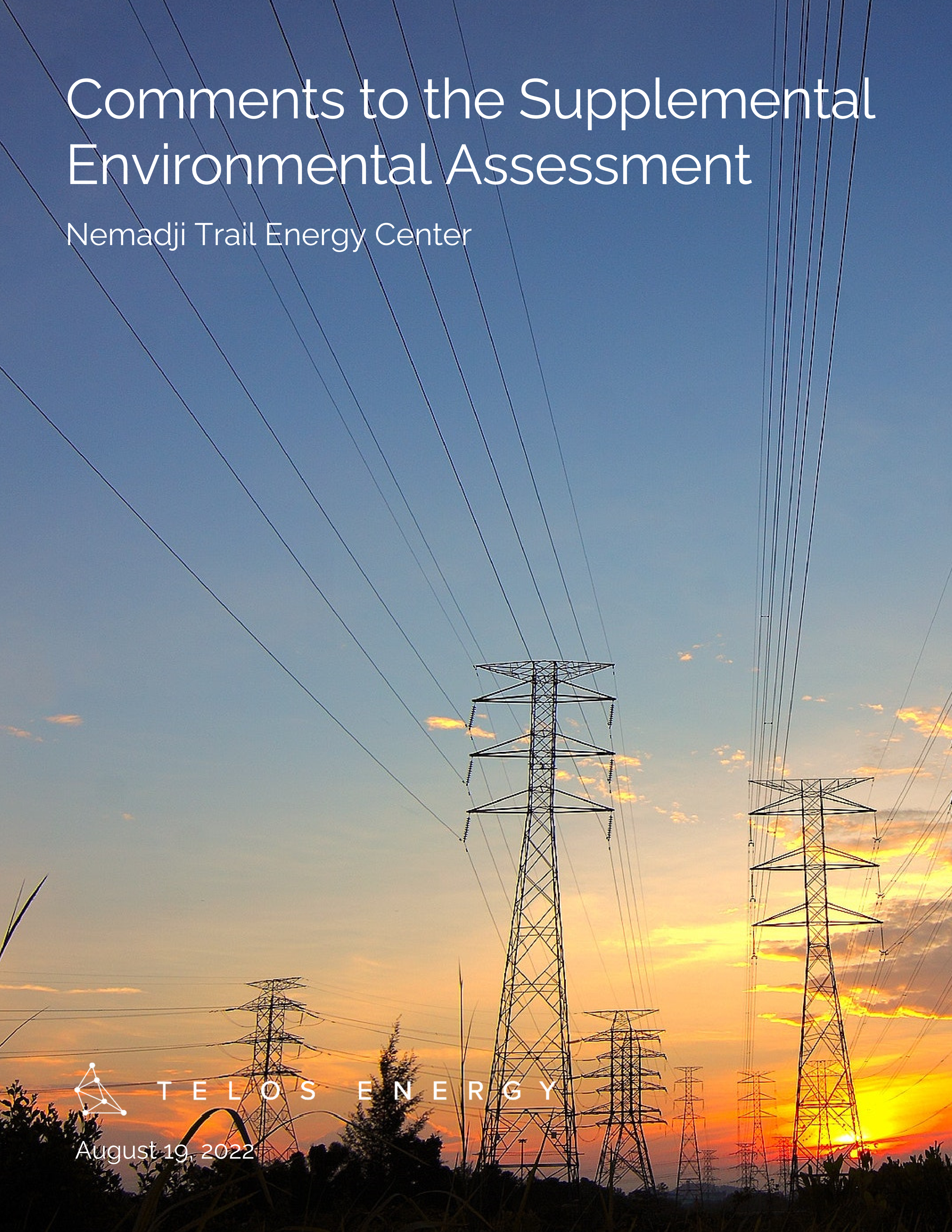

Comments to the Supplemental Environmental Assessment

Nemadji Trail Energy Center

TELOS ENERGY

August 19, 2022

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Summary

The supplemental environmental assessment (SEA) on the climate change impact associated with the Nemadji Trail Energy Center (NTEC) concludes that the addition of a 550 - 625 MW combined-cycle natural gas plant in Superior, Wisconsin reduces greenhouse gas (GHG) emissions and enables greater renewable energy generation. However, the type of analysis used to quantify NTEC's effect on the climate minimizes the long-term impact of building an additional GHG emitting resource that is expected to run at a high capacity factor for decades and therefore will exacerbate climate change risks.

In fact, the type of analysis relied upon in the SEA would indicate that any new gas plant, or even an efficient new coal plant, would have negative emissions as long as there are other emission sources still on the MISO system that emit more GHGs per unit of energy and cost more than the new plant.

The SEA also claims NTEC would enable more renewable generation. However, the additional renewable energy that the assessment concludes would be enabled by NTEC is very small, representing less than 0.25% of total renewable and hybrid renewable generation by 2040 in the production cost analysis performed in the SEA analysis. It is important to acknowledge that much greater levels of renewable generation could be enabled by considering different portfolios of resources instead of NTEC, such as solar, standalone storage and hybrid solar + storage resources.

In addition, a review of the SEA's analysis raises the question of why no consideration was given to MISO Futures 2 and 3, given their final release date of December 2021 and this report release in June 2022.

However, even using the more optimistic MISO futures, the SEA analysis would still underestimate NTEC's negative climate impact by, among other things, ceasing to count emissions after 2040, when the facility would only be 13 years old and after which the electric grid would be expected to continue to decarbonize (if it is not fully decarbonized by then).

Commentary

1.1 The SEA Analysis Obscures NTEC's GHG Emissions and Does Not Align with Decarbonization Goals

The analytic approach used by the SEA obscures NTEC's GHG emissions and climate impact. As shown in the SEA production cost results, NTEC is situated on the dispatch curve, shown in Figure 1, before the coal and peaking power plants. This type of analysis will always show a marginally more efficient fossil fuel resource as "clean" with negative emissions until that unit becomes the dirtiest unit on the dispatch stack as coal and inefficient peaking units retire during the expected lifetime of the proposed resource. Even under the most ambitious decarbonization scenarios, it will take many years before all the dirtier fossil fuel plants currently on the system are retired. Meanwhile, virtually any new fossil fuel plant (expected to be more fuel-efficient than existing plants) would be shown to have negative emissions under the approach used by the SEA.

Figure 8: Generation Dispatch Stack

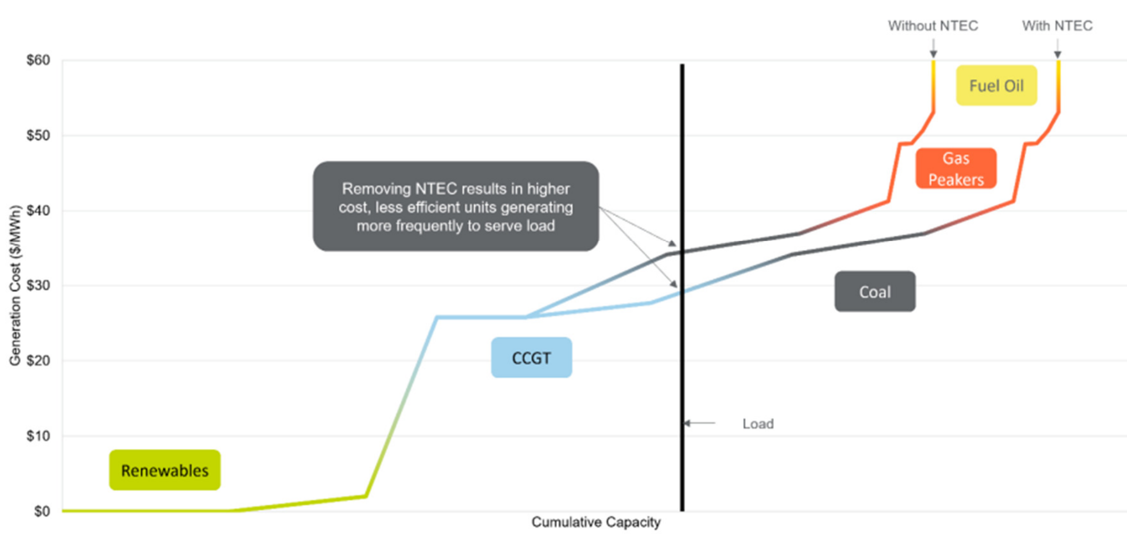

Figure 1. NTEC SEA production cost analysis generation dispatch stack[1]

It is particularly likely that a new plant can be shown to have negative emissions if the analysis does not consider the new plant's full lifetime emissions. The SEA obfuscates the real GHG impact of the plant by limiting the years modeled to 2040, which is approximately 27 years short of a combined-cycle's 40-year expected life. By the last year modeled, NTEC still has over 67% of its lifetime emissions

[1] NTEC Production Cost Analysis, Dairyland Power Cooperative, Nemadji River Generation, LLC, South Shore Energy LLC. Appendix B of the Supplemental Environmental Assessment for the Nemadji Trail Energy Center Project. June 2022.

remaining, assuming it runs at similar capacity factors both before and after 2040. Therefore, the SEA is leaving out over two-thirds of NTEC's lifetime emissions from this analysis.

The SEA also shows NTEC in a scenario where coal is still prevalent and other inefficient fossil resources remain through 2040, which is inconsistent with the national goal of achieving full decarbonization of the power grid by 2035. (The relatively modest rate of grid decarbonization assumed in the SEA is discussed more in part 3.0.) If operated as intended, NTEC would prevent the achievement of grid decarbonization goals by 2035, or indeed by any year during NTEC's lifetime. It would still cause large amounts of GHG emissions every year, since a combined cycle plant like NTEC would be expected to run over 70% of the time and adaptations to mitigate the plant's emissions would make it much less cost competitive with clean energy technologies.

1.2 NTEC Has Significant Emissions

As modeled in the SEA, the addition of the NTEC plant would contribute an average of 1,763,211 tons of CO_2 emissions per year. This level of CO2 emissions is evident based on the plant's 850 lb CO_2/MWh carbon intensity (as specified in the SEA[2]) and coupled with the annual generation results from the production cost model for years 2025, 2030, 2035, and 2040. Note, however, that these annual emissions only reflect CO_2 from the combustion turbines, not other GHGs, and assume NTEC runs at an average 76% capacity factor. According to the SEA, if NTEC operates at full capacity, its annual CO_2 emissions would be 2,242,381 tons per year. When NTEC's other GHGs are included (methane, nitrous oxide, and sulfur hexafluoride), the SEA shows that NTEC's potential annual GHG emissions would be 2,739,924 tons of CO_2e per year.

Assuming an expected plant life of 40 years and assuming the plant runs at no more than the SEA model projects, the total emissions of CO_2 alone from NTEC would be 70,528,470 tons. However, if other gases are included and the plant were run at higher capacity factors, its 40-year lifetime GHG emissions could be up to 109,596,960 tons of CO2e. Whether NTEC runs at full capacity or the lower level modeled in the SEA, NTEC's emissions represent an obvious additional barrier to reaching net zero emissions goals. Deploying greater levels of commercially proven zero emissions resources now provides a better chance to reach climate change goals rather than deferring progress towards those goals to a later date.

The SEA analysis fails to compare the emissions impact or potential renewable enablement benefits of the plant against alternative resource portfolios. Simply showing that a marginal amount of renewable energy generation increases when the NTEC facility is in the production cost model misses the point that a substantially larger amount of energy is still directly tied to burning fossil fuels and works against long-term net zero emissions goals.

1.3 Carbon-Free Alternatives are Cost Competitive

As an alternative to investing in NTEC, Dairyland could meet its energy needs through a mix of carbon-free resources, like a combination of wind, solar, energy storage, and demand response, perhaps

[2] Dairyland Power Cooperative, *Supplemental Environmental Assessment for the Nemadji Trail Energy Center Project*, page 3-21, https://www.rd.usda.gov/sites/default/files/NTEC_Supplemental_EA_June2022_FINAL.pdf, June 2022.

coupled with some conventional units that would run infrequently for reliability. Xcel has recently opted to do something similar instead of building a large combined cycle plant.[3] These types of investments could achieve deep emissions reductions. Like NTEC under the SEA analysis, such a carbon-free combination would displace carbon-polluting generation from both coal plants and other fossil fuel plants, but unlike NTEC, it would do so without producing millions of tons of new GHG emissions. It would also shield ratepayers from higher energy prices due to fuel price volatility of the sort occurring today and would not leave ratepayers on the hook for decarbonizing a plant using unproven and uneconomic technologies, which NTEC would someday require to continue operating consistent with decarbonization goals.

For comparison of the relative economics of alternative resource options with NTEC, Table 1 compares the levelized cost of electricity for wind, solar and hybrid solar projects coming online in 2027 to a new combined cycle power plant similar to NTEC based on the EIA 2022 Levelized Cost of New Generation Resources report. (Hybrid solar projects combine solar power with batteries at the same site.) The values represented in Table 1 reflect regional variations in capital costs, resource availability and cost of labor. They show that renewable resources are cost competitive with conventional generation with the added benefit of no fuel cost volatility and no direct emissions impacts. Although there are near-term cost increases associated with renewables and storage projects, long-term cost declines are projected to continue beyond 2030. In fact, other industry standard data sources, such as NREL's Annual Technology Baseline, show even greater declines in the LCOE of wind, solar and hybrid solar for plants built in 2027.[4] This stands in contrast to fossil fuel technologies which could face significantly greater costs in the future on several fronts. Whether caused by CO_2 regulations, fuel shortages or capital markets divesting from fossil fuels, the risk of higher costs for energy are more prevalent from an emitting power plant relative to zero emissions resources.

Table 1. EIA Annual Energy Outlook 2022 levelized cost of electricity (LCOE) for new resources in 2027[5]

Technology Type	Levelized Cost of Electricity in 2027 (2021 $/MWh)
Wind, onshore	$30 – 66
Solar, standalone	$27 – 45
Solar, hybrid	$40 – 63
Combined Cycle	$34 – 50

A combination of resources such as wind, solar and storage can also provide a wide range of benefits beyond zero emissions energy. For example, batteries can be more efficient at providing capacity, ancillary services, and responsive reserves compared to a gas plant as they can respond nearly instantaneously and at a wider range of output with no minimum output level and no minimum up or

[3] Kirsti Marohn, *Xcel Energy changes course, new plan does not include Becker gas plant*, https://www.mprnews.org/story/2021/06/25/xcel-energy-changes-course-new-plan-does-not-include-becker-gas-plant, June 25, 2021.
[4] NREL, *2022 Electricity Annual Technology Baseline*, https://atb.nrel.gov/electricity/2022/technologies.
[5] EIA, *Levelized Costs of New Generation Resources in the Annual Energy Outlook 2022*, Table 2, https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf, March 2022.

down times. Batteries also provide the benefit of storing excess renewable energy during times of overproduction and shifting that energy to periods of high demand, directly enabling more renewable energy to service load during peak demand and mitigating curtailment due to transmission congestion.

2.1 The Renewable Energy Enabled by NTEC is Very Small

The NTEC Production Cost Analysis claims that NTEC enables greater renewable energy generation by relieving transmission and congestion issues, allowing more wind and solar to serve load centers in MISO West. This analysis depends upon two sets of long-term predictions. First, it depends on predicting what other generating sources exist on the MISO West power grid between now and 2040. Energy storage deployment in MISO West is assumed to be very small in the future system assessed in the SEA; a more robust buildout of energy storage would enable more renewable energy to shift from periods of high production to periods of peak demand, enabling more renewables to serve load when needed. Secondly, it depends on predicting what additional transmission upgrades are built over this period. Transmission upgrades could resolve congestion problems to the extent that NTEC would not enable any additional renewable generation.

However, even if the long-term predictions on which their analysis rests prove to be true, their analysis indicates that the amount of renewables enabled by NTEC would be very small. The NTEC Production Cost Analysis states that the scenario with NTEC online "resulted in 2,302,807 MWh of additional renewable generation, which was not curtailed over the study period."[6] The enabled renewable energy over the 15-year study period is equivalent to a 17.5 MW renewable plant running constantly, or a 35 MW wind plant achieving 50% capacity factor. Their own analysis shows that the renewables enabled is very small compared with the size of the NTEC plant, which is expected to generate 66,491,555 MWh over the same period. Therefore, the renewable energy enabled is a mere 3.4% of the energy produced by the fossil plant. Furthermore, Table 2 shows the total additional renewable generation attributed to NTEC relative to the total renewable generation in the results without NTEC. The amount of renewable generation claimed to be enabled by NTEC represents less than 0.25% of total renewable and hybrid renewable generation in MISO West by 2040 in the production cost modeling performed in the SEA analysis. To characterize NTEC as a project that enables renewable generation exaggerates its impact.

Table 2: Additional Renewable Generation

Model Year	2025	2030	2035	2040
Total Additional Renewable Generation with NTEC (MWh x 1000)	17	129	182	232
Total Renewable Generation without NTEC (MWh x 1000)	84,747	95,052	107,763	110,486
Additional Renewable Generation as Percent of Total (%)	0.02%	0.14%	0.17%	0.21%

[6] NTEC Production Cost Analysis, Dairyland Power Cooperative, Nemadji River Generation, LLC, South Shore Energy LLC. Appendix B of the Supplemental Environmental Assessment for the Nemadji Trail Energy Center Project. June 2022.

2.2 Multiple Smaller Utility-Scale Resources Can Improve Transmission Utilization

Large, centralized generation stations inject high levels of electric power to the transmission system at a single location, which can cause more stress (thermal overloading) to the transmission system than the injection of several smaller utility-scale resources spread throughout the transmission system. With a centralized generation plant, the power typically flows through a small number of transmission lines (the "backbone") until it gets closer to the load. This means that the loss of any of these power-carrying "backbone" elements of the grid can be especially severe because that power will be forced to flow through other (often smaller) paths of the transmission network, which can cause overloading of those smaller lines. However, by spreading out the resources across several different interconnection points, it is less likely that any one or two transmission contingencies will be overloading the grid because the total generated power from all of the collective resources is flowing through more transmission paths initially.

Therefore, while NTEC claims to be reducing congestion on the grid and thus enabling the use of more renewable energy, it could in fact be causing greater transmission concerns because it would be such a large and centralized generation source. If, instead of building NTEC, investments were made in a portfolio of more distributed generation sources, such as wind, solar, and storage facilities, it could better improve the utilization of the transmission system and avoid reliance on single large generation sources which represent risks.

3.0 The SEA Assumes Only Modest Rates of Grid Decarbonization and Does Not Reflect Most of NTEC's Full Operating Lifetime

As it stands, the SEA relies on a narrow view of the future MISO system (MTEP Future 1), which is the most conservative MTEP future scenario regarding CO_2 emissions reductions and far more conservative than the national goal of a carbon-free electric grid by 2035. Of the MTEP Futures, Future 1 has the highest portion of fossil fuel resources in the generation mix. In 2040 it still assumes 57% of energy is obtained by coal and natural gas.[7] When used as a baseline for the analysis, the addition of NTEC would show greater emissions reduction benefits because there are more high-emissions plants in the Future 1 scenario that could be displaced by NTEC. This contrasts with MTEP Futures 2 and 3, which have fewer greenhouse gas emissions assumed, such that a displacement of resources due to the addition of NTEC would be expected to show a lower benefit for emissions reduction. Therefore, the use of MTEP Future 1 as the base scenario results in a higher estimated emissions displacement benefit of adding NTEC to the resource mix compared to the other MISO Futures.

The choice to only assess MISO Future 1 was made based on the unavailability of MISO Futures 2 and 3 at the time of the analysis. However, the full release of the MTEP 2021 study was December 2021 and the release of this report was drafted by 5/11/2021. No reason is provided as to why the analysis did not consider the impact of removing NTEC from the MISO futures for Futures 2 and 3 during the 5 months between the full MTEP release and the NTEC Supplemental Assessment release. There is also no assessment of NTEC in a future consistent with decarbonization goals and there is no discussion

[7] MISO, *MTEP21 Full Report*, pg. 8, https://cdn.misoenergy.org/MTEP21%20Full%20Report%20including%20Executive%20Summary611674.pdf, December 2021.

of the additional expenses that would be required to operate NTEC as a net zero emissions resource in the future. In short, there is no consideration of the near-term need to plan accordingly to meet climate change emissions targets and transition to a clean energy future in the SEA.

The narrowness of using only MISO Future 1 is compounded due to the limited expansion of battery storage and hybrid solar + storage units in MISO Future 1. Table 3 shows the dramatically higher levels of renewable and storage additions assumed in MISO Futures 2 and 3 by 2030 for Local Resource Zones (LRZs) 1-3 relative to Future 1. LRZs 1-3 constitute the MISO West sub-region, which is the focus of the SEA modeling; MISO West includes Wisconsin, Minnesota, North Dakota, Iowa, the Michigan Upper Peninsula, and parts of Illinois, South Dakota, and Montana. Even with the more aggressive battery storage build out assumed in MISO Future 3, there is still potential for even greater amounts of storage to be added to meet decarbonization goals, including long duration energy storage. Under such scenarios, the flexibility afforded by the new storage resources could meaningfully change how the generation fleet operates and the resulting emissions impact.

Table 3: MISO Futures Scenarios LRZ 1-3 Renewable and Storage Additions by Technology[8]

Technology Type	MISO Future 1 Additional Capacity	MISO Future 2 Additional Capacity	MISO Future 3 Additional Capacity
Storage	0 MW	0 MW	1,890 MW
Hybrid Solar	198 MW	841 MW	3,732 MW
Solar	8,311 MW	8,190 MW	8,401 MW
Wind	5,363 MW	9,081 MW	21,875 MW

4.0 NTEC Cannot Address 2022/2023 MISO Capacity Concerns

In addition to the main claims related to greenhouse gas emissions and renewable energy enablement, the supplemental assessment claims that NTEC will help address the recent 1,230 MW capacity shortfall identified by MISO for the 2022/2023 Planning Resource Auction (PRA). MISO provided additional comments to RUS regarding the need for additional capacity and how NTEC could satisfy some of the capacity shortfall identified in MISO LRZs 4-7. While we do not dispute MISO's position that additional capacity is required to satisfy the aggregate planning reserve margin requirements in MISO North/Central via the PRA construct, we dispute that NTEC should be given more weight for addressing reliability concerns when other resources could, and likely will, satisfy the capacity shortfall between now and 2027.

It is very difficult to estimate the capacity shortfall or surplus that may exist in 2027 given the large number of resource additions in queue that could be in-service by that time. In addition to resources already in the queue, MISO recently approved over $10 billion in new transmission investments, which largely increase transmission capability from the renewable rich MISO West regions

[8]MISO, *MTEP21 Report Appendix E: Futures Development, Model Building, Resource Forecasting, and Siting*, https://cdn.misoenergy.org//Draft%20MTEP21%20Appendix%20E%20-%20Futures%20Assumptions581042.pdf, December 2021

to those regions experiencing the capacity shortfall (Zones 4-7 in the east of MISO).[9] In conjunction with substantial transmission investments which will enable more renewable generation to serve load across MISO, the U.S. Congress recently passed the Inflation Reduction Act (IRA).[10] The IRA is specifically geared towards incentivizing a more rapid transition to clean energy. Notable provisions in the IRA which will affect the energy resource mix for years to come are a 10-year extension of the solar investment tax credit, wind production tax credit and a new investment tax credit for standalone storage assets. In particular, the storage investment tax credit is expected to spur substantial development of new storage resources across MISO. Storage plays a fundamental role in shifting energy from hours with surplus (when solar and wind production is the greatest) to when demand is highest or renewable energy output is low.

These developments will drastically reshape the future energy landscape. At this time, it is apparent that the future world assessed in the SEA is highly unlikely to play out due to the hundreds of billions of dollars in renewable and storage incentives passed by Congress and the significant transmission developments planned by MISO. Any assessments done to date may overstate NTEC's contribution to reliability and renewable enablement while locking in a polluting resource intended to run at high capacity factors and contributing substantial emissions over its 40-year lifetime.

In addition to the uncertainty of future PRA shortfalls, the MISO West subregion within which Dairyland operates is not short in capacity for the 2022/2023 PRA. The PRA requirement shortfall identified by MISO showed tight conditions in LRZ 4-7, which cover most or parts of Michigan (Lower Peninsula), Indiana, Illinois and Missouri, and Kentucky, not in LRZ 1-3 where the companies proposing NTEC provide service.[11] While MISO's plans for reliability operations merge LRZs 1-7 into North/Central zones, it would be extremely unusual for Dairyland to specifically acquire capacity to meet the shortfall of different load serving entities located in entirely different MISO zones.

Even with the capacity shortfall in the 2022/2023 PRA, MISO indicated in the results that most entities are still providing their own capacity to meet reserve requirements, either through self-scheduling their own units, or through bilateral contracts outside the auction. To this point, in Dairyland's 2022 optional-IRP compliance report for the Minnesota Public Utilities Commission, Dairyland projects more than sufficient capacity to meet its Class A and D planning reserve margin requirements, including surplus capacity sales. Dairyland, with a 50% stake in NTEC, would have a capacity surplus of over 300-400 MW relative to its reserve margin requirements outlined in its optional-IRP filing.[12] If the majority owner of NTEC is projected to have a capacity surplus even without the plant, as indicated by their own filings, NTEC is not necessary to alleviate capacity shortfalls for Dairyland and should not be considered as a vital resource for addressing capacity needs in distant MISO regions. We

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[9] MISO, *MISO Board Approves $10.3B in Transmission Projects*, https://www.misoenergy.org/about/media-center/miso-board-approves-$10.3-in-transmission-projects/, June 25, 2022.

[10] Senate Democrats, *Summary of the Energy Security and Climate Change Investments in the Inflation Reduction Act of 2022*, https://www.democrats.senate.gov/imo/media/doc/summary_of_the_energy_security_and_climate_change_investments_in_the_inflation_reduction_act_of_2022.pdf.

[11] MISO, *2022/2023 Planning Resource Auction (PRA) Results*, https://cdn.misoenergy.org/2022%20PRA%20Results624053.pdf, April 14, 2022.

[12] Dairyland Power Cooperative, *2022 Optional-IRP Compliance Report of Dairyland Power Cooperative*, 2022.

reiterate that Dairyland has no need to acquire additional capacity to meet existing shortfalls in MISO LRZ 4-7 and that the 5-year lead time for construction of the project makes it ill-suited to satisfy MISO-wide needs, especially while there is no near-term capacity shortfall for Dairyland itself or even Dairyland's MISO sub-region.