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January 27, 2026

In the Matter of Northern States Power Co. d/b/a Xcel Energy's Petition for Approval of Capacity*Connect, a Distributed Capacity Procurement (DCP) program

Docket No. E002/25-378

SUPPLEMENTAL COMMENTS BY JESSE ANGRIST

EXECUTIVE SUMMARY

The Minnesota Public Utilities Commission should deny Xcel Energy ("Xcel")'s petition for approval of Phase 2 of Capacity*Connect ("C*C") and require that they promptly present a revised petition which includes more substantial and transparent sensitivity analysis of the program's assessed benefits and costs, as well as a more articulate methodology for valuing deferred distribution investments, "time to power," and any other incidental benefits of the DCP program. Having exclusive access to proprietary information about its own distribution network and exclusive authority over distribution-level investments (but for the Commission), Xcel has functionally withheld the necessary information to evaluate whether the C*C program is in the public interest. Given that Xcel has requested to indiscriminately recover the costs of the C*C program from ratepayers under the RES rider (which I do not challenge), approving the petition in its current state would be irresponsible given the unclear picture of the proposal's benefits and the potential downside risks which Xcel has downplayed in presenting its analysis.

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XCEL ENERGY HAS FAILED TO PRESENT A ROBUST ANALYSIS OF POTENTIAL PROJECT OUTCOMES

Background

Xcel presents a cost-benefit analysis of the C*C program which includes "a single, ambitious scenario" using "optimistic underlying assumptions," which they acknowledge "depends… on fortuitous market dynamics and policy dynamics that are outside [Xcel's] control."[1] Several parties, such as the Office of the Attorney General and the R Street Institute, have indicated concerns that, even granting the assumptions of the proposed budget, the program may be a net cost to ratepayers. These concerns are well-founded, yet it is even more important to investigate the assumptions which have so far directed public discussion of the proposal. Notably, Xcel did attach their CBA model, protected as it was from public scrutiny, to their initial proposal. This is unsatisfactory for two reasons: first, it is the so-called "headline" set of costs and benefits presented in the body of the proposal which has an outsized impact in shaping the terms of public debate, and this headline CBA is lacking nuanced consideration of several potential assumptions and outcomes; second, Xcel is unlike other discussants of the proposal not only for being an especially well-resourced party with expert lawyers, engineers, and economists on staff, but also for having privileged access to the specifications and historical performance of their network infrastructure. This combination of facts means that Xcel, as the party bringing the proposal before the commission, are uniquely capable of substantiating technical claims and rigorously answering highly salient questions about the proposal, on which outside observers may only speculate.

As I will show in the remainder of Section 1, Xcel has failed to make use of this unique capability to create a proposal that features transparent and rigorous analysis. The Commission should consider that Xcel has presented a dramatically incomplete analysis of the costs and benefits of the program and be wary of accepting positive or negative arguments about its cost-effectiveness at face value. An experimental program whose costs and benefits are subject to economic and political forces beyond its control is a textbook case for robust consideration of

[1] MPUC Docket No. 25-378, Xcel Energy, *Petition: Request for Approval*, October 3, 2025, pg. 34 (hereinafter *RFA*)

many scenarios, as opposed to Xcel's choice to essentially model a single case. Moreover, the Commission can and should require a rigorous and transparent analysis of Xcel's proposal, one that would depict in detail a realistic range of outcomes beyond any single set of assumptions.

Deficits of the Current Analysis

Parameters and Assumptions: Cost of New Entry

The single most shocking and influential assumption in Xcel's CBA, which only merited two sentences of discussion, is the escalation rate of MISO's Cost Of New Entry (CONE) paid to enrolled capacity resources, which was set at the average observed escalation rate since the 2015/2016 planning year of 3.81%.[2] One of those two lone sentences acknowledges that this assumption is "more optimistic" than in Xcel's most recent Integrated Resource Plan, wherein the CONE escalation rate was set at 2%.[3] *The magnitude of this assumption cannot be overstated.* Before discounting, an assumed 3.81% compound annual growth rate ("CAGR") results in capacity payments which increase by 111.24% after 20 years; over the same 20 year period, an assumed CAGR of 2% results in capacity payments which increase only 48.59%! While this difference in assumed CONE would be proportionally smaller for forecast years closer to the present, the choice of this growth rate is still the single most influential factor in estimating the capacity revenue for the C*C program.

As such, it is completely unacceptable that Xcel's CBA was implemented with only a single value for this CONE escalation rate, especially when this value diverges significantly from the value most recently presented to the Commission in Xcel's Integrated Resource Plan. A charitable explanation for this divergence is that Xcel sees the value of its DCP proposal in providing a revenue hedge for ratepayers against higher-than-anticipated CONE growth. Yet this is nowhere explained in Xcel's proposal or reply comments, nor is their choice of a historical ten-year average for the CONE escalation rate for what is ultimately a twenty-year calculation of net benefits. An uncharitable explanation is that Xcel has chosen a plausible-sounding overstatement of their actual expectation of the CONE escalation rate, which buoys their

[2] Xcel, *RFA*, Pg. 36
[3] Ibid, Pg. 36

arguments that C*C is most cost-effective as a capacity-revenue-oriented program, rather than e.g. targeting distribution system relief.

Notably, MISO publishes their methodology and assumptions for calculating the Cost Of New Entry.[4] This makes it reasonable and prudent to require that Xcel produce more carefully considered analyses using escalation rates which are transparently derived according to public methodology. The Commission, if it requires Xcel to revise the cost benefit analysis of their proposal, should mandate that they:

1) Consider at least three values for the Cost Of New Entry escalation rate in its sensitivity analysis, which should span a realistic range of possible CONE escalation rates
2) Analyze the strength and significance of these values in determining the cost-benefit ratio of the proposal
3) State transparently the (sets of) assumptions which lead to each value under consideration
4) Explain how these assumptions differ from those of their most recent Integrated Resource Plan in those cases where the considered escalation rates diverge from the 2% escalation rate assumed in the same IRP.

Parameters and Assumptions: Capital Investments

A large share of the proposed C*C budget consists of the capital costs of the BESS themselves, and this means that deviations in the realized cost of BESS have a major impact on the cost-benefit ratio of the entire program, as is revealed in Xcel's limited sensitivity analysis.[5] In reality, the program costs of BESS investments are less certain than they appear. On one hand, lithium-ion batteries have experienced steep cost declines over the past decade, and it is not unreasonable to anticipate further cost declines. On the other hand, BESS manufacturing happens primarily overseas, where recent trade policy shocks have created unstable and uncertain costs

[4] See e.g. MISO Resource Adequacy Subcommittee, *CONE and Net CONE Update for Planning Year 2025/2026*, September 23, 2024, https://cdn.misoenergy.org/20240923%20RASC%20Item%2003%20CONE%20and%20Net%20CONE%20Update649247.pdf

[5] RFA, pg. 40

for imported energy technologies and raw materials.[6,7] It is important that Xcel's cost projections consider these countervailing effects, especially once their Distributed Capacity Procurement program moves out of learning-oriented and into scaling-oriented stages.

A related oversight in Xcel's current CBA is their choice of a single discount rate. While Xcel's weighted average cost of capital ("WACC") is certainly well-defined, it should be viewed neither as static nor as certain. Fluctuating general interest rates - chiefly a product of macroeconomic monetary policy - determine the cost at which any private corporation can issue debt, as well as influencing the Commission's evaluations of Xcel's underlying cost of equity. In short, the choice of a single, unchanging discount rate (equal to the WACC) is a deceptive simplification of the Net Present Value calculation for the program. The Commission, if it sees fit to require Xcel to revise its cost benefit analysis of the C*C program, should order that Xcel:

5) Consider at least three interest rate forecasts, which meaningfully span a range of possible future macroeconomic environments, and expand their sensitivity analysis to evaluate the net present value of the proposal using the evolving discount rate determined by each of these forecasts
6) Evaluate in their analysis the strength and significance of the chosen interest rate forecast on the program's cost-benefit ratio
7) State, in the case of each forecast, how the projected future WACC values compare with those assumed in Xcel's most recent Integrated Resource Plan.

Parameters and Assumptions: Distribution Value

Xcel, in their proposal and reply comments, emphasizes that the proposed C*C program is primarily designed to earn capacity revenue from MISO and that the program should only incidentally realize other benefits, such as deferred distribution investments. They maintain that this is the most cost-effective orientation of the program.[8] I welcome Xcel's reply comment agreeing to estimate actual distribution deferral value in their 2027 Integrated Distribution Plan,

[6] D. Yellen & S. Saha, *Policy Brief: How Tariffs are Undermining U.S. Energy and Economic Security,* CATF, June 4, 2025 https://www.catf.us/resource/policy-brief-how-tariffs-undermining-us-energy-economic-security/
[7] C. McKerracher, *New Record Lows for Battery Prices,* BNEF, December 19, 2025 https://about.bnef.com/insights/clean-transport/new-record-lows-for-battery-prices/
[8] See *RFA,* pgs. 26 & 37, and MPUC Docket No. 25-378, Xcel Energy, *Reply Comments*, January 9, 2026, pgs. 4, 8, 20-22 [hereinafter *Reply Comments]*

which was an accommodation of various parties' concerns that distribution deferral value was underestimated or underexplored in the original proposal.[9] These are concerns which I share.

In particular, I would draw the Commission's attention to the fact that Xcel's defense of the capacity-first orientation of the C*C proposal is based on their forecasts which say that capacity revenues make up the largest share of the benefits of the program. Yet, as discussed above, the relative abundance of capacity revenues depends on a choice of CONE escalation rate which Xcel has not defended before the Commission. The choice of distribution deferral value, though Xcel has agreed to amend it in the future, is arguably just as arbitrary as it stands in the current cost-benefit analysis. A 2020 literature review of the benefits of distributed BESS by the Pacific Northwest National Laboratory finds a range of empirical distribution deferral values between $9/kW-yr and $177/kW-yr, with a mean of $93/kW-yr.[10] It is thus fair to say that Xcel has neither considered a realistic *range* of plausible future capacity revenues nor has Xcel considered a realistic *range* of achievable distribution deferral values. There is thus *little concrete basis at all to Xcel's claims that a capacity-revenue orientation of the C*C program* must *be its most cost-effective design, if the cost-benefit analysis which underlies that claim rests on untested assumptions for both capacity and distribution value.*

Xcel's insistence on the capacity-revenue orientation of the C*C program, if it has not already, may obscure alternate distributed capacity program designs which would be more cost-effective for ratepayers. Consider one conclusion of the PNNL analysis, that, "[the literature] suggest[s] that the value of T&D deferral is highly situational and location dependent."[11] By categorically refusing to ever prioritize distribution system benefits over enrollment in a capacity market, Xcel's deployment of BESS will almost certainly overlook individual cases, comparatively few in number, where distributed storage can provide *much* more investment deferral value than capacity value. These cases may well be discovered in the course of Xcel's proposed feeder selection process, and to ignore them on the principle of maintaining total program orientation towards capacity revenues would straightforwardly deprive ratepayers of potential savings. To remedy this potential problem, the Commission should require that Xcel:

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[9] Xcel, *Reply Comments,* pgs. 20-22

[10] P. Balducci et al., *Washington Clean Energy Fund Grid Modernization Projects: Economic Analysis,* PNNL, October 2020, pg. 12, Table 3.2
https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-30594.pdf

[11] Ibid., pg. 22

8) Reevaluate their claims that prioritizing capacity revenue is the most cost-effective design for the C*C program in light of a revised sensitivity analysis of the program's costs and benefits which must include a representative range of possible CONE escalation rates as well as a representative range of possible distribution deferral values
9) Obey a principle of maximizing *particular* as opposed to general benefit when deploying and operating BESS units. Specifically, to the extent that any individual study reveals that a BESS unit would provide more distribution deferral value than capacity revenue, it should be deployed and operated to capture this distribution value, rather than enrolled for the lesser capacity revenue.

Missing Modeling: Time to Power

In Xcel's initial proposal, "time to power" ("TTP") is wrongly relegated to a few sentences which acknowledge the significance of accelerating the interconnection of additional generation and load, but are ultimately insufficient to facilitate fair consideration of the proposal.[12] *In an era where investments in large, centralized electricity infrastructure are characterized by years-long interconnection timelines, costly interconnection upgrades, permitting and legal challenges, and political risk, time to power should be a* principal *benefit of any distributed capacity procurement program.* By characterizing TTP as a merely qualitative benefit, Xcel deprives the Commission and the public of the opportunity to consider this substantive feature of the proposal.

Xcel lists two obstacles in assigning monetary value to TTP: the first is isolating the effect of the C*C program on the interconnection of new generation and load on the distribution network, and the second is converting this time effect into a dollar value.[13] The Commission should consider, however, that there is no other entity better equipped to overcome either of these formidable challenges. For instance, Xcel must have conducted innumerable interconnection studies for public EV charging stations and community solar installations. They are the only party which could say with certainty whether their own interconnection process for significant

[12] Xcel, *RFA,* pgs. 40-41
[13] Ibid.

distribution-level loads and generators could be accelerated via harmonization with distributed energy storage procurement. To that end, the Commission should require that Xcel:

10) Coordinate at least some of their distributed capacity procurement in Phase 2 of C*C with the specific aim of accelerating the interconnection process of distributed loads and generators, and require that Xcel (or another party) report on the status of these efforts by no later than the Interim Program Assessment (or equivalent significant reporting milestone).

As to the difficulty of quantifying the time value of faster interconnection, Xcel has essentially abdicated any attempt to use their extensive knowledge of their own network, generation resources, or ratepayers to answer a novel and important question about distributed capacity procurement. I reiterate that what is so unsatisfying about settling for TTP as a "qualitative" benefit is that this distinction immediately removes it from the realm of serious consideration against other quantifiable benefits, such as capacity revenue. Even a central numerical estimate with a large uncertainty value is much more useful for decisionmaking than a qualitative description. Some potential avenues to investigate TTP quantitatively include:

- Determining the effect of interconnecting low-cost distributed generation or managed, distributed load on rates and estimating resultant changes to consumer welfare
- Determining the lost revenues and costs incurred by developers waiting for interconnection and estimating resultant changes to producer welfare
- Evaluating the costs and timelines of counterfactual efforts to meet the same system need (to interconnect new load or generation) via centralized capacity resources or infrastructure upgrades

To facilitate a thorough public consideration of the benefits of the C*C proposal, the Commission should:

11) Require that Xcel conceive and/or adopt a public methodology to quantify and monetize the "time to power" benefit of distributed capacity procurement

12) Require that Xcel implement this methodology, using transparent inputs to forecast the potential monetary benefit of time to power under the current proposal, as well as using observations of DCP's effect on interconnection time to document actual time to power benefits as soon as these observations are available

Missing Modeling: Learning by Doing

Xcel has characterized Phase 2 of the C*C program as a "learning phase," emphasizing that this stage is oriented towards developing institutional knowledge and operational experience with distributed capacity procurement rather than achieving immediate cost-effectiveness.[14] This framing, however, should not immunize the proposal from scrutiny over its current unimpressive benefit-cost ratio. To the contrary, it is precisely because this is a learning phase that Xcel should be held to a higher standard of transparency and analytical rigor in demonstrating that, though it may not yet be cost-effective, there still exists learning value in executing the second phase of the C*C program.

The uncertainties discussed throughout this comment - regarding CONE escalation rates, capital costs, distribution deferral values, and time to power - are not static. A learning phase, properly conceived, should serve as an occasion to systematically narrow these uncertainties using new information gathered at both the micro level (e.g., procurement costs, operational performance) and the macro level (e.g., communication with MISO on DER participation, macroeconomic developments). Xcel's current proposal treats its baseline assumptions as fixed inputs to a single cost-benefit calculation, rather than as parameters to be updated and refined as the program proceeds. This approach squanders the epistemic value of a learning phase.

Moreover, any future consideration of extending or scaling the C*C program will require the Commission and interested parties to have substantial reason to believe in the program's cost-effectiveness under realistic conditions. This determination cannot be made if the program's interim reports merely track realized costs against a single, static set of projections. The Commission should therefore:

13) Require that Xcel's quarterly reports include updated cost-benefit analyses which incorporate observed program costs, revised parameter estimates, and updated uncertainty ranges for key assumptions
14) Require that Xcel present a variety of "cost futures" in each interim report, with transparent discussion of how and why projections have changed from previous reports

[14] See Xcel, *RFA,* pgs. 8-9, 34 as well as Xcel, *Reply Comments,* pgs. 4, 7, 29-30, etc.

15) At minimum, if full model revisions are not feasible on a quarterly basis, require that Xcel record and report all observations of operational and program cost data on a quarterly basis, including those proposed by the Minnesota Department of Commerce,[15] so that the Commission or interested parties may conduct independent analyses by the time of the Interim Program Assessment

Conclusion

The Commission should deny Xcel Energy's petition for approval of Phase 2 of Capacity*Connect in its current form and require that Xcel present a revised petition which addresses the deficiencies enumerated in these comments.

It bears emphasis that a more robust analysis is not demanded despite the experimental nature of this program, but because of it. A learning phase which does not systematically track, update, and report on the key uncertainties that determine program cost-effectiveness is not a learning phase at all, but rather a commitment of ratepayer funds to an uncertain venture with inadequate accountability. The Commission has both the authority and the responsibility to ensure that any experimental program approved under its jurisdiction is designed to generate actionable knowledge, not merely to proceed under the cover of acknowledged uncertainty.

A more transparent analysis also serves to level the playing field for interested parties. If Xcel can disclose that their BESS costs fall within some range, or that their CONE expectations span certain values, this is far less revealing of proprietary information than disclosing single, actual figures—yet it provides vastly more useful information for public deliberation than the current approach. The Commission should not permit Xcel's privileged access to its own network data to translate into an informational asymmetry that forecloses meaningful public participation in evaluating this proposal.

In sum, the Commission should require that Xcel:

- Conduct sensitivity analyses across realistic ranges of CONE escalation rates, capital costs, distribution deferral values, and discount rates, with transparent disclosure of the assumptions underlying each scenario

[15] See Xcel, *Reply Comments,* pgs. 31-32

- Develop/adopt and implement a methodology to quantify the "time to power" benefit of distributed capacity procurement
- Commit to updating cost-benefit analyses in interim reports as new information becomes available, presenting multiple cost scenarios with clear explanations of changes from prior reports
- Evaluate whether a capacity-revenue orientation is in fact the most cost-effective design for the program, or whether individual deployments should be permitted to prioritize distribution deferral value where analysis supports such an approach

Until Xcel provides the Commission and the public with the analytical foundation necessary to evaluate whether the C*C program is in the public interest, approval of the petition would be premature.

Summary: 15 Recommendations to the Commission

In modifying the proposal, the Commission should require that Xcel:

1) Consider at least three values for the Cost Of New Entry escalation rate in its sensitivity analysis, which should span a realistic range of possible CONE escalation rates
2) Analyze the strength and significance of these values in determining the cost-benefit ratio of the proposal
3) State transparently the (sets of) assumptions which lead to each value under consideration
4) Explain how these assumptions differ from those of their most recent Integrated Resource Plan in those cases where the considered escalation rates diverge from the 2% escalation rate assumed in the same IRP.
5) Consider at least three interest rate forecasts, which meaningfully span a range of possible future macroeconomic environments, and expand their sensitivity analysis to evaluate the net present value of the proposal using the evolving discount rate determined by each of these forecasts

6) Evaluate in their analysis the strength and significance of the chosen interest rate forecast on the program's cost-benefit ratio
7) State, in the case of each forecast, how the projected future WACC values compare with those assumed in Xcel's most recent Integrated Resource Plan.
8) Reevaluate their claims that prioritizing capacity revenue is the most cost-effective design for the C*C program in light of a revised sensitivity analysis of the program's costs and benefits which must include a representative range of possible CONE escalation rates as well as a representative range of possible distribution deferral values
9) Obey a principle of maximizing *particular* as opposed to general benefit when deploying and operating BESS units. Specifically, to the extent that any individual study reveals that a BESS unit would provide more distribution deferral value than capacity revenue, it should be deployed and operated to capture this distribution value, rather than enrolled for the lesser capacity revenue.
10) Coordinate at least some of their distributed capacity procurement in Phase 2 of C*C with the specific aim of accelerating the interconnection process of distributed loads and generators, and require that Xcel (or another party) report on the status of these efforts by no later than the Interim Program Assessment (or equivalent significant reporting milestone).
11) Conceive and/or adopt a public methodology to quantify and monetize the "time to power" benefit of distributed capacity procurement
12) Implement this methodology, using transparent inputs to forecast the potential monetary benefit of time to power under the current proposal, as well as using observations of DCP's effect on interconnection time to document actual time to power benefits as soon as these observations are available
13) Ensure their quarterly reports include updated cost-benefit analyses which incorporate observed program costs, revised parameter estimates, and updated uncertainty ranges for key assumptions
14) Present a variety of "cost futures" in each interim report, with transparent discussion of how and why projections have changed from previous reports

15) At minimum, if full model revisions are not feasible on a quarterly basis, record and report all observations of operational and program cost data on a quarterly basis, including those proposed by the Minnesota Department of Commerce, so that the Commission or interested parties may conduct independent analyses by the time of the Interim Program Assessment.

About the Author

Jesse Angrist is an Electrical and Computer Engineering student at Princeton University. The views expressed in this comment are his and his alone.

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From: Jesse Angrist
To: Staff, CAO (PUC)
Subject: Public Comment on E002/M-25-378
Date: Tuesday, January 27, 2026 10:21:33 AM
Attachments: Supplemental_Comments_Jesse_Angrist-FINAL.pdf

Dear MPUC Staff,

Please see my attached comment on Docket E002/M-25-378.

Best,
Jesse Angrist