STATEMENT OF

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XCEL ENERGY INC.

BEFORE THE

U.S. SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

HEARING ON

EXPANDED DEPLOYMENT

OF GRID-SCALE ENERGY STORAGE

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1. Introduction

Chairman Murkowski, Ranking Member Manchin, and distinguished members of the Committee, thank you for inviting me to testify before you today.

My name is Ben Fowke, and I am Chairman, President and CEO of Xcel Energy, a public utility holding company serving 3.6 million electricity customers and 2 million natural gas customers through four utility subsidiaries. Headquartered in Minneapolis, we serve parts of eight Western and Midwestern states, including Minnesota, Colorado, North Dakota, South Dakota, Wisconsin, the Upper Peninsula of Michigan, the Texas Panhandle and Southeastern New Mexico.

At Xcel Energy, we have already achieved a 38% system-wide reduction in carbon dioxide emissions from 2005 levels, but we aim to go much further. Our experience shows us that, with the right strategy, we can achieve remarkable levels of emission reductions while simultaneously preserving the reliability and affordability of our electric system. A few months ago, I was proud to announce Xcel Energy's industry-leading carbon emission reduction strategy. Under that strategy, we have set in motion a plan to achieve an 80% reduction in carbon emissions by 2030, and a vision to be completely carbon-free by midcentury.

Technology is the key to the success of our strategy. The emission reductions that we have achieved to date have relied heavily on the deployment of affordable renewable energy technologies, especially one of the nation's leading wind energy portfolios. We will continue to add new renewable energy to our system as long as it makes sense, but at some point we will need new, clean energy technologies if we are to maintain an affordable, reliable energy system.

Those new technologies will undoubtedly include energy storage. For this reason, I want to thank the members of this Committee for holding today's hearing. I am excited about the possibilities of grid-scale storage technologies and the potential value it can offer to our utility system and customers as we continue to reduce our carbon dioxide emissions. While we are in the early days of energy storage and many challenges remain, I believe storage has the potential to play an important role in a carbon-free electric grid.

2. Overview: Storage has a bright future.

As I have already stated, Xcel Energy's long-term carbon strategy depends on the deployment of advanced clean technologies. One of the most important of those technologies is grid-scale energy storage. Today, storage is beginning to play a more important role in our electric system, and we see it as a valuable part of the future of electricity service.

My testimony describes how storage can help utilities manage growing renewable energy portfolios. Wind and solar provide low-priced, clean energy to customers, but they are "intermittent": they generate when the wind blows or the sun shines, not necessarily when our customers need it. Despite their many benefits, high levels of renewables represent an operational, reliability and, eventually, cost challenge for our system.

That's where storage comes in. As discussed in more detail below, grid-scale storage helps with renewable integration, allowing higher renewable energy levels than would otherwise be possible. Storage can also provide other system benefits, including more reliable grid operations, voltage support and frequency control.

The good news is that utilities are already taking advantage of the many different values of grid-scale storage. In fact, utilities are the leading developers of storage technology in the nation. That makes sense: storage is first and foremost a grid asset, and, as grid owners and operators, utilities are uniquely situated to maximize the multiple benefits of storage. As I detail in this testimony, Xcel Energy has a number of advanced storage projects already deployed on our system and a growing interest in using storage in the future.

At the same time, we also recognize that storage today still has limitations. My testimony discusses two significant challenges for storage: First, storage cannot today solve the problem of the wide seasonal variation in renewable energy generation, which is the chief factor preventing the creation of fully renewable electricity system. Second, while storage can initially help integrate renewables by moving energy from the time it is produced to when it is needed, the value of each additional increment of storage capacity declines as more is added to the system. Finally, although storage can bring multiple services to the grid – power quality and grid support, for example – the value of all of these services are not all additive (or "stackable"). As a general rule, these services are not all available at the same time.

Despite these challenges, I am bullish on the potential of storage as a part of our electricity system. Good policies are critical to enabling the optimal deployment of storage, and federal support is especially important. Federal policies should promote storage research, development and deployment as part of a larger clean technology program. Incentives are also important, but they need the right design to be effective. My testimony sets forth these and other policies we think would support the bright future we see for grid-scale storage.

3. Xcel Energy has broad and growing experience with storage.

Electricity storage devices include a variety of technologies that store electrical energy directly (e.g. capacitors) or, more typically, after converting to some other form of potential or kinetic energy. For example, pumped hydro storage facilities use electrical energy to pump water to a higher elevation and store that water as gravitational potential energy; flywheels use electrical energy to rotate a mass to high velocities and thus store energy as kinetic energy; compressed air projects store energy in a geologic formation as pressurized potential energy; and batteries use electrical energy to drive chemical reactions and then store that energy as chemical potential energy. As no energy conversion process occurs without inefficiencies or losses, any energy storage system will discharge a lesser amount of energy than used to charge the device. If deployed properly, energy storage can help enable a smarter, stronger, cleaner and more reliable grid.

Xcel Energy has long been a leader in deploying energy storage. We have operated pumped storage hydro energy storage on our system for decades and have adapted its operation to meet our evolving system. Today, we are implementing pilots and other programs exploring new storage technologies that will play a role in our energy future.

Cabin Creek Pumped Storage. Historically pumped storage hydro has been the dominant source of energy storage – even today, nearly 92% of operational storage in the US is pumped storage. Our largest energy storage asset is the 324 MW Cabin Creek pumped hydroelectric storage facility in Colorado. The Cabin Creek facility was built in 1967. Like all pumped storage facilities, it has an upper and a lower reservoir. When economic, we pump water from the lower to the upper reservoir. When the system has additional energy needs, we allow the water to "spill" out of the upper reservoir to the lower through a hydro turbine to generate electricity. Originally, the facility was used to transfer excess energy from off-peak hours to on-peak hours, but today it is also used for renewable energy integration. We spill water to meet customer demand when the wind stops blowing and pump water to the upper reservoir during times when the wind energy generated on our system exceeds customer demands.

Luverne MinnWind Storage Project*:* The Luverne wind-to-battery project in Minnesota was one of the first battery storage pilot projects our company pursued and the first U.S.-based pairing of wind energy and a storage battery. The pilot was intended to test the various ways batteries could be used to provide wind integration and regulation services supporting the energy grid. The 1 MW, 7 MWh sodium sulfur battery paired with an 11 MW wind project has been in-service since 2009, and was recently updated by the manufacturer with new grounding technology and cells, extending the life of the battery and allowing us to test new battery applications. It was funded in part by a $1 million grant from Minnesota's Renewable Development Fund.[1]

SolarTAC**:** We are the original founding member, host utility and a development partner at the Solar Technology Acceleration Center (SolarTAC), an outdoor solar testing facility located in Aurora, Colorado.[2] Together, the solar industry and utilities work at SolarTAC to test, validate and demonstrate advanced solar technologies under actual field conditions. We worked with our SolarTAC partners to test two different battery storage projects.

- A community energy storage project at SolarTAC is testing a more cost-effective way to improve the integration of solar power in areas with high solar production. Working with the Electric Power Research Institute (EPRI), we are testing a 25-kilowatt battery integrated with four small photovoltaic installations that simulate a neighborhood with multiple rooftop solar power systems.

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[1] Xcel Energy Wind-to-Battery Project: https://www.xcelenergy.com/staticfiles/xe/Corporate/Environment/wind-to-battery%20fact%20sheet.pdf

[2] Solar Technology Acceleration Center: http://www.solartac.org/

- Through our Solar2Battery project, we installed a 1.5 MW battery to evaluate how energy storage can help in operating the electricity grid with energy from large-scale solar facilities.

These projects have increased our knowledge of how batteries respond to intermittent solar generation, how battery chemistries perform over time, and how energy storage systems can create value for our system.

Innovative Clean Technologies Program**:** The Colorado Public Utilities Commission has approved an Innovative Clean Technologies (ICT) program to test emerging technologies that are designed to lower carbon emissions associated with electricity service. We currently have two battery storage demonstration projects operating under the ICT program:

- Stapleton Community Energy Storage Project: As demand for solar energy at our customers' homes and businesses increases, we are examining how battery storage can help integrate higher concentrations of customer solar energy on our system. Through a project in Denver's Stapleton neighborhood, Xcel Energy installed six customer batteries and six larger grid batteries to test rooftop solar integration and grid support capabilities.[3]
- Panasonic Battery Demonstration Project: Through a public-private partnership, Xcel Energy, Panasonic and Denver International Airport are collaborating to test a battery storage system that can both serve as a microgrid to provide backup power to Panasonic's Denver headquarters and support Xcel Energy's grid at other times. As part of the project, Xcel Energy owns a 1.3 MW solar carport installation and a 1

[3] Community Storage Project in Stapleton Neighborhood: https://www.xcelenergy.com/energy_portfolio/innovation/stapleton

MW/2MWh lithium ion battery. Panasonic also owns a 0.20 MW solar array located atop its building, which is also tied into the system.[4]

These pilot projects have provided great operational experience for future, widespread deployment of batteries on our system. From these projects, we have gained detailed information on the value, costs and benefits of battery installations. The projects demonstrate the need for better interoperability between the devices and systems. They will inform future system architecture, including cybersecurity and interconnection issues associated with battery operation. In addition, we currently have nearly 300 residential batteries installed across our states and are working with customers and the storage industry to provide battery interconnection guidelines and support.

Colorado Energy Plan: The Colorado Energy Plan (CEP) is the next step in our efforts to transform our energy system for our Colorado affiliate. It includes the retirement of two existing coal units and the construction of 1,100 MW of new wind and 700 MW of new solar. As part of the all-source bids associated with the CEP, we received 133 total energy storage bids from 97 separate projects. Taking advantage of the tax credit incentives, several of the project developers were able to present us with very competitive pricing for batteries paired with solar. From these bids, we selected two separate battery-plus-solar projects totaling over 600 MW of universal scale solar paired with 275 MW of battery storage, which was then the largest utility-proposed acquisitions of battery storage in the U.S. The Colorado Public Utilities Commission approved CEP in August 2018, and with this approval we are moving forward to implementation.

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[4] Panasonic Battery Demonstration Project: https://www.xcelenergy.com/staticfiles/xe-responsive/Energy%20Portfolio/CO-Panasonic-Fact-Sheet.pdf

As I'll discuss below, it's important to understand that storage has both benefits and challenges. However, the CEP bids showed the nation that storage has arrived as a grid resource.

4. Energy storage has multiple values to an electricity system

Energy storage can be deployed in all parts of the energy grid, and can help to enable a smarter, stronger, cleaner, and more reliable energy grid for all customers. Although there are multiple opportunities for energy storage to add value to our system, today I will focus on four key areas: renewable integration, grid support, deferred investment, and power quality.

Renewable Energy Integration: As Xcel Energy continues to add significant amounts of renewable energy generation to our system, energy storage can support integrating those renewables into the energy grid. Renewable energy is available when the wind blows or the sun shines, and customer energy demand is often not synchronized with its availability. Storage can help shift renewable energy to time periods when it is needed, reducing the need for investment in peaking plants and support facilities. This is especially true for short-term deviations – a few minutes to a few hours – between customer demand and renewable generation. The Colorado Energy Plan, referenced earlier, demonstrates that storage can play an important role in the near-term to cost-effectively incorporate renewables on the system.

Grid Support: As the owners and operators of the grid, utilities are first and foremost responsible for the safety, reliability, and optimal operation of our system for our customers. A reliable electric system requires attention to the physics of electricity transmission and distribution. It is not enough to match generation and power supply; we also must make sure that the power can be delivered to customers. Energy storage can help with grid reliability and resilience by providing:

- voltage support at critical places on the electric system where low voltage prevents the transmission of power;
- frequency regulation, ensuring that the appropriate frequency of the alternating current on the system is maintained;
- readily available reserves, reducing the need for additional investments in "quick start" generation and transmission assets that maintain the system in the event of a disruption; and
- Black start capability, or the ability to restart the entire electric system in the event the whole system goes down.

Utilities are well-positioned to maximize the value of these storage capabilities to ensure system planning and visibility with the primary objective of enhancing reliability and optimizing performance in a cost-effective manner. We can facilitate the deployment of energy storage on our system when and where it is most needed.

Deferred Investment: Storage has the potential to take the place of traditional grid investments across our system, including fulfilling the role of new peaking generation, transmission and distribution upgrades, and reliability investments to maintain grid support. Its ability to do so depends on whether the proposed storage resource is (1) capable of providing the same benefits as the asset it replaces; and (2) cheaper than the more traditional alternative. Increasingly, the price of storage combined with solar (with the federal investment tax credit) is on par with the price of a gas-fired peaking facility. As storage technologies continue to improve and prices come down, there are greater opportunities for storage to take the place of existing technologies, especially in areas where the unique circumstances of the system make traditional technologies more expensive.

We are actively exploring additional deferral opportunities for our system where storage may provide a solution. This requires new tools and processes to analyze the appropriate location and size of the potential storage solution, as well as a cost-benefit analysis of those solutions as compared to traditional grid investments. Properly positioned storage can defer or reduce the need for incremental transmission and distribution investments, while poorly-sited storage may require additional investments in new capacity or distribution upgrades.

Power quality: Given society's growing dependence on electronic devices, some customers seek power quality above and beyond what is provided by our standard electric service. Batteries can improve power quality by helping avoid the momentary outages that interfere with the operation of sensitive electronic equipment. Projects like our Panasonic pilot have demonstrated the value of customer-utility partnerships in addressing these issues by placing a utility-owned battery close to, or at, a customer site to provide premium power quality service, while also allowing the utility to leverage the battery for grid services.

I am optimistic about these and other benefits of grid-scale storage. Key to capturing the full spectrum of these benefits is the recognition that storage is first and foremost a grid asset. As more and more energy storage is deployed on our system and across the country, it is important that the rules governing ownership and operation of energy storage assets are clear and aimed at maximizing the grid benefits of storage while encouraging its affordable, reliable and safe deployment. Utilities are uniquely situated to understand the grid and its needs and should play an important role both in owning and operating grid-scale storage.

5. Despite its potential, storage today cannot address all of the challenges associated with the development of a carbon-free electric system.

Energy storage offers companies like Xcel Energy great opportunities to provide better, more efficient energy service. It will enhance our operations, help us integrate renewable energy, and play an important role in achieving our clean energy vision. At the same time, storage is not a silver bullet that would solve all electricity system challenges. While we see storage as a growing part of our energy system, it must be part of a diverse clean energy portfolio. Storage has inherent limitations that policy makers and utilities must keep in mind as we invest in the energy system of the future.

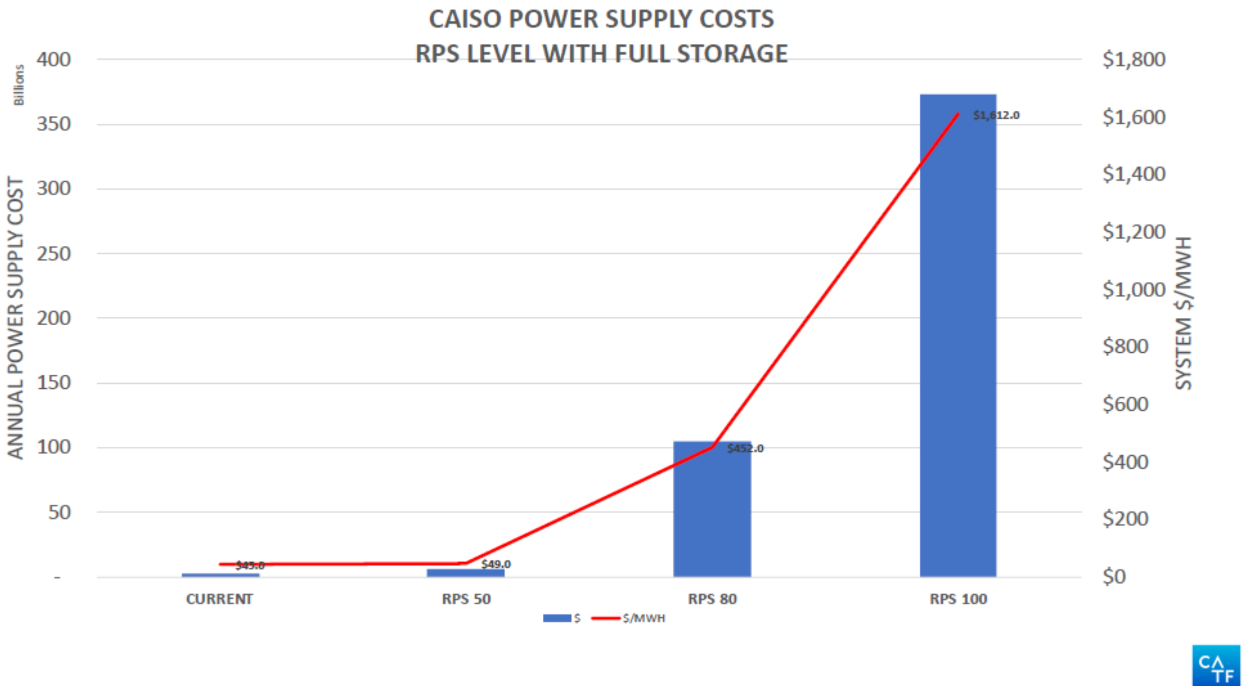
Seasonal renewable variation. No company is more committed to renewable energy than Xcel Energy, and no company has done more to integrate growing levels of renewables. Wind and solar have been a key part of our strategy for more than a decade, and we plan to continue to add renewable energy as long as we can do so cost effectively and reliably.

By 2030, however, we anticipate that we will be close to what today appears to be the economic and operational limits of renewable penetration. As I discussed above, storage has growing value to help integrate renewable energy on the electric system. However, it will not enable the transition to an all-renewable electric system.[5] The problem of seasonable variation on a 100% renewable energy grid is a problem that grid-scale energy storage cannot solve today.

Wind and solar resources are not consistently available and controllable to serve the energy needs of all customers all the time on the whole energy system. For our system today, the cost of integrating renewable energy is manageable up to about 50 to 60% renewable penetration. At that point, however, the cost of integrating additional renewable energy begins to climb rapidly. The following chart, derived from a Clean Air Task Force (CATF) analysis of the

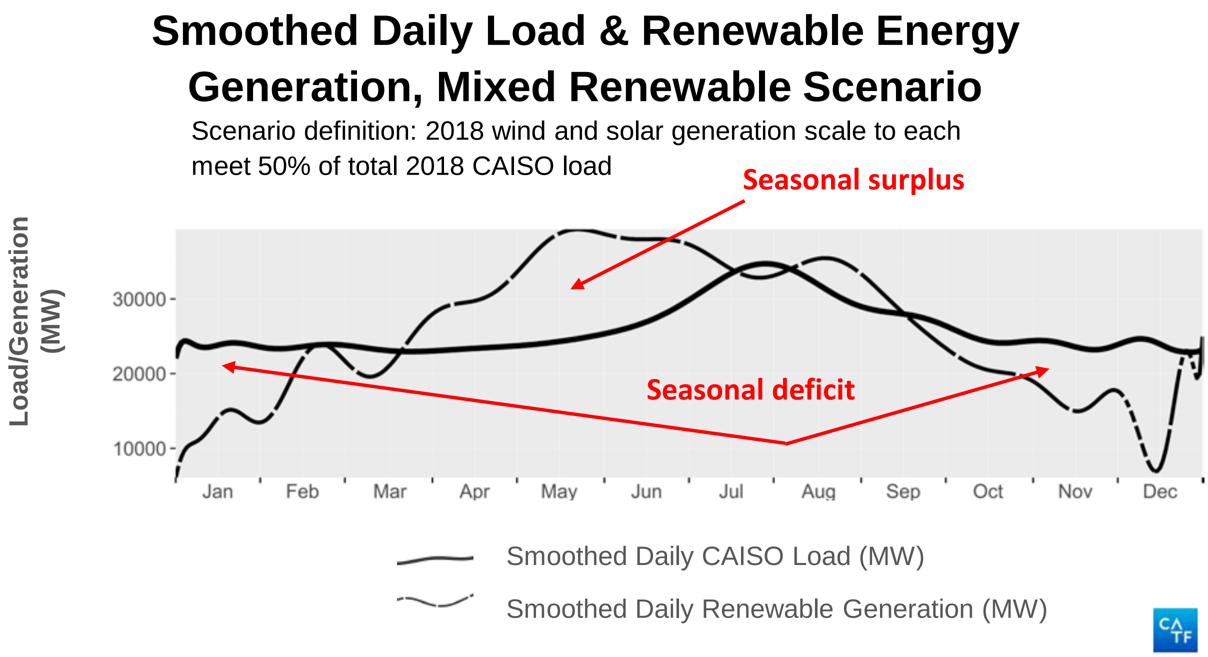
[5] Today, it is possible for individual customers to use financial transactions and customer products to match 100% of their energy consumption with renewable sources; Xcel Energy provides customers with the opportunity to enhance their renewable energy leadership through products like Renewable*Connect. However, the success of these products does not mean that the entire energy system can accommodate 100% renewable energy.

California energy system, shows the impact of increasing levels of renewable penetration.[6] As this chart demonstrates, at levels of renewable penetration above 70%, the cost of adding the next MW-Hr of renewable energy becomes untenable.[7]



Seasonal variation in renewable generation is the primary reason that the cost of renewable energy grows so substantially as renewable penetration increases. The CATF chart below shows that, during the periods when renewable output is very high, the California energy system would generate substantial additional renewable energy. This additional renewable energy would have to charge a massive amount of battery capacity to ensure that load is served when renewable output is relatively low.

[6] Clean Air Task Force analysis of CAISO data. February 2019.
[7] *$2.5 trillion reason we can't rely on batteries to clean up the grid*, James Template, August 4, 2018. https://www.wind-watch.org/documents/the-2-5-trillion-reason-we-cant-rely-on-batteries-to-clean-up-the-grid/



In fact, CATF estimates that 9.6 million MW-hours of energy storage would be required to achieve 80% renewables in California—compared to the roughly 150,000 MW-hours of storage in California now. To reach 100% renewables, CATF has concluded that California would need 36 million MW-hours of storage.

The cost of storage to achieve 100% in California would be astronomical – at 100% renewables, $3.6 trillion in capital costs to store all the surplus renewable generation, even assuming a 60% drop from today's storage costs. CATF's analysis applies equally well outside of California. Based on external analysis of our carbon reduction plans for our Upper Midwest system, achieving even an 80% reduction in CO_2 emissions is more than twice as expensive if we exclude new firm resources (including natural gas) and attempt to reach this goal with only renewable energy plus storage.[8]

[8] Energy and Environmental Economics analysis of Xcel Energy's Upper Midwest portfolio, April 17, 2019.

We remain committed to providing our customers with a carbon-free electric system, and we will add renewable energy to that system as long as it makes sense. In my testimony, I have been clear that storage will play an important role in a future clean energy system. However, given the huge challenge of seasonal variation in renewable generation, it is not realistic to expect that storage will make a 100% renewable energy system possible. Storage alone cannot provide the American people with the reliable and affordable energy that they need. A broader suite of new dispatchable zero carbon technologies will be key to achieving our long-term carbon goals.

Peak demand shifting. Storage can help meet peak energy demand by shifting some excess renewable energy to periods when it is needed. This is a great benefit, but its value declines dramatically as more storage is added to the system.

As its name implies, a system peak is like the top of a mountain or a pyramid. It represents a short period of time during each day when energy usage is at its highest. Energy storage can shave off and lower the top of the peak, but it also widens it. As a result, a larger, more expensive storage system is required to further reduce the system energy needs.

The following chart, prepared by an Xcel Energy engineer, illustrates this problem. The gray line represents a single day of energy demand for one of our operating companies. Suppose that a 250 MW battery with four hours of storage capability (i.e. 1000MWh) is added to the system. It will shave off the top of the peak, deploying its energy over a five hour period. This analysis assumes that the battery will extend the hours in which it is available to discharge to the system from four to five hours, but doing so requires it to discharge energy during at least some of the hours at a capacity less than its 250 MW maximum. In effect, the battery reduces its maximum capacity in order to be available for more hours. The result is a lower, wider peak –

more like a plateau. The next tranche requires more energy spread over more hours to gain the same effect – in this example, a total of 750MW of four hour batteries (3000MWh) that are deployed over a seven hour period. Because the top of the plateau is wider, the batteries must reduce their maximum capacity by a greater amount in order to be available for the full seven hour period. The final tranche – a total of 1500MW of four hour batteries (6000MWh) – is deployed over *nine* hours. In this final case, the effective capacity is significantly reduced to cover the many hours of need.

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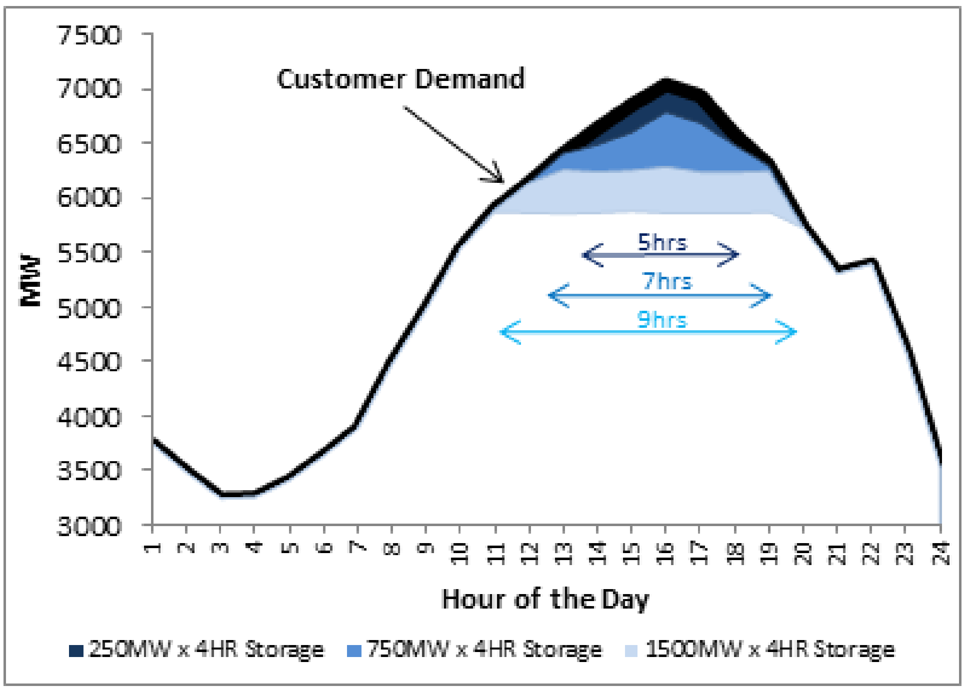

This chart shows that more batteries with longer duration and lower capacity are required at each step to reduce the peak. At some point, it is not technically or economically feasible to continue to use storage to shift energy from off-peak to on-peak periods.

Stacking storage values. As I testified above, storage provides multiple values, each of which can enhance the operation and efficiency of the grid. Adding multiple values together – "stacking" – can make the storage resource more valuable as a whole. For example, a storage resource that provides voltage support and renewable integration will be more valuable than a storage resource that provides only one of these benefits. As the cost of storage continues to decline, stacking these benefits together increases the probability that a utility would choose to add a battery or other storage resource to its system.

At the same time, in determining the value of a storage resource, its multiple potential benefits should not be added if one value precludes another. A battery may simultaneously provide voltage support and frequency regulation, but it cannot, for example, simultaneously integrate renewables and provide black start capability. In the latter case, the battery must be available to restart the system, and it may not be available to do so if it has been discharged to integrate renewables. Thus, before stacking the values of a storage resource, the utility must first determine if it is appropriate to assume those values are simultaneously available.

Together, the problems of seasonality of renewable production, diminished value of peak demand shifting, and stacking demonstrate that, despite its promise, storage still has challenges. Storage is still a valuable resource, one that will be more valuable with technology advancement and careful deployment. In other words, it will be enhanced if it is deployed wisely with good public policy.

6. Federal support for storage research and development, incentives, and permitting will encourage states and utilities to bring the benefits of storage to electric consumers.

Congress should take an active role in the development of new energy storage opportunities. There are three key areas in need of federal action: (1) research and development; (2) incentives; and (3) supportive infrastructure and policies. States and utilities will inevitably choose the resources that make the most sense for their system and customers, but they cannot lead in the same way as the federal government in driving new technology into the marketplace.

Research and Development. Federal energy storage research and development should be part of a broader clean energy research agenda focused on zero-carbon, dispatchable technologies. The nation needs a broad suite of these clean, dispatchable technologies if it is to achieve significant carbon emission reductions at a reasonable price. In fact, Xcel Energy's long-term carbon-free aspiration depends on the development of these technologies.

A federal research and development agenda for storage should focus on increasing storage duration and reducing its cost. In our business, scale matters, and that is true for storage as well. Research should focus on grid-scale storage that is most likely to provide benefits to customers at the lowest cost. The federal research agenda should be developed in concert with the utility industry – after all, utilities are in the best position to understand and maximize the value of different storage attributes, including the value of improving operational control of storage resources.

While lithium ion batteries are the dominant technology in the battery storage industry today, a federal research agenda should target those technologies that have the greatest potential to address long-term system needs and reach commercialization. Those technologies include pumped storage, flow batteries, compressed air energy storage, and other forms of mechanical, thermal and ice storage. The federal research agenda should also encourage the development of hydrogen and other power-to-gas technologies that have the potential to link renewables and other sources of clean electricity to the rest of the economy and dramatically increase the amount of energy storage capacity in the nation.

Incentives. Incentives, including tax credits and federal grant funding, have always played a role in moving new technologies to commercialization. We believe incentives for energy storage, if properly designed, could play a similar role. We appreciate the leadership of Senator Heinrich, Senator Gardner, Senator Wyden, and others on this committee to evaluate new tax incentives to support energy storage investment. These kinds of incentives could encourage even more investment in new storage technologies if companies like Xcel Energy have more efficient options to use them. We encourage Congress to ensure that additional tax incentives enable efficient monetization by utilities or any others.[9]

Supportive Infrastructure and Policies. Congress can also encourage the development of new storage projects by streamlining project permitting and siting and encouraging common standards for the integration, operation and cybersecurity of grid-scale storage systems.

We appreciate Congress's effort last year to streamline the Federal Energy Regulatory Commission (FERC) hydro and pumped storage permitting process with America's Water Infrastructure Act.[10] However, Congress has an opportunity to improve on that legislation. The two year permitting window in that Act only applies when an application is filed and does not address pre-filing licensure. We recommend Congress streamline the pre-license review and determine whether FERC would need additional resources to implement these permitting reforms.

State leadership. With federal support for deployment of commercial storage resources, states will be well positioned to ensure their entry into the marketplace. At least seventeen

[9] Xcel Energy supports proposals to provide for more efficient monetization of energy credits than is the case with the tax equity partnerships commonly used today. Specifically, we support proposals to allow the transfer of energy tax credits to project partners – an approach already employed under some of the clean energy credits. We also support the creation of "American Energy Bonds", under which bonds could be issued to finance investments in clean energy infrastructure with the interest on those bonds paid for using existing tax credits.

[10] America's Water Infrastructure Act of 2018, https://www.congress.gov/bill/115th-congress/senate-bill/3021

states, most recently Minnesota, have adopted energy storage policies that either set targets, create financial incentives, allow utilities to own storage, or require storage to be included in Integrated Resource Plans (IRPs)[11]. This trend is likely to continue, and policy will be a major driver of how the storage market develops. It will be important to manage risk and avoid policies that result in unintended consequences like cost-shifting and cross-subsidization between customers.

Utilities, working with their regulators and policy makers, are closest to the electric system and best understand the value and deployment challenges. Congress and federal agencies should defer to states on the issues unique to their expertise.[12]

7. Conclusion

On behalf of Xcel Energy, I appreciate the opportunity to testify before you today to discuss storage and its future on the grid. Storage is already becoming an important part of the electric system. It will play a growing role as we pursue our ambitious carbon reduction targets. We look forward to working with Congress and the storage industry to advance the technology and help overcome the barriers to greater storage deployment.

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[11]Edison Electric Institute Energy Storage Trends and Key Issues, http://www.eei.org/issuesandpolicy/Energy%20Storage/Storage_Key_Trends_Solutions_March_2019%20(002).pdf

[12] For example, FERC recently issued Order 841, addressing the role of storage resources on the wholesale electric system. Under Order 841, state commissions are preempted from making decisions about how storage resources connected to the distribution system or behind the customer's meter participate in wholesale markets. We are concerned that the Order does not properly recognize states' role in regulating retail sales of electricity and ensuring distribution system reliability.