

# Boundary Dam Integrated Carbon Capture Demonstration Project

Status of Carbon Capture Programs and Technology

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## SaskPower Mandate

- **Crown Corporation**

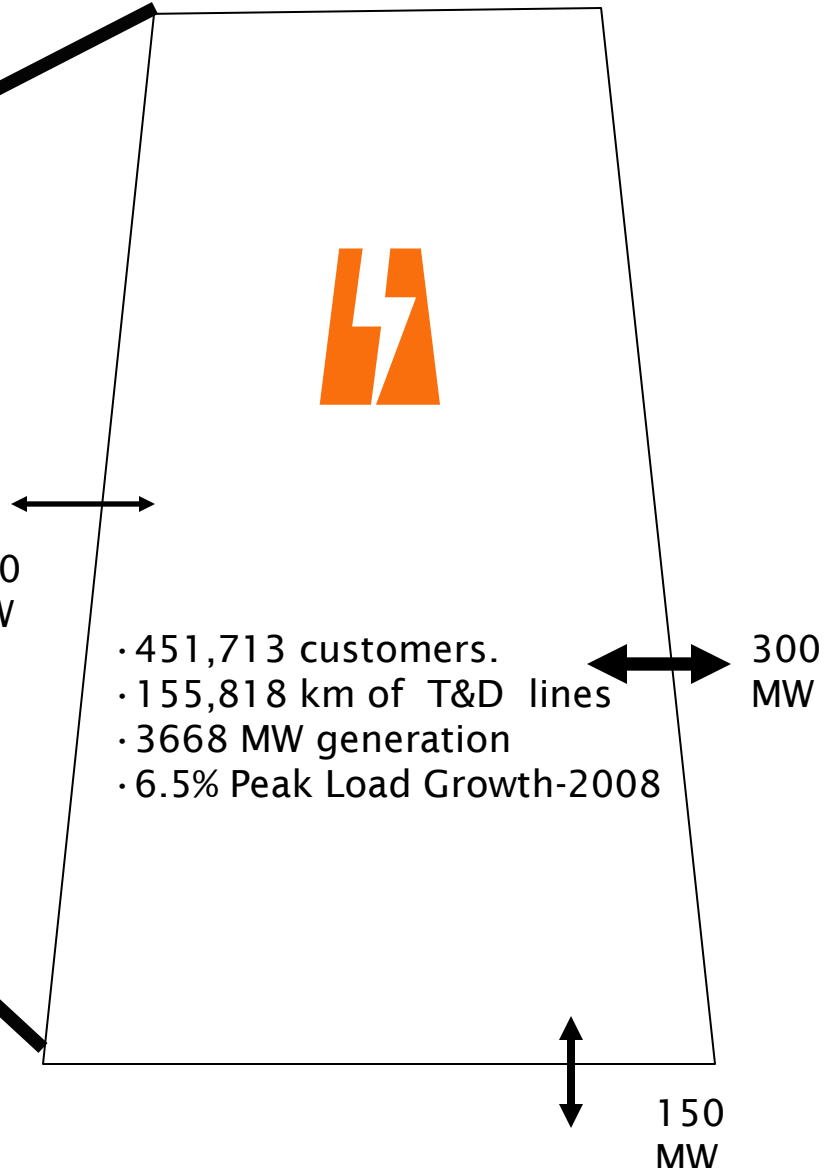
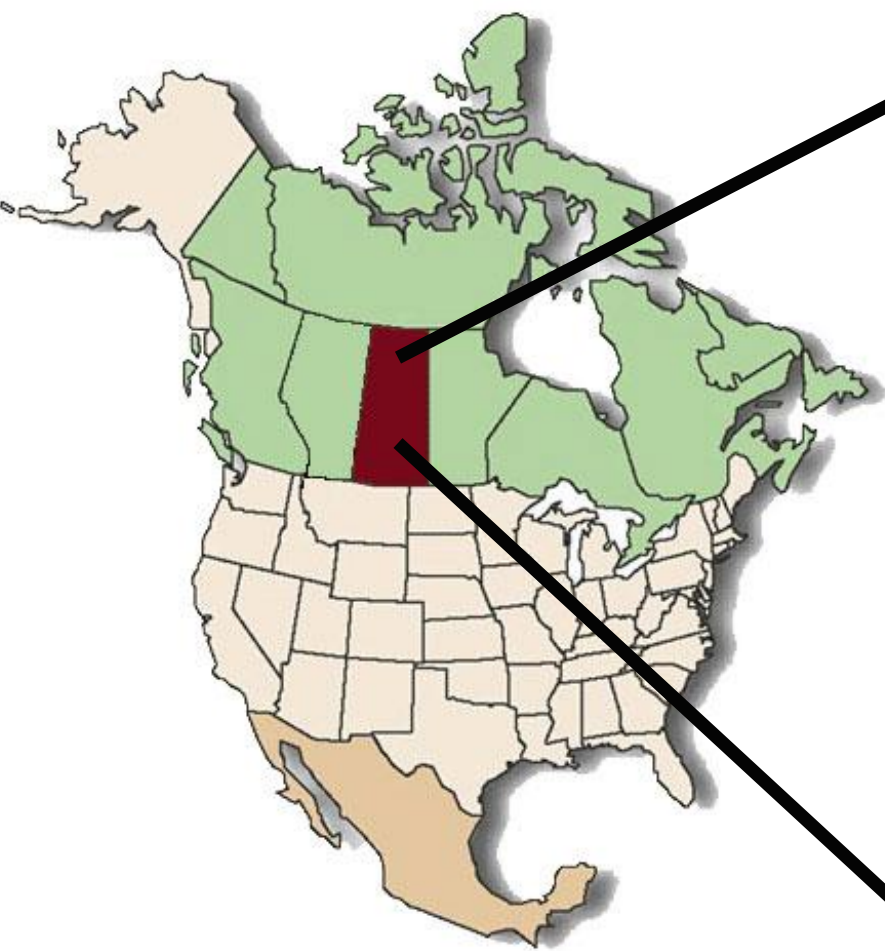
- Owned by Government of Saskatchewan

- **Mandate is to Customers**

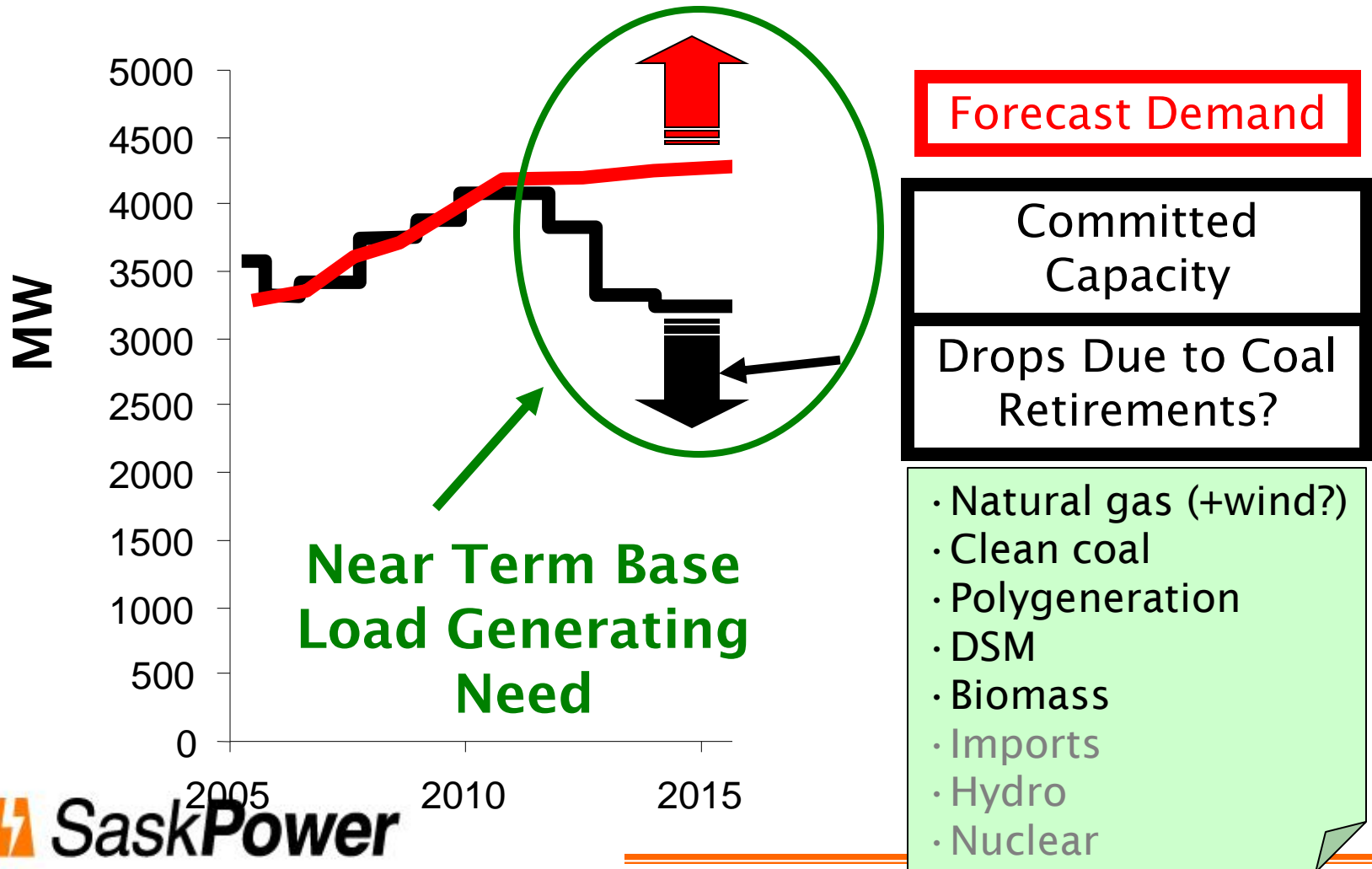
- SaskPower's mission is to provide safe, reliable and sustainable power to the people of Saskatchewan.

- Providing customers with power at the lowest possible cost.

# clean $\text{CO}_2$ ™ Project



# SaskPower Capacity Position



# Greenhouse Gas Air Emission Regulations

- **Greenhouse Gas (GHG) Regulations**

GHG Requirements (discussed to date):

- 17% below 2005 levels by 2020
- Performance standard applies to new coal in 2015 and old coal beyond 45 year end of life

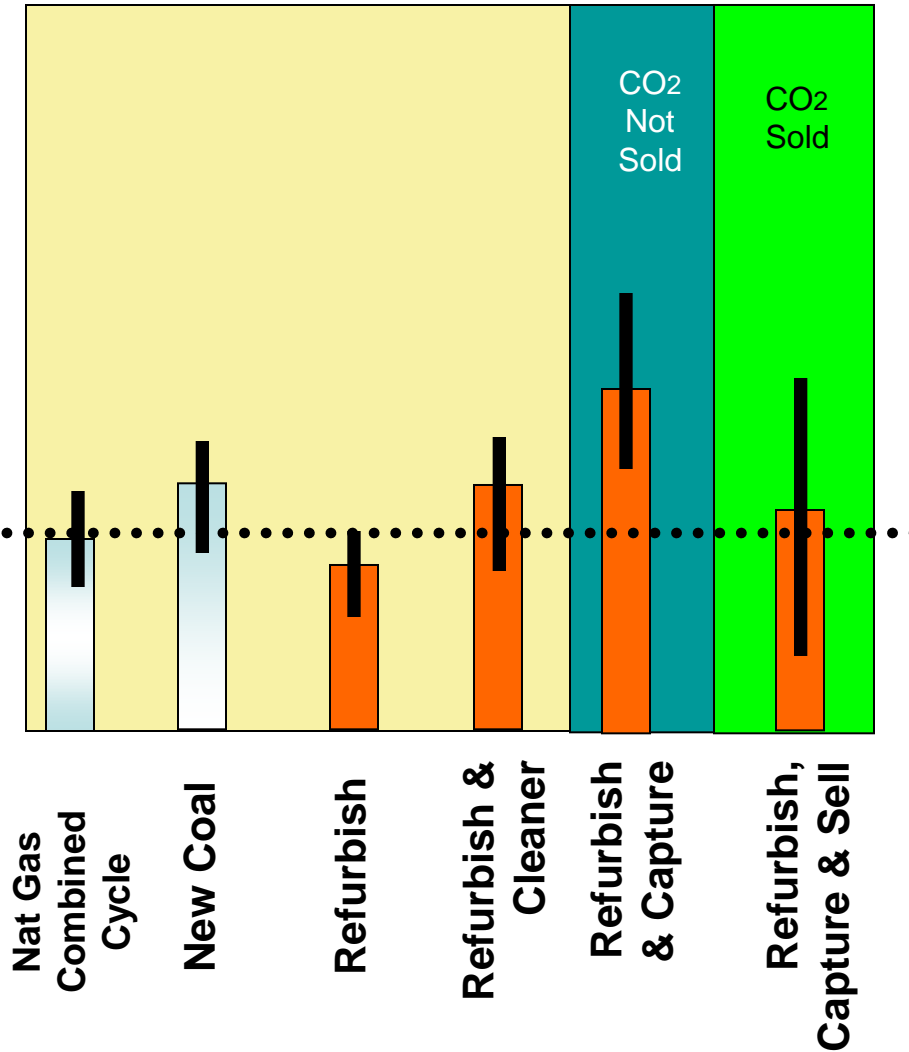
- **Federal Policy**

- to be determined in 2010
- regulations potentially set in 2015

- **Saskatchewan in alignment with Federal government on environmental regulations**

# Cost of Electricity

baseline is cost of new natural gas generation



# clean coal<sub>2</sub><sup>TM</sup> Project

## BD ICCS Demonstration

### Why BD3?

#### 1) Valuable Existing Assets

–lowers capital costs = lower cost of electricity

#### 2) Right Size

–1 million tonnes of CO<sub>2</sub> per year matches enhanced oil recovery (EOR) market

#### 3) BD3 reaches major decision in 2013

–If no action – default is retirement – 0 MWs

#### 4) Applicable to other aging coal fired units

## SaskPower Clean Coal Objectives

- To develop environmentally sustainable electricity supply options that utilize Saskatchewan's coal resource.
- To ensure that the cost of electricity (COE) from clean coal is lower than the cost from other options.



# BD ICCS Demonstration

## Five Key Deliverables:

- 1) **Life Extension** - Refurbish Unit 3 to allow an additional 30 years of reliable, safe operation
- 2) **Performance Upgrades** - Upgrade Unit 3 criteria emissions control (SO<sub>x</sub>, NO<sub>x</sub>) as well as improve efficiency
- 3) **CO<sub>2</sub> Capture Technology** – incorporate technology that best meets our overall Corporate objectives – both near and long term
- 4) **Competitive COE** – all of the above to be accomplished with a COE at or below that of the next lowest supply option – likely Nat. Gas CC. Likely require a CO<sub>2</sub> sale for EOR to achieve
- 5) **In-Service 2013**

## Project Economics

- **Cost of Electricity (COE)**= lifetime costs – lifetime non-electricity revenues
- **Costs:**
  - capital cost of the designing, procuring and erecting the plant
  - lifetime expenses to operate and maintain the plant
  - lifetime cost of fuel
- **Revenues:**
  - revenue from the sale of CO<sub>2</sub>
  - avoided green house gas emissions credit
  - subsidy funding from government for first of a kind project

# clean $\text{CO}_2$ ™ Project



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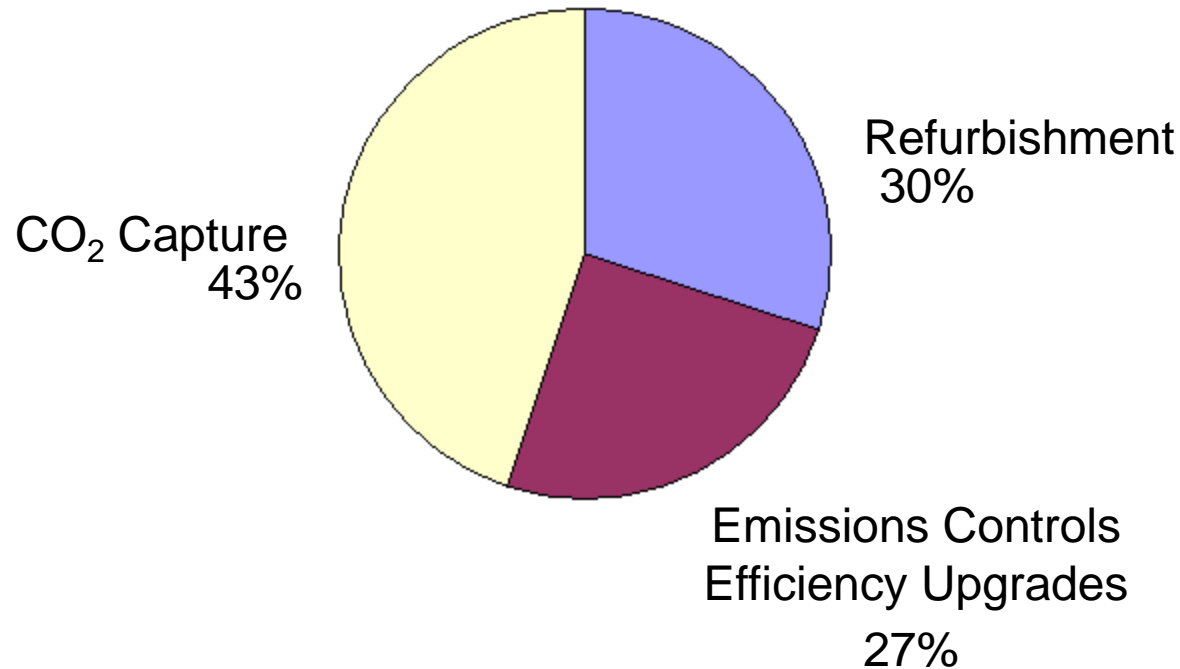


CO<sub>2</sub> Capture Plant

## Construction Forces

- Estimated 1,100 person-years of work;
- Work will begin almost immediately after project approval, late 2010;
- Peak construction period: mid-2011 through mid-2013 average in range of 300 to 400 people, peaking at approximately 600 people.

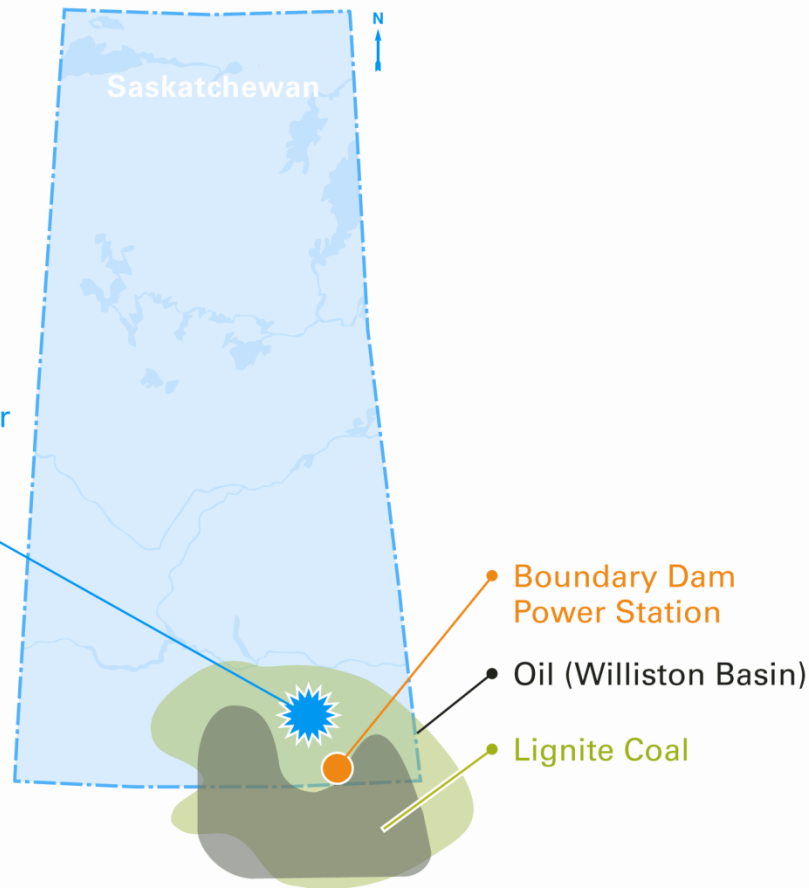
# Boundary Dam Project Capital Cost Breakdown



# Saskatchewan Experience in CO<sub>2</sub> Storage

## Weyburn-Midale CO<sub>2</sub> Monitoring and Storage Project

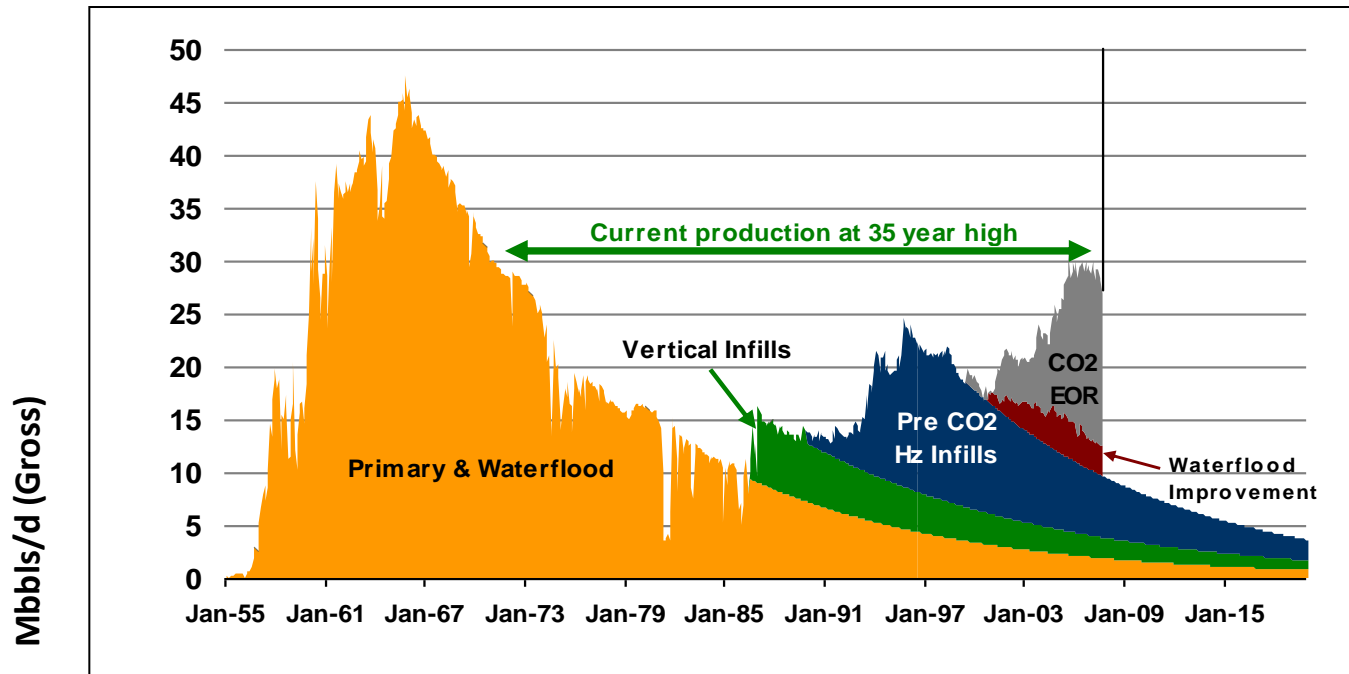
World's largest full-scale, in-field measurement, monitor and verification study with enhanced oil recovery





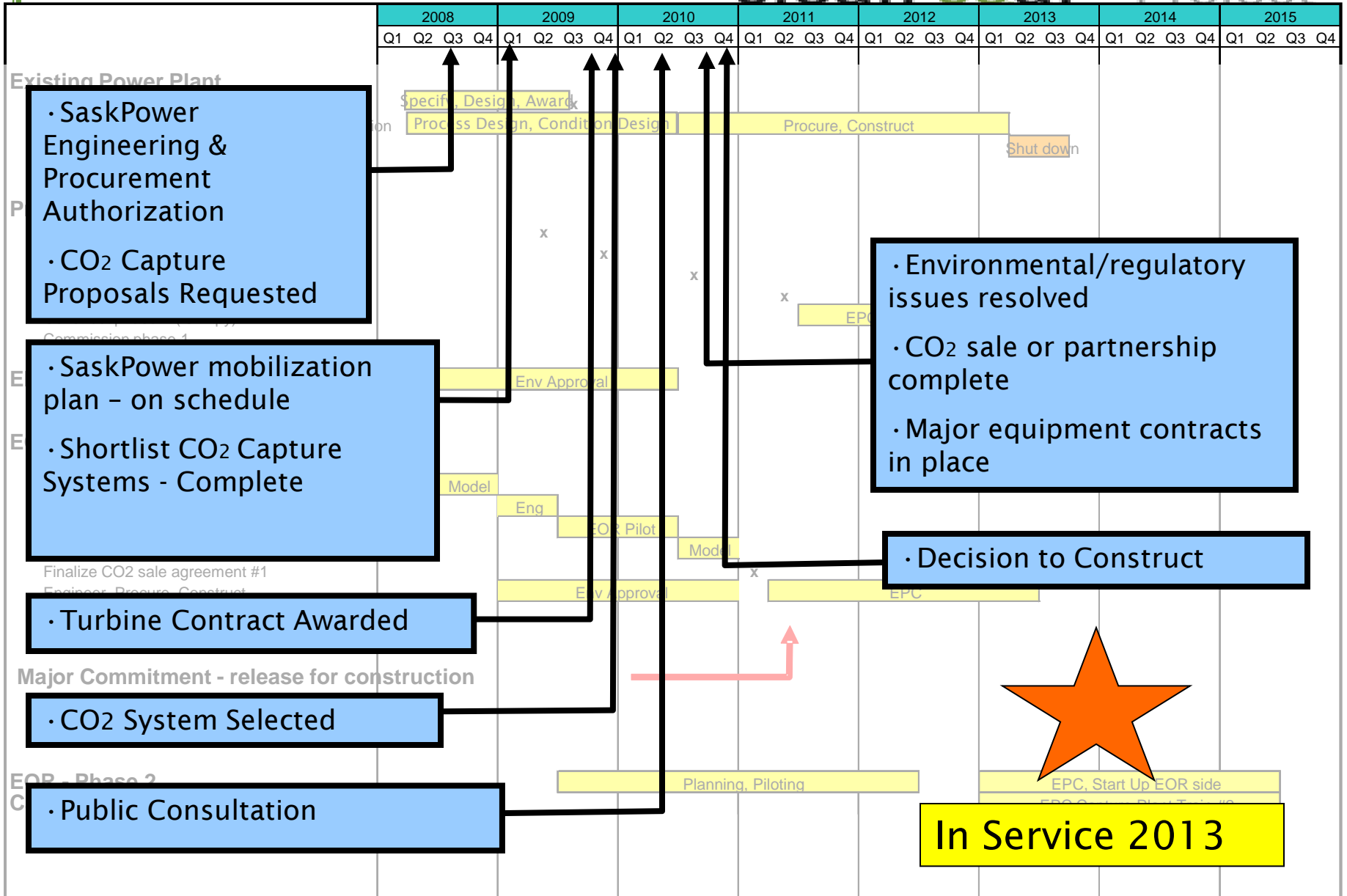
## Total Oil Production at Weyburn

- Around 30,000 bbl/day: a 35-year high
- 20,000 bbl/d are due to the CO<sub>2</sub> flood



CO<sub>2</sub> stored equivalent to removing more than 8 million cars off the road for a year

# clean coal™ Project





SaskPower  
Boundary Dam