SASKPOWER RESPONSE:

FEDERAL CLEAN ELECTRICITY REGULATIONS CANADA GAZETTE, PART I

ESTABLISHED IN 1929, SASKPOWER IS SASKATCHEWAN'S LEADING ELECTRICITY SUPPLIER. WE ARE DEFINED BY OUR COMMITMENT TO SUPPORT ECONOMIC GROWTH AND ENHANCE QUALITY OF LIFE IN OUR PROVINCE.

OUR CORPORATE MISSION: ENSURING RELIABLE, SUSTAINABLE AND COST-EFFECTIVE POWER FOR OUR CUSTOMERS AND THE COMMUNITIES WE SERVE.

AT A GLANCE

652,000
square kilometres of service area

3,910 MW
annual peak load

1.2M
distribution poles

5,437 MW
available generating capacity

160,707
circuit kilometres of transmission and distribution lines in service

3,100
permanent full-time employees

35%
renewable generation capacity

$13B
generation, transmission, distribution and other assets

553,849
customer accounts

189,157
pole, pad-mounted and step transformers

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SUMMARY

SaskPower is committed to decarbonizing its electricity system as quickly as possible while ensuring reliability and affordability. Federal regulatory flexibility will be central to a successful path for Saskatchewan that effectively addresses the energy transition trilemma of balancing decarbonization with reliability and affordability.

- The Clean Electricity Regulations (CER) were developed without fully understanding Saskatchewan's unique context and the associated impacts of the CER. Modelling executed by Environment and Climate Change Canada (ECCC) that assisted with the design of the CER was not shared prior to Gazette I (including inputs and assumptions). And while a national model was developed, region-specific models were not created. On September 25, 2023, ECCC committed to sharing its modelling inputs and assumptions with SaskPower and to creating a Saskatchewan-specific model. With this commitment made after Canada Gazette, Part I, of the CER and a November 2, 2023, feedback deadline looming, it is critically important that this be completed in time to inform the CER prior to publishing in Canada Gazette, Part II.

- For SaskPower to comply with the CER as drafted in Canada Gazette, Part I, our company would need to effectively reduce its greenhouse gas (GHG) emissions to net-zero by 2035. This means much of our current generating capacity will need to be expanded, replaced, and rebuilt in just over 11 years. This is not possible technologically or logistically and would gravely impact electricity affordability and reliability for customers while severely eroding Saskatchewan's ability to attract and retain investment.

- The CER will impact over 2,900 megawatts (MW) of baseload and dispatchable generating capacity and will significantly limit SaskPower's ability to serve customers during peak demand periods and support our company's growing presence of intermittent renewables.

- The 2,900 MW capacity loss is in addition to the retirement of three major conventional coal-fired facilities by 2030, totalling 1,280 MW. SaskPower is on track to retire its conventional coal fleet by 2030 by making significant investments in lower emitting technologies. The total fossil fuel generation impacted by the CER and the federal coal regulations represents almost 80 per cent of Saskatchewan's current system generating capacity of about 5,400 MW.

- In addition to a commitment to reducing GHG emissions by 50 per cent from 2005 levels by 2030, SaskPower is targeting a net-zero GHG electricity system by 2050 to allow more time to manage affordability and reduce the risk for emerging, non-emitting baseload generation options such as nuclear small modular reactors (SMRs) and natural gas with carbon capture and storage (CCS) before deployment in Saskatchewan.

- SaskPower has already committed billions in its transition to a net-zero GHG future. This is evidenced by:
    - Our investment in over 450 MW of wind, solar and biomass generation in the last five years, with a minimum requirement now introduced for Indigenous equity for all new wind and solar projects;
    - A massive buildout of at least 3,000 MW of wind and solar generation by 2035;
    - Life extension of key legacy hydroelectric facilities;
    - Expanding import agreements with Manitoba Hydro to 290 MW;
    - Investment in nuclear Small Modular Reactor (SMR) development, with the potential for a first unit to be commissioned by 2034;
    - A commitment to a regional transmission interconnection expansion to support a major build-out of intermittent renewables and to act as a bridge to the potential construction of nuclear SMRs in Saskatchewan;
    - Significant expansion of in-province transmission lines;
    - The planned integration of multiple utility-scale Battery Energy Storage Systems, one of which would be among the largest in Canada;
    - Support for development of geothermal in Saskatchewan;
    - Development of the Boundary Dam Integrated Carbon Capture and Storage (CCS) Project – the world's first commercial scale CCS facility at a coal-fired power station that has captured over 5.5 million tonnes of carbon dioxide (CO_2) to-date;
    - Development of the SaskPower Carbon Capture Test Facility at Shand Power Station, capable of long-term technology evaluation using up to 120 tonnes/day of CO_2;

  - Co-founding the International CCS Knowledge Centre, sharing SaskPower's experience with the world to advance CCS technologies;
  - Investigation into carbon capture and storage on natural gas-fired facilities;
  - Our existing and planned investment in approximately 1,500 MW of efficient natural-gas fired generation to support our unprecedented build-out of intermittent renewable energy and assist us with bridging away from conventional coal until zero-emissions baseload options can be commercialized for use in Saskatchewan;
  - Execution of a distribution system transformation program; and
  - Construction of the Descharme Lake Microgrid in Northern Saskatchewan, which will increase reliability and reduce the reliance on diesel generation through solar generation and a battery energy storage system.

- With three customers per kilometre of line, SaskPower has one of the lowest customer densities in Canada; this means a relatively small number of customers must bear the growing cost of operating an already costly electricity system with an operating area of approximately 652,000 square kilometres.

- Saskatchewan electricity customers must not be affected disproportionately by the CER, resulting in an affordability crisis and erosion of provincial economic competitiveness. Consumers will have significantly lower disposable income available after paying for much higher electricity costs. This will reduce their demand for commercial goods and services in Saskatchewan, resulting in job and income losses in the commercial sector. Saskatchewan is already at a disadvantage because of the ability of hydro-rich jurisdictions to keep electricity rates relatively low. Rushing to decarbonize the electricity system will exacerbate this disparity.

- The profitability and competitiveness of industry – including the mining of critical minerals and agricultural sector – will be significantly impacted. The result will be a substantial decline in investment in major Saskatchewan industries, resulting in lower employment and income.

- Significant federal cost sharing is required, especially in the development and construction phases of early mover nuclear power projects, the deployment of CCS on natural gas-fired generating facilities, the installation of utility-scale energy storage, and the construction of expanded regional interconnections.

- Time must be allowed for the development of commercially proven technological alternatives so that SaskPower can maintain system reliability while optimizing capital expenditures on a path to net-zero GHG emissions. Without commercially proven, non-emitting baseload technologies available in Saskatchewan today, compliance with the CER by 2035 is not achievable. A target of net-zero by 2050 provides the time necessary for these emerging technologies to be commercially proven, mitigating cost and risk.

- The North American Electric Reliability Corporation (NERC) is an independent, international regulatory authority that manages the reliability and security of the North American electricity system. NERC's 2023 reliability risk report identifies Energy Policy as a significant risk factor, requiring increased communication, coordination and collaboration between levels of government and other stakeholders to mitigate risks to reliability and affordability.

- A detailed response around the draft CER in Canada Gazette, Part I follows.

SASKPOWER'S DECARBONIZATION PATHWAY

LACK OF RECOGNITION FOR SASKPOWER'S PROGRESS AND COMMITMENTS

- In the face of increasing load growth – much of it associated with the production of critical minerals for Canada and the world – SaskPower has already committed to reducing GHGs to 50 per cent below 2005 levels by 2030 and to net-zero by 2050. Our company is also currently responding to multiple emissions-related federal measures, including those related to carbon pricing and the requirement to close conventional coal facilities by 2030.

- SaskPower is already committed to moving as fast as possible to a net-zero GHG future. The amount of work SaskPower has already planned by the end of 2034 will be extremely challenging to deliver. The CER will only impose more cost and will not help us achieve a net-zero future more quickly.

- SaskPower is investing billions to meet these emission reduction targets and support a net-zero GHG future.

- In the last five-years, SaskPower has added:
  - Over 400 MW of wind generation;
  - 30 MW of utility-scale solar generation;
  - 290 MW in non-emitting imports from Manitoba;
  - 8 MW from an Indigenous-owned biomass power facility; and
  - 350 MW of efficient combined-cycle natural gas-fired generation.

- Between 2023 and 2035 SaskPower plans to:
  - Add at least 3,000 MW of intermittent renewable generation; almost 400 MW of battery energy storage; approximately 1,500 MW of efficient natural gas-fired generation; and at least 1,000 MW of low- or non-emitting imports;
  - Develop expanded regional transmission interconnections that will enable access to lower emitting imports while also enabling the export of surplus renewable energy;
  - Execute planning, development and potential construction of a 315-MW nuclear SMR.

LACK OF RECOGNITION OF SASKATCHEWAN'S UNIQUE CHALLENGES TO ACHIEVING NET-ZERO

- Saskatchewan has one of the longest decarbonization paths of any Canadian jurisdiction because of its historic reliance on readily available and affordable fossil fuels, as well as a lack of access to in-province hydroelectricity potential.

- SaskPower has one of the smallest rate bases dispersed over one of Canada's largest service areas.

- Transforming the provincial power system in just over 11 years will not be possible without greater flexibility, targeted financial support, and a continued role for natural gas-fired generation as a lower emitting transition between conventional coal-fired generation to non-emitting baseload generation, such as nuclear SMRs.

CER TECHNOLOGICAL AND RELIABILITY ISSUES

FAR-REACHING IMPACTS TO SASKATCHEWAN'S ELECTRICITY SYSTEM

- With the magnitude of Saskatchewan's electricity transition and the long lead times required for project development, decisions are required now for solutions to be in place by the end of 2034. Currently, there are no commercially available non-emitting baseload generation technologies available for Saskatchewan that can replace natural gas-fired generation and be operational by the end of 2034.

- With natural gas-fired generation being the only baseload generation option available at the scale and in the time required to replace conventional coal before 2030, SaskPower is planning to add more than 1,100 MW between 2023 and 2030 to ensure reliability for our customers. The CER now imposes significant restrictions for operation of these facilities beyond 2034, adding cost and risk when there are no other baseload options available.

- Compliance for natural gas-fired generating units will dictate early retirement or restricted operations, to a maximum of about 5 per cent (i.e., 450 hours), for:
    - Four legacy natural gas-fired facilities by 2035, totaling almost 1,000 MW of generating capacity.
    - Three modern natural gas-fired facilities, totaling 1,130 MW of capacity, which are intended to replace conventional coal-fired generation (unless major investments in untested CCS technology are made by 2035 or soon after).
    - Two new flexible simple-cycle units, totaling 90 MW, that will support SaskPower's expanded fleet of intermittent renewable generation.
    - Three natural gas-fired Independent Power Producer facilities, totalling an additional 600 MW in baseload and dispatchable capacity.

- Compliance with the CER will also require the early retirement of Saskatchewan's world-leading Boundary Dam Power Station Unit #3 (BD3), a coal-fired generating station retrofitted with CCS in 2013. The forced retirement of this $1.5 billion asset with ten years of life remaining will result in new investment in generation earlier than expected.

- In addition to the cost of new generation required to replace BD3, by 2035 SaskPower customers will still need to absorb the cost of accelerated depreciation to support the repayment of the remaining debt related to the retired facility. Accelerating the

depreciation of BD3 to match a 2035 retirement results in an immediate rate impact of approximately 2 per cent on SaskPower customers.

- The CER will significantly limit SaskPower's ability to address peak demand periods, support intermittent renewables such as wind and solar and, in turn, ensure the reliability of electricity supply for customers.

- In total, the CER will affect over 2,900 MW of baseload and dispatchable generating capacity (today's current system capacity is about 5,400 MW). The fossil fuel generation impacted by the CER and the federal coal regulations represents almost 80 per cent of Saskatchewan's current system generating capacity. This includes the capacity loss associated with the mandated retirement of three conventional coal-fired facilities by 2030, totalling 1,280 MW.

LACK OF DETAILED INSIGHT INTO FEDERAL MODELING FOR CER IMPACTS IN SASKATCHEWAN

- SaskPower is being asked to respond to the draft CER with limited details of the results of federal modeling leading to the CER parameters or any firm commitments on carbon pricing beyond 2030.

AN UNACHIEVABLE PERFORMANCE STANDARD BASED ON UNPROVEN TECHNOLOGY

- The CER Performance Standard of 30 tonnes CO_2 per gigawatt-hour (30 t CO_2/GWh) by 2035 and the 40 t CO_2/GWh allowance following commissioning are excessively stringent. This standard cannot be met by any current thermal generating unit. This standard also has not been met on an annual basis by any thermal unit fitted with CCS at the utility scale. CCS vendors indicate this performance standard is achievable, however, it is theoretical and not yet commercially proven.. Until CCS is commercially proven, the strict performance standard proposed, coupled with the associated legal implications, will prevent utilities from investing in CCS. As a result, CCS is unlikely to be a viable option for utilities by 2035.

- The 450-hour operating limit to enable natural gas-fired peaking support is entirely inadequate for the scale of intermittent renewables considered in the analysis leading to the CER. Natural gas-fired generation is the only commercially available dispatchable technology that can provide the necessary back-up to support SaskPower's planned buildout of at least 3,000 MW of intermittent renewable generation by the end of 2034. This proposed operating limit will put SaskPower in a position of having to choose between meeting customer demand and complying with Federal regulations.

- Wind generation in Saskatchewan has shown that actual generation can vary from near 0 per cent to 100 per cent of capacity in under 12 hours. These periods of low or no generation can last for consecutive days and often coincide with the hottest or coldest days when demand for electricity is high. For example, during a period of more than four days in January 2023, out of an installed wind generation capacity of 617 MW, actual generation was near zero due to a combination of ice fog, freezing rain and low wind (see Appendix 2). Further, wind turbines have a low temperature cut-out of around -32 degrees Celsius, when they stop operating.

- Keeping units in operating condition only to run at 5 per cent availability is cost-prohibitive, inefficient, and unnecessary. Running hour-limited units in sequence to meet demand does not improve emissions outcomes because the efficient combined-cycle units are held to the same limit as inefficient simple-cycle units.

EMERGENCY CONDITIONS

- As proposed, the federal Minister must agree with an emergency declaration that allows a power producer to exceed emissions limits (on the instruction of the grid operator). A compliance liability develops for any person involved where the Minister does not support a Provincial emergency declaration after the fact. This would put directors, officers and employees of our company at risk of criminal prosecution, which could lead to significant fines or even incarceration.

- Without non-emitting baseload technologies available in Saskatchewan at the scale and in the time required to comply with the CER, natural gas-fired generation will be critical to ensuring reliability beyond 2034. SaskPower anticipates that compliance will be challenging and could result in multiple instances where emergency conditions arise and regulated limits are exceeded.

ASSUMED DEPENDENCE ON HIGH-RISK, HIGH-COST COMPLIANCE OPTIONS

- *Carbon Capture and Storage (CCS):* CCS represents a high-risk pathway to compliance in the time available. The performance standard of 30 t or even 40 t CO_2/GWh applied to natural gas units would require up to 95 per cent CO_2 capture rates. SaskPower's experience with CCS through the BD3 Carbon Capture and Storage Project suggests far greater flexibility will be required following commissioning. Canada asserts that an emissions performance of 100 t CO_2/GWh is, “easily obtainable by any CCS unit.” However, no examples are provided. The CER performance standard should be based on commercially proven performance, which will require more time than the 2035

compliance date allows. Furthermore, availability of water supply and suitable geological formations for storage of CO_2 may constrain the application of CCS on existing generating facilities. Additional important considerations:

- CCS has a high parasitic load, combined with an availability that is approximately 10 per cent less than the associated natural gas unit, meaning that 25 per cent more natural gas is burned to get 90 per cent of the energy.
- The CER does not recognize the limitations that a CCS facility can place on generating facility availability, nor the limitations of placing CCS on peaking natural gas-fired facilities.

- *Intermittent Renewables:* The addition of at least 3,000 MW to Saskatchewan's 2023 total system capacity of about 5,400 MW will require significant dispatchable backup generating capacity, in addition to the new baseload generation that is required to replace conventional coal-fired generation and serve a growing demand for electricity. In addition, SaskPower's experience with wind generation has shown that more than 20 per cent of the time the total generation is less than 10 per cent of the facility's rated capacity.

- *Hydro:* Hydro development is limited in Saskatchewan due to a lack of remaining viable locations, none of which could be in-service by 2034. In addition, requirements from other federal ministries are taking away the operating flexibility of SaskPower's existing hydroelectric facilities, making it more challenging to integrate intermittent renewables. Meanwhile, sharing of hydro resources among provinces lacks the support of a federal framework.

- *Nuclear:* Saskatchewan will not have its first SMR in operation until 2034, at the earliest. If a decision is made to proceed with SMR development in Saskatchewan, it is likely that at least two SMRs would be built. However, two SMRs (2 x 315 MW) would not be sufficient to offset even half of the 1,280 MW of conventional coal-fired generation retired due to federal coal regulations by 2030. Further, as SMRs are an emerging technology and not commercially available in Saskatchewan until at least 2034, natural gas-fired generation is the only baseload option available at the scale required to bridge between the end of conventional coal-fired generation and potential deployment of SMRs. Although large-scale nuclear is not currently a viable option for Saskatchewan's grid, it could be an option in the 2040s.

- *Hydrogen:* Hydrogen blending is not a proven technology at the utility scale. Meanwhile, hydrogen is locally constrained by infrastructure and globally constrained by supply. Additionally, hydrogen volumes required for a power station are too large for practical application. As hydrogen is primarily produced from fossil fuels (>95 per cent globally), co-firing or blending hydrogen is likely to result in no better emissions outcomes than direct combustion of natural gas.

TRANSMISSION & DISTRIBUTION BUILDOUT

- In addition to the replacement of the majority of SaskPower's generating fleet in such a short time to meet federal requirements, SaskPower must also continue to make historic investments in new transmission and distribution lines, grid transformation and the sustainment of our province's existing electricity system.

- The expansion of renewables in the province further complicates the transition, with renewable facilities located away from the province's load centres. This requires extensive new in-province transmission infrastructure to transmit the electricity to where it is needed.

- As electrification drives increased customer electricity consumption, coupled with increased customer participation with Distributed Energy Resources (DERs), SaskPower is transforming the distribution system to increase capacity, visibility, control and automation.

ENERGY POLICY IMPACT ON RELIABILITY

- The North American Electric Reliability Corporation (NERC) is an independent, international regulatory authority that manages the reliability and security of the North American electricity grid. Saskatchewan's electricity system is regulated by NERC.

- In August 2023, NERC released its *2023 Electric Reliability Organization (ERO) Reliability Risk Priorities Report* identifying key risks to the North American grid and recommended actions to mitigate those risks. This year's report identifies Energy Policy as a new risk profile and illustrates how it can impact reliability and resilience of the electricity system. The report states that Energy Policy should consider potential impacts on the reliability and resilience of the electricity system, and that it can create potential risks when it does not. The report recommends increased communication, coordination, and collaboration between federal, provincial, and state policy makers, regulators, owners,

and operators of the electricity system as well as with the critical interdependent sectors is needed to mitigate this risk.

CER AFFORDABILITY IMPACT

ELECTRICITY RATE INCREASES WILL NEGATIVELY IMPACT FEDERAL ELECTRIFICATION GOALS

- The overall net benefits estimated by ECCC for the CER downplay the disproportionate and major negative affordability impact the CER will have on Saskatchewan.

- SaskPower's initial estimates show that complying with the requirements of the CER will result in total capital costs of approximately $40 billion by 2035, representing an incremental capital cost between $7 billion and $10 billion, relative to SaskPower's net-zero 2050 plan. This will add 20 per cent to rates by 2035, compared to achieving Saskatchewan's planned net-zero 2050 target.

- Ratepayers will experience the cumulative cost increases from existing federal policies and regulations, not just the incremental CER impacts. As of April 1, 2022, residential rates in Saskatchewan were more than 50 per cent higher than rates offered by the average Canadian hydroelectric utility.

- Saskatchewan's rate disparity with hydro-rich jurisdictions will only widen under the CER. Higher rates will deter conversion to electricity from other competitive energy alternatives.

IMPACT OF HIGHER ELECTRICITY COSTS ON THE VULNERABLE

- Rate increases will disproportionately impact low-income households, as well as Indigenous and remote communities in northern Saskatchewan that rely on electric heat.

UNINTENDED CONSEQUENCES OF THE CER

PROLIFERATION OF GHG-EMITTING SMALL GENERATING UNITS

- As units less than 25 MW capacity avoid both the CER and federal natural gas regulations, a future electricity system could develop around smaller, less efficient units.

SYSTEM EMISSION INEFFICIENCIES

- The low natural gas-fired unit hour limit could lead to the preferential dispatch of older, less efficient units running in sequence up to the 450-hour limit to support intermittent renewables. This would show no emissions benefits and could result in potentially higher emissions overall when compared to a single, more efficient facility, run for more hours, under the same total emissions cap.

COGENERATION DETERRANCE

- Available electricity capacity from the industrial sector will be curtailed due to CER performance limits. Industrial heat needs will see a conversion to natural gas-fired boilers, with no net emissions benefits and working contrary to Canada's goal of a net-zero GHG economy by 2050.

FIRST MOVER RISKS AND COSTS

- Transformation by 2035 means utilities, particularly those currently dependent on fossil fuels, must prematurely lock in large investments for commercially unproven technologies rather than benefit from technological advances and cost reductions that will occur over time.

- The timeframes of the CER will only increase inflationary pressures in the electricity sector.

SUPPLY CHAIN

- The CER will increase pressure on the supply chain as Saskatchewan competes with many other jurisdictions for the same labour and material resources to build the low- and non-emitting generation sources and supporting infrastructure needed to enable the transition to a low carbon economy.

- SaskPower is already seeing supply chain induced step changes in the cost of wind, solar and battery energy storage systems, as well as extended delivery timelines of up to three years for critical equipment, like transformers.

INTERPROVINCIAL COOPERATION

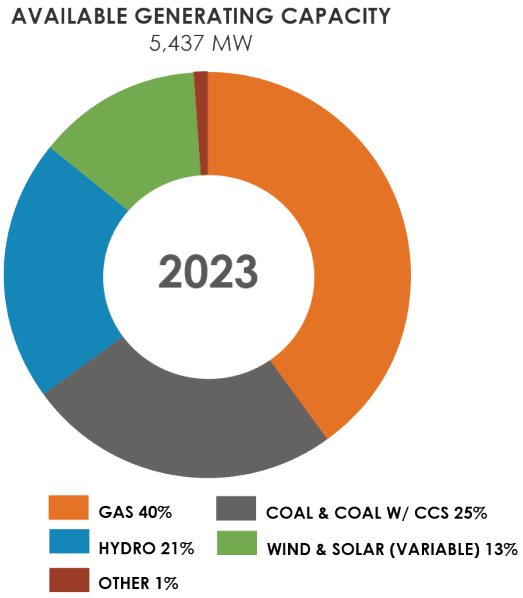
- With respect to emergency conditions, exemption provisions under the CER are province-specific and not enabled by declarations in another jurisdiction. As a result, neighbouring jurisdictions may be reluctant to respond with assistance if Performance Standard non-compliance becomes a risk.

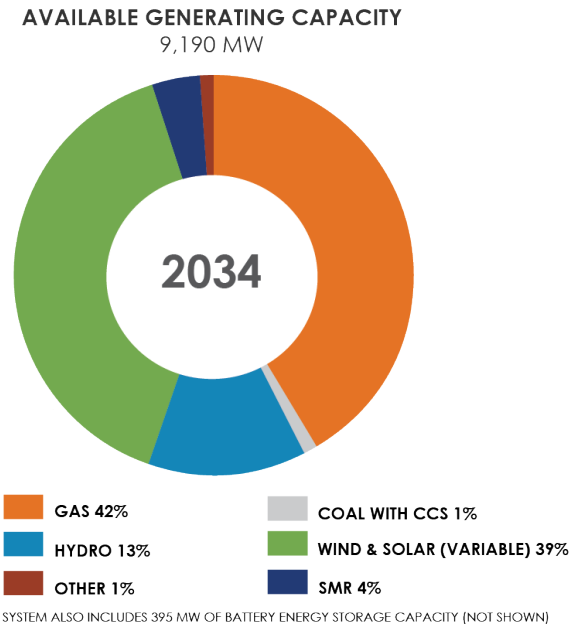
APPENDICES

APPENDIX 1: CRITICAL ROLE OF NATURAL-GAS FIRED GENERATION FOR RELIABILITY BEYOND 2034

The charts below illustrate the significant shift in SaskPower's system generating capacity from a historic reliance on fossil fuel generation to lower emitting generation sources. The 2034 supply mix is based on SaskPower's current net-zero 2050 supply plan and illustrates the importance of having sufficient dispatchable and baseload generation capacity to ensure reliability as variable renewable generation sources are expanded in the province.

Without non-emitting dispatchable and baseload generation sources being commercially available at the scale required, natural gas-fired generation will be critical to ensuring reliability for customers beyond 2034.





APPENDIX 2: WIND GENERATION DURING EXTREME WEATHER EVENTS

The charts below are based on actual performance data from SaskPower's wind generation fleet during extreme weather conditions. These charts illustrate:

- Significant variability occurring over short periods of time.
- During the hottest or coldest days of the year when demand for electricity is high, wind generation is often very low and can remain that way for a few hours or multiple days.
- Other extreme weather conditions, such as ice fog, can have widespread and long-lasting impacts to wind generation, as shown in Figure 1 below.

Figure 1: Winter Example

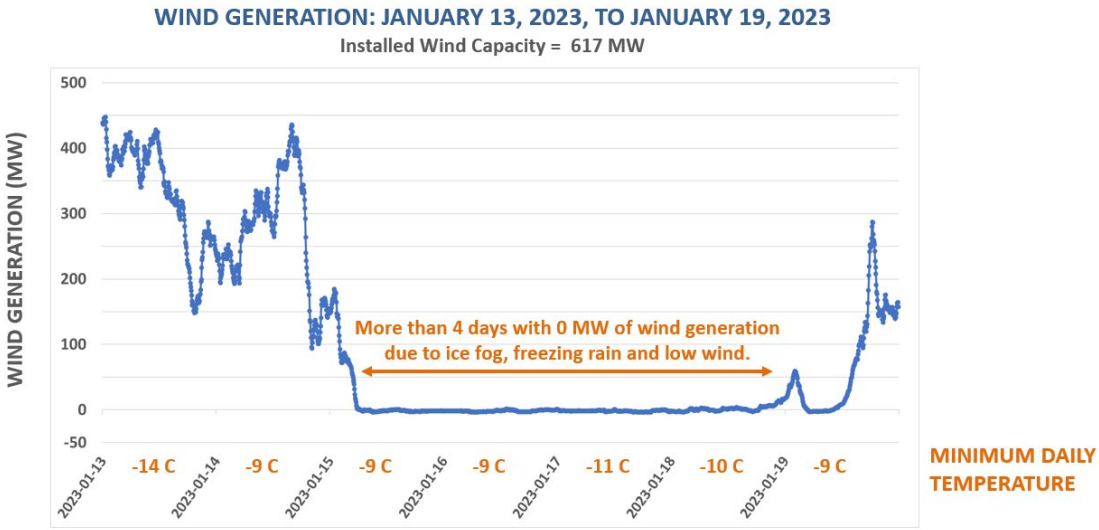


Figure 2: Summer Example