




Carbon Capture Storage Initiatives *Regulations & Permits – Progress with Confidence*  **SaskPower**

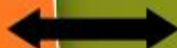
Welcome to Saskatchewan

- 473,000 customers
- 150,000 km of T&D lines
- 3,513 MW generation

100 MW



300 MW



150 MW



2010 GROSS ELECTRICITY SUPPLIED – 20,759 GWh

COAL 58%

GAS 18%

HYDRO 19%

WIND 2%

IMPORTS 2%

OTHER 1%



- Installed in 1969
- Comprised of 6 units
- Present output 140 MW/s

- Emissions 1.1 m tonnes CO₂ / year
- Construction of CO₂ and SO₂ capture facility underway
- Refurbished Unit #3 operational Q1, 2014

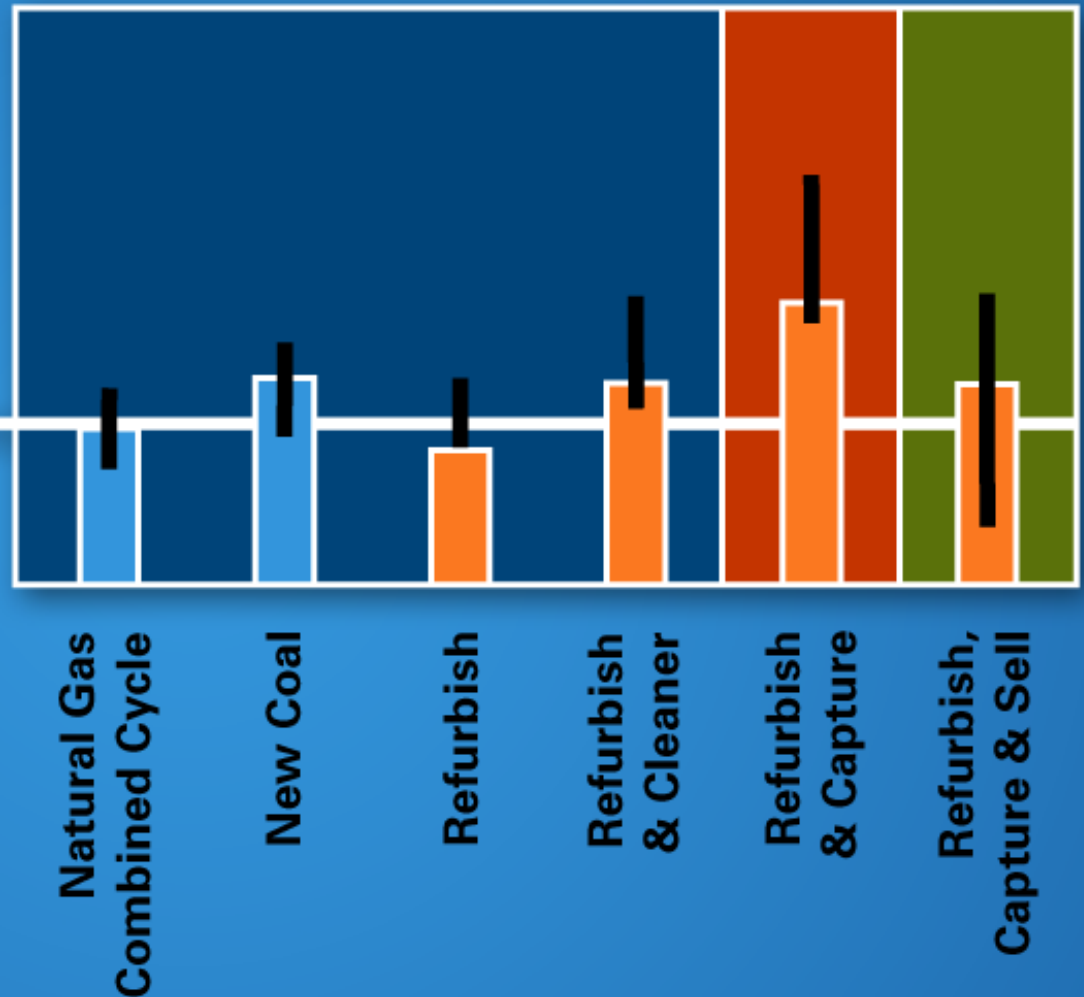
Deliverables



1. **Life Extension** - refurbish Unit 3 for thirty more years of operation
2. **Performance Upgrades** – improve emissions control and efficiency
3. **CCS Technology** – apply technology that prepares for new regulations
4. **Competitive Cost** – operate at or below combined cycle natural gas
5. **In-Service** – Q1 2014

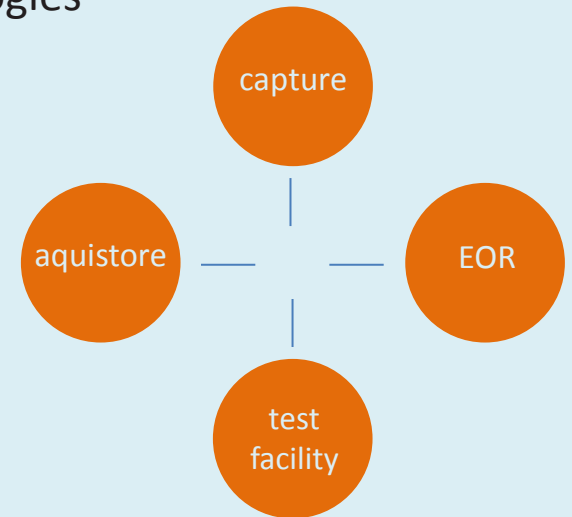
Cost of Electricity

Baseline is cost of new natural gas generation.

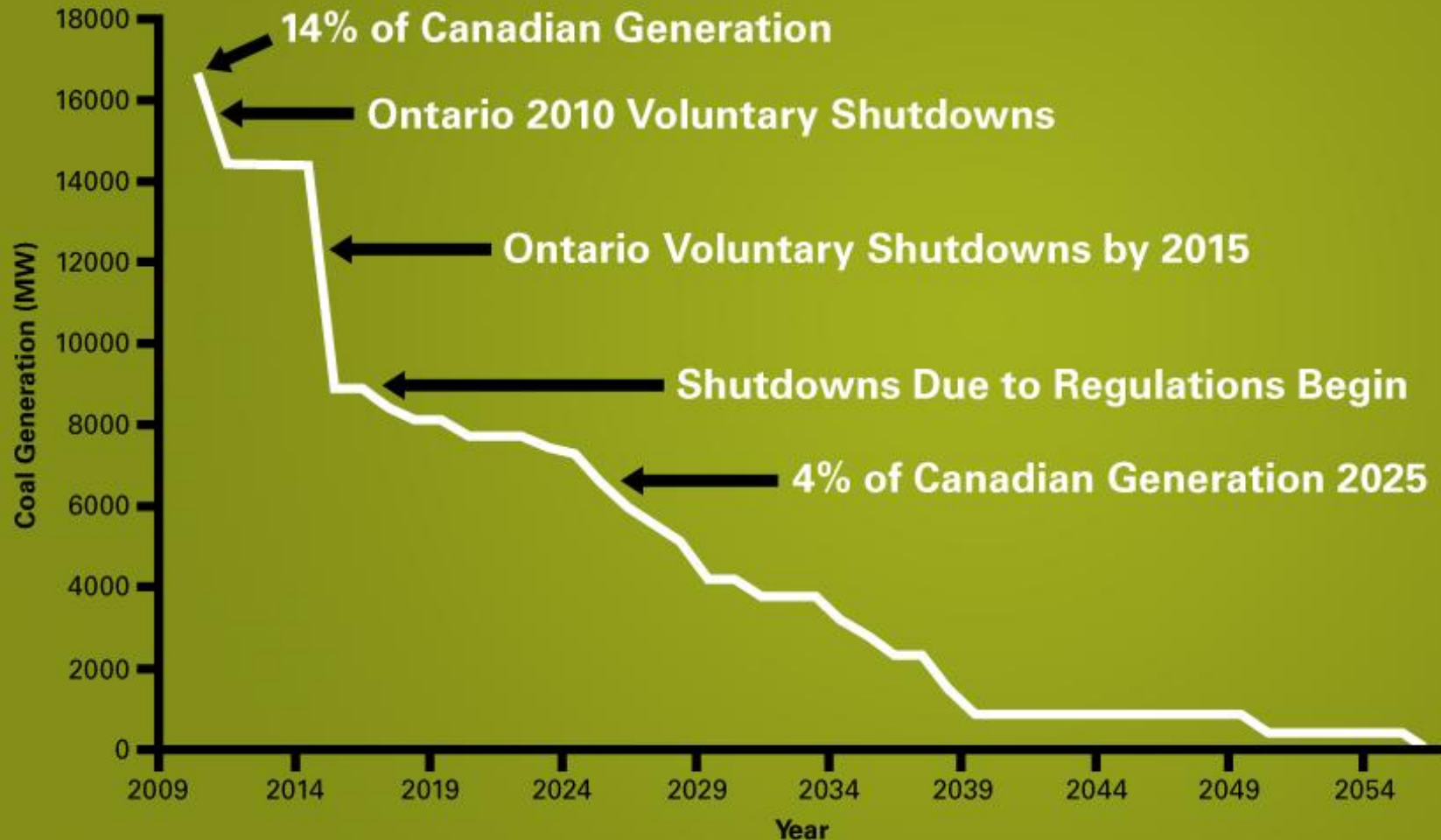


Key Initiatives

- Capturing CO₂ & SO₂
- Selling CO₂ for Enhanced Oil Recovery (as well as SO₂ + Fly Ash)
- Storing CO₂ in Aquistore
- Providing a Test Facility for advancing new capture technologies



Coal Generation in Canada – The Decline



Regulations Have Arrived!

- Years of talk about looming Green House Gas regulations
 - Our conventional coal plants emit ~1,100+ tonnes/GWh
- Aug 2011, federal government published proposed regulations
- Sep 2012, federal regulations announced limiting CO₂ emissions
 - Limit of 420 tonnes CO₂/GWh (clean as natural gas combined cycle)
 - Existing units must comply at ~50 years of age or shut down
- BD3 ICCS will emit 140 tonnes/GWh (up to 90% capture)

More Regulations Coming?

- **Provides certainty**, even if one doesn't always like the restrictions
- **Draft Saskatchewan Climate Change regulation**
 - Cap and cut system to reduce GHGs by 20% below 2006 levels by 2020
 - Targets large emitters that release 50,000 tonnes or more per year
 - Province seeking equivalency agreement with federal government
 - A challenge to link federal CO₂ intensity based system with provincial cap and cut system
 - To be finalized in Spring 2013
- **Multiple Government bodies**
 - Environment Canada
 - Ministry of Environment & Environmental Assessment Branch + Industrial Branch
 - Integrated Water Saskatchewan Group
 - Health Canada
 - Natural Resources Canada

Permits, Permits & Permits

- **Most of our permit applications are requests to amend our Operational permit**
- **Hundreds of moving parts, dozens of applications and amendments**
 - Change In Operations
 - Hazardous Substances, Waste, Dangerous Goods
 - Construction
 - Air Emissions
 - Water Allocation
 - Ash Lagoon Use change
 - Effluent discharges
 - Storing CO₂
 - Waste water transfer and disposal
 - Transporting captured CO₂
 - Quality Control (equipment , materials, work procedures)

Challenges

- **Legacy Issues & a Can of Worms**

- Need for additional water allocation on BD3 resulted in having to resubmit applications for water needs on all our plants drawing from same Water Shed


- **Do it Again for the Very First Time**

- Need to resubmit permit information for amine degradation product emissions for second review
- Worked with Ministry of Environment to adopt Norwegian Standards

- **Make Sure Everyone's Invited to the Wedding**

- Getting the right information to the right people to obtain needed permits



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