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STATE OF MINNESOTA
BEFORE THE OFFICE OF ADMINISTRATIVE HEARINGS
FOR THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Petition	)	
Northern States Power Company	)	**MPUC Docket No. E-002/CN-12-1240**
to Initiate a Competitive	)	**OAH Docket No. 8-2500-30760**
Resource Acquisition Process	**)**	

INITIAL BRIEF OF CALPINE CORPORATION

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INITIAL BRIEF OF CALPINE CORPORATION

Pursuant to Your Honor's July 17, 2013 Second Prehearing Order, Calpine Corporation and its affiliate Mankato Energy Center, LLC ("Calpine") hereby submit their Initial Brief in the above-referenced proceedings. As discussed below, the record developed in this case supports the selection of Calpine's April 15, 2013 Expansion Proposal to supply a portion of the estimated 500 megawatts ("MW") of Xcel Energy Inc.'s ("Xcel") forecasted resource need for the 2017 to 2019 timeframe. Calpine's Expansion Proposal achieves the goal of installing additional electric generation capacity to help meet customer demand with state-of-the-art, environmentally responsible and cost effective combined cycle technology.

I. CALPINE'S EXPANSION PROPOSAL

Calpine's Expansion Proposal involves the planned completion of its existing Mankato Energy Center located within the City of Mankato, Minnesota, through the addition of one natural gas-fired combustion turbine generator ("CTG"), an additional heat recovery steam generator ("HRSG"), and related ancillary equipment. Selection of Calpine's Proposal would result in an incremental 345 megawatts ("MW") of integrated combined-cycle and peaking capacity for Xcel's customers, as measured under winter conditions. Selection of Calpine's

Expansion Proposal would culminate in the execution of a long-term, twenty (20) year power purchase agreement ("PPA") between Calpine and Xcel.

II.
EXECUTIVE SUMMARY

Through Xcel's Integrated Resource Planning ("IRP") process, the Minnesota Public Utilities Commission ("Commission") determined that Xcel would require an additional 150 MW of capacity by 2017, increasing up to 500 MW by 2019 to reliably serve its customers.[1] The Commission subsequently established an open and transparent competitive procurement process to meet Xcel's future resource needs and requested that developers file proposals to meet some or all of Xcel's needs. The Commission ultimately received proposals from Calpine, Geronimo Energy, LLC ("Geronimo"), Great River Energy ("GRE"), Invenergy Thermal Development, LLC ("Invenergy") and Xcel, which proposed to build and own resources to meet the identified need.[2]

In its June 21, 2013 Notice and Order for Hearing issued in this proceeding, the Commission stated that "the ultimate issue in this case is the identification of resource proposals that will provide the most reasonable and prudent strategy for Xcel to meet the needs of its service area."[3] The expansive record developed in this proceeding clearly demonstrates that Calpine's Expansion Proposal represents the most prudent and reasonable strategy based upon both quantitative and qualitative metrics.

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[1] *See In the Matter of Xcel Energy's 2011-2025 Integrated Resource Plan*, Docket No. E-002/RP-10-825, Order Approving Plan, Finding Need, Establishing Filing Requirements, and Closing Docket (March 5, 2013).

[2] Geronimo proposed 100 MW of solar generation distributed at various sites; GRE proposed to sell capacity resource credits to Xcel for the years of 2017-2019; Invenergy submitted a proposal to expand its existing Cannon Falls facility with the addition of a combustion turbine ("CT") and build a new Hampton Energy Center with two CT units; and Xcel proposed to build one 215 MW CT at its existing Black Dog generating station ("Black Dog 6") and two 215 MW CT units at a new site in North Dakota ("Red River Valley Units").

[3] June 21, 2013 Notice and Order for Hearing at p. 5.

In this proceeding three parties submitted comprehensive quantitative economic analyses outlining the objective merits of the proposed resources – all of which support the selection of Calpine's Expansion Proposal to meet all or a portion of Xcel's future resource needs. Calpine Witness Paul J. Hibbard demonstrated that Calpine's Expansion Proposal is the least expensive option among the thermal energy resources offered in this procurement by Xcel, Calpine, and Invenergy based on the levelized cost of electricity ("LCOE") as seen from the perspective of Xcel's ratepayers. The LCOE results show that the Calpine Expansion is the least cost resource over a broad range of differing scenarios, assumptions and contingencies – demonstrating that the Expansion can serve as a valuable hedge against foreseeable and unknown changing system conditions for years to come.

Similarly, the Department of Commerce's ("Department") and Xcel's Strategist analyses, which analyzed the present value of societal costs ("PVSC") of different combinations of bids, similarly support the selection of Calpine's Expansion. No other party submitted a quantitative economic analysis. As a result, the Commission has before it three separate modeling exercises – conducted using similar inputs but slightly varying methods and assumptions – that conclude that Calpine's Expansion should be viewed as the best (or in Xcel's analysis, among the best) resource options available to the Commission from LCOE and PVSC perspectives.

In addition, the record demonstrates that the economic modeling performed understates the value of Calpine's Expansion Proposal. Mr. Hibbard's LCOE analysis purposefully used conservative assumptions that tended to disadvantage Calpine relative to its competition. Notwithstanding this purposeful approach, Calpine's Expansion has the lowest LCOE among the thermal resource proposals by wide margin. The Strategist modeling relied on by the Department and Xcel in making their recommendations failed to ascribe certain fuel costs and costs related to

environmental control technology to other bids, the effect of which is to undervalue the relative cost-effectiveness of Calpine's Expansion. These facts further support the selection of Calpine's Expansion based on purely quantitative metrics.

From a qualitative standpoint, the economic modeling fails to fully reflect the significant "non-price" benefits related to the operation of Calpine's proposed combined-cycle generation compared with simple-cycle generation proposed by Xcel and Invenergy. The Expansion's environmental performance and the ability to serve as a hedge against future market uncertainty set Calpine's Proposal apart from the CT resources proposed in this proceeding. Calpine's Expansion Proposal also benefits from being an expansion of an existing facility that was planned and constructed with the Expansion in mind. While such planning allowed Calpine to price its proposal aggressively, the planning also reduces the Expansion's impact on the environment and the community in which it operates. These are important qualitative attributes that also support the selection of Calpine's Expansion Proposal.

Finally, the record in this case highlights the importance of adding combined cycle capacity through this procurement. The record shows that selecting only CT peaking capacity in this proceeding – compared to combined cycle capacity or a mix of CT and combined cycle capacity – would diminish the resilience of Xcel's resource mix to respond to higher-than-expected load growth and future resource retirements, and would constrain the flexibility Xcel's system has to integrate variable renewable resources in an economically- and environmentally-responsible manner. Accordingly, based on the record developed in this proceeding, the Commission should direct Xcel to enter into PPA negotiations with Calpine to secure the clear benefits of the Calpine Expansion for Xcel's customers. Injecting a competitive PPA negotiation process at the end of the contested case proceeding, as some parties suggest, is unnecessary and

potentially defeats the very purpose of this contested case by providing an additional process that allows the parties to ignore or discount the record evidence developed in this proceeding.

III.
DISCUSSION

In its June 21, 2013 Notice and Order for Hearing in this proceeding, the Commission stated that "the ultimate issue in this case is the identification of resource proposals that will provide the most reasonable and prudent strategy for Xcel to meet the needs of its service area."[4] As demonstrated below, the record demonstrates that (1) each quantitative economic analysis supports the selection of Calpine's Expansion Proposal as the most reasonable and prudent strategy for Xcel; (2) the modeling results and economic analyses understate the value of Calpine's Expansion vis-à-vis competing proposals; (3) qualitative non-price factors support the selection of Calpine's Expansion Proposal; (4) Invenergy's argument that combined cycle resources are not needed is not supported by the record; and (5) the Commission should direct Xcel to enter into PPA negotiations with Calpine. Each is discussed in turn below.

A. EACH QUANTITATIVE ECONOMIC ANALYSIS SUPPORTS THE SELECTION OF CALPINE'S EXPANSION PROPOSAL AS THE MOST REASONABLE AND PRUDENT STRATEGY FOR XCEL.

Throughout the course of this proceeding, three parties submitted comprehensive quantitative economic analyses outlining the objective merits of the resources proposed in this procurement. Each independent analysis supports the selection of Calpine's Expansion Proposal to meet all or a portion of Xcel's future resource needs. Calpine Witness Paul J. Hibbard demonstrated that Calpine's Expansion Proposal is the least expensive option among the thermal (*i.e.,* gas-fired) resources offered in this procurement by Xcel, Calpine, and Invenergy based on the LCOE, as seen from the perspective of Xcel's ratepayers. Similarly, the Department's and

[4] June 21, 2013 Notice and Order for Hearing at p. 5.

Xcel's Strategist analyses, which analyzed the PVSC of different combinations of bids, support the selection of Calpine's Expansion Proposal. No other party submitted a quantitative economic analysis refuting these results.

1. Calpine's Expansion has the Lowest LCOE Among Thermal Resources Proposed by a Wide Margin.

a. Calpine's LCOE Analysis.

As part of its direct case filed in this proceeding, Calpine recognized both the value and limitations of the Strategist modeling undertaken by the Department and Xcel in evaluating the resource proposals submitted by bidders. As Calpine Witness Paul J. Hibbard testified, "Strategist can be a useful tool for considering at a high level and from a long-term resource planning perspective the potential implications of different resource combinations over time" but "the Strategist model may fail to capture operational details that could be important in understanding the relative value of CC versus CT technologies on the Company's system, in particular as the level of variable renewable generation on the Company's system increases."[5] As a check on the "black box" proprietary Strategist modeling, Mr. Hibbard presented a LCOE analysis to provide the Commission with "an additional analytical tool to inform its decision."[6]

Under Mr. Hibbard's LCOE analysis, "capacity, energy, and other cost elements in project proposals are translated into an equivalent dollars-per-megawatt hour (MWh) metric, using consistent financial, market, and temporal assumptions across all proposals."[7] The purpose of the LCOE analysis was to determine the cost of proposals to Xcel customers. Mr. Hibbard developed the LCOE for the thermal bids (*i.e.*, Calpine's combined cycle Expansion Proposal and Invenergy and Xcel's CT proposals) using data contained in each proposal,

[5] Exhibit No. 51, Direct Testimony of Paul J. Hibbard at p. 7, lines 10-17 ("Hibbard Direct").

[6] Hibbard Direct at p. 8, lines 18-21.

[7] Hibbard Direct at p. 5, lines 8-12.

including capital costs, energy costs, operating costs, financing costs, and pollutant emissions provided by each company.[8]

As set forth in Mr. Hibbard's Direct Testimony, the analysis undertaken demonstrates that Calpine's Expansion Proposal offers the lowest LCOE across all gas-fired resource bids by a wide margin. The results of Mr. Hibbard's analysis are shown in Figure 1 of his Direct Testimony[9] and shown below:

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[8] Hibbard Direct at p. 9, lines 3-5. As Mr. Hibbard further testified, "[t]o complete the analysis, I made a number of additional operational and financial assumptions," all of which are set forth and explained in his Direct Testimony. *Id.* at p. 9, lines 5-7.

[9] Figure 1 is set forth in Mr. Hibbard's Direct Testimony at p. 10.

As depicted in Figure 1, under base case assumptions,[10] Calpine's Expansion Proposal offers the lowest LCOE across all gas-fired bids at **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS],** while Xcel's proposed Black Dog Unit 6 bid is the lowest cost option among the CT proposals at **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]**.

Importantly, the findings presented in Mr. Hibbard's LCOE analysis are constant, even when a different range of assumptions beyond the base case are applied. In fact, Mr. Hibbard demonstrated that Calpine's Expansion remains the least cost resource under a number of scenarios. As Mr. Hibbard noted, his LCOE analysis included a number of different scenarios "to explicitly and transparently test the sensitivity of modeling results to factors directly relevant in the current procurement, such as capacity factors, pollution control technology investments, power purchase agreement ('PPA') terms (extending the PPAs to 35 years), CO2 cost variations, and the pricing of natural gas transportation service (*i.e.,* firm versus non-firm)."[11] In virtually every case, Mr. Hibbard demonstrated "that the Mankato facility consistently represents the lowest-cost resource from the ratepayer's perspective, often by a wide margin."[12] The results of Mr. Hibbard's analysis under each of these scenarios are summarized in Exhibit No. __ (PJH-4) to his Direct Testimony. According to Mr. Hibbard:

> In short, under nearly every way to analyze the LCOE of proposals in this proceeding, against a wide range of potential future power system and financial conditions, and using assumptions (where needed) that conservatively overstate Mankato's costs or understate competitors' costs, Calpine's Mankato proposal offers substantial benefits from a ratepayer's perspective relative to the other bids in this solicitation.[13]

[10] Exhibit No. __ (PJH-3) to Mr. Hibbard's Direct Testimony includes a full list of model assumptions and inputs.

[11] Exhibit No. 53, Rebuttal Testimony Paul J. Hibbard at p. 8, line 12-17 ("Hibbard Rebuttal").

[12] Hibbard Rebuttal at p. 8, lines 17-18.

[13] Hibbard Direct at p. 11, lines 30-35.

No party refuted the accuracy of Mr. Hibbard's LCOE analyses or his underlying assumptions. Instead, parties challenged the efficacy of a LCOE analysis or contend that the analysis was biased in favor of Calpine's Expansion Proposal. As discussed below, such criticisms are without merit.

b. Criticisms of Calpine's LCOE Analysis are Without Merit.

While no party challenged the accuracy of Mr. Hibbard's LCOE analysis, Xcel and Invenergy questioned its usefulness in evaluating the proposals submitted. First, Xcel Witness Mr. Steve Wishart contends that a LCOE analysis only looks at cost and is only appropriate when comparing "very similar resources of the same type where cost is the principal, if not the only, distinguishing factor between the resources."[14] In Mr. Wishart's view, "a proper analysis must examine both the costs of the proposed resources and their widely varying benefits, which is what Strategist does."[15]

Calpine disagrees with Mr. Wishart's assessment and purposefully limited its LCOE analysis to a comparison of the gas-fired resources submitted in this proceeding to ensure reasonable comparability.[16] As was made clear, the LCOE analysis was developed and presented as a check against relying on a single, non-transparent economic model. Mr. Hibbard specifically recognized the limitations in relying on any one model, testifying that:

> The decision made in this proceeding will affect ratepayer costs, risks, and system operations/reliability for decades. Given the importance of this decision, the Commission should carefully consider all of the modeling and analyses presented by parties in the proceeding. The Commission should keep in mind that Strategist is a proprietary 'black box' model, one whose unit commitment and dispatch module is opaque and admittedly simplistic, in ways that are clearly of heightened

[14] Exhibit No. 47, Rebuttal Testimony of Steven Wishart at p. 15, lines 20-22 ("Wishart Rebuttal").

[15] Wishart Rebuttal at p. 16, lines 4-6.

[16] *See e.g.,* Hearing Transcript, Volume 1 (October 22, 2013) at p. 66, lines 2-3 where Mr. Hibbard testifies that he was "only asked to review the thermal energy generating resources."

> importance in comparing technologies offered in this procurement. One value of the LCOE analysis I present is that it provides a fully transparent and straightforward assessment of the cost of proposals to ratepayers in a manner that provides the Commission with an additional analytical tool to inform its decision.[17]

Thus, contrary to Mr. Wishart's view, Mr. Hibbard's LCOE analysis provides a second useful analytical tool such that the Commission does not need to rely on Strategist alone.

Similarly, Invenergy's criticism that the LCOE analysis is biased in favor of Calpine's Expansion Proposal is unfounded. Invenergy alleges that "the LCOE analysis, which relies on calculating costs on a per MWh basis, effectively skews results towards high-capacity factor resource additions with limited regard to overall costs to ratepayers."[18] However, Mr. Norman's criticism is effectively an argument that the Commission should ignore the efficiency benefit of Calpine's combined cycle Expansion Proposal when compared to less efficient CTs proposed by Invenergy (and by Xcel). This argument has no merit and must be rejected.

The record in this case makes very clear that the value to ratepayers of combined cycle versus CT capacity varies significantly based upon how often the resources are expected to be called on to run, which is expressed as the resource's average annual capacity factor ("CF").[19] The reality Invenergy would have the Commission ignore is that combined cycle resources are more efficient and therefore will be dispatched more often than CT resources. As Xcel Witness Wishart correctly recognized, Calpine's clear "efficiency advantage" as a combined cycle resource must be factored into an economic analysis.[20]

[17] Hibbard Direct at p. 8, lines 13-21.

[18] Exhibit No. 73, Rebuttal Testimony of Ron Norman at p. 8, line 3-5 ("Norman Rebuttal").

[19] Hibbard Direct at p. 18, lines 7-9.

[20] Exhibit No. 44, Direct Testimony of Steve Wishart at p. 17, lines 5-15 ("Wishart Direct").

Importantly, in conducting his LCOE analysis Mr. Hibbard used "estimates of resource utilization that would seriously understate the value of Mankato relative to competing CT proposals" and yet "Mankato is the clear winner."[21] In particular, Mr. Hibbard testified:

> Specifically, assuming average annual capacity factors of **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]** for CT units and 20 percent for the Mankato CC unit . . . the LCOE of Mankato is 42 percent less than the next closest proposal (Xcel's Black Dog CT), and 46 percent to 59 percent less than all other bids that I evaluated. At average annual capacity factor assumptions that are higher than 20 percent for the Mankato unit, or lower than **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]** for CTs – both likely outcomes for reasons that I discuss later in this testimony – Mankato's advantage from a LCOE perspective increases.[22]

Based upon Mr. Hibbard's review of historical CF data presented in the Xcel Fuel Plan, a **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]** may overstate the CF for CTs because Xcel's Fuel Plan "shows that the vast majority of CFs for natural gas-fired CT units from 2010 through 2012 were between 1 and 3 percent in each year."[23] In contrast, Mr. Hibbard testified that:

> Xcel Fuel Plan shows that Xcel's two most efficient CC units (High Bridge and Riverside – **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]** operated at 37 percent and 44 percent CF in 2012, and between 14 percent and 23 percent in 2010 and 2011. My choice of 20 percent for a CC CF is less than the three year average CF (25 percent) for these two plants over the 2010-2012 period.[24]

[21] Hibbard Direct at p. 11, lines 35-37.

[22] Hibbard Direct at p. 11, line 37 through p. 12, line 9.

[23] Hibbard Direct at p. 16, line 21 through p. 17, line 2.

[24] Hibbard Direct at p. 17, lines 11-17. Mr. Hibbard further noted that "to the extent that over the next several years emerging CO_2 and other Environmental Protection Agency (EPA) requirements lead to the retirement of additional baseload coal-fired generation, I would expect the role and CFs of CC units on Xcel's system – particularly the most efficient, highest heat rate units – to expand significantly relative to past performance and current expectations." *Id.* at p. 17, lines 17-21.

Even assuming the CTs proposed by Xcel and Invenergy were expected to operate at higher CFs and Calpine's Expansion Proposal at a lower CF than 20%, Calpine's Expansion is still the most economical resource from a LCOE perspective. As set forth in Figure 2 of Mr. Hibbard's Direct Testimony and shown below,[25] if one assumes a **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]** for Black Dog 6 (the next most economical resource from a LCOE perspective) then the Calpine Mankato Expansion offers a lower LCOE at a CF of approximately 8 percent, and *always* lower than this at CFs above 8 percent.

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[25] Figure 2 is set forth in Mr. Hibbard's Direct Testimony at p. 19.

As discussed by Mr. Hibbard, this Figure 2 demonstrates that "if the Black Dog CT is modeled at a **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]**, Mankato will always be more cost effective at any CF above 8 percent than Black Dog (or any other proposed CT, as can be seen in Exhibit No. __ (PJH-5))."[26]

As previously noted, as Xcel Witness Steve Wishart testified, his current expectation is that Black Dog 6 (and Invenergy's proposed Cannon Falls CT) would have around a 5% CF.[27] Invenergy did not offer any evidence as to what CF its proposed CTs would have because it did not undertake any substantive analysis.

Finally, confirming the fact that Calpine's Expansion would be expected to achieve at least a 20% CF, Mr. Wishart testified that with Calpine's efficiency advantage, "the unit would operate as an intermediate type resource with capacity factors in the 20%-30% range."[28] Similarly, Xcel's Strategist modeling shows around a **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]** CF for Calpine and the Department's projected CF for the Expansion reaches as high as **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]**.[29] These CFs are wholly consistent with Mr. Hibbard's conservative assumption of a 20% CF for Calpine's Expansion and a **[TRADE SECRET INFORMATION BEGINS TRADE SECRET INFORMATION ENDS]** for Xcel and Invenergy in his base case LCOE analysis. And while arguably one could be skeptical if Calpine's Expansion Proposal was

[26] Hibbard Direct at p. 18, line 20 through p. 19, line 6. Exhibit No. __ (PJH-5) to Mr. Hibbard's Direct Testimony shows that at any CF greater than approximately 14 percent, Calpine's Expansion will always be the most cost-effective option on a $/MWh basis compared to any proposed CT operating at the same, or lower, CF.

[27] Wishart Direct at p. 13, lines 10-11; *see also* Hearing Transcript, Volume 1 (October 22, 2013) at p. 93, line 16 through p. 94, line 4 (stating "my expectation is still that any peaking resource should be around 5 percent.").

[28] Wishart Direct at p. 17, lines 9-10.

[29] Hearing Transcript, Volume 1 (October 22, 2013) at p. 71, lines 9-17.

determined to be the least cost resource under Mr. Hibbard's LCOE analysis alone, as set forth below, the results of Xcel and the Department's Strategist modeling corroborates Mr. Hibbard's conclusions that Calpine's Expansion is the best choice.

2. Strategist Results Support the Selection of Calpine's Expansion.

The Department and Xcel used Strategist to analyze the relative economic merits of the proposals submitted in this proceeding. As Mr. Hibbard testified, the Strategist modeling results differ somewhat in scope and approach from his LCOE analysis:

> [T]he Strategist results compare the present value of societal costs ("PVSC") of different combinations of bids that would, at a minimum, meet the identified resource needs. While there are many similarities in the bid cost information presented in the analyses, the key difference is that the Strategist model also includes a representation of the impact that incorporating the proposed units in system dispatch has on overall system costs.[30]

Notwithstanding such differences, Xcel and the Department's Strategist analyses demonstrate that Calpine's Expansion proposal is "among the highest-value resources in the procurement under base case conditions, but its value is by far the most robust to changes in key assumptions and sensitivities."[31] The record is clear on this point.

a. The Department's Strategist Results.

Relying on its Strategist analysis, the Department initially recommended that "…the Commission approve Calpine's proposal and Xcel's proposal for a unit at the Black Dog site with a 2019 in-service date."[32] In reaching his recommendation, Dr. Rakow tested 27 different scenarios for his eight preferred resource plans[33] varying inputs such as load forecast, fuel prices,

[30] Hibbard Rebuttal at p. 4, lines 1-7.

[31] Hibbard Rebuttal at p. 2, lines 3-5.

[32] Exhibit No. 83, Direct Testimony of Dr. Steve Rakow at p. 43, lines 3-6 ("Rakow Direct").

[33] Dr. Rakow's eight best resource plans were selected based upon his initial screening of resource plans in Strategist. Rakow Direct at p. 35, lines 9-20.

CO_2 prices and externality values, market prices, and capital costs. The results show that the Calpine Expansion/Black Dog combination was the lowest-cost option across all 27 scenarios.[34]

While the Department ultimately noted that if Invenergy's Cannon Falls proposal is modeled on interruptible fuel and Invenergy's proposed in-service date is moved out from its original proposed in-service date,[35] the gap between Calpine's Proposal and Invenergy's proposal narrows, the Department concluded that the Calpine/Black Dog option "is still ranked first."[36] As discussed below, however, allowing Invenergy's proposed CTs to use lower cost interruptible fuel, while factoring in the cost of firm fuel for Calpine's Expansion and Xcel's Black Dog 6 unit, is unreasonable and artificially inflates the perceived value of Invenergy's otherwise non-competitive proposal.

Dr. Rakow ultimately recommends that "[t]he Commission send both ICT1 [Invenergy Cannon Falls CT] and the CCC1 [Calpine Expansion] proposal to PPA negotiations [with Xcel]. If significant issues are identified with any of the top three proposals . . . the other two projects can go forward. If no issues arise . . . the overall best package remains BD6 and CC1."[37] While the Department hedged on its initial recommendation that Calpine and Black Dog move forward,

[34] Rakow Direct, Department Direct Testimony Attachment (SRR-5A), page 3 of 8 (Exhibit No. 81). Importantly, Dr. Rakow's results are consistent under all variations when CO_2 costs are set to zero, except in the low-forecast scenario. Rakow Direct, Department Direct Testimony Attachment (SRR-5A), page 7 of 8. As noted by Mr. Hibbard, "[t]his modeling scenario happens to be the *only* one of more than 50 scenarios considered by DOC in which Calpine is not included in the lowest-cost option. Importantly even with such assumptions, under Dr. Rakow's analysis, the Calpine Expansion/Black Dog option (ranked number 2) remains a lower-cost option than the Invenergy/Black Dog option (ranked number 5)." Hibbard Rebuttal at p. 9, lines 2-7.

[35] As noted by Dr. Rakow, his "analysis indicates that the potential for flexible in-service dates for ICT1 significantly reduces the difference between packages with ICT1 deferred and the packages with ITC1's original in-service date – by about $50 to $55 million PVSC under base case conditions." Exhibit No. 86, Rebuttal Testimony of Dr. Steve Rakow at p. 11, lines 11-14 ("Rakow Rebuttal").

[36] Rakow Rebuttal at p. 12, lines 3-6.

[37] Rakow Rebuttal at p. 21, lines 1-5.

the results of its Strategist analysis still clearly demonstrates the economic merits of Calpine's Expansion vis-à-vis alternative proposals.

b. Xcel's Strategist Results.

Based on its separate Strategist analyses, Xcel recommends that the "Commission identify Black Dog 6 in combination with either Invenergy's Cannon Falls proposal or Calpine's Mankato Energy Center expansion as the least cost projects in this process."[38] However, Xcel's analysis also demonstrates that Calpine's Expansion Proposal is more favorable when variations are made in key assumptions related to cost, emissions, and contract-term values.

In particular, Table 9 of Xcel Witness Wishart's Direct Testimony shows that in (1) virtually every resource plan Calpine is the most robust across different sensitivity tests – that is – Calpine's Expansion is even more favorable economically in scenarios involving higher gas costs, higher CO2 costs and increased capacity values, and (2) every plan involving Invenergy's units fails relative to Calpine's Expansion in particular – as well as all other plans – when all bids are compared consistently on the basis of firm natural gas transportation costs.[39]

In this respect, the ratepayer benefits of Calpine's Expansion Proposal are strongly supported by the modeling analyses carried out by Xcel and the Department – despite the application in each case of assumptions likely to disadvantage Calpine's Expansion relative to competing proposals, as discussed below.

B. THE MODELING RESULTS AND ECONOMIC ANALYSES UNDERSTATE THE VALUE OF CALPINE'S EXPANSION VIS-À-VIS COMPETING PROPOSALS.

As discussed above, in preparing his LCOE analysis, Mr. Hibbard used conservative base case assumptions designed to disadvantage Calpine vis-à-vis Invenergy and Xcel. As Mr.

[38] Wishart Direct at p. 43, line 16-18.

[39] Wishart Direct, Table 9 at page 39; *see also*, Hibbard Rebuttal at p. 9, line 18 through p. 10, line 2.

Hibbard testified, "since I am a witness for Calpine in this proceeding, I took an expressly conservative approach to the evaluation of Calpine's bid; that is, wherever there was uncertainty in bid or financial parameters, or the need to apply subjective judgment in analytic assumptions, I selected values that tend to disadvantage Calpine's proposal relative to other offers in this procurement."[40] As previously noted, no party challenged Mr. Hibbard's analysis substantively.

The Department and Xcel's Strategist analyses and recommendations similarly understate the value of Calpine's Expansion is several material respects, including (1) by failing to base their final recommendations on firm fuel requirements for all thermal resources; and (2) by failing to include the costs of selective catalytic reduction ("SCR") technology on the CT resources proposed in the proceeding. Each is discussed below.

1. Firm Fuel Requirements.

As noted above, based on their Strategist results both Xcel and the Department recommend that Xcel enter into PPA negotiations with both Calpine and Invenergy (related to its proposed Cannon Falls CT). The basis of this recommendation is that Calpine and Invenergy's proposals both have economic merit under their respective Strategist modeling. However, this is only the case because the modeling heavily disfavors Calpine's Expansion relative to Invenergy's proposed Cannon Falls CT.

Specifically, both Xcel and the Department's recommendations assume that Invenergy's pricing for natural gas will be based on interruptible natural gas transportation service, with no cost adjustment for sufficient alternative fuel storage capability needed to ensure reliable, year-round operations.[41] This is a fundamental inconsistency in the comparison of resources proposed

[40] Hibbard Direct at p. 6, lines 15-19.

[41] Xcel Witness Wishart noted that "…the fuel tanks at the site are barely sufficient to support the operation of a single turbine. For reliable winter operation the amount of on-site fuel storage would need to be expanded.

in this procurement, and inappropriately favors the Invenergy's Cannon Falls proposal relative to both Calpine's Expansion and Xcel's proposed Black Dog 6 facility – both of which include the costs of firm fuel. When modeled on a comparable basis, Invenergy's Cannon Falls proposal is simply not competitive.

Xcel Witness Wishart specifically notes that "the total PVSC for Plan 1 increases by about $30 million with the addition of firm gas at Cannon Falls, ***making it uncompetitive with the Calpine proposal***."[42] Department Witness Dr. Rakow similarly concludes that "the potential use of interruptible natural gas supply for ITC1 significantly reduces the PVSC for ITC1 and, thus, significantly reduces the difference between packages with ITC1 and the other packages – by about $35 million PVSC."[43] Assuming a comparable firm-fuel transportation requirement for the proposed Invenergy Cannon Falls CT, the economic advantage of the Calpine/Black Dog 6 combination as the highest-ranked resource plan would be even more magnified and should all but eliminate Invenergy's CT proposals from consideration.

Nevertheless, if the Commission were to determine that Invenergy's Cannon Falls proposal should be allowed to be considered based on operation on interruptible fuel, it should also ascribe greater value to Calpine's and Xcel's proposals from a reliability perspective.[44] As Invenergy Witness Ron Norman conceded, a resource's availability could impact its capacity

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Invenergy has not included these costs in their bid and has not provided supplemental information on the issue." Wishart Direct at p. 50, lines 1-5.

[42] Wishart Rebuttal at p. 22, lines 11-13. Emphasis added.

[43] Rakow Rebuttal at p. 10, lines 21-23.

[44] Xcel Witness James Alder testified at hearing that if Xcel pursues "interruptible gas [for Cannon falls] there would some discussion about whether or not fuel back up would be advantageous to the proposal or not. And so there could be some adjustments, I presume, for providing fuel oil backup." Hearing Transcript, Volume 1 (October 22, 2013) at p. 134, line 20 through p. 135, line 10.

accreditation by the Midcontinent Independent System Operator, Inc. ("MISO").[45] In Invenergy's case, if served by interruptible fuel the proposed Cannon Falls CT "…will not be available on many winter days"[46] potentially decreasing the value of the CT's capacity.[47] As Xcel Witness Wishart confirmed, the greater possibility that Cannon Falls will be interrupted in the winter would result in a "lower level of certainty of service" and other units on the system needing to pick up the slack.[48] Such reliability considerations clearly favor moving forward with Calpine's Expansion even if one were to assume against the weight of the evidence in this proceeding that all things "are" equal.

2. SCR Costs.

Through its testimony in this proceeding, Calpine has urged the Commission to consider the value of mitigating the environmental impacts of CT capacity used to help manage net load variability by requiring the installation of state-of-the-art selective catalytic reduction ("SCR") technology on Invenergy and Xcel's proposed CT resources and that the costs of that equipment be included in the economic evaluation of the bids.[49] Failure to do so would place Calpine's

[45] Hearing Transcript, Volume 2 (October 23, 2013) at p. 21, lines 13-15.

[46] Exhibit No. 77, Attachments to the Direct Testimony of Mr. Sachin Shah at DOC Attachment __ at (SS-5), pp. 30 and 31 of 32 ("Shah Direct Attachments"). Indeed, in response to Department of Commerce Information Request No. 42, Xcel provided cost estimates to "provide firm year-round transportation service to Hampton and Cannon Falls to make the plants' fuel supply highly reliable." *Id.*

[47] As Xcel Witness Wishart testified, "[e]ach dispatchable unit's maximum capability is reduced by a percentage that represents the probability that it will not be available due to unplanned outages. ***The adjustment is based on each unit's historic reliability record***, and the adjusted maximum capability is referred to as the 'unforced capacity' rating or UCAP." Wishart Direct at p. 6, lines 10-14 (emphasis added).

[48] Hearing Transcript, Volume 1 (October 22, 2013) at p. 89, lines 4-19 and p. 91, lines 2-15.

[49] *See e.g.*, Exhibit No. 55, Direct Testimony of Mr. Todd Thornton at p. 12, lines 12-22 ("Thornton Direct"). Based on recent study for the PJM Interconnection, Mr. Hibbard estimated that "the cost of SCR installations on CT technology to be on the order of $15 million in 2017 dollars for a unit roughly the size of the CTs proposed in this procurement." Hibbard Direct at p. 30, FN 35.

Expansion at a competitive disadvantage and undermines the fact that the Expansion is a cleaner option.[50]

As Mr. Hibbard testified, considering the policy objectives of Minnesota's renewable energy standards and other efforts to address power plant emissions, requiring SCRs on Xcel and Invenergy's proposed CTs would help create a more level playing field from an emissions perspective for the resources under consideration and evaluation in this procurement. "Relying on any argument that such equipment is not necessary strictly from a permitting perspective may be appropriate for a project that is being considered on a stand-alone basis, but would be shortsighted and contrary to the obvious state policy objectives . . ."[51]

C. QUALITATIVE NON-PRICE FACTORS SUPPORT THE SELECTION OF CALPINE'S EXPANSION PROPOSAL.

Similar to the results of the economic analyses presented in this proceeding, the qualitative "non-price" considerations also support the selection of Calpine's Expansion. These "non-price," but measureable factors, include the Expansion's (1) superior environmental performance, (2) ability to serve as a hedge against future baseload resource retirements; (3) ability to support the integration of renewable resources and state environmental goals; and (4) unique ability to take advantage of earlier planning to reduce impacts on the environment and host community.

1. Environmental Considerations Support the Selection of Calpine's Expansion Proposal.

The record developed in this proceeding clearly demonstrates that the emissions from the proposed Calpine Expansion are far lower than from the CTs proposed in this procurement on a

[50] Both Xcel Witness Ford and Invenergy Witness Ewan conceded that including SCR would reduce expected emissions at their proposed CT facilities. Hearing Transcript, Volume 1 (October 22, 2013) at p. 78, lines 2-9 and Volume 2 (October 23, 2013) at p. 12, lines 11-17.

[51] Hibbard Direct at p. 30, line 9-13.

per unit of energy generated basis. The relative impact of CT versus CC technologies from an emission perspective was presented in Exhibit Nos. __ (PJH-6a) and (PJH-6b) to Mr. Hibbard's Direct Testimony.

Exhibit Nos. __ (PJH-6a) and (PJH-6b) show emission rates from each unit proposed in this solicitation on a pounds per MWh (lbs/MWh) basis as well as the reductions in emissions resulting from the installation of SCR. Exhibit No. __ (PJH-6a), reproduced below, shows emission rates by technology for nitrous oxide ("NOx"):

[TRADE SECRET INFORMATION BEGINS:

TRADE SECRET INFORMATION ENDS]

As shown in this Exhibit __ (PJH-6a), the NO_x emission rates for Calpine's Expansion are lower than the next-closest option by **[TRADE SECRET INFORMATION BEGINS**

TRADE SECRET INFORMATION ENDS].

Exhibit No. __ (PJH-6b), reproduced below, shows emission rates by technology for carbon dioxide ("CO_2"):

[TRADE SECRET INFORMATION BEGINS:

TRADE SECRET INFORMATION ENDS]

As shown in this Exhibit __ (PJH-6b), the CO_2 emission rates for Calpine's Expansion are lower than the next-closest option by **[TRADE SECRET INFORMATION BEGINS**

TRADE SECRET INFORMATION ENDS]. No party substantively challenged these conclusions.

As Mr. Hibbard testified, "[t]hese emission rates are primarily a direct function of the relative energy efficiency (i.e., heat rates) of the respective projects; in simple terms, using less fuel per MWh results in less air pollution per MWh. With respect to NO_x, the differential is also due to the fact that Mankato includes back-end emission control technology that is not included in the CT bids."[52]

While other parties have argued that total annual emissions are likely to be lower for the CTs proposed by Invenergy and Xcel,[53] as Mr. Hibbard testified a "true apples-to-apples comparison of the environmental impacts of the projects in this procurement requires a comparison not of total annual tonnage, but based on emissions per unit of energy produced. From this perspective, the emissions from the Calpine Expansion are far lower than from the CTs proposed in this procurement, per unit of energy generated."[54] Thus, assuming equal quantities of MWh produced, the Calpine expansion would have lower total emissions than the CTs proposed.

To the extent that the Calpine Expansion operates more hours than the CTs due to its efficiency advantage, on a unit-to-unit comparison basis, the Calpine Expansion could have higher total annual emissions. As Mr. Hibbard testified, however, this is only part of the story, as emission displacement must also be taken into consideration. According to Mr. Hibbard, "for every hour of operation of a CC resource when the CT would not operate, you are not adding

[52] Hibbard Direct at p. 29, lines 13-17.

[53] *See e.g.*, Exhibit No. 43, Rebuttal Testimony of Xcel Witness Gregory Ford at p. 4, lines 18-22 (noting that Calpine's emissions could be higher on an annual basis due to the fact that combined cycle units commonly operate "at a capacity factor that is four times higher than the capacity factor for CTs.") ("Ford Rebuttal").

[54] Hibbard Rebuttal at p. 19, lines 10-13.

incremental emissions – you are likely *displacing* generation from resources that also have a higher emission rate in lb/MWh than the new CC facility, and thus emissions are reduced."[55]

2. Because Calpine's Expansion Uses Combined Cycle Technology, it is the only Proposed Resource that Can Effectively Serve as a Hedge Against Future Resource Retirements.

Among the thermal resources proposed in this proceeding, only Calpine's proposed combined cycle technology allows the proposed Expansion to operate as an intermediate or baseload resource. The CTs proposed by Xcel and Invenergy, on the other hand, are expected to operate only as peaking resources during limited hours each year.[56] For this reason, installing combined-cycle capacity at this time will provide a valuable hedge against the risk of intermediate and baseload resource retirements in light of anticipated environmental regulation or unforeseen factors.[57] As Mr. Hibbard points out, "[t]he potential loss of baseload resources in Xcel's service territory heightens the need for replacement with intermediate or baseload capacity, such as can be provided by CC units."[58]

In evaluating the merits of adding additional combined cycle capability to Xcel's system, the Commission should consider the potential that a significant quantity of baseload coal-fired resources may become uneconomic as a result of changes in the dispatch of resources due to low natural gas costs and/or existing and future environmental requirements that will be relevant within the timeframe of interest in the current proceeding. According to Mr. Hibbard:

> The Commission should consider this risk in its evaluation of the resources competing in this procurement, since new regulations – possibly including

[55] Hibbard Rebuttal at p. 20, lines 7-10.

[56] As noted above, Xcel and Invenergy's proposed CTs do not include the use of back-end environmental control technology, limiting their hours of operation.

[57] As Calpine Witness Todd Thornton testified, "[p]eaking units are often selected not because they provide greater value to the market in terms of energy production or operational flexibility, but simply because they typically require a lower capital investment than a combined-cycle unit." Thornton Direct at p. 11, lines 17-20.

[58] Hibbard Rebuttal at p. 16, lines 15-17.

> requirements on CO_2 emissions at existing power plants – will influence asset decisions by the time this procurement's resources come on line. The potential loss of baseload resources in Xcel's service territory heightens the need for replacement with intermediate or baseload capacity, such as can be provided by CC units.[59]

Importantly, Mr. Hibbard further pointed out that retirement risk and its impact on reserve margins has implications beyond the Xcel service territory as Xcel's neighbors are heavily dependent on coal-fired generation at risk of retirement, and "this has implications for the future development of sufficient baseload and intermediate resources throughout all of MISO."[60] As noted by the Independent Market Monitor for the MISO region, "the increased penetration of wind resources and new EPA regulations will put substantial economic pressure on baseload coal resources that should accelerate retirements and reduce planning reserve margins."[61] As a result, Mr. Hibbard noted that "the Commission should not assume that there will be sufficient excess reserve capacity throughout MISO to fill in any gaps in Xcel's needs."[62] The ability of Calpine's Expansion to serve as a hedge against future market uncertainty is an important attribute from a public policy perspective that the Commission should take into consideration in its evaluation of the bids. Selection of Calpine's Expansion will provide the Commission with greater flexibility in making future resource decisions.

3. Calpine's Expansion Supports the Integration of Renewable Resources.

Minnesota has adopted an aggressive renewable energy standard, which requires that eligible renewable electricity account for 31.5% of Xcel's total retail electricity sales in

[59] Hibbard Rebuttal at p. 16, lines 11-17.

[60] Hibbard Rebuttal at p. 16, lines 18-21.

[61] Hibbard Rebuttal at p. 16, line 22 through p. 17, line 2.

[62] Hibbard Rebuttal at p. 17, lines 3-4.

Minnesota by 2020.[63] The record in this case shows that both CTs and Calpine's combined-cycle Expansion Proposal can be used to support the integration of renewable resources on Xcel's system. As Mr. Hibbard testified, "[t]he fast-start and fast-ramp capability of CTs mean that they are effective in addressing system contingencies that need to be met through resource activation within a half-hour to several hours."[64]

According to Mr. Hibbard, however, the value of Calpine's Expansion to help integrate variable resources is "likely higher" because combined cycle resources:

> [C]an manage net load variability more efficiently, and at lower cost and lower emissions than CT capacity: (a) when variation needs to be managed on timescales of several hours or more, when the capacity is off line, and (b) when variations of *any* timescale (i.e., on the order of seconds to minutes to hours to days) need to be managed, and there is CC capacity already on line. Put another way, compared to CC capacity, CT capacity is an expensive and higher-emitting way to meet any net load variability that otherwise could be met by on-line or off-line CC capacity.[[65]]

As Mr. Hibbard concluded, "compared to CC capacity, CT capacity is an expensive and higher-emitting way to meet any net load variability that otherwise could be met by on-line or off-line CC capacity."[66] In this respect, both the CT resources proposed by Xcel and Invenergy and the combined cycle Expansion proposed by Calpine can aid the integration of renewables. As noted above, however, Calpine's Expansion can do so more cost effectively and with fewer emissions on a per unit of energy generated basis.

[63] *See* Minn. Stat. § 216B.1691.

[64] Hibbard Rebuttal at p. 17, lines 17-19.

[65] Hibbard Rebuttal at p. 18, line 19 through p. 19, line 2.

[66] Hibbard Rebuttal at p. 19, lines 2-4.

4. Calpine's Prior Planning Sets Calpine's Expansion Apart From Other Proposals.

Calpine's Expansion Proposal benefits from being an expansion of an existing facility that was planned and constructed with the Expansion in mind. While such planning allowed Calpine to price its proposal aggressively, the planning also reduces the Expansion's impact on the environment and the community in which it operates.

Specifically, Calpine's Expansion Proposal is focused on the completion of the existing Mankato Energy Center. As set forth in Mr. Thornton's Direct Testimony, the Mankato Energy Center was designed and built with the expectation that it would be expanded into a 720-MW natural gas-fired, combined-cycle facility.[67] As Mr. Thornton explained, Calpine was able to offer "such a competitive bid price is because the existing STG is oversized relative to current operations and can accommodate the steam output of an additional power train."[68] In this respect, Calpine's bid reflects the ability to avoid the purchase and installation of expensive equipment that otherwise would be required in the development of new combined-cycle capacity.[69]

In addition, the Calpine Expansion has several benefits compared with the other proposals submitted in this proceeding. As Mr. Thornton testified, Calpine's Expansion utilizes an existing brownfield site already used for electric power generation and the Expansion will be developed entirely within the site's existing 25-acre footprint.[70] The Expansion also avoids proliferation of additional pipeline and transmission corridors, which is consistent with the

[67] Thornton Direct at p. 6, lines 21-22.

[68] Thornton Direct at p. 7, lines 1-3.

[69] At hearing Xcel Witness Wishart confirmed that Xcel's assumed pricing for capacity for a "generic" combined cycle resource was higher than Calpine's Expansion Proposal and that "we were pleasantly surprised with the pricing of the proposals that were submitted to this docket." *See* Hearing Transcript, Volume 1 (October 22, 2013) at p. 109, line 1 through p. 110, line 2.

[70] Thornton Direct at p. 8, lines 16-19.

State's policy to "locate large electric power facilities in an orderly manner compatible with environmental preservation and the efficient use of resources."[71] Specifically, the existing pipeline lateral is sufficiently sized to accommodate the fuel requirements of the full 720-MW plant and the additional generation will use the existing plant's transmission outlets and interconnections to Xcel's Mankato substation.[72]

The Expansion also enjoys strong community support in the greater Mankato region as demonstrated by the strong support from the Greater Mankato Growth Association and the City of Mankato.[73] Finally, the Expansion takes advantage of an award-winning water recycling agreement with the City of Mankato that reduces phosphorus loading in the Minnesota River.

As highlighted in Mr. Thornton's testimony, during development of the existing Facility, Calpine helped fund construction of a new water reclamation facility adjacent to the City's existing wastewater treatment plant through a first of its kind water use agreement. Under the agreement, the Mankato Energy Center uses the reclaimed water for processing and cooling and plant discharge is subsequently returned to the City's treatment plant, resulting in considerable environmental benefits.[74]

The water use agreement allows the City to more effectively manage the quality of its water discharge, particularly with respect to phosphorus load to the Minnesota River. As Mr. Thornton testified:

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[71] *See e.g.*, Minn. Stat. § 216E.02, Subd. 1 ("The legislature hereby declares it to be the policy of the state to locate large electric power facilities in an orderly manner compatible with environmental preservation and the efficient use of resources. In accordance with this policy the commission shall choose locations that minimize adverse human and environmental impact while insuring continuing electric power system reliability and integrity and insuring that electric energy needs are met and fulfilled in an orderly and timely fashion").

[72] Thornton Direct at p. 8, line 22 through p. 9, line 7.

[73] Through their public written comments to Your Honor, the Greater Mankato Growth Association and the City of Mankato have communicated their strong support for the expansion of Calpine's Mankato Energy Center.

[74] *See generally*, Thornton Direct at p. 9, line 8 through p. 10, line 2.

> This water agreement, therefore, serves the dual purpose of providing a cost-effective and environmentally appropriate water supply for Calpine and supports the City's need to control the quality of its wastewater discharge. Calpine's use of reclaimed water replaces the more typical practice of using surface or ground water for processing and cooling. Use of reclaimed water also eliminates the need for Calpine to create new water collection or discharge points along the Minnesota River.[75]

Calpine's bid reflects these cost savings and passes the benefits of those economies of scale and environmental attributes to Xcel and its ratepayers. Because of Calpine's prior efforts, "Xcel now has a unique opportunity to acquire higher-value combined-cycle generating capacity at a price that is at least equal to and probably significantly less than the cost of simple-cycle capacity."[76]

D. INVENERGY'S ARGUMENT THAT COMBINED CYCLE RESOURCES ARE NOT NEEDED IS NOT SUPPORTED BY THE RECORD.

Throughout this proceeding, Invenergy has alleged that Xcel should seek to add peaking (*i.e.*, CTs) rather than combined cycle capacity. Invenergy alleges that if combined cycle capacity is selected in this procurement, ratepayers will be forced to pay for an underutilized asset and will be "doubling down" on underutilized CC capacity.[77] As Mr. Hibbard demonstrated, however, "[s]uch claims both mischaracterize current and future Xcel system conditions and ignore the fact that asset utilization is specifically and explicitly incorporated in the modeling of ratepayer impacts."[78]

In particular, the LCOE and PVSC analyses presented in this proceeding represent the costs to Xcel's ratepayers under a wide range of potential capacity factors for competing resources, and a wide range of potential future conditions, fully addressing in a modeling sense

[75] Thornton Direct at p. 9, line 19 through p. 10, line 2.

[76] Exhibit No. 56, Rebuttal Testimony of Todd Thornton at p. 8, lines 14-17 ("Thornton Rebuttal").

[77] Exhibit No. 65, Direct Testimony of Daniel Ewan at pp. 28-29 ("Ewan Direct").

[78] Hibbard Rebuttal at p. 13, lines 12-14.

the impact of asset utilization on ratepayer costs. As both Department Witness Dr. Rakow and Xcel Witness Wishart confirmed at hearing, the utilization of existing resources and the resources proposed in this proceeding are fully accounted for by Xcel and the Department's Strategist modeling,[79] which demonstrates that Calpine's Expansion is the best or, at a minimum, among the best resource plans across a wide range of potential resource utilization.

In this respect, as Mr. Hibbard confirmed, "[r]egardless of assumed or expected capacity factors, if modeling results show Mankato to be better from a ratepayer perspective, then ratepayers are not paying for underutilized capacity – they are paying the least amount of money to meet the system's combined energy and capacity needs."[80] Moreover, as Mr. Hibbard testified:

> Further, the suggestions by Invenergy witness Ewan that Xcel is overstocked on CC capacity, understocked on CT capacity, and will rely far more heavily in the future on CT capacity is simply wrong. Xcel's Sherco Study presents the current and modeled future resource mix on its system, including a breakdown of natural gas-fired resources between CT and CC capacity. As figures 6.1 and 6.2, and Appendix D-6 in the Sherco Study demonstrate, (1) there are currently roughly equal quantities of CT and CC capacity on the Xcel system (approximately 1,500 MW of CT capacity and 1,400 MW of CC capacity); (2) each resource type currently represents twenty percent or less of Xcel's resource mix (approximately 20 percent for CC, and 19 percent for CT); and (2) the Company's projected capacity mix shows an increasing and significant contribution from CC capacity, far outstripping the projected growth of CT capacity. Importantly, this level of projected growth in CC capacity in the Sherco study occurs at the Strategist-modeled costs for a generic CC unit, a cost that is likely significantly higher than the cost of the proposed Mankato expansion.[81]

Finally, it should be recognized that the record clearly demonstrates that both CTs and combined cycle units are "capacity" resources on Xcel's system and are used to meet Xcel's

[79] Hearing Transcript, Volume 1 (October 22, 2013) at p. 91, line 18 through p. 93, line 11 (Wishart oral testimony), and Hearing Transcript, Volume 2 (October 23, 2013) p. 53, lines 3-25 (Dr. Rakow oral testimony).

[80] Hibbard Rebuttal at p. 13, lines 18-22.

[81] Hibbard Rebuttal at p. 14, line 9 through p. 15, line 2.

existing and future capacity requirements.[82] Invenergy's attempt to mischaracterize combined cycle resources as "energy" resources and CTs as "capacity" resources should be rejected as unfounded.[83]

E. THE COMMISSION SHOULD DIRECT XCEL TO ENTER INTO PPA NEGOTIATIONS WITH CALPINE.

As Calpine confirmed in this proceeding, it stands ready, willing and able to move forward with PPA negotiations with Xcel.[84] Calpine does not believe, however, that the record supports Invenergy's Cannon Falls CT facility also proceeding to PPA negotiations. As the record in this proceeding clearly demonstrates, Calpine's Expansion Proposal wins on both price and non-price metrics by a wide margin if all bids are reviewed objectively and on a comparable basis. Injecting a competitive PPA negotiation process at the end of the contested case proceeding is unnecessary and potentially provides a process that allows the parties to ignore or discount the record evidence developed in this proceeding.

As Calpine Witness Thornton testified, "the Commission will need to approve any PPA, which ensures that any agreement reached appropriately balances the interests of both parties and is in the long-term interests of Xcel's customers."[85] Moreover, even though the Strategist results suggest that Calpine's Expansion and Invenergy's Cannon Falls CT are very close in terms of potential ratepayer impacts, it should be noted that this is only true when Cannon Falls is modeled without firm gas supply and without installation of comparable air emissions control

[82] Hearing Transcript, Volume 2 (October 23, 2013) p. 21, lines 4-12 (Invenergy Witness Mr. Norman's oral testimony confirming that MISO does not distinguish between combined cycle and CTs resources for capacity purposes).

[83] *See e.g.*, Norman Rebuttal at p. 4, FN 4 where Mr. Norman states that "for purposes of this testimony, I define 'Capacity Resources' as . . . thermal peaking resources . . . and 'Energy Resources' as baseload . . . and intermediate (e.g., natural gas-fired combined cycle) resources."

[84] Thornton Rebuttal at p. 2, lines 17-18.

[85] Thornton Rebuttal at p. 2, lines 18-21.

technology. Furthermore, the Strategist analyses do not adequately reflect the substantial non-price benefits of Calpine's Expansion with respect to environmental performance, operational flexibility and hedging against future market uncertainty, all of which is clearly supported in the record. No amount of discussion during parallel PPA negotiations will change the unique and important differences between these two types of energy resources, and the Commission should not base its decision on an overly narrow view that fails to fully recognize the importance of a balanced, flexible and diversified energy mix. As demonstrated in this proceeding, choosing only simple-cycle peaking units to meet the current resource need does not support the State's energy and environmental policy goals and is not in the interests of Xcel's customers, especially considering that the Commission now has the opportunity to acquire the full operational capability and environmental performance of combined-cycle capacity at the same – or even lower – cost.

IV.
CONCLUSION

The detailed record developed in this case shows that consideration of ratepayer costs, Xcel's changing resource mix needs, and Minnesota's energy and environmental policy goals supports the selection of the Calpine Expansion in this procurement.

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Respectfully submitted,

/s/ Brian M. Meloy

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