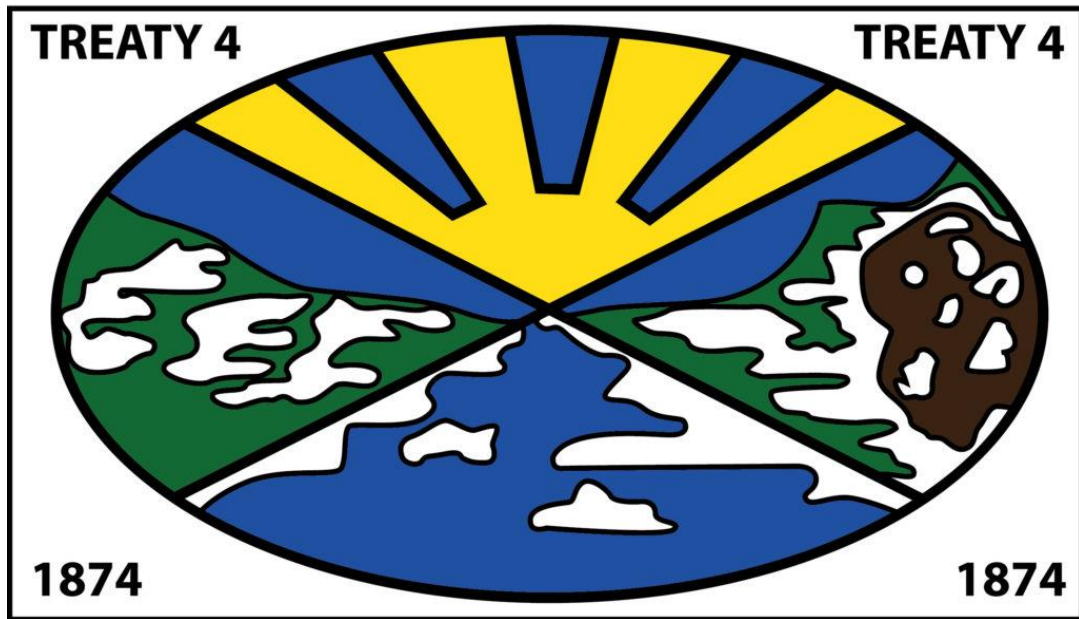




NUCLEAR POWER FROM

SMALL MODULAR REACTORS (SMRs)



SAFETY MOMENT

- Safety is part of everything we do.
- Today's webinar is a safe space to ask questions, express concern and/or show support.
- We need the feedback and input of the people we serve.
- Thoughtful questions drive productive discussion and better decisions.



Canadian Nuclear
Safety Commission

Commission canadienne
de sûreté nucléaire



NUCLEAR WASTE
MANAGEMENT
ORGANIZATION

SOCIÉTÉ DE GESTION
DES DÉCHETS
NUCLÉAIRES



Énergie NB Power

ONTARIO
POWER
GENERATION

**Where a brighter
tomorrow begins.**



WHY WE'RE HERE TODAY

- Why nuclear power, why now?
- Why not all wind and solar?
- What is an SMR?
- What about the waste?
- SMR project schedule
- Answer your questions
- Learn what's important to you
- Invite your feedback and input

POLL #1

- Please tell us where in Saskatchewan you're joining from today!

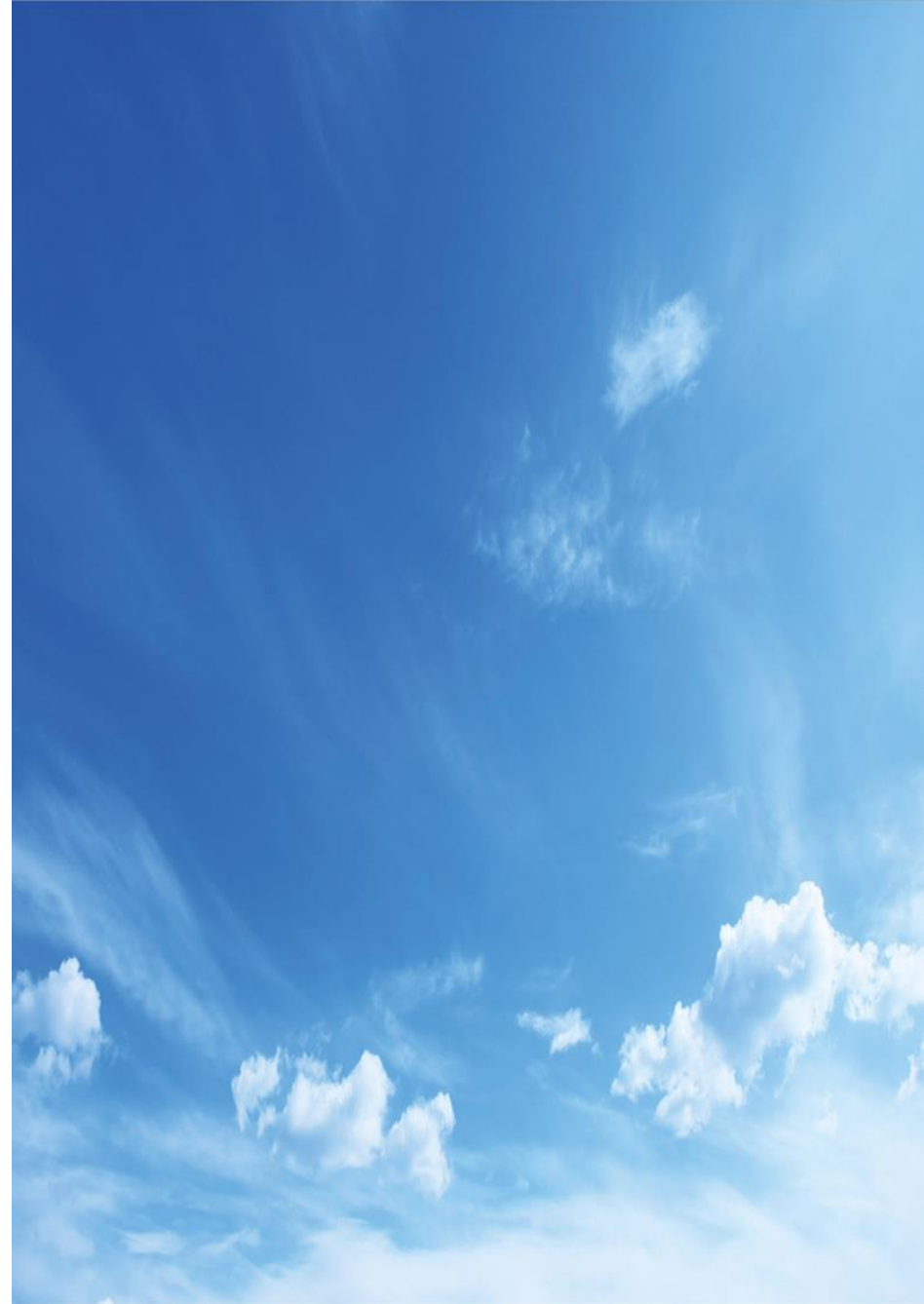


Why nuclear power, why now?

WHY NUCLEAR POWER AND WHY NOW?

- Studied nuclear power since the early 1970s
- Large reactors not feasible
- SMR technologies advancing, better fit for small grids like Saskatchewan's
- Climate change driving the need to decarbonize energy systems
- Mandated phase out of conventional coal; increasing carbon price on natural gas

We'll need all low or no emissions options to tackle climate change and achieve net zero emissions as quickly as possible



PLANNING FOR NET ZERO EMISSIONS

Options available before and after 2030

- **Small scale options**
 - Geothermal, biomass, energy storage
- **Options that require back-up generation**
 - Wind, solar
- **Available baseload options**
 - Natural gas, hydro, strengthened regional interconnections, carbon capture and storage (CCS) on coal

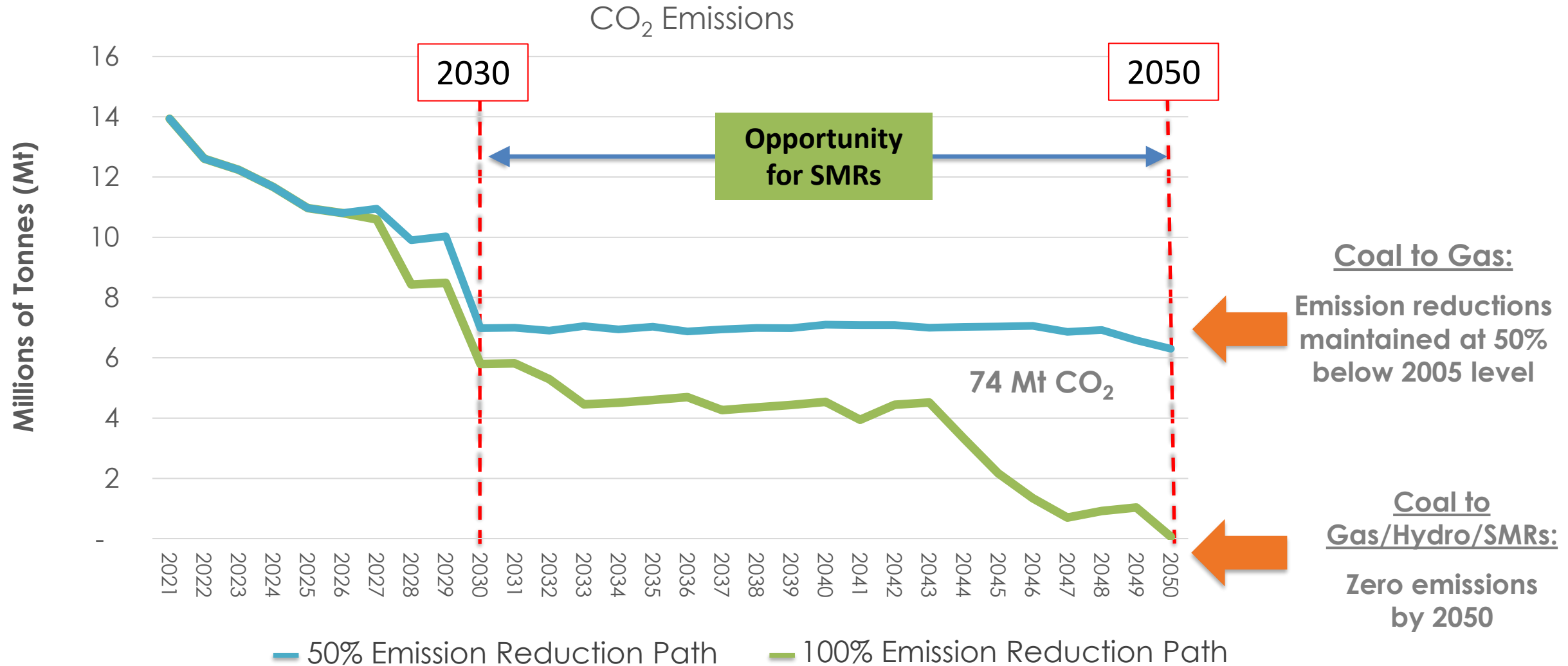
Options available in the 2030s onward

- Wind, solar + storage
- Hydrogen
- Nuclear power from small modular reactors (SMRs)



GAS/SMRS/RENEWABLES

AVOIDS 74 MT OF GHG EMISSIONS BETWEEN 2027 AND 2050



POLL #2

How important is it *to you* that SaskPower achieves net zero emissions from the power system?

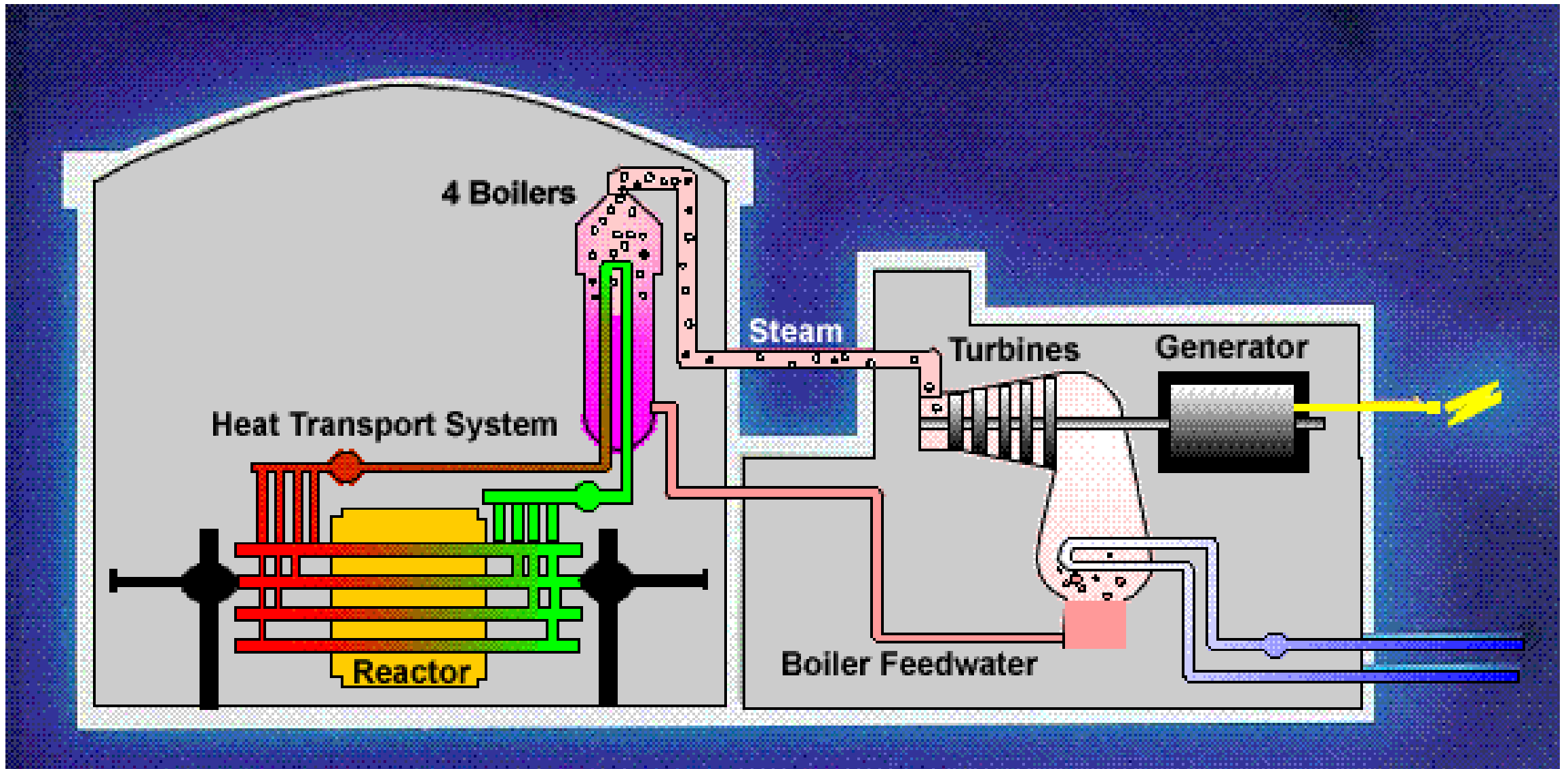
- Very important
- Somewhat important
- Not important at all



How Nuclear Power Works

What is an SMR?

HOW A NUCLEAR POWER PLANT WORKS



Darlington Nuclear Generating Station
3,500 MW, Lake Ontario
70 km east of Toronto



ONTARIO
POWER
GENERATION

Where a brighter
tomorrow begins.

SMRs ARE A GOOD FIT FOR SMALLER GRIDS

Small = 50-300 MWe per unit	<ul style="list-style-type: none">• Better fit for smaller grids/ serve incremental load
Lower capital cost	<ul style="list-style-type: none">• Reduces financial risk
Modular construction	<ul style="list-style-type: none">• Should result in less risk to project cost/schedule
Strong safety case	<ul style="list-style-type: none">• Emerging designs, enhanced safety features



CANADA'S SMR ACTION PLAN – THREE TECHNOLOGY STREAMS

STREAM 1

ON-GRID (NEAR-TERM)

- GE-HITACHI – Boiling Water Reactor
- X-ENERGY – High Temperature Gas Reactor
- TERRESTRIAL ENERGY – Molten Salt Reactor

STREAM 2

ON-GRID (NEXT GENERATION)

- ARC CANADA – Sodium Cooled Fast Reactor
- MOLTEX ENERGY – Stable Salt Reactor

STREAM 3

OFF-GRID (REMOTE)

- GLOBAL FIRST POWER – 5 MW Very Small Modular Reactor (vSMR)
- WESTINGHOUSE – 5 MW Very Small Modular Reactor (vSMR)

John Gorman, President
Canadian Nuclear Association

"SMRs are to large reactors
what desktops were to
mainframe computers in
the 1980s."



ECONOMIC BENEFITS

SMR development in Saskatchewan could:

- Generate \$1.6 billion in GDP,
- \$944 million in wages; and
- \$526 million in taxes between 2021 and 2032.
- Generate about \$8.8 billion in GDP over the life of an SMR fleet.
- Offset economic losses from phase out of conventional coal.
- Reduce reliance on electricity from natural gas (carbon price risk).
- Support aggressive deployment of wind/solar.




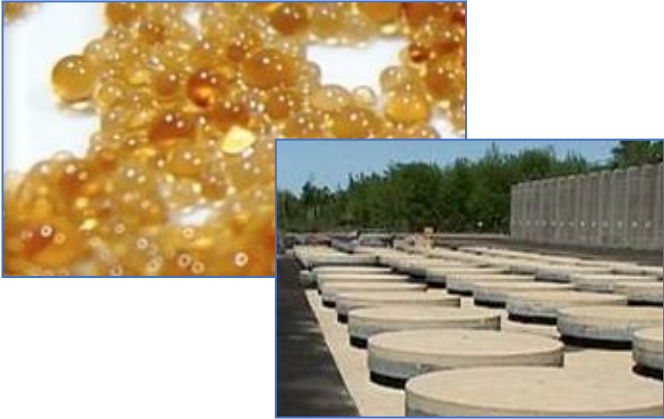
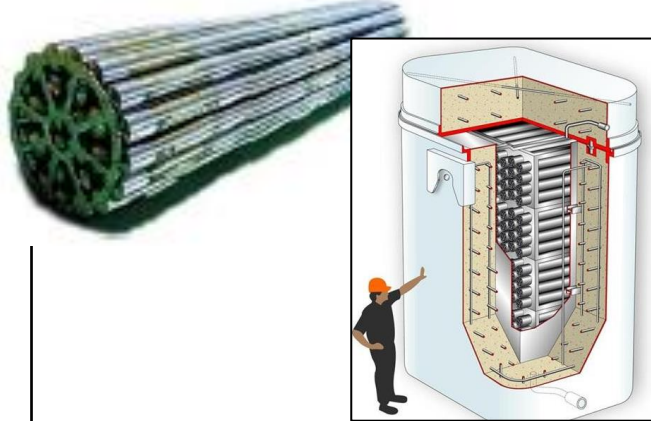
KEY REQUIREMENTS FOR SMR DEVELOPMENT IN SASKATCHEWAN

- National SMR fleet
- Utility partnerships
- Successful first-of-a-kind deployment in Canada
- Indigenous participation
- Federal risk sharing
- Competitive power price



What about used nuclear fuel and nuclear waste?

MANAGEMENT OF NUCLEAR WASTE

Low-level	Intermediate-level	High-level
<p>Clothing, mops, rags, paper, plastic, wood</p>  <p>The image shows various items of low-level nuclear waste: a yellow mop bucket with a mop, a red hard hat, a pair of white gloves, a hammer, and a large stack of papers and some plastic waste.</p>	<p>Resins, filters, used reactor components</p>  <p>The image shows two types of intermediate-level waste. On the left is a close-up of yellow, granular resin beads. On the right is a photograph of several large, cylindrical concrete drums, which are used for storing used reactor components.</p>	<p>Used fuel (spent uranium)</p>  <p>The image shows two representations of high-level nuclear waste. On the left is a photograph of a single spent nuclear fuel rod, which is a long, cylindrical metal object with a green, crystalline structure. On the right is a diagram of a fuel assembly, showing a cross-section of a reactor core with a worker standing next to it for scale.</p>

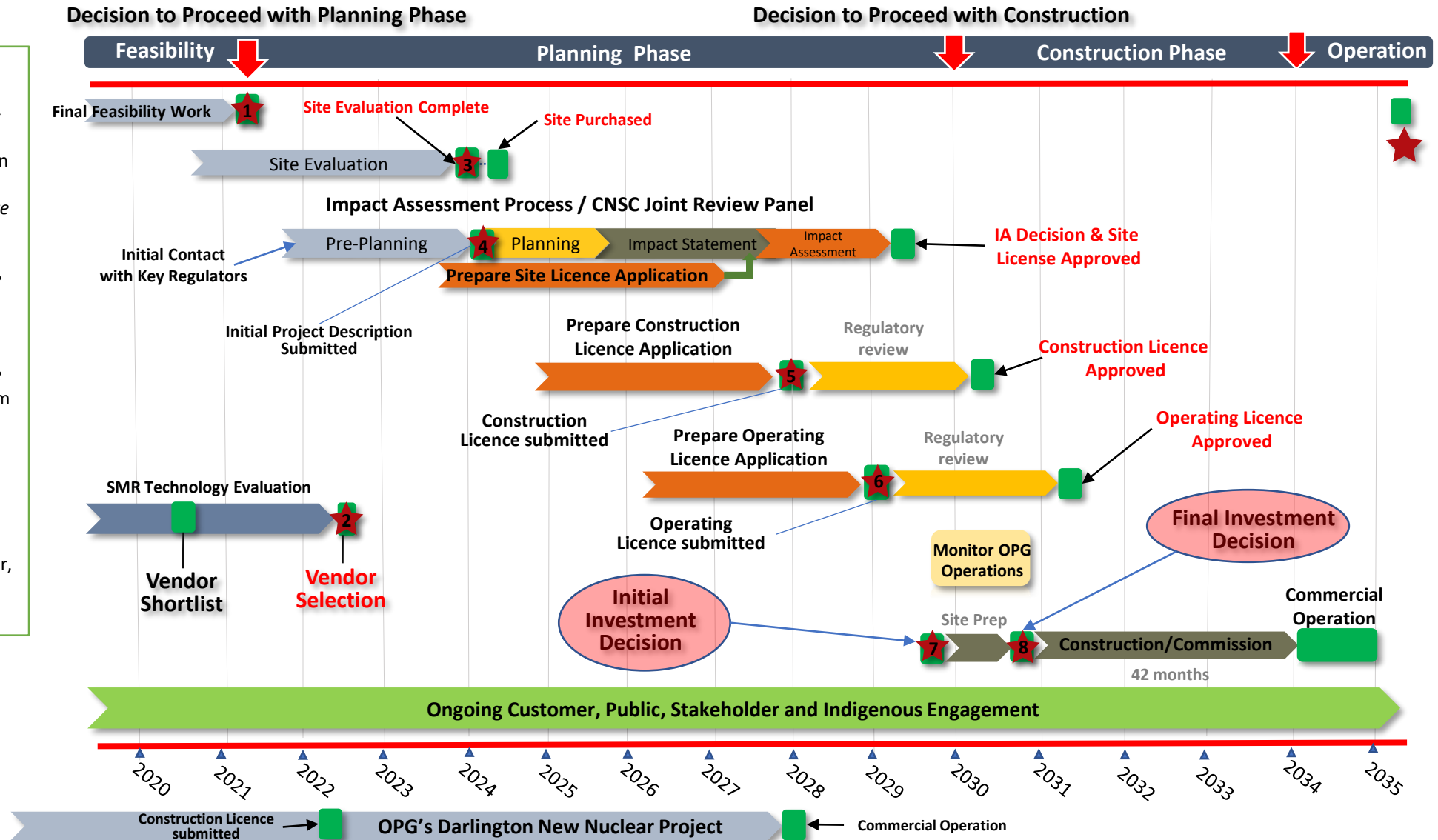
REGULATORY RIGOR FOR SAFE, LONG-TERM USED FUEL & WASTE MANAGEMENT



Planning phase activities and milestones

SaskPower SMR Project Schedule, Milestones and Key Decisions

Updated: October 2021



- Planning Phase includes:**
- SMR site selection;
 - SMR technology down-selection;
 - Preparation, submission and approval of a *License to Prepare a Site* from the CNSC;
 - Preparation and submission of a *License to Construct* an SMR from the CNSC;
 - Preparation and submission of a *License to Operate* an SMR from the CNSC;
 - Environmental, social, economic and Indigenous impact assessment; and
 - Extensive and ongoing Indigenous, stakeholder, customer and public engagement.

SITING CONSIDERATIONS



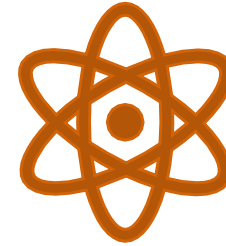
Environment



Indigenous
Knowledge



Land Use



Technical



Cost



Feedback & Input

Questions and discussion

PublicConsultation@saskpower.com

JOIN THE CONVERSATION

- Sign up for our SMR E-Newsletter
- Take our online survey
- More SMR information sessions in Winter 2022
- SMR siting engagement phase mid-2022
- [SMRs – Planning and Development Phase \(saskpower.com\)](https://saskpower.com)
- Net Metering Program & Distributed Energy Strategy (Winter 2022)
- Understanding the Power Grid (Winter 2022)



POLL #3

I know more about nuclear power and SMRs than I did before today.

- Strongly agree
- Agree
- Disagree
- Strongly disagree



WE NEED YOUR FEEDBACK

- Your feedback on what we shared today.
- What questions do you have?
- How would you respond if we told you your community might look like a good place for an SMR?
- How do you want to exchange information?
- What do you know that can help?



RESOURCE LINKS

- [Canadian Nuclear Safety Commission](#)
- [Impact Assessment Agency of Canada - Canada.ca](#)
- [The Nuclear Waste Management Organization \(NWMO\)](#)
- [A Next Step | \(radwasteplanning.ca\)](#)
- [World Nuclear Association - World Nuclear Association \(world-nuclear.org\)](#)

