Developing a Carbon Capture and Storage (CCS) Blueprint for Alberta

Fall 2008 Update

Jim Carter, Chair
Alberta Carbon Capture & Storage Development Council

CARBON CAPTURE AND STORAGE

A Pembina Institute–ISEEE Thought Leader Forum

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Alberta Government direction

- Government priority: ***Ensure Alberta's energy resources are developed in an environmentally sustainable way.***
- Minister Knight's mandate letter from Premier Stelmach: ***Implement carbon capture & storage research and demonstration projects***

Alberta has taken a leadership position by virtue of its $2B funding for vanguard CCS Projects in Alberta

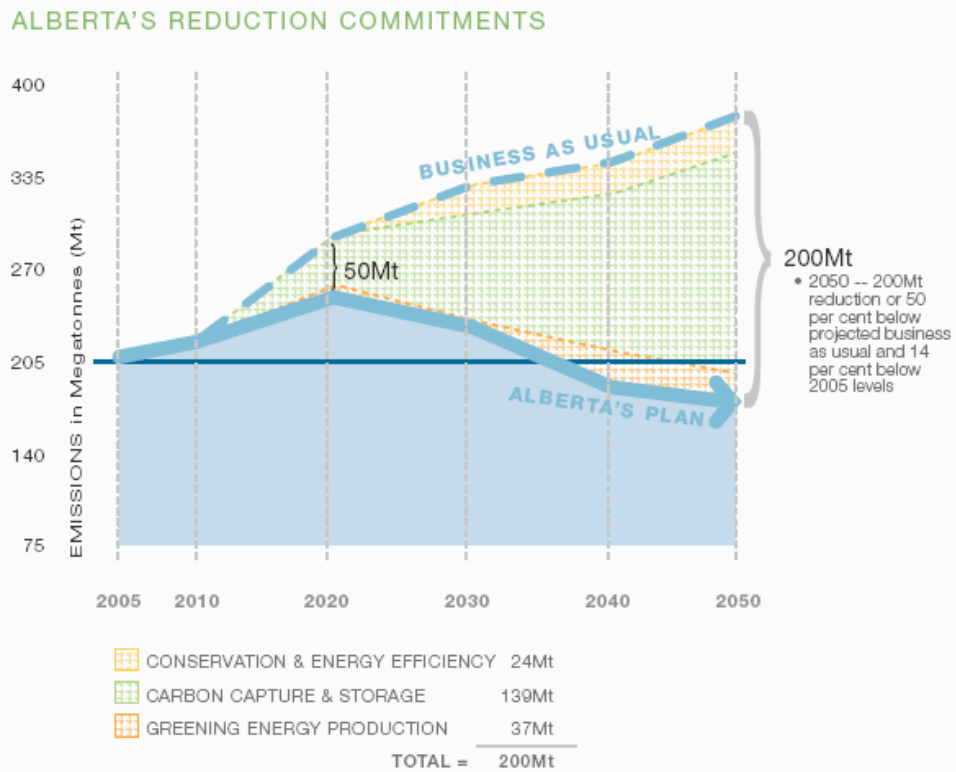
Council's Framework

- Make recommendations to facilitate the immediate implementation of CCS in Alberta - **$2B announced**
  - *But this is now an ADOE program – Council not involved*
- Make recommendations to facilitate the long-term success of CCS in Alberta
- Underlying considerations:
  - Keep industries competitive
  - Provide certainty for long-term planning
  - Meet commitment in Alberta's 2008 Climate Change Strategy

Mandate

- Objective:
  "…..partnership for making meaningful, progressive, and immediate advancements on the adoption of CCS technology in Alberta"

- Help Alberta deliver 139Mt of reductions by 2050 (Alberta's Climate Change Strategy)
- Respond to Eco
- Final report 09



CCS Development Council Membership

Government:

- Len Webber, MLA
- Peter Watson, AB Energy Dept.
- Jim Ellis, AB Environment Dept.
- Ian Shugart, Environment Canada
- Cassie Doyle, NRCan

Academia:

- Mike Percy, U. of A.
- David Keith, U. of C.

Industry:

- Jim Carter, Chair
- Don Lowry, EPCOR
- Roger Thomas, Nexen
- Steve Williams, Suncor
- Bill Andrew, Penn West
- Dave Collyer, Shell
- Kathy Sendall, Petro-Canada
- Art Meyer, Enbridge
- John Brannan, EnCana

Importance of CCS for Alberta

- Society will depend on oil, gas and coal for some time, so demand for our energy will grow…..consumption remains one of the largest contributions to total greenhouse gas emissions
- As a global energy supplier, Alberta's CO_2 emissions are increasing due mainly to energy production – the heart of the Alberta economy
- And now the "but"…

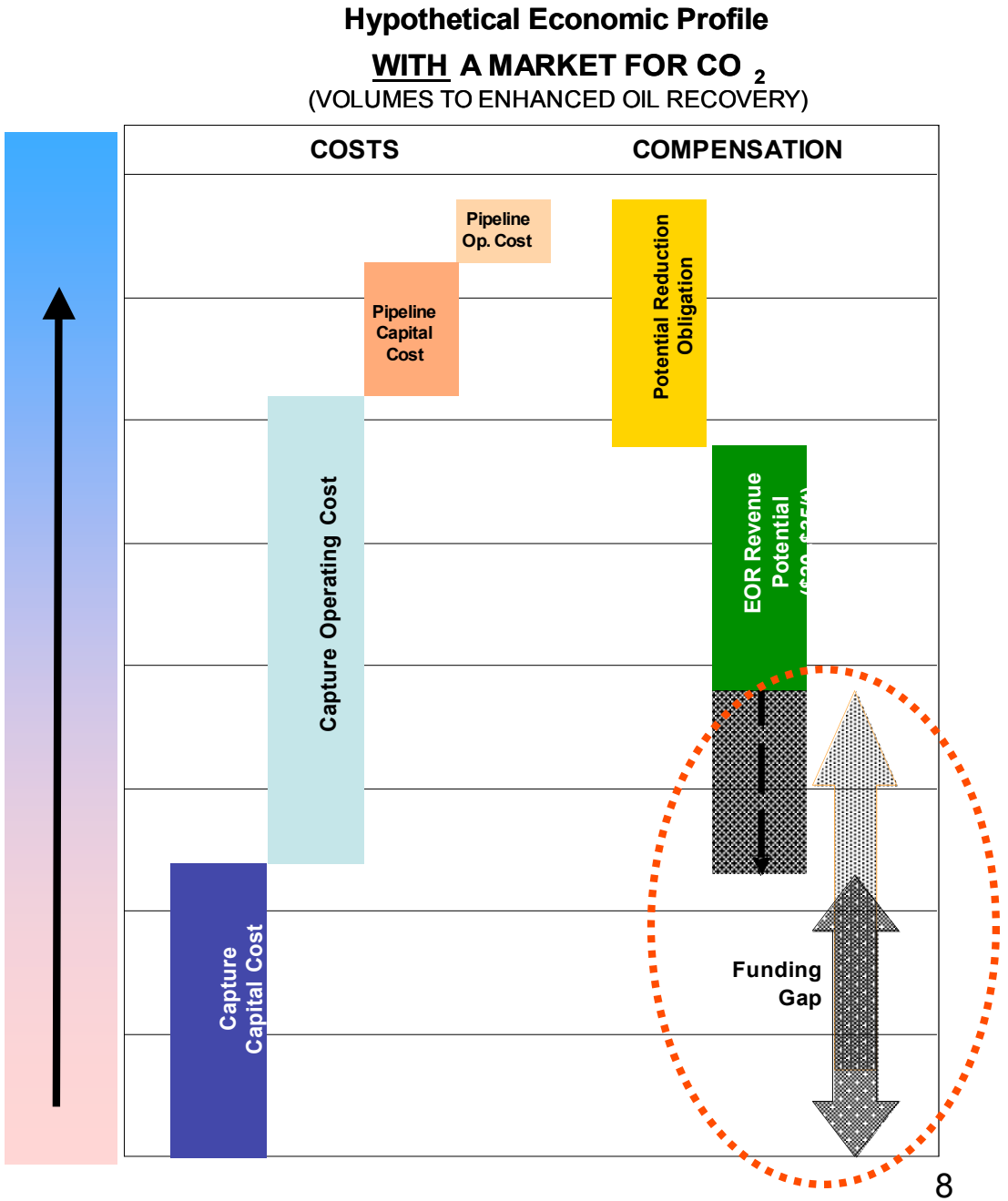
Importance of CCS for Alberta

- But… the world is becoming carbon emission constrained and customers are demanding cleaner fuel processing
- An investment in CCS is also an investment in the environment
- CCS will be key as it is the only technology able to transform the GHG footprint in the timelines/scale required – this is being recognized around the world

Closing the cost gap…

…may well be the single largest task…

…unless/until the international price of carbon increases



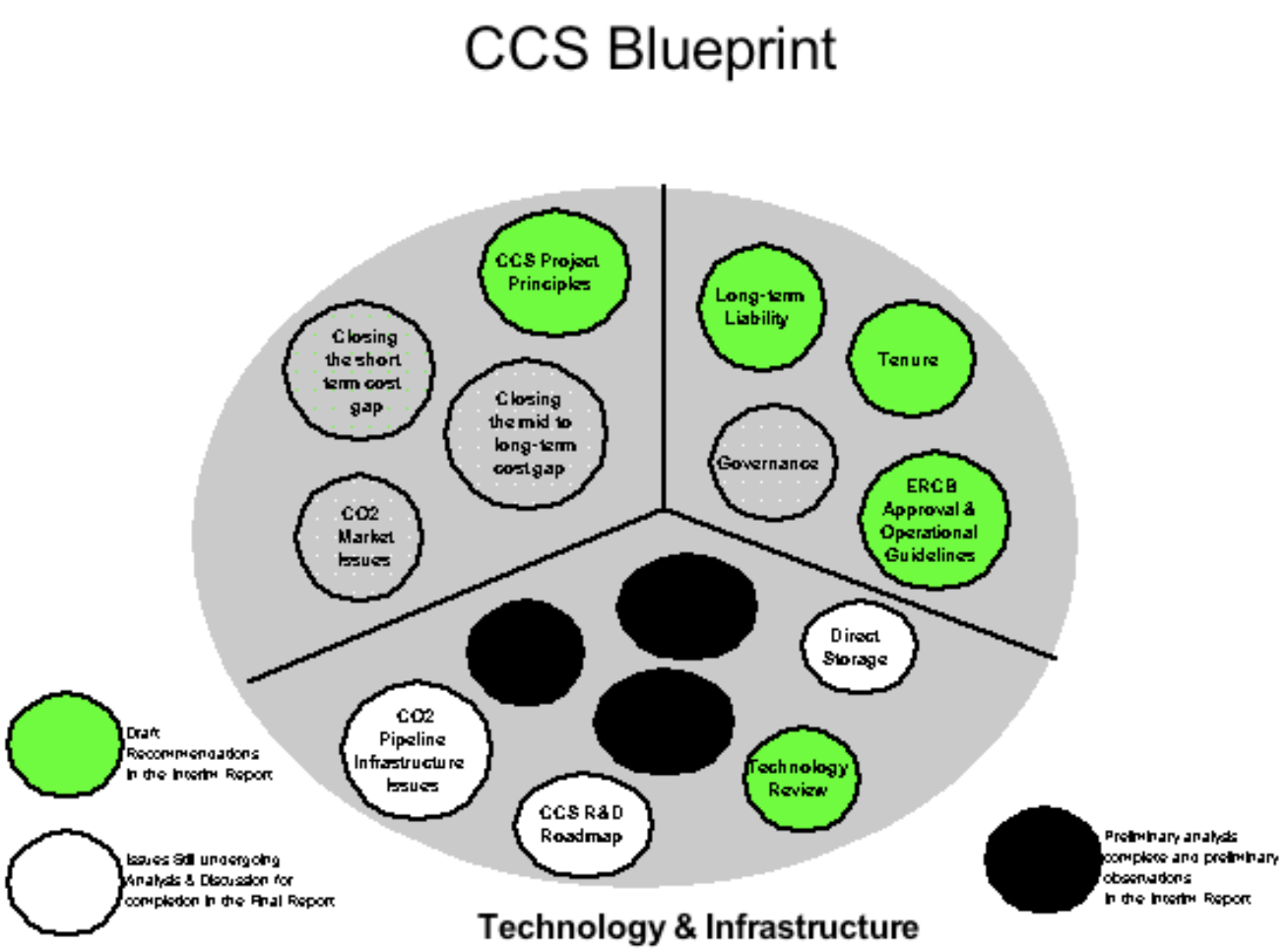
Initial High-level Observations

- *Greenhouse gas (GHG) emissions will continue to grow before they start to fall* – CCS emissions reduction is an immediate challenge that requires ongoing and sustained commitment
- *Technical, economic and schedule risks* – large-scale CCS will take time to properly implement
- *Alberta leadership* – needed in the development of CCS technologies and implementation given the immensity of projected energy developments
- *Unique opportunity* – in Alberta to implement a broad-based CCS network given the large number of single point GHG emission sources and reservoirs
- *Strong regulatory base* – related to hydrocarbon emissions and storage from which to grow a CCS regulatory framework
- *Strong CCS R&D and technology* leadership base that needs to continue to grow to meet Alberta's sustainability challenge

Preliminary Recommendations

- A set of principles to consider in providing public support for CCS projects;
- A recommended approach to CCS/CO_2 long-term liability and tenure issues;
- Recommended site/operational guidelines;
- A preliminary review of CO_2 supply costs;
- A review of the key CCS technology challenges to be focused upon;
- A preliminary review of EOR demand and economics.

Framing the Blueprint: 3 key success factors



CCS Principles for Public Support…

- The Alberta Government's $2B CCS Program:
  - End-to-end integrated projects that offer real CO_2 reductions
  - Projects that demonstrate promising technologies from more than one industry sector
  - Projects that offer cost effectiveness and the potential for broader application
  - Projects that have the potential to contribute to the cost-effective development of medium-term transportation, sequestration and enhanced oil recovery (EOR) infrastructure within Alberta
  - Projects that have risk mitigation plans

…were delivered to the Alberta Government before the Expression of Interest deadline – the Council has no further role in this program

Policy & Regulatory: Completed & In Preparation

Completed

- Tenure policy framework
  (pore space a key issue)
- Liability framework
  (MMV & public safety)
- ERCB project approval process for CCS
  (avoiding CCS industrial site "proliferation")

In Preparation

- Details on tenure
- Details on liability framework
- "How to apply for CCS approval" guide from the ERCB
- Governance – maintaining the CCS momentum

Technology/Infrastructure: Completed & In Preparation

Completed

- Technology review
- Capture technology & costs – initial estimates (cogen to lower costs)
- CO_2 supply curve – initial estimates (real "captureable" amounts)
- EOR demand curve – initial estimates (EOR/storage synergies)

In Preparation

- Final recommendations on technology/R&D needs
- Capture technology & costs – final
- CO_2 supply curve – final
- EOR demand curve – final
- Direct storage/Saline
- Pipeline system

Conclusions

- The Council is on track to complete its work by around the end of 2008 or early 2009
- CCS development will take a long & sustained effort that has:
  - The right policies, regulations & incentives in place to close the cost gap over many years
  - Technology costs coming down over time
  - Clarity and supportive project-based regulations
  - Ongoing private/public partnership to coordinate and manage CCS development

Back-up Slides

Organization & Reporting Structure