

26th Annual CO₂ Conference

Presented Both Live and Virtually

Enhance Energy & Canadian EOR & CCS

Blair Eddy, Enhance Energy Inc.

Presented at the 26th Annual CO₂ Conference

Tuesday - Thursday Dec 8th-10th, 2020

Bush Convention Center

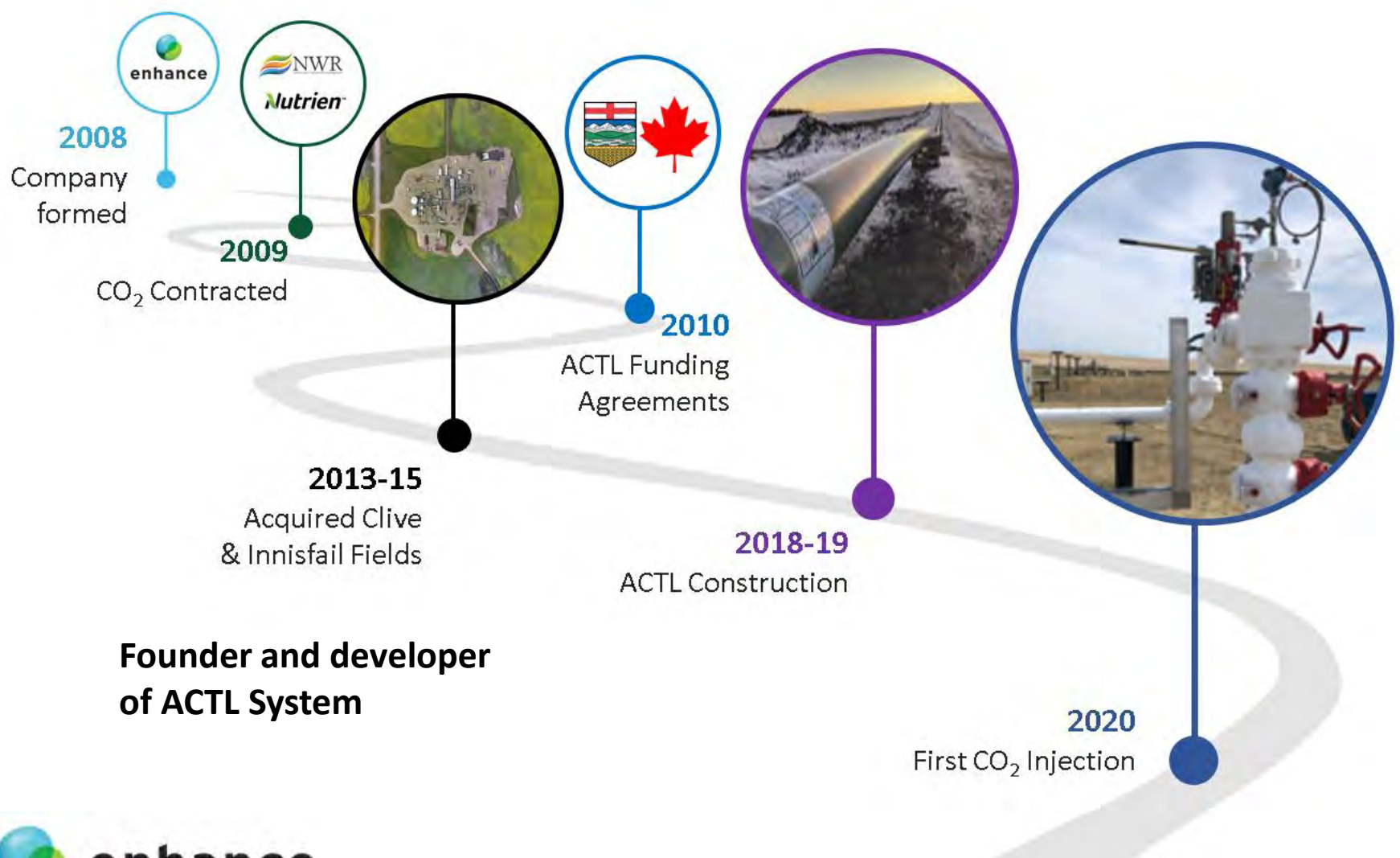
Midland, Texas



Agenda

- Enhance Energy & ACTL
- Canada's CCUS
- Enhance Energy Clive Unit EOR
- Enhance Energy – What's next?

Enhance Corporate History



Vision Statement

Play a key role in enabling the world's transition to a zero-carbon economy

Mission Statement

Be a world leader in utilizing and developing carbon capture and storage to reduce the carbon intensity of consumer products, energy, and materials

The Alberta Carbon Trunkline System

- Integrated Carbon Capture, Transport, Utilization and Storage
- Over \$1 B capital invested
- World's Largest pipeline system dedicated to man made CO₂
- Founded and developed by Enhance Energy



The ACTL System Partners



1.3-1.6 MM T/yr

CO₂ Suppliers in the
Alberta Industrial
Heartland



0.3 MM T/yr



40,000 hp Compression,
240 km pipeline

CO₂ Compression and
Transportation



2 MM T/yr CO₂ EOR/Storage

CO₂ Enhanced Oil Recovery &
CO₂ Storage



Natural Resources Canada / Ressources naturelles Canada



ACTL – Sturgeon Compressor Station

NWR volumes compressed via 2 compressors:

- ~17,000 HP, IG unit on NWR site
 - Atmospheric to ~200 psi
- ~13,000 HP, IG unit (Sturgeon Compressor Station)
 - 200 psi – 2600 psi
- No dehydration or any additional processing required as CO₂ is pure and dry due to rectisol process
- 3600 – 4400 T/d design rate



Redwater Carbon Recovery Facility

Nutrien volumes require more conditioning:

- Process more complex due to CO₂ being wet and hot
- Cooling and dehydration required
- ~5000 HP, IG unit as first stages of compression
 - Atmospheric to ~550 psi
- Dehydration and refrigeration to liquify CO₂ to allow for pumping to ACTL pressure
 - 550 psi – 2600 psi
- 880 T/d design rate

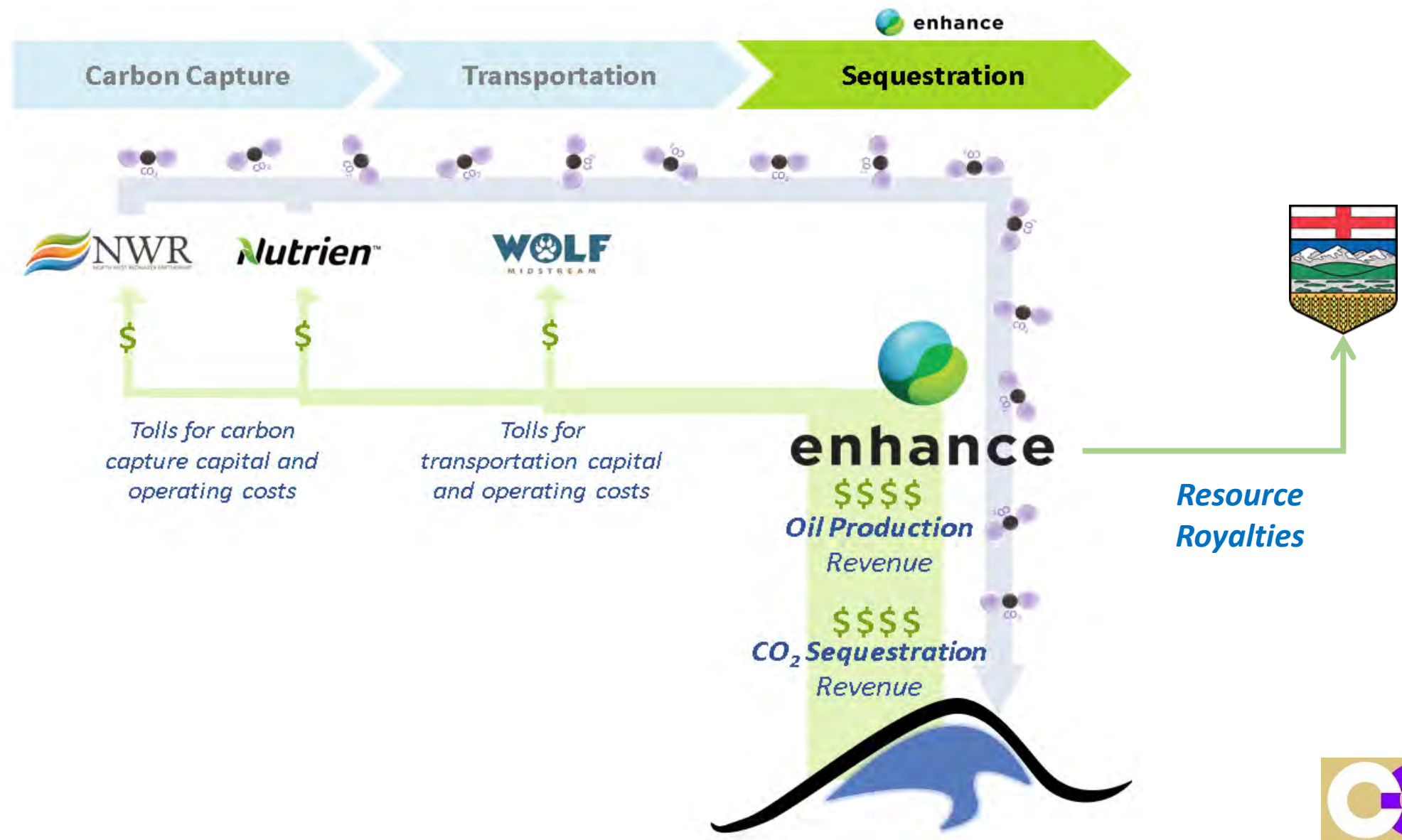


ACTL Pipeline

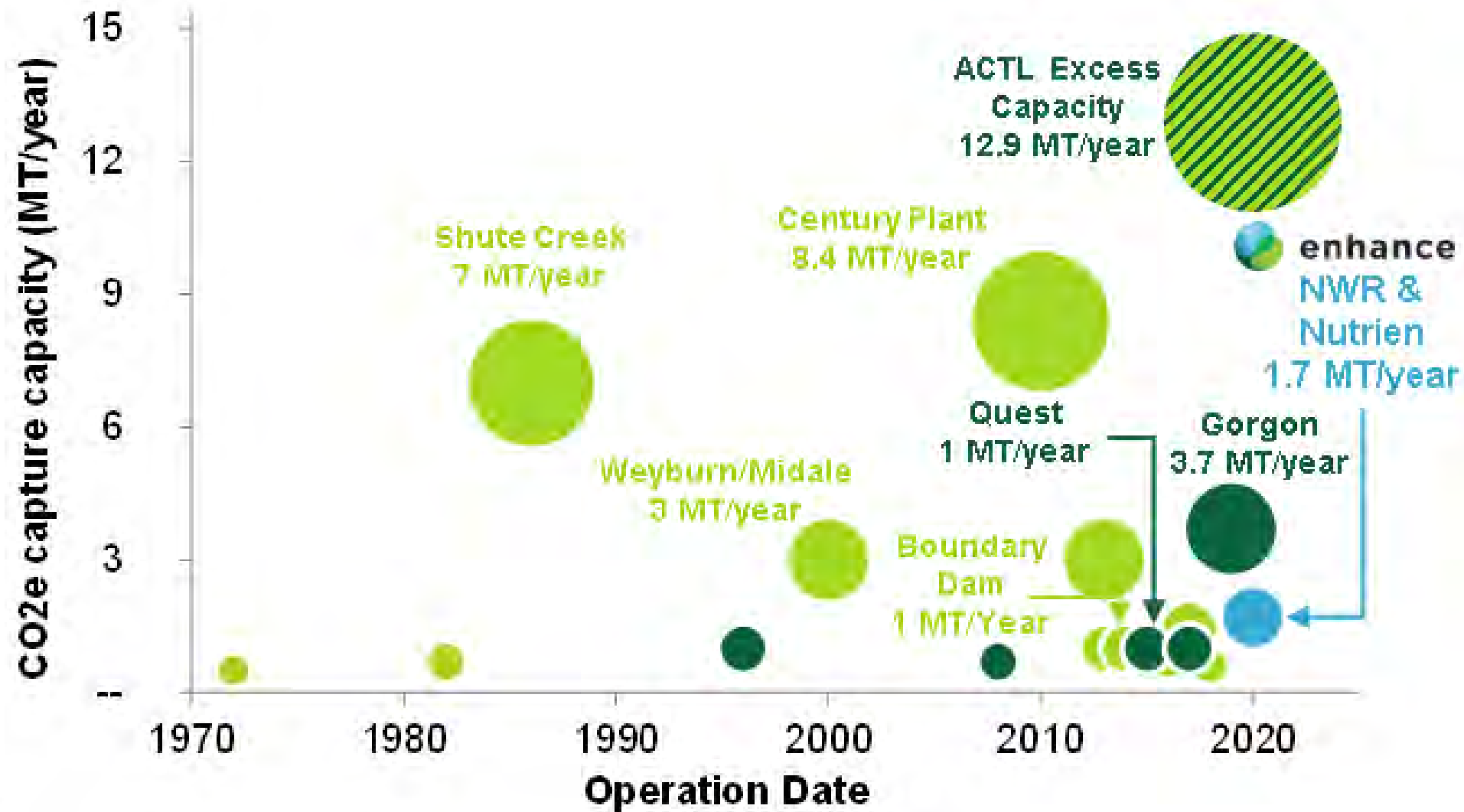
- 240 km system
- ~20 km – 12” through Alberta Industrial Heartland area
- ~220 km – 16” to Clive Unit
- Licenced for 15,000 T/d
 - Capability to expand with pumping stations and looping
- Valve stations every ~15kms to allow for CO2 intake/offtake



ACTL – Underpinned by Enhance



ACTL: World Leading Anthropogenic CO₂ System



Importance of Canadian CCUS

- Produces net zero fuel to drive the zero-carbon economy
- Optionality that maximizes revenue, and profitability
 - Transition to “Advanced EOR+”⁽¹⁾ as carbon pricing escalates
- Regulatory and social license with Albertans
- Financial bridge to sequestration

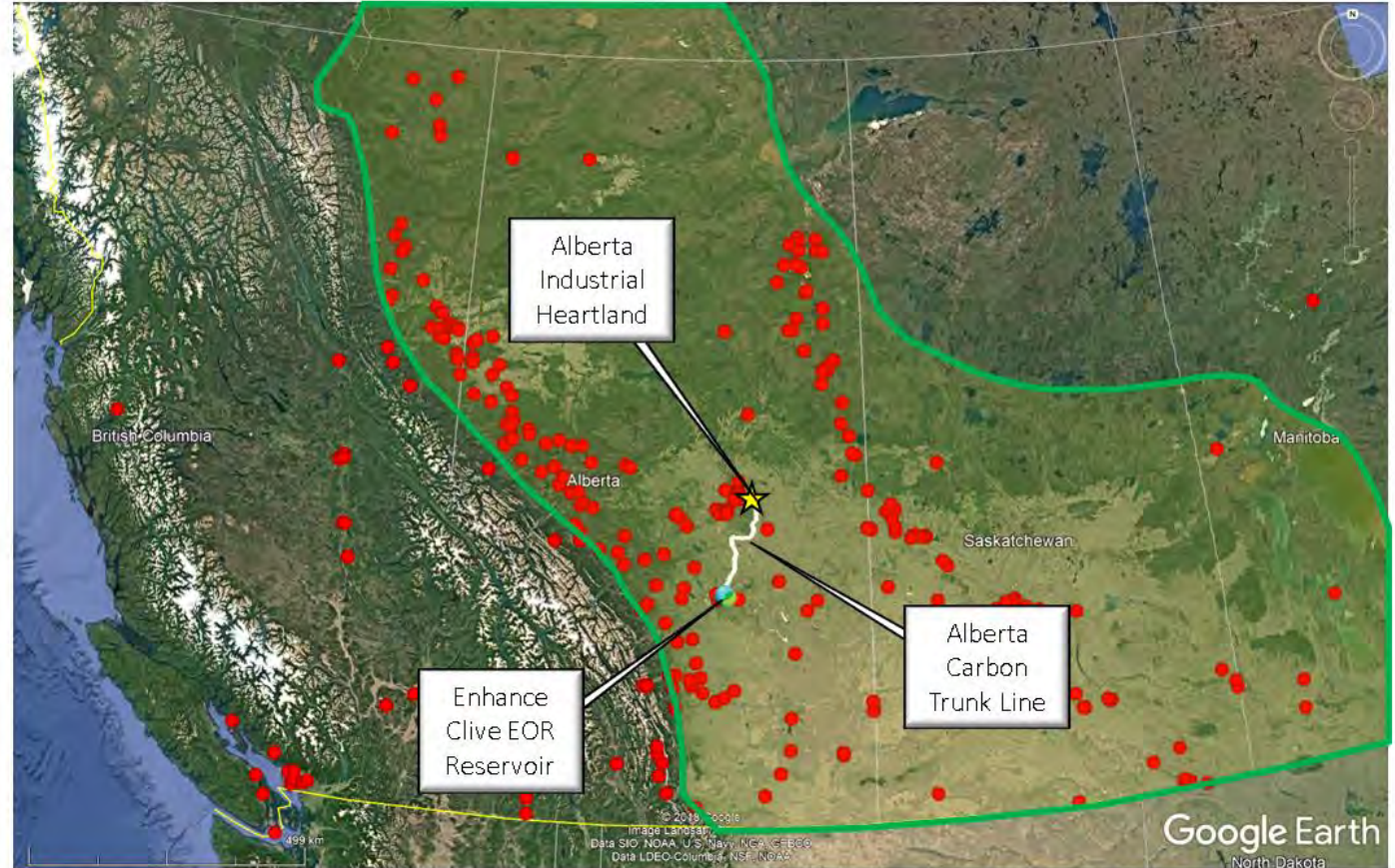


Major Emitters are Under Pressure to Reduce Emissions

- Social Licence
- IFRS Standard/Sustainability Reporting
- TIER (Technology Innovation and Emissions Reduction Program)
- Federal Net-Zero by 2050
- Clean Fuel Standards (CFS)
- Task Force on Climate-Related Financial Disclosure (TCFD)
- Sustainability Accounting Standards Board (SASB)

CO₂ EOR and CCS are Fit for Alberta

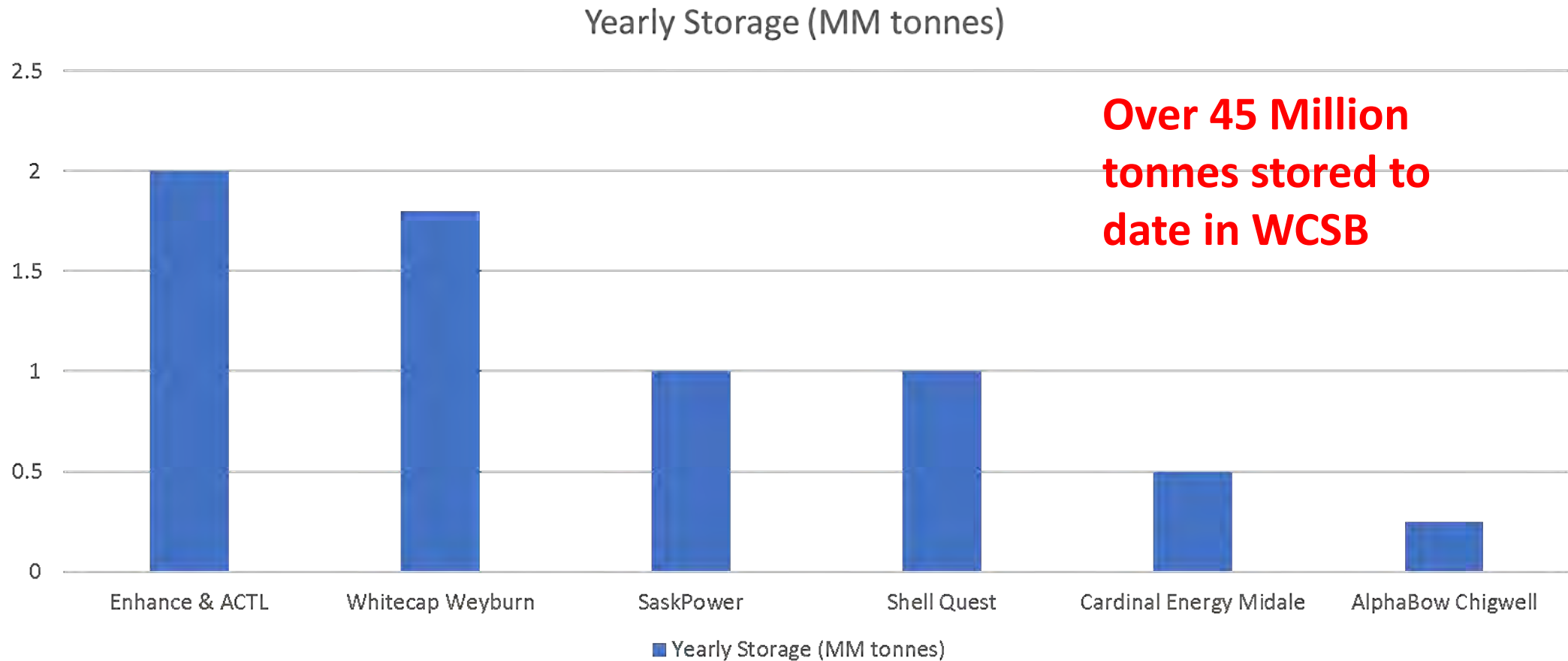
- 200 Large Emitters > 148 Mtpa
- Western Canada Sedimentary Basin
- Mature regulatory regime
- Pore space ownership regulations
- Public acceptance
- Alberta Carbon Trunk Line



● Large Emitter Reporting > 50 ktCO₂e in 2017⁽¹⁾

Western Canada Sedimentary Basin

Canadian CCUS Projects



Carbon Pricing

Alberta Provincial Carbon Offset Credits

- Sequestered CO₂ at Clive generates emissions offsets
- Offsets sold into the Alberta Offset Market
- Current price C\$30/T
- Provincial commitment to increase to C\$50/T by 2022



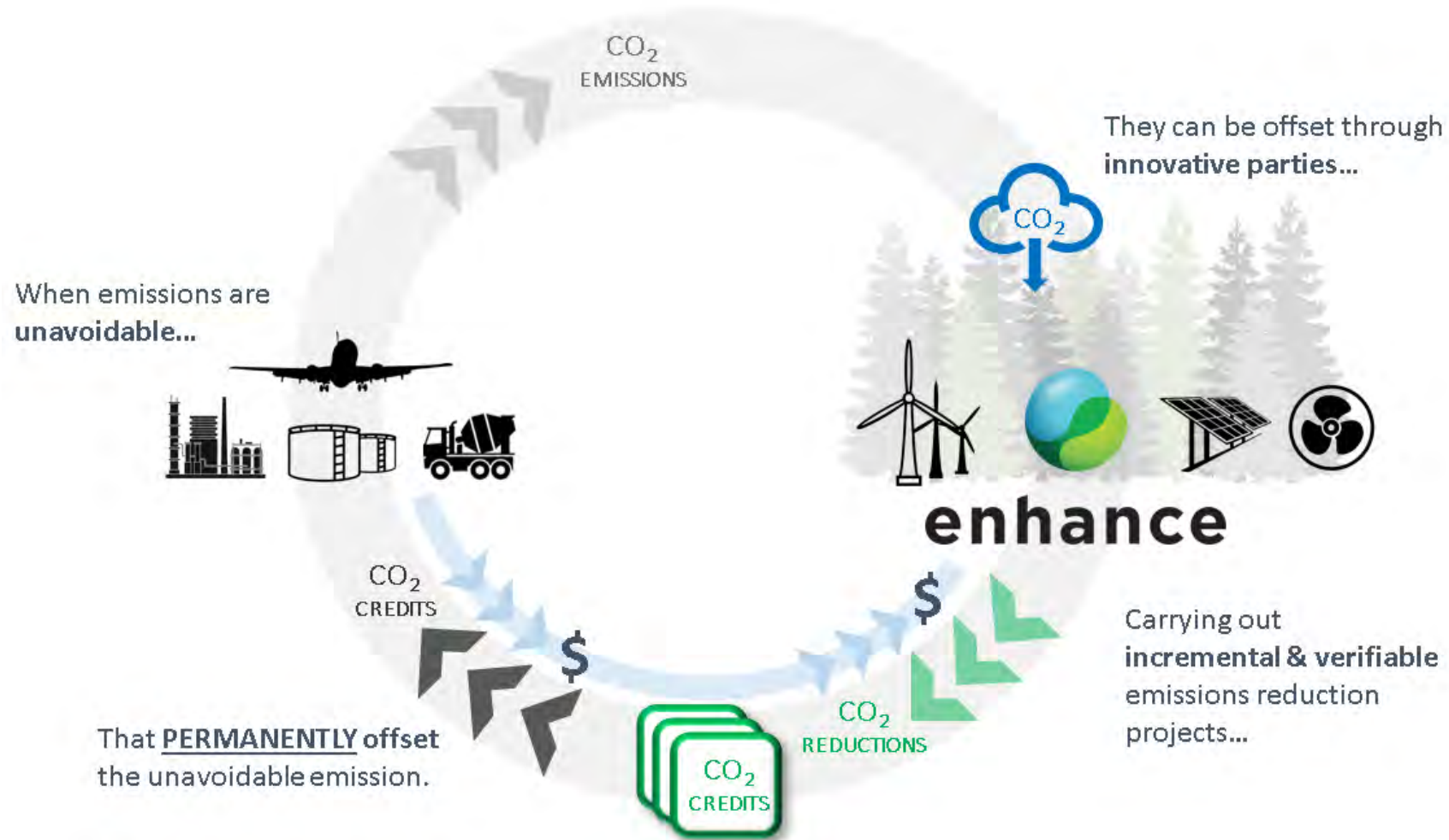
Credit Generation

- Protocols generated/renewed every 5 years
 - Credit term 8 years + 5 years (require review for approval)
 - Demonstration of **permanence** required
 - Holdbacks and discount factors applied
 - Application frequency up to project proponent
 - Offset Project Plan and Offset Project Reports required
- TIER
 - Emissions Performance Credits
 - Yearly application

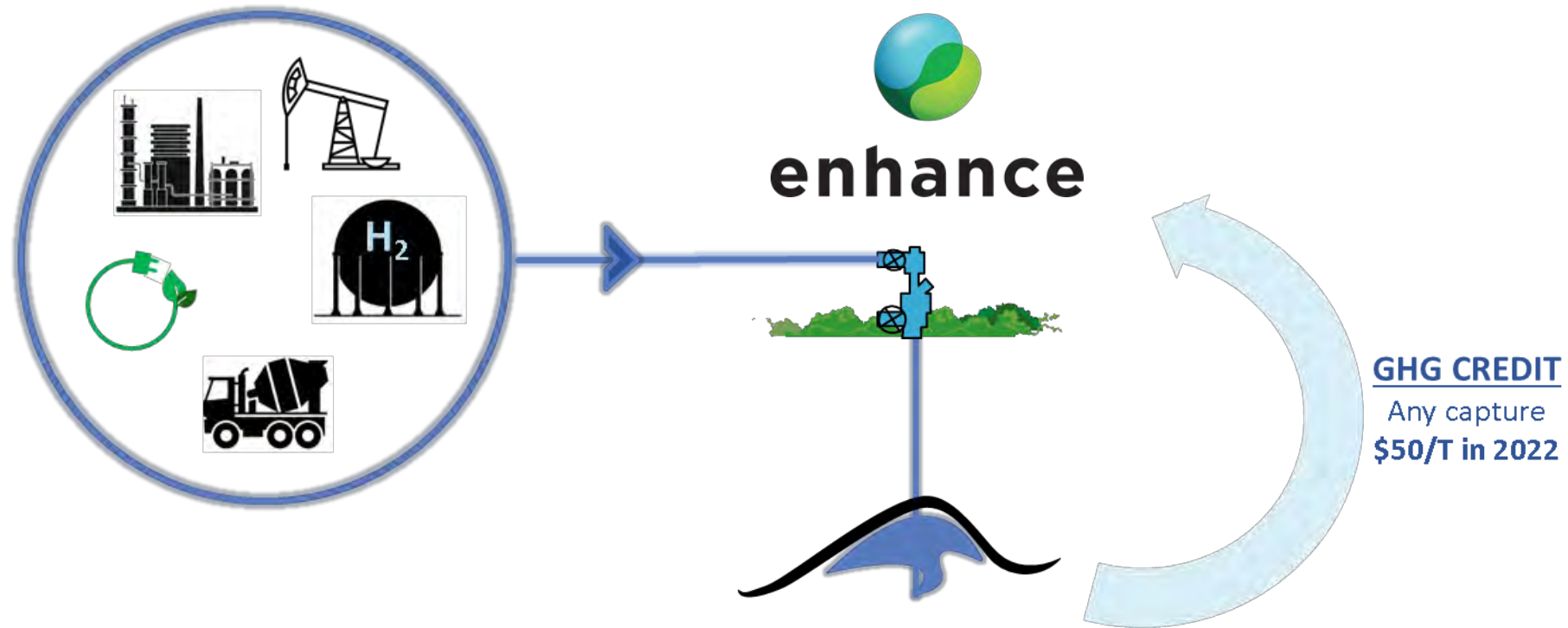
Credit Generation

- Both methods require verification and certification
 - Independent verifier required to review/approve
 - Certified by CSA (Canadian Standards Association)
 - Upon certification, credits are then marketable
- Significant effort involved throughout crediting process
- Credit market values are function of “quality” of the credit

Enhance's Role as a Credit Generator



Credits Generated by a Sequestered Tonne



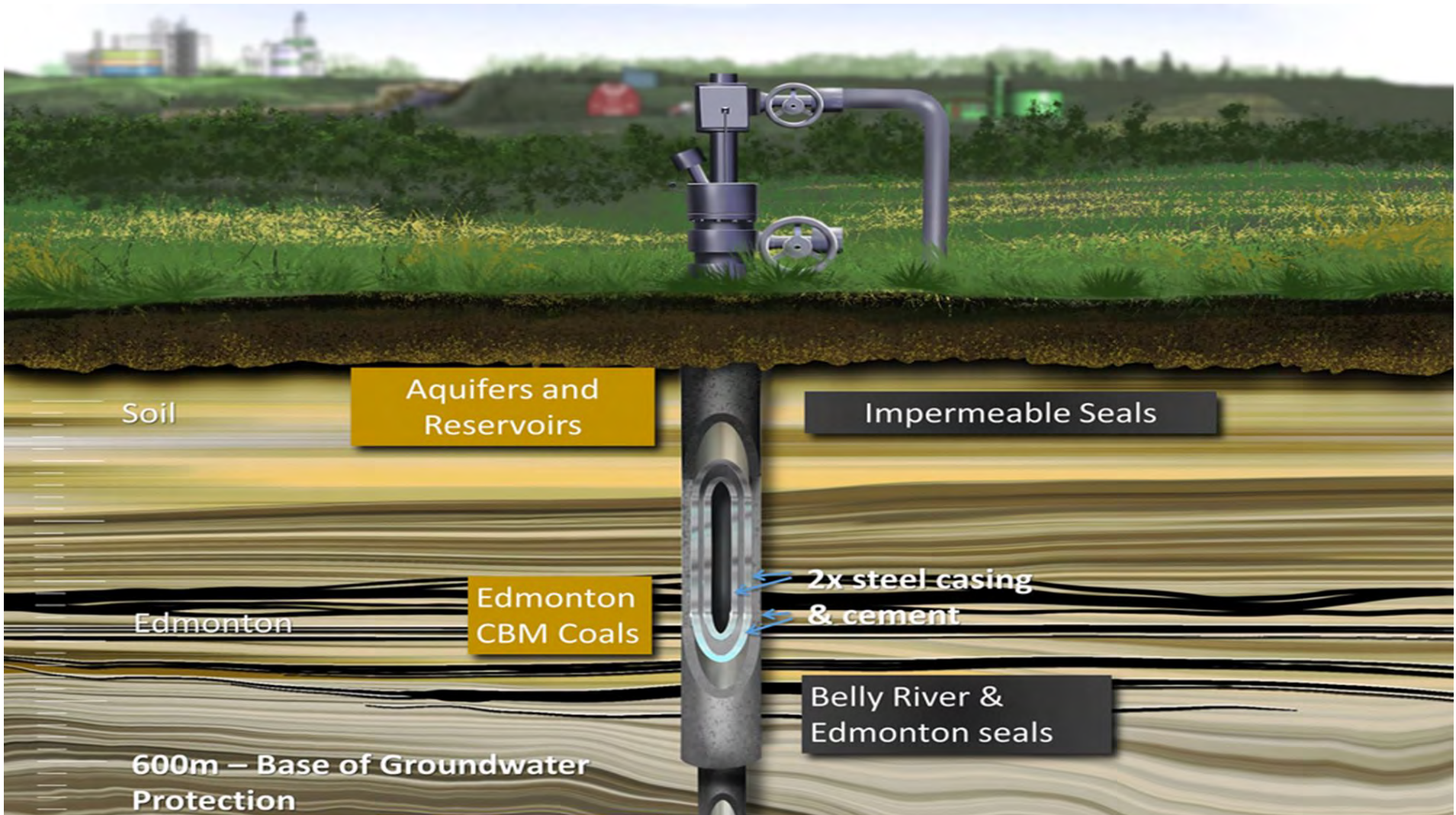
Clive EOR Approval

- Required involvement both multiple departments, not just Alberta Energy Regulator
- Alberta Energy and Alberta Environment and Parks were required for approval of MMV plan
 - MMV plan key component of Knowledge Sharing requirements from Alberta government funding
 - Demonstrating permanence key deliverable

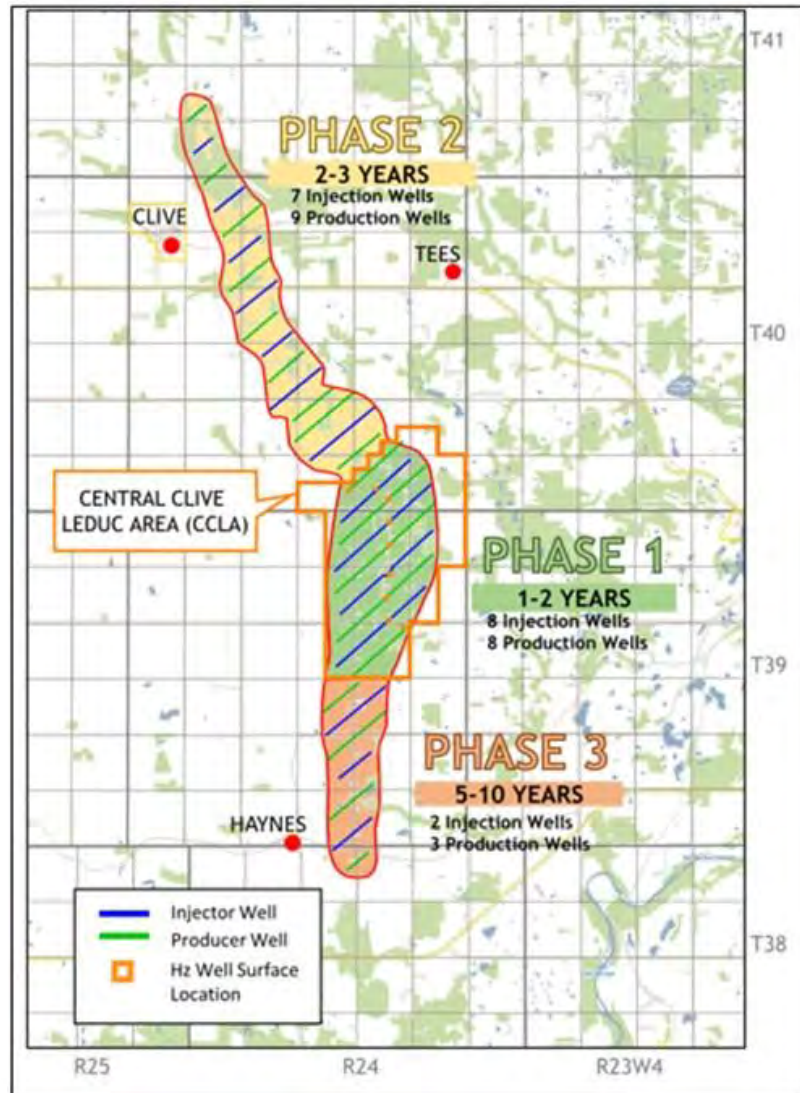
MMV REGULATIONS IN ALBERTA

- There are no specific regulatory requirements for MMV in Alberta
- The AER Directives regulate oil & gas operations
 - Reservoir management and monitoring
 - Operational constraints
 - Measurement requirements
 - Wellbore management
- Enhance is required to provide an MMV Plan as part of the government funding agreement – one off requirement

MMV Overview



Clive EOR Development Activities



Complete and Near-Term Activity

- 2020 Phase 1 activity
 - 6 CO₂ injectors drilled
 - 4 producers presently drilling
 - Battery expansion, gathering infrastructure
- 2021 Development
 - Complete Phase 1
 - Commence Phase 2

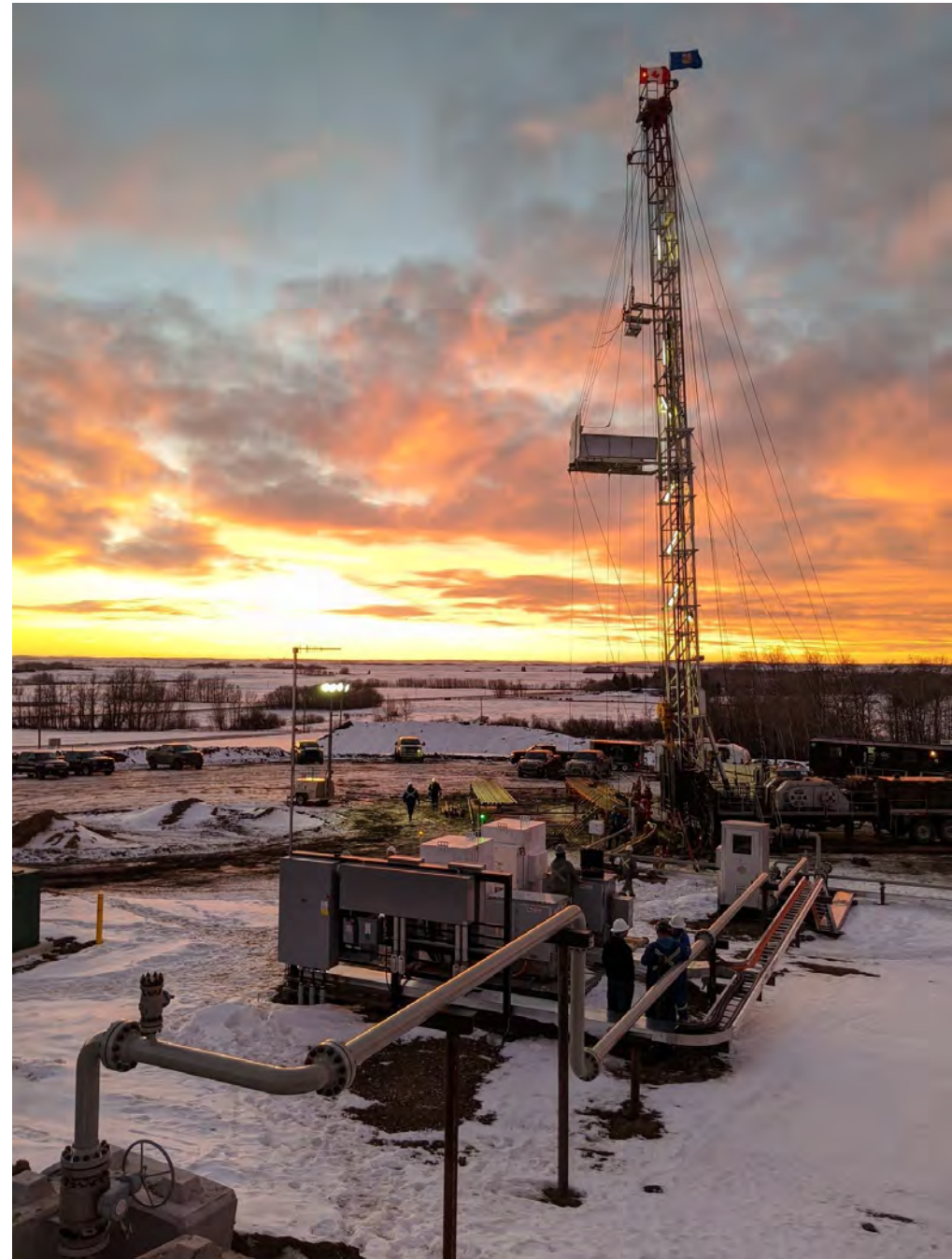
EOR Development Scope

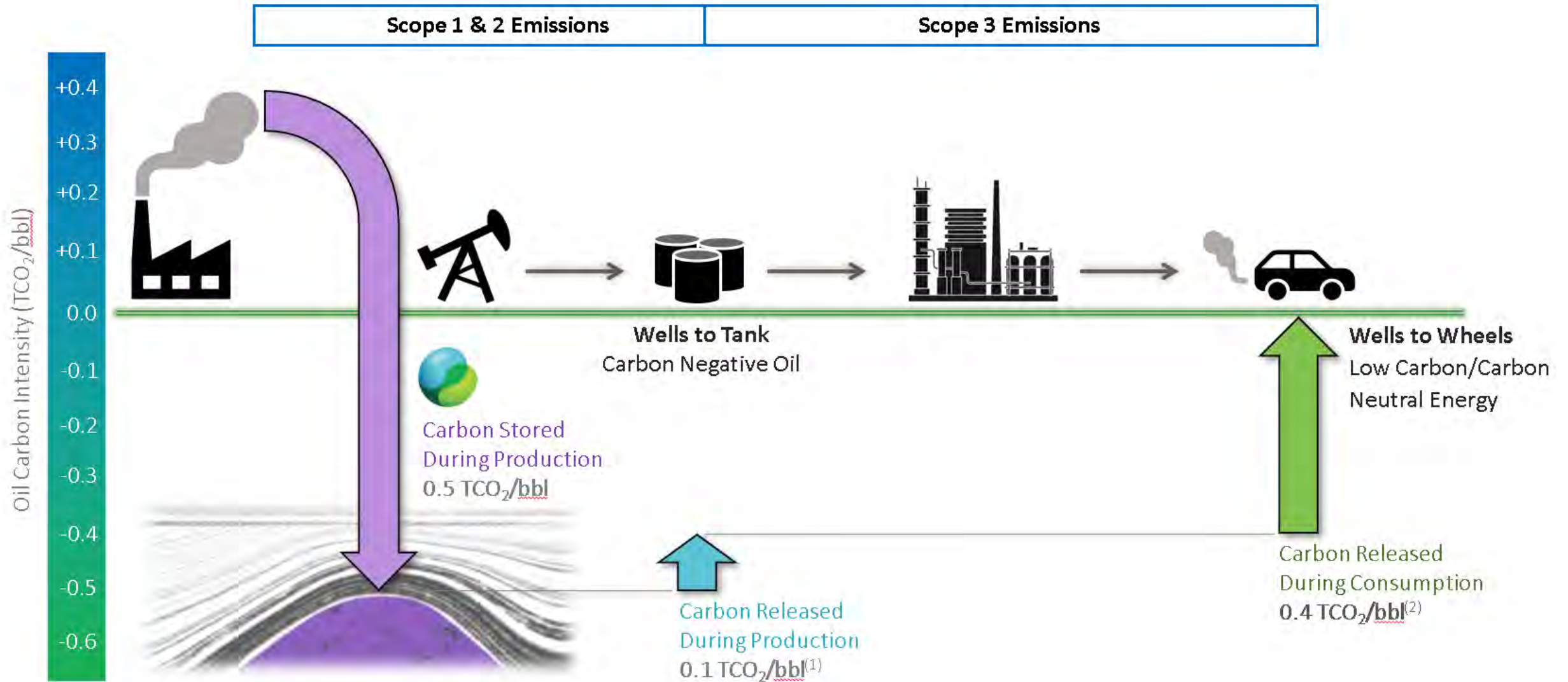
- New production and injection wells
- New CO₂ injection and production pipelines
- Recycle Compression Expansion

Clive EOR Construction



Clive Injection & Production Sites





(1) Carbon Capture & Storage in the United States Power Sector, Clean Air Task Force, February 2019

(2) Oil Sands: A strategic resource for Canada, North America and the global market, Government of Canada, May 2013

Conclusion

- ✓ In operation and sequestering CO₂ today
- ✓ Large CO₂ supply contracts in place – 20+ years
- ✓ Experienced, proven operational team
- ✓ Vast regulatory knowledge and experience
- ✓ Established credibility & social license with public stakeholders
- ✓ World-scale fully operational CCS assets
- ✓ Financial diversification with CCS/EOR crediting

