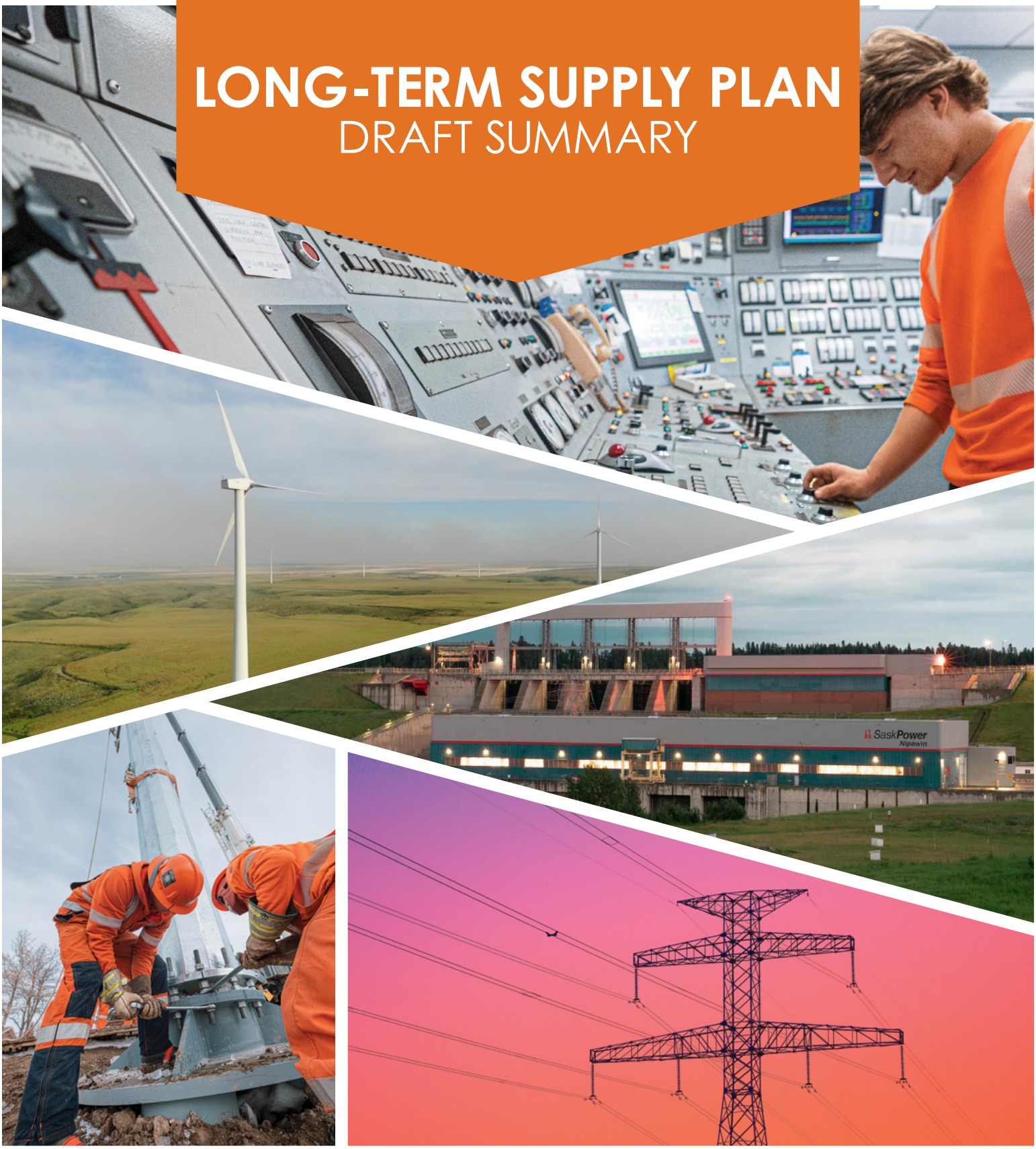
LONG-TERM SUPPLY PLAN
DRAFT SUMMARY



March 2024

Planning for 2030 and Beyond

SaskPower
Powering our future®

TABLE OF CONTENTS

INTRODUCTION

The world around us is changing, and so are we.

Established in 1929, SaskPower is Saskatchewan's leading electricity supplier. Our team includes 3,100 permanent full-time employees. We manage $13 billion in generation, transmission, distribution and other assets that have the generating capacity of 3,968 megawatts (MW) of power. We also buy power from Independent Power Producers (IPP) for a total generating capacity of 5,353 MW. We're proud to serve over 550,000 customers.

Now, as we respond to undeniable changes in our climate and the world around us, we must transform as a company. One thing that's not changing is our goal to reach net-zero greenhouse gas (GHG) emissions. We're on track to achieve net-zero by 2050 — or sooner. This Long-Term Supply Plan: Draft Summary outlines key recommendations for how to get there while delivering reliable, cost-effective and sustainable power.

GHG emissions are gases that trap heat in the atmosphere. GHGs include gases like carbon dioxide, methane, nitrous oxide and fluorinated gases like hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride and nitrogen trifluoride.

Carbon dioxide (CO_2) is the primary greenhouse gas emitted through human activities. The main human activity that emits CO_2 is the combustion of fossil fuels (coal, oil and natural gas) for energy and transportation.

PURPOSE OF THE LONG-TERM SUPPLY PLAN

Our Long-Term Supply Plan is a roadmap. It provides direction for decision-makers to ensure we can continue to provide reliable, sustainable and cost-effective power to 2050. It offers the Saskatchewan public insight into where we're headed. This document is the draft summary of our 2024 Long-Term Supply Plan. The purpose of this draft is to share the lessons learned through our internal supply planning process and through our Future Supply Plan – 2030 and Beyond engagement project. It also includes our key recommendations developed in response to the lessons learned. You can weigh in on this document at saskpower.com/engage. We'll use your feedback to inform the final Long-Term Supply Plan which will be released this summer.

You won't find a prescribed path forward within the Long-Term Supply Plan. You will find our lessons learned, key recommendations and:

Decisions to 2030
Decisions that have already been made that support the recommendation.

Short-term actions to 2035
Actions or decisions necessary before 2035 to support the recommendation.

Preparing for long-term actions to 2050
Actions necessary now to put us in a position to make decisions in the long term.

Signposts
Factors, risks or opportunities that will prompt us to revisit the recommendation to assess if it needs updating or revising.

HOW THE SUPPLY PLAN IS DEVELOPED

Supply planning is standard practice for us. We create two complementary plans – the Annual Supply Plan and the Long-Term Supply Plan. The Long-Term Supply Plan assesses different supply mix scenarios. We use the scenarios exercise to learn about our future options. After that analysis, we draft recommendations. This year we're including the public's input to expand the lessons we're learning and to ensure we account for the risks they raise.

The Annual Supply Plan sets out the supply requirements to 2035. Its purpose is to serve as a guideline for decision-makers by outlining the current recommended path forward. That path must balance cost, regulatory requirements, environmental targets, reliability and risk. Each specific project recommended in the Annual Supply Plan is taken forward for decision by SaskPower leadership. Major decisions, including large new supply decisions go to Cabinet. Recommended projects, such as new supply additions, power unit life extensions, or power unit retirements are weighed against alternatives.

The Long-Term Supply Plan informs the annual plan and is updated every two to three years and historically looks 20 years into the future. The scope of the 2024 plan has been extended to 2050.

There are many challenges and factors that we consider as we update the plan for 2024. They include:

Federal regulations
Conventional coal plants must retire by Dec. 31, 2029 and net-zero targets are being accelerated.

Carbon taxes
Generating power with coal and natural gas is getting more expensive as carbon taxes rise.

Customer expectations
Now more than ever customers want to engage in decisions about – and participate in – Saskatchewan's power future.

Innovation
A global focus on clean energy is accelerating development of new power production technology.

Electrification
New and expanded uses for power are emerging and that will lead to unprecedented demand for power.

Extreme weather
We're seeing an increase in extreme weather events, including higher summer temperatures, wildfires and floods. We must be ready for those events by planning and preparing for them.

Long project timelines
Generation, transmission and distribution project timelines are lengthy, partially due to regulatory approval processes, and are getting longer because of supply chain competition.

As always, we must also consider reliability, safety, cost and sustainability of each supply option. New for the 2024 plan, we're also including public input from the Future Supply Plan – 2030 and Beyond engagement project.

What about projects that aren't in your plan?

Project proposals or Unsolicited Power Proposals (UPPs) that aren't part our Annual Supply Plan or Long-Term Supply Plan are handled on a case-by-case basis by our Independent Power Producers (IPP) team in consultation with our system planners and future supply planners.

Net-zero means achieving a balance where carbon emitted into the atmosphere is equal to the carbon removed from it. This can be achieved by cutting GHG emissions to as close to zero as possible and finding ways to remove (offset) any remaining emissions.

Reliability is the ability of the power system to adequately supply power to meet customers' demand and recover from sudden system disturbances such as a power unit failure.

PUBLIC INPUT

Our supply planning team has been working alongside our stakeholder and engagement team to gather public input through the Future Supply Plan – 2030 and Beyond engagement project. The project's focus is on supporting participation in Saskatchewan's power future from a broad range of people without requiring a technical background in the electrical power system.

Throughout this project, we sought public input at co-ordinated intervals so that it could be incorporated into the plan. There are five stages in this public engagement process.

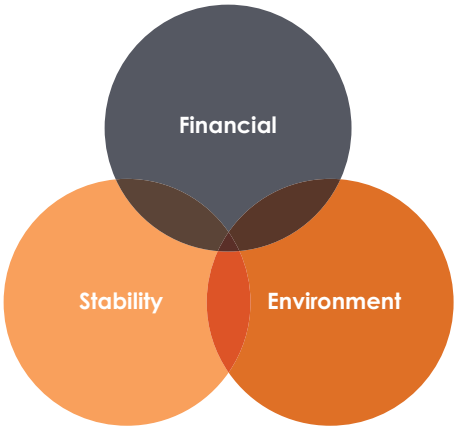
Stage 1 ran from September to November 2022.
We started engaging with Saskatchewan residents by asking them how they wanted to participate, what supply options they'd like to learn more about and what opportunities they see for the future.

Stage 2 ran from November 2022 to May 2023.
We shared information about the supply options we're considering. We also dug deeper into customer values and priorities when evaluating power supply options. Over 15,000 Saskatchewan residents participated in Stage 2.

Stage 3 ran from October 2023 to January 2024.
We provided learning opportunities about supply planning and shared four future supply scenarios. These scenarios explored timelines to reduce GHG emissions, different supply mixes, and their impact on power rates, land use and more. Assessing these scenarios is a crucial step in future supply planning. This analysis is what drove many of our key recommendations. Over 25,000 Saskatchewan residents participated in Stage 3.

In Stages 2 and 3, we asked participants to reflect on the overall planning priorities SaskPower should use to inform the Long-Term Supply Plan. The Consumer Values and Priorities Map diagram above shows some of the values and considerations people raised. These are shown here in binary terms although some are complementary. This inventory isn't comprehensive, but it does capture many perspectives we've heard so far.

The planning priorities we heard about most were financial, stability and environment. Each priority area is made up of many aspects. Immediate affordability and power reliability concerns are higher priority for most participants.



Most participants recognize the transition to net-zero GHG emissions is important but also expressed concerns about the potential negative impacts of striving for net-zero too quickly. There's tension between all three planning priorities. Review our 'What We Heard' reports from Stages 1, 2 and 3 at saskpower.com/engage to learn more.

Stage 4 runs from March to April 2024.
We're looking to see if we're on the right track with our lessons learned and key recommendations. Learn how to participate in Stage 4 at saskpower.com/engage.

Stage 5 will conclude the engagement process with the release of the final 2024 Long-Term Supply Plan.

SCENARIOS TO CONSIDER

Using public input and internal analysis, we created four scenarios that show what our future power system could look like. Each scenario responds to questions asked by participants in Stage 1 and 2 and shows the dynamics between emissions, rates, reliability, power supply options and other considerations. View the scenarios at saskpower.com/blog to learn more.

WHY REDUCE GHG EMISSIONS

There are several reasons why we must reduce our GHG emissions, including:

Growing impact of climate change.
We're witnessing first-hand the impacts of events like wildfires, floods, drought, and other severe weather, and it's taking a toll on our infrastructure.

Changing customer expectations.
Many customers want to see more renewable power in our supply mix, expect us to reduce our GHG emissions, and in some cases want to contribute to the supply mix.

Federal regulations.
The Federal Government's draft *Clean Electricity Regulations* (CER) are focused on a near-zero GHG emissions power system by 2035 to support the goal of Canada reaching net-zero GHG emissions by 2050.

Industrial decarbonization.
Our largest customers want to reduce the carbon footprint of their operations.

Electrification.
Other industries and residential customers are switching to electric power to lower their GHG emissions.

HOW DECISIONS ARE MADE

It can take many months to reach a final decision about new supply additions, power unit life extensions, power unit retirements, etc. Our decision-making process is outlined here:

1. Public input is used to update and inform the Long-Term Supply Plan.
2. The Long-Term Supply Plan informs the Annual Supply Plan.
3. The Annual Supply Plan informs individual Decision Items.
    a. Individual projects are taken forward as separate Decision Items. Project recommendations are built through a collaborative process with internal and external stakeholders.
4. Decision Items are submitted to SaskPower's Executive for consideration.
5. If approved, they proceed to SaskPower's Board of Directors, Crown Investments Corporation and the Provincial Government for review and approval.

At any point during this process the Decision Item can be sent back for more investigation, to answer questions or to consider new information.

SUPPLY PLAN TO 2030

As of March 2024
Shows decisions confirmed to 2030.

2024
20 MW/20 MWh Battery Energy Storage
Regina

2024
Great Plains Power Station online (377 MW)
Moose Jaw

2024
Bekevar Wind Facility online (200 MW) (*IPP owned)
Near Moose Mountain Provincial Park

2024-2027***
Boundary Dam Unit 5 on standby** (150 MW)
Estevan

2024-2027***
Meadow Lake Power Station on standby** (41 MW)
Meadow Lake

2025
Ermine Power Station Expansion online (45 MW)
Kerrobert

2025
Yellowhead Power Station Expansion online (45 MW)
North Battleford

2026
Iyuhána Solar Energy Facility online (100 MW) (*IPP owned)
Estevan

2027
400 MW wind generation online (*IPP owned)
South central Saskatchewan

2027
200 MW solar generation online (*IPP owned)
South central Saskatchewan

2027
Aspen Power Station online (370 MW)
Lanigan

2027
Southwest Power Pool interconnection enables up to 650 MW energy transfer
(Potential import contracts are still in planning)

2029
Current federal regulations require conventional coal units to retire by Dec. 31, 2029

2030

** Independent Power Producer.*
*** Units on standby are available to return to service in case of the need for additional power. This helps ensure our grid has enough power in case of unplanned events or greater-than-anticipated demand.*
**** Standby could potentially be extended.*

LESSONS LEARNED AND KEY RECOMMENDATIONS

Our key recommendations are based on what we learned during the supply planning process and from public input received through the Future Supply Plan – 2030 and Beyond engagement project.

1. Customers are concerned with the price of power now and into the future. Power rates must remain cost competitive with our neighbours.

A. Recommendation: Continue to explore opportunities to help mitigate the impacts of rising power costs for customers through innovation, programs, collaboration and federal funding.

Decisions to 2030:

- Continue to offer a portfolio of Demand Side Management (DSM) solutions. For example, the Energy Assistance Program, the Northern First Nations Home Retrofit Program, the Energy Efficiency Discounts Program, Demand Response Program and the Home Efficiency Retrofit Rebate. *(On-going)*
- Provide affordability options and resources to customers. *(On-going)*
- Continue to offer payment deferrals, instalment plans and equalization payment plans. *(On-going)*
- Continue to offer support for those customers who are receiving Jordan's Principle support through Indigenous Services Canada or through the Métis Nation of Saskatchewan's Homelessness Prevention Program. *(On-going)*
- Continue to engage the Federal Government on Saskatchewan's unique position, regulatory flexibility, and financial support for the energy transition.
- Leverage federal funding opportunities for industry to build renewable generation and storage solutions.
- Continue to find efficiencies to responsibly manage capital and operating budgets.

Short-term actions to 2035:

- Investigate other opportunities or changes to existing programs that will provide greater support and accessibility to programs that can help mitigate the impacts of rising energy costs for customers.
- Pursue funding initiatives that not only benefit all customers, but also programs that are targeted to specific customer groups.
- Manage expenses efficiently while continuing to pursue external funding to help offset the costs associated with building a clean, reliable and modernized power system.
- Continue to apply through federal funding programs for support on new technologies.

Preparing for long-term actions to 2050:

- Look for system efficiencies and areas of opportunity for redesign as major changes are made to the generation, transmission and distribution systems.
- Consider increased export of energy as a revenue stream.

Signposts:

- Increasing or decreasing number of customers who spend six per cent or more of their income on natural gas and electricity bills (this is known as high-energy burden).
- Increasing or decreasing enrolment in affordability programs.
- Changes in funding or funding opportunities.

2. Many customers want to help Saskatchewan reach net-zero GHG emissions.

A. Recommendation: Continue to pursue DSM as a cost-effective way to reduce the need for power generation, to avoid costs and to reduce GHG emissions.

Decisions to 2030:

- Continue to offer a portfolio of DSM solutions. For example, the Energy Assistance Program, Northern First Nations Home Retrofit Program, Energy Efficiency Discounts Program and the Home Efficiency Retrofit Rebate. *(On-going)*

Short-term actions to 2035:

- Publish our DSM targets and share the results regularly.
- Explore new DSM solutions, including Demand Response. *(On-going)*

Preparing for long-term actions to 2050:

- Continue to evolve the DSM portfolio to meet customer needs and targets.

Signposts:

- Increasing or decreasing customer participation in DSM programs.
- Increasing or decreasing need for energy (GWh) and capacity (MW) reductions through DSM.

B. **Recommendation:** Seek customer input into the development of customer generation solutions.

Decisions to 2030:

- Study how the Renewable Access Service (RAS) impacts the overall supply plan. This service supports industrial customers' large-scale wind and solar projects. *(On-going)*

Short-term actions to 2035:

- Engage with key and major account customers on alternate options to provide additional renewable or low-emitting generation. *(On-going)*
- Consider how increased customer generation can benefit the long-term supply plan. *(On-going)*
- Explore further opportunities to leverage residential and small-medium business customer solutions that could cost-effectively reduce GHG emissions.

Preparing for long-term actions to 2050:

- Collaborate with key account customers on potential nuclear power opportunities.

Signposts:

- Change in cost of renewables and energy storage on the individual and utility scale.
- Increasing or decreasing enrolment in customer generation, storage, renewable programs and Demand Response programs.

Demand Side Management (DSM) includes energy efficiency options to permanently reduce the demand for power, as well as demand response and load management options to temporarily reduce or shift the demand for power from 'on-peak' periods to 'off-peak' periods. Effective DSM strategies can eliminate the need for new generation at price points at or below most generation alternatives. Some examples of DSM are:

- Energy efficiency that permanently reduces the demand curve for power by replacing existing technologies with more efficient technologies.
- Load shifting like 'time-of-use' power rates or other incentives to shift the demand for power from on-peak to off-peak hours.
- Strategic load growth like leveraging new demands for power like EV charging and energy storage to increase sales at times of low demand.
- Demand response like reducing the demand for power during critical times of peak demand.

3. We need interconnections with our neighbours to reach net-zero GHG emissions, increase reliability and manage cost.

A. **Recommendation:** Advance a transmission strategy to increase interconnections with neighbouring jurisdictions.

Decisions to 2030:

- Increased interconnection with the Southwest Power Pool by up to 650 MW by 2027.

Short-term actions to 2035:

- Analyze options for additional large grid interconnections by 2035 and beyond.

Preparing for long-term actions to 2050:

- Create a long-term transmission interconnection strategy.

Signposts:

- Reliability is threatened due to the supply mix.
- Demand for power significantly increases or decreases.
- Changes in provincial, national or international energy regulations.

4. Our long-standing reliance on a diverse supply mix is necessary to continue to reduce risk. We need power supply alternatives to keep our options open.

A. Recommendation: Develop new low- and non-emitting technologies that we may need to rely on.

Decisions to 2030:

- Committed to looking at nuclear power.
- Investigating carbon capture and storage (CCS) on natural gas technology. *(On-going)*
- Signed a five-MW Power Purchase Agreement (PPA) with Deep Earth Energy Production Corporation for a future potential geothermal facility.
- Issued a request for proposals for 600 MW of new wind and solar generation in south central Saskatchewan.
- Issued a request for proposals for 500 MW of firm import from the Southwest Power Pool in the United States.

Short-term actions to 2035:

- Conclude the planning phase for nuclear power from the first small modular reactor (SMR) project for an investment decision by 2029 and a potential in-service date in 2034.
- Develop a large natural gas with CCS facility option to enable a potential in-service date as early as 2033.
- Assess conversion of coal units to operate on natural gas for limited life extension (up to 10 years based on GHG emissions performance under current regulations).
- Assess four-hour batteries as an option for the 2028 timeframe.
- Continue to investigate compressed air energy storage potential.
- Refresh highest potential Saskatchewan hydro projects for consideration post-2035.
- Maintain the current build out of wind and solar resources to add up to 3,000 MW by 2035.
- Continue industrial customer collaboration through RAS and explore other service offerings.

Preparing for long-term actions to 2050:

- Expand the current assessment of nuclear generation supply options to include additional SMRs, advanced reactors and larger nuclear reactors.
- Continue to investigate emerging and advancing technologies including longer duration energy storage and hydrogen generation and storage.

Signposts:

- Advancements in technology.
- New units in commercial operation.
- Changes in carbon-related cost, policy or regulations.

5. Saskatchewan residents want to know that we're looking at every supply option.

A. Recommendation: Continue transparently sharing information on all the supply options we're investigating.

Decisions made to 2030:

- Update saskpower.com with information about available and emerging supply options. *(On-going)*
- Develop a public education plan. *(On-going)*

Short-term actions to 2035:

- Continue to share what we're doing to explore emerging technologies.

Preparing for long-term actions to 2050:

- Repeat public engagement on future long-term supply plan(s).

Signposts:

- Advancements in technology.
- Change in costs, environmental impacts or reliability of supply options.
- Interest levels and public feedback.

6. The energy transition will lead to new challenges for our system that we need to accommodate to maintain reliability at the same time as we must maintain and update an aging power system.

A. Recommendation: Ensure sufficient resources are committed to continue to assess, plan for and address the following challenges:

- Aging infrastructure
- Extreme weather events
- Increasing load variability due to increased variable supply and demand (wind and solar generation, distributed energy resources, electric vehicles, etc.)
- Uncertain load growth

Decisions to 2030:

- Invest in the renewal of our power infrastructure. *(On-going)*
- Advance grid modernization and distribution system transformation. *(On-going)*
- Reinforce and expand in-province electrical transmission. *(On-going)*
- Increase flexible, dispatchable generation that can balance variability. *(On-going)*
- Increase energy storage and interconnections with our neighbours to enable us to respond quickly and economically to unanticipated changes in demand for power. *(On-going)*

Short-term actions to 2035:

- Design the system to allow for maximum flexibility so we can quickly adapt to provincial and local load forecast growing faster or slower than planned.

Preparing for long-term actions to 2050:

- Prepare contingency plans for high load growth scenarios.

Signposts:

- Local demand increases at the distribution level.
- Provincial demand increases or decreases significantly beyond forecast.

7. We must comply with the law and as regulations change, we must be quick to adapt. It's important that the Federal Government understands Saskatchewan's unique challenge to significantly reduce GHG emissions.

A. Recommendation: Be ready to act on a plan toward the pending *Clean Electricity Regulations* while continuing to engage with Provincial and Federal Governments on accommodations for Saskatchewan.

Decisions to 2030:

- Continue engagement with Provincial and Federal Governments with a focus on obtaining regulatory flexibility and financial support for SaskPower during our energy transition.

Short-term actions to 2035:

- Support a renewed Equivalency Agreement between Canada and Saskatchewan to enable flexibility and optimal emission outcomes from 2025 to 2030.
- Define our flexibility needs under Canada's draft *Clean Electricity Regulations* that reflect our unique generation opportunities and limitations.

Preparing for long-term actions to 2050:

- Acquire regulatory permits in a timely manner to ensure new generation, transmission and distribution projects can be deployed as needed.

Signposts:

- New regulations are enacted, existing regulations are struck down or amended.

WHAT'S NEXT

The final 2024 Long-Term Supply Plan will be released this summer. In addition to the information included in this draft summary, it'll include detailed analysis and information about load forecast, environmental constraints, existing generation, transmission and imports, an updated action plan, and much more.

SUPPLY OPTIONS

We heard from the public that they want to know that we've considered every supply option and options to support supply when it comes to powering the province in the future. Below is a summary of our current use of each option, what we could use in the future, a high-level description of the option, and other considerations.

Battery Energy Storage System (BESS)

Current
20 MW/20MWh from a lithium-ion BESS in Regina.

Future
Increasing. We're working toward four-hour batteries as a next step.

About
Battery technology allows us to store energy from intermittent resources and manage the reliability of the transmission system. The Regina BESS will be capable of powering 20 MW of load for up to one hour. This project is helping us understand the future potential and benefits of battery energy storage in Saskatchewan and how it can support reliability of the transmission system and variable renewable power. Recycling heavy metals found in batteries is a developing consideration we're watching.

Biomass

Current
8 MW from the Meadow Lake Tribal Council (MLTC) Bioenergy Centre.

Future
Possibly increasing. We're interested in future biomass power as an option to serve supply needs and will assess projects brought forward by Independent Power Producers so long as they're competitive with other supply options in price and reliability.

About
Biomass is a renewable source of power that comes from organic materials. Biomass power comes in many forms. Common methods include burning wood waste materials or pellets to create steam to turn a turbine. The MLTC Bioenergy Centre is fueled by sawmill residues that are burned to convert a fluid to steam which drives a turbine.

What is a Power Purchase Agreement?

A Power Purchase Agreement (PPA) is a long-term contract between an off taker (like SaskPower) and an electricity generator or Independent Power Producer (IPP). A PPA allows us to buy power at a pre-negotiated price over a term of 20-30 years. The IPP is responsible for developing, owning and operating the generating facility.

Carbon Capture and Storage (CCS) on Coal

Current
108 MW from Boundary Dam Power Station Unit 3 (BD3).

Carbon Intensity
400-500 t/GWh. This range is based on our experience operating BD3 with CCS and calculated using regulations affecting our coal facilities.

Future
No additional units. We've determined that the cost and technology risk of additional CCS units on coal are very high in comparison to other baseload generation options at this time. Additionally, CCS on coal can't meet the emissions targets as proposed in the Federal Government's draft *Clean Electricity Regulations*.

About
In 2014, the Boundary Dam Power Station near Estevan became the first commercial power station in the world to successfully use CCS technology. Burning coal creates power and creates CO_2 as a byproduct. CCS technology captures and stores that CO_2 before it reaches the atmosphere, reducing the negative impact on the environment. Coal with CCS technology is a reliable source of power, but the technology is expensive.

Carbon Capture and Storage (CCS) on Natural Gas

Current
None.

Carbon Intensity
Potentially less than 30 t/GWh.

Future
Possibly increasing. We're investigating CCS on natural gas as a supply option for 2033.

About
CCS on natural gas is a rapidly developing technology. Its goal is to capture CO_2 to prevent it from being released into the atmosphere. Instead, it's stored in underground repositories or used for enhanced oil recovery. CCS on natural gas isn't commercially available yet. Much of our extensive knowledge and experience on the BD3 CCS project can be transferred to implementing CCS on natural gas turbines. Natural gas is a cleaner burning fuel than coal and CCS on natural gas is expected to be more efficient.

Coal

Current
1389 MW from the Poplar River, Boundary Dam and Shand Power Stations.

Carbon Intensity
1100 t/GWh.

Future
None due to federal regulations which mandate the retirement of conventional coal power stations by Dec. 31, 2029.

About
A coal-fired power station creates power by burning coal. The coal is pulverized and then burned in a boiler, creating steam, which is then used to spin turbines that turn generators.

Flare Gas

Current
0.75 MW from the Flare Gas Power Generation Partner Program.

Future
Increasing. We'll be buying power from 4.7 MW of flare gas generation developed through our Power Generation Partner Program. We also signed a PPA to purchase 15 MW of flare gas generation from a project being developed by Flying Dust First Nation, in partnership with Capstone Power.

About
It's not uncommon to see flare stacks while driving down Saskatchewan's highways or grid roads. The flares are used by oil and gas production sites to dispose of unusable gases. Flare gas creates power by burning in a gas engine or turbine. Flare gas is a relatively dependable power source and is a cost-effective way to create power. Flare gas is considered carbon neutral as it uses waste energy from oil and gas production that would otherwise be emitted to the atmosphere.

Geothermal

Current
None.

Future
Possibly increasing. Currently, there are no utility-scale geothermal projects in Canada, but we're actively watching their development and have a PPA for five MW with Deep Earth Energy Production Corporation.

About
The further you travel toward the earth's core, the hotter it gets. Geothermal power generation passes hot water through a heat exchanger which produces steam and drives a turbine to produce power. Geothermal power produces no GHG emissions, but geothermal power facilities can't be built just anywhere. A reservoir with temperatures above 120°C is needed to proceed with a geothermal power station. Initial exploration shows the possibility of these reservoirs is greatest in southeast Saskatchewan.

Hydro

Current
864 MW from seven hydroelectric power stations.

Future
Possibly increasing. There are a few potentially feasible hydro projects in the province left to develop.

About
Hydro is our largest renewable energy source. It's made by flowing water that turns turbines to create power. Because power production relies on water flow, low water years can impact the power supply. However, it's considered a reliable source of power. Compared to other generation types, hydro has no direct waste and lower GHG emissions. At the same time, special care is needed for wildlife habitats and aquatic ecosystems and there is a lengthy regulatory approval process involved with these projects. There are two types of hydroelectric power plants:

- Reservoir stations store and manage water flow with a dam. Water flows through the dam and can be adjusted like a tap to generate the amount of power needed.
- Run-of-river stations have little or no storage. The water flows through a tube and produces electricity and is then sent back to the river. The amount of power that's produced depends on the river flow as well as the difference in height between the intake and the turbine.

Hydrogen

Current
None.

Future
Possibly increasing. We don't have any hydrogen generation now, but we're investigating when and if this technology might be a good fit for Saskatchewan.

About
Hydrogen can be generated from a variety of feedstocks and chemical processes. Most hydrogen is currently produced from natural gas. The key to making hydrogen carbon free is to use non-emitting power in electrolysis. Electrolysis of water is a proven method that produces hydrogen and oxygen, but it's expensive and requires a lot of power and water. Once the hydrogen is made, it can be transported and stored for use where and when energy is required. When the hydrogen is burned to create electricity, the only byproduct is water. Natural gas generators may be retrofit or replaced with hydrogen generators in the future.

Imports

Current
290 MW from PPAs with Manitoba Hydro.

Future
Increasing. We've issued a request for supply proposals (RFP) for up to 500 MW of power through the Southwest Power Pool. In the future, we may look to sign additional import contracts if it's more cost effective than building a project in Saskatchewan. Importing power requires the use of existing or new transmission infrastructure with our neighbours (interconnections). Power generated by coal is specifically excluded from the RFP.

About
There are two ways SaskPower imports power from our neighbours:

- Firm contracts. These are contractual obligations usually for hundreds of megawatts over several years. SaskPower's power purchase contracts for 290 MW of electricity with Manitoba Hydro are examples of firm contracts.
- Energy trading. These trades are over the immediate/short term. An example of energy trading is when SaskPower buys power from Alberta to cover a temporary shortfall.

Landfill Gas

Current
2.7 MW from projects in the landfills in Regina and Saskatoon.

Future
Possibly increasing.

About
Gases are produced within a landfill by anerobic decomposition. These gases consist mostly of methane gas which can be collected and burned in a micro-turbine to generate electricity. Methane is much more harmful to the environment than CO_2 so burning it is better overall for the environment.

Microgrids

Current
None.

Future
Increasing. A demonstration project has been developed and is scheduled to be implemented at Descharme Lake in the spring of 2024. We're investigating other opportunities, for example, a stand-alone mobile microgrid package is being procured for the purpose of evaluating other use cases.

About
Microgrids provide cost-effective, non-wires generation solutions for edge-of-grid and off-grid applications. A microgrid can integrate local generation and battery storage to improve reliability and reduce costs associated with traditional infrastructure when supplying low customer density requirements in remote regions. Local generation options including clean intermittent renewables and fossil fuel generation can be optimized to improve reliability and reduce costs and GHG emissions.

Natural Gas

Current
2065 MW from 10 natural gas facilities.

Carbon Intensity
360-550 t/GWh.

Future
Increasing. We're building the Great Plains Power Station (377 MW) in Moose Jaw's Industrial Park and the Aspen Power Station (370 MW) near Lanigan. We're also adding two 47-MW fast-acting simple cycle gas turbines – one at each of our existing Ermine and Yellowhead facilities.

About
Natural gas is a non-renewable energy source. Meaning once it's burned it's gone for good. Compared to coal, it produces about 50 per cent less GHG emissions. But because of its GHG emissions, natural gas will only be a temporary bridge to reaching net-zero GHG emissions from the power grid. Natural gas generates power by using the heat of combustion. There are two ways we can use this heat to make power:

- Simple cycle gas turbines use heat from burning natural gas to turn a turbine to create power. This fastest acting but higher emitting method is best when power use is at its peak, and for load following capability with renewables. (~500 t/GWh CO_2 emissions)
- Combined cycle gas plants reuse the exhaust heat from the gas turbine to make steam. This steam is used to turn another turbine to create additional power. Combined cycle plants are about 15 per cent more efficient. (~360 t/GWh CO_2 emissions)

Having natural gas in our power mix is required to enable additional renewables to further reduce GHG emissions. That's because power must be used in real time and natural gas generation is very fast acting, so on the days when wind is high, we won't run natural gas plants as much. But when it's not windy or sunny, natural gas generation can quickly take its place.

Nuclear

Current
None.

Future
Possibly increasing. Our small modular reactor (SMR) development project is in year three of an eight-year planning process to inform an investment decision to build our first SMR facility.

About
Nuclear power is made from the heat generated by splitting atoms into two or more parts. This process is known as fission. Uranium's often used because its atoms are easier to split apart than other elements. The heat from fission is used to turn water into steam. The steam is then used to spin a turbine and generator to produce electricity. SMRs are much smaller than traditional reactors used today. They're modular, which means they're built in a factory, brought to the power station site, and assembled. This modular design is one of the reasons SMRs are expected to be less expensive to build than traditional nuclear power projects. SMRs don't emit GHG emissions. The management and disposal of radioactive waste is a key consideration. The federal regulator in Canada is the Canadian Nuclear Safety Commission.

Other Storage

Current
None.

Future
Possibly Increasing. We're exploring storage technologies to see what specific technology might be right for us in the future.

About

Electricity storage is the capture of energy produced at one time for use later. It's typically used to capture energy from intermittent sources like wind or solar when demand is low. Then, it can be used later when demand is high. Energy storage technologies include technologies like batteries, compressed air facilities, and flywheels. Each of these different technologies vary in their size and scale, how the energy is stored, how long energy can be stored, how quickly or slowly they can be turned on and the amount of time they can supply energy for. Utility-scale storage options are expensive but are becoming more economical as technologies advance.

Solar

Current
30 MW from three solar facilities.

Future
Increasing. We're currently in the competitive process to add another 200 MW of solar power in south central Saskatchewan as well as another 118 MW through our industrial partners and the Power Generation Partner Program. That's on top of the 100 MW Iyuháná solar facility near Estevan.

About
Solar power uses panels to capture and generate energy from the sun. It's one of the cleanest technologies available, but it only works when the sun's shining. So, baseload and back-up sources of generation must be integrated with solar generation. Saskatchewan has some of the best solar resources in Canada but despite Saskatchewan's tremendous solar potential, the profile for solar doesn't align with how Saskatchewan customers use electricity. Unlike most American utilities and many in Canada, Saskatchewan is a winter peaking utility. That means that demand for electricity is greatest in the winter between 6-9 p.m., when the sun isn't shining. Recycling and extracting valuable metals from solar panels such as silicon and cadmium is a developing consideration we're watching.

Waste Heat

Current
20.8 MW from four waste heat facilities.

Future
Possibly increasing. We're interested in adding more waste heat power and will assess projects brought forward by Independent Power Producers so long as they're needed and competitive with other supply options in price and reliability.

About
Waste heat's all around us. It's the warm heat that comes from your air conditioner or when incandescent light bulbs get hot. The exhaust from industrial work is used to make waste heat. It's then collected and converted into power. Since we're capturing the heat that's being created, it's a dependable source of power. Waste heat is considered non-emitting since it uses waste energy from processes already in place.

Wind

Current
615 MW from eight wind facilities.

Future
Increasing. The 200 MW Bekevar Wind Facility is under construction and will be in service by the end of 2024. We're also currently in the competitive process to build an additional 400 MW of wind in south central Saskatchewan by the end of 2027.

About
Saskatchewan has an excellent wind resource. A wind turbine converts wind into electricity by turning the blades of a wind turbine to spin the generator in the same way as steam or water turbines. In North America, wind turbine blade recycling programs are developing and are expected to continue to grow. Wind turbines don't work well when there's no wind, too much wind (for safety reasons) or when it's too cold. Adding more wind facilities will help us meet GHG emissions goals but on its own wind won't be enough. It will need back up for calm days.

Consider using this space to record your thoughts before completing the Stage 4 Survey. Find the survey at the QR code or at saskpower.com/futuresupplysurvey.

NOTES

Our Power in Saskatchewan should be: _____.

Saskatchewan Power Corporation
2025 Victoria Avenue
Regina, Saskatchewan
Canada S4P 0S1
saskpower.com