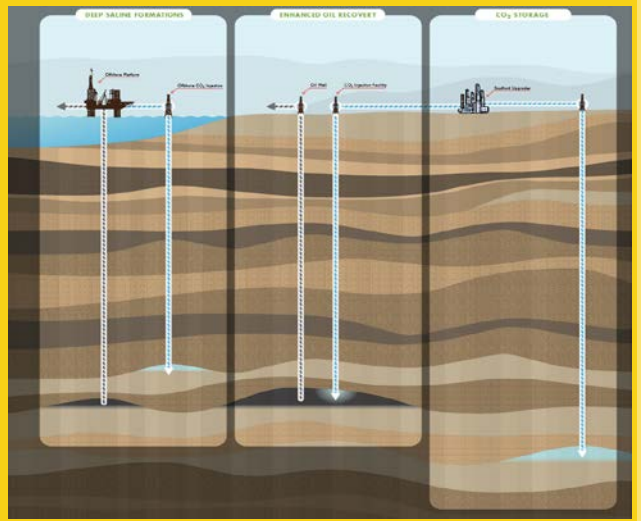
QUEST Carbon Capture & Storage Project

Synergy Conference

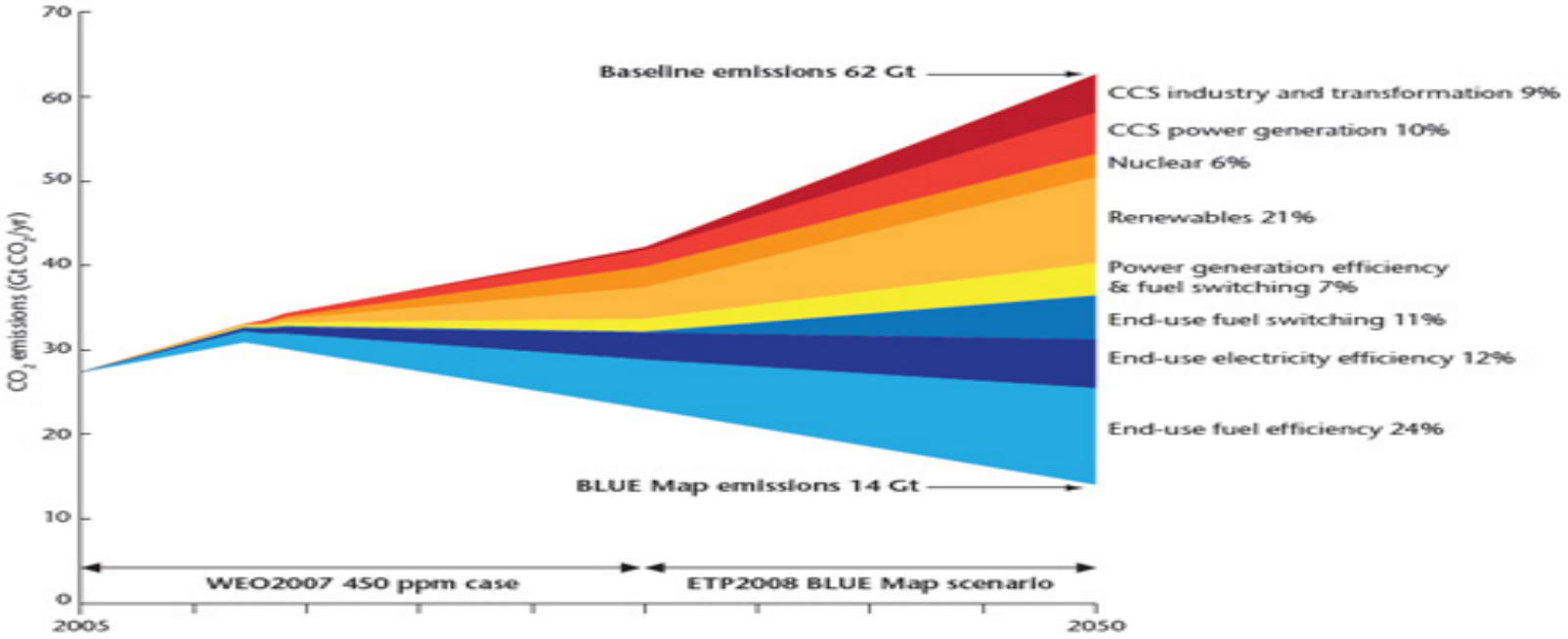
October, 2011



Ian Silk, Manager - Quest Venture

Shell Canada Energy

Importance of CCS in Mitigating Climate Change

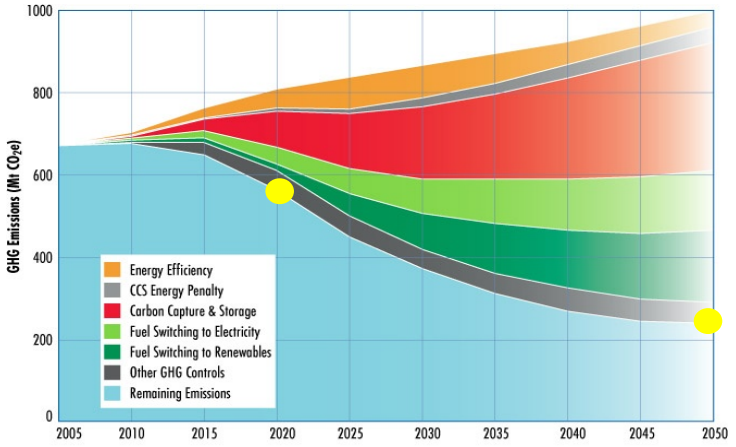


- International Energy Agency (IEA) view CCS as significant part of the GHG mitigation plan in order to keep global warming below 2ºC
- Forecast to account for 19% of World GHG reductions by 2050 and 50% by 2100
- CCS's contribution in 2020 on par with Renewables

CCS in Canada/Alberta

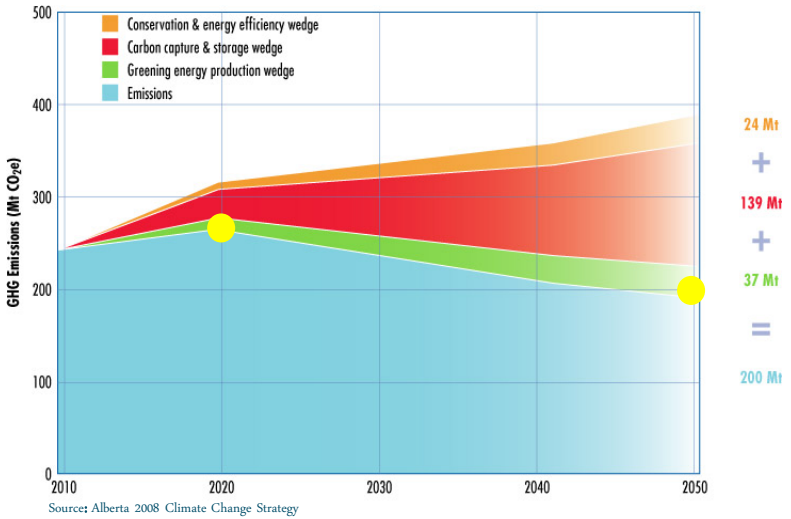
- A significant part of GHG mitigation plans for both Canada and Alberta
- Technically possible today
  - Builds on proven components
- CCS needs...
  - Government leadership and financial support
  - Public awareness and acceptance
  - Demonstration projects
- Canada & Alberta providing partial funding for CCS demonstration projects
- Seen as a enabler for sustainable economic growth in the AIHA

GHG emissions profile and mitigation options – Canada



Source: NRTEE 'Achieving 2050: A Carbon Pricing Policy for Canada", 2009

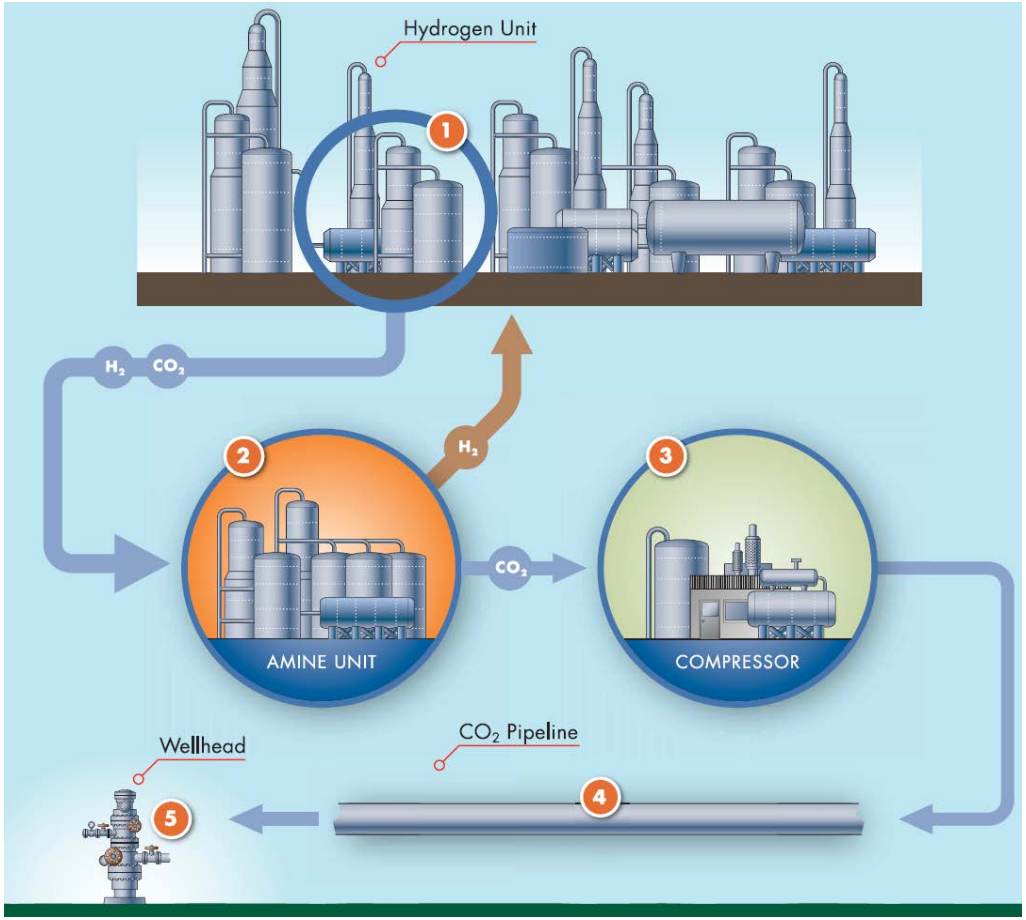
GHG emissions profile and mitigation options – Alberta



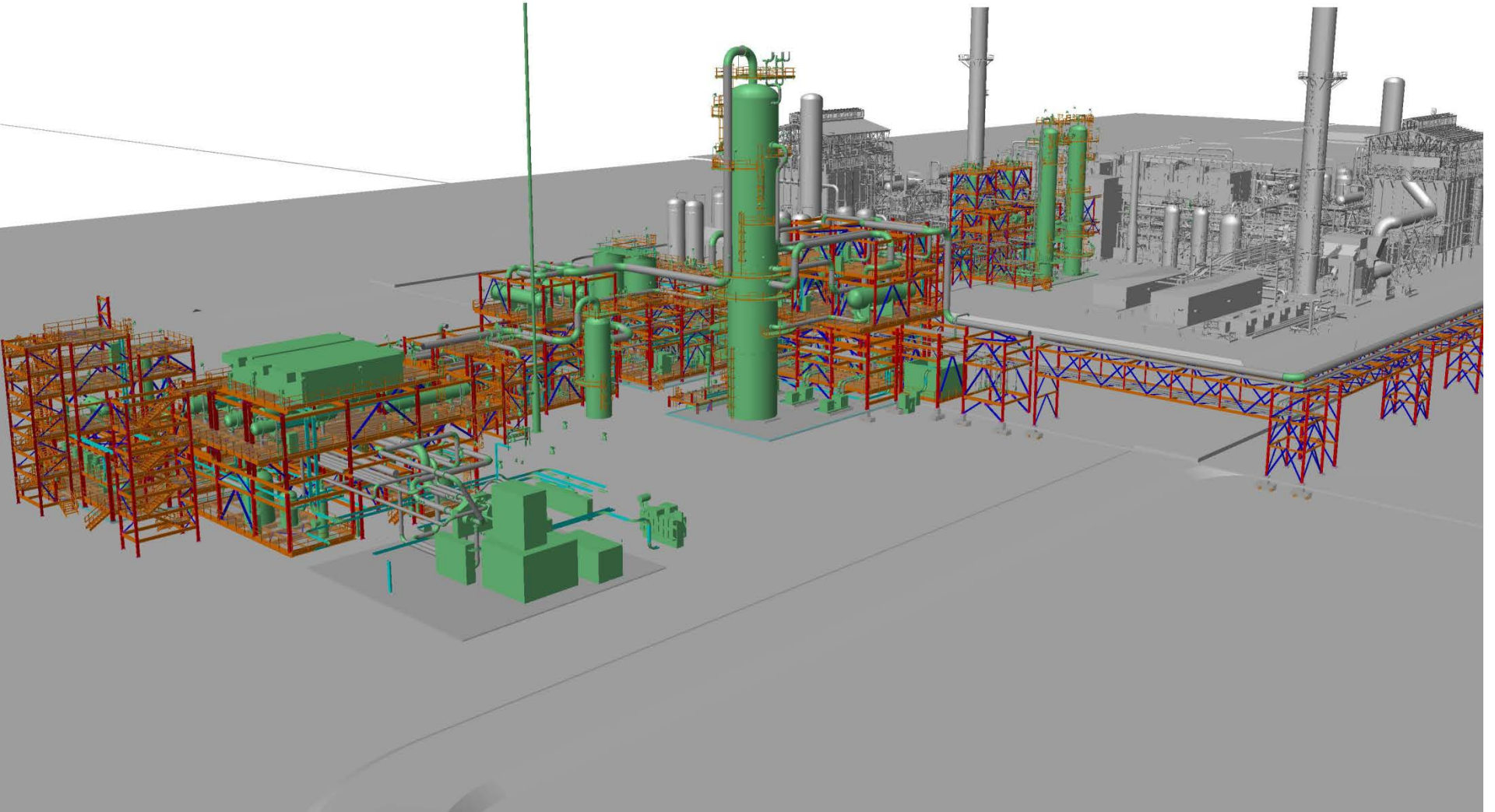
Source: Alberta 2008 Climate Change Strategy

Quest CCS Project - Overview

- Quest CCS Project - fully integrated CCS (capture, transport & storage)
- Part funded by Alberta & Canadian Gov'ts ($745 mln & $120 mln)
- JV among Shell (60%); Chevron (20%); and Marathon (20%)
- Improves GHG performance of Oil Sands operations
- Uses existing technology
- Capture at the Scotford Upgrader from 3 Hydrogen Units, Amine system ADIP-X
- Capacity to capture over one million tonnes of CO_2 per year for 25 years
- Equiv to emissions from175,000 cars

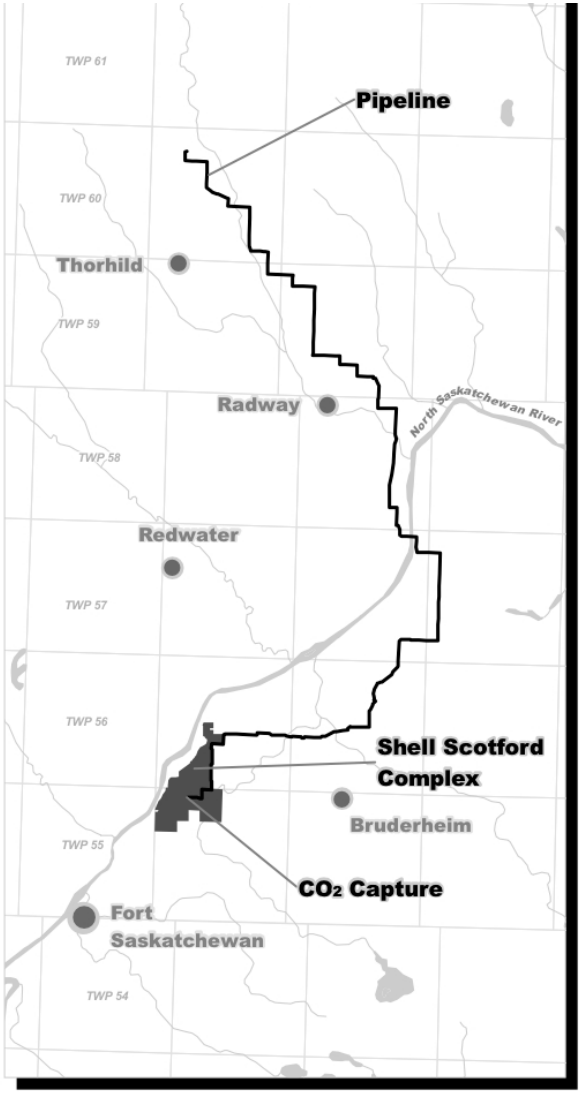


Scotford Facilities 3D Model, HMU's 1&2 only shown



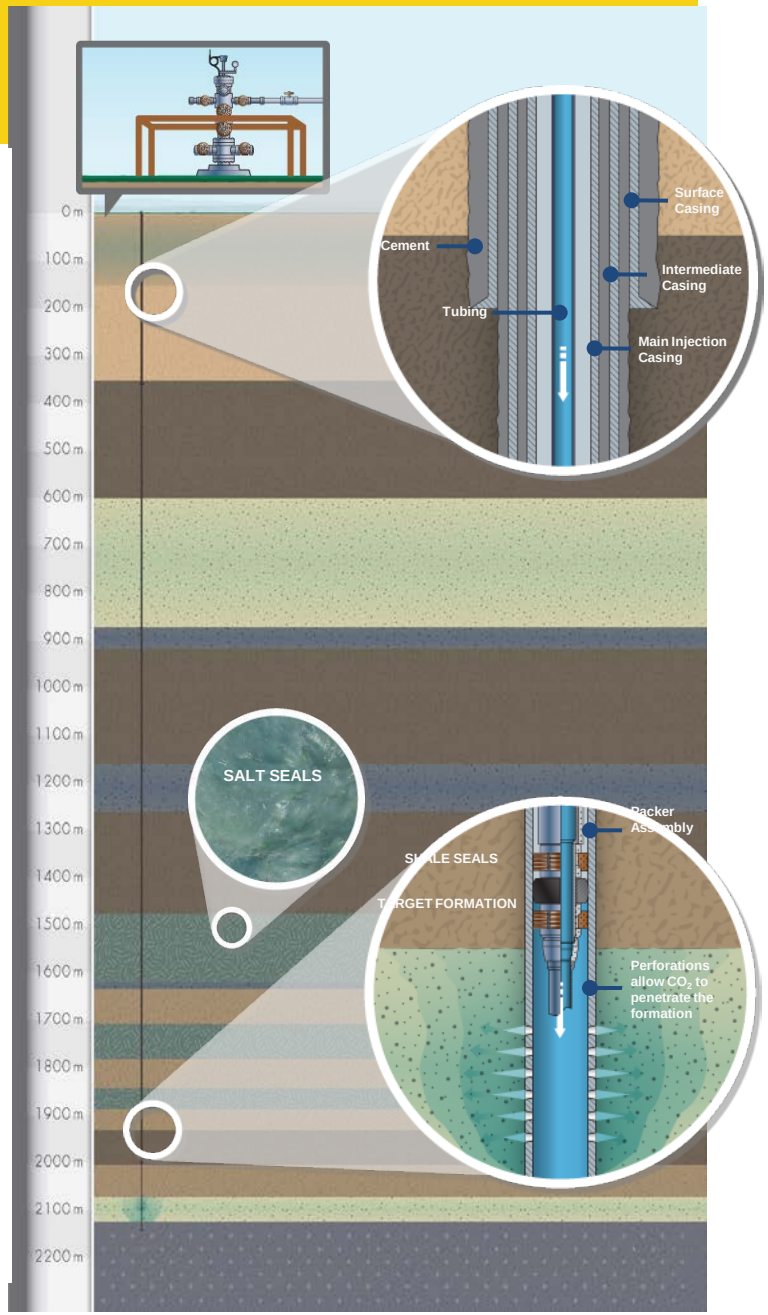
Quest Proposed Pipeline Route

- Quest CCS Project CO_2 capture plant located in Industrial Heartland Region, approx 5 km N.E. of Fort Saskatchewan
- CO_2 transported by pipeline to storage
- 5,800 km of CO_2 lines safely operating in the US for 35+ years
- The pipeline will travel approx. 80 km north of the Scotford Upgrader to the chosen injection locations
- Route selected to meet stakeholder requirements:
  - 28 km follows existing ROW
  - Drilled under North Saskatchewan River
  - 30+ re-routes to accommodate landowner wishes
- Line size of12 inches in diameter



Quest CO_2 Storage Plan

- CO_2 stored in porous rock containing natural brine
- Basal Cambrian Sands (BCS) selected
  - Storage zone is a formation called Basal Cambrian Sands (BCS) 2,300 m, Prairies deepest sandstone
  - Multiple caprock and salt seal layers, no significant faulting visible from wells or seismic
  - The BCS is well below hydrocarbon bearing formations and potable water zones in the region
  - Relatively few wells drilled into the BCS, none within 10km of the proposed storage site
- Wells and Drilling
  - Plan to have 3 – 8 wells, first drilled near Radway
  - Conventional drilling methods
  - Multiple steel casings for wells, 3 in freshwater zone, all cemented to surface



Quest Monitoring Plan (MMV)

- Measurement, Monitoring & Verification (MMV)
- Purpose to confirm CO_2 remains contained in BCS
- MMV designed to protect the natural environment from above BCS to atmosphere
  - CO_2 'plume' in BCS monitored using time-lapse seismic survey
  - Deep wells planned above storage formation to demonstrate containment
  - Injection wells monitored for pressure, temperature & noise
  - Groundwater assurance monitoring via baseline well surveys, and dedicated Quest water monitoring wells located near injectors, legacy wells etc.
  - Ongoing monitoring that uses sensitive satellite information (InSAR) to monitor even extremely small surface ground movement from CO2 injection (millimetres over a broad area on a annual basis.)
  - Remote sensing for environmental surface changes, plant growth
  - Line of sight CO_2 gas flux monitoring trialed to measure and understand soil gas to atmosphere effects across storage site before any CO_2 is injected

Law & Regulatory

- 'CCS Act' passed enabling underground storage of CO2, addresses pore space access and liability, and amends other regs. accordingly
- Details being developed by Gov't via Regulatory Framework Assessment (RFA) process
- Shell have applied for and received pore space for Quest
- Regulatory process critical path for front end of the project
- Seven bundled regulatory applications/ amendments/ assessments sit with the authorities
- Public hearing anticipated by year-end
- Shell expects to take a Financial Investment Decision subject to hearing outcome and public support

Public Acceptance - Local Stakeholder Engagement

- Laws & regulations necessary but not sufficient to secure public support
- Has been stumbling block for all that have gone before us

Objectives of our Engagement Programme

- Inform stakeholders about the Quest CCS Project & provide opportunity to discuss concerns and identify ways to mitigate
- Establish / build upon existing relationships
- Identify opportunities to maximize benefits to stakeholders
- Support Federal CEAA (Canadian Environmental Assessment Agency) and Provincial EIA processes
- Meet ERCB D-56 (Energy Applications & Schedules) and D-71 (Emergency Preparedness and Response Requirements)

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Who are the Key Stakeholders?

- Landowners/occupants along pipeline route at injection and storage sites
- Fed and Prov Govt Agencies; CEAA (Canadian Environmental Assessment Agency), NRCan, Environment Canada, ERCB, AENV, ASRD, AB Energy
- Counties/Town Councils (Thorhild, Radway, Lamont, Sturgeon, Fort Saskatchewan & Strathcona)
- Residents w/i Scotford public consultation area
- ENGO's
- JV Partners
- Media
- Commercial Industry Partners / Competitors

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Concerns/Questions raised in Open Houses

- Questions regarding CCS/Quest focused on following areas:
  - Technology – Is it proven?
  - Climate Change – Is it real?/ How will CCS address vs. other technologies?
  - Environment/ Health & Safety – How will you know the CO_2 remains contained?/ Questions on wells/pipeline safety
  - Costs – Why is gov't support necessary?
  - Local Benefits - (business, contracting & employment opportunities & social investment)

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CCS Public Opinion Survey – IPSOS Reid

- A total of 1,600 telephone interviews with Albertan in both the summer of 2010 and 2011 to test peoples' knowledge/opinions of CCS & and proposed CCS projects (survey funded by Shell/TransAlta)
- 400 interviews conducted with residents of the Industrial Heartland (Sturgeon County, Lamont County, Thorhild County, Strathcona County, and the City of Fort Saskatchewan).
- Carbon Capture and Storage top mention as technology to reduce CO2 emission – about 64% of people surveyed had heard of CCS
- Of those aware of CCS 67% strongly/somewhat support the use of CCS
- CCS should be a top priority of companies that produce energy (76% strongly/somewhat agree)
- Impression of Shell among those that were aware Shell operated in the community (63% good/very good; 31% fair)
- About one in five people were aware of the Quest Project – of those 65% strongly/ somewhat supported the project

Quest Progress to Date

- Front-end Engineering and Design completed, Storage Development Plan complete
- One ‘keeper’ injector appraisal well drilled & tested
- Detail engineering & early procurement underway
- Regulatory hearing anticipated by year-end
- Pore space secured, long-term liability ownership settled (with Province)
- Funding Agreements signed, delivering C$865 mln between 2009 to 2025
- Final Investment Decision expected, post-Hearing, March 2012
- 1st Injection, 2015

Contact Us/ For more information…

Questions or Concerns?

- Contact us at 1-800-250-4355 or quest-info@shell.com

Shell Canada Quest

- www.shell.ca/quest/

Royal Dutch Shell & CCS

- http://www.shell.com/home/content/environment_society/environment/climate_change/ccs/

Integrated CO2 Network

- www.ico2n.com/

International Performance Assessment Centre for Geologic Storage of CO2 (IPAC-CO2)

- www.ipac-co2.com/