UPPER MIDWEST
LAW CENTER

October 15, 2021

Via E-filing

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
St. Paul, MN 55101

Re: In the Matter of Xcel Energy's 2020-2034 Upper Midwest Integrated Resource Plan
Docket No. E-002/RP-19-368

Center of the American Experiment's Reply Comments

Dear Mr. Seuffert:

I represent, along with my colleague Attorney James Dickey, also of the Upper Midwest Law Center ("UMLC"), the Center of the American Experiment ("CAE"), which wishes to offer reply comments on Xcel Energy's Supplemental Integrated Resource Plan at issue in this proceeding.

CAE's reply comments, prepared by Isaac Orr and Mitchell Rolling of CAE, are attached hereto.

UMLC reserves the right, on CAE's behalf, to submit further comments and replies to the comments of other parties in the event another extension to the reply comment period is granted, and to proceed with any applicable appeals or challenges to any forthcoming decision of the PUC.

Respectfully,

Douglas P. Seaton

Douglas Seaton, Esq., President of UMLC
Attorney for Center of American Experiment

Attachment

cc: Service List
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Prepared by Isaac Orr and Mitch Rolling

Center of the American Experiment submits the following reply comments for Docket No. E-002/RP-19-368 related to Xcel's 2020-2034 Upper Midwest Integrated Resource Plan (IRP) for consideration of the Minnesota Public Utilities Commission (PUC).

Dear Members of the Public Utilities Commission,

Center of the American Experiment continues to believe that the most prudent course of action for Minnesota families and businesses is to approve a modified version of Scenario 15, in which both the Sherburne County Unit 3 and A.S. King coal-fired power plants are retained through the end of their original retirement dates, both nuclear facilities are extended, and Xcel does not build any solar or wind facilities that are not required to meet mandates under the Next Generation Energy Act (NGEA) or the Solar Energy Standard (SES).

The emerging energy crisis in Europe and rapidly rising natural gas prices in the United States should give us pause about the idea of relying too heavily on wind, solar, and natural gas to provide the electricity we rely upon for nearly every aspect of our lives.

U.S. Energy Information Administration (EIA) data show natural gas inventories are below their five-year average[1] and that prices have increased from approximately $2.30 per million British thermal units (mmBtu) at this time last year to $5.50 per mmBtu this fall.[2]

High natural gas prices have increased the burn rate at U.S. coal plants compared to this time last year.[3] Many of these plants were not anticipating such high rates of burn, and as a result, may be short of supplies this winter, prompting the use of higher-cost natural gas or potentially causing rolling blackouts.

In Europe, skyrocketing natural gas prices—due to low supply—and low wind speeds have prompted electric companies to restart their coal-fired power plants. Unfortunately, due to a failure to plan appropriately for the absence of wind generation, coal supplies on the global market are scarce and driving up electricity prices.[4] Market prices for electricity are so high that Goldman Sachs warns that prices may get high enough to curb industrial demand through blackouts.[5]

Rather than repeating the mistakes made by governments in Europe, Xcel Energy should build upon its Memorandum of Understanding with NuScale Power and plan to gradually replace its existing carbon-dioxide emitting facilities with small-modular nuclear reactors (SMRs).[6]

Xcel clearly sees the value in the emerging firm, carbon-free technology that is SMRs. American Experiment believes that retaining reliable and affordable coal and natural gas-fired power plants until SMRs are ready to replace them is the best bridge to zero while keeping costs as low as possible. This would prevent Xcel from

building redundant natural gas plants that would eventually be replaced with carbon-free energy sources far before the end of their useful lives.

We firmly believe that the Commission should move to approve Scenario 15. However, we would also respect and support the Commission if it decides to take a “wait-and-see" approach on this Integrated Resource Plan (IRP) until spring.

This would provide the Commission with the benefit of another winter’s worth of data to examine the interplay between natural gas use for electricity generation and home heating.

Sincerely,

Isaac Orr and Mitch Rolling

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Policy Fellow
Center of the American Experiment

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Policy Analyst
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Table of Contents

Executive Summary

American Experiment has updated its modeling for the Supplement and Alternate plans presented by Xcel. Our findings show that the Alternate Plan, which no longer includes a combined-cycle natural gas facility at Becker, would cost Minnesota ratepayers $47.8 billion through 2050, while the Supplement Plan would cost $46 billion.[7] Xcel's proposed plans would result in an average cost increase per customer of over $1,100 per year, while residential electricity rates would soar past 19 cents per kilowatt-hour by 2034 in both scenarios – an increase of over 40 percent from 2019 rates.

Both plans are expensive because of a planned buildout of wind, solar, and natural gas capacity to replace coal facilities on Xcel's system. These coal facilities could continue to provide electricity for Minnesotans for many years but for the premature retirements that Xcel is seeking.

Based on filings to the PUC, Xcel is planning to replace roughly 4,350 MW of retiring coal and natural capacity with just under 12,000 MW of wind, solar, and natural gas capacity – a ratio of nearly 3 to 1.[8]

Consequently, one of the largest expenses to ratepayers throughout the duration of the model is utility returns, which will cost $25.6 billion for the Alternate Plan – $1.7 billion more than the Supplement Plan. Utility returns become such a major expense to Xcel ratepayers because of the massive amount of new wind, solar, and natural gas capacity Xcel plans to bring onto the grid, for which they are guaranteed a rate of return. Additional generation expenses will add up to $7.7 billion, while property taxes and transmission expenses will reach an additional $6.4 billion and $6.7 billion, respectfully, through 2050.

Under Xcel's Alternate Plan, it would cost more than $110 per ton for each short ton of carbon dioxide reduced. Thus, this plan fails a cost-benefit analysis with Minnesota environmental cost values for CO_2. In fact, as Figure 1 shows, the cost per short ton reduced exceeds Minnesota's environmental cost values for CO_2 in every year of our modeling through 2050.

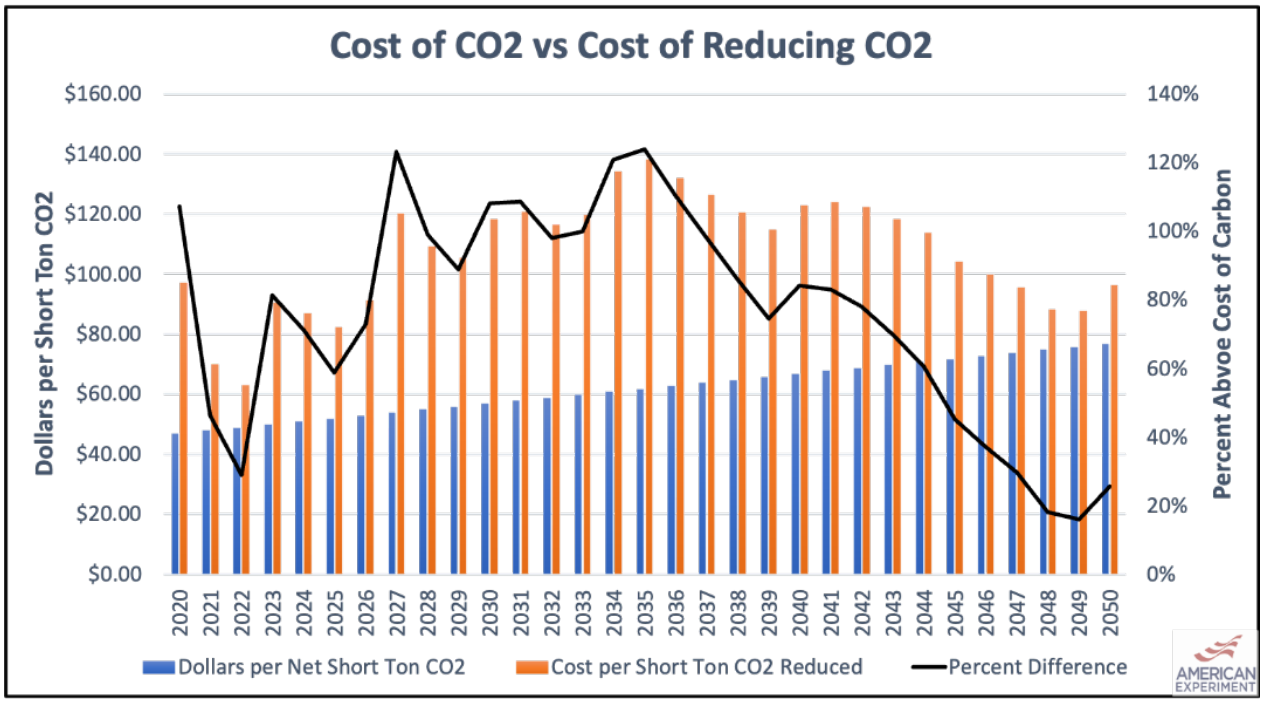


Figure 1. *The cost of Xcel's Alternative Plan exceeds the cost of the highest Social Cost of Carbon established by the Minnesota Public Utilities Commission, therefore failing a cost-benefit analysis.*

Cause for Warning from Europe

European Energy Crises

The continent of Europe is currently in the throes of multiple energy crises that are a result of bad policy choices. Unfortunately, Xcel's Alternative Plan would emulate these mistakes rather than avoid them.

In 2005, approximately 29 percent of Europe's electricity supply was generated by coal (943 terawatt-hours (TWh) out of 3,283 TWh), and 30 percent came from nuclear power plants (997 TWh).[9] Natural gas accounted for just 20 percent of electricity generation that year. By 2020, coal accounted for just 12 percent of E.U. electricity generation nuclear accounted for 24 percent, gas increased modestly to 21 percent, and wind and solar went from mostly insignificant contributors in 2005 to generating 15 percent and 5 percent of E.U. electricity, respectively.

The shift away from dispatchable, fuel-secure resources in favor of intermittent renewables backed up by natural gas generation has led Europe to be increasingly vulnerable to natural gas price increases and supply shocks.[10] It has also made the continent more subject to changes in weather patterns that affect wind generation in the North Sea.

European Wind Drought

Increasing reliance upon wind and natural gas has had foreseeable, negative consequences. This fall, Europe has been experiencing a "wind drought," with wind-generated electrical output falling by 15 percent this year, prompting European electricity providers to restart coal-fired power plants (See Figure 2).[11]

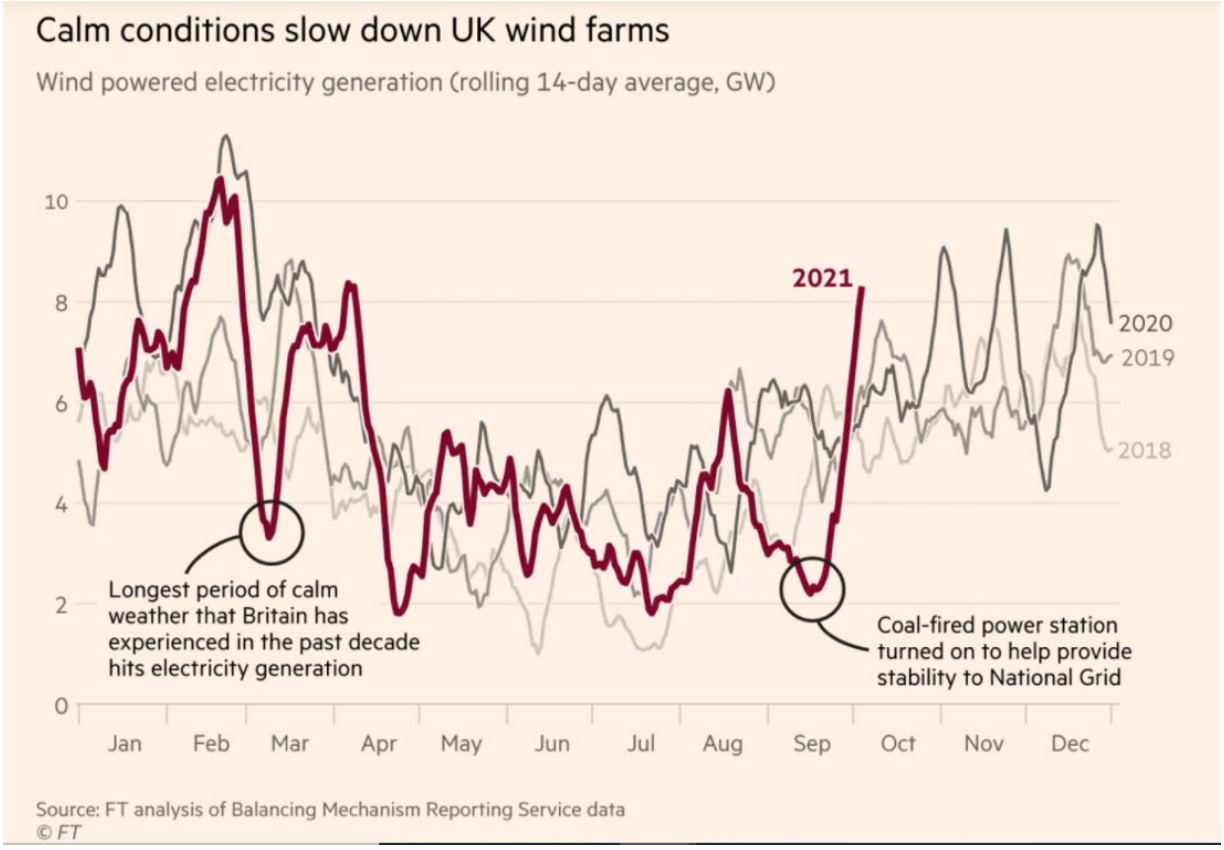


Figure 2. *Low wind speeds and soaring natural gas prices prompted electricity generators in Europe to restart their coal plants.*

The *Financial Times* notes that the cause of the slowdown in wind speeds is unknown, but one possible explanation is a phenomenon called global stilling. This is a decrease in average surface wind speed owing to climate change.

The *Financial Times* continues:

> "Near-surface wind speed trends across the globe found that winds have generally weakened over land over the past few decades," said Paul Williams, Professor of Atmospheric Science at the University of Reading. "This suggests that the phenomenon is part of a genuine long-term trend, rather than cyclic variability."

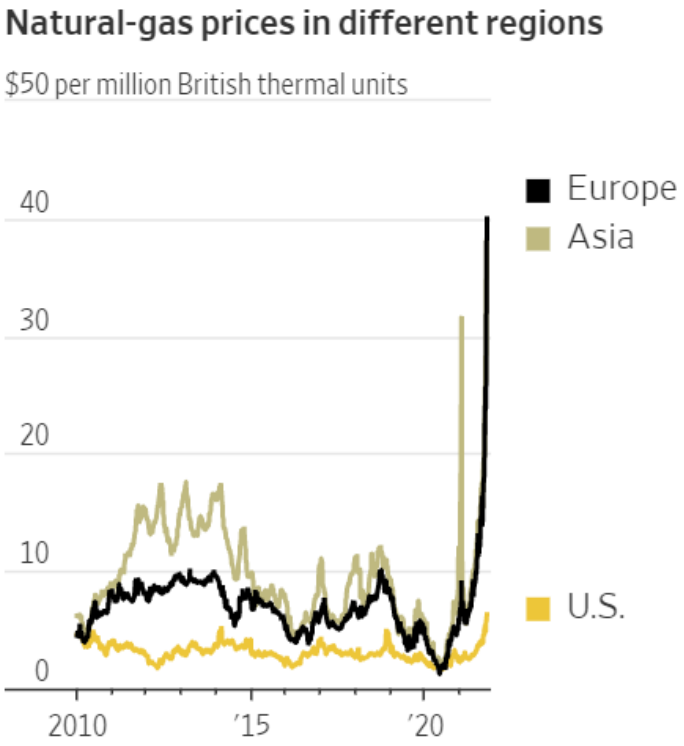
One explanation for this could be that "human-related climate change is warming the poles faster than the tropics in the lower atmosphere," Williams noted. "This would have the effect of weakening the mid-latitude north-south temperature difference and consequently reducing the thermal wind at low altitudes."

Low wind speeds have caused a large increase in natural gas use, causing prices to increase dramatically in Europe.

European Natural Gas Prices Are Soaring

Natural gas prices in Europe have hit record highs, rising 400 percent this year due to natural gas shortages.[12] Prices are rising because of increasing demand and a lack of domestic production in the E.U. that has left the continent at the mercy of Russian gas production and imports of liquified natural gas from Australia, the United Arab Emirates, and the United States.

The Wall Street Journal reports that natural gas prices have increased from approximately $10 per million British thermal units (mmBtu) to $40 per mmBtu since the end of June 2021 (See Figure 3).[13] This increase in costs occurred nearly overnight, demonstrating that large swings in commodities prices can happen in rapid succession.



Notes: Data through Tuesday. Prices are for gas in the Netherlands and at Henry Hub in Louisiana; LNG in China, Taiwan, South Korea and Japan.
Source: S&P Global Platts

***Figure 3**. Natural gas prices in Asia and Europe have soared in the last several months. Prices are increasing in the United States, but to a lesser degree because of hydraulic fracturing, or "fracking."*

EuroNews reports that Citizens in countries like Spain, Italy, France, and Poland are now facing all-time-high energy bills that add to the economic woes caused by the pandemic.[14] In Italy, Roberto Cingolani, minister for the ecological transitions, has already warned Italians to expect a 40 percent increase in their bills over the next months.

High Energy Costs in Europe Harm Manufacturing

German factories have reported huge production-cost increases, and British manufacturers, including producers of steel, glass, ceramics, and paper, have warned that they could be forced to shut down due to soaring energy prices.[15]

In Spain, steelmaker Sinedor announced it has suspended production at its plant near the city of Bilbao until the end of the year due to a sharp increase in electricity prices, which made the operation financially unviable.[16]

The energy policies enacted in Europe over the last two decades should be an example of *what not to do.* Unfortunately, repeating these mistakes will have predictable, negative consequences.

The U.K. Pledges More Nuclear

The Government in Britain has recently pledged that nuclear will feature as a key resource in its move away from natural gas. As explained by British officials, it is "a landmark move to end Britain's dependency on volatile fossil fuels."[17]

The Business Secretary, Kwasi Kwarteng, explained, "The more I look at this, I think nuclear has to be part of the solution."

"What we need to do in this country is have a cheap, affordable system, something that's sustainable, and something which we can rely on ourselves, which protects us from the vagaries of international price movements," he continued.

As a nation that relies on natural gas for 38 percent of its electricity needs, it's important to note that Britain is steering away from exactly the place that Xcel's proposal would guide Minnesota toward – that is, an overreliance on wind, solar, and natural gas. The implications of Xcel's proposed Alternate and Supplement plans are very predictable and apparent.

As analyst Carlos Torres Diaz, head of gas and power markets at Rystad Energy, lays out, "Definitely the strong growth in renewable power generation is affecting the prices and the power mix."[18]

Implications for Minnesota

The energy crises plaguing Europe offer real-world examples of the unintended consequences that accompany energy policies similar to the ones Xcel is proposing.

The Dangers of Wind Dependency

The premature retirement of reliable, affordable, and fuel-secure resources in favor of a combination of wind, solar, and just-in-time natural gas will present severe reliability concerns during periods of high stress on the grid, such as the Polar Vortex of 2021, also known as Winter Storm Uri.

According to U.S. Energy Information Administration data, there were several hours when Xcel's coal plants, the Sherburne County Generating Station (Sherco) and the Allen S. King plants, were generating more electricity, on average, than all of the wind installed on the regional electric grid, the Midcontinent Independent Systems Operator (MISO), combined (See Figure 4).

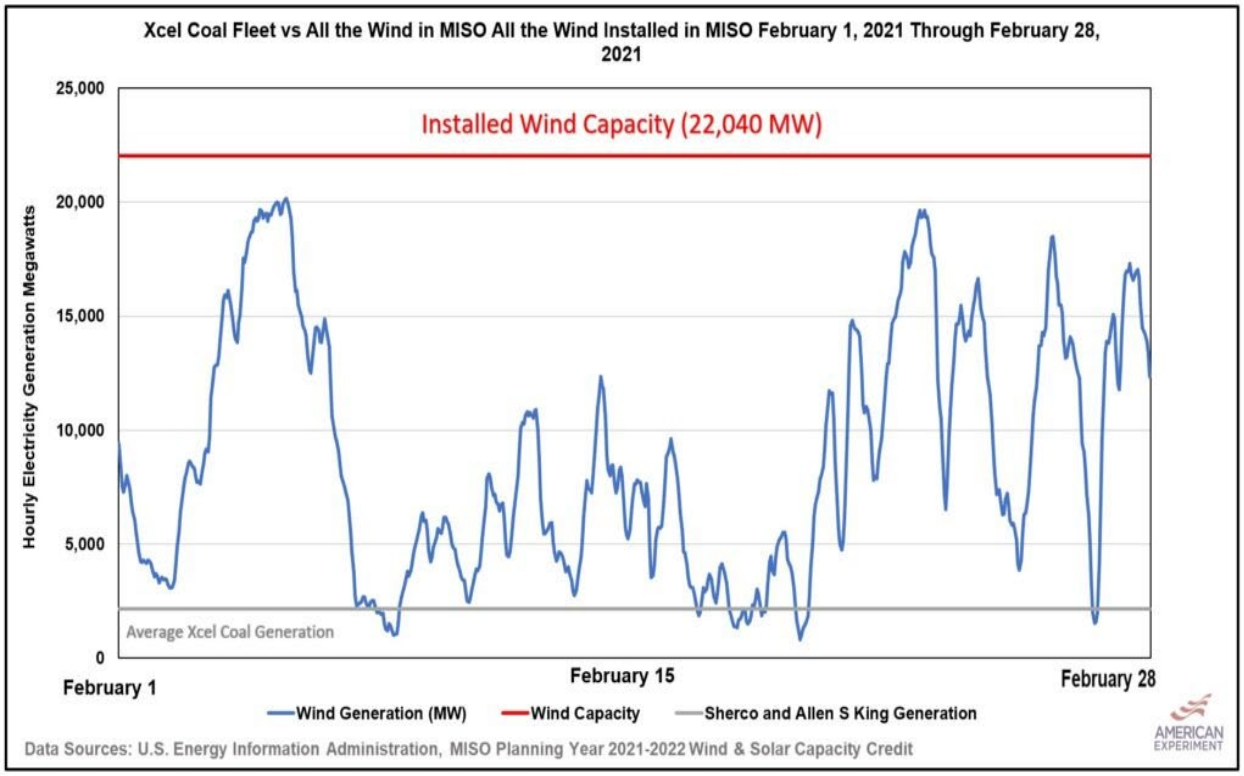


Figure 4. *Low wind speeds during Winter Storm Uri led to a dramatic and prolonged shortage of electricity generation from wind turbines. During several hours of the event, Xcel's coal fleet outperformed the entire MISO wind fleet.*

This occurred despite the fact that Xcel's coal fleet has an installed capacity of only 2,749 megawatts (MW) of capacity, and there were 22,040 MW of installed wind capacity in the MISO footprint at the time of the storm. This means that there is there was eight times more wind capacity on the MISO grid than Xcel's coal capacity, but it was producing ***less than half*** of the electricity that Sherco and Allan S. King were providing to the grid when we needed the electricity most (See Figure 5).

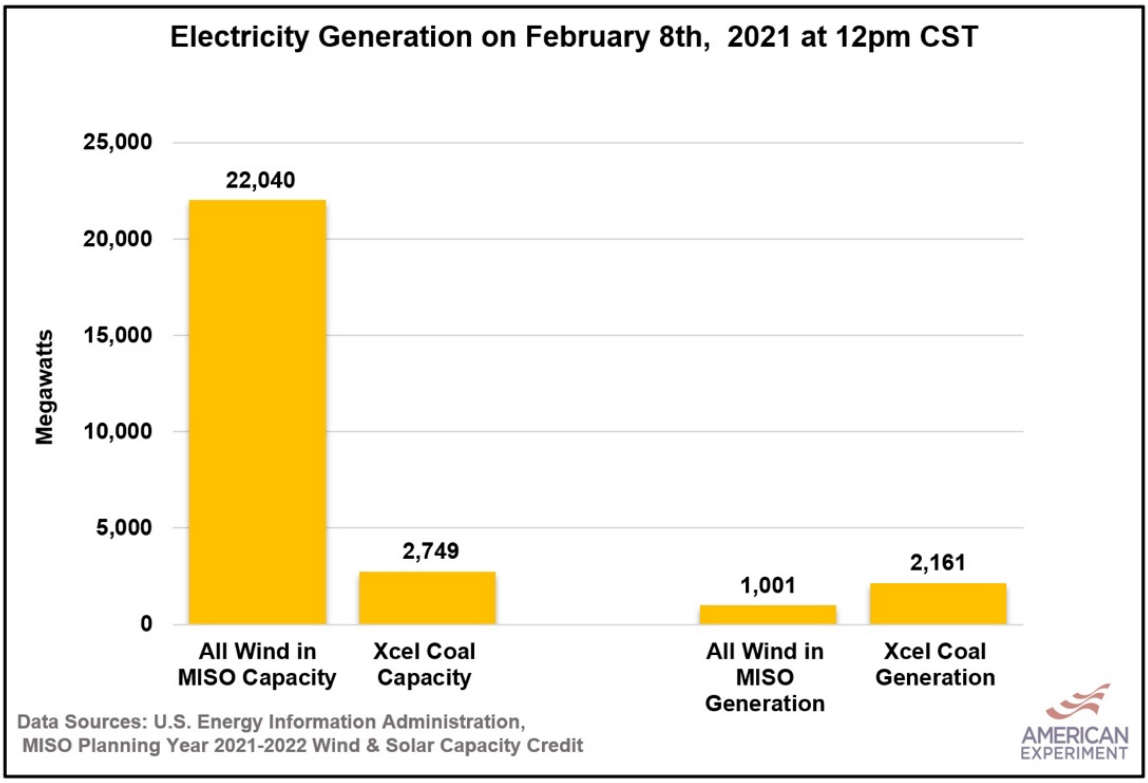


Figure 5. *Xcel's coal fleet produced twice as much electricity as the MISO wind fleet on February 8th at noon central time.*

The realities of this situation complicate the idea that Minnesota will be able to shut down its reliable coal plants and still provide reliable, affordable electricity to the homes and businesses that need it. Indeed, this calls into question the idea that "the wind is blowing somewhere" and that Xcel would be able to import electricity when its wind and solar fleet are not generating power.

Furthermore, Europe's experience with "global stilling" should be a warning sign for Minnesota because their experience aligns with comments made by Center of the American Experiment in our initial filing in this docket.[19] In our initial filing, we presented findings from the scientific literature showing wind speeds in the central United States are expected to experience the largest reduction in wind-powered electricity generation, as a percentage of output, on the planet as temperatures increase.

If the expected declines in wind output occur in the central United States, Minnesota will become increasingly reliant upon natural gas as a peaking resource, exposing Minnesota families and businesses to spikes in fuel prices with no hedges against them in the form of coal.

Given the scientific research in this field and the real-life consequences of overreliance upon wind generation in Europe, American Experiment believes the most responsible course of action is to prioritize reliable electricity sources —meaning power plants that can be turned on and off — such as coal and nuclear, rather than increasing our dependence upon intermittent, weather-dependent resources like solar and wind with natural gas backup.

Natural Gas Prices

It is true that the United States is in a much better situation in terms of natural gas supply than Europe because we are the leading producer of natural gas in the world, and we do not rely upon Russian natural gas to meet our energy needs.

However, despite our abundant natural gas resources, gas prices in the United States are more than 2.5 times higher this year than at this time last year (See Figure 6).[20] Furthermore, prices have more than doubled since April 2021 alone.

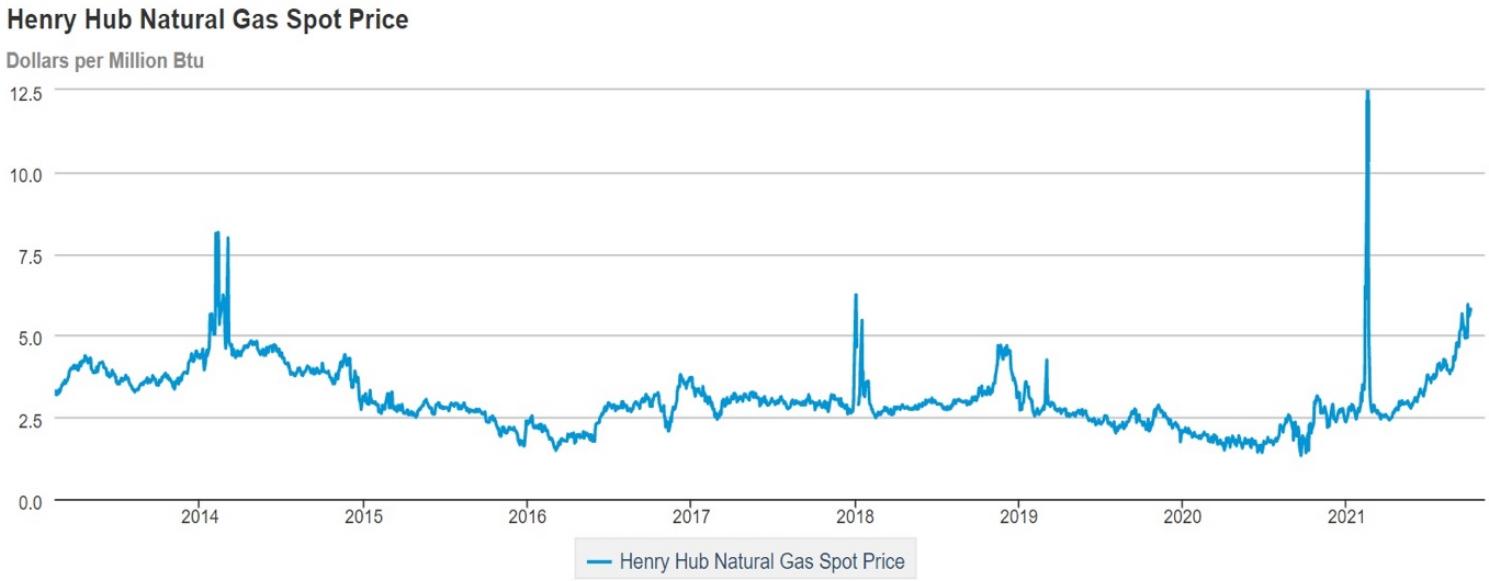


Figure 6. *Henry Hub natural gas prices have reached more than $5.50 per mmBtu.*

Higher natural gas prices are an indication of supply constraints. U.S. Energy Information Administration (EIA) data show natural gas inventories are below their five-year average and supplies in the Midwest region are 8 percent below last year, indicating that higher prices—and possibly supply shortages—for natural gas used for electricity generation and home heating are likely in store for this winter.[21]

Xcel's Alternative Plan, Home Heating Bills, and Winter Storm Uri

Approving Xcel's Alternative Plan would make the electric grid more reliant upon natural gas during future cold snaps when it is too cold for wind turbines to operate. Generating additional MWhs with natural gas, instead of coal, during Winter Storm Uri would have further driven up the cost of natural gas used for electricity generation and by residential customers for home heating.

Figure 7 below shows Minnesota's electricity mix in 2020 and compares it to a theoretical day in the future with low wind and solar output. If Minnesota's coal plants are closed, there will be an enormous increase in the amount of natural gas burned to supply the grid with electricity.

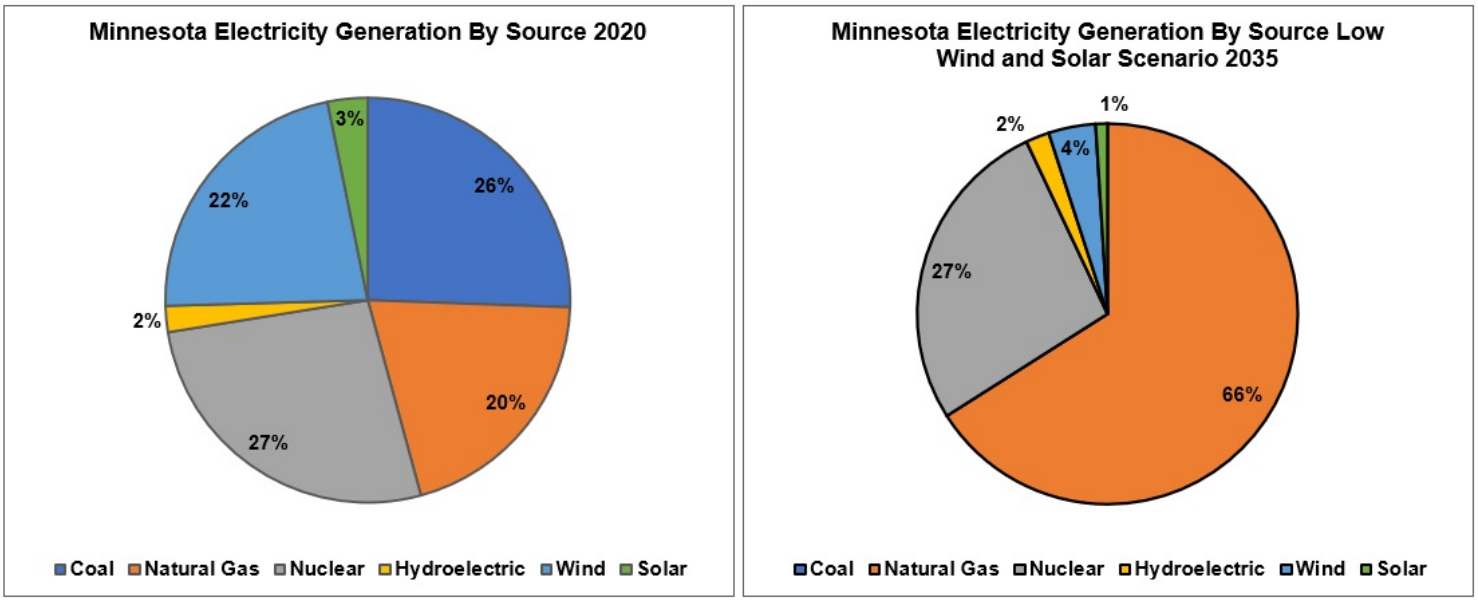


Figure 7. *Natural gas demand will spike during future polar vortices if Xcel is allowed to shut down its fuel-secure coal resources. Xcel's nuclear plants also deliver crucial fuel diversity.*

Such wild swings in natural gas consumption will likely result in rising natural gas costs for both electricity generation and home heating, especially during periods of peak energy demand.

Given the large, $350 increase in heating costs for the week of Winter Storm Uri, alone, the PUC should keep in mind that the electric system and the natural gas system are increasingly interconnected. This interconnection can materialize in higher prices and reduced reliability.

Furthermore, it is currently unclear whether there will be enough natural gas pipeline capacity to meet peak demand for power generation and home heating during extreme weather events like Winter Storm Uri. American Experiment believes Xcel's plan is leaping before looking.

Before approving resource plans that set retirement dates for Xcel's coal fleet, the PUC should require a thorough analysis of the peak gas capacity needed to meet demand during an extreme weather event without the benefit of Xcel's coal fleet, assuming there is zero contribution from wind or solar resources. If this analysis finds there is not adequate pipeline capacity, the study should determine the costs associated with building the needed capacity.

Will We Have Enough Coal This Winter?

Higher coal generation has resulted in lower coal stocks at coal-fired power plants. EIA data show Midwest coal supplies were approximately 30 percent lower in July 2021 than in July of 2020, and there is reason to believe that stocks have shrunk since July.[22]

Elevated natural gas prices have increased the burn rate of coal-fired power plants in the Midcontinent Independent Systems Operator (MISO) footprint. According to EIA data, the coal burn was substantially higher in August of 2021 than in August of 2020 (See Figure 8).[23]

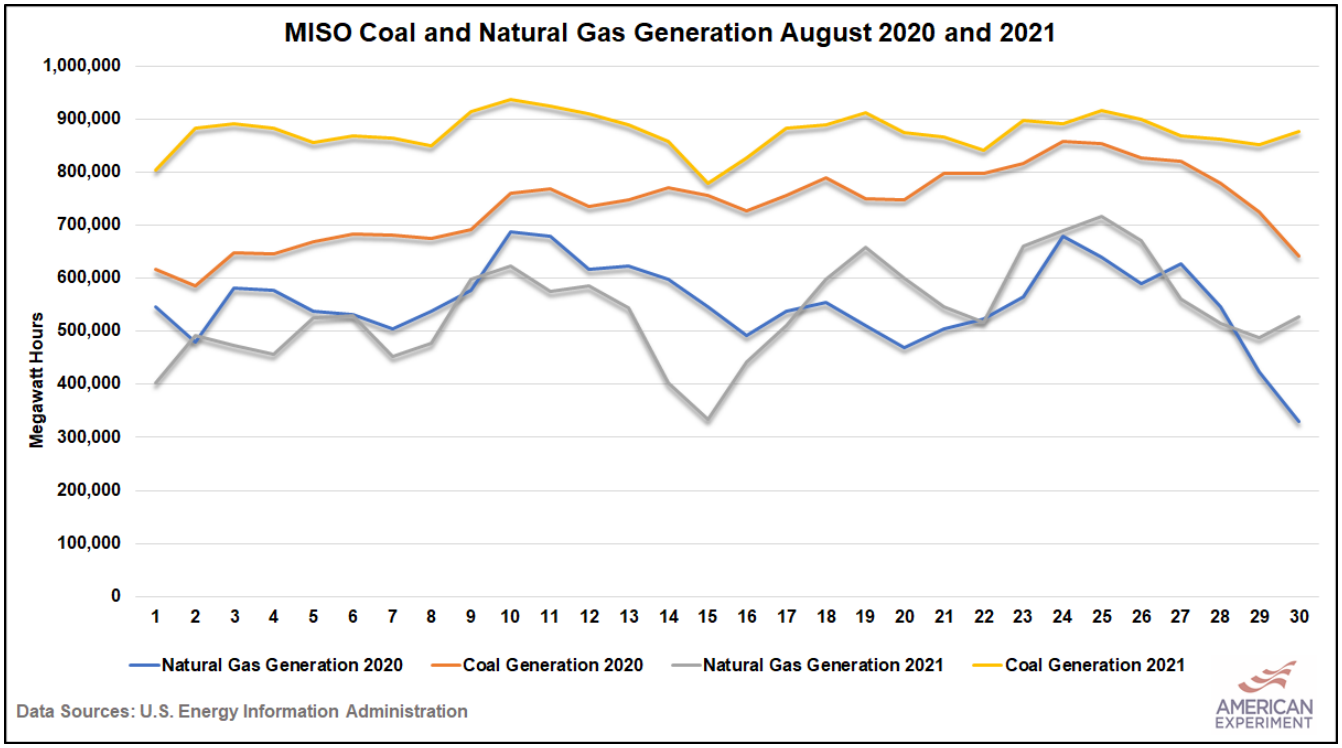


Figure 8. *EIA data show much more coal generation in August of 2021 than in August of 2020.*

While coal demand is rebounding, supplies are not. According to S&P Global, mining companies have not ramped up production to meet the new market conditions.[24]

There are several reasons why coal suppliers have not increased production, including limited access to capital, uncertain demand outlook, labor shortages, and the time it takes to increase, and transport new supplies.[25]

Coal supplies are built upon long-term supply contracts. Without reasonable long-term certainty, we can expect coal supplies to remain relatively flat for the next several years. Approving Scenario 15 would be a reasonable way to give producers and end-customers the certainty they need to optimize supply, demand, and prices and ensure Minnesotans have reliable power.

In conclusion, Minnesota may be getting an unpleasant preview of the CEO's Preferred Plan and Xcel's Alternative Plan this winter. Utilities did not secure adequate supplies of coal, and higher natural gas prices have left them in a bind. Furthermore, historical data show wind and solar are unlikely to contribute to the grid when we need them most. The results will be higher prices and potentially blackouts during periods of high stress on the grid this winter.

Xcel Energy's Memorandum of Understanding in NuScale Power

Xcel Energy recently signed a memorandum of understanding (MOU) with NuScale Power, a company that is developing small-modular nuclear reactors (SMRs). Under the MOU, the two companies will examine the potential for Xcel to work to provide a suite of power plant services to NuScale's customers based on Xcel's exceptional nuclear operational management systems.

Rather than repeating the mistakes made by much of Europe over the last 15 years, Xcel Energy should build upon its MOU with NuScale Power and plan to gradually replace its existing carbon-dioxide emitting facilities with SMRs.

Building new nuclear power plants would allow the company to utilize existing grid infrastructure at the Sherco and King sites to minimize costs and provide critical jobs and tax revenue for the communities that have hosted coal plants for decades. This plan would be a "just transition" for these host communities and save money for all Xcel customers.

For example, replacing the Sherco coal facility with SMRs would require only a 1-1 replacement of capacity, whereas generating the same amount of electricity as the coal plants with wind, solar, and natural gas would require an almost 3-1 buildout. The SMRs have the added benefit of needing no additional transmission or pipeline infrastructure, saving hundreds of millions of dollars.

The obvious benefits of this approach have caught the attention of policymakers in the state of Wyoming. The Governor, TerraPower, and Pacific Corp. are currently working together to build a small modular reactor at the site of a coal plant in the state by 2028.[26]

New nuclear power plants, as well as other dispatchable carbon-free energy sources, will be vital to meet the goals set forward by Xcel because wind and solar are not capable of providing the reliable, affordable electricity we rely upon every day.

Europe's energy crisis has stoked intense interest in building new nuclear power plants. We detailed Britain's newfound enthusiasm for nuclear power plants, and France is now working to promote the development of SMR technology by 2030.[27] We can learn from Europe's mistakes without repeating them ourselves.

Xcel Energy clearly sees the benefits of SMR technology. Rather than approving a resource plan that relies upon wind turbines and solar panels, which only last 20 to 30 years, the PUC should give financial reprieve to ratepayers by pressing pause on Xcel's profligate spending until new SMR technology is ready to shoulder the burden of producing carbon-free power for the next 80 years.

By approving these more wind turbines and solar panels as part of Xcel's resource plan, the PUC will be delaying the adoption of carbon-free technologies that are up to the task of actually replacing fossil fuels instead of temporarily displacing them. The continued pursuit of wind and solar will delay the ultimate decarbonization of the electric grid and increase the cost of doing so.

Conclusion

Xcel's Alternate Plan would cost $47.8 billion through 2050, resulting in charging every Xcel customer $1,100 per year on average through 2050. This would translate into an average cost per short ton of CO_2 reduced of nearly $110 per ton, failing a cost-benefit analysis when compared to Minnesota's social cost of CO_2.

In addition to failing to provide ratepayers with equitable environmental benefits, Xcel's plan would expose electricity consumers to spikes in natural gas prices, as well as diminish the reliability of the grid due to the loss of a significant amount of firm, dispatchable capacity. American Experiment believes that it is not reasonable, just, nor fair to charge Minnesotans $1,100 per year on average through 2050 to receive poor results in both the environment and reliability.

Furthermore, there is still a good amount of uncertainty surrounding Xcel's Alternate and Supplement plans going forward.

Both plans rely on significant technological advancements occurring in wind, solar, and battery storage facilities in the future to improve reliability and costs, which have not materialized anywhere in the world. Additionally, these plans depend on wind speeds remaining the same or improving, in the future, which the best evidence suggests will not occur.

Xcel's Alternate and Supplement plans also put to the test energy failures that have taken place in California, Texas, Europe, Australia, and other regions around the world. While each case varies in exact details, the common denominators are that an increase in wind and solar penetration results in higher electricity costs, weakened system reliability, more frequent power outages, and less price protection to natural gas price spikes.

In other words, Xcel is banking on Minnesota being the exception to the rule of the negative consequences that a heavy reliance on wind and solar has produced around the world. American Experiment believes approving either Xcel's Alternate or Supplement plan would be incredibly dangerous and expensive for the millions of Xcel customers who depend on the utility company for reliable, affordable electricity.

American Experiment proposes a modified Scenario 15, where Xcel's coal facilities are operated until the end of their useful lives, both nuclear facilities are extended, and no new wind and solar is built that isn't required by state mandates. This would allow for the development of a sustainable long-term strategy to introduce reliable, baseload, carbon-free energy sources to the grid that would not entail building tens of thousands of megawatts of redundant wind, solar, and natural gas capacity.

Endnotes

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[4] Joe Wallace, "Energy Prices in Europe Hit Records After Wind Stops Blowing," *The Wall Street Journal,* September 13, 2021, https://on.wsj.com/2X7KZny.

[5] Elena Mazneva and Javier Blas, "Goldman Warns of Blackout Risk for European Industry This Winter," *Bloomberg,* September 15, 2021, https://www.bloomberg.com/news/articles/2021-09-15/goldman-warns-of-blackout-risk-for-european-industry-this-winter.

[6] Mike Hughlett, "Xcel Explores Nuclear Power Partnership with Oregon Firm NuScale," *Minneapolis Star Tribune,* August 17, 2021, https://www.startribune.com/xcel-explores-nuclear-power-partnership-with-oregon-firm-nuscale/600088697/.

[7] Xcel correctly informed American Experiment of double counting utility returns on wind and solar facilities in our last modeling of Xcel's IRP. We accept these corrections and thank Xcel for noting them. We assume all capital costs are owned by Xcel because the company will seek to maximize its profits.

[8] All capacity additions and retirements modeled by American Experiment are listed in Xcel's latest Integrated Resource Plans (IRPs). American Experiment included no additional capacity outside of what Xcel has sought or achieved approval for from the Minnesota Public Utilities Commission (PUC). Thus, the 3 to 1 replacement ratio is based solely on Xcel proposals.

[9] Our World In Data, "Electricity Production by Source, EU 27 +1," accessed October 12, 2021, https://ourworldindata.org/electricity-mix.

[10] David Sheppard, "Gas Shortages: What is Driving Europe's Energy Crisis," *The Financial Times,* October 10, 2021, https://www.ft.com/content/72d0ec90-29e3-4e95-9280-6a4ad6b481a3.

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[12] DW, "Europeans Brace for Hard Winter As Energy Price Surge Hits Households," September 21, 2021, https://www.dw.com/en/europeans-brace-for-hard-winter-as-energy-price-surge-hits-households/a-59246714.

[13] Joe Wallace, "Natural-Gas Shortage Sets Off Scramble Ahead of Winter," *The Wall Street Journal,* October 7, 2021, https://www.wsj.com/articles/natural-gas-shortage-sets-off-scramble-ahead-of-winter-11633635902.

[14] Jorge Liboreiro, "Why Europe's Energy Prices Are Soaring and Could Get Much Worse," *EuroNews,* October 4, 2021, https://www.euronews.com/2021/09/23/why-europe-s-energy-prices-are-soaring-and-could-get-much-worse.

[15] Ludovic Marin, "Nuclear Plants Insulate France From the Energy Crisis. Now Macron Is Doubling Down on Them In A $35 Billion Moonshot Plan," Fortune, October 12, 2021, https://fortune.com/2021/10/12/nuclear-power-insulates-france-energy-crisis-macron-doubling-down-on-it-35-billion-moonshot/.

[16] Reuters Staff, "UPDATE-1 Spain's Sidenor Suspends Production Due to Spiraling Energy Costs," Reuters, October 11, 2021, https://www.reuters.com/article/spain-energy-sidenor-idUKL8N2R72S9.

[17] Jessica Shankleman and Rachel Morison, "UK plans fossil fuel-free power grid by 2035 using nuclear energy," Al Jazeera, October 4, 2021, https://www.aljazeera.com/economy/2021/10/4/uk-plans-fossil-fuel-free-power-grid-by-2035-using-nuclear-energy

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