

Carbon Capture and Storage Workshop London 28-29 October 2008



Recent Developments in CCS in Canada



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Outline of Today's Presentation



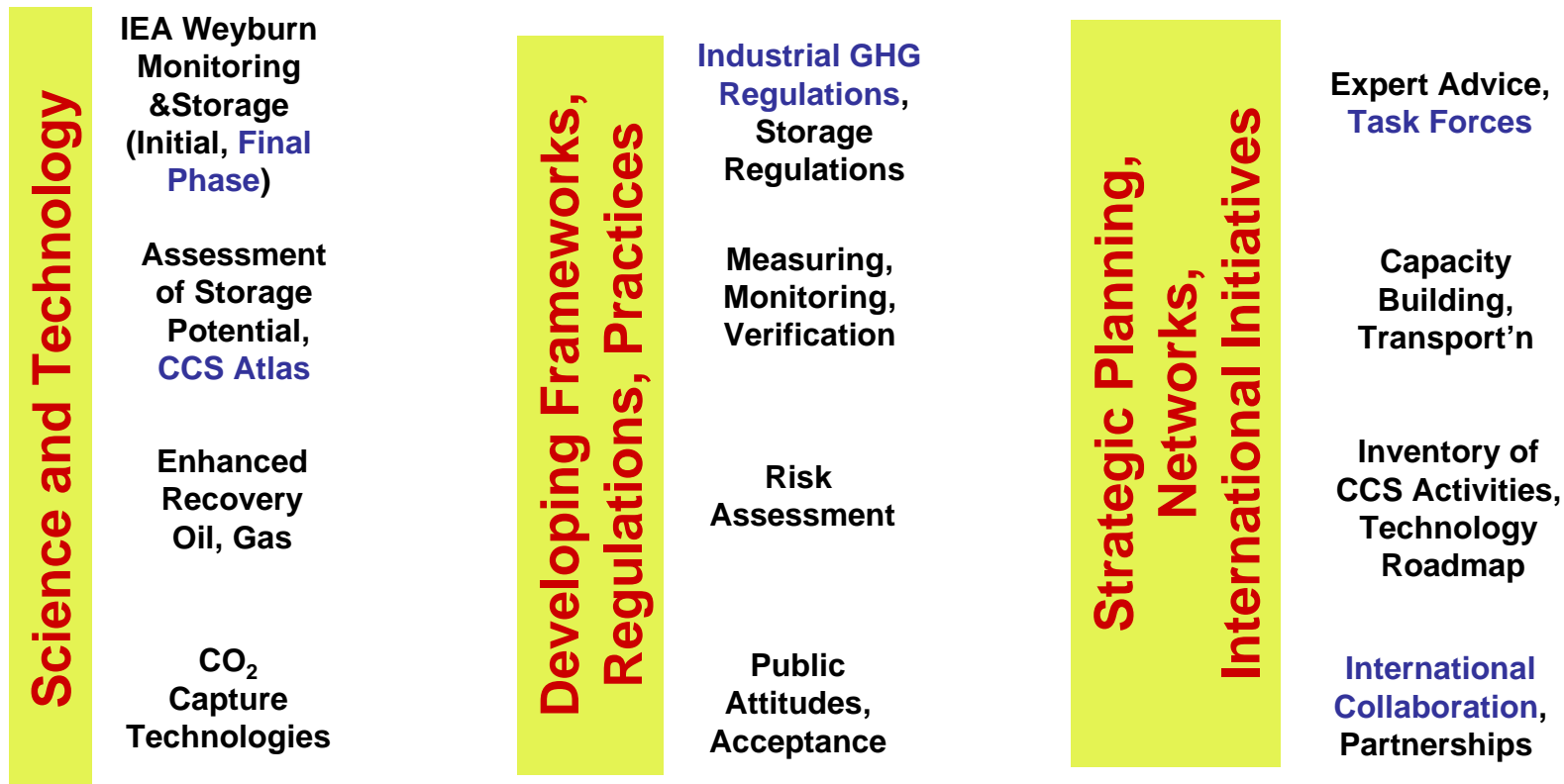
- **Weyburn Project Update**
- **Financial Incentives**
- **Federal R&D**
- **Demonstration Projects**

Canada's CCS Program

A Suite of Interdependent Initiatives



CCS Program Vision – Creating the Environment for Widespread Implementation of CO₂ Capture, Use and Storage in Canada





IEA GHG Weyburn - Midale CO₂ Monitoring and Storage Project

Highlights from Initial Phase 2000-2004 (Weyburn Field)

Update on Final Phase 2007-2011 (Weyburn and Midale Fields)



IEA GHG
WEYBURN-MIDALE
CO₂ MONITORING
AND STORAGE PROJECT



Phase I – 2000-2004 Objectives and Results



■ Objectives

- *to **develop monitoring and modeling** methods to address the long-term migration and fate of CO₂*
- *to **predict and verify** the ability of oil reservoirs to securely and economically contain CO₂ through a comprehensive analysis of various methodologies*

Geological characterization of geosphere and biosphere

the geological setting at Weyburn-Midale appears to be highly suitable for long-term CO₂ geological storage

Prediction, monitoring and verification of CO₂ movements

Seismic monitoring proved effective to track movements, as did geochemical fluid sampling

CO₂ storage capacity and distribution predictions, and the application of conformance control treatments –

history matching was successful

Long-term risk assessments of the storage site

98% of the injected CO₂ will remain stored

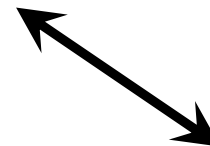
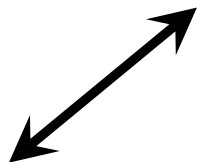


Final Phase – 2007-2011 Best Practices Manual, Project Components



Best Practices Manual

- Practical technical guide CO₂ EOR storage projects
- Will accelerate development of – regulatory frameworks, public communication and dialogue, policy development



Technical Components

(90% of budget)

1. Site Characterization / Selection
2. Wellbore Integrity
3. Monitoring and Verification
4. Risk Assessment



Non-Tech Components

(10% of budget)

1. GHG Regulatory Protocols
2. Public Communication and Outreach
3. Business Environment / Fiscal Policy



Final Phase – 2007-2011 Technical Program



- ***Theme 1 – Geological Integrity (Site Selection)***
 - develop firm protocols for site selection

- ***Theme 2 – Wellbore Integrity***
 - complete identifying essential parameters for well-bore integrity

- ***Theme 3 – Storage Monitoring Methods***
 - Characterize the accuracy of monitoring technologies for quantitative prediction of CO₂ location and volume

- ***Theme 4 – Risk Assessment and Storage Mechanisms***
 - complete full-field risk assessment from Phase 1



Final Phase – 2007-2011 Non-Technical Program



- ***Theme 1 – Regulatory Protocols***
 - Scoping study of CCS regulatory initiatives

- ***Theme 2 – Public Communication and Outreach***
 - Communication and Action Plan

- ***Theme 3 – Business Environment***
 - Study complete

R&D in Canada



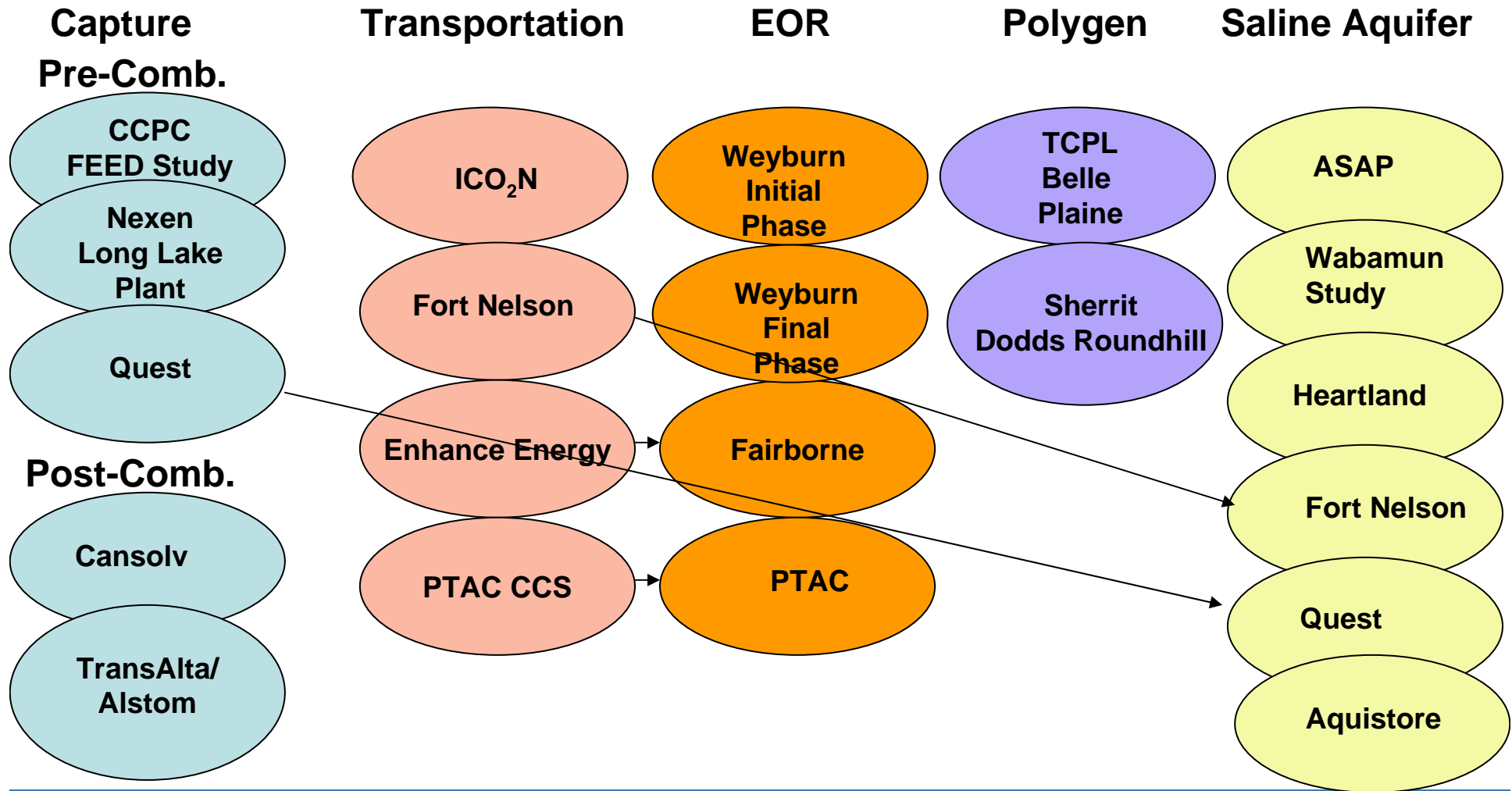
- **Capture-related activities**
 - **Gasification**
 - for coal, petroleum coke, bitumen and biomass
 - **Oxy-Fuel Combustion**
 - applicable to all forms of fossil fuels (solid, liquid and gaseous),
 - **CO₂ Scrubbing with Solvents**
 - post-combustion process as a stand alone add-on to existing air combustion process,
 - integrated with either the gasification or oxy-fuel combustion process
- **CO₂ Storage related activities**
 - **Develop Measurement, Monitoring and Verification tools and protocols**
 - **Assessing storage integrity**
 - **Analyzing public attitudes, developing communication materials**
 - **Develop CCS Atlas**

Recent CCS Funding Initiatives



- **\$240m – Partnership between Canada; Saskatchewan; and SaskPower for a \$1.4 b project**
- **\$125m - ecoENERGY Technology Initiative**
- **\$5m – To support research at the Institute of Sustainable Energy, Environment and the Economy**
- **\$5m – To support geological research examining the potential for carbon storage in Nova Scotia**
- **\$2b – Alberta call for CCS proposals**

Recent Industry Announcements and Initiatives



Key Messages

CCS at the Tipping Point?



- **CCS is recognized as a means of meeting GHG reductions**
- **CCS is not technology dependent**
- **Regulatory systems are developing**
- **Funding is available**
- **There is no lack of projects**

BUT

- **Liability and some financial risk are issues**