



Beyond Boundary Dam – What's Next?

USEA Consensus Webinar, October 19, 2021

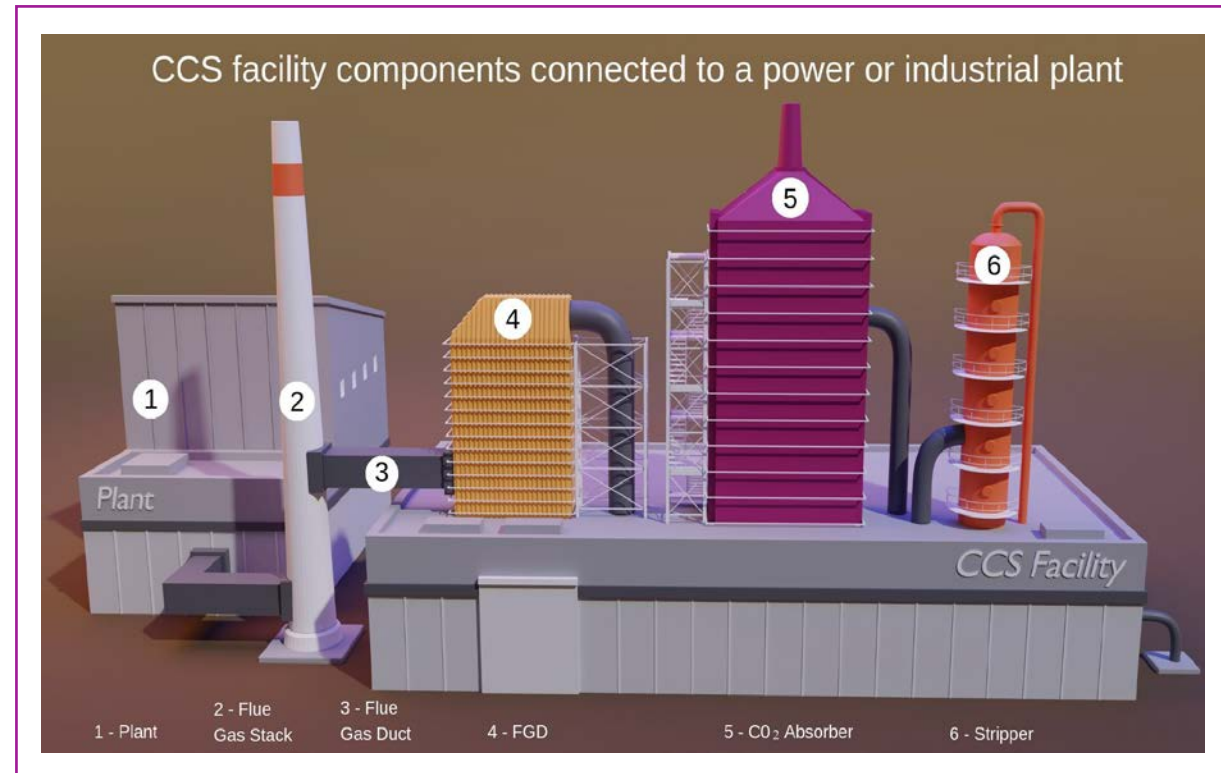
Presented by: Beth (Hardy) Valiaho, VP Strategy and Stakeholder Relations

ABOUT THE INTERNATIONAL CCS KNOWLEDGE CENTRE

Mission:

To accelerate the understanding and use of carbon capture and storage as a means of managing GHG emissions

- Staff are available to provide experience-based considerations for CCS projects.
- Guidance for planning, design, construction and operation.
- Active engagement with financiers, decision makers, and business case partners.



CCS Operational Lessons for the World

Boundary Dam 3 CCS Facility



LEARNING STARTS HERE

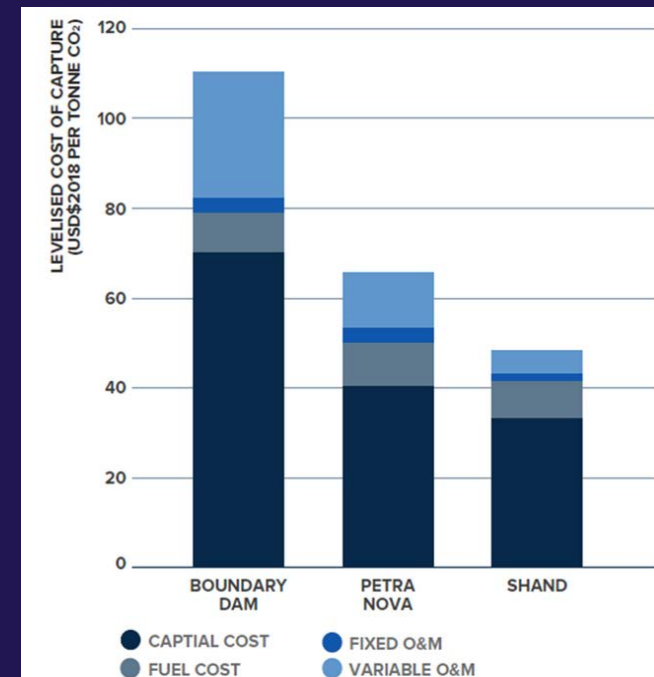
WORLD'S 1ST LARGE-SCALE POST-COMBUSTION
CCS FACILITY

IN OPERATION SINCE 2014
with over 4 million tonnes captured & stored

Shand Feasibility Study

Key findings of the feasibility study evaluates the economics of CCS on a 300MW coal-fired power plant in Saskatchewan.

- Projected capture capacity of **2Mt/yr**
- Capital cost to be **67% less** per tonne of CO₂ captured

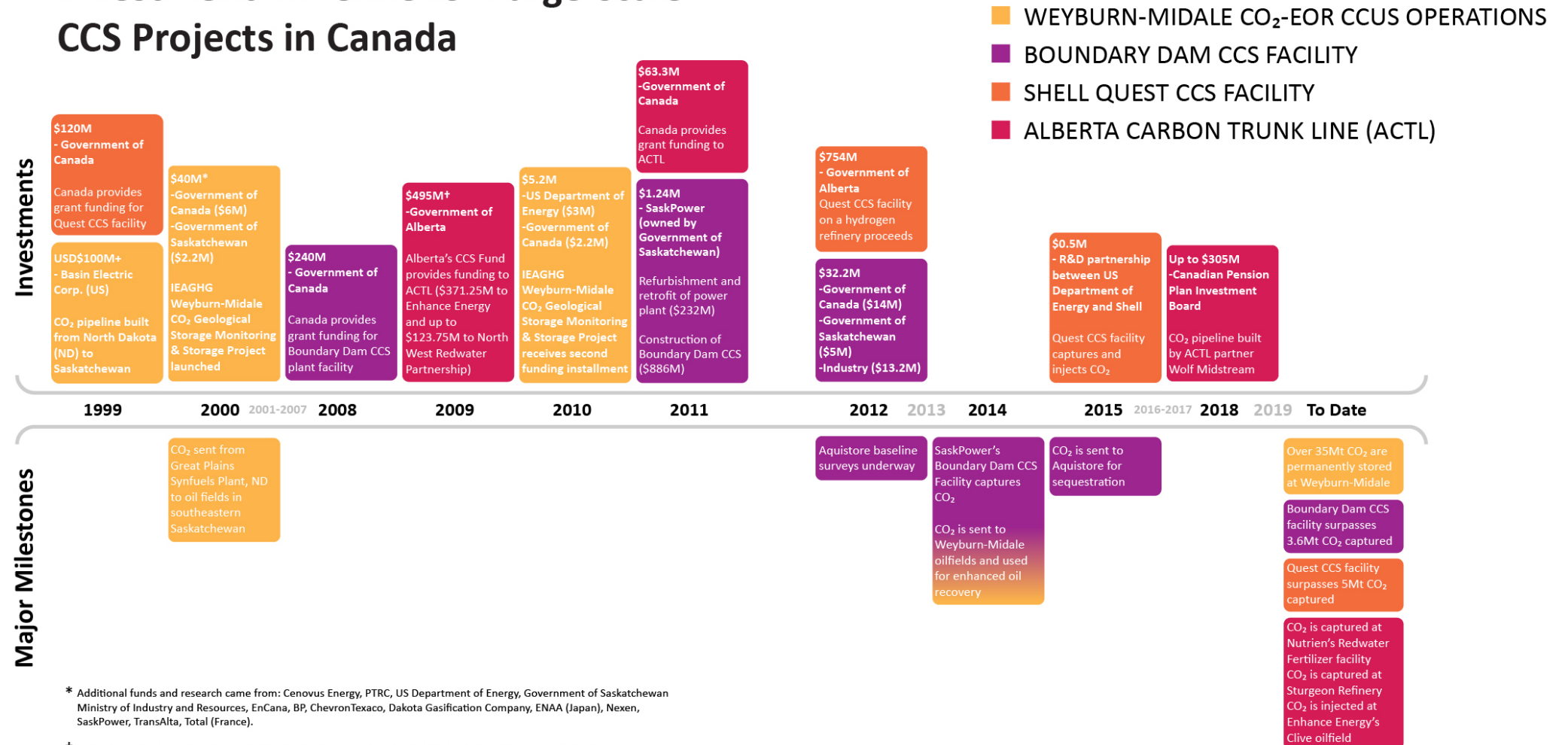


Break Down
of Levelized
Cost of Capture

Global Status of CCS Report
2019 - Global CCS Institute

CURRENT STATE OF CCS SECTOR IN CANADA

Investment Timeline for Large-scale CCS Projects in Canada



* Additional funds and research came from: Cenovus Energy, PTRC, US Department of Energy, Government of Saskatchewan Ministry of Industry and Resources, EnCana, BP, ChevronTexaco, Dakota Gasification Company, ENAA (Japan), Nexen, SaskPower, TransAlta, Total (France).

† Funding was accessible based on milestone achievements complete, 40% during construction, 20% with the achievement of commercial operations which was achieved in Spring 2020 and the remaining 40% as CO₂ is injected. <https://www.alberta.ca/assets/documents/carbon-capture-storage-projects-funding-agreement-actl.pdf>

LEHIGH HANSON EDMONTON POST-COMBUSTION CO₂ CAPTURE FEASIBILITY STUDY



As the world moves towards decarbonizing more industrial sectors, CCS will play a vital role in reducing the carbon footprints of various industries that do not have renewable alternatives.

To produce cement, two streams of emissions occur – energy emissions, and industrial process emissions

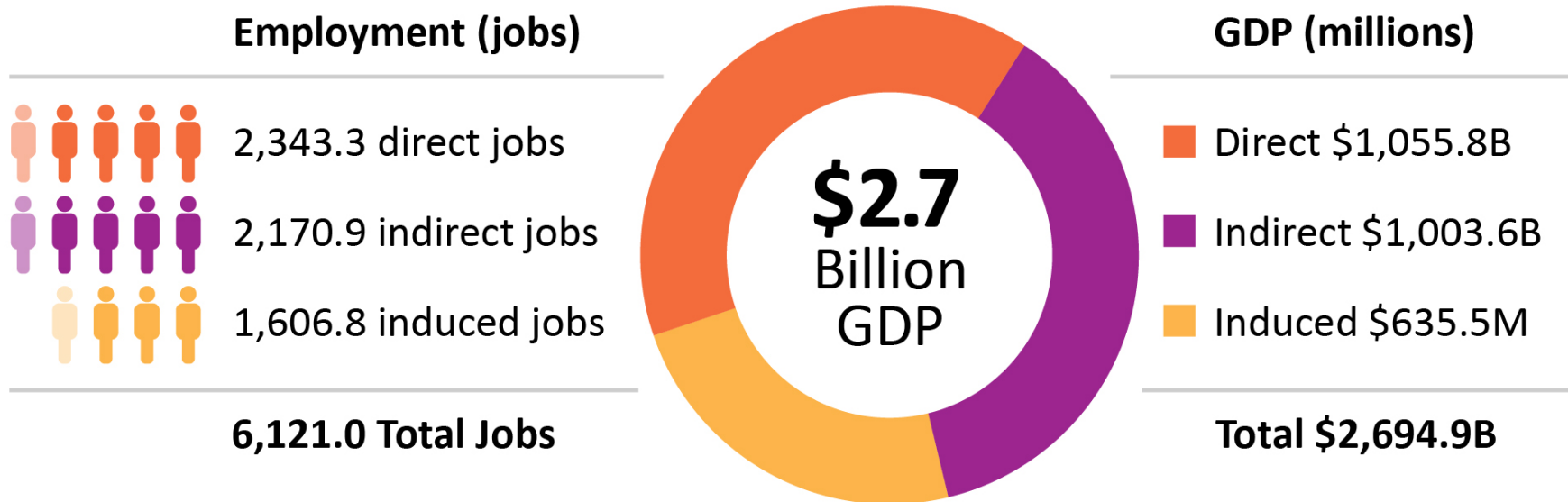
- Energy emissions can be reduced by efficiency.
- Industrial process emissions must be captured to significantly lower emissions. They represent 4% of global emissions.

Lehigh Cement and the Knowledge Centre announced a joint feasibility study of a commercial-scale CCS project (study results this fall!). ANTICIPATING OPERATION MID-2020s



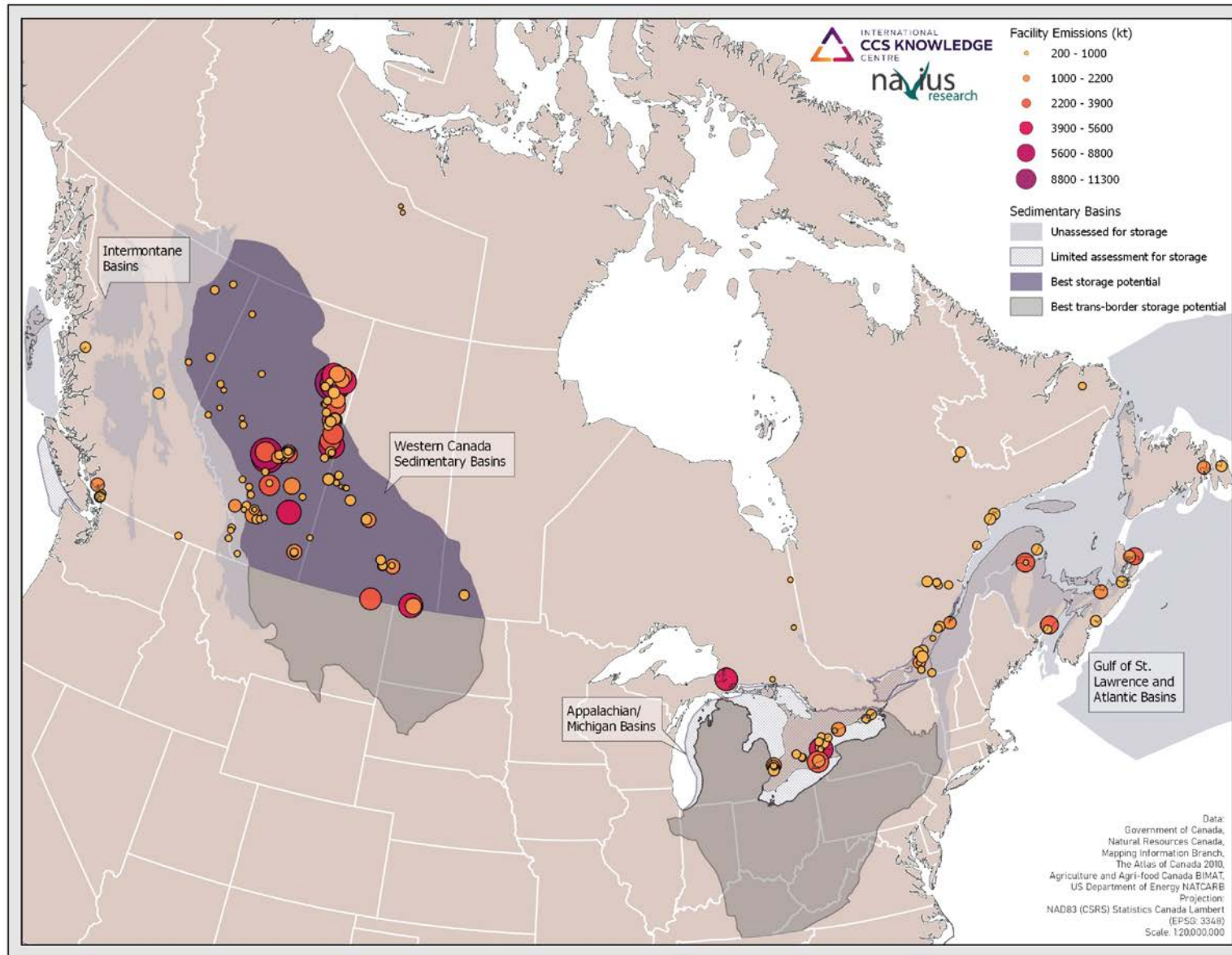
ECONOMIC IMPACT

Impacts to GDP & Employment of Increased Large-Scale CCS Investment in Canada (for 3 projects over 4 years)



This graph shows the economic impacts, specific to GDP and employment based on the construction and development of three large-scale CCS projects over three years. This would translate to an annual GDP of \$673.3M for each of the four years.

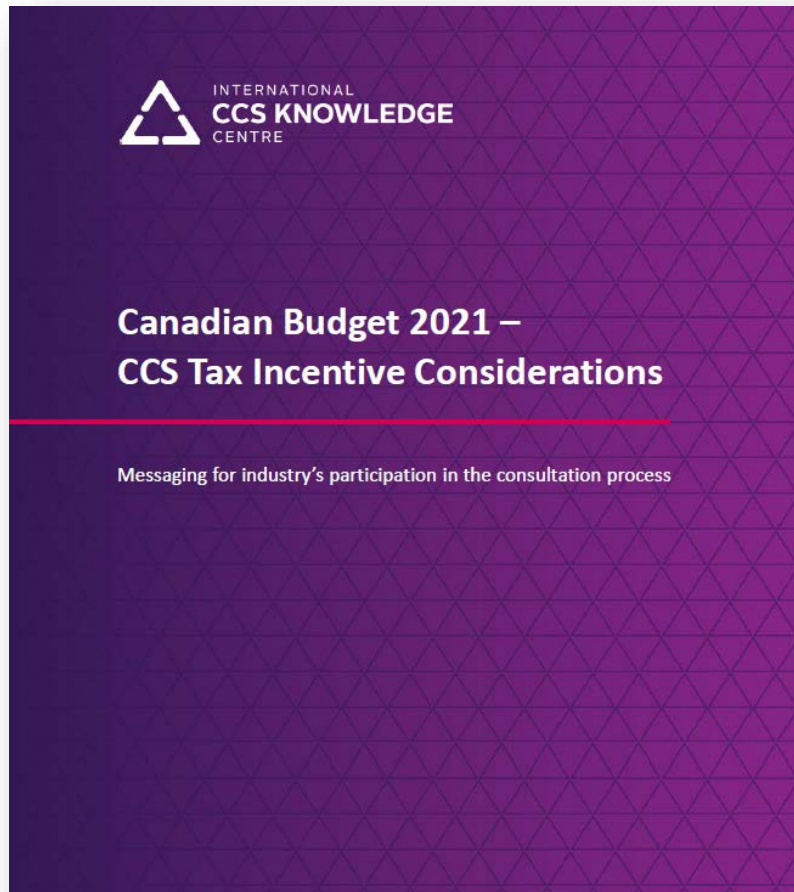
CARBON CAPTURE AND STORAGE POTENTIAL



Map indicates large heavy industry emitters across Canada, as well as storage 'sink' potential.

Source: The International CCS Knowledge Centre

CCS INCENTIVE TAX CREDIT UNDER DEVELOPMENT IN CANADA



WHO GETS THE CREDIT?



EMISSIONS REDUCTIONS & TIMELINES



INVESTMENT TAX CREDIT (ITC) DESIGN



VALUE OF THE TAX CREDIT

-
- FRONT-END ENGINEERING DESIGN (FEED)
 - STORAGE PERMANENCE
 - ENHANCED OIL RECOVERY (EOR)

CERTAINTY AND RISK



45Q tax credit & competitiveness



Uncertain carbon price vs certainty of ITC / capital financing



Changing business models – EOR as revenue vs. credit stacking



Alberta Pore Space Tenure Management (“Public Good” Sequestration Hubs)



EOB uncertainty vs EOR real reductions



Technology Readiness Levels and near-term projects

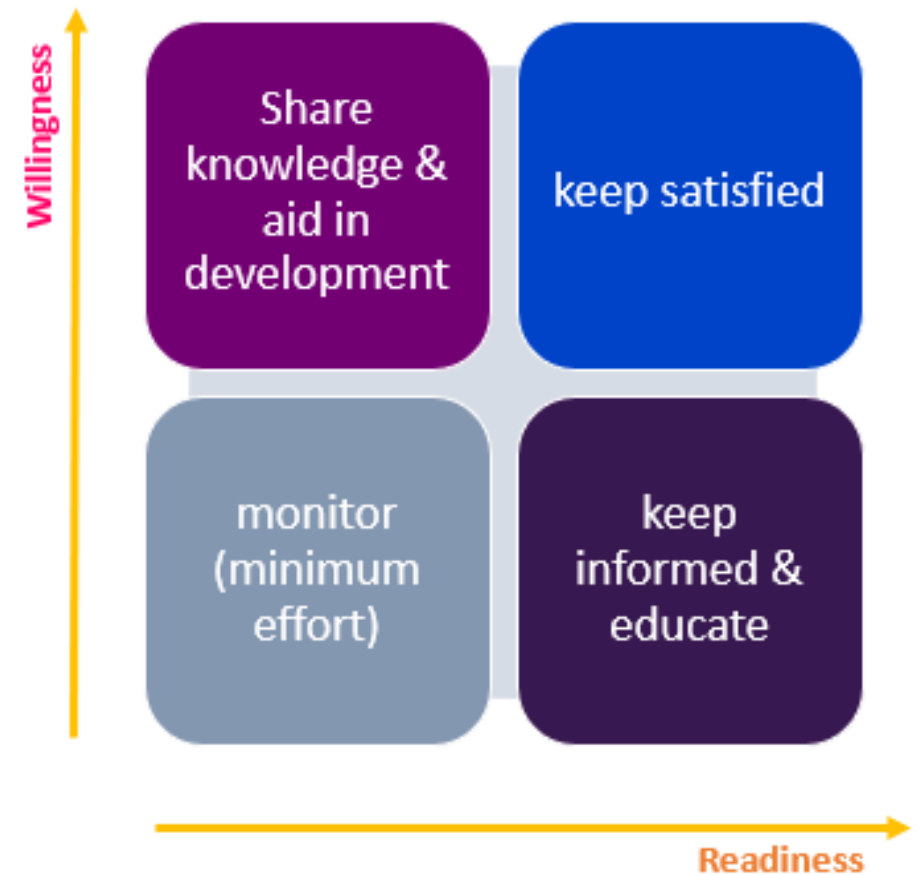
FUTURE OF THE KNOWLEDGE CENTRE

Based on our lessons learned and hands-on expertise, the Knowledge Centre can aid in the acceleration of CCS globally to mitigate GHG emissions.

Projects can relate to strategic advice, CCS engineering and studies, as well as the associated policy, financing, and business cases required to implement CCS.

These offer partners and clients risk management/mitigation strategies required to satisfy decision makers and financiers.

The Knowledge Centre has a competitive advantage because of its experience and is well positioned to add real value, bringing the most value when it is fully engaged as a cohesive unit for strategy, stakeholder engagement and project development advisory services.





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ccsknowledge.com



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