

SASKPOWER CCS CCUS TEM



@SaskPowerCCS

SASKATCHEWAN'S ENVIRONMENT









Growing both economically and demographically.

WHO IS **SASKPOWER?**



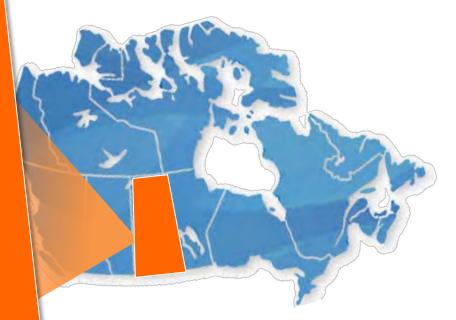
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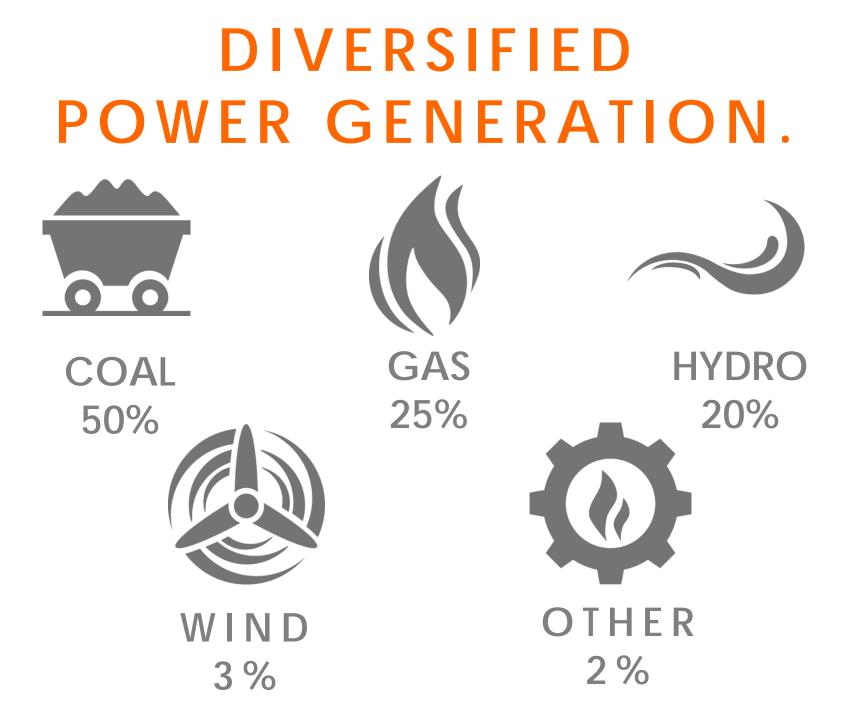
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SASKPOWER'S ENERGY MIX

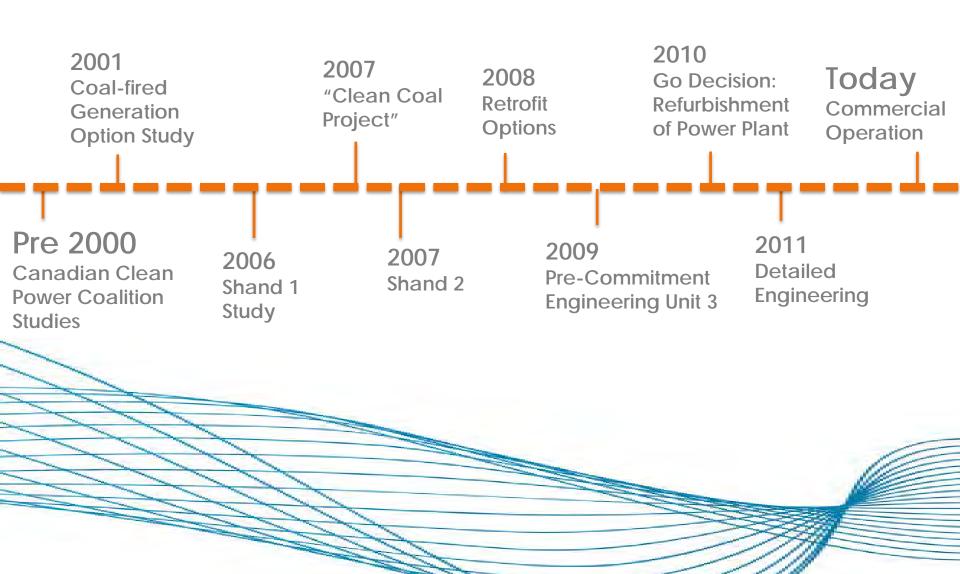
- 490,000 customers
- 151,000KM of transmission line
- 3,513 MW generating capacity





CCS TIMELINE.





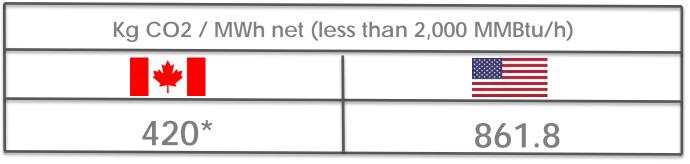
Why Did We Get Involved In





COMPARING REGULATIONS.

MODIFIED / REFURBISHED COAL UNITS

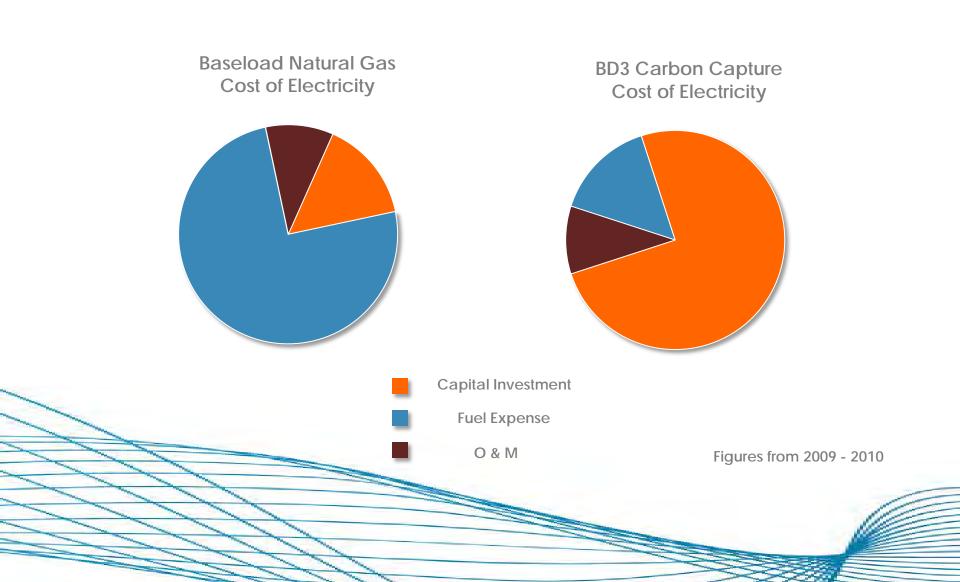


NEW COAL / NATURAL GAS UNITS

| Kg CO2 / MWh net | | | |
|------------------|-------|--|--|
| * | | | |
| 420* | 644.5 | | |

*Conversion based on SaskPower's BD3 unit at 124.6 MW net (after station services, SO2 capture, CO2 capture but before CO2 compression).

COMPARING COSTS.



TWO PROJECTS

SaskPower Boundary Dam

12.1

BOUNDARY DAM CCS PROJECT





CO2 AND SO2 ABSORBERS N



\bigcirc O₂ STRIPPER



SO₂ STRIPPER







BOUNDARY DAM UNIT 3

| Emission Change | Pre-CCS | Post-CCS | Reduction |
|------------------------|---------|----------|-----------|
| CO ₂ | 1094 | 120 | 90% |
| SO ₂ | 11 | 0 | 100% |
| NO | 1.5 | 1.1 | 27% |
| PM10 | .2 | .02 | 90% |
| PM2.5 | .1 | .03 | 70% |

THE EQUIVALENT TO:

TAKING ALL THE CARS OFF THE ROAD IN REGINA, SK (POP. 220K)

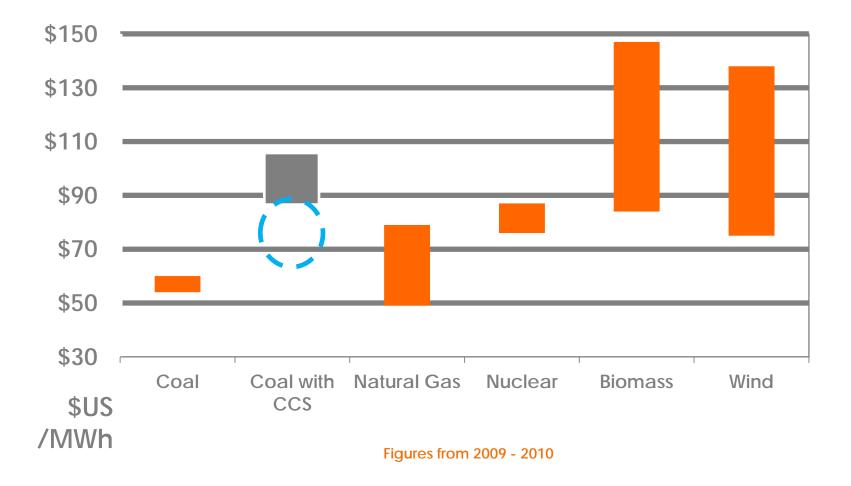


+ CAPTURING ALL CO2 FROM HEATING/COOLING OF EVER HOME



+ KEEPING THE LIGHTS ON IN HALF OF THE CITY.

GENERATION COSTS.



Data Source: 2010 Electrical Power Research Institute, Program on Technology Innovation: Integrated Generation Technology Options

THE NEW REALITY.



Complex Commissioning



Unprecedented Simulator Training



Detailed SOP



Vendor Contract Negotiations



THE STATS.

- 1,700 Number of construction workers on site at peak
- Percentage of engineers who have done this before 0%
- 4.7M Combined man hours thus far
- +10 Amount of countries who contributed materials, components, technology
- 150+ Number of contracts in place

FULL SPECTRUM

SECURING OFF-TAKERS.

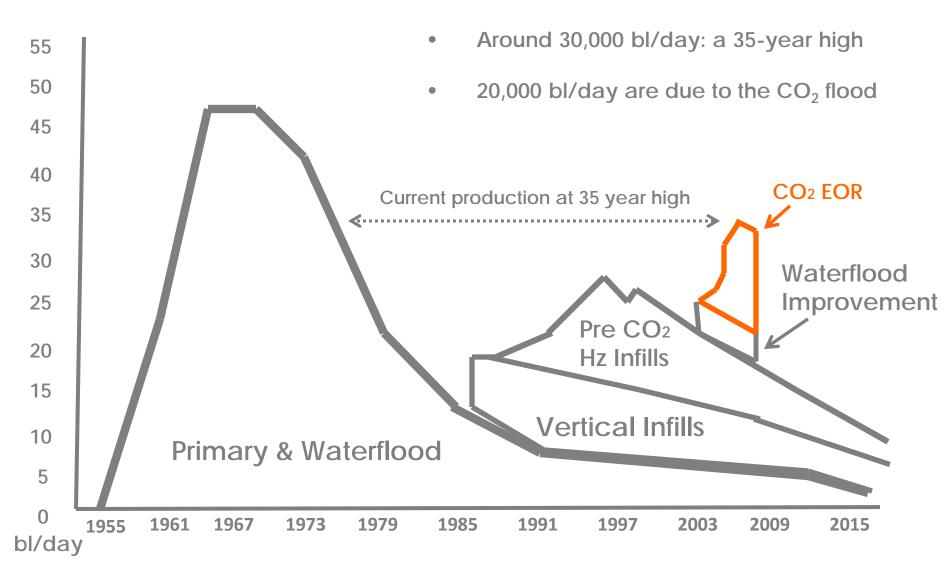


Sale of sulphuric acid, used primarily for industrial purposes including fertilizer.

Sale of flyash for concrete production 100%.

• Sale of CO₂ to oil company for EOR.

ENHANCED OIL RECOVERY.



STORAGE.

Pure CO₂ storage with SaskPower's Carbon Storage and Research Centre's host project, Aquistore.

Independent monitoring project that identifies feasibility of injecting CO₂ into a deep saline reservoir in an effort to reduce GHG emissions.

Aquistore will receive approximately 350,000 tonnes of CO₂ over its life. Storage is regulated by the Ministry of Environment.

Will be measured, monitored, verified and audited.

Saskatchewan has experience with storage due to the Weyburn Midale project. Approximately 20 million tonnes of CO₂ stored and monitored.



MAKING THE NEW REALITY.



Complex Commissioning



Unprecedented Simulator Training



Detailed SOP



Vendor Contract Negotiations



WHERE ARE WE GOING?



Amine Chemistry Lab

CCTF





University Collaboration



Boundary Dam 4+5

Symposium





POST-COMBUSTION H O O D O O O O O Panasonio **CONSORTIUM**

CCS DATA Base Information on the Boundary Dam 3 Project*:

- Construction
- Environmental permitting
- Training
- Commissioning
- Public Acceptance

How to build your own CCS project using lessons learned and cost saving opportunities.

*Subject to restrictions

FORUM Collaboration with other members and SaskPower experts

Tailored CCS solutions for your market

Sharing CCS resources from world operators, regulators, vendors, developers and utilities

> Contribute to the growing resource library of the Consortium, attracting more members

EXPERTS On-site consultation with SaskPower experts

Access to SaskPower facilities and data:

- Carbon Capture Test Facility
- Carbon Storage and Research Centre
- Amine Chemical Laboratory

SCIENTIFIC RESEARCH For an additional fee per topic, members can access exlusive research on areas such as:

Access to SaskPower facilities and data:

- Amine chemical research
- Simulator training data
- Ongoing Unit 3 operational and performance data
- Development research into Unit 4 and Unit 5 projects

WHY IT MATTERS

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PUBLIC ACCEPTANCE: BEING PROACTIVE

TAKE THE TOUR. www.SaskPowerCCS.com/tour



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