more of peaking or intermediate capacity in the 2017-2019 time frame. Unfortunately, the Recommendation also then fails to fully discuss important aspects of the various peaking and intermediate capacity proposals, presenting a distorted view of the record. For example, the ALJ Recommendation fails to address ratepayer exposure to excessive costs with the Xcel bids. Similarly, the

[33] *See* Ex. 65, p. 31 (Ewan Direct); Ex. 43, p. 83 (Rakow Direct)

Recommendation fails to address the extent of existing and underutilized combined cycle capacity on Xcel's system, suggesting a lack of need for additional such capacity. Further, the Recommendation does not address the magnitude of the increased capacity payments with the Calpine bid when compared to Invenergy's proposals, nor does it discuss the dramatically higher costs contained in the Geronimo bid. Finally, the Recommendation includes no discussion of the benefits, community support, additional flexibility or other critical features of the Invenergy proposals.

CONCLUSION

The Commission faces a challenging task in this proceeding. Never before has the Commission attempted to run a competitive resource acquisition through a contested case process. However, several factors guide the Commission's deliberations and can lead to a result consistent with the broad public interest.

First and foremost, the Commission has already determined the need for Xcel to acquire 150 MW or more of peaking or intermediate resources in this proceeding. It is that identified need that attracted bidders and that must now be filled. The Commission should not follow the invitation of the ALJ Recommendation to suddenly reverse its prior finding and determine that no peaking or intermediate resource acquisition was necessary after all.

Second, the Commission is guided by the Certificate of Need statutes and rules. Parties have built a record regarding the efficiency, reliability, cost-effectiveness, adequacy and flexibility of their proposals. Similarly, the record demonstrates the various proposals' compatibility with the natural and socio-economic environments. On

each of these factors, the Invenergy proposals shine. As Invenergy witness Mr. Ewan explained, "a full review of the record shows that Invenergy's proposals provide a superior fit to the need that must be filled."[34] However, if the ALJ and Commission have any uncertainty as to the superiority of the Invenergy resources, Invenergy would not object to the Expansion moving forward to PPA negotiations, so that the Commission can be further assured that ratepayer interests are protected to the maximum extent possible.

Dated: January 21, 2014

WINTHROP & WEINSTINE, P.A.

By: /s/ Eric F. Swanson
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[34] *Id.*, p. 15.

EXHIBIT A
Specific Exceptions of Invenergy by Section of ALJ Recommendation

Section V. Features of Proposal Submitted by Xcel.

The ALJ Recommendation lacks findings on the nature of Xcel's bid, the ineffectiveness of proposed Rider adjusting ROE as a means of cost control, the inability to determine what operations and maintenance or other costs were included and the inherent difficulty in comparing bidder proposals with Xcel's "self-build" proposals. Therefore, Invenergy recommends that the following be inserted after ALJ Finding 82:

- By providing significantly greater capacity than the Commission has determined is needed, the Xcel proposals in aggregate commit greater resources than necessary and leave less flexibility going forward to adapt to continued changes in both the supply side and the demand side of the business.[1]

- In addition, by proposing two North Dakota facilities, Xcel locates these Capacity Resources far from its most significant load and bring no ancillary benefits to the Minnesota economy.

- Xcel's unique role as both "bidder" and "buyer" in this proceeding creates challenges when comparing Xcel's proposal with other parties' formal bids.

- As both bidder and buyer, Xcel fails to offer ratepayers the benefit of a fixed-price proposal.[2] In an effort to compensate for that fact, Xcel proposed a rate rider for each of the three 215 MW units in its proposal.[3] The rider would adjust the return on equity applicable to the investment in each unit "to reflect any difference between [Xcel's] baseline estimated capital cost and the actual capital cost of the unit."[4] If the actual capital cost exceeded the estimate by more than 10%, Xcel proposed a 1% (or 100 basis point) reduction in the return on equity applied to that unit's capital cost. Conversely, if Xcel brought the unit on line below the estimated cost by 10% or more,

[1] *See* Ex. 65, pp. 31-32 (Ewan Direct).
[2] *Id*. at 32.
[3] Ex. 49, p. 5 (Alders Direct).
[4] *Id*.

Xcel would receive a bonus of 1% (or 100 basis points) above its authorized return on equity.[5]

- Xcel's proposal relates solely to its capital costs, leaving all non-capital costs unchecked. Of course, projects also have associated operating and maintenance ("O&M") costs and general and administrative costs separate and apart from their capital costs. For the Xcel proposals, Department witness Dr. Rakow stated that "Xcel should have included that, to the extent there are such costs, things like fixed O&M, variable O&M."[6] The Department did not ask information requests of Xcel to further explore this issue.[7] Rather, for its modeling, the Department "gave Xcel the inputs we were going to use . . . so it's up to them to figure out how to allocate the costs we gave them."[8] Thus, not only do Xcel's operating costs remain unchecked by any "rider" type mechanism, it is unclear how such a mechanism could even be devised and those costs remain unclear in the economic analyses done to date.

- As to capital costs, the Xcel proposal does not hold customers harmless. In contrast to a fixed price proposal such as that offered by Invenergy, Xcel still seeks full capital cost recovery, with a modestly reduced return on those costs if they exceed the capital cost estimate by more than 10 percent.[9]

Section VI. Features of the Proposal Submitted by Calpine.

ALJ Finding 95 is not supported by a preponderance of the evidence in the record. Moreover, the ALJ Recommendation failed to include sufficient findings on the nature of Calpine's proposed resource, the impact on ratepayers of higher capacity payments, the extent of underutilized combined cycle capacity on the Xcel system and the flaws in the LCOE analysis done by Calpine and impacting both the Calpine and Geronimo proposals. Therefore, Invenergy recommends that the Commission strike Finding 95 and insert the following after ALJ Finding 97:

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[5] *Id*. The Xcel proposal also suggested a one-half percentage point decrease/increase if capital costs exceeded/fell short of the estimated cost.
[6] Transcript Vol. 2, p. 54 (Rakow) (emphasis added).
[7] *Id*.
[8] *Id*.
[9] Ex. 69, p. 14 (Ewan Rebuttal).

- To meet a need of 150 MW of capacity in 2017 (or less if Xcel's September 2013 updated forecast proves accurate), increasing to up to 500 MW of capacity by 2019, Calpine offers a one-time addition of 345 MW of combined cycle capacity with an in-service date of 2017. Calpine also offered pricing for in-service dates of 2018 or 2019. However, the Department's modeling indicated little benefit to ratepayers by delaying the in-service date.[10]

- Combined cycle capacity carries a higher capacity cost (and lower energy cost) than a Capacity Resource such as a combustion turbine.[11] Comparing the capacity pricing offered by Invenergy with that offered by Calpine demonstrates that the Calpine proposal, if accepted, would impose substantially higher capacity payments on Xcel ratepayers.[12]

- Calpine suggests that its combined cycle proposal provides substantial benefits that can justify these higher capacity costs, stating that "the selection of [combined cycle] technology rather than or at least in addition to [combustion turbine] technology provides a hedge against the risk that increasingly stringent control requirements lead to greater than expected retirements of baseload coal-fired capacity since [combined cycle] capacity can operate in baseload and intermediate roles."[13]

- Xcel has already made significant investments in self-built and contracted combined cycle facilities, including Calpine's existing Mankato facility. These facilities are only lightly used relative to their capabilities and relative to combined cycle facilities on other utility systems.[14] In fact, not only has the utilization of Xcel's owned combined cycle facilities continued to lag behind the national median, in 2012 Calpine's existing combined cycle plant in Mankato was utilized only about one-third as much as the national median and far less that either Riverside or High Bridge.[15]

- Calpine witness Mr. Hibbard has previously noted the potential of existing gas units such as Xcel's combined cycle facilities to provide additional power production

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[10] Ex. 86, p. 11 (Rakow Rebuttal).
[11] Ex. 69, p. 8 (Ewan Rebuttal).
[12] *See* Ex. 87, TRADE SECRET ATTACHMENT SR-R-9, pp. 3-6 (Rakow Rebuttal) (showing the difference in capacity costs between the Expansion and Calpine on a per MW basis) and Ex. 45, HIGHLY SENSITIVE TRADE SECRET ATTACHMENT 2, p. 8 of 10 (Expansion) and p. 10 of 10 (Calpine) (Wishart Direct) (showing the year-by-year difference in total capacity costs).
[13] Ex. 51, pp. 25-26 (Hibbard Direct).
[14] Ex. 73, pp. 28-31 (Norman Rebuttal); Ex. 65, pp. 25-27 (Ewan Direct).
[15] Ex. 65, p. 26 (Ewan Direct) (showing a national median capacity factor for combined cycle facilities of over 50%, while Mankato has operated at between 11 and 17% for the years 2009-2012).

as opposed to building new units. In an August 2010 report which Mr. Hibbard co-authored, a section of the report titled "Existing Gas Units Have Untapped Power Production Potential" states: "Despite declines in natural gas prices, existing gas units have significant untapped power production potential, which can be expanded during off peak periods without constructing new generation."[16]

- Both Xcel and the Commission Staff have also previously noted the enormous untapped potential of Xcel's currently owned and contracted for combined cycle fleet. In the 2010 IRP Docket, Staff summarized the situation as follows:

> Xcel explained that, when [Xcel] looks at the operation of its system in 2017-2019, the resources to be added likely will not operate many hours. Thus, a combustion turbine peaking resource may meet that need most cost-effectively…. Over the last several years, Xcel has invested in more than 1,000 MW of combined cycle capacity (i.e., roughly 500 MW at High Bridge and 500 MW at Riverside). According to Xcel, 'the capacity factor of those two plants today is roughly 20 percent.' Xcel's Strategist modeling configured the units to operate at 30 percent into 2018. Thus, according to [Xcel], 'there is a huge amount of available production capacity on [Xcel's] system' if the High Bridge and Riverside facilities were to operate at the 30 percent assumed in Strategist. Moreover, 'they can operate at 70-80 percent,' so Xcel does not believe another combined cycle addition benefits the system at this time.[17]

- Given this untapped capacity, to the extent energy needs on the Xcel system materialize faster than currently anticipated, Xcel already has Energy Resources available that can be called on rather than contracting for the cost of a new combined cycle power plant.[18]

- Calpine attempted to support its proposal with a LCOE analysis showing the Calpine proposal as the least cost resource. However, the record demonstrates that the LCOE analysis presented was overly simplistic, fundamentally flawed and designed to skew the results "to favor resource units with lower heat rates and higher capacity factors, such as combined cycle" resources. In part due to those drawbacks, Xcel explained that a LCOE analysis "is only appropriately used when comparing very similar resources of the same type where cost is the principal, if not only, distinguishing factor between the resources." The Energy Information Administration provides an even more blunt assessment of the value of LCOE analyses, stating that: "the direct comparison of

[16] Ex. 91, p. 13; Transcript Vol. 1, pp. 54-55 (Hibbard).
[17] Ex. 73, pp. 28-29, quoting Staff Briefing Papers, MPUC Docket No. E-002/RP-10-825, February 20, 2013, p. 5.
[18] Ex. 73, p. 29 (Norman Rebuttal).

the levelized cost of electricity across technologies is often problematic and can be misleading as a method to assess the economic competitiveness of various generation alternatives."[19]

- Calpine also states that its combined cycle proposal could meet "the need for intermediate and baseload capacity in the face of potential retirements, and the need for flexible resources to integrate variable renewable generation."[20]

- The Commission did not initiate this proceeding to satisfy some unidentified and hypothetical need for future intermediate and baseload capacity or to replace current facilities. The Commission initiated this proceeding after finding in the 2010 IRP Docket that "Xcel will need an additional 150 MW in 2017, increasing up to 500 MW by 2019. . . . Xcel should invite proposals for adding peaking resources, intermediate resources, or a combination of the two."[21] Since the date of that Order, Xcel's September 2013 updated forecast suggests the possibility of a lower need, with decreasing energy needs and a lower overall system load factor going forward. None of this indicates a need for "intermediate and baseload capacity in the face of potential retirements."

- The record fails to support the notion that the Xcel system will face heretofore unforeseen retirements of baseload resources in the 2017-2019 time frame of concern in this proceeding. The record instead shows that Xcel's baseload resources will likely continue providing baseload power through the 2017-2019 time frame and beyond.[22]

- Combined cycle facilities also appear highly unlikely to economically displace Xcel's Minnesota assets that traditionally operate in a baseload mode. The record demonstrates that Xcel's Minnesota baseload assets are relatively low variable cost dispatch resources on the Xcel system.[23] These favorable economics have kept Xcel's baseload resources highly utilized plants compared to other baseload generators.[24] Even in 2012 – a year of historically low natural gas prices that, in many cases, resulted in combined cycles supplanting coal-fired resources as more economical baseload choices – Xcel's Sherco 1 and 2 and Allen S. King plants were among the top-performing (from a capacity factor perspective) assets within MISO.[25]

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[19] Ex. 47, p. 15-16 (Wishart Rebuttal).
[20] Ex. 53, p. 16 (Hibbard Rebuttal).
[21] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 6.
[22] Ex. 73, p. 23 (Norman Rebuttal).
[23] *Id*., p. 25.
[24] *Id*.
[25] *Id*., pp. 25-26.

- Xcel's currently owned and contracted combined cycle fleet is underutilized. These underutilized facilities are available to provide substantial additional energy if needed, "at a lower incremental cost to Minnesota ratepayers than through contracting for the (entire cost) of a new combined cycle power plant."[26]

- Given the lack of identified need to replace existing resources, the unlikely circumstances of new combined cycle resources economically displacing existing baseload resources and the substantial available capacity on Xcel's existing combined cycle resources, adding still more combined cycle capacity fails the "common sense test."[27] Rather, Xcel's near-term capacity needs are best met with relatively less expensive (on a capital basis) Capacity Resources.

Section VII. Features of the Proposal Submitted by Geronimo.

The ALJ Recommendation fails to include findings on the intermittency of solar resource, the ratepayer costs that would be imposed by the Geronimo proposal or the ratepayer benefit of a separate competitive bid for new solar resources to meet the new solar energy standard. Therefore, Invenergy recommends that the Commission add the following to the ALJ Findings:

- Geronimo offers a solar capacity proposal that would add even more intermittent resources to a system already rich in intermittent resources.

- The Geronimo offer provides by far the most expensive resource in this proceeding. As the Department observed, that cost differential meant that Geronimo's proposal "was too far removed to be considered" along with the other proposals, despite the state's renewable energy preference.[28]

- Solar energy will play a significant role in Minnesota's energy future, given the recently enacted solar energy standard. However, that role will fill a different need than the need identified in the current docket. Ratepayers will be better benefitted if solar resources are added through a competitive solar acquisition process similar to the competitive wind acquisition processes the Commission has utilized in the past.

[26] *Id*., p. 29.
[27] *See* Transcript Vol. 2, pp. 15-16 (Norman).
[28] Transcript Vol. 2, p. 56 (Rakow).

Section VIII. Features of the Proposal Submitted by Great River Energy.

The ALJ Recommendation fails to reflect the Department's analysis of the GRE proposal and should be amended by adding the following:

- GRE offers to sell capacity credits for select years. As such, GRE offers no actual capacity or energy to the system and no longer-term solution to fill Xcel's need. Nonetheless, both Xcel and the Department included GRE in the Strategist modeling, to determine if this capacity credit offer had sufficient value to warrant consideration, for example, by delaying the need to actually add resources to the system. However, the value of delaying other resource additions was outweighed by the costs of the GRE proposal.[29] Thus, the record demonstrates that it is neither reasonable nor prudent for Xcel to pursue a capacity credit purchase from GRE.

Section IX. Features of the Proposal Submitted by Invenergy.

The ALJ Recommendation both mischaracterizes the Invenergy proposals and fails to reflect substantial record evidence demonstrating the benefits of those proposals. Specifically, the ALJ fails to include findings regarding the uniqueness of Invenergy's proposal regarding the flexibility of their timing , their economic benefits, the strong local community support, the economic modeling results and biases that inappropriately punished the Invenergy proposals and other features. Therefore, Invenergy recommends that the Commission delete ALJ Finding 139 and incorporate the following findings into its final decision:

- To meet a need of 150 MW of capacity in 2017 increasing to up to 500 MW of capacity by 2019, Invenergy offered two Capacity Resource proposals – the approximately 179 MW combustion turbine Expansion project at Cannon Falls and two approximately 179 MW combustion turbines, for a potential combined 357 MW project at Hampton.

[29] Ex. 46, p. 24 (Wishart Direct).

- For both proposals, Invenergy offered pricing assuming in-service dates ranging from 2016 to 2019, including identical pricing for either a 2016 or 2017 date.[30] As the Department recognized, modeling suggests that the flexible in-service dates for the Expansion could provide substantial cost savings to ratepayers.[31] While the Department did not conduct any detailed modeling of Hampton, Invenergy offered the same flexible structure and slightly *lower* pricing overall for Hampton as for Cannon Falls.[32] Thus, Invenergy offers flexible Capacity Resource additions that can meet the needs of the Xcel system on an incremental and as needed basis.

- By offering a proposed 20 year power purchase agreement ("PPA"), the Invenergy proposals provide ratepayers the benefit of a re-evaluation of Xcel's resource needs at the end of that contract.[33] Invenergy also offered an additional PPA term giving Xcel the option to extend the PPA in five year increments at a reduced capacity price for up to three additional five year terms.[34] To the extent capital costs rise significantly over the next 20 years, this optionality could prove extremely valuable to Xcel ratepayers and no other bidder offered a similar term.

- Invenergy proposes to construct its facilities in supportive local communities, creating over 100 construction jobs and generating local tax revenues approximating $500,000 per generating unit each year.[35] Cannon Falls testified to its strong support of the Expansion project at the public hearing – the only local community to provide such support to a proposal.[36]

- The Invenergy facilities take advantage of existing infrastructure and will have minimal impact on the natural environment.

- The record of this proceeding contains three sets of Strategist modeling results, two from the Department and one from Xcel.[37] Xcel's Strategist modeling shows Invenergy's Expansion proposal (with an early in-service date of 2016) as being a part of

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[30] Ex. 69, p. 4 (Ewan Rebuttal); TRADE SECRET Ex. 87, Attachment SR-R-9, pp. 3-4 (Rakow Rebuttal).
[31] Ex. 86, p. 11 (Rakow Rebuttal); Transcript Vol. 2, p. 55 (Rakow).
[32] *See* TRADE SECRET Ex. 87, Attachment SR-R-9, pp. 3-4 (Rakow Rebuttal).
[33] *Id*., pp. 31-32.
[34] Ex. 69, p. 17 (Ewan Rebuttal).
[35] *Id*., pp. 12-13.
[36] *See* Public Hearing, October 15, 2013 Transcript, pp. 30-34.
[37] Strategist is a complex resource planning software which includes detailed modeling of every unit on Xcel's system and includes an hourly generation dispatch simulation that attempts to calculate total costs and associated air emission costs related to various combinations of resources. Ex. 44, pp. 19-21 (Wishart Direct); Transcript Vol. 1, p. 92 (Wishart).

the overall least cost set of resources, together with the Xcel self-build at Black Dog.[38] The Department's modeling initially did not place the Expansion proposal as high. However, with the modeling results presented in its rebuttal testimony, the Department included the Expansion in its two top performing packages.[39]

- The record demonstrates the limitations of Strategist. However, Strategist can nonetheless provide useful information if the Commission recognizes these limitations.

- The Strategist modeling done by both Xcel and the Department overstate the costs of the Invenergy proposals in several ways. Both the Department and Xcel assumed an in-service date of June 2016. However, Invenergy stated that it would hold its pricing the same with an in-service date of June 2017.[40] Despite this clarification, neither Xcel nor the Department ever modeled the Invenergy proposals with an in-service date of 2017.[41] By not modeling a 2017 start date, these model results penalized the Invenergy proposals by adding a full year of cost on the front end when compared to any other proposal.

- Xcel's modeling also distorted the variable operation and maintenance expense associated with the Expansion by assuming a run time per start approximately half of that experienced by Invenergy over the last five years of operation at Cannon Falls.[42] Revising the run time per start to equal something more reflective of actual performance would further lower the cost of the Expansion.[43]

- Strategist also incorrectly "rewards" high forced outage rates.[44] Xcel's modeling effectively reduced the capacity of each project by the forced outage rate that the particular entity proposed. Invenergy proposed a lower forced outage rate than the other parties, reflective of the extremely high reliability experienced to date at Cannon Falls.[45] However, this lower forced outage rate then had the effect of adding incremental capacity payment costs to the Invenergy proposals, again making them appear more expensive than other resources.[46]

- The modeling also assumed air emissions at the level currently permitted at Cannon Falls. However, actual emissions have been far lower than permit levels and

[38] Ex. 44, p. 26 (Wishart Direct).
[39] Ex. 87, p. 3 (Rakow Rebuttal).
[40] Ex. 69, p. 4 (Ewan Rebuttal); Transcript Vol. 2, p. 8 (Ewan).
[41] *See* Transcript Vol. 1, p. 102 (Wishart) and Transcript Vol. 2, p. 55 (Rakow).
[42] Ex. 69, p. 4 (Ewan Rebuttal).
[43] *Id*.
[44] *Id*., p. 5.
[45] *Id*.; Transcript Vol. 2, p. 8 (Ewan).
[46] *Id*.

Invenergy anticipates that both the Expansion and Hampton will be permitted on a more restrictive basis than the existing Cannon Falls facility. By overstating the emissions and then applying externality costs to those overstated levels, the modeling again inappropriately penalizes the Invenergy proposals.[47]

- The Strategist results also differed widely between the Department and Xcel, given the different approaches and assumptions made by the two parties. As Xcel witness Mr. Wishart explained, a few key decisions made by the modelers appear to account for the majority of the difference in results. Mr. Wishart explained that Xcel "locked" the model's long-term expansion plan in order to evaluate all resource proposals in the context of the same plan and to get a "cleaner comparison of just the economics of one proposal versus the other."[48]

- The Department did not "lock" the expansion plan, meaning that with each bid portfolio studied Strategist created different sets of other resources for the period 2020 through 2036.[49] This approach meant that the Department's model results "are not a direct comparison between bid proposals, but rather a comparison of the bids plus the cost of some generic plants that were added by Strategist."[50]

- The Department modeling also ended at 2036 (as opposed to Xcel's analysis which ran through 2050) and then included substantial "end effects" adjustments to both the Invenergy Expansion and to Black Dog.[51] An "end effects" adjustment incorporates into the results "an estimate of the long-term cost of a resource instead of modeling the long-term cost."[52] For Black Dog, the impact of the Department's adjustment meant "a $10 million penalty for the project."[53] Invenergy's Expansion proposal fared even worse, with Xcel explaining that "the Department's model applies a $50 million 'end effects' penalty to the Invenergy bid. . . . The magnitude of the 'end effects' adjustment is very non-intuitive."[54] Nothing in the record explains the basis for this substantial penalty.

- Despite these flaws, the Strategist modeling presented for the record shows the Expansion as part of the least cost package for meeting Xcel's ratepayer's needs. Correcting the inappropriate cost assumptions built in to this modeling would only

[47] Ex. 69, p. 5 (Ewan Rebuttal).
[48] Transcript Vol. 1, pp. 97-98.
[49] Ex. 47, p. 7 (Wishart Rebuttal).
[50] *Id*.
[51] The Department did no detailed modeling of Hampton but presumably the same adjustment would have been applied.
[52] Ex. 47, pp. 13-14 (Wishart Rebuttal).
[53] *Id*., p. 6.
[54] *Id*., pp. 13-14 (emphasis added).

improve the standing of the Expansion. In addition, after correcting these assumptions the model results for Hampton may show an even more dramatic effect.[55] As Invenergy explained, Hampton is ideally situated adjacent to both a substation and natural gas line. Invenergy also offered alternative in-service dates for Hampton which, presumably, would have the same "substantial" impact on cost effectiveness as the alternative dates for the Expansion. Therefore, the Strategist modeling to date supports advancing both the Expansion and Hampton proposals.

- Calpine raised concerns that Invenergy's Expansion and Hampton proposals pose reliability risk due to the use of an interruptible gas supply. Calpine stated that to eliminate that risk, all modeling of the Invenergy proposals should include the costs of firm gas supply.[56] The record demonstrates that requiring the Expansion to use a firm gas supply adds approximately $35 million in cost. Xcel stated that "the use of an interruptible natural gas supply can deliver significant cost savings without a significant impact on reliability, so long as the unit can operate on back-up fuel oil or there are other system units available to meet the demand."[57] Both the Expansion and Hampton have back-up fuel oil supplies. Moreover, even in the highly unlikely event of the Expansion being completely unavailable in the winter months, Xcel testified that "the project's cost effectiveness does not change."[58]

- Calpine also criticized the Invenergy (and Xcel) Capacity Resource proposals for not including selective catalytic reduction ("SCR") pollution control technology and recommended that the Commission require such technology be installed on any combustion turbine selected as a result of this proceeding. The record demonstrates that this recommendation would simply add "wholly unnecessary" costs of $15 million to the combustion turbine proposals. SCR technology is not required on combustion turbines, given their low run time and associated low total air emissions and the combustion turbine proposals of both Invenergy and Xcel meet all applicable environmental standards.[59]

Section XV. Strategist Model and the Forecasts of Future Needs.

The ALJ Recommendation reflects an incomplete understanding of Strategist and the Strategist results presented in this proceeding and misstates the need for new resources. To accurately reflect the record, Invenergy recommends that the Commission

[55] Ex. 69, p. 5 (Ewan Rebuttal).
[56] *See, e.g.*, Ex. 53, p. 6 (Hibbard Rebuttal).
[57] Ex. 47, p. 20 (Wishart Rebuttal) (emphasis added).
[58] *Id.*, pp. 20-21.
[59] Ex. 69, p. 18 (Ewan Rebuttal); Ex. 43, pp. 3-5 (Ford Rebuttal).

delete Finding 183 as an inappropriate characterization of record, incorporate additional findings regarding the decreasing load factor on the Xcel system and the implications of that fact, add a finding to accurately re-state the Commission's determination of need, and add findings to more accurately portray the current status of Xcel's forecast and needs by incorporating the following findings:

- The Commission Order concluding Xcel's 2010 IRP Docket informs the size, type and timing of resources necessary in this proceeding. In that Order, the Commission stated that: "Xcel will need an additional 150 MW in 2017, increasing up to 500 MW by 2019. . . . Xcel should invite proposals for adding peaking resources, intermediate resources, or a combination of the two."[60]

- The record developed in this proceeding shows two significant developments since the Commission Order that must be considered in selecting an appropriate resource or resources to fill this need – the addition of significantly greater Intermittent Resources to the Xcel system and Xcel's continually declining load factor.

- Xcel will add dramatically greater wind energy to its system than envisioned by the Commission at the time it initiated this proceeding.[61] At that time, the Commission and Xcel both anticipated that Xcel would add 200 MW of wind energy to its system through a wind acquisition proceeding.[62] Instead, Xcel ultimately petitioned the Commission to acquire 750 MW of wind, a change significant enough that the Commission required Xcel to file a Notice of Changed Circumstances in both the 2010 IRP Docket and in the current docket.[63]

- As a result of dramatically increasing its acquisition of wind resources, Xcel will have significantly more Intermittent Resources on its system in the 2017-2019 time frame than assumed at the time of the Commission Order. With such resources,

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[60] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 6.
[61] *See* Transcript Vol. 2, p. 10 (Ewan).
[62] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 4.
[63] MPUC Docket Nos. E-002/RP-10-825, E-002/CN-12-1240, E-002/M-13-603 and E-002/M-13-716, Order Requiring Notice of Changed Circumstances and Granting Intervention, October 4, 2013, p. 4.

Xcel must accept power deliveries except when curtailment issues arise.[64] Given wind's unpredictable nature, Xcel must simultaneously maintain sufficient amounts of flexible and efficient quick-starting resources – Capacity Resources – to balance the system.[65]

- Calpine witness Mr. Hibbard testified that, "combustion turbines in particular can be used as fast-start, fast-ramp resources, and provide net-load-following capability in off-line and on-line mode."[66] The Invenergy proposals provide Capacity Resources with the ability to start quickly (achieving minimum load within 20 minutes and full load within 30 minutes) and then can be ramped up and down to follow load as needed.[67]

- In addition to the dramatic increase in wind now planned for Xcel's system, Xcel will be adding significant new solar energy resources. Minnesota enacted its first-ever solar energy mandate after the Order initiating this docket. Under that mandate, investor-owned utilities such as Xcel must provide one and one-half percent of their retail electric sales to retail customers in Minnesota with solar energy resources.[68]

- Xcel's increasing levels of Intermittent Resources raise two specific concerns relevant to this resource selection proceeding – the need to manage for the variability of those resources and the need for quick-starting resources in the event of extreme and unexpected drop offs in generation.[69] These concerns typically lead utilities to add Capacity Resources in the form of peaking facilities as they add Intermittent Resources.[70]

- Xcel currently lags far behind its own subsidiary Public Service Company of Colorado ("PSCo") with respect to the level of Capacity Resources on its system. PSCo has nearly twice as much peaking capacity as wind capacity – capacity that proved beneficial when PSCo experienced an unexpected wind ramp down of nearly 800 MW within 30 minutes last year.[71] In contrast, Xcel's current peaking capacity fails to even match its existing wind capacity.[72] After the addition of another 750 MW of wind, Xcel's

[64] Ex. 65, p. 23, fn. 1 and p. 27 (Ewan Direct); Ex. 73, p. 4, fn. 4 and pp. 16–20 (Norman Rebuttal).
[65] Ex. 65, p. 27 (Ewan Direct); Ex. 73, pp. 16-20 (Norman Rebuttal).
[66] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[67] Ex. 65, p. 7 (Ewan Direct).
[68] Minn. Stat. § 216B.1691, subd. 2f; *see also* Transcript Vol. 2, p. 10 (Ewan).
[69] Ex. 73, pp. 16-17 (Norman Rebuttal).
[70] *Id*.
[71] *Id*., pp. 17-18.
[72] *Id*.

peaking capacity will decrease to only two-thirds of its wind capacity,[73] leaving it particularly vulnerable to wind ramp down events.

- Capacity Resources of the type Invenergy proposes best complement the Intermittent Resources on Xcel's system. Calpine witness Mr. Hibbard testified that combustion turbines provide "fast-start, fast-ramp resources, and provide net-load-following capability in off-line and on-line mode."[74]

- In contrast, a combined cycle facility such as that proposed by Calpine can only provide balancing functions when on-line and requires "on the order of several hours" to come on-line from a cold start.[75] Such a facility is "often operated as close to the most efficient operational point, with a dispatch range that is narrow relative to its size, limiting ramp/flexibility potential."[76]

- Prior Department modeling has also shown the impact of significant Intermittent Resources to the Xcel system. As Mr. Norman noted, previous Strategist modeling by the Department in the Black Dog Docket found that any need for combined cycle generation was typically delayed by the addition of large amounts of wind generation.[77] Specifically, the Department stated that its modeling showed that "addition of a combined cycle is delayed to 2020 or later under certain circumstances, usually involving large quantities of wind additions."[78]

- The Department noted that Xcel's most recent forecast predicts that its load factor will decrease significantly over time, with customers demanding ever more from Xcel's peak while using less energy overall.[79]

- The potential need for greater capacity at peak, while requiring less energy overall, suggests that Capacity Resources, not Energy Resources, best fit Xcel's customers' needs and best ensure those customers a continued adequate electric supply.

- Consideration of the most efficient means of meeting Xcel's needs must also consider the characteristics of Xcel's system. A low load factor indicates a system

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[73] *Id*, p. 19.
[74] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[75] Transcript Vol. 1, pp. 42-43 (Hibbard).
[76] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[77] Ex. 73, pp. 21-22 (Norman Rebuttal), citing MPUC Docket No. E-002/CN-11-184, Department of Commerce Letter, March 1, 2012, p. 2.
[78] MPUC Docket No. E-002/CN-11-184, Department of Commerce Letter, March 1, 2012, p. 2.
[79] Ex. 76, p. 10 (Shah Direct).

where supply resources will sit idle for periods of time until higher load conditions occur.[80] On such systems, ratepayer costs are minimized with Capacity Resources, since a Capacity Resource such as a combustion turbine imposes significantly lower capacity costs on the system than an Energy Resource such as a combined cycle or coal plant.[81]

- Xcel's recent analyses of its system needs have shown a preference for the kind of Capacity Resource proposed by Invenergy. In the Black Dog Docket, Xcel withdrew its application for a certificate of need for a combined cycle facility, stating that the proposal was no longer in the best interest of ratepayers given the softening demand and lower energy forecasts now seen for its system.[82] Given those lower energy needs, which the record shows continues to hold true, Xcel stated that "it is more likely that the next resource should be a combustion turbine,"[83] rather than a combined cycle facility such as that proposed by Calpine.

- To summarize the adequacy, reliability and efficiency considerations relevant to this proceeding, the Commission has already established a need on the Xcel system of 150 MW of capacity in 2017 and up to 500 MW by 2019. Since that decision, Xcel has committed to adding significant new Intermittent Resources to its system. In addition, forecast updates suggest a need in 2017 possibly lower than the 150 MW identified by the Commission, with a continually decreasing load factor. Each of these factors indicates a need for lower capital cost, quick starting facilities in the form of peaking resources as proposed by Invenergy and Xcel.

Section XVII. Using Generic Credits to Equalize Proposals for Evaluation.

Invenergy respectfully requests that the Commission refuse to adopt Findings 192 and 193 as unsupported by the record. Again, the ALJ appears to have misunderstood the testimony regarding Strategist and the Strategist inputs, to the detriment of the Invenergy proposals. While the costs of the generic units built into the Strategist modeling may influence the modeling results, the record demonstrates that given the costs assumed by the Department and Xcel, smaller capacity additions such as those proposed by Invenergy

[80] *Id*., p. 11.
[81] *Id*.
[82] MPUC Docket No. E-002/CN-11-184, Xcel Motion to Withdraw Application, p. 2.
[83] *Id*.

were effectively penalized when compared to larger capacity additions such as those proposed by Xcel or Calpine.

Section XVIII. Evaluating Interconnection Costs and Savings.

Invenergy respectfully requests that the Commission not adopt Finding 201 as unsupported by a preponderance of the evidence in the record

Section XIX. The Department's Strategist Analysis.

In addition to its prior Exceptions regarding the Strategist analyses, Invenergy respectfully requests that the Commission not adopt Finding 225 as unsupported by the evidence.

Section XXI. Impact on the Adequacy Reliability or Efficiency of Energy Supply.

For all of the reasons discussed above regarding the ALJ's inappropriate reversal of the Commission's determination of need, Invenergy respectfully requests that the Commission strike ALJ Findings 237 – 250 and replace them with the following:

- The bidders in this docket collectively propose three different types of resources to fill the need existing on the Xcel system in the 2017-2019 time frame: (1) "Capacity Resources," in the form of combustion turbines, as proposed by both Invenergy and Xcel and providing principally peaking capacity; (2) "Energy Resources," namely the Calpine proposal to add 345 MW of combined cycle intermediate resources, providing both capacity and energy; and (3) "Intermittent Resources," in Geronimo's solar energy proposal.[84]

- The Commission Order concluding Xcel's 2010 IRP Docket informs the size, type and timing of resources necessary in this proceeding. In that Order, the Commission stated that: "Xcel will need an additional 150 MW in 2017, increasing up to

[84] GRE does not offer a "resource" that would add any physical capacity to the system. Rather, GRE offers to sell capacity credits.

500 MW by 2019. . . . Xcel should invite proposals for adding peaking resources, intermediate resources, or a combination of the two."[85]

- The record developed in this proceeding shows two significant developments since the Commission Order that must be considered in selecting an appropriate resource or resources to fill this need – the addition of significantly greater Intermittent Resources to the Xcel system and Xcel's continually declining load factor.

- Xcel will add dramatically greater wind energy to its system than envisioned by the Commission at the time it initiated this proceeding.[86] At that time, the Commission and Xcel both anticipated that Xcel would add 200 MW of wind energy to its system through a wind acquisition proceeding.[87] Instead, Xcel ultimately petitioned the Commission to acquire 750 MW of wind, a change significant enough that the Commission required Xcel to file a Notice of Changed Circumstances in both the 2010 IRP Docket and in the current docket.[88]

- As a result of dramatically increasing its acquisition of wind resources, Xcel will have significantly more Intermittent Resources on its system in the 2017-2019 time frame than assumed at the time of the Commission Order. With such resources, Xcel must accept power deliveries except when curtailment issues arise.[89] Given wind's unpredictable nature, Xcel must simultaneously maintain sufficient amounts of flexible and efficient quick-starting resources – Capacity Resources – to balance the system.[90]

- Calpine witness Mr. Hibbard testified that, "combustion turbines in particular can be used as fast-start, fast-ramp resources, and provide net-load-following capability in off-line and on-line mode."[91] The Invenergy proposals provide Capacity Resources with the ability to start quickly (achieving minimum load within 20 minutes

[85] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 6.
[86] *See* Transcript Vol. 2, p. 10 (Ewan).
[87] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 4.
[88] MPUC Docket Nos. E-002/RP-10-825, E-002/CN-12-1240, E-002/M-13-603 and E-002/M-13-716, Order Requiring Notice of Changed Circumstances and Granting Intervention, October 4, 2013, p. 4.
[89] Ex. 65, p. 23, fn. 1 and p. 27 (Ewan Direct); Ex. 73, p. 4, fn. 4 and pp. 16–20 (Norman Rebuttal).
[90] Ex. 65, p. 27 (Ewan Direct); Ex. 73, pp. 16-20 (Norman Rebuttal).
[91] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).

and full load within 30 minutes) and then can be ramped up and down to follow load as needed.[92]

- In addition to the dramatic increase in wind now planned for Xcel's system, Xcel will be adding significant new solar energy resources. Minnesota enacted its first-ever solar energy mandate after the Order initiating this docket. Under that mandate, investor-owned utilities such as Xcel must provide one and one-half percent of their retail electric sales to retail customers in Minnesota with solar energy resources.[93]

- Xcel's increasing levels of Intermittent Resources raise two specific concerns relevant to this resource selection proceeding – the need to manage for the variability of those resources and the need for quick-starting resources in the event of extreme and unexpected drop offs in generation.[94] These concerns typically lead utilities to add Capacity Resources in the form of peaking facilities as they add Intermittent Resources.[95]

- Xcel currently lags far behind its own subsidiary Public Service Company of Colorado ("PSCo") with respect to the level of Capacity Resources on its system. PSCo has nearly twice as much peaking capacity as wind capacity – capacity that proved beneficial when PSCo experienced an unexpected wind ramp down of nearly 800 MW within 30 minutes last year.[96] In contrast, Xcel's current peaking capacity fails to even match its existing wind capacity.[97] After the addition of another 750 MW of wind, Xcel's peaking capacity will decrease to only two-thirds of its wind capacity,[98] leaving it particularly vulnerable to wind ramp down events.

- Capacity Resources of the type Invenergy proposes best complement the Intermittent Resources on Xcel's system. Calpine witness Mr. Hibbard testified that combustion turbines provide "fast-start, fast-ramp resources, and provide net-load-following capability in off-line and on-line mode."[99]

- In contrast, a combined cycle facility such as that proposed by Calpine can only provide balancing functions when on-line and requires "on the order of several hours" to come on-line from a cold start.[100] Such a facility is "often operated as close to

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[92] Ex. 65, p. 7 (Ewan Direct).
[93] Minn. Stat. § 216B.1691, subd. 2f; *see also* Transcript Vol. 2, p. 10 (Ewan).
[94] Ex. 73, pp. 16-17 (Norman Rebuttal).
[95] *Id*.
[96] *Id*., pp. 17-18.
[97] *Id*.
[98] *Id*, p. 19.
[99] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[100] Transcript Vol. 1, pp. 42-43 (Hibbard).

the most efficient operational point, with a dispatch range that is narrow relative to its size, limiting ramp/flexibility potential."[101]

- Prior Department modeling has also shown the impact of significant Intermittent Resources to the Xcel system. As Mr. Norman noted, previous Strategist modeling by the Department in the Black Dog Docket found that any need for combined cycle generation was typically delayed by the addition of large amounts of wind generation.[102] Specifically, the Department stated that its modeling showed that "addition of a combined cycle is delayed to 2020 or later under certain circumstances, usually involving large quantities of wind additions."[103]

- The Department noted that Xcel's most recent forecast predicts that its load factor will decrease significantly over time, with customers demanding ever more from Xcel's peak while using less energy overall.[104]

- The potential need for greater capacity at peak, while requiring less energy overall, suggests that Capacity Resources, not Energy Resources, best fit Xcel's customers' needs and best ensure those customers a continued adequate electric supply.

- In assessing resource addition proposals, Minnesota rules require the Commission to consider more than simply ensuring that the utility has an adequate supply. The rules also require the Commission to consider the reliability and efficiency of that supply.[105]

- Invenergy's combustion turbine proposals offer superior reliability to the Xcel system. Invenergy proposes adding identical combustion turbines to those currently employed at the existing Cannon Falls site. Those turbines have shown very high reliability both in terms of their starting reliability and in terms of an extremely low forced outage rate of less than one percent over the last four years.[106]

- The Invenergy proposals assume interruptible gas supply to the facilities. The record demonstrates that interruptible supply saves ratepayers significant expense without jeopardizing reliability.[107] The Xcel system peaks in the summer when gas

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[101] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[102] Ex. 73, pp. 21-22 (Norman Rebuttal), citing MPUC Docket No. E-002/CN-11-184, Department of Commerce Letter, March 1, 2012, p. 2.
[103] MPUC Docket No. E-002/CN-11-184, Department of Commerce Letter, March 1, 2012, p. 2.
[104] Ex. 76, p. 10 (Shah Direct).
[105] Minn. R. 7849.0120 (A).
[106] Transcript Vol. 2, pp. 9-10 (Ewan).
[107] Ex. 69, pp. 8-9 (Ewan Rebuttal); Ex. 47, p. 20 (Wishart Rebuttal).

supply is readily available.[108] The existing Cannon Falls facility operated by Invenergy has historically seen the vast majority of its operating hours in the summer, to meet those peak needs, with only forty hours of operation in the past four winters combined.[109] In addition, both the Expansion and Hampton will have a back-up supply of fuel oil in the unlikely event that the facilities will be called upon when natural gas is not available.[110]

- Requiring a firm gas supply would add unnecessary costs to ratepayers, lessening the efficiency of the system while not increasing the reliability. The Department analyzed the cost savings of an interruptible gas supply for the Expansion and found a savings of approximately $35 million compared to the use of firm supply.[111] In contrast, Xcel's modeling which assumed zero availability for the Expansion in the winter months added only $1 million of cost compared to the Expansion being available (through use of firm gas).

- Consideration of the most efficient means of meeting Xcel's needs must also consider the characteristics of Xcel's system. A low load factor indicates a system where supply resources will sit idle for periods of time until higher load conditions occur.[112] On such systems, ratepayer costs are minimized with Capacity Resources, since a Capacity Resource such as a combustion turbine imposes significantly lower capacity costs on the system than an Energy Resource such as a combined cycle or coal plant.[113]

- Xcel's recent analyses of its system needs have shown a preference for the kind of Capacity Resource proposed by Invenergy. In the Black Dog Docket, Xcel withdrew its application for a certificate of need for a combined cycle facility, stating that the proposal was no longer in the best interest of ratepayers given the softening demand and lower energy forecasts now seen for its system.[114] Given those lower energy needs, which the record shows continues to hold true, Xcel stated that "it is more likely that the next resource should be a combustion turbine,"[115] rather than a combined cycle facility such as that proposed by Calpine.

- To summarize the adequacy, reliability and efficiency considerations relevant to this proceeding, the Commission has already established a need on the Xcel system of 150 MW of capacity in 2017 and up to 500 MW by 2019. Since that decision, Xcel has committed to adding significant new Intermittent Resources to its system. In

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[108] *Id.*; Ex. 47, p. 21 (Wishart Rebuttal).
[109] *Id.*
[110] Ex. 69, p. 9 (Ewan Rebuttal).
[111] Ex. 87, p. 10 (Rakow Rebuttal).
[112] *Id.*, p. 11.
[113] *Id.*
[114] MPUC Docket No. E-002/CN-11-184, Xcel Motion to Withdraw Application, p. 2.
[115] *Id.*

addition, forecast updates suggest a need in 2017 possibly lower than the 150 MW identified by the Commission, with a continually decreasing load factor. Each of these factors indicates a need for lower capital cost, quick starting facilities in the form of peaking resources as proposed by Invenergy and Xcel.

Section XXII. The Most Reasonable and Prudent Alternative.

Again, for the reasons discussed above, the ALJ Recommendation determining the Geronimo proposal to be the most reasonable and prudent alternative cannot be sustained. The Geronimo proposal does not meet the need identified by the Commission with respect to either the size or type of resource required. Therefore, Invenergy respectfully requests that the Commission strike ALJ Findings 252 – 267 and replace with them with the findings already set forth in Sections IX, XV and XXI above, as well as the following:

- GRE offers to sell capacity credits for select years. As such, GRE offers no actual capacity or energy to the system and no longer-term solution to fill Xcel's need. Nonetheless, both Xcel and the Department included GRE in the Strategist modeling, to determine if this capacity credit offer had sufficient value to warrant consideration, for example, by delaying the need to actually add resources to the system. However, the value of delaying other resource additions was outweighed by the costs of the GRE proposal.[116] Thus, the record demonstrates that it is neither reasonable nor prudent for Xcel to pursue a capacity credit purchase from GRE.

Section XXIII. Compatibility with Our Socioeconomic and Natural Environments.

The ALJ Recommendation fails to reflect the record regarding the benefits of the Invenergy proposals and the strong local support for those proposals. Therefore, Invenergy requests that the Commission strike Findings 269-281 and replace them with the following:

- The Expansion and Hampton both bring significant benefits to the community, while protecting or enhancing the natural and socioeconomic environments.

[116] Ex. 46, p. 24 (Wishart Direct).

- In assessing any project under this criterion, the Commission considers first "the relationship of the proposed facility, or a suitable modification thereof, to overall state energy needs."[117] The Invenergy proposals provide necessary Capacity Resources to support both the influx of new renewable energy resources and the declining load factor experienced on Xcel's system. These facilities impose low capital costs, while having the ability to quickly provide power to the system to maintain reliability. Invenergy has built an impressive track record of reliable and efficient operation at its existing Cannon Falls facility and proposes employing the same technology at its new facilities, taking advantage of its substantial expertise and experience.

- The Expansion and Hampton projects also bring substantial socioeconomic benefits. The Expansion and Hampton projects will employ a peak labor force of approximately 100 and 150 workers, respectively, during their 12 month construction periods.[118] Once operational, the projects will provide an additional approximately $500,000 per year in taxes and payments in lieu of taxes to the local economy in Cannon Falls and $1,000,000 per year in Hampton assuming the installation of two generating units there.[119]

- Cannon Falls City Administrator Aaron Reeves stated that: "Invenergy has been an excellent business partner in Cannon Falls," generating zero complaints from citizens or businesses while involving itself in the community and financially supporting the schools and other local projects. Given its experience with Invenergy, Cannon Falls views the Expansion as "an excellent economic development opportunity for the city" and that the city sees "no issue at all with providing the necessary local approvals that would move forward quickly."[120]

- The Invenergy proposals also provide indirect benefits to the community and the business environment. By providing cost-effective and reliable energy supply to the Xcel system, the Invenergy proposals will minimize the financial impact to Xcel's business and residential ratepayers at a time when they face regular and significant rate increases.[121]

- Invenergy's facilities will take advantage of substantial existing infrastructure, minimizing the impacts on existing land use. In addition, Invenergy employs Environmental, Health and Safety staffs who work together with staff at its

[117] Minn. R. 7849.0120 C (1).
[118] Ex. 65, pp. 12-13 (Ewan Direct).
[119] *Id*., p. 13.
[120] Public Hearing, October 15, 2013 Transcript, pp. 30-34; *see also* Ex. 70, Attachment 3 (Shield Direct).
[121] Ex. 70, p. 20 (Shield Direct).

facilities to maintain compliance with local, state and federal regulations.[122] Each facility will implement a comprehensive compliance tracking program and to ensure ongoing compliance and to alert appropriate staff to upcoming requirements.[123]

- The Expansion and Hampton will fully comply with all applicable air quality regulations, including undergoing a Best Available Control Technology review.[124] Once operational, emissions from the facilities will be minimized through multiple means.[125] The Cannon Falls facility has operated well below its permitted emissions levels.[126]

- Regarding air emissions, Calpine contends that its combined cycle proposal is "a cleaner option" than the combustion turbines proposed by Invenergy.[127] However, Calpine's combined cycle facility will not necessarily result in significantly lower emissions.[128] As Calpine acknowledged, combined cycle facilities have a longer start-up time than combustion turbines.[129] During that start-up time, combustion controls are not yet effective and emissions are higher than the "steady state" emissions from the facility.[130] Moreover, combined cycle facilities typically operate at a higher capacity factor than a combustion turbine, meaning significantly more total emissions.[131] Thus, it is not possible to state with any degree of certainty that the Calpine proposal will have less environmental impact than the Invenergy proposals.

Section XXIV. Future Compliance with Applicable Law.

Based on faulty and fundamentally flawed economic analyses, the ALJ incorrectly found that neither Xcel, Invenergy, Calpine nor the Department demonstrated that a natural gas facility would comply with applicable laws. To the contrary, the record demonstrates that Geronimo's solar proposal simply cannot compete on economic terms with the natural gas facilities proposed. Moreover, no record evidence suggests that

[122] Ex. 70, Attachment , p. 13 (Shield Direct).
[123] *Id*.
[124] Ex. 69, pp. 12, 18 (Ewan Rebuttal).
[125] Ex. 65, pp. 17-18 (Ewan Direct).
[126] Ex. 69, p. 5 (Ewan Rebuttal).
[127] Ex. 51, p. 30 (Hibbard Direct).
[128] Ex. 69, p. 12 (Ewan Rebuttal); Ex. 43, pp. 4-5 (Ford Rebuttal).
[129] Transcript Vol. 1, pp. 42-43, 62-63 (Hibbard); Ex. 93.
[130] Ex. 69, p. 12 (Ewan Rebuttal).
[131] Ex. 43, p. 4 (Ford Rebuttal).

Invenergy will not fully comply with all applicable law as it has throughout its history in Minnesota. Therefore, Invenergy requests that the Commission strike Findings 283 – 289 and replace them with the following:

- Invenergy has listed the relevant permits for both the Expansion and Hampton.[132] In addition, the record demonstrates Invenergy's strong commitment to regulatory compliance.[133] The strong support Invenergy has received from the Cannon Falls community serves as evidence of the strong relationship Invenergy builds with government officials in its communities. Thus, the ALJ and Commission can have full confidence that both the Expansion and Hampton projects will comply with all applicable policies, rules and regulations.

Exceptions to Conclusions of Law.

For reasons discussed above, the ALJ Conclusions err in multiple ways, including: (1) the ALJ overturns the Commission determination of the size, type and timing of resource needed, without substantial evidence supporting that reversal; (2) the ALJ Recommendation fails to recommend sufficient resources to meet Xcel's system needs and instead relies on a future proceeding to meet those needs; (3) the ALJ relies on a fundamentally flawed economic analysis; and (4) the ALJ Recommendation would impose excessive costs on ratepayers. Therefore, Invenergy recommends that the Commission not adopt the ALJ Conclusions and instead conclude that:

- The record in its totality demonstrates that the Invenergy Expansion and Hampton proposals most reasonably and prudently meet the need on Xcel's system in the 2017-2019 time frame and should be selected. Xcel and Invenergy should proceed to PPA negotiations and the final PPAs should be presented to the Commission for its review and approval.

[132] Ex. 65, pp. 18-19, 21-22 (Ewan Direct).
[133] *Id.*; Ex. 70, p. 21 and Attachment 1, p. 13 and Attachment 2, p. 13 (Shield Direct).