Knowledge transfer from commercial scale projects: Quest

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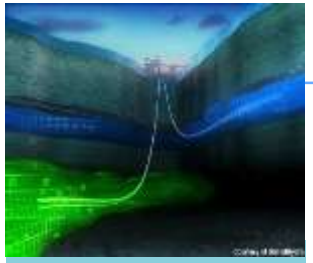
Global Shell involvement in CCS projects



Northern Lights

Quest

TCM

Peterhead (cancelled)

Gorgon

Boundary Dam

- Industrial scale projects in operation
- Planned industrial scale project - FEED completed
- Involvement through Shell Cansolv technology – no Shell equity
- CCS project under construction/planning

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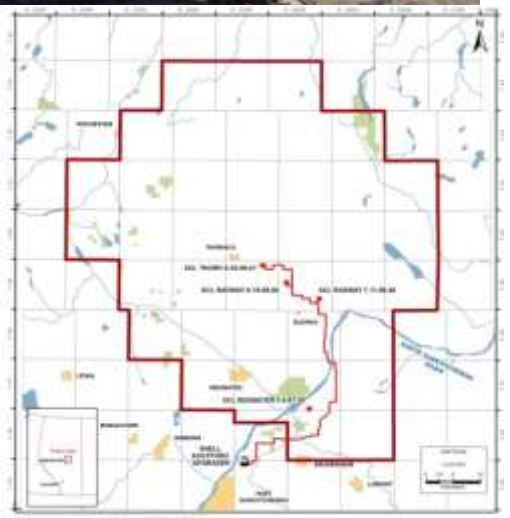
Quest: Industrial CCS on Hydrogen

- Fully integrated, commercial scale CCS project at an industrial facility:
  - Capture at Scotford Upgrader in Alberta, Canada
  - Transportation by 65 km 12″ pipeline
  - Storage in a deep saline aquifer at a depth of 2 km
- Shell operated joint venture between Canadian Natural Upgrading, Chevron and Shell
- Impact: 1 million tonnes of CO_2 a year for 25 years
  - $^1/_3{}^{rd}$ of CO_2 from the Upgrader
  - equivalent to the emissions of about 250,000 cars



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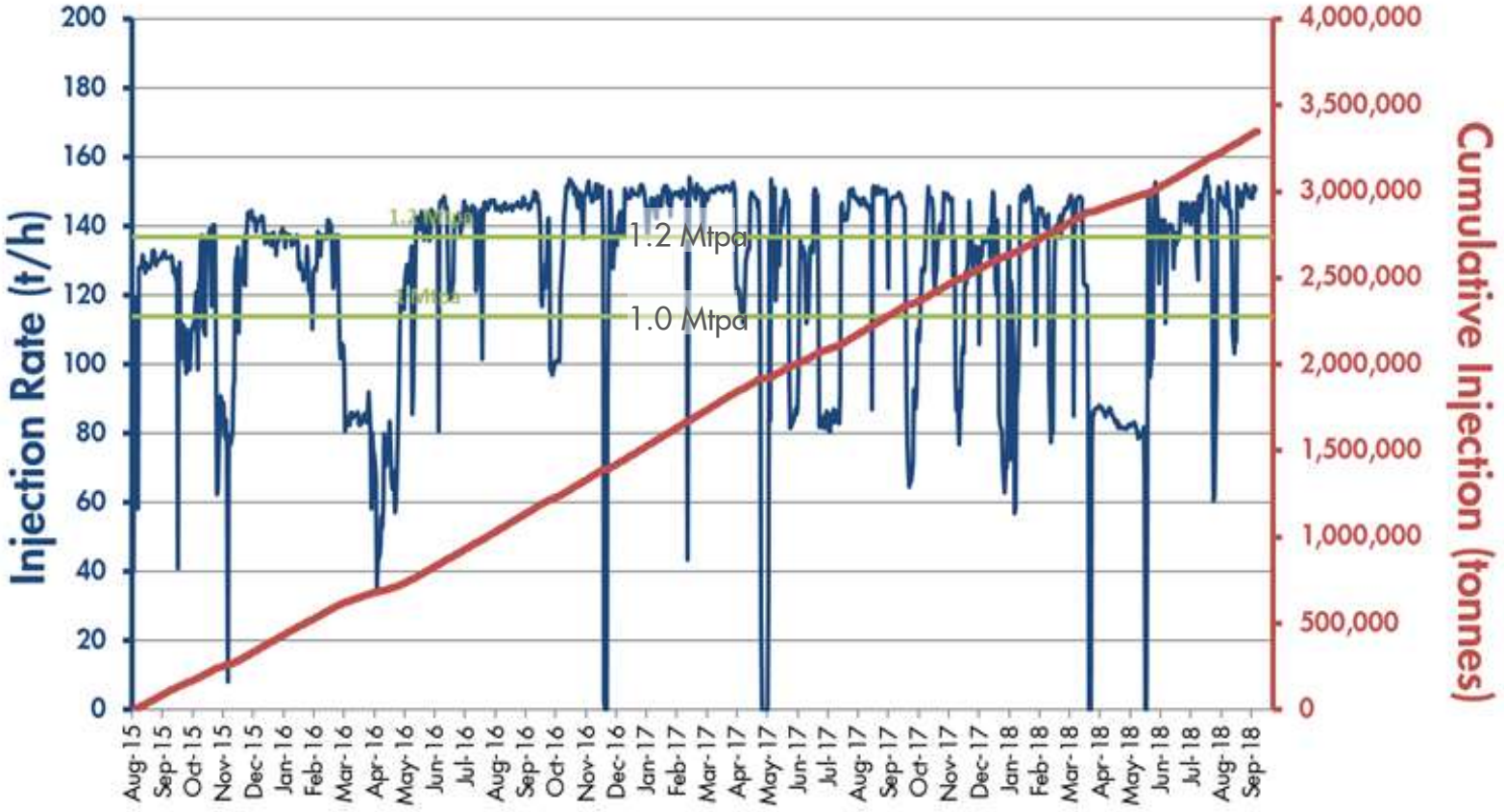
Quest Performance



Capture:

- Almost 3.5 million tonnes injected in 3 years of operation
- Capture rates exceeding expectations
- Operating costs lower than expected
- Excellent amine/TEG recycle rates

Storage:

- Excellent injectivity – reservoir acting better than expected
- Multiple monitoring technologies indicate that the CO_2 is where it is supposed to be

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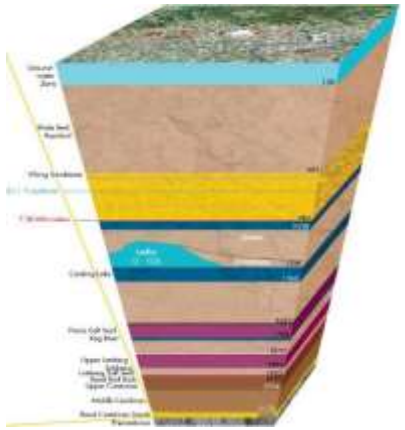
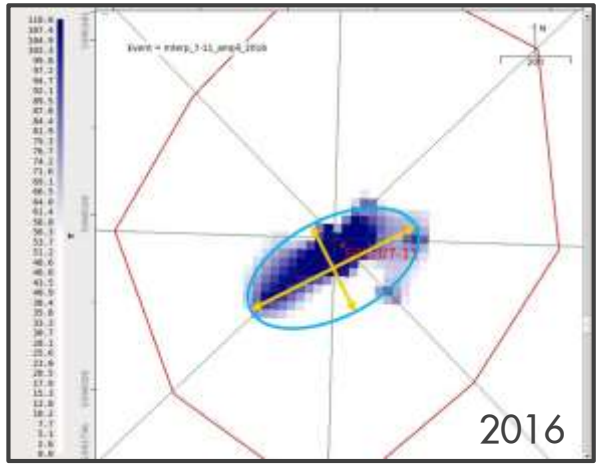
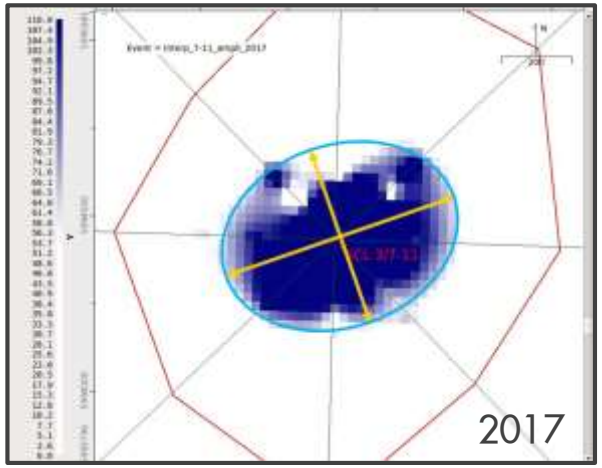
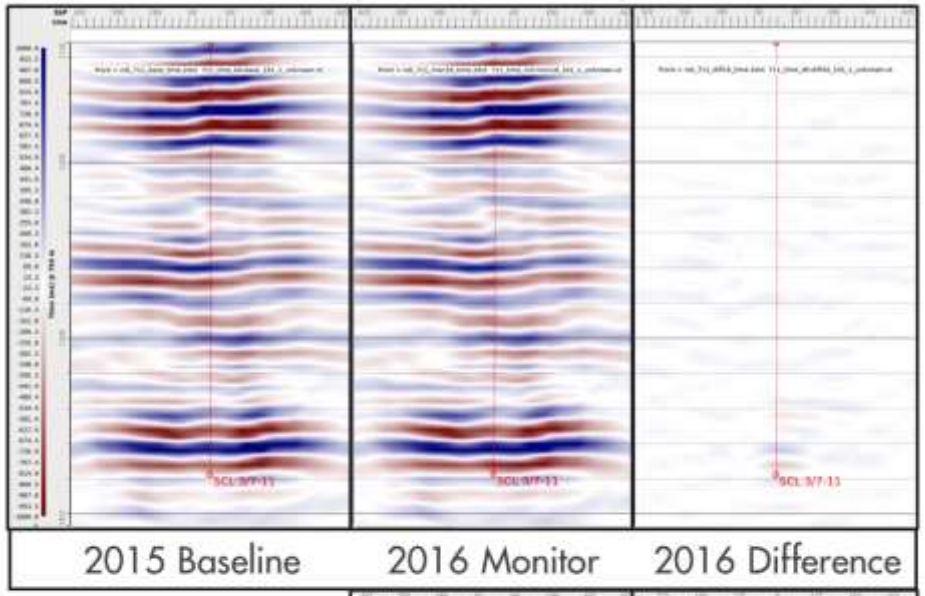
Monitoring is confirming storage

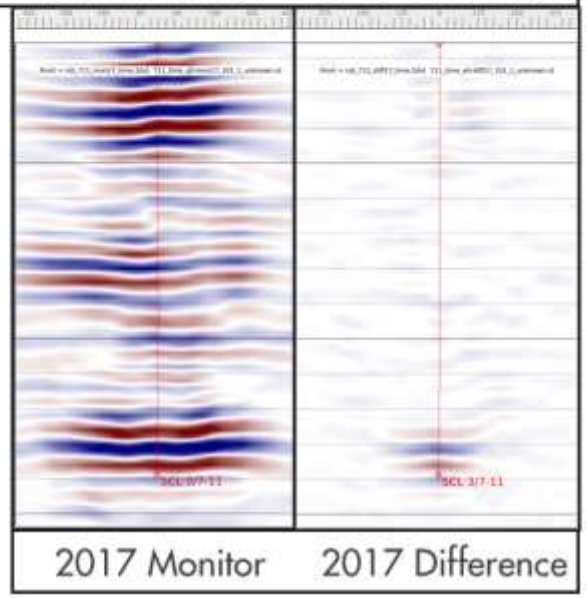






- Baseline VSP acquired in Q1-2015
- 1st monitor VSP recorded in Q1-2016
- 2nd monitor VSP recorded in Q1-2017





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Knowledge Sharing through engagement and collaboration

Annual Reporting
- Alberta
- Federal

Conferences
- O&G
- CCUS
- International Climate (COP)

Bi/Tri Laterals
- Canada/USA/Mexico
- Norway
- UK
- China

Joint Research
- US DOE for MMV

Tours
- Project developers
- Ministers
- Research institutes
- EII

Organisations
- GCCSI
- ZEP
- GHGT

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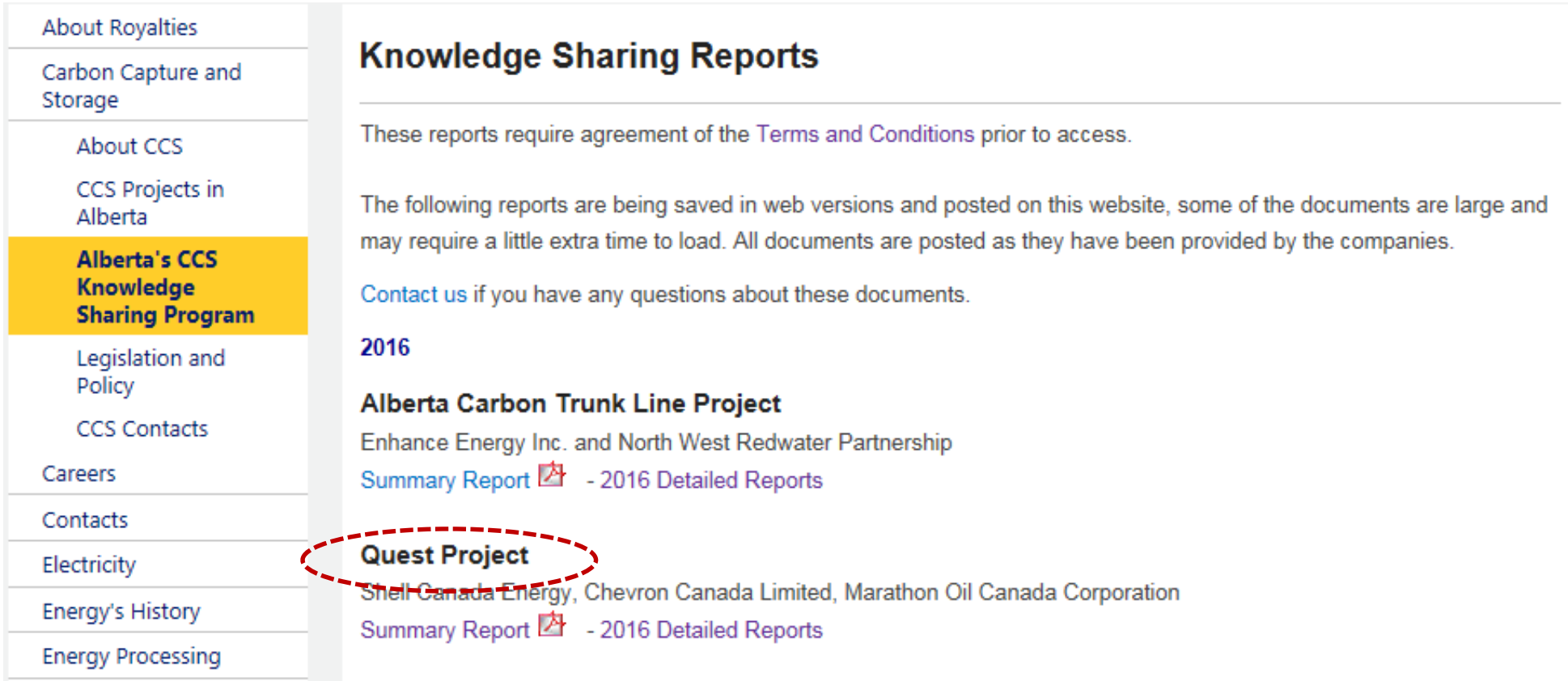
Knowledge sharing

http://www.energy.alberta.ca/AU/CCS/KnowledgeSP/Pages/default.aspx



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Peterhead CCS Project Knowledge Sharing

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Collection

Carbon Capture and Storage knowledge sharing

Knowledge collected from UK CCS projects.

Published 11 June 2015
Last updated 28 June 2016 — see all updates
From: Department for Business, Energy & Industrial Strategy

Contents

— List of Peterhead and White Rose Key Knowledge Deliverables
— 1. Technical: Subsurface and Well Engineering
— 2. Technical: Power and Capture
— 3. Technical: Full Chain
— 4. Commercial, Project Management and Lessons Learned
— 5. Technical: Transport

Related content

Low carbon technologies

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- Project FEED phase data shared as part of the UK CCS Program
  - Lessons learned report
  - Stakeholder and community engagement plans
  - Risk allocation
  - .....

Knowledge Sharing Focus: Stakeholders

- The need to listen
  - Perceived risk can be as real and important as actual risk
- Hear concerns and accept them as legitimate
  - Be open to changing the plan to accommodate community feedback
- Meet stakeholders on their terms and where they are comfortable
  - Don't expect them to come to you and then be surprised when they later raise objections
- Develop consistency and deep relationships
  - They may mistrust the organization, but they will trust people
- They want to get to know the leaders and the experts – not just community relations team

Community Advisory Panel - MMV

QUEST SAFELY REMOVES 1.2M TONNES PER YEAR OF CO2 – THAT'S EQUIVALENT TO...

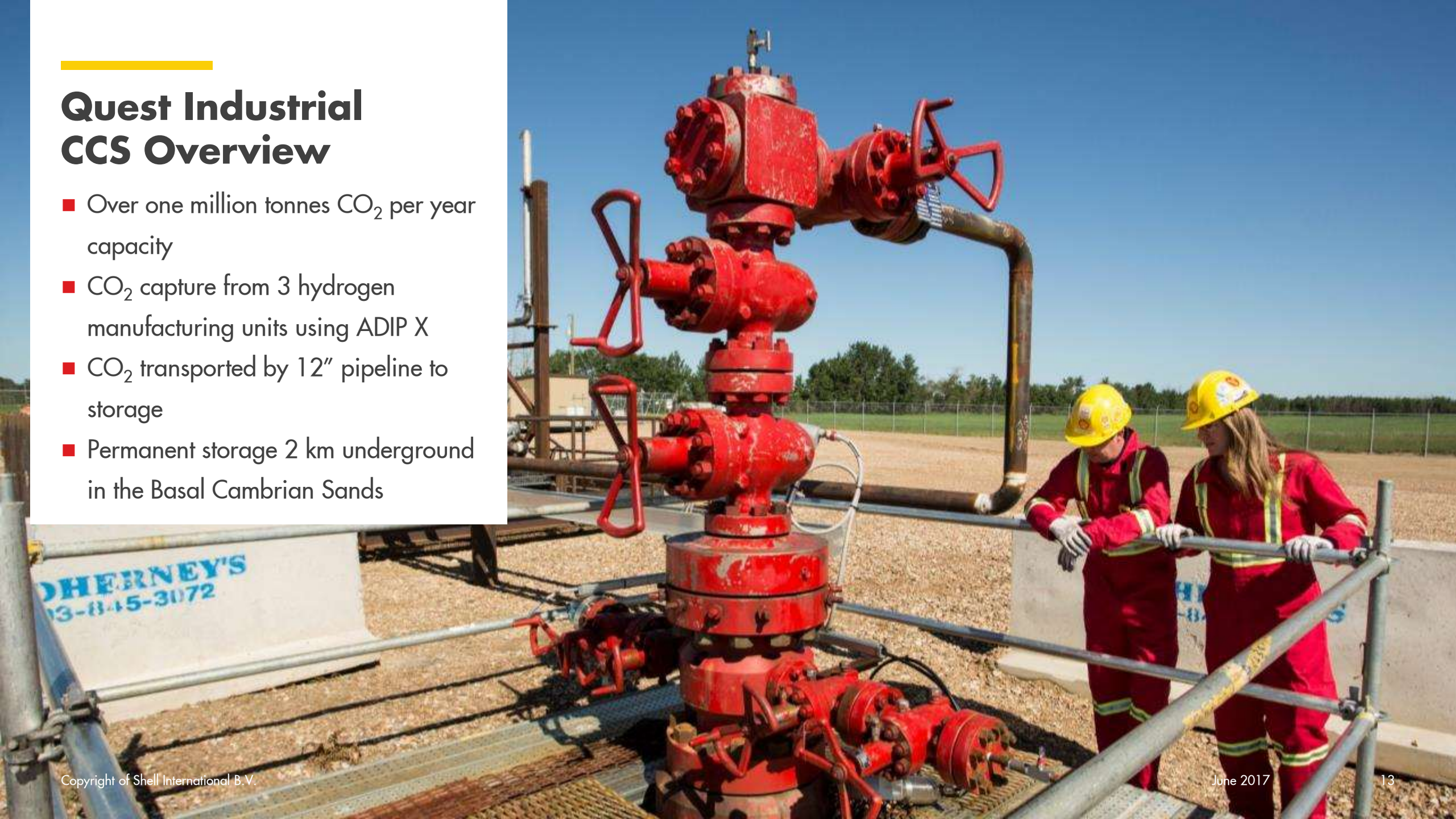
The emissions from about

250,000

VEHICLES

Quest Industrial CCS Overview

- Over one million tonnes CO_2 per year capacity
- CO_2 capture from 3 hydrogen manufacturing units using ADIP X
- CO_2 transported by 12″ pipeline to storage
- Permanent storage 2 km underground in the Basal Cambrian Sands



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