

# SaskPower Clean Coal Project

Presented to

Fifth Annual Conference on Carbon Capture &  
Sequestration

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Lional May – Balance of Plant Lead –SaskPower Clean Coal Project

Jonathan Kalmakoff – Legal Counsel – SaskPower Clean Coal Project



SaskPower

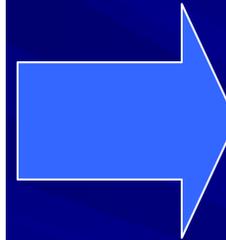
# Canadian Clean Power Coalition

- Coalition of Coal Users and Producers formed 2000
- Supported conceptual work leading directly or indirectly to:
  - SaskPower Clean Coal Project
  - Sask Polygeneration Project
  - Pilot Coal Beneficiation & Gasification producing H<sub>2</sub> (AB)
  - FEED package for 400 MW IGCC with CO<sub>2</sub> capture (AB)



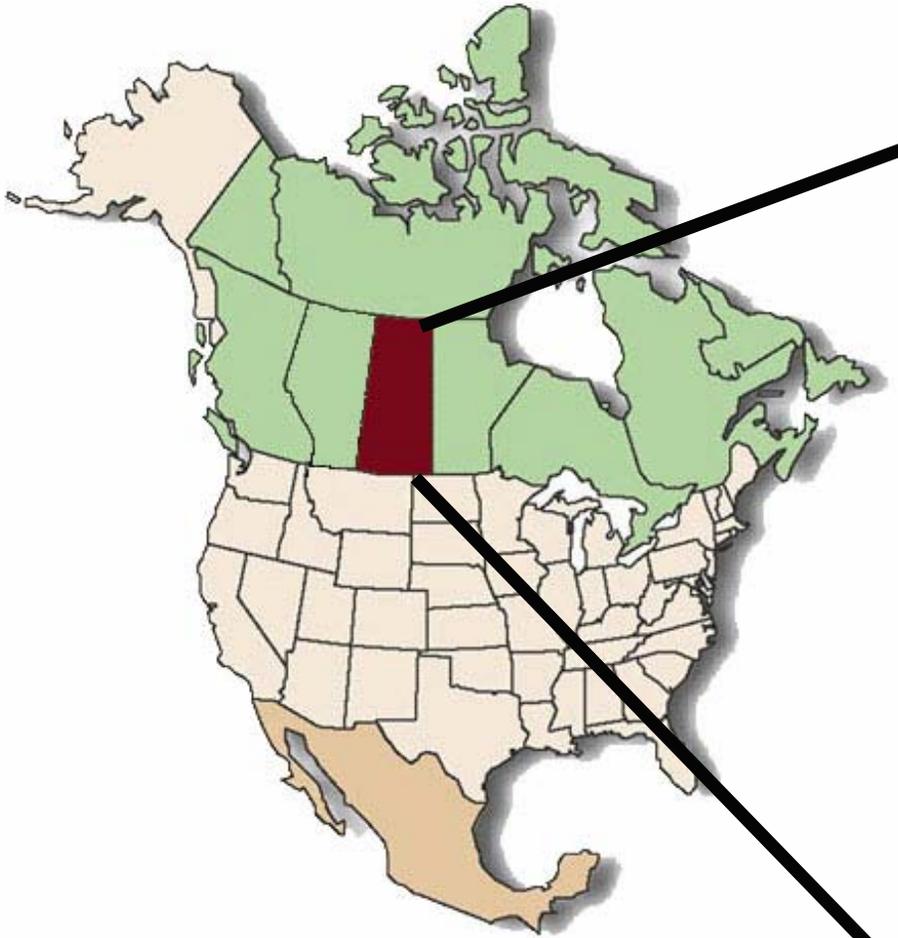
# SaskPower Clean Coal Project

Capacity Need  
Fuel Availability  
Environmental Liabilities  
Legislated Requirement to Serve  
Proven Sequestration Effectiveness  
Value for CO<sub>2</sub>  
Technical/Financial Capacity  
Fed/Prov Cooperation



300 MW  
(near) Zero  
Emissions  
Pulverized Coal  
Plant in 2011?

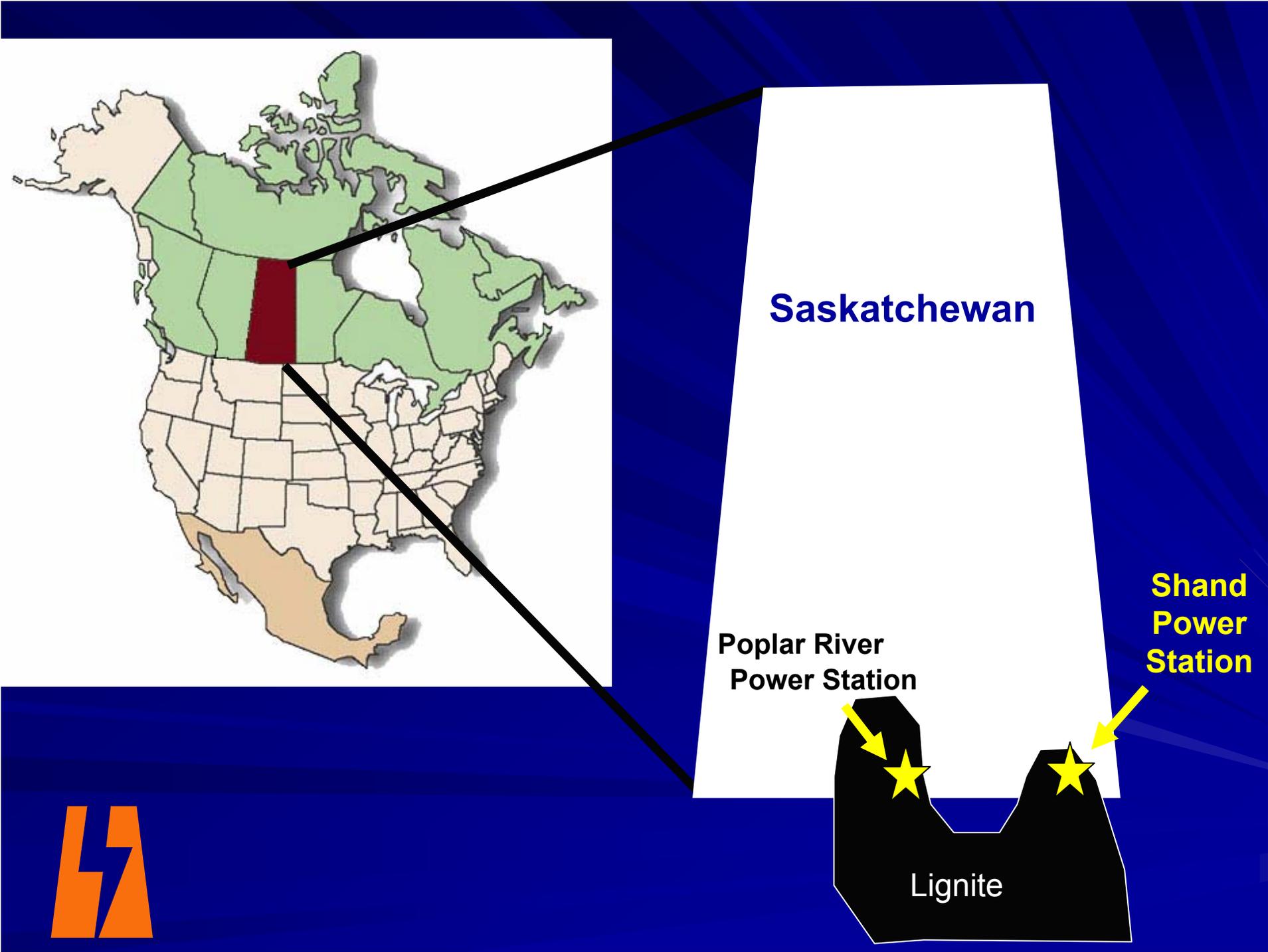




**Saskatchewan**



**Where are we?**



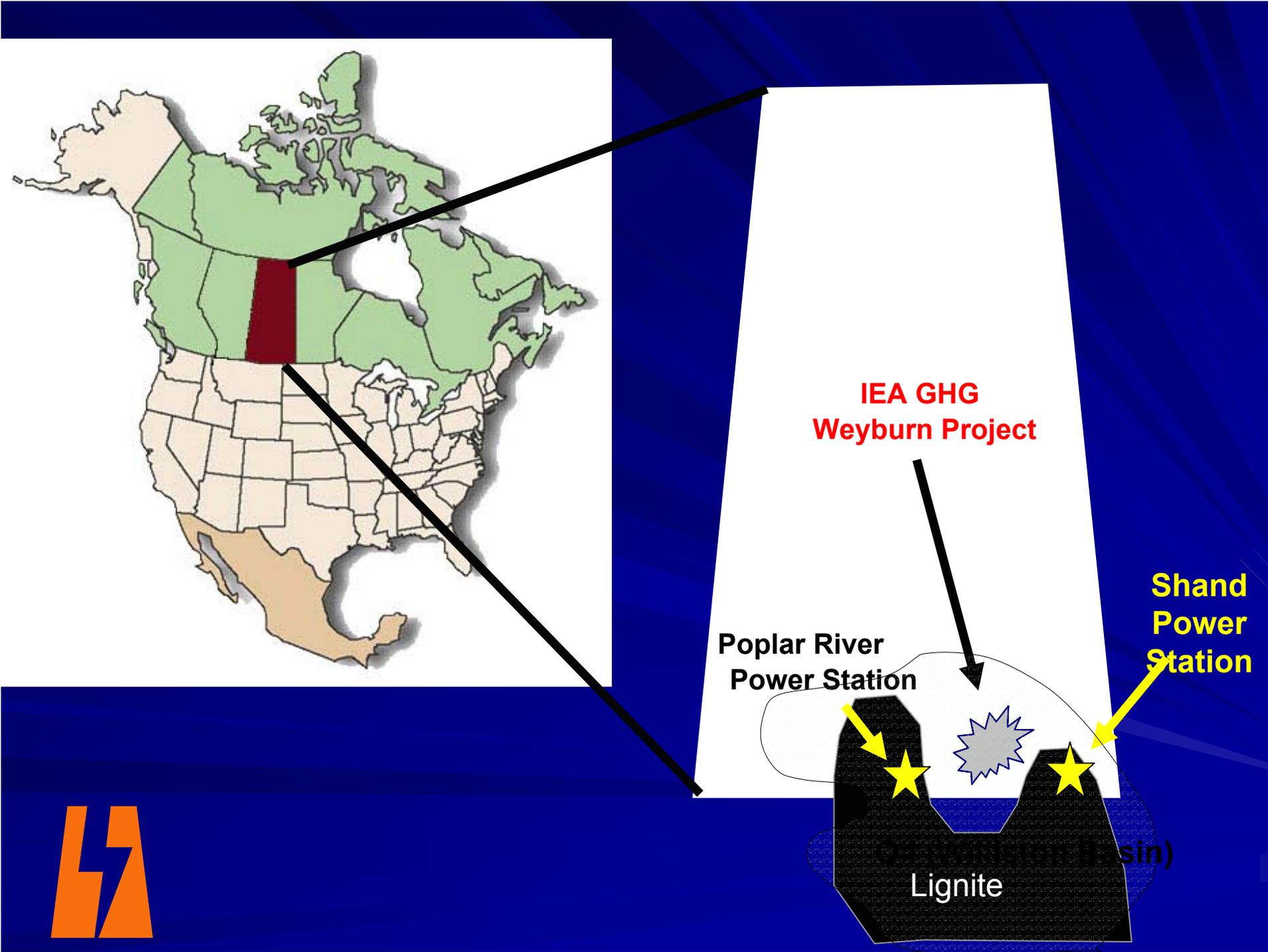
**Saskatchewan**

**Poplar River  
Power Station**

**Shand  
Power  
Station**

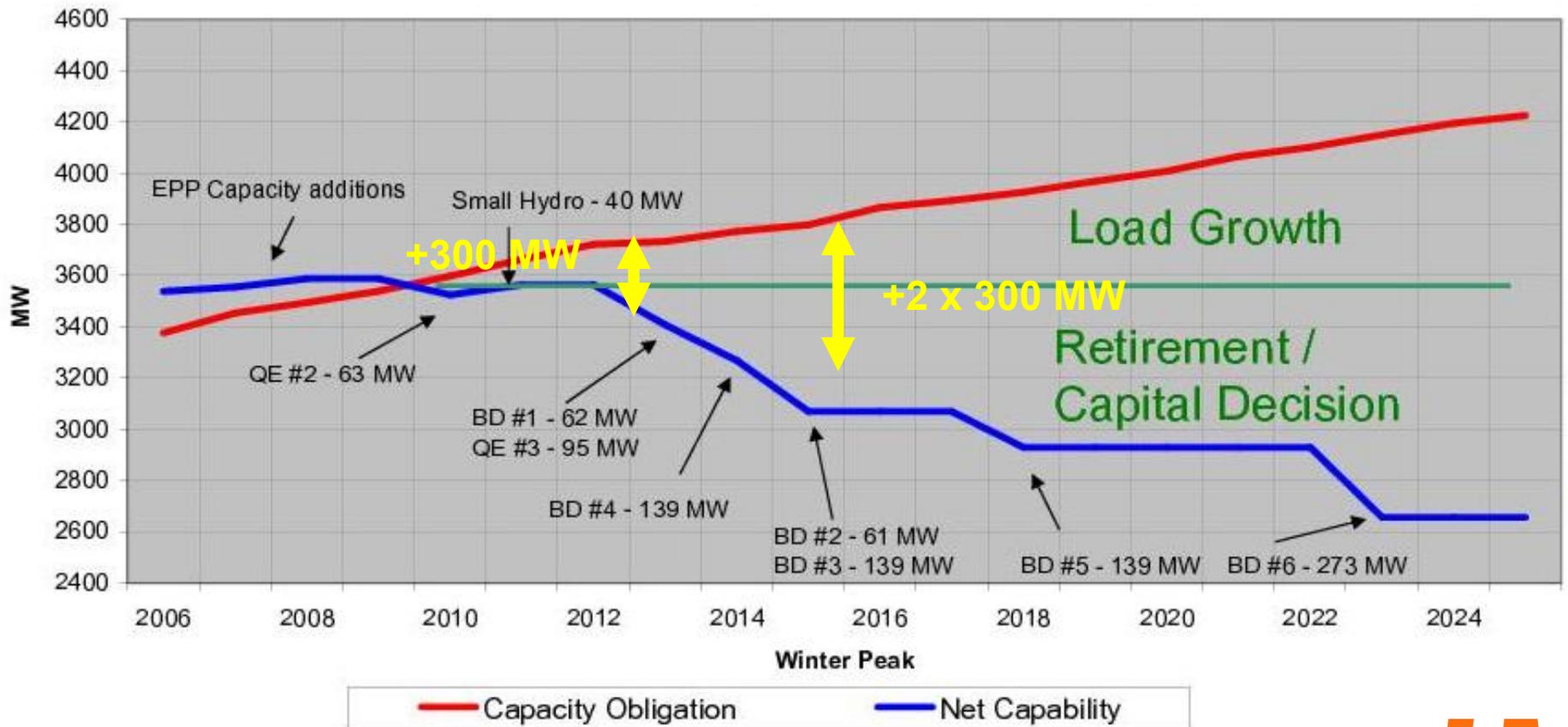
**Lignite**





# SaskPower Capacity Position

## Base



Peaking plants are assumed to be replaced in-kind.



# CONVENTIONAL COAL POWER PLANT

CARBON AS CO<sub>2</sub> (GAS)

(CO<sub>2</sub> released to atmosphere is considered a climate altering greenhouse gas)

ELECTRICITY

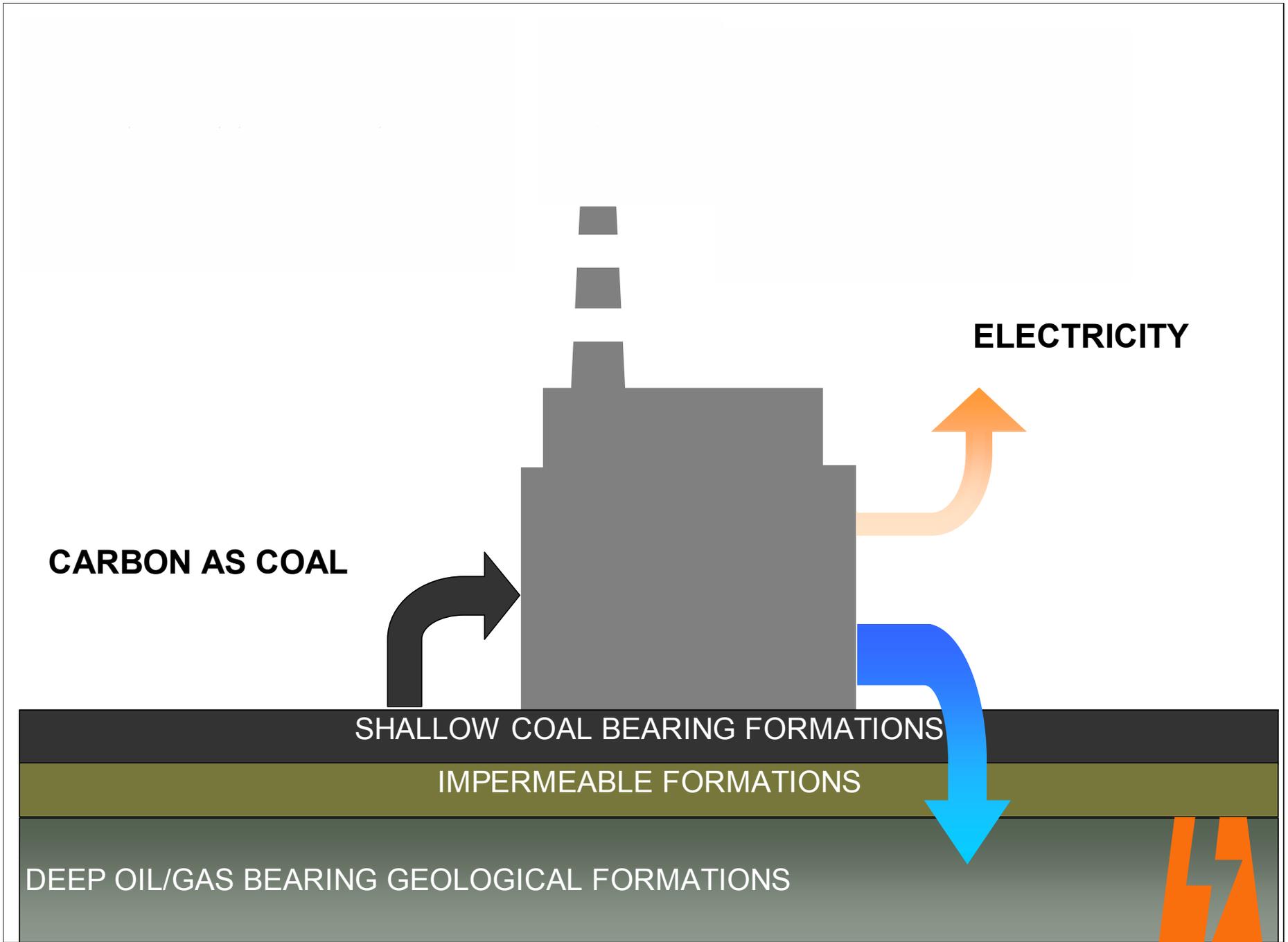
CARBON AS COAL

SHALLOW COAL BEARING FORMATIONS

IMPERMEABLE FORMATIONS

DEEP OIL/GAS BEARING GEOLOGICAL FORMATIONS





**CARBON AS COAL**

**ELECTRICITY**

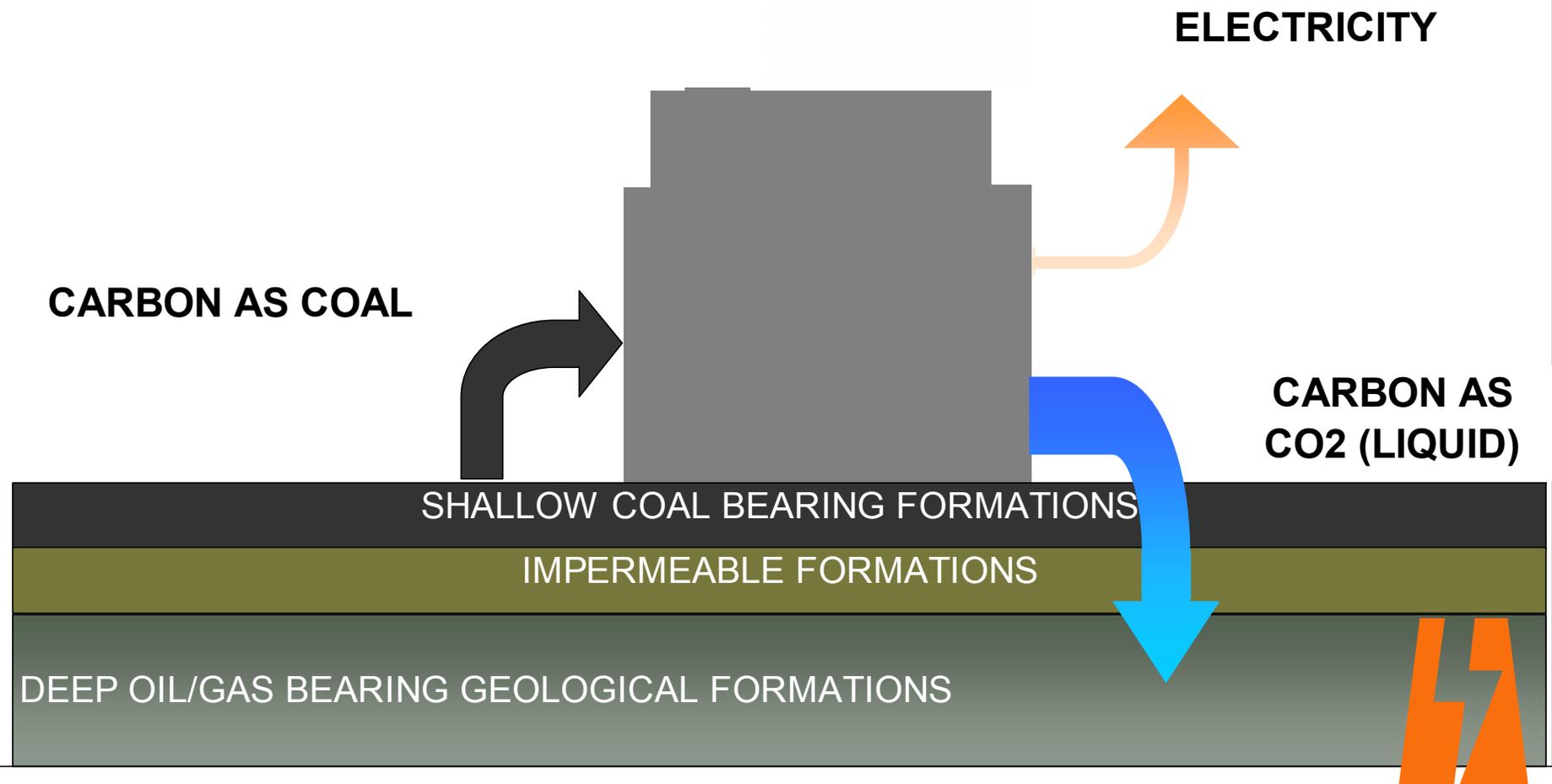
SHALLOW COAL BEARING FORMATIONS

IMPERMEABLE FORMATIONS

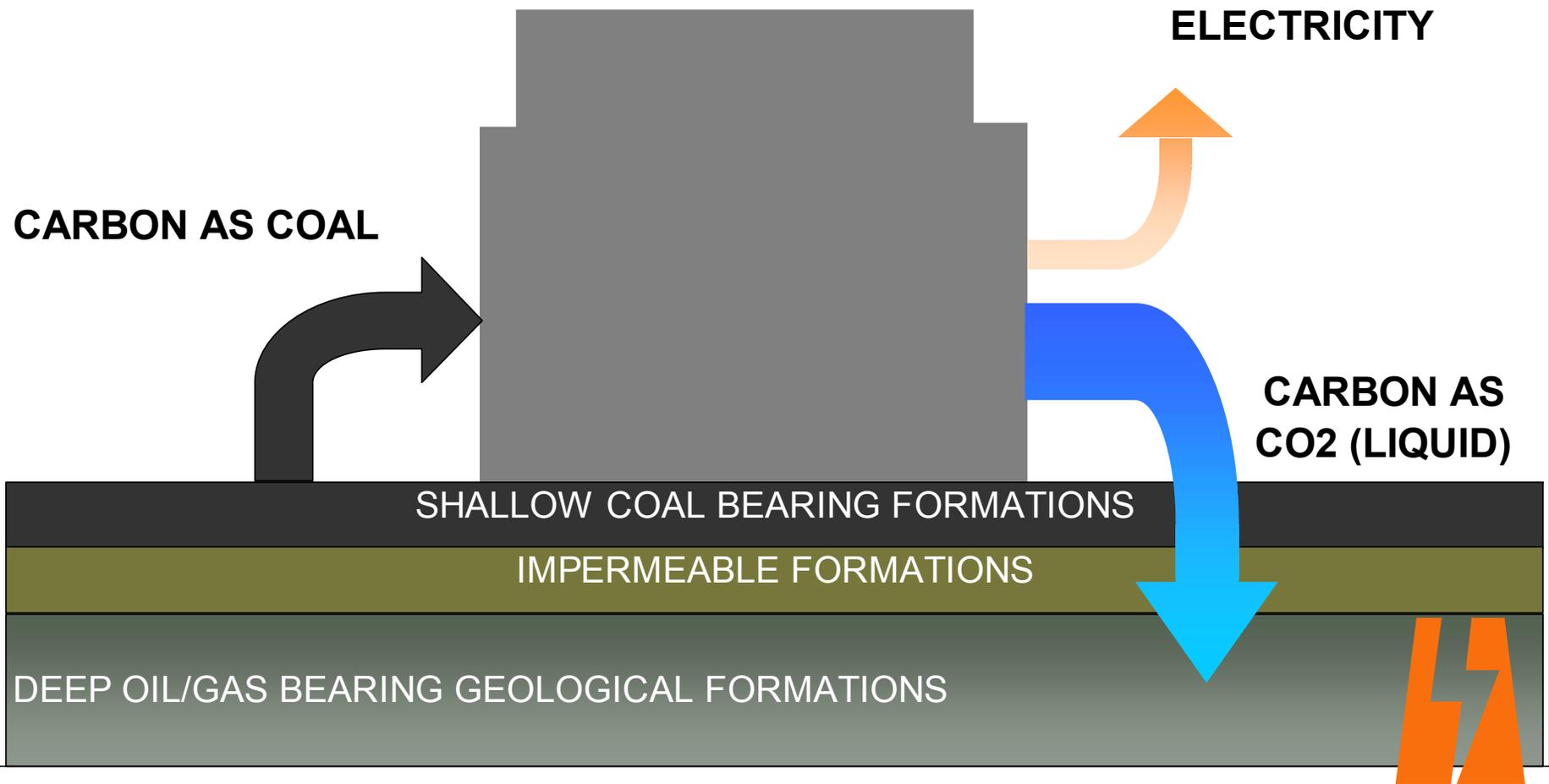
DEEP OIL/GAS BEARING GEOLOGICAL FORMATIONS



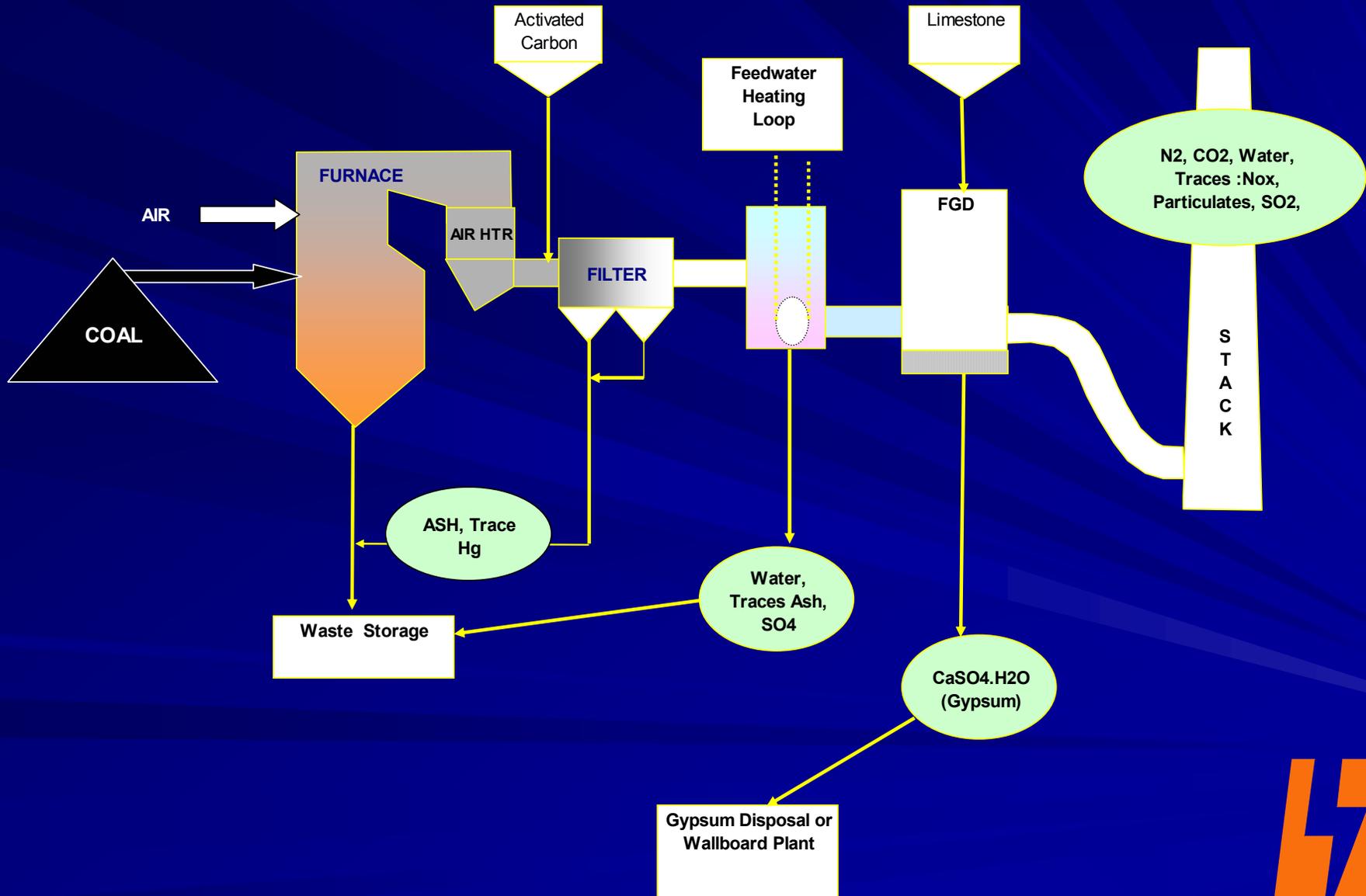
# SaskPower's CLEAN COAL POWER PLANT



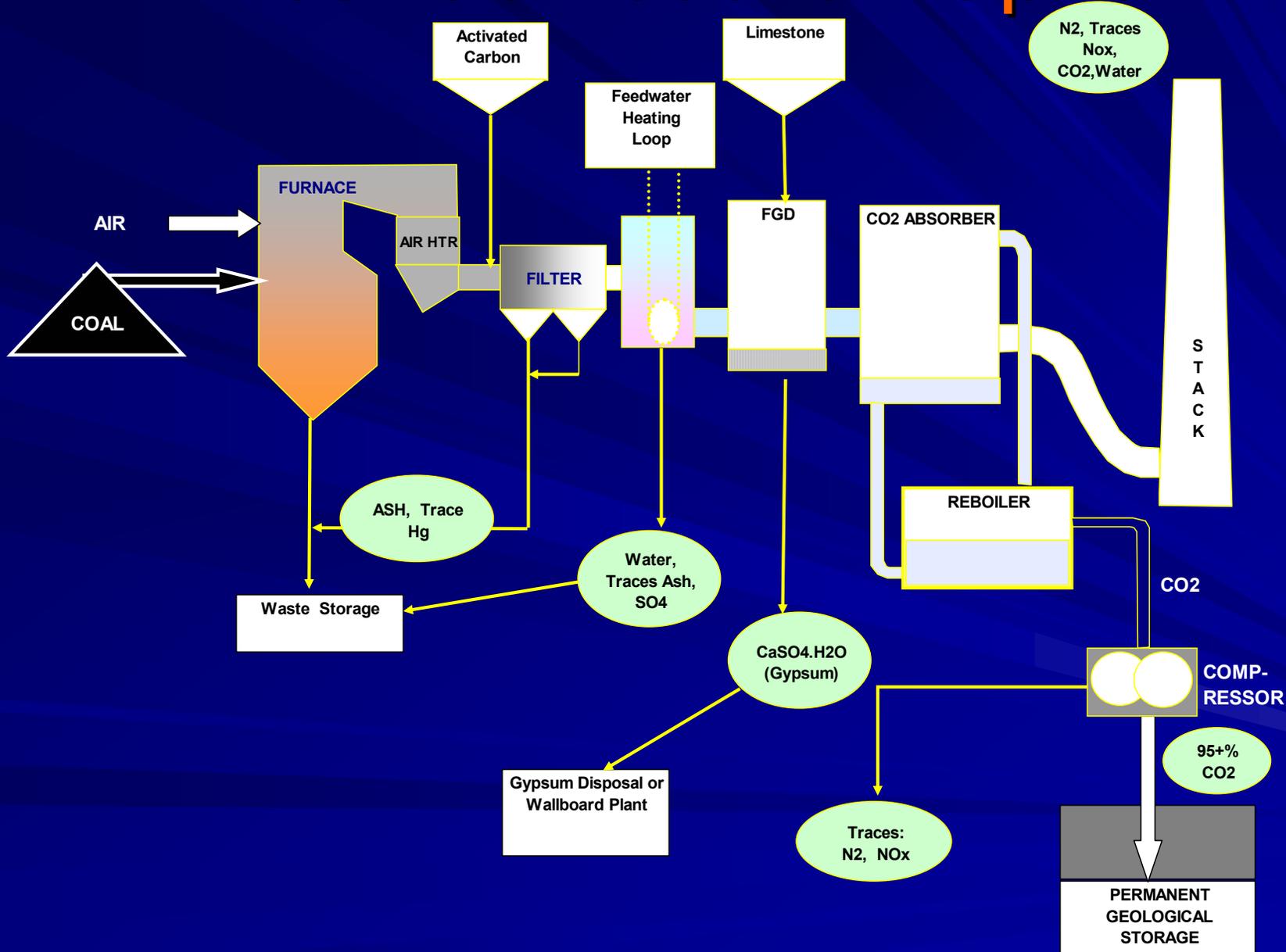
# SaskPower's CLEAN COAL POWER PLANT



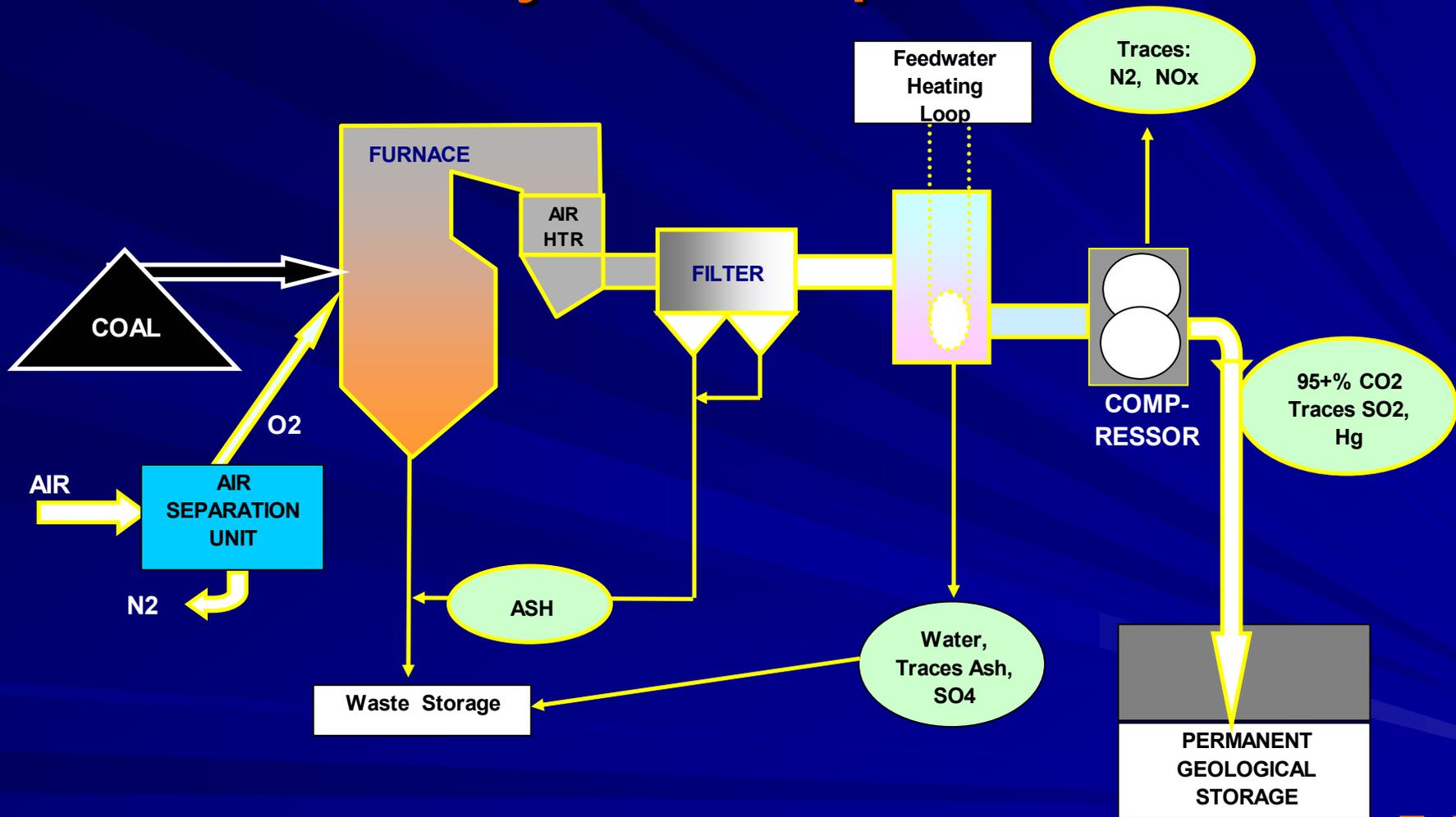
# Compliant Coal Unit



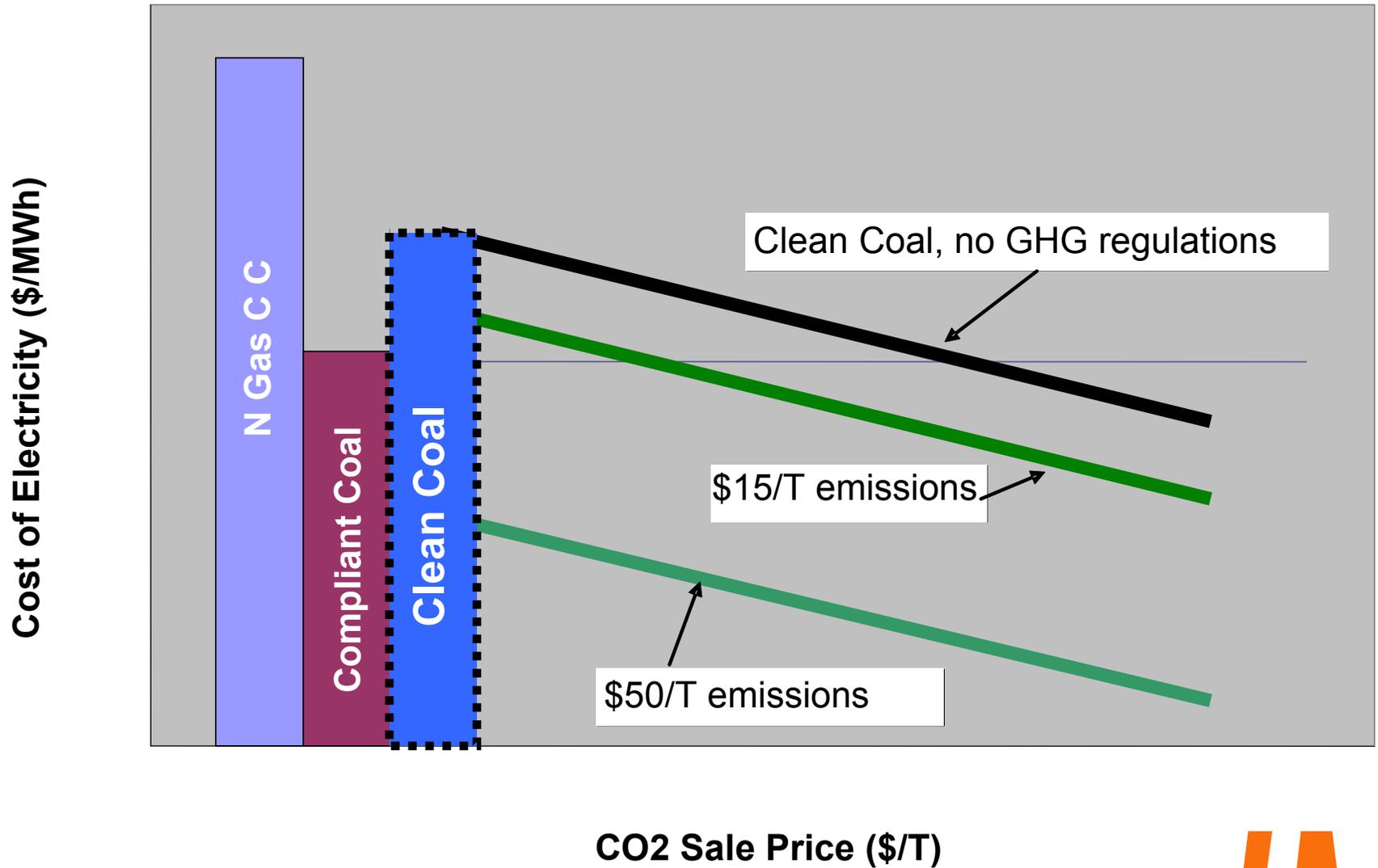
# Post Combustion Option



# OxyFuel Option



## Preliminary Cost Comparison 300 MW Base Load



# SaskPower Clean Coal Project

- World's first "Near Zero Emissions" pulverized coal plant
- 450 MW gross, 300 MW net
- Capturing 90%+ of CO<sub>2</sub>
- 3 MT/y CO<sub>2</sub> for sequestration or EOR Sale
- 1.6 MT/y emission reduction
- Fast tracked for in service 2011
- Site depends on coal quantity & price, water, relative capital cost, line losses, CO<sub>2</sub> pipeline costs
- MOU commits Sask/Canada Gov't cooperation



# SaskPower Clean Coal Project

## World Leading Environmental Technology

- Large Capital Investment; technology stretch, potentially attractive rate of return
- May be lowest cost means to meet base load needs to 2016,
- Two potential sites located near oil fields using CO<sub>2</sub> for EOR

Technical, Regulatory and Economic Risk



# COMPARISON OF SITES

## ■ Shand:

- Significant facilities in place for new unit
- Coal:
  - Adequate quantity
  - Lower Sulphur
  - Higher Cost
  - Coal exploration underway
- Water cooling
- Nearer CO2 sale point

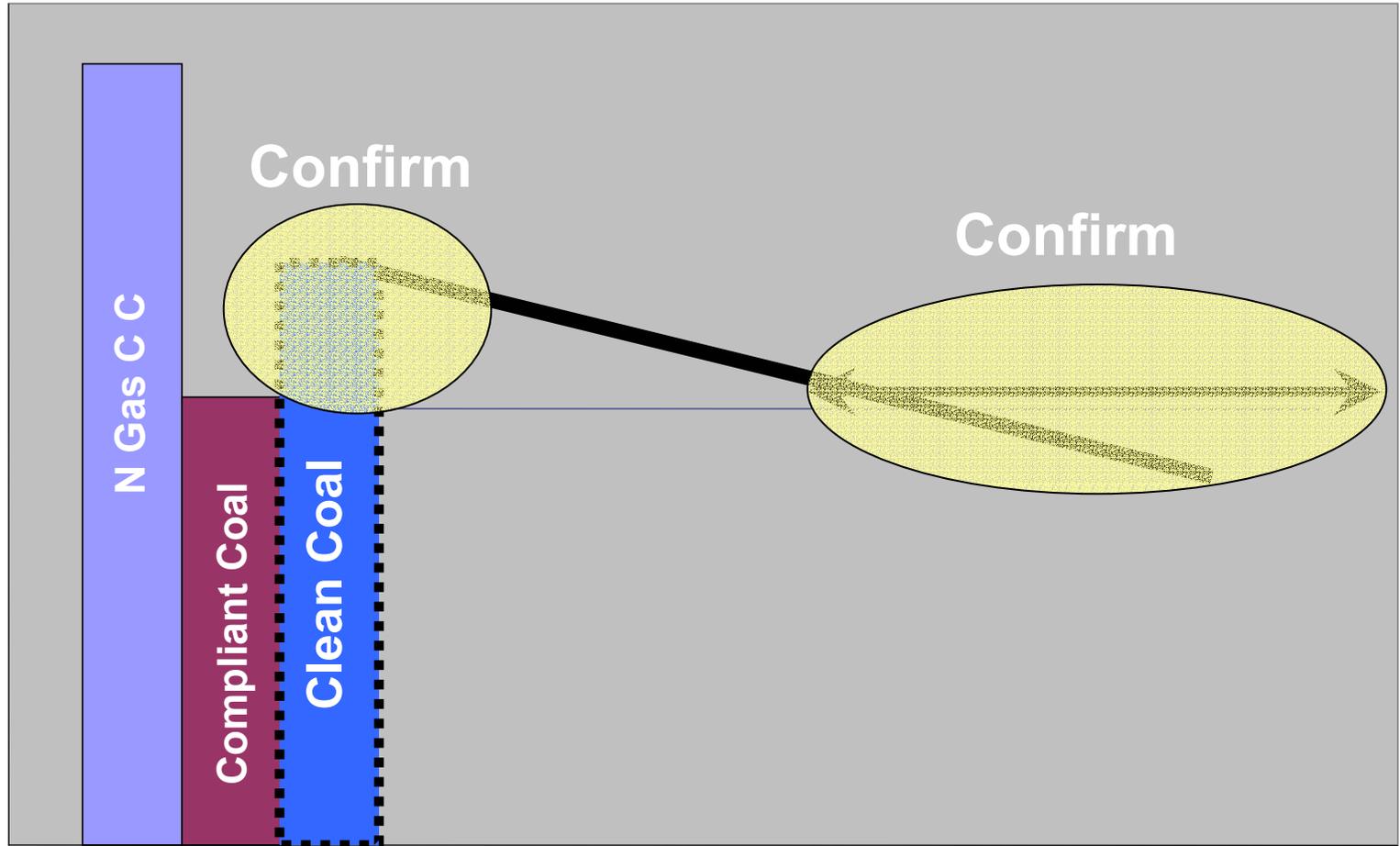
## ■ Poplar River:

- Significant facilities in place for new unit
- Coal:
  - Abundant
  - More erosive, less slagging
  - Lower Cost
  - Coal exploration underway
- Air cooling



# Preliminary Cost Comparison 300 MW Base Load

Cost of Electricity (\$/MWh)



CO2 Sale Price (\$/T)





# Master Schedule

2006	2007	2008	###	2011	2012
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Definition & Proposal

(Pre Commitment Engineering)



Plant EIS and Project Recommendation



Release to Manufacture

Manufacture

Full Environmental & Project Approval



Release for Site Work



Manufacture, Erect and Commission

Optimize



# Contract Packages

- **Boiler** – partnership with Vendor will facilitate technology advancement, support Saskatchewan manufacture, manage technical risk
- **Turbine Island**– partner with Vendor will facilitate technology advancement, support Saskatchewan manufacture, manage technical risk
- **CO<sub>2</sub> Recovery** – RFI processes underway
- **Coal Supply** – RFI processes underway, mine expansion?
- **Balance of Plant** – “EPC” Contract contemplated
- **Engineering Contract** –Neill & Gunter (Regina)
- **CO<sub>2</sub> Sales** – Offtaker agreements to be developed

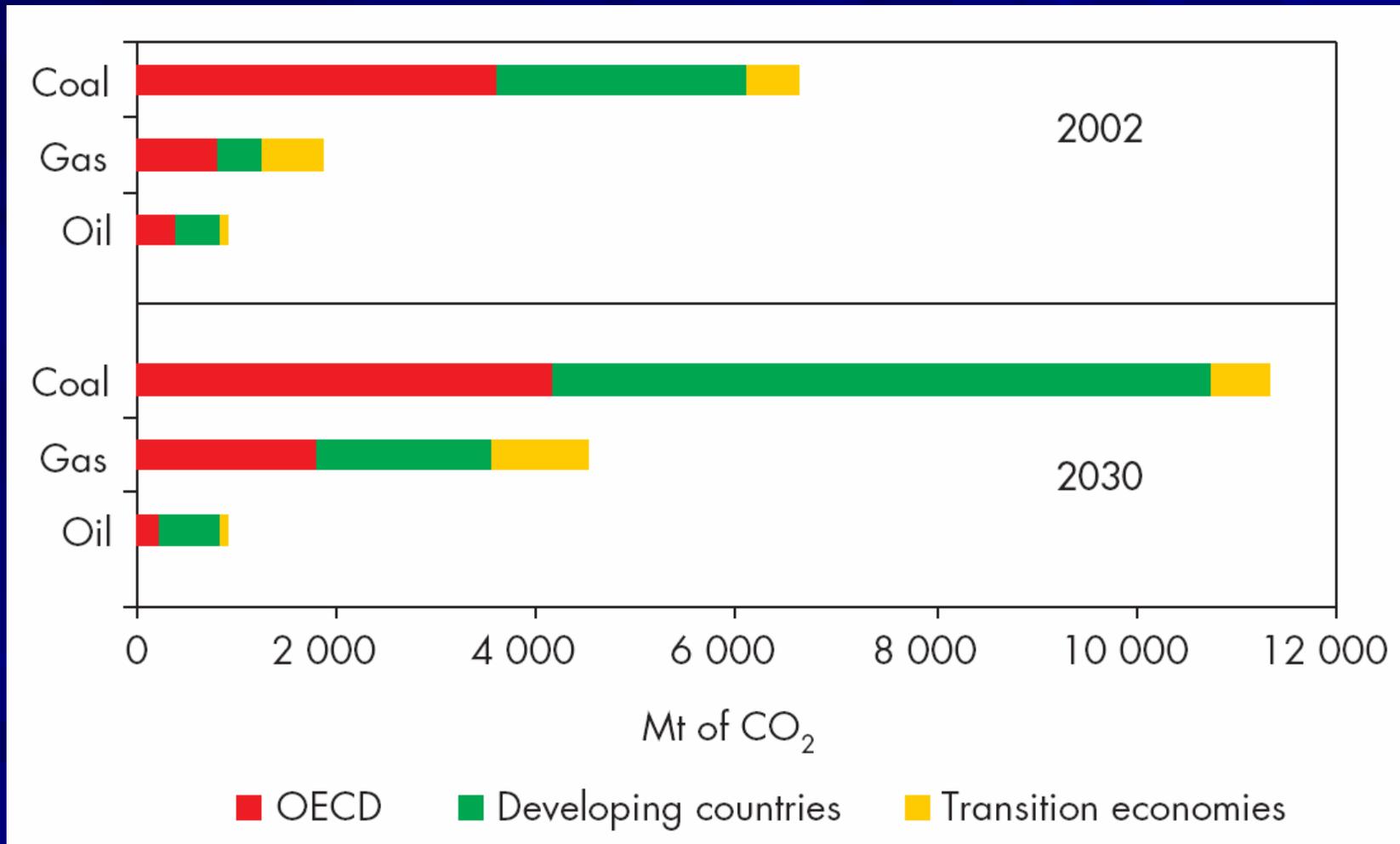


# 300 MW (near) Zero Emissions Pulverized Coal 2011:

- Demonstrates and advances CO<sub>2</sub> capture technology for pulverized coal
- Potential global application - especially in developing economies
- Advances principles for Capture Ready design
- Demonstrates EOR value chain – key factor for other fast track CCS projects
- Early enough to inform post-Kyoto debate
- Close links with Canadian universities for training home and overseas students

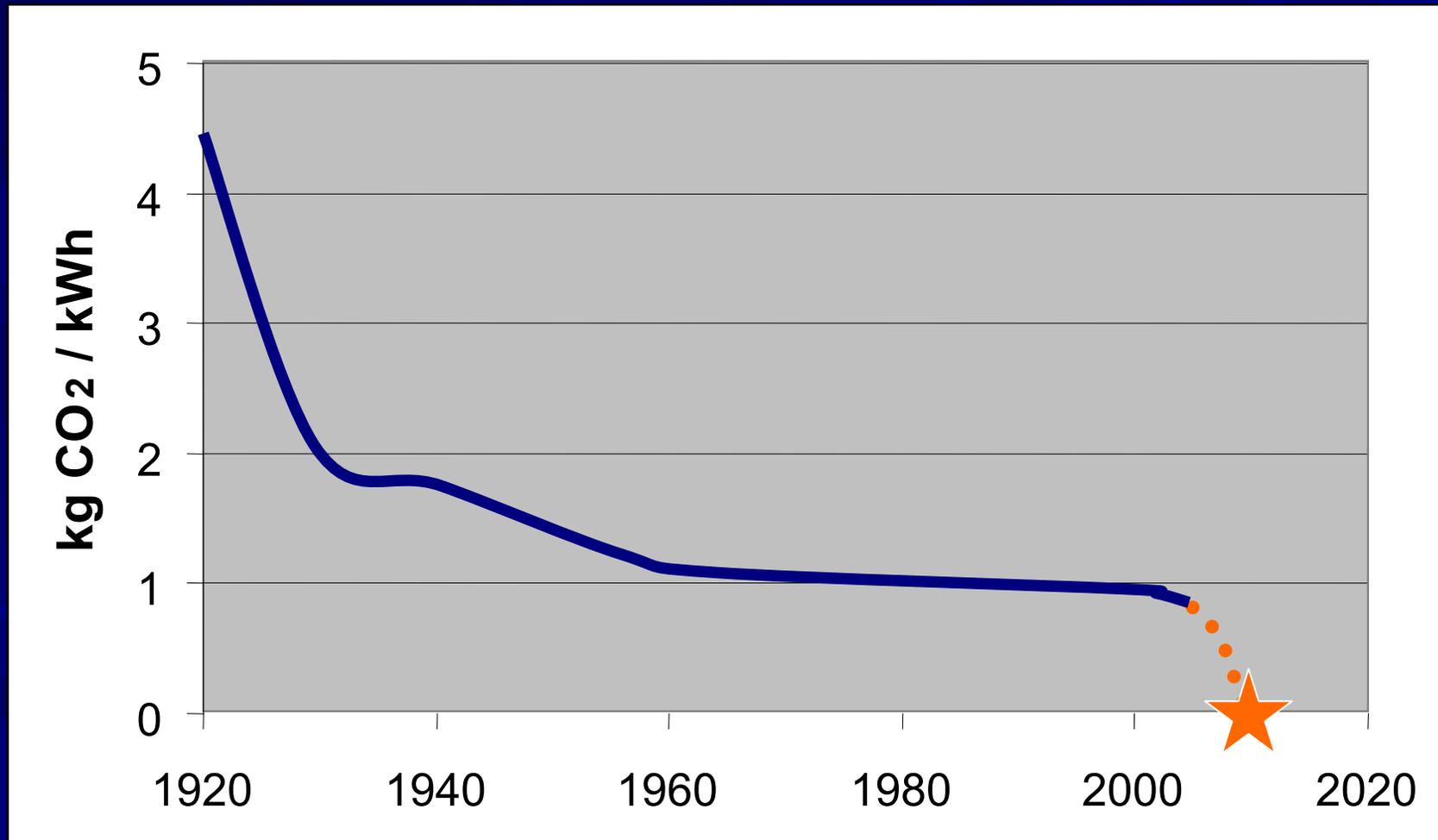


# Global Power Sector CO<sub>2</sub> emissions



IEA World Energy Outlook, 2004

# 100 Years of Progress for Coal & Electricity





Questions?

