INTERNATIONAL CCS KNOWLEDGE CENTRE

COP24 - Katowice
Applying Operational Experience on CCS
- Poland and Industrial Sources -

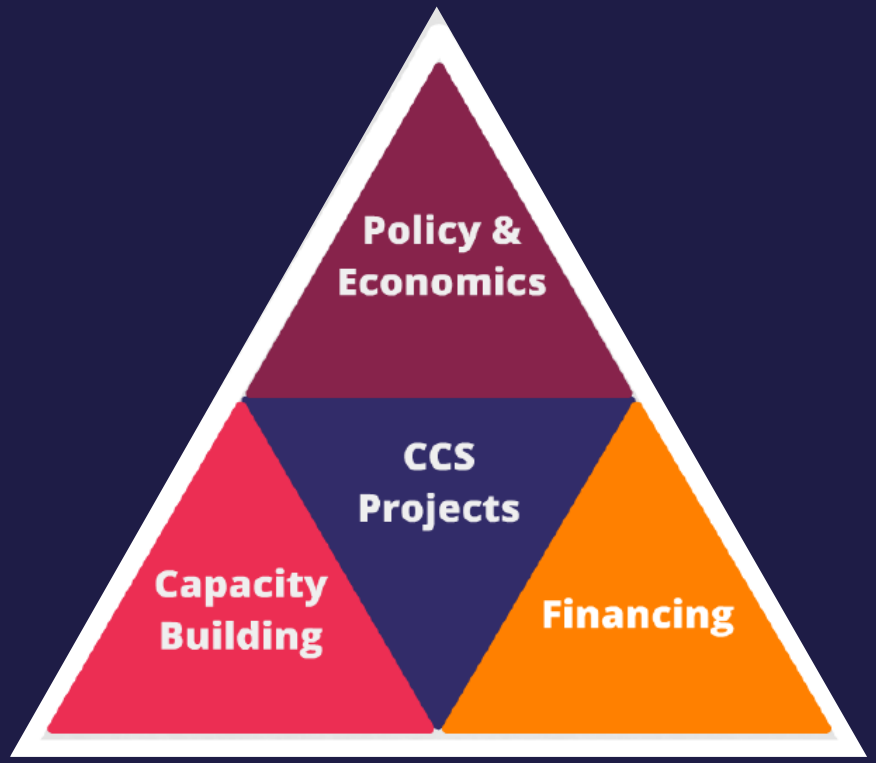
Mike Monea, President / CEO

About the International CCS Knowledge Centre

The International CCS Knowledge Centre is a non-profit organization created and sponsored by BHP and SaskPower.

MISSION:
Accelerate the understanding and use of CCS as a means of managing GHG emissions.

Sharing lessons learned from hands-on operations ensures for experienced-based decision making.



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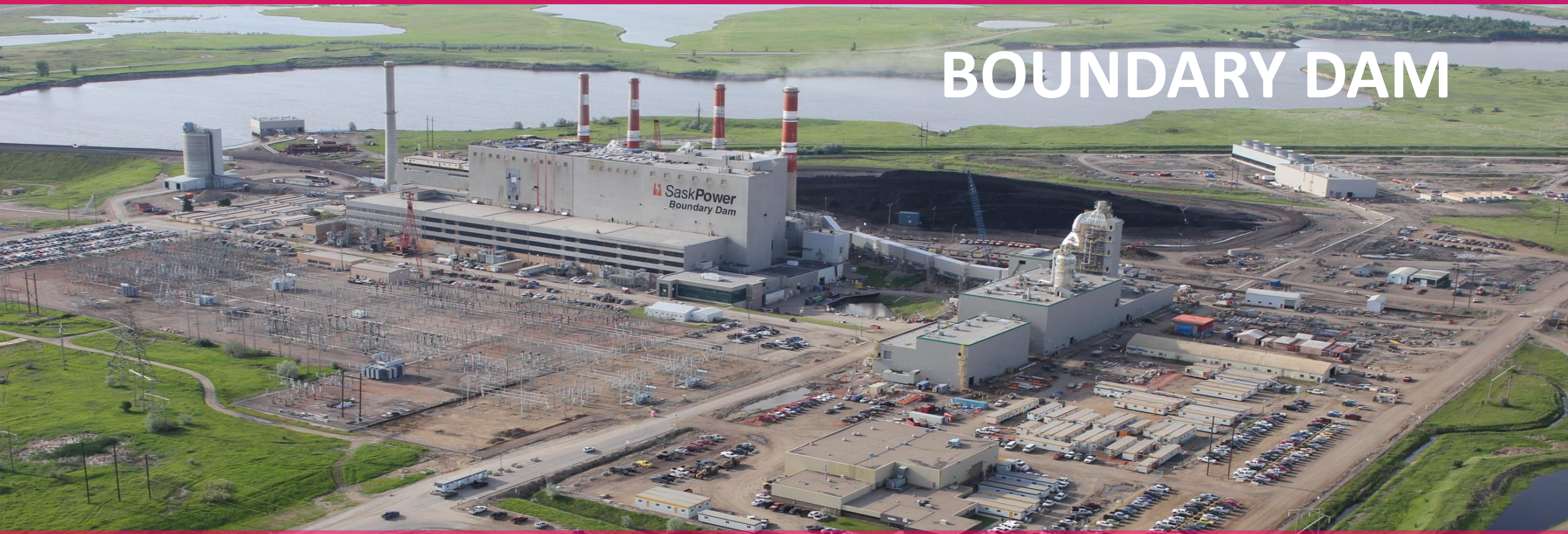
BOUNDARY DAM



LEARNING STARTS HERE:
WORLD'S 1ST INTEGRATED LARGE-SCALE POST-COMBUSTION CCS FACILITY

Operational Understandings: Exceeding Federal Regulations

1100 t/GWh = Lignite Coal Plant

550-500 = Current Natural Gas Plant

420 = Federal Regulations on Coal Plant

375-400 = New Natural Gas Plant

300-325 = Wind (with peakers)

120-140 = CCS on Boundary Dam 3*

*Name plate capacity

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SECOND GENERATION DESIGN

3D Model of CCS on Shand Power Station

- Designed to capture 2Mt
- 67% capital cost reduction (per tonne CO2)
- Cost of capture at USD$45/t CO2
- Can capture up to 97% while integrating with renewables
- Fly ash sales can further reduce CO2 – net-negative emissions
- No new water

Application to Poland

Coal-fired power provides 80% of Poland's electricity

Over 100,000 Polish jobs are related to coal

But coal-fired power plants are aging:

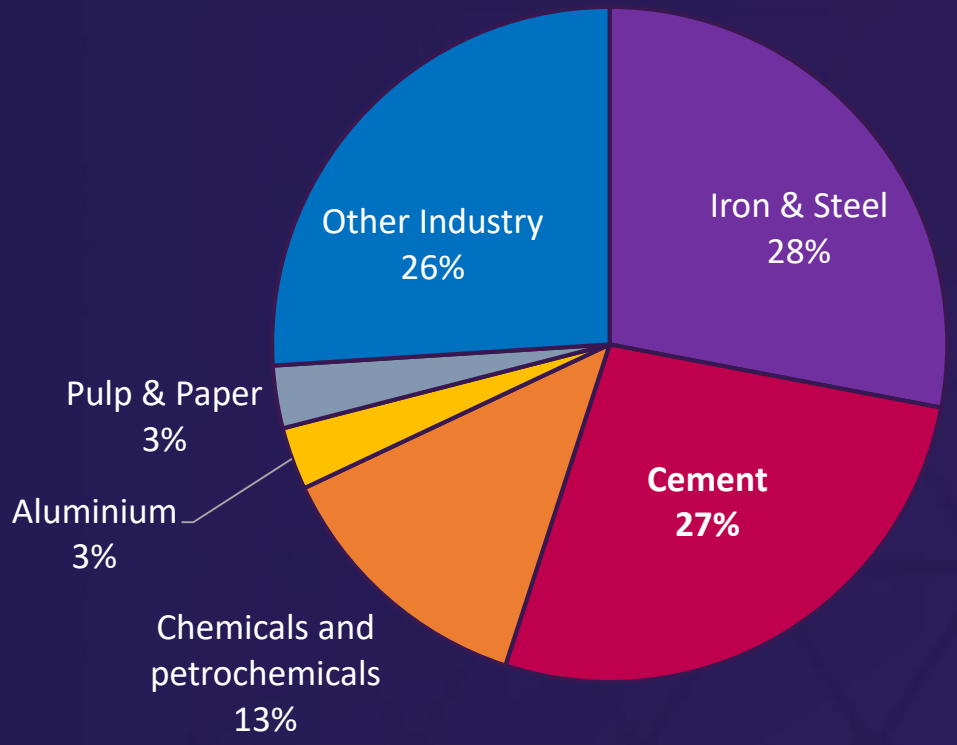
- 60% of the system is more than 15 years old
- 40% is more than 20 years old

Storage studies have been conducted and show Poland has vast storage capacity (deep saline formations and some offshore)

Coal-fired power plant in Katowice

Application to Industrial Emissions

Direct industrial CO_2 emissions (2014)



Industrial CO_2 emissions represent 24% of global CO_2 emissions at 8.3 Gt CO_2 (2014)

- Similar flue gas characteristics enable application to industrial emission sources
- Size and layout / integration are key considerations

Costs can be saved with:

- CO_2 infrastructure hubs
- cost recovery with EOR
- modularization and
- byproduct sales decisions

Driving Future Opportunities

CCS technology is proven; so de-risked deployment can occur

Reliable and affordable energy with reduced emissions are imperative for energy security.

Driving Future Opportunities:

- Cooperative approaches
- Reduce Administrative Burden
- Incentives & Financing

Operational insight drove greater:
cost reductions,
complexity reductions,
emissions reductions.

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Thank You

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