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December 6, 2013

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VIA E-FILING AND U.S. MAIL

The Honorable Eric L. Lipman
Office of Administrative Hearings
P.O. Box 64620
St. Paul, MN 55164-0620

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
OAH Docket No. 8-2500-0760

Dear Judge Lipman:

Enclosed please find the Reply Brief and Proposed Findings of Fact and Conclusions of Law of Invenergy Thermal Development LLC in the above-referenced docket. The 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

Cc: Attached Service List

8566969v1

BEFORE THE MINNESOTA OFFICE OF ADMINISTRATIVE HEARINGS
600 North Robert Street
St. Paul, Minnesota 55101

FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION
121 Seventh Place East, Suite 350
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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 OAH Docket No. 8-2500-0760 **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 6th day of December, 2013, she served the attached **Reply Brief and Proposed Findings of Fact and Conclusions of Law** 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
6th day of December, 2013.

/s/ Jane E. Justice
Notary Public

My Commission Expires: January 31, 2015

8566983v1

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REPLY BRIEF OF INVENERGY THERMAL DEVELOPMENT LLC

December 6, 2013

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INTRODUCTION

As Invenergy noted in its Initial Brief, the current docket marks the first time the Commission has combined competitive bidding with a contested case format in order to select a new resource for a Minnesota utility. In setting forth this new process, the Commission made clear two things.

First, the Commission asked for a comprehensive review utilizing the Certificate of Need criteria as a guide, so that the Commission could select "the most reasonable and prudent strategy for Xcel to meet the needs of its service area."[1] Given this need for a complete analysis, any attempt to defer the decision making to either a fundamentally flawed or an opaque economic model must be rejected. While a theoretically sound model such a Strategist can inform this process, it cannot resolve the process in and of itself. If it could, no contested case proceeding would be necessary.

Second, the Commission determined that Xcel has a need for new resources beginning in 2017. Invenergy, Xcel, the other bidding or intervening parties, the regulatory agencies, the public commenters and the ALJ have all now devoted substantial resources to determine how to best meet that need. The record provides further information and insight into Xcel's need, which must be considered in selecting the most appropriate type of resource to meet that need. However, nothing in the record vitiates the Commission's prior determination of need. A resource (or resources) must be selected and, as Invenergy fully discussed in its Initial Brief, the record supports selection of the Invenergy proposals to meet Xcel's need most reasonably and prudently.

[1] Notice and Order for Hearing, June 21, 2013, p. 6.

I. FULL CONSIDERATION OF THE CERTIFICATE OF NEED CRITERIA DEMONSTRATES THAT THE INVENERGY RESOURCES MOST REASONABLY AND PRUDENTLY MEET XCEL'S NEED.

Five parties offered proposals to meet the needs of Xcel Energy ("Xcel") and its service area: Invenergy Thermal Development LLC ("Invenergy"), with peaking capacity facilities in Cannon Falls and Hampton; Geronimo Wind Energy, LLC, d/b/a Geronimo Energy, LLC ("Geronimo"), with a solar energy proposal; Calpine Corporation ("Calpine"), with a combined cycle, intermediate facility in Mankato; Great River Energy ("GRE"), with an offer to sell capacity credits; and Xcel itself, with peaking capacity facilities at Black Dog and in North Dakota. In addition to these bidding parties, the Department of Commerce ("Department") provided testimony and documentary evidence regarding these proposals and the Administrative Law Judge ("ALJ") and the Minnesota Public Utilities Commission ("Commission") now have the benefit of the record and various public comments in determining how best to move forward.[2]

Despite the Commission's directive for a thorough analysis utilizing the Certificate of Need criteria as a guide, Geronimo notes that "Xcel and the Department advocate for selection of resources based solely on the outcome of their respective Strategist model results."[3] Indeed, the Department's Initial Brief largely restates the testimony of Dr. Rakow concerning the results of his various Strategist model runs.

[2] In its Initial Brief, Invenergy proactively addressed many of the arguments raised in other parties' briefs and in public comments. Invenergy will not repeat those discussions here. Rather, Invenergy addresses select arguments raised by others. Failure to address any issue should not be interpreted as agreement with any other party's position. Where Invenergy does concur with another party, it has so stated.

[3] Geronimo Initial Brief, p. 11.

Calpine offers an alternative (and fatally flawed) economic model, but it too fails to provide the thorough Certificate of Need criteria analysis envisioned by the Commission when it forwarded this matter to the ALJ for contested case proceedings. Aside from Invenergy, only Geronimo provides a comprehensive review of the Certificate of Need criteria. However, Geronimo's proposal cannot survive this review given the wide price differential between its proposal and the Invenergy proposals. Thus, a full review of the record supports selection of the Invenergy resources in this proceeding.

A. Increasing Intermittent Resources and a Decreasing Load Factor Both Point to the Need for Additional Capacity, not Additional Energy.

As this docket commenced, the Commission also determined that the Xcel system needed an additional 150 MW of capacity by 2017, increasing to up to 500 MW by 2019.[4] At that time, the Commission indicated it would consider peaking resources, intermediate resources, or a combination of the two to fill that need. However, as Invenergy discussed in its Initial Brief, since that time Xcel has moved to add dramatically more wind energy to its system than previously envisioned by the Commission and Xcel's updated forecasts indicate an ever decreasing load factor on the Xcel system.[5] Both of these factors weigh in favor of adding peaking resources to best meet Xcel's needs in the 2017 – 2019 time frame.

By their nature, wind energy resources generate power intermittently and these intermittent resources put certain strains on an electric supply system. Such resources

[4] *See* MPUC Docket Nos. E-002/RP-10-825 ("2010 IRP Docket"), Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 6.
[5] *See* Invenergy Initial Brief, pp. 18-22.

require a utility to have sufficient amounts of flexible and efficient quick-starting resources to balance the system – precisely the kind of resources proposed by Invenergy.[6] While Calpine now argues that its combined-cycle intermediate capacity best complements intermittent resources,[7] Calpine's expert Mr. Hibbard has previously stated, and still agrees, 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."[8] Mr. Hibbard also acknowledged that 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.[9] Moreover, 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."[10] Thus, Calpine's own expert testimony supports a finding that the kind of Capacity Resources offered by Invenergy best fits the needs of a system with high penetration of intermittent resources, such as the Xcel system. That testimony is no surprise, since the need to manage for the variability of intermittent resources and the need for quick-starting resources in the event of extreme and unexpected drop offs in generation typically lead utilities to add peaking facilities as they add resources such as wind or solar.[11]

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[6] Ex. 65, p. 27 (Ewan Direct); Ex. 73, pp. 16-20 (Norman Rebuttal).
[7] *See* Calpine Initial Brief, pp. 25-26.
[8] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[9] Transcript Vol. 1, pp. 42-43 (Hibbard).
[10] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[11] Ex. 73, pp. 16-17 (Norman Rebuttal).

Xcel's forecasts, and its continually declining load factor, further lead to the conclusion that Capacity Resources, i.e. peaking resources, best match Xcel's current need. 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.[12]

As Invenergy observed, Xcel's declining load factor continues a trend for the company dating back to 2004 and mirrors the trend seen nationwide over that same time span.[13] Obviously, a utility system needing greater capacity at peak but requiring less energy overall does not require resources capable of operating at higher capacity factors. Rather, such a utility system again requires the kind of fast-start, fast-ramp resources provided by the Invenergy proposals – resources with a relatively lower capacity cost than the utility would incur with an intermediate or baseload resource.

B. When Compared to the Calpine or Xcel Alternatives, Invenergy Offers Flexibility that Benefits Ratepayers.

For both its Cannon Falls Expansion ("Expansion") and Hampton Energy Center ("Hampton") proposals, Invenergy offered pricing assuming in-service dates ranging from 2016 to 2019, including identical pricing for 2016 and 2017.[14] Unfortunately, while Xcel and the Department based their recommendations in this proceeding on the results of their economic modeling, neither party ever modeled the impact of adding the

[12] Ex. 76, p. 10 (Shah Direct) (emphasis added).
[13] Ex. 65, pp. 23-24 (Ewan Direct).
[14] Ex. 69, p. 4 (Ewan Rebuttal); TRADE SECRET Ex. 87, Attachment SR-R-9, pp. 3-4 (Rakow Rebuttal).

Expansion or Hampton to the Xcel system with a June 1, 2017 in-service date. In fact, Xcel examined no option for either the Expansion or Hampton beyond a 2016 in-service date[15] and the Department conducted no detailed analysis of Hampton whatsoever, eliminating it from any serious consideration on the basis of the assumed 2016 start date.[16] In Rebuttal Testimony, the Department examined a 2019 in-service date (in addition to the 2016 date) for the Expansion, finding the ratepayer savings resulting from the later in-service date were "substantial," yet it still did not examine a 2017 in-service date for the Expansion, nor did it re-examine the Hampton proposal.[17] Since Invenergy offered the same flexible structure and slightly *lower* pricing overall for Hampton as for Expansion,[18] this premature elimination of Hampton from consideration in the Xcel and Department analyses may fail to capture significant ratepayer benefits.

The record does not demonstrate similar ratepayer benefits related to flexible in-service dates for the Calpine proposal. In fact, the Department's modeling indicated little difference in the total cost to ratepayers depending on the in-service date.[19] Dr. Rakow summarized the record well when he stated that "while there may not be much to be gained by adjustments to Calpine's in-service date, adjusting the date of Invenergy's project could yield significant results for ratepayers."[20]

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[15] Transcript Vol. 1, p. 102 (Wishart).
[16] *See* Ex. 83, p. 35 (Rakow Direct) (indicating Hampton did not make it through to Dr. Rakow's "Second Round" analysis).
[17] *See* Transcript Vol. 2, p. 55 (Rakow).
[18] *See* TRADE SECRET Ex. 87, Attachment SR-R-9, pp. 3-4 (Rakow Rebuttal).
[19] Ex. 86, p. 11 (Rakow Rebuttal).
[20] *Id*., p. 12.

The Invenergy proposals also offer flexibility in terms of the size of the capacity addition(s) to the Xcel system. Invenergy offers three approximately 179 MW generating units – one at the Expansion and two at Hampton. As such, Invenergy most closely tailors the size of an initial addition of capacity to the size of the need on the system, with the ability to add incremental capacity as required. In contrast, Calpine offers a one-time addition of 345 MW of combined cycle capacity and Xcel offers 215 MW units, offering a total of 645 MW of capacity, well outpacing the identified need in the 2017-1019 time frame. Of course, the combined cycle capacity offered by Calpine also carries a higher capacity cost than a Capacity Resource such as a combustion turbine.[21] Indeed, a simple comparison of the capacity costs associated with the Expansion and the Calpine facility demonstrates that the Calpine proposal would impose millions of dollars more in capacity payments on Xcel ratepayers.[22]

These lower capacity costs, in turn, provide flexibility of their own, bringing additional benefits to Xcel and its ratepayers. As Invenergy witness Mr. Norman explained:

> [M]aintaining 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

[21] Ex. 69, p. 8 (Ewan Rebuttal).
[22] *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).

it to. . . . The Invenergy proposal capacity payments are, I would say, materially lower than capacity payments proposed from Calpine.[23]

C. The Credible Economic Analyses in the Record Support Selection of the Invenergy Proposals.

As Invenergy has discussed, the ALJ and Commission should not rely on an economic model to fully and exclusively determine the appropriate resource in this proceeding. However, with appropriate inputs, a sound economic model can yield results that provide value in the resource selection process. The record contains the results of two models, the levelized cost of energy ("LCOE") model presented by Calpine and the Strategist model used by Xcel and the Department. Analysis of the radically different model results generated by these three parties, as well as an analysis of the supporting and responsive testimony on these models: (1) demonstrates the need to disregard the LCOE results; and (2) shows the value to ratepayers of the Invenergy proposals.

Regarding Calpine's LCOE analysis, Invenergy's Initial Brief has already discussed the inappropriateness of LCOE analysis when comparing different generation options for meeting a utility's needs.[24] In fact, the Energy Information Administration warned that LCOE analysis in this type of setting "can be misleading as a method to assess the economic competitiveness of various generation alternatives."[25] Thus, Geronimo's and Calpine's continued use of LCOE "results" to support their proposals must be rejected.

[23] Transcript Vol. 2, p. 26 (Norman) (emphasis added).
[24] Invenergy Initial Brief, pp. 43-44.
[25] Ex. 47, p. 16 (Wishart Rebuttal).

While Strategist can provide useful information to a resource selection process, all parties have acknowledged that Strategist has limitations and, as with any model, is a creature of the assumptions and choices of the modeler. For example, Invenergy's Expansion proposal fares significantly differently under Xcel's Strategist approach as compared to the Department's. It appears this substantial difference is explained by the different approaches taken by the Xcel and Department modeler, including Xcel's use of a "locked" expansion plan and the Department's use of an "end effects" adjustment that added tens of millions of dollars in cost to the Expansion.[26]

As Xcel witness Mr. Wishart explained, the company "locked" its expansion plan in order to get a "cleaner comparison of just the economics of one proposal versus the other."[27] 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.[28] This modeling decision means that the Department's results do not directly compare the various bid proposals, but rather compare the impact of "the bids plus the cost of some generic plants that were added by Strategist."[29] This difference in approach becomes significant, given the Department's observation that the costs of the generic units plugged in by the Department appear high when compared to the bids submitted in this proceeding.[30] As the Department acknowledged, given its modeling approach, "if the generic units are more expensive than the proposals, then when

[26] *See* Invenergy Initial Brief, pp. 41-42.
[27] Transcript Vol. 1, pp. 97-98 (Wishart).
[28] Ex. 47, p. 7 (Wishart Rebuttal).
[29] *Id*.
[30] *See* Department Initial Brief, pp. 38-39.

Strategist is run, large packages will tend to look cheaper than smaller packages."[31] This "bonus" given to larger projects (such as the 345 MW Calpine proposal) would mean that smaller projects (such as the Invenergy 179 MW turbines) "would be unfairly disadvantaged."[32]

Other aspects of the Strategist analyses too, have unfairly disadvantaged the Invenergy proposals. For example, the model incorrectly "rewards" high forced outage rates.[33] Given the extremely high reliability of the Invenergy turbines, this aspect of Strategist perversely punished Invenergy.[34] The Department's analysis further penalized the Expansion proposal by adding a $50 million "end effects" adjustment in the year 2036.[35] The Department has provided no rationale for this penalty, either in testimony or in brief. Similarly, the Department's initial analyses assumed firm gas supply, as opposed to interruptible supply, adding another $35 million in cost to the Expansion.[36] Finally, as discussed above, both Xcel and the Department assumed a 2016 in-service date, further penalizing the Invenergy proposals. As Invenergy witness Ewan explained, since Strategist reduces all costs to a net present value, early in-service assumptions can penalize proposals and "the timing of resource additions becomes critical" in Strategist runs.[37] Xcel agreed, noting that the 2016 in-service dates resulted in additional net cost

[31] *Id.*, p. 38, citing Ex. 83, p. 29 (Rakow Direct).
[32] Ex. 83, pp. 30-31 (Rakow).
[33] Ex. 69, p. 5. (Ewan Rebuttal).
[34] *Id*.
[35] Ex. 47, pp. 13-14 (Wishart Rebuttal).
[36] Ex. 87, p. 10 (Rakow Rebuttal).
[37] Ex. 65, p. 16 (Ewan Direct).

for the Expansion when compared to the Calpine proposal.[38] Unfortunately, neither Xcel nor the Department ever modeled the Invenergy proposals with a 2017 in-service date, despite the Department's acknowledgement that its limited "analysis of flexible in-service dates demonstrated that this is a critical issue for Invenergy's Cannon Falls proposal."[39]

Even with the deck stacked against it as described above and in Invenergy's Initial Brief, Invenergy survived the Strategist analyses of both the Xcel and Department. In fact, Xcel identifies the Expansion as part of the least cost plan.[40] The Department identifies the Expansion as part of one of "the two top performing packages."[41] As Invenergy discussed more fully in its Initial Brief, proper inputs and assumptions would only make the Invenergy proposals appear more favorable for ratepayers, clearly supporting their selection to fill Xcel's needs.

D. Geronimo's Solar Capacity Proposal Adds Unnecessary Costs to Ratepayers.

Geronimo offers a markedly different proposal than Invenergy, Calpine or Xcel. By offering a solar capacity proposal, Geronimo offers even more intermittent resources to a system already rich in intermittent resources. As such, Geronimo simply misses the target in the current proceeding. Xcel requires fast-start, fast-ramp Capacity Resources to balance the already pervasive intermittent resources on its system.

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[38] Ex. 46, p. 31 (Wishart Direct).
[39] Department Initial Brief, p. 61 (emphasis added).
[40] Ex. 44, p. 26 (Wishart Direct).
[41] Ex. 87, p. 3 (Rakow Rebuttal).

Moreover, Geronimo offered 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.[42]

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. More importantly, that role should be filled in a way that brings the same kinds of competitive pressures to bear on solar energy providers that the Commission has brought to bear in the current proceeding – through a competitive solar acquisition process similar to the competitive wind acquisition processes the Commission has utilized in the past. For these reasons, Invenergy joins in the Department recommendation that the Commission consider initiating an all solar resource acquisition proceeding.

E. GRE's Offer to Sell Capacity Credits Fails to Meet Xcel's Need.

GRE too provides a markedly different proposal, by offering 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

[42] Transcript Vol. 2, p. 56 (Rakow).

additions was outweighed by the costs of the GRE proposal.[43] Thus, the record demonstrates that it is neither reasonable nor prudent for Xcel to pursue a capacity credit purchase from GRE.

F. Summary.

For all of the reasons discussed above and in its Initial Brief, Invenergy respectfully requests that the ALJ recommend and the Commission approve selection of the Expansion and Hampton proposals to meet the needs identified for Xcel in the 2017 – 2019 time frame. The Invenergy proposals best meet Xcel's needs regarding the size, type and timing of resource additions. In particular, Invenergy provides the appropriate peaking resources to meet the needs on the Xcel system. The Invenergy proposals will provide the needed capacity reliably, efficiently and at a reasonable, fixed cost. Moreover, the Invenergy proposals will provide this needed capacity in a manner consistent with all relevant rules and regulations and in a manner compatible with the natural and socio-economic environments, providing significant benefit to the Minnesota host communities.

II. NEITHER THE RECORD NOR SOUND PUBLIC POLICY SUPPORT 'FINAL' SELECTION OF BLACK DOG AT THIS TIME.

Xcel recommends that the ALJ and Commission conclude the current phase of this proceeding with a two-tiered decision. First, Xcel asks the ALJ and Commission to "select" Black Dog 6 at this time to meet a portion of its need.[44] Second, Xcel asks the ALJ and Commission to send Xcel into Power Purchase Agreement ("PPA") negotiations

[43] Ex. 46, p. 24 (Wishart Direct).
[44] Xcel Initial Brief, p. 1.

with both Invenergy and Calpine, but to make no finding at this time regarding "selection" of either resource. In fact, Xcel specifically discusses the possibility that it may ultimately cancel either or both of the Invenergy or Calpine projects.[45] In addition, Xcel recommends that the ALJ and Commission "hold [Xcel's] Red River Valley Unit 1 in reserve in the event neither the Cannon Falls nor Mankato PPA is acceptable upon completion of the negotiation phase."[46] Neither the record nor sound public policy supports such an Xcel-centric outcome.

As discussed in Invenergy's Initial Brief, the record cannot support final "selection" of Black Dog 6 at this time.[47] As Invenergy discussed, Xcel's unique role as both "bidder" and "buyer" in this proceeding creates challenges when comparing Xcel's proposal with other parties' formal bids. Xcel's assumed costs related to Black Dog remain opaque.[48] In addition, Xcel fails to offer ratepayers the benefit of a fixed-price proposal and its proposed "rate rider" offers ratepayers little or no meaningful protection from cost overruns to ratepayers.[49] The Commission has already stated that "all bidders should be held to the cost information provided in their bids, which the Commission will evaluate in the course of this contested case proceeding."[50] However, the record does not demonstrate how the Commission can accomplish this with respect to Black Dog. Therefore, the Black Dog project cannot be "selected" as a "winner" at this time.

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[45] *Id*., p. 28.
[46] *Id*., p. 29.
[47] Invenergy Initial Brief, pp. 33-37.
[48] *See* Transcript Vol. 2, p. 54 (Rakow).
[49] Ex. 69, p. 14 (Ewan Rebuttal).
[50] Order Extending Bidding Deadline and Refining Procedural Framework, March 5, 2013, p. 4 (emphasis added).

In addition, as the Department noted, no one can state with confidence that Black Dog is a "least cost" resource at this time. In addition to the mystery surrounding its costs, the fact remains that:

> The Black Dog unit may turn out to be more expensive, for example, than the final PPAs of both Invenergy and Calpine. You might assume it's in second place right now, but it might end up in third place later.[51]

Finally, sound public policy cannot support "approving" Xcel's Black Dog build now, while sending other proposals to the potential purgatory of PPA negotiations. Xcel would have little motivation to favorably conclude those negotiations, particularly given that it seeks to "hold in reserve" the option of a further self-build in North Dakota if PPA negotiations fail. Xcel's effort to continue pushing the North Dakota project raises particular concern regarding its motivations and interest in protecting ratepayers, since Xcel itself admits that the North Dakota projects are "not as cost-effective" as the Invenergy or Calpine proposals.[52] Approving an Xcel self-build now, on the basis of this record, while also leaving open the possibility of a further self-build pending the outcome of PPA negotiations between third party providers and Xcel would send a chilling message to independent power producers with respect to any future resource selection proceedings in Minnesota.

III. FAILURE TO ADD CAPACITY WILL JEOPARDIZE THE ADEQUACY, RELIABILITY AND EFFICIENCY OF ENERGY SUPPLY.

In its Public Comment, three of Xcel's large industrial customers ("XLI") recommend that the ALJ and Commission take no action to add capacity resources to the

[51] Transcript Vol. 2, p. 52 (Rakow).
[52] *See* Xcel Initial Brief, p. 29.

Xcel system at this time.[53] Such a decision would jeopardize the adequacy, reliability and efficiency of the Xcel system, as discussed at length in Invenergy's Initial Brief.[54] 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. While the ALJ and Commission must factor these developments into their review of the record, nothing in the record indicates that the ALJ and Commission can simply kick the capacity need can down the road. Rather, the record demonstrates the need for lower capital cost, quick starting facilities in the form of Capacity Resources, to be added to the Xcel system beginning in 2017.

IV. NEXT STEPS.

Invenergy continues to respectfully request that the ALJ recommend and the Commission approve selection of Invenergy's Expansion and Hampton projects to meet Xcel's need. If the ALJ and Commission have any question that Invenergy provides the most reasonable and prudent alternative for meeting this need, then no resource (including Xcel's Black Dog proposal) should receive final "approval" at this time, but the Expansion should move to PPA negotiations. In addition, Invenergy believes the

[53] In its Public Comment, XLI also complains without merit that it "was not allowed to participate and develop the record." XLI Comments, November 22, 2013, pp. 12-14. To the contrary, the ALJ properly denied XLI's Petition to Intervene, given the extremely tardy nature of the Petition. However, nothing prevented XLI from presenting public testimony and exhibits or even questioning witnesses. *See* Minn. R. 1400.6200, subp. 5. For whatever reason, XLI chose not to take advantage of those alternatives.

[54] *See* Invenergy Initial Brief, pp. 16-27.

record demonstrates the potential ratepayer benefits of Hampton, so it too should move to PPA negotiations. In order to ensure as much transparency as possible and to ensure Xcel does not unduly delay such negotiations, Invenergy recommends that the ALJ and Commission establish a reporting process and a timeline for completion of all PPA negotiations, with that timeline set to ensure the feasibility of a 2017 in-service date. Invenergy recommends an aggressive timeline, given that the parties already have existing PPAs and that Xcel has already circulated its proposed Dispatchable Model PPA.[55]

CONCLUSION

Invenergy files this Reply Brief over three years after the filing of Xcel's 2010 IRP, which spawned the current resource acquisition. Certainly, much has changed since that time regarding Xcel's system and much will continue to change. However, if no resource is selected until Xcel's system stops changing, no resource decision will ever be made. Instead, the ALJ and Commission must factor in the dynamic nature of the Xcel system as part of the overall review of the record, in order to make the "best" resource selection at this time. Such a "big picture" review of the record shows that the Invenergy proposals:

- Impose far lower capacity costs on Xcel ratepayers than the combined cycle intermediate resource offered by Calpine;
- Provide a more predictable cost than the Xcel "self-build" proposal;

[55] *See* Ex. 46, p. 47 (Wishart Direct).

- Provide the appropriate type of resource for the Xcel system, given the decreasing load factor and the increasing penetration of wind and solar resources on the Xcel system;

- Provide Xcel the needed capacity resources reliably and efficiently, given the ability to utilize existing infrastructure;

- Preserve maximum flexibility to meet Xcel's needs going forward, given the dynamic nature of the Xcel, State and regional systems and load forecasts;

- Minimize environmental impacts and bring substantial benefits to a supportive local community; and

- Accomplish these results in full harmony with other applicable policies, rules and regulations.

For those reasons, Invenergy respectfully asks the ALJ to recommend and the Commission to approve the selection of the Invenergy proposals to meet Xcel's need.

Dated: December 6, 2013

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BEFORE THE MINNESOTA OFFICE OF ADMINISTRATIVE HEARINGS
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St. Paul, Minnesota 55101

FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION
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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** **OAH Docket No. 8-2500-0760**

PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW OF INVENERGY THERMAL DEVELOPMENT LLC

December 6, 2013

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I. APPLICABLE LAW

1. Prior Minnesota Public Utilities Commission ("Commission") Orders and Minnesota's certificate of need statutes and rules guide the consideration of the record in this proceeding.

2. The Commission initiated this docket following lengthy debate and analysis of the resource needs of Northern States Power Company d/b/a Xcel Energy ("Xcel") in multiple other dockets, most notably: Xcel's Prairie Island Extended Power Uprate docket, in which the Commission ultimately terminated Xcel's certificate of need for an increase in baseload capacity at the Prairie Island nuclear plant;1 Xcel's 2010 Integrated Resource Plan;2 and Xcel's Black Dog repowering docket, where Xcel ultimately withdrew its request for a certificate of need for an approximately 450 megawatt ("MW") combined cycle facility at the Black Dog site3 (collectively, the "Related Dockets").

3. Through its work in the Related Dockets and its Orders in the current docket, the Commission has established the need for new capacity on the Xcel system in the 2017-2019 time frame. In addition, the Commission has required a comprehensive review of the available resource options, so that Xcel ratepayers receive the benefit of the best resource to fit this need. Specifically, the Commission found in the 2010 IRP Docket 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."4 The Commission opened the current docket to select the resource or resources that best meet Xcel's need.

4. Through multiple Orders, the Commission has stated that the Certificate of Need statutes and rules will guide its consideration of the various resource options to fill Xcel's need. When first soliciting comments on the resource proposals submitted, the Commission asked parties to provide input on:

> The completeness of Xcel Energy's resource proposal using certificate of need-like criteria for an out-of-state resource and the requirements outlined in the Commission's May 31, 2006 Order in Docket E002/RP-04-1752.
>
> [and]

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

The completeness of alternative bidders' resource proposals under the requirements outlined in the Commission's May 31, 2006 Order in Docket E002/RP-04-1752."[5]

5. In that May 2006 Order, the Commission stated:

> The Commission is convinced that the heightened scrutiny and rigorous factual development of the certificate of need process are required whenever Xcel competes in its own competitive procurement process. The Commission will therefore require the use of the certificate of need procedural framework whenever Xcel proposes a self-build option in the competitive resource procurement process.
>
> The Company simply – and necessarily – has too much control over resource selection to use the standard process when it is a bidder. It has much more reliable and complete information about its own needs than its competitors. It also has superior information about its existing generation portfolio, the configuration of its transmission system, and any synergies that would result from adding different resources to the mix.
>
> All these advantages, combined with a clear and unavoidable conflict of interest, point to a need to use the more stringent, certificate-of-need-like process whenever the Company submits its own proposal.[6]

6. Thus, while a certificate of need itself is not required for a resource selected through a Commission-approved competitive bidding process,7 this resource selection proceeding mirrors a certificate of need process and the certificate of need statute and rules provide the overall structure and framework for the analysis of the various resource alternatives.

7. Minnesota's certificate of need statute requires the Commission to consider, among other factors, "the relationship of the proposed facility to overall state energy needs," and the "benefits of [the] facility, including its uses to protect or enhance environmental quality, and to increase reliability of energy supply in Minnesota and the region."[8]

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[5] Notice of Comment Period on the Completeness of Xcel Energy and Alternative Bidders' Resource Proposals, April 17, 2013 (emphasis added).
[6] MPUC Docket E-002/RP-04-1752, Order Establishing Resource Acquisition Process, Establishing Bidding Process under Minn. Stat. § 216B.2422, subd. 5 and Requiring Compliance Filing, May 31, 2006, p. 7 (emphasis added).
[7] Minn. Stat. § 216B.2422, subd. 5.
[8] *Id*., subparts (3) and (5).

8. The Commission's certificate of need rules set forth more specific criteria upon which to choose the appropriate resource in this proceeding.[9] In order to approve a resource, the Commission's rules require it to determine that:

> A. the probable result of denial [of the facility] would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states, . . .
>
> B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record, considering:
>
> (1) the appropriateness of the size, the type, and the timing of the proposed facility compared to those of reasonable alternatives;
>
> (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives . . .;
>
> (3) the effects of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and
>
> (4) the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives;
>
> C. by a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health, . . . and
>
> D. the record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.[10]

[9] Minn. R. 7849.0120.
[10] Minn. R. 7849.0120.

II. THE ALTERNATIVES PROPOSED

9. In response to the Commission-directed Request for Proposals issued by Xcel, five parties submitted timely proposals: (1) Xcel, with self-build proposals consisting of a 215 MW combustion turbine peaking facility at Black Dog 6 and two 215 MW combustion turbines in North Dakota; (2) Invenergy, with a 179 MW combustion turbine peaking facility at Cannon Falls and two 179 combustion turbines at Hampton; (3) Calpine, with a 345 MW combined cycle intermediate facility at Mankato; (4) Geronimo, with a 100 MW distributed solar capacity intermittent resource; and (5) Great River Energy, with a proposed short term sale of capacity credits.

III. INVENERGY AND THE INVENERGY PROPOSALS

10. Invenergy has developed over 7,500 MW of utility-scale renewable and natural gas-fueled power generation facilities in the United States, Canada, and Europe. This portfolio includes more than 5,700 MW of projects in operation, with more than 1,800 MW under contract or in construction.

11. Invenergy has a large portfolio of natural gas-fueled electric generating facilities in the United States and Canada. This portfolio includes green-field projects initiated by Invenergy, as well as facilities acquired and completed by it. Operating projects in North America total 2,245 MW and include the Cannon Falls Energy Center. In total, Invenergy and its affiliate have funded more than $10 billion in corporate and power project financings in the last seven years.[11]

12. Invenergy's Cannon Falls Energy Center commenced commercial operations in 2008. The project consists of two simple cycle, dual fuel GE 7FA combustion turbines, providing 357 MW of peaking capacity. The project receives natural gas via Greater Minnesota Transmission and Northern Natural Gas. Xcel purchases the output of the project under a long-term power purchase agreement reviewed and approved by this Commission.[12]

13. The existing Cannon Falls facility has had a 96.9% Capacity Availability Factor over the last two years. After adjusting for planned outages, the Cannon Falls facility has shown a reliability of 99.2% since the 2008 commercial operation date.[13]

14. Cannon Falls City Administrator Aaron Reeves expressed the support of the city council, the city's economic development authority, the county and the school district for Invenergy's Cannon Falls Expansion ("Expansion") proposal. Mr. Reeves noted that the city, county and township conducted an extensive public hearing process

[11] *Id*., pp. 6-9.
[12] *Id*., pp. 5-7.
[13] *Id*., p. 12.

prior to construction of the existing Cannon Falls facility, culminating in a host agreement between Invenergy, the city, the county and the schools. Mr. Reeves testified 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, Mr. Reeves testified that 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."[14]

15. No other host community provided public testimony regarding the alternative proposals.

16. The Expansion can be operational as early as January 1, 2016 with commercial operation beginning June 1, 2016 if necessary to meet Xcel's need by 2017.[15] Only Invenergy indicated an ability to meet a 2016 in-service date.

17. Invenergy offered identical pricing for either a June 1, 2016 or a June 1, 2017 commercial operation date, thereby providing front end flexibility to Xcel that no other proposer offered, including Xcel itself.[16] In addition, Invenergy offered in-service dates of June 1, 2018 and June 1, 2019, adding to the flexibility of its proposal and enabling a "best fit" to the system needs.[17]

18. In response to Xcel's inclusion of a "replacement cost" assumption in its analysis of the Expansion, Invenergy also offered an additional power purchase agreement ("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.[18] No other bidder offered a similar term.

19. The Expansion will be located just south of the Twin Cities metropolitan region, providing geographic diversity relative to other Xcel generation resources yet also utilizing existing infrastructure such as the operations and maintenance building, fuel oil unloading and storage facilities, transmission system and natural gas pipeline facilities and other equipment. As such, Invenergy is able to minimize the cost of the project and minimize any adverse impact to the surrounding community and existing land uses.

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[14] Public Hearing, October 15, 2013, Transcript pp. 30-34; *see also* Ex. 70, Attachment 3 (Shield Direct).
[15] Ex. 70, Attachment 1, pp. 4, 8 (Shield Direct).
[16] Ex. 69, p. 4 (Ewan Rebuttal); TRADE SECRET Ex. 87, Attachment SR-R-9, pp. 3-4 (Rakow Rebuttal).
[17] *Id*.
[18] Ex. 69, p. 17 (Ewan Rebuttal).

20. The personnel and operations necessary for the Expansion will be integrated with the existing Cannon Falls facility, resulting in cost-saving synergies.[19]

21. For the Expansion, Invenergy offered to enter into a fixed price PPA to be executed and in which Invenergy assumes the construction and operation cost risk associated with the Expansion. Invenergy's performance will be backed by security in the amount of $15 million upon execution of the PPA, reduced to $5 million for the full term of the PPA upon reaching the commercial operation date.[20]

22. Regarding potential environmental impacts, given that the Expansion will be located on 9.3 acres of vacant land that is directly north of the existing Cannon Falls units and in an industrial park, no re-zoning will be required.[21] The record demonstrates that the Expansion would have a minimal visual impact to the surrounding area and minimal impact to the local topography or to soil compaction or erosion issues, particularly as compared to a greenfield site.[22] The Expansion will require only a modest amount of water for evaporative cooling on hot summer days and for emission controls when firing back-up fuel and that water can be supplied via the existing infrastructure. No surface water will be used.[23]

23. As a peaking facility, the Expansion will operate a limited number of hours annually. In addition to limiting the number of operating hours, potential emissions will be limited through use of pipeline quality natural gas with dry low NOx burners for the majority of its operating time. Additionally, a water injection system will minimize NOx emissions when fuel oil is used as an emergency back-up fuel.[24]

24. Regarding other potential impacts, the record demonstrates that traffic impact during construction will be fairly minor, with no adverse impact to traffic during operations.[25] The Expansion will comply with State noise standards and does not produce solid waste. Invenergy also identified all relevant permits for the project and will continue its strong record of compliance on all regulatory matters.[26]

25. The Hampton proposal calls for the development of approximately 357 MW of peaking capacity using two simple cycle, approximately 179 MW GE 7FA Combustion Turbine Generators ("CTG") to be located at a new site in Dakota County,

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[19] Ex. 70, pp. 12-14 (Shield Direct).
[20] *Id*., p. 14.
[21] Ex. 65, p. 17 (Ewan Direct).
[22] *Id*.; Ex. 38, p. 23 (DOC EERA Environmental Report).
[23] Ex. 65, p. 17 (Ewan Direct); Ex. 38, pp. 17-18 (DOC EERA Environmental Report).
[24] Ex. 38, p. 37 (DOC EERA Environmental Report).
[25] Ex. 65, p. 18 (Ewan Direct); Ex. 38, p. 58 (DOC EERA Environmental Report).
[26] Ex. 65, pp. 18-19, 33 (Ewan Direct).

Minnesota.[27] As with Cannon Falls, Hampton can be operational as early as January 1, 2016, with commercial operation beginning June 1, 2016 if necessary.[28] Again, Invenergy offered identical pricing for either a June 1, 2016 or a June 1, 2017 commercial operation date[29] Invenergy also offered in-service dates of June 1, 2018 and June 1, 2019 for Hampton, adding to the flexibility of its proposal to enable a "best fit" to the system needs.[30] As with the Expansion, in response to Xcel's inclusion of a "replacement cost" assumption in its analysis, Invenergy offered an additional power purchase agreement ("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.[31]

26. For Hampton, Invenergy has optioned property immediately adjacent to the site of the new 345 kV Hampton Substation. This location will concentrate industrial land use in one area and thus require minimal changes to existing land use. Hampton will also interconnect to an existing natural gas pipeline of Greater Minnesota Transmission ("GMT") that runs less than one-half mile from the proposed project site. This ideal location with its close proximity to gas and electrical infrastructure minimizes cost, minimizes disruption to existing land usage and minimizes overall community disturbance.

27. Hampton also offers the same personnel and operations benefits as the Expansion, similar negligible impacts to traffic, noise, water resources impacts and air emissions, and Hampton will be backed by similar security, providing assurance to the Commission, Xcel and its ratepayers that Invenergy will meet the commitments set forth in its Hampton Proposal.[32]

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[27] Ex. 70, Attachment 2 (Shield Direct) contains the PUBLIC version of the Hampton Energy Center Proposal, while TRADE SECRET Ex. 72 contains the full proposal. During the evidentiary hearings it became apparent that the Department and Xcel modeled the Expansion solely as a single 357 MW addition of capacity, despite Hampton actually consisting of two 179 MW turbines. Transcript Vol. 1, p. 105-106 (Wishart), stating that "the Hampton Corners combustion turbines were paired together, therefore Strategist was forced to select those as a combination." (Emphasis added.)

[28] Ex. 70, Attachment 1, p. 8 (Shield Direct).

[29] Ex. 69, p. 4 (Ewan Rebuttal); TRADE SECRET Ex. 87, Attachment SR-R-9, pp. 3-4 (Rakow Rebuttal).

[30] *Id*.

[31] Ex. 69, p. 17 (Ewan Rebuttal).

[32] Ex. 70, pp. 15-16 (Shield).

IV. CERTIFICATE OF NEED CRITERIA ANALYSIS

A. The Effect Upon The Future Adequacy, Reliability, Or Efficiency Of Energy Supply.

28. 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.[33]

29. 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."[34]

30. 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.

31. Xcel will add dramatically greater wind energy to its system than envisioned by the Commission at the time it initiated this proceeding.[35] 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.[36] 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.[37]

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

[34] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 6.

[35] *See* Transcript Vol. 2, p. 10 (Ewan).

[36] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 4.

[37] 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.

32. 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.[38] Given wind's unpredictable nature, Xcel must simultaneously maintain sufficient amounts of flexible and efficient quick-starting resources – Capacity Resources – to balance the system.[39]

33. 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."[40] 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.[41]

34. 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.[42]

35. 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.[43] These concerns typically lead utilities to add Capacity Resources in the form of peaking facilities as they add Intermittent Resources.[44]

36. 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.[45] In contrast, Xcel's current peaking capacity fails to even

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[38] Ex. 65, p. 23, fn. 1 and p. 27 (Ewan Direct); Ex. 73, p. 4, fn. 4 and pp. 16 – 20 (Norman Rebuttal).
[39] Ex. 65, p. 27 (Ewan Direct); Ex. 73, pp. 16-20 (Norman Rebuttal).
[40] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[41] Ex. 65, p. 7 (Ewan Direct).
[42] Minn. Stat. § 216B.1691, subd. 2f; *see also* Transcript Vol. 2, p. 10 (Ewan).
[43] Ex. 73, pp. 16-17 (Norman Rebuttal).
[44] *Id*.
[45] *Id*., pp. 17-18.

match its existing wind capacity.[46] After the addition of another 750 MW of wind, Xcel's peaking capacity will decrease to only two-thirds of its wind capacity,[47] leaving it particularly vulnerable to wind ramp down events.

37. 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."[48]

38. 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.[49] 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."[50]

39. 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.[51] 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."[52]

40. 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.[53]

41. 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.

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[46] *Id*.
[47] *Id*, p. 19.
[48] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[49] Transcript Vol. 1, pp. 42-43 (Hibbard).
[50] Transcript Vol. 1, pp. 62-63 (Hibbard); Ex. 93 (Hibbard presentation to Clean Energy Regulatory Forum, April 2012).
[51] 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.
[52] MPUC Docket No. E-002/CN-11-184, Department of Commerce Letter, March 1, 2012, p. 2.
[53] Ex. 76, p. 10 (Shah Direct).

42. 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.[54]

43. 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.[55]

44. The Invenergy proposals assume interruptible gas supply to the facilities. The record demonstrates that interruptible supply saves ratepayers significant expense without jeopardizing reliability.[56] The Xcel system peaks in the summer when gas supply is readily available.[57] 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.[58] 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.[59]

45. 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.[60] 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).

46. 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.[61] On such systems, ratepayer costs are minimized with Capacity Resources, since

[54] Minn. R. 7849.0120 (A).
[55] Transcript Vol. 2, pp. 9 – 10 (Ewan).
[56] Ex. 69, pp. 8-9 (Ewan Rebuttal); Ex. 47, p. 20 (Wishart Rebuttal).
[57] *Id.*; Ex. 47, p. 21 (Wishart Rebuttal).
[58] *Id.*
[59] Ex. 69, p. 9 (Ewan Rebuttal).
[60] Ex. 87, p. 10 (Rakow Rebuttal).
[61] *Id.*, p. 11.

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.[62]

47. 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.[63] 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,"[64] rather than a combined cycle facility such as that proposed by Calpine. to the Invenergy proposals.

48. 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.

B. Alternatives Analysis.

1. Invenergy.

49. 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, 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.

50. 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.[65] As the Department recognized, modeling suggests that the flexible in-service dates for the Expansion could provide substantial cost savings to ratepayers.[66] 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

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[62] *Id*.
[63] MPUC Docket No. E-002/CN-11-184, Xcel Motion to Withdraw Application, p. 2.
[64] *Id*.
[65] Ex. 69, p. 4 (Ewan Rebuttal); TRADE SECRET Ex. 87, Attachment SR-R-9, pp. 3-4 (Rakow Rebuttal).
[66] Ex. 86, p. 11 (Rakow Rebuttal); Transcript Vol. 2, p. 55 (Rakow).

Falls.[67] Thus, Invenergy offers flexible Capacity Resource additions that can meet the needs of the Xcel system on an incremental and as needed basis.

51. By offering a proposed 20 year PPA, the Invenergy proposals provide ratepayers the benefit of a re-evaluation of Xcel's resource needs at the end of that contract.[68] 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.[69] 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.

52. 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.[70]

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

54. The record of this proceeding contains three sets of Strategist modeling results, two from the Department and one from Xcel.[71] Xcel's Strategist modeling shows Invenergy's Expansion proposal (with an early in-service date of 2016) as being a part of the overall least cost set of resources, together with the Xcel self-build at Black Dog.[72] 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.[73]

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

56. 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

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[67] *See* TRADE SECRET Ex. 87, Attachment SR-R-9, pp. 3-4 (Rakow Rebuttal).
[68] *Id*., pp. 31-32.
[69] Ex. 69, p. 17 (Ewan Rebuttal).
[70] *Id*., pp. 12-13.
[71] 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).
[72] Ex. 44, p. 26 (Wishart Direct).
[73] Ex. 87, p. 3 (Rakow Rebuttal).

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.[74] Despite this clarification, neither Xcel nor the Department ever modeled the Invenergy proposals with an in-service date of 2017.[75] 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.

57. 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.[76] Revising the run time per start to equal something more reflective of actual performance would further lower the cost of the Expansion.[77]

58. Strategist also incorrectly "rewards" high forced outage rates.[78] 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.[79] 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.[80]

59. 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 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.[81]

60. 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

[74] Ex. 69, p. 4 (Ewan Rebuttal); Transcript Vol. 2, p. 8 (Ewan).
[75] *See* Transcript Vol. 1, p. 102 (Wishart) and Transcript Vol. 2, p. 55 (Rakow).
[76] Ex. 69, p. 4 (Ewan Rebuttal).
[77] *Id*.
[78] *Id*., p. 5.
[79] *Id*.; Transcript Vol. 2, p. 8 (Ewan).
[80] *Id*.
[81] Ex. 69, p. 5 (Ewan Rebuttal).

in the context of the same plan and to get a "cleaner comparison of just the economics of one proposal versus the other."[82]

61. 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.[83] 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."[84]

62. 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.[85] 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."[86] For Black Dog, the impact of the Department's adjustment meant "a $10 million penalty for the project."[87] 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."[88] Nothing in the record explains the basis for this substantial penalty.

63. 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 improve the standing of the Expansion. In addition, after correcting these assumptions the model results for Hampton may show an even more dramatic effect.[89] 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.

64. 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

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[82] Transcript Vol. 1, pp. 97-98.
[83] Ex. 47, p. 7 (Wishart Rebuttal).
[84] *Id*.
[85] The Department did no detailed modeling of Hampton but presumably the same adjustment would have been applied.
[86] Ex. 47, pp. 13-14 (Wishart Rebuttal).
[87] *Id*., p. 6.
[88] *Id*., pp. 13-14 (emphasis added).
[89] Ex. 69, p. 5 (Ewan Rebuttal).

costs of firm gas supply.[90] 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."[91] 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."[92]

65. 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.[93]

2. Calpine.

66. 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.[94]

67. Combined cycle capacity carries a higher capacity cost (and lower energy cost) than a Capacity Resource such as a combustion turbine.[95] 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.[96]

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[90] *See, e.g.*, Ex. 53, p. 6 (Hibbard Rebuttal).
[91] Ex. 47, p. 20 (Wishart Rebuttal) (emphasis added).
[92] *Id.*, pp. 20-21.
[93] Ex. 69, p. 18 (Ewan Rebuttal); Ex. 43, pp. 3-5 (Ford Rebuttal).
[94] Ex. 86, p. 11 (Rakow Rebuttal).
[95] Ex. 69, p. 8 (Ewan Rebuttal).
[96] *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,

68. 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."[97]

69. 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.[98] 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.[99]

70. 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 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."[100]

71. 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,

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p. 8 of 10 (Expansion) and p. 10 of 10 (Calpine) (Wishart Direct) (showing the year-by-year difference in total capacity costs).

[97] Ex. 51, pp. 25-26 (Hibbard Direct).

[98] Ex. 73, pp. 28-31 (Norman Rebuttal); Ex. 65, pp. 25-27 (Ewan Direct).

[99] 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).

[100] Ex. 91, p. 13; Transcript Vol. 1, pp. 54-55 (Hibbard).

> 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.[101]

72. 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.[102]

73. Calpine attempted to support its proposal with a levelized cost of energy ("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 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."[103]

74. 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."[104]

75. 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."[105] 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

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[101] Ex. 73, pp. 28-29, quoting Staff Briefing Papers, MPUC Docket No. E-002/RP-10-825, February 20, 2013, p. 5.
[102] Ex. 73, p. 29 (Norman Rebuttal).
[103] Ex. 47, p. 15-16 (Wishart Rebuttal).
[104] Ex. 53, p. 16 (Hibbard Rebuttal).
[105] 2010 IRP Docket, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket, March 5, 2013, p. 6.

this indicates a need for "intermediate and baseload capacity in the face of potential retirements."

76. The record fails to supports 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.[106]

77. 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.[107] These favorable economics have kept Xcel's baseload resources highly utilized plants compared to other baseload generators.[108] 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.[109]

78. 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."[110]

79. 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."[111] Rather, Xcel's near-term capacity needs are best met with relatively less expensive (on a capital basis) Capacity Resources.

3. Xcel.

80. Like Invenergy, Xcel proposes Capacity Resources to meet its need. To meet an identified 150 MW need in 2017 (or perhaps less as indicated in Xcel's September 2013 update) and up to a 500 MW need in 2019, Xcel proposed a total of 645

[106] Ex. 73, p. 23 (Norman Rebuttal).
[107] *Id*., p. 25.
[108] *Id*.
[109] *Id*., pp. 25-26.
[110] *Id*., p. 29.
[111] *See* Transcript Vol. 2, pp. 15-16 (Norman).

MW of Capacity Resources, consisting of three 215 MW combustion turbine generators – one to be located at Black Dog and two to be located in North Dakota.[112]

81. 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.[113]

82. 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.

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

84. As both bidder and buyer Xcel fails to offer ratepayers the benefit of a fixed-price proposal.[114] In an effort to compensate for that fact, Xcel proposed a rate rider for each of the three 215 MW units in its proposal.[115] 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."[116] 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, Xcel would receive a bonus of 1% (or 100 basis points) above its authorized return on equity.[117]

85. 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."[118] The Department did not ask information requests of Xcel to further explore this issue.[119] 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

[112] Ex. 49, pp. 2-3 (Alders Direct).
[113] *See* Ex. 65, pp. 31-32 (Ewan Direct).
[114] *Id*. at 32.
[115] Ex. 49, p. 5 (Alders Direct).
[116] *Id*.
[117] *Id*. The Xcel proposal also suggested a one-half percentage point decrease/increase if capital costs exceeded/fell short of the estimated cost.
[118] Transcript Vol. 2, p. 54 (Rakow) (emphasis added).
[119] *Id*.

them."[120] 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.

86. 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. [121]

4. Geronimo.

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

88. The Geronimo offers 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.[122]

89. 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.

5. GRE

90. 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.[123] Thus, the record demonstrates that it is neither reasonable nor prudent for Xcel to pursue a capacity credit purchase from GRE.

6. Summary

91. Compared to the alternatives, Invenergy's Expansion and Hampton proposals: (1) best fit Xcel's needs in terms of size, (2) offer flexible timing, (3) offer a

[120] *Id*.
[121] Ex. 69, p. 14 (Ewan Rebuttal).
[122] Transcript Vol. 2, p. 56 (Rakow).
[123] Ex. 46, p. 24 (Wishart Direct).

fixed and economical price, and (4) ensure flexibility going forward to adapt to any continued changes on the Xcel system in terms of either its supply side resources or its capacity and energy demand.

C. Impacts on the Natural and Socioeconomic Environments.

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

93. 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."[124] 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.

94. 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.[125] 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.[126]

95. 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."[127]

96. 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

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[124] Minn. R. 7849.0120 C (1).
[125] Ex. 65, pp. 12-13 (Ewan Direct).
[126] *Id*., p. 13.
[127] Public Hearing, October 15, 2013 Transcript, pp. 30-34; *see also* Ex. 70, Attachment 3 (Shield Direct).

business and residential ratepayers at a time when they face regular and significant rate increases.[128]

97. 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 facilities to maintain compliance with local, state and federal regulations.[129] Each facility will implement a comprehensive compliance tracking program and to ensure ongoing compliance and to alert appropriate staff to upcoming requirements.[130]

98. The Expansion and Hampton will fully comply with all applicable air quality regulations, including undergoing a Best Available Control Technology review.[131] Once operational, emissions from the facilities will be minimized through multiple means.[132] The Cannon Falls facility has operated well below its permitted emissions levels.[133]

99. Regarding air emissions, Calpine contends that its combined cycle proposal is "a cleaner option" than the combustion turbines proposed by Invenergy.[134] However, Calpine's combined cycle facility will not necessarily result in significantly lower emissions.[135] As Calpine acknowledged, combined cycle facilities have a longer start-up time than combustion turbines.[136] During that start-up time, combustion controls are not yet effective and emissions are higher than the "steady state" emissions from the facility.[137] Moreover, combined cycle facilities typically operate at a higher capacity factor than a combustion turbine, meaning significantly more total emissions.[138] 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.

[128] Ex. 70, p. 20 (Shield Direct).
[129] Ex. 70, Attachment , p. 13 (Shield Direct).
[130] *Id*.
[131] Ex. 69, pp. 12, 18 (Ewan Rebuttal).
[132] Ex. 65, pp. 17-18 (Ewan Direct).
[133] Ex. 69, p. 5 (Ewan Rebuttal).
[134] Ex. 51, p. 30 (Hibbard Direct).
[135] Ex. 69, p. 12 (Ewan Rebuttal); Ex. 43, pp. 4-5 (Ford Rebuttal).
[136] Transcript Vol. 1, pp. 42-43, 62-63 (Hibbard); Ex. 93.
[137] Ex. 69, p. 12 (Ewan Rebuttal).
[138] Ex. 43, p. 4 (Ford Rebuttal).

D. Compliance With All Relevant Policies, Rules, And Regulations Of Other State And Federal Agencies And Local Governments.

100. Invenergy has listed the relevant permits for both the Expansion and Hampton.[139] In addition, the record demonstrates Invenergy's strong commitment to regulatory compliance.[140] 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.

V. PROCEDURAL RECOMMENDATIONS OF PARTIES.

101. Invenergy requested that the ALJ recommend and the Commission order the selection of the Expansion and Hampton projects to meet the capacity needs identified for the Xcel system in the 2010 IRP Docket and as further developed in this proceeding. Regarding Hampton, Invenergy recommended consideration of delayed in-service dates, using the pricing information already provided to Xcel.[141] At a minimum, Invenergy recommended that its proposals should move forward to PPA negotiations with Xcel, given the flexibility these proposals provide – both in the 2017-2019 time frame and beyond.

102. Calpine asked the Commission to approve its Mankato facility.[142] Calpine does not appear to support moving one or more proposals forward to PPA negotiations.

103. Xcel recommends that the Commission approve the selection of its Black Dog proposal at this time and that the remaining needs be satisfied with either Invenergy's Expansion project or the Calpine project, depending on the results of PPA negotiations.[143] However, the details of Xcel's recommendation remain unclear. For example, Xcel noted the potential benefit of flexibility so as to best meet its needs and stated that "our (Xcel's) proposal includes the flexibility to adjust in-service dates or even cancel development of one or more units in the event of changed circumstances warrant (sic)."[144] Thus, it is unclear exactly what Xcel means when it recommends that the Commission "select" Black Dog at this time.

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[139] Ex. 65, pp. 18-19, 21-22 (Ewan Direct).
[140] *Id.*; Ex. 70, p. 21 and Attachment 1, p. 13 and Attachment 2, p. 13 (Shield Direct).
[141] That pricing information is set forth in TRADE SECRET Ex. 87, Attachment SR-R-9, pp. 3-4 (Rakow Rebuttal).
[142] *See* Ex. 55, p. 13 (Thornton Direct).
[143] Ex. 49, p. 8 (Alders).
[144] *Id*.

104. Xcel also specifically discusses the possibility that it may ultimately cancel either or both of the Invenergy or Calpine projects.[145] In addition, Xcel recommends that the ALJ and Commission "hold [Xcel's] Red River Valley Unit 1 in reserve in the event neither the Cannon Falls nor Mankato PPA is acceptable upon completion of the negotiation phase."[146]

105. As discussed in the Alternatives section, above, the record cannot support final "selection" of Black Dog 6 at this time. Xcel's unique role as both "bidder" and "buyer" in this proceeding creates challenges when comparing Xcel's proposal with other parties' formal bids. Xcel's assumed costs related to Black Dog remain opaque.[147] In addition, Xcel fails to offer ratepayers the benefit of a fixed-price proposal and its proposed "rate rider" offers ratepayers little or no meaningful protection from cost overruns to ratepayers.[148] As the Department noted, no one can state with confidence that Black Dog is a "least cost" resource at this time.[149]

106. Sound public policy also cannot support "approving" Xcel's Black Dog build now, while sending other proposals to the potential purgatory of PPA negotiations. Xcel would have little motivation to favorably conclude those negotiations, particularly given that it seeks to "hold in reserve" the option of a further self-build in North Dakota if PPA negotiations fail. Approving an Xcel self-build now, on the basis of this record, while also leaving open the possibility of a further self-build pending the outcome of PPA negotiations between third party providers and Xcel would send a chilling message to independent power producers with respect to any future resource selection proceedings in Minnesota.

107. The Department recommends that three projects move forward at this time – Invenergy's Expansion, the Calpine combined cycle plant and Xcel's Black Dog proposal.[150] However, the Department does not recommend that any project, including Black Dog, be "approved" at this time, since any two of the three projects the Department recommends may end up being the least cost option.[151]

VI. RECOMMENDATION

108. The Administrative Law Judge finds that the record in its totality demonstrates that the Invenergy and Hampton proposals most reasonably and prudently meet the need on Xcel's system in the 2017 – 2019 time frame and should be selected.

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[145] *Id*., p. 28.
[146] *Id*., p. 29.
[147] *See* Transcript Vol. 2, p. 54 (Rakow).
[148] Ex. 69, p. 14 (Ewan Rebuttal).
[149] Transcript Vol. 2, p. 52 (Rakow).
[150] Ex. 86, p. 21 (Rakow Rebuttal).
[151] Transcript Vol. 2, p. 52 (Rakow).

Xcel and Invenergy should proceed to PPA negotiations and the final PPAs should be presented to the Commission for its review and approval.

109. In the alternative, the Commission should make no final "selection" at this time, but forward the Invenergy proposals to PPA negotiations, along with any other proposal the Commission believes may as reasonably and prudently meet Xcel's needs. Given the looming need for additional resources, the Commission should place strict timelines on those negotiations.

Dated: December 6, 2013

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