

Carbon Capture & Storage (CCS)

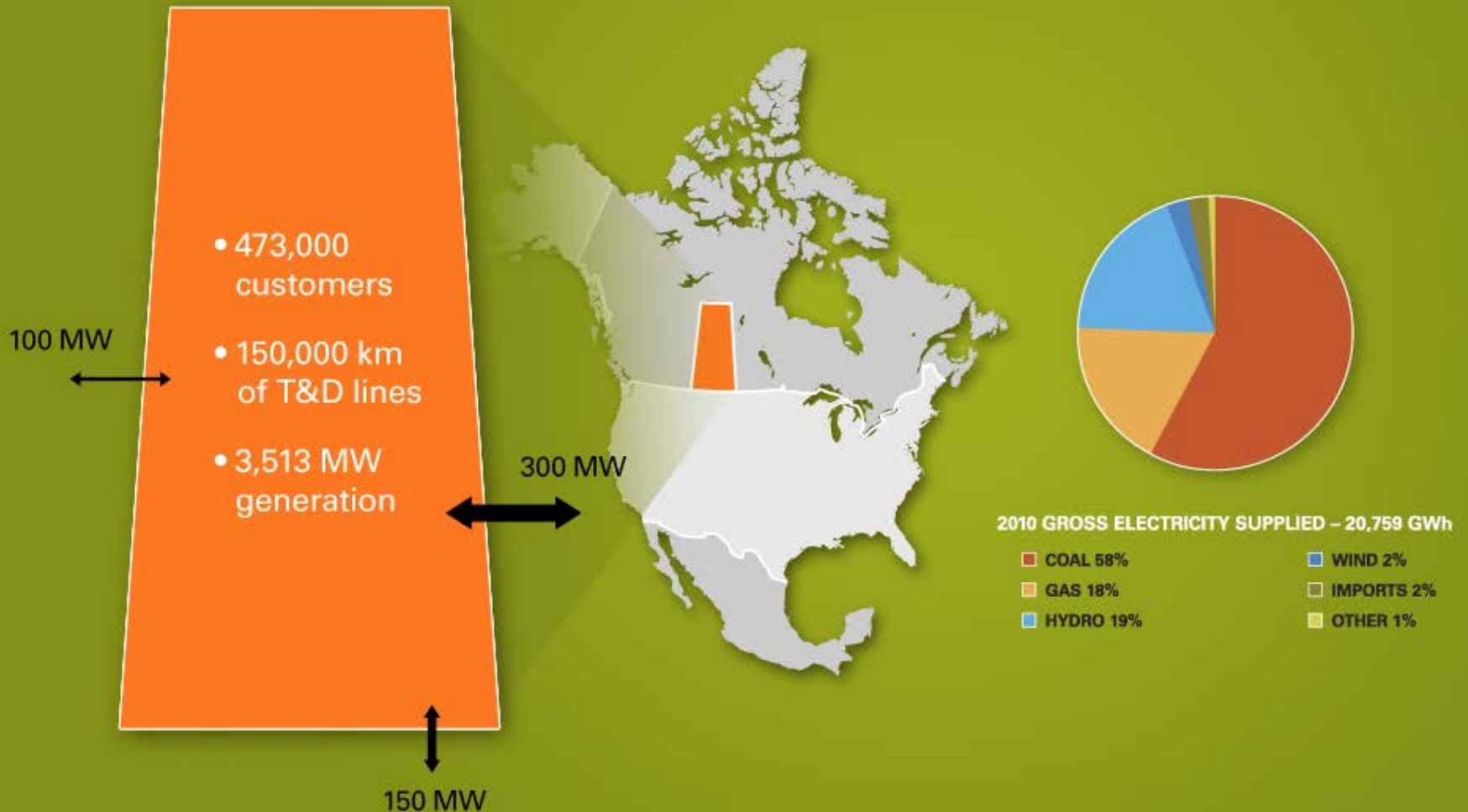
The Boundary Dam Story



Presented by **Michael J. Monea, Vice President, Integrated Carbon Capture & Storage Projects, SaskPower**

 **SaskPower**
Powering the future

Welcome to Saskatchewan

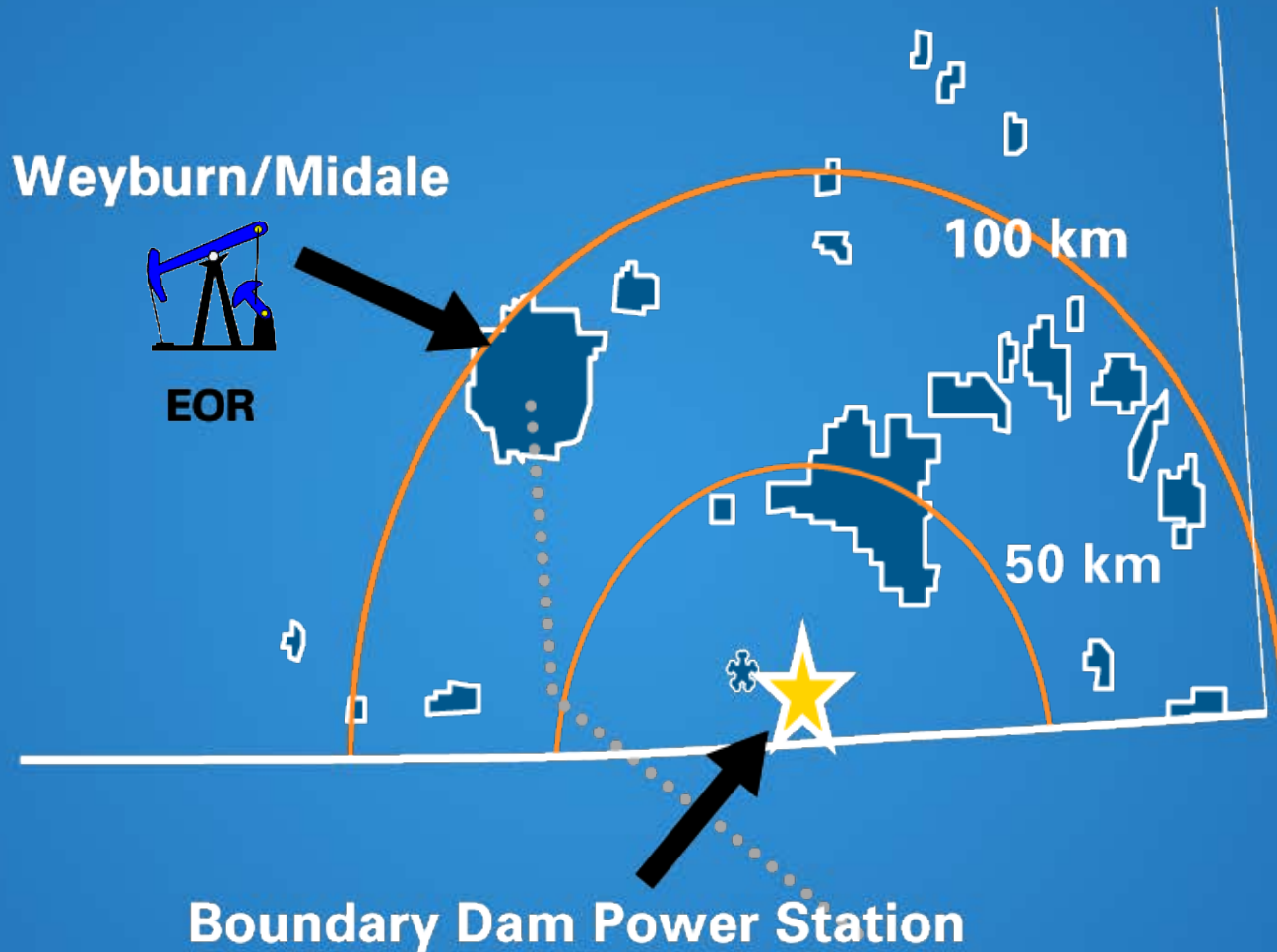


SaskPower's Carbon Capture and Storage Objectives

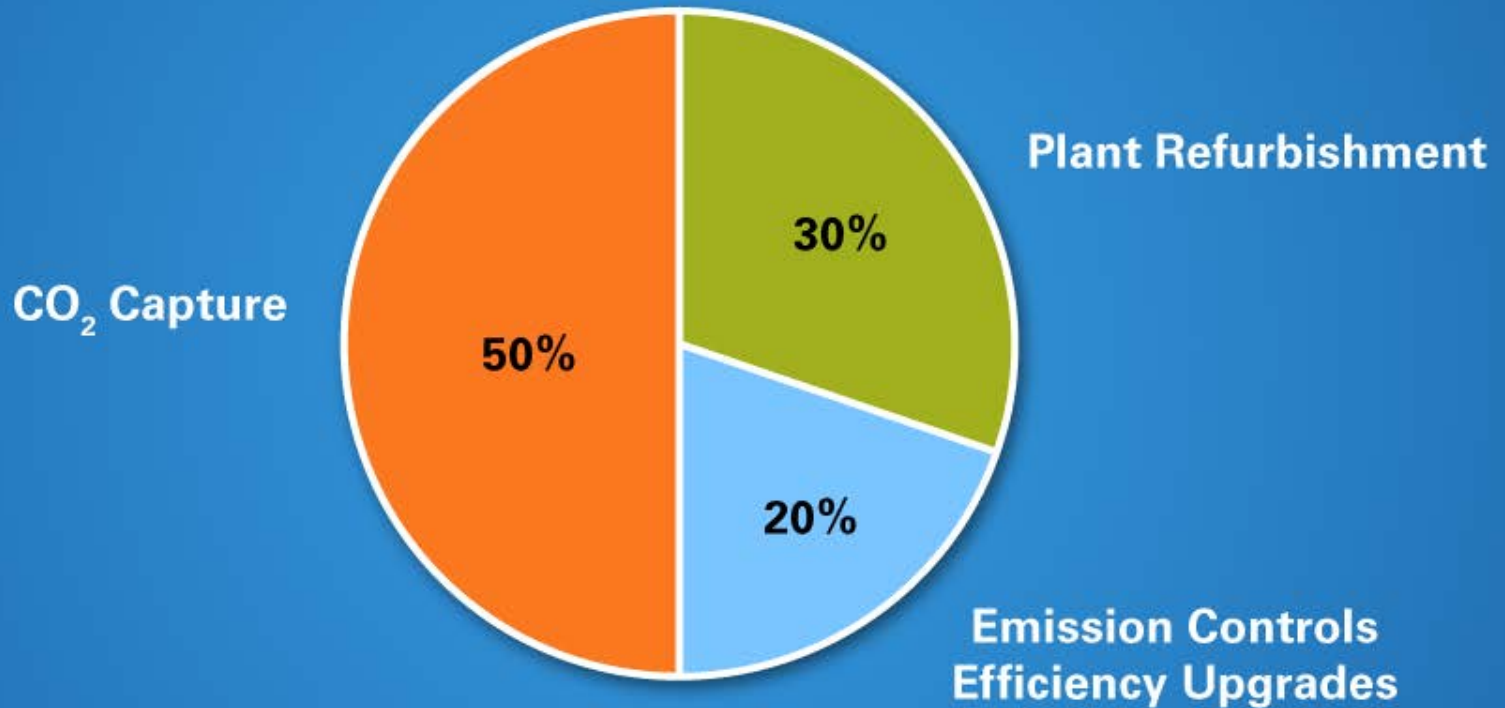


- Minimize future customer cost increases related to emissions regulations.
- Develop economically and environmentally sustainable electricity supply options through coal.
- Ensure cost of electricity is lower than other available options to be viable in long term.

Boundary Dam ICCS Demonstration



Boundary Dam Project Capital Cost Breakdown



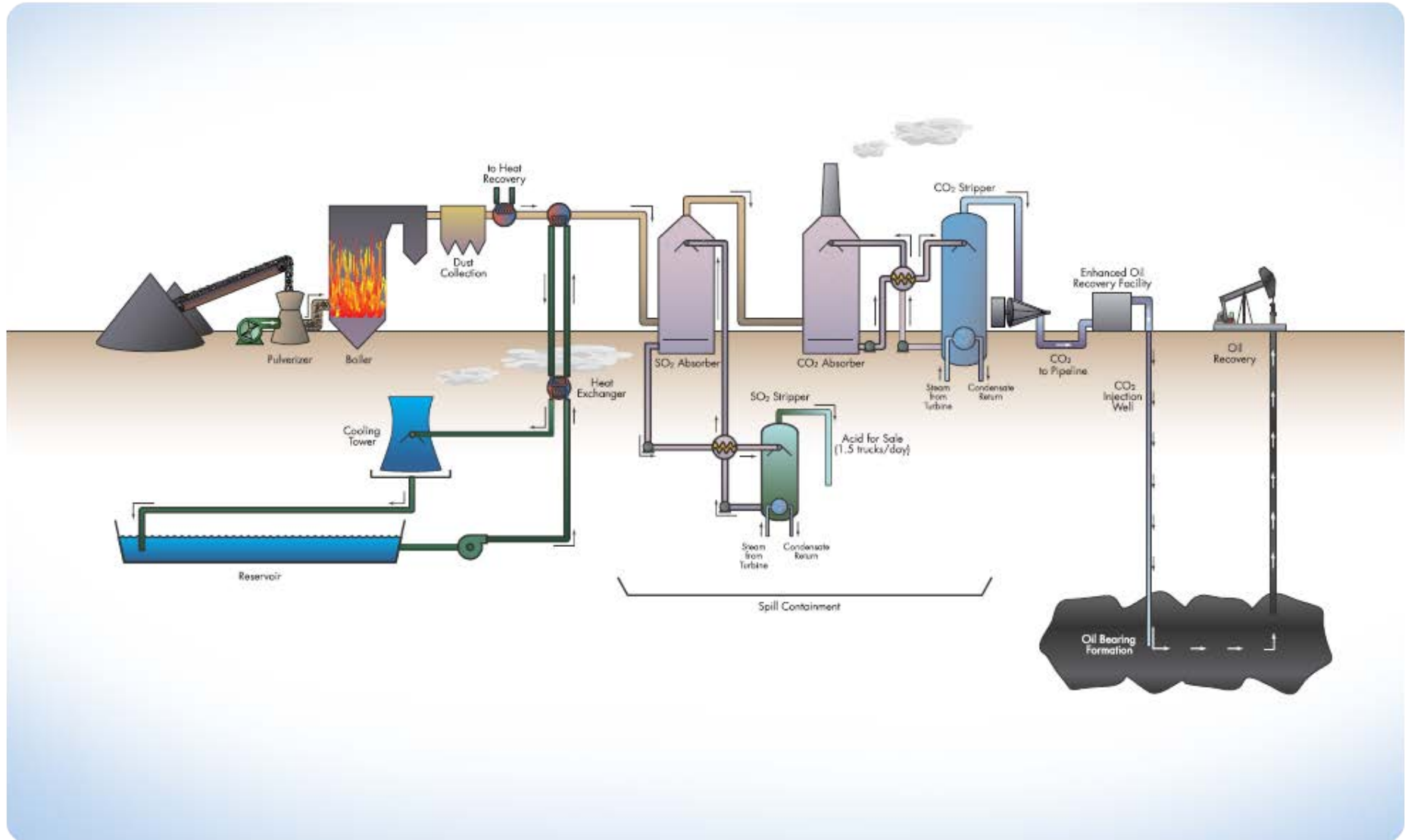


BD3 ICCS

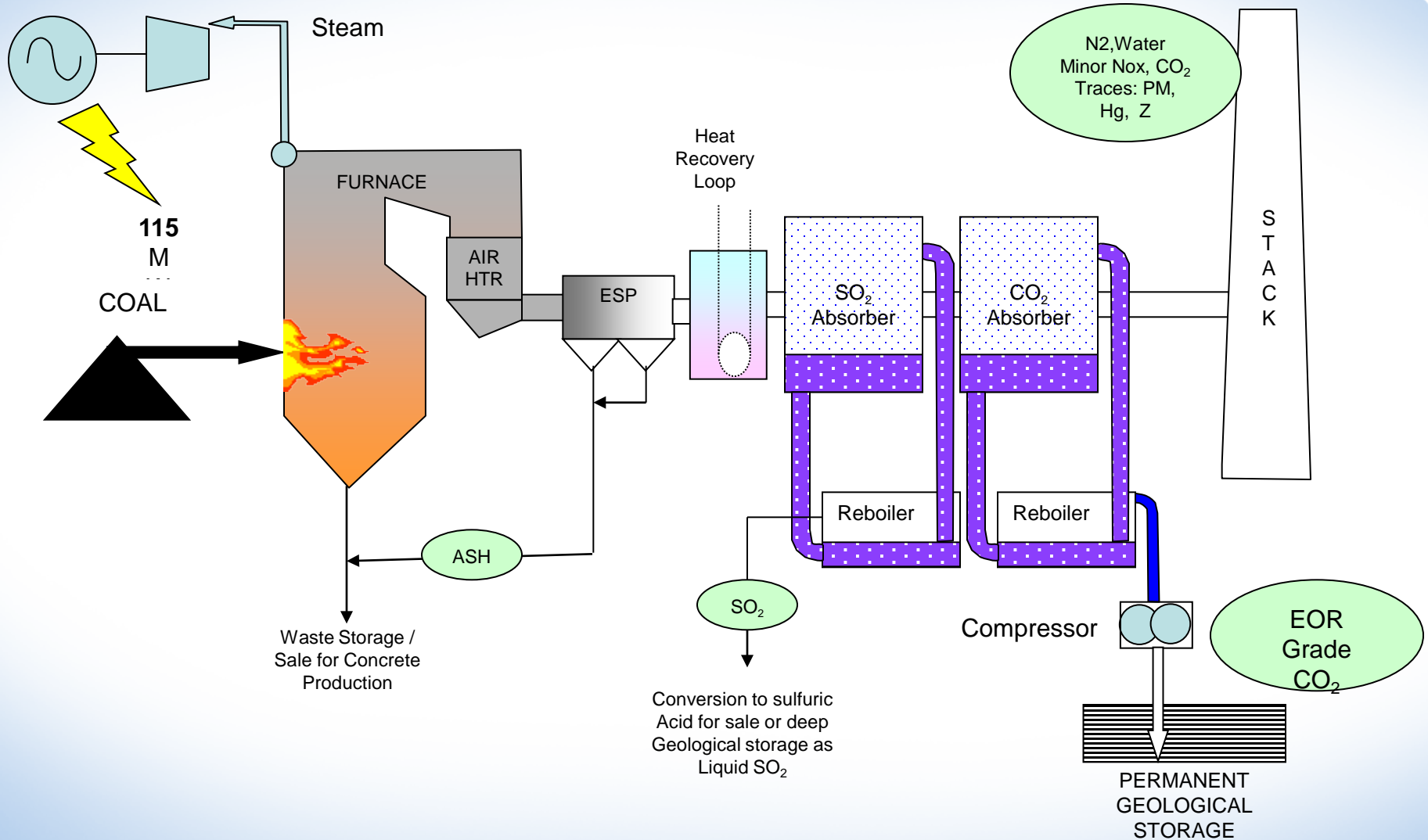
An aerial photograph of a power plant facility, overlaid with a semi-transparent blue filter. The image shows four tall, cylindrical smokestacks with alternating white and reddish-brown horizontal bands. To the right, a large, multi-story industrial building is visible, with the text 'Unit 3' overlaid in white. The surrounding area includes various smaller structures, pipes, and a parking lot with several vehicles. The background shows a flat landscape under a clear sky.

Unit 3

Carbon Capture Process



BD 3 Repowered



Boundary Dam ICCS Demonstration

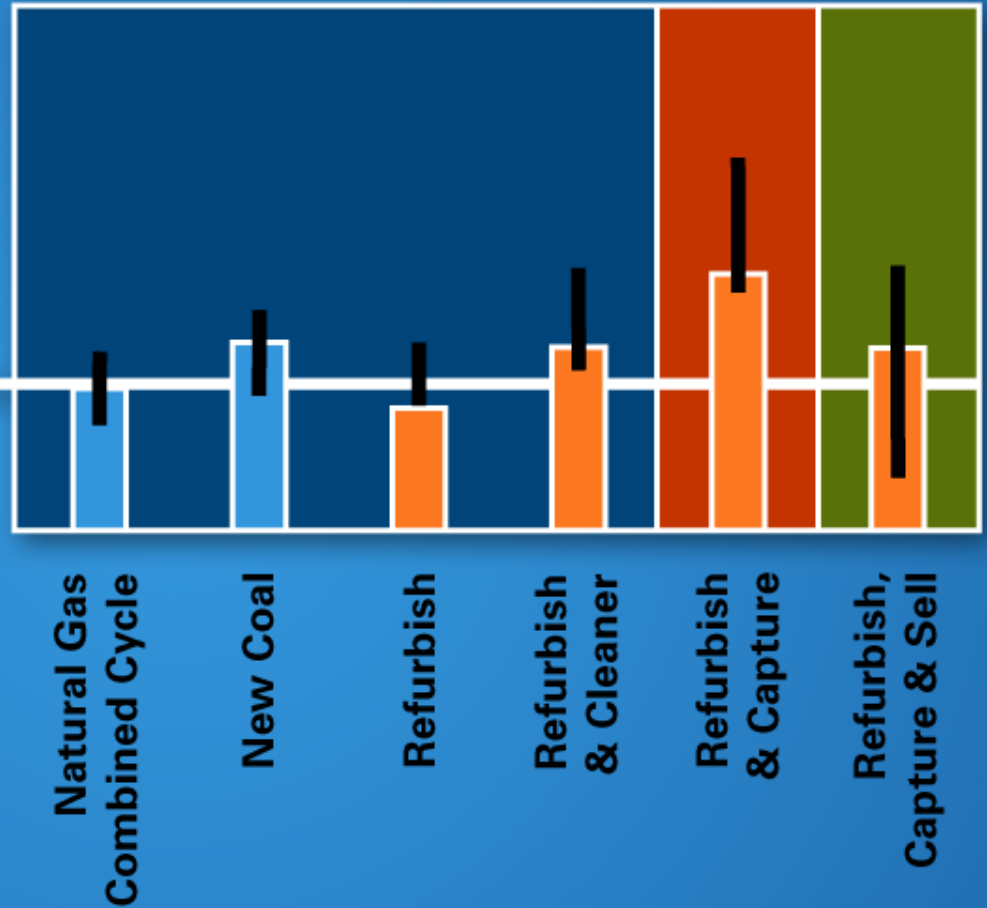


Commercial Operation
(1Q 2014)



Cost of Electricity

Baseline is cost of new natural gas generation.



Boundary Dam Project Progress

Two broad areas of engineering:

1) Power Island Performance and Integration

- Boiler and turbine performance upgrades;
- Integration with flue gas desulphurization (FGD) and CO₂ capture systems; and
- Results to date – as important as CO₂ capture technology selection.

2) CO₂ Capture components

- March 2, 2010, SaskPower announced Cansolv and SNC Lavalin will provide the technology and construction estimates for the boundary dam commercial project business case;
- CO₂ offtakers for CO₂ EOR markets are being identified; and
- SaskPower continuing to monitor emerging technologies.

Knowledge Gained

Lesson 1:

We Learn By Doing

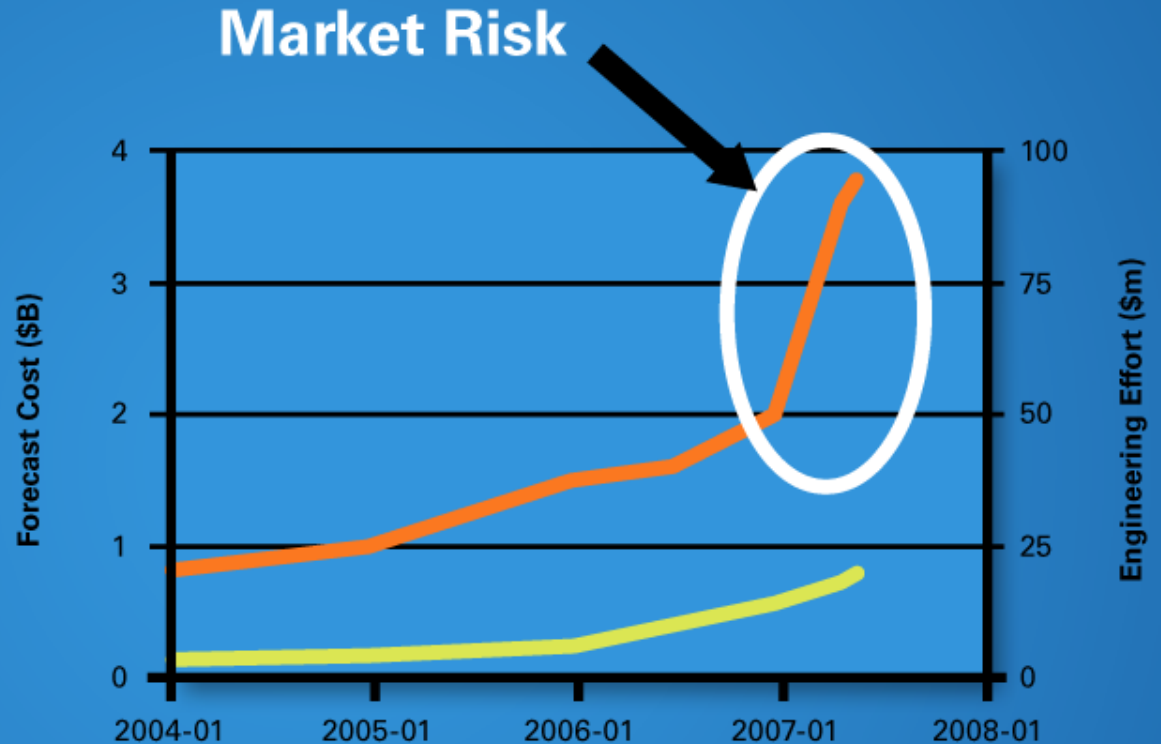
Corollary

Experience makes Success Possible

Knowledge Gained

Lesson 2:

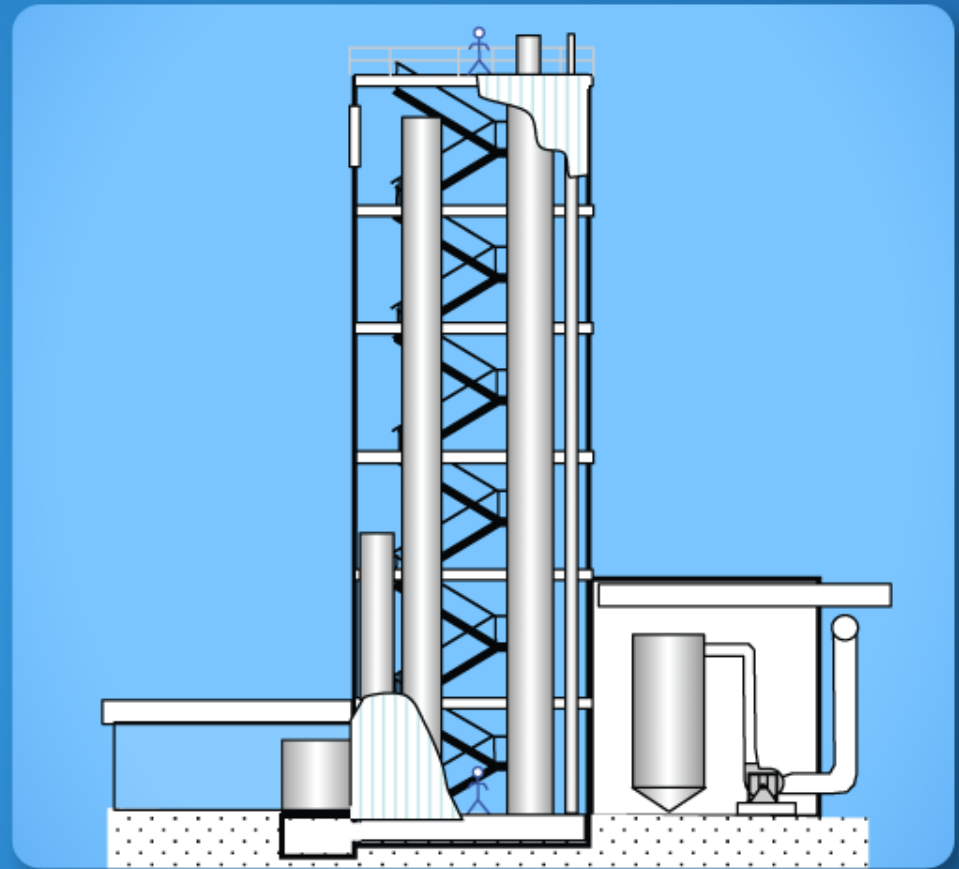
You don't know what it costs until you see the contract.



Knowledge Gained

Lesson 4:

Industry Needs Better Tools for Assessing Performance and Risk on Post Combustion Capture Systems

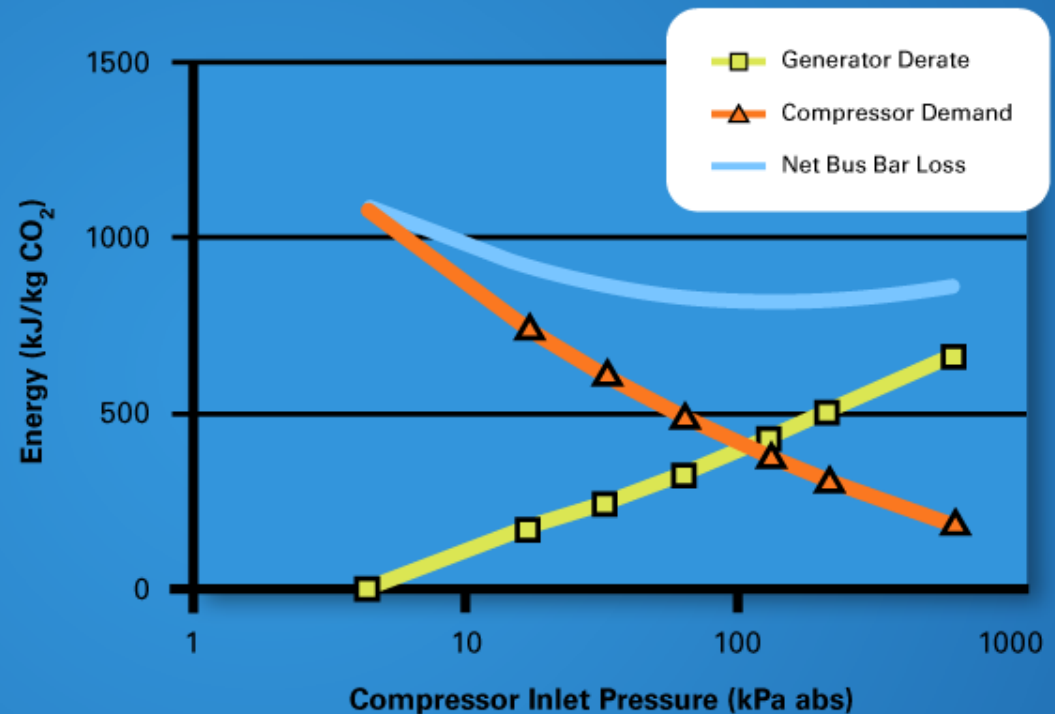


Knowledge Gained

Lesson 5:

Carbon Capture and Power Plant Configuration are integral.

Steam Stripping Optima



Conclusions



- Preserves coal as a fuel source and maintains fuel mix diversity.
- Cost of electricity competitive with natural gas.
- Provides information needed for making future decisions.
- Develops EOR-CO₂ buyer market - has significant positive economic impact for the provincial economy.
- Future projects more economic - COE \$100/MWh.



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EPC Contractor - SO₂/CO₂ System

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