PLANNING A SUSTAINABLE POWER FUTURE

THE POTENTIAL ROLE OF SMRs

Presented to the Saskatchewan Industrial & Mining Suppliers Association (SIMSA)

Wednesday, March 24, 2021

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Generation Asset Management & Planning

SaskPower

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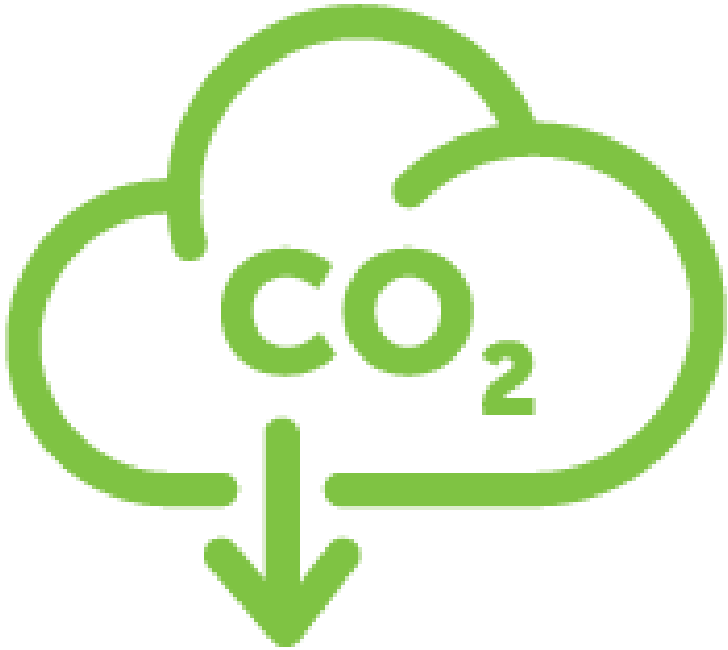
TODAY'S OUTLINE

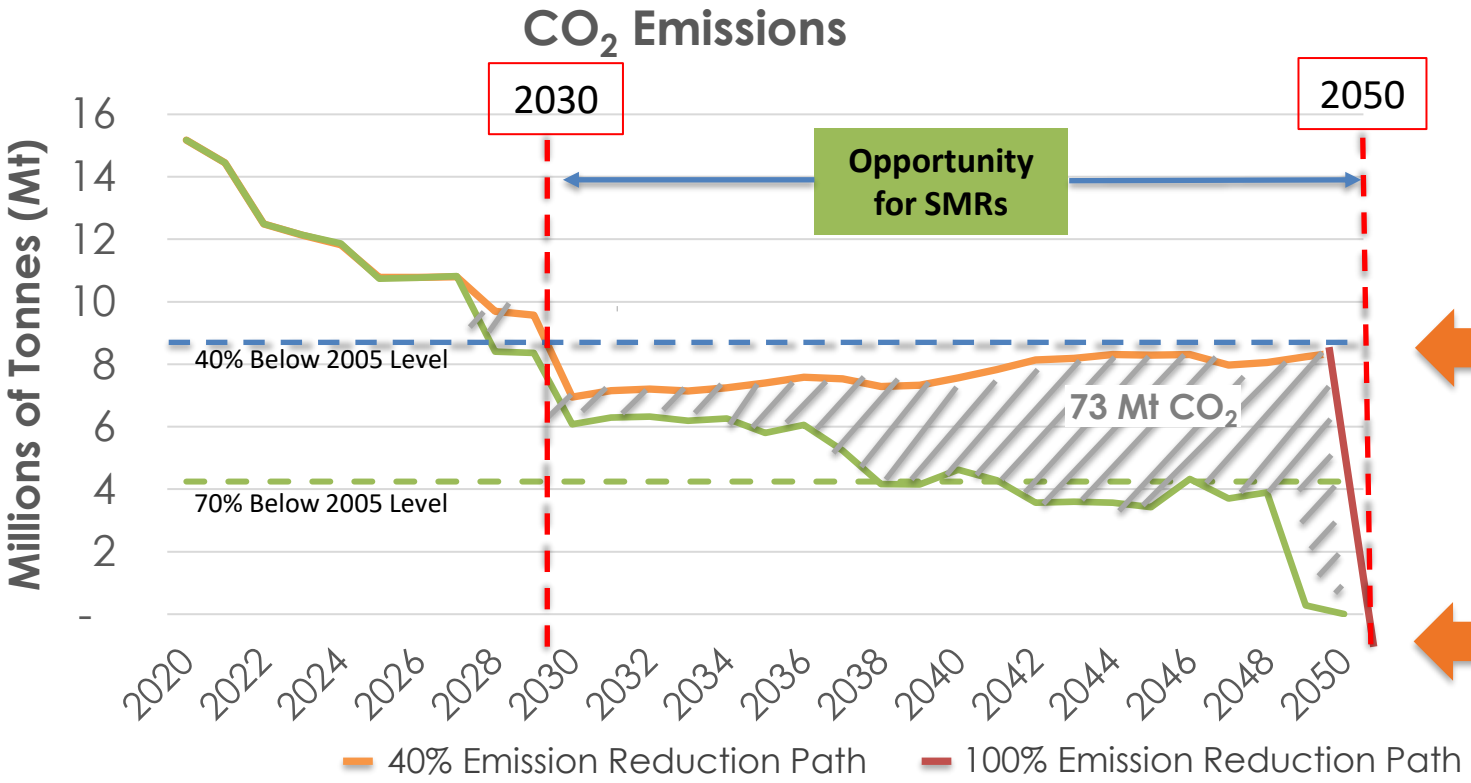
- Why evaluate SMRs?
- SMR planning phase update
- Decision timeline

TRANSITIONING THE PROVINCE'S POWER SYSTEM

- Saskatchewan's economic strength depends on clean, reliable, competitively priced electricity
- SaskPower is evaluating clean power sources to achieve net zero emissions by 2050



DEEPER CUTS TO GHG EMISSIONS



Coal to Gas:

Emission reductions maintained at 40% below 2005 level

Coal to Gas/Hydro/SMRs:

Zero emissions by 2050

OTHER LONG-TERM BENEFITS OF SMRS FOR SASKATCHEWAN

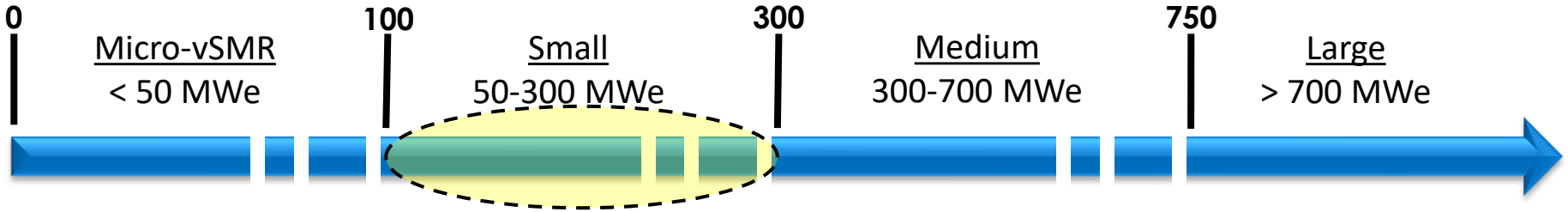
- Conference Board of Canada study: SMRs could generate $1.6 billion in GDP for SK between 2021-2032 and approximately $8.8 billion over the 85-year life of an SMR fleet
- Could offset economic losses from Federal phase out of conventional coal
- Could reduce reliance on electricity from natural gas (carbon price risk)
- Could support aggressive deployment of wind/solar

KEY REQUIREMENTS FOR SMR DEPLOYMENT

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

NUCLEAR POWER FROM SMALL MODULAR REACTORS (SMRs)

- **Small**: 50-300 MWe per generating unit, smaller footprint which makes them a better fit for smaller power grids
- **Modular**: units designed to be made in a factory and delivered to project site for assembly, which reduces costs and risks to schedule
- **Reactor**: nuclear fission reactor; installed underground, which is one of the many enhanced safety features



EXAMPLES OF SMR DESIGNS

GE-Hitachi	BWRX-300	Boiling Water Reactor	Ontario/Saskatchewan OPG/SaskPower
Xenergy	Xe-100	High Temperature Gas Reactor	Ontario/Saskatchewan OPG/SaskPower
Terrestrial Energy	Integral Molten Salt Reactor	Molten Salt Reactor	Ontario/Saskatchewan OPG/SaskPower
ARC Canada	ARC-100	Sodium Cooled Fast Reactor (100 MWe)	New Brunswick NB Power
Moltex Energy	Stable Salt Reactor	Molten Salt Reactor (300 MWe – scalable)	New Brunswick NB Power
Global First Power	MMR	vSMR (5 MWe)	Ontario OPG/CNL
Westinghouse	eVinci	vSMR (5 MWe)	Ontario Bruce Power

MICRO OR VERY SMALL MODULAR REACTOR (VSMRs)

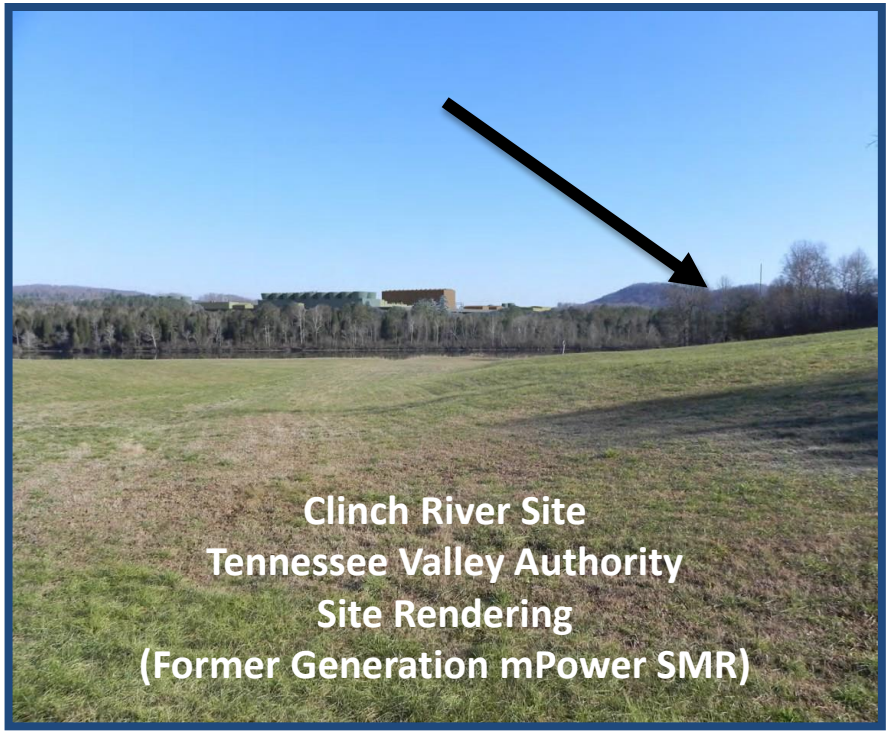
- Reliable, clean power for remote communities, mine sites
- ~5-50 megawatts
- Some designs have 20-year fuel cycle

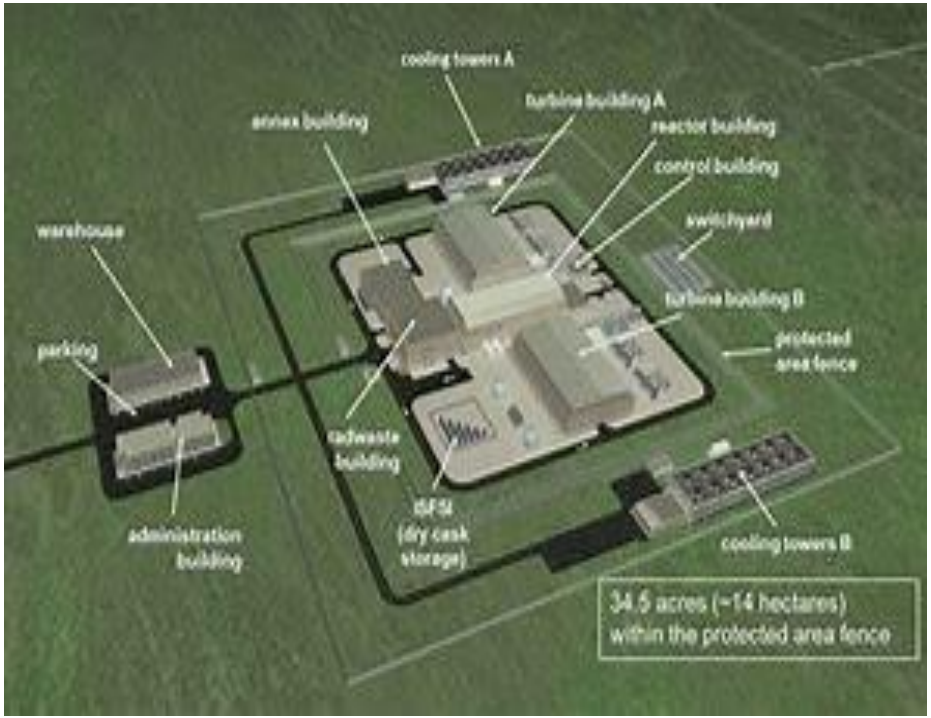
Ultra Safe Nuclear Corporation
Idaho National Labs Micro Modular Reactor Project

FOOTPRINT OF A LARGE REACTOR FACILITY

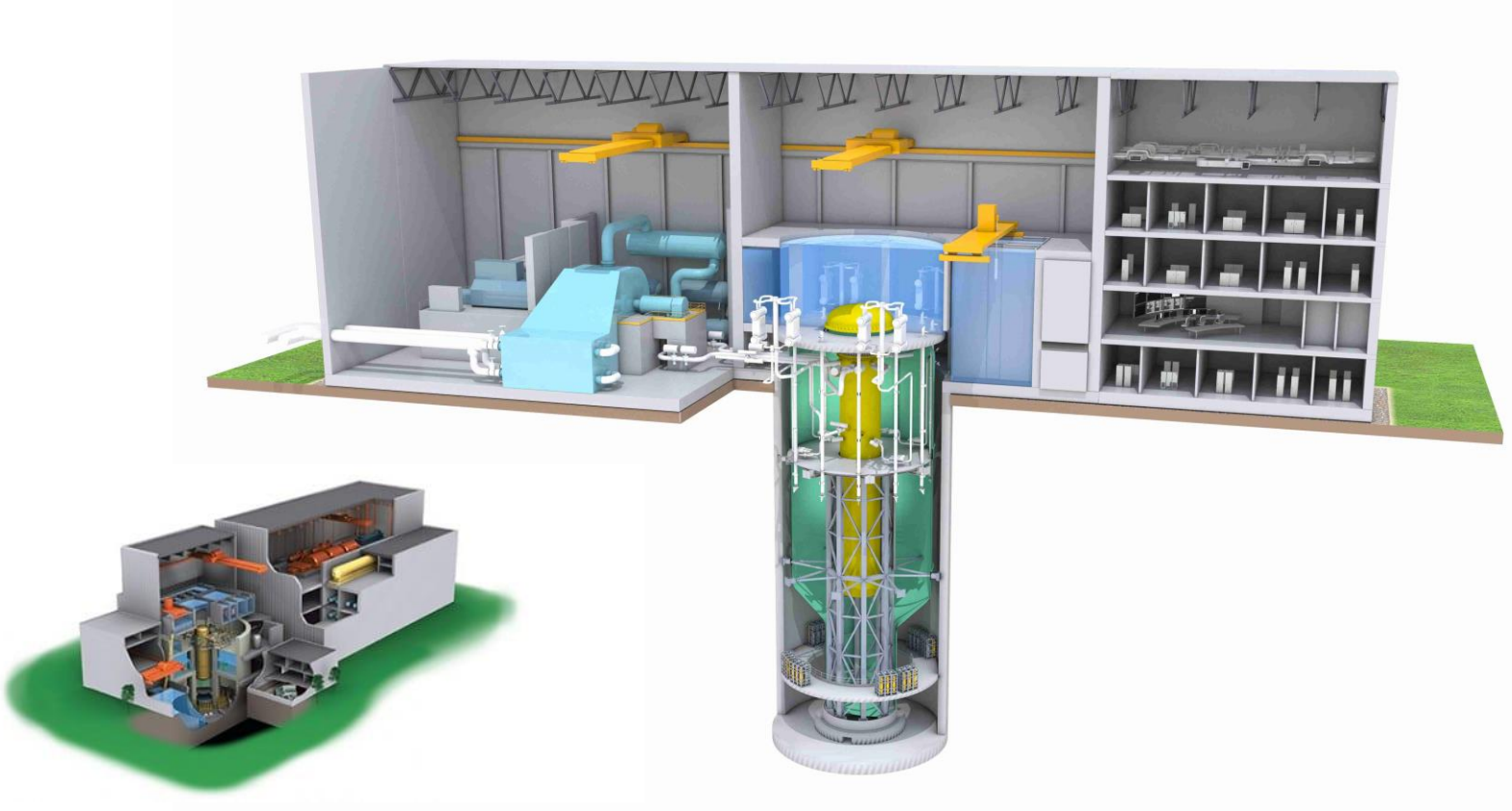
Darlington Nuclear Generating Station (Photo Courtesy of Ontario Power Generation)

WHAT AN SMR FACILITY COULD LOOK LIKE





UTILITY SCALE SMR – BWRX-300 SMR



SMR PLANNING PHASE WORK UNDERWAY

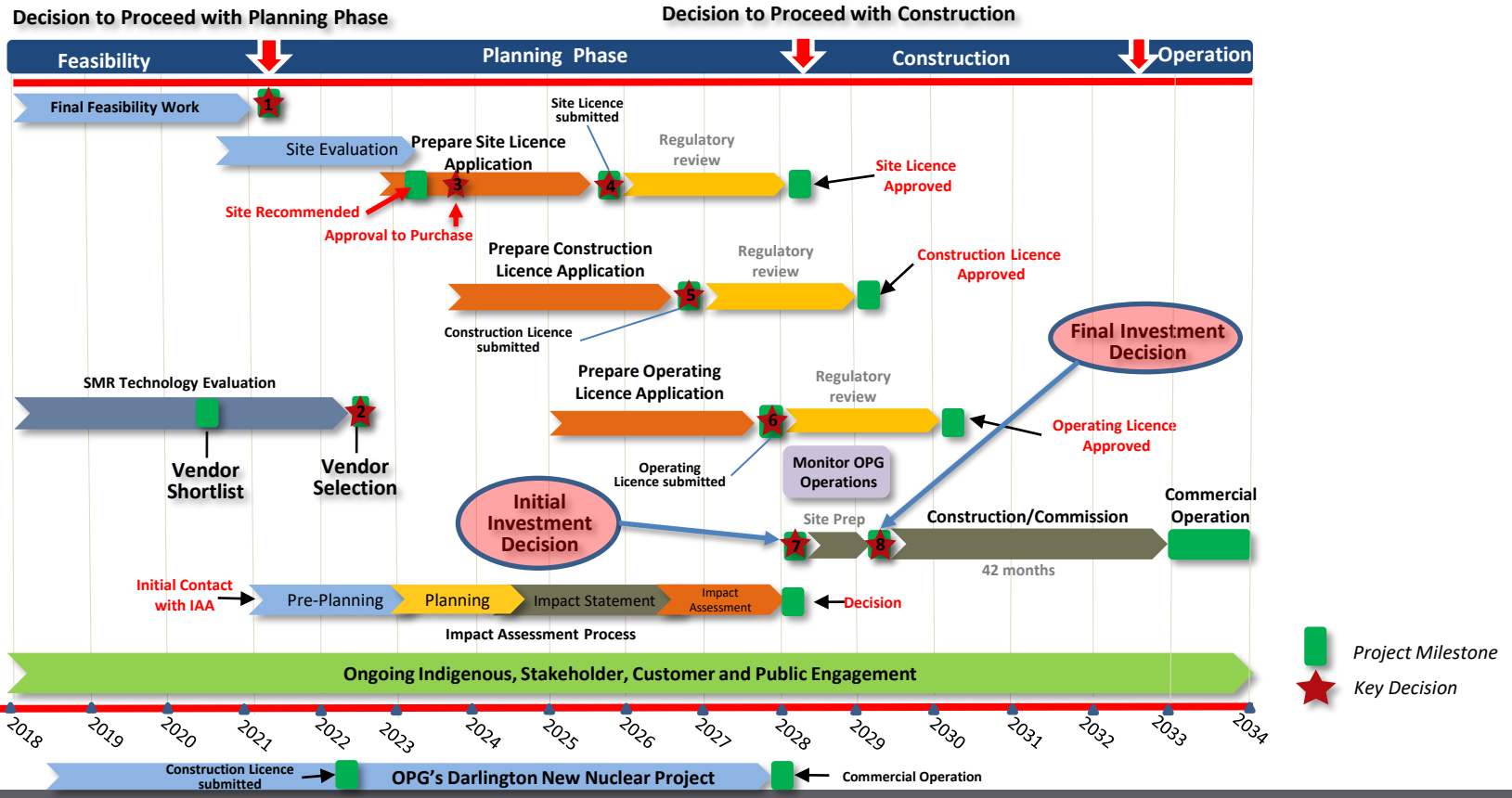
- Site selection
- Technology selection
- Preparation, submission and approval of a License to Prepare a Site from the Canadian Nuclear Safety Commission (CNSC);
- Preparation of a Licence to Construct from the CNSC;
- Impact Assessment work;
- Extensive Indigenous, stakeholder, customer and public engagement; and
- Evaluation of potential business models and business case

PLANNING PHASE MILESTONES

Draft updated: January 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 *Licence to Construct* an SMR from the CNSC;
- Preparation and submission of a *Licence to Operate* an SMR from the CNSC;
- Environmental, social, economic and Indigenous impact assessment; and
- Extensive and ongoing Indigenous, stakeholder, customer and public engagement.



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THANK YOU!
Email your questions to:
PublicConsultation@saskpower.com

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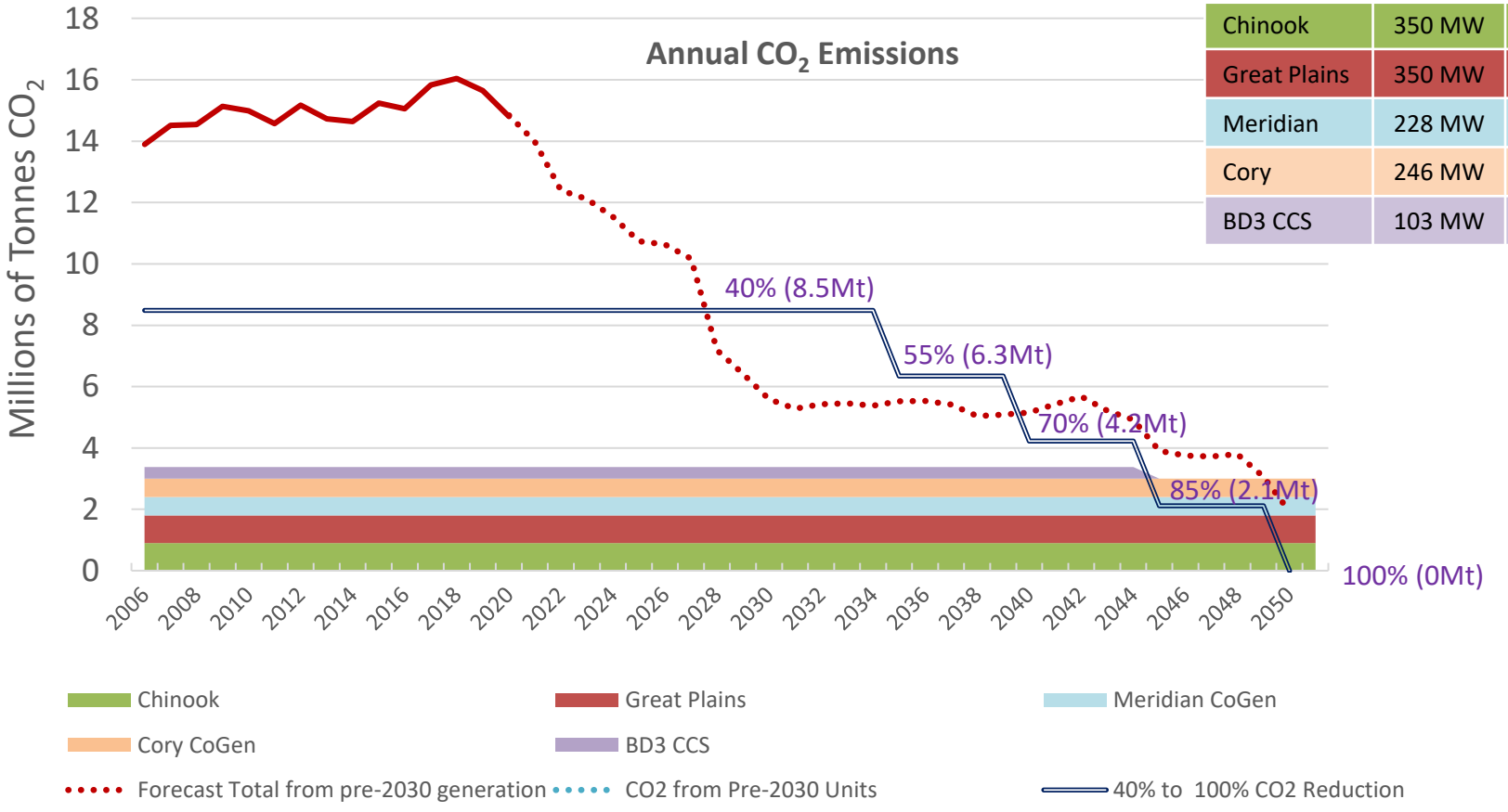
FORECASTED EMISSIONS PERFORMANCE

Facility	Net Capacity	Annual Emissions
Chinook	350 MW	0.9 Mt
Great Plains	350 MW	0.9 Mt
Meridian	228 MW	0.6 Mt
Cory	246 MW	0.6 Mt
BD3 CCS	103 MW	0.3 Mt



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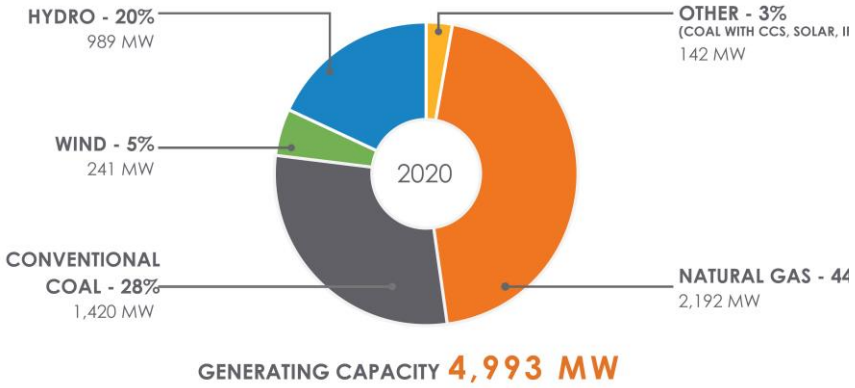
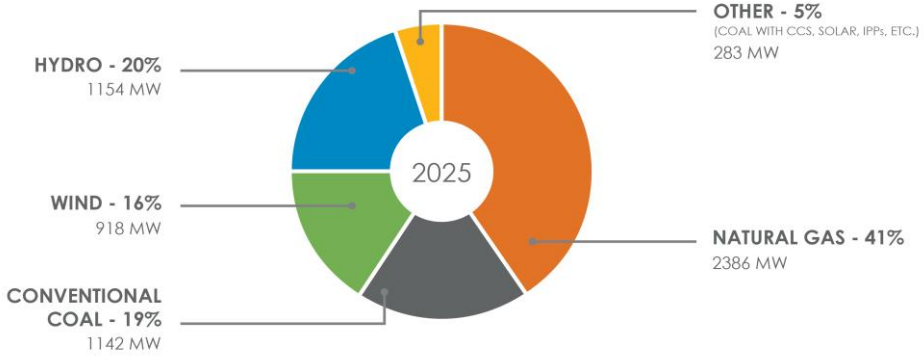
TRANSITIONING THE PROVINCE'S POWER SYSTEM



GENERATING CAPACITY **4,993 MW**



GENERATING CAPACITY **5,883 MW**