

# **Alberta's approach to managing long-term liability**

*Prepared by Alberta Energy*

*Joint IEA-GCCSI Workshop*

*April 21, 2015*



# Overview

- Alberta's CCS development program
- Alberta's approach to long term liability management
- Post Closure Stewardship Fund
- Lesson's learned

# Alberta's CCS Development Program

- CCS Funding Program
  - Enable development of commercial-scale CCS
- CCS Policy and Regulatory Development
  - Reduce regulatory barriers. Ensure comprehensive & transparent regulatory framework.
  - Build public confidence
- Engagement & Knowledge Sharing
  - Contribute to Global Effort
  - Learn from others

# Alberta's CCS Funding Program

- Objective is to sequester 2.76 Mt CO<sub>2</sub> annually, with projects starting to come on line in 2015
- CAD\$1.3 billion allocated to two commercial-scale projects:
  - Alberta Carbon Trunk Line
  - Quest Project
- Reduce oil sands emissions
- Knowledge sharing



# The Quest Project

- Partners: Shell Canada, Chevron, Marathon.
- 1.08 Mt/year into deep saline formation.
- Funding (\$1.3 Billion):
  - \$745 Million – Alberta
  - \$120 Million – Canada
  - \$485 Million – Quest Partners
- Commercial Operation: 2015



# The Alberta Carbon Trunk Line

- Partners: Enhance Energy, NWRP.
- 1.68 Mt/year via CO<sub>2</sub>-EOR.
- Capacity of 14 Mt/year
- Funding (\$1.2 Billion):
  - \$495.0 Million – Alberta
  - \$63.3 Million – Canada
  - \$640 Million – ACTL Partners
- **Commercial Operation: 2017**



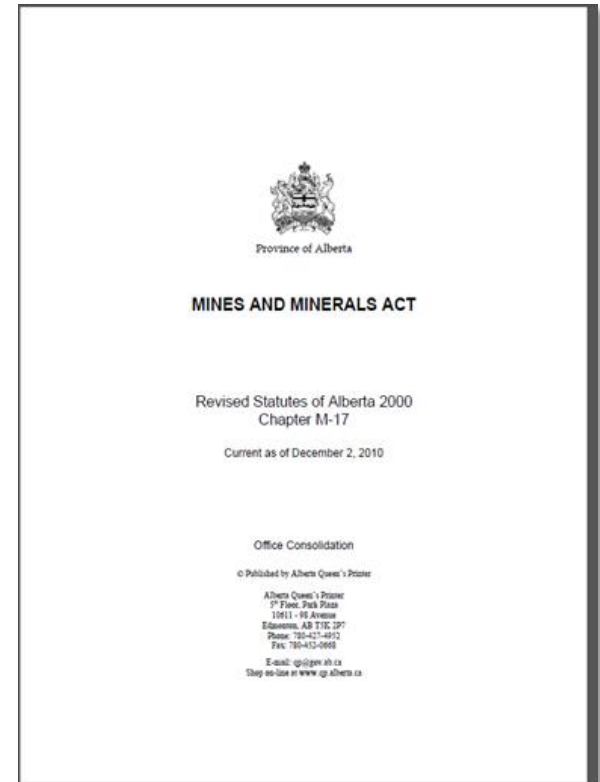
# Long term liability

- Issue for today's discussion:
  - long-term liability for sequestered CO<sub>2</sub> is a key regulatory issue facing CCS proponents and Governments
- Alberta's Path:
  - Alberta will assume long-term liability once a closure certificate is issued.

# CCS Legislation

## ***CCS Statutes Amendment Act, 2010***

- Pore space ownership
- Tenure agreements
- Long-term liability
- Established the Post Closure Stewardship Fund (PSCF)

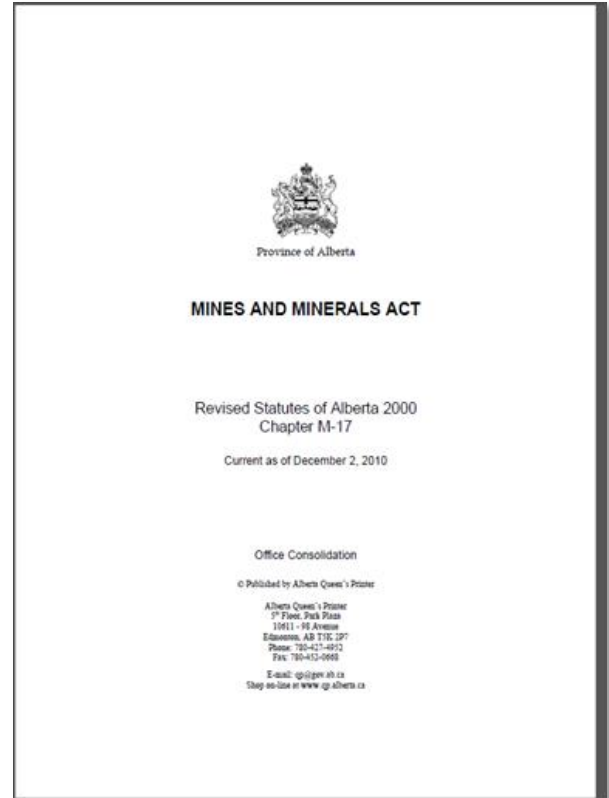




# CCS Legislation

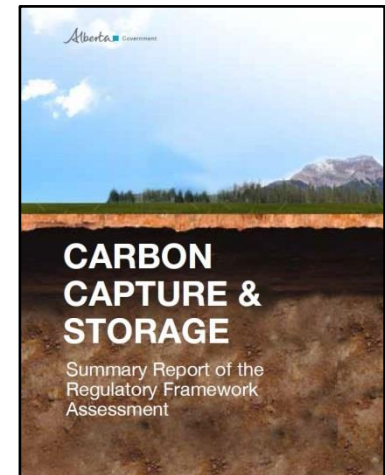
## ***CCS Statutes Amendment Act, 2010***

- Upon issue of closure certificate, the Crown:
  - Becomes owner of captured CO2 site
  - Assumes obligations of the lessee
  - Indemnifies lessee against tort damages



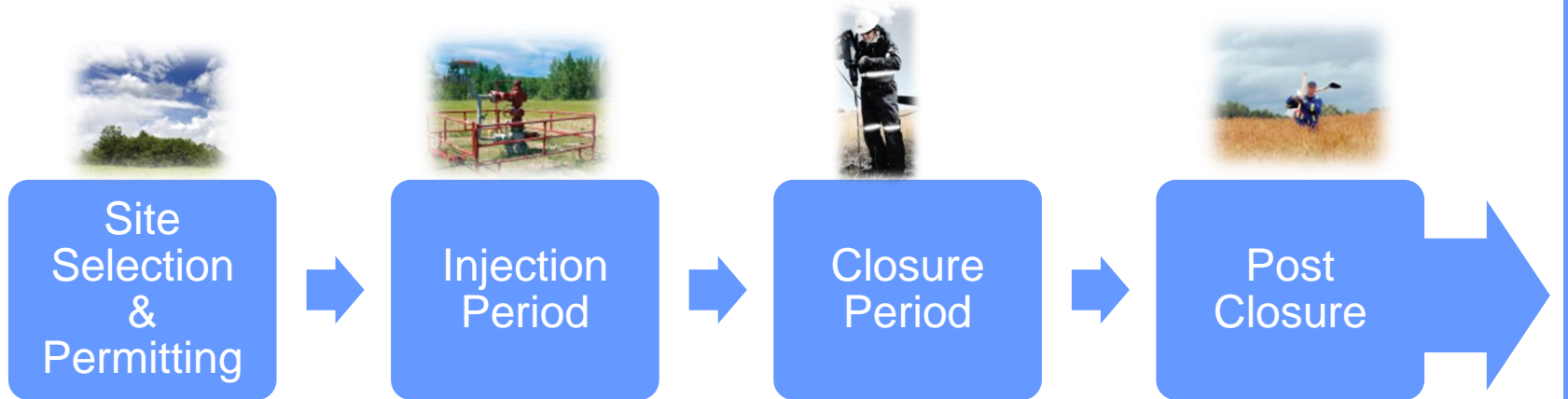
# Regulatory Framework Assessment

- 18-month review of Alberta's framework
  - Assessed regulatory system:
    - Applications, Approvals and Regulatory Framework
    - Risk Assessment, Monitoring, and Technical Requirements
    - Public Consultation and Notification, Surface Access and Public Safety
    - Site Closure and Long Term Liability
  - 71 recommendations to consider toward closing regulatory gaps or enhancing current requirements



# CCS Project Timeline

## Managing Long Term Liability



## Responsible for CO<sub>2</sub> storage site



# Site Selection and Permitting



- *Carbon Sequestration Tenure Regulation*
  - Evaluation Permit 5 year, non-renewable
  - **Carbon Sequestration Lease** 15 year, renewable
    - Require MMV and **Closure plans** – (renewed every 3 years)
- **Site selection**
  - Adequate storage volume capacity, injectivity, suitable containment
- 1000m minimum depth
- Various approvals through Regulator

Site  
Selection  
&  
Permitting

# Site Selection and Permitting



- RFA Recommendations

- Risk Assessments

- Should form the basis of Closure and MMV plans

- Closure plans criteria

- Project overview, storage performance criteria for site closure (as per MMV submission), storage performance evidence, operating plan updates, proposed closure activities.

- MMV

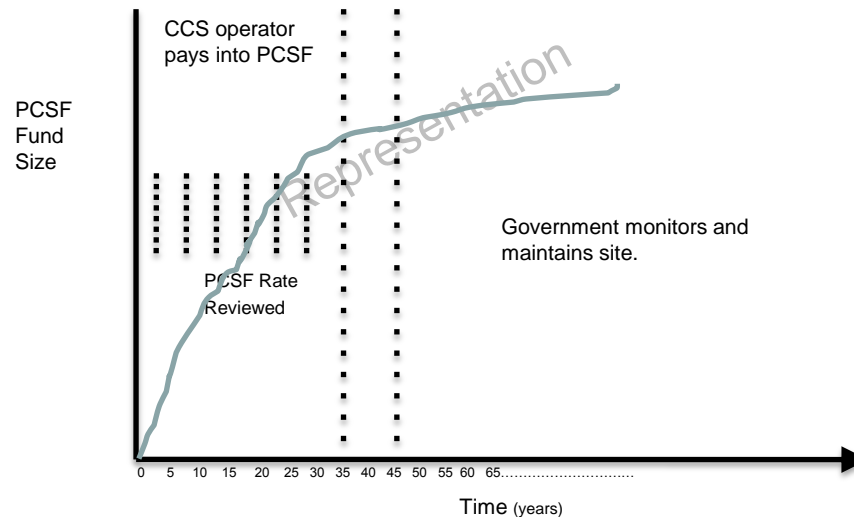
- Use of best available technologies to monitor each domain of review
    - Risk based, site specific
    - Shallow groundwater monitoring plans

Site  
Selection  
&  
Permitting

# Injection Phase



- Ongoing updates to MMV, Closure plans.
- Reporting and data
- Payments into the Post Closure Stewardship Fund (PCSF)



Injection Period

# Closure



- Closure Period
  - Ongoing monitoring
  - Abandonment and reclamation
- Closure Point
  - Issuance of a Closure Certificate once all closure requirements are fulfilled
  - Point when long-term liability for sequestered CO<sub>2</sub> transfers to the Crown

Closure

# Closure



- RFA Recommendations
  - Minimum closure period of 10 years.
  - Closure criteria:
    - Conformance
    - Containment
    - Predictable CO2 behaviour
    - Decreasing risk profile
    - Decommissioning and surface reclamation complete
  - Closure certificate application
    - Include a final closure report and MMV report (evidence and data)

Closure



# Post-Closure



- Ongoing maintenance and monitoring
- **Post Closure Stewardship Fund**
  - Uses:
    - Monitoring of injected CO<sub>2</sub>
    - Fulfilling obligations assumed when closure certificate issued
    - Suspension, abandonment, remediation and reclamation of orphaned facilities (not capture or pipelines)
- Work to Date:
  - CCS RFA
  - PCSF Working Group

Post  
Closure

# Post Closure Stewardship Fund

- RFA Recommendations
  - Elements to consider when determining the rate
    - Risk-based and probability-weighted basis
    - Project specific
    - Not increase due to withdrawals from the PCSF, or risks associated with other projects
    - Be reviewed every three years
  - Funds should be pooled amongst all PCSF payees

# PCSF Working Group

- Members from government agencies, NGOs, academia and industry
- Goals of the Working Group:
  - Assist in development of robust procurement process for Fund rate consultant
  - Review consultant progress over the duration of the contract
  - Provide detailed principles that can be used to set the Fund rate

# Methodology

- Statistical model

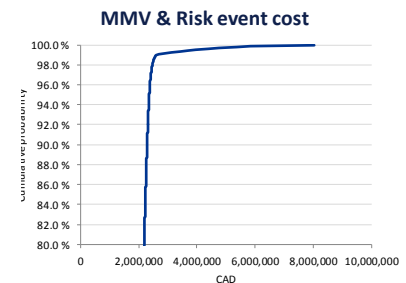
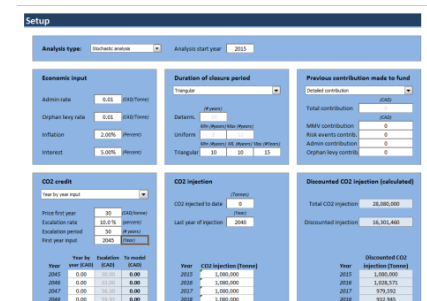
- Commissioned DNV GL to produce a replicable, defensible and quantitative methodology.

- Risk based, probability weighted, and project specific

- Statistical Model (Monte Carlo Simulation)

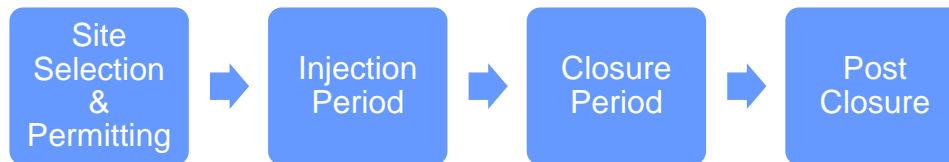
- Inputs include

- Monitoring, measurement and verification
- Risk events
- Interest and Inflation rate
- Orphan levy
- Admin Cost



# Lessons learned

- Collaboration has been key
  - Global experts
  - RFA has provided a future look
  - Project Proponents
- Approach allows for refinement
  - Learn by doing
  - Roles and responsibilities
  - PCSF - Ability to review



# Knowledge Sharing

- Knowledge sharing reports focus on:
  - Capture, transport and storage;
  - Regulatory Approvals; and
  - Costs and Revenues.
- *What would valuable be for you?*
- Alberta's first knowledge sharing reports are publically available at:

<http://www.energy.alberta.ca/Initiatives/1438.asp>



Thank you

Alberta 