

ENTROPY INC.

SPE CCUS Conference
October 3rd, 2023



AGENDA



- Who we are
- Why we are different
- What we have accomplished
- Where we are going
- How we work with emitters
- What people get wrong about our business



WHO WE ARE



ENTROPY: COMMERCIAL CARBON CAPTURE AND STORAGE, TODAY

Clean Tech Pure Play

- Dedicated, full-service industrial CCS company
- Proprietary, innovative technology and commercial structure

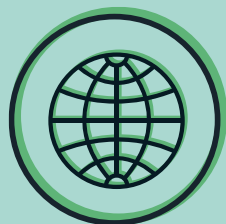


Technology

- Exclusive ownership of world-leading solvent
- Innovative process enhancement technologies
- Decades of storage experience

Expertise

- Valuable and unique technical backgrounds
- Deep talent pool of experts focused on economic scaling of CCS technology and project execution



Capital

- Deploying Entropy capital to advance projects
- Creating exposure to rising carbon prices
- Willingness to invest alongside emitters

ENTROPY



BROOKFIELD + ENTROPY INITIAL STRATEGIC INVESTMENT



Brookfield

Transition Strategy

- 24,000 MW Renewable Power Portfolio
- Expanded global reach
- Accelerated decarbonization
- Development & operating expertise

**\$300 Million
Strategic
Investment**

ENTROPY

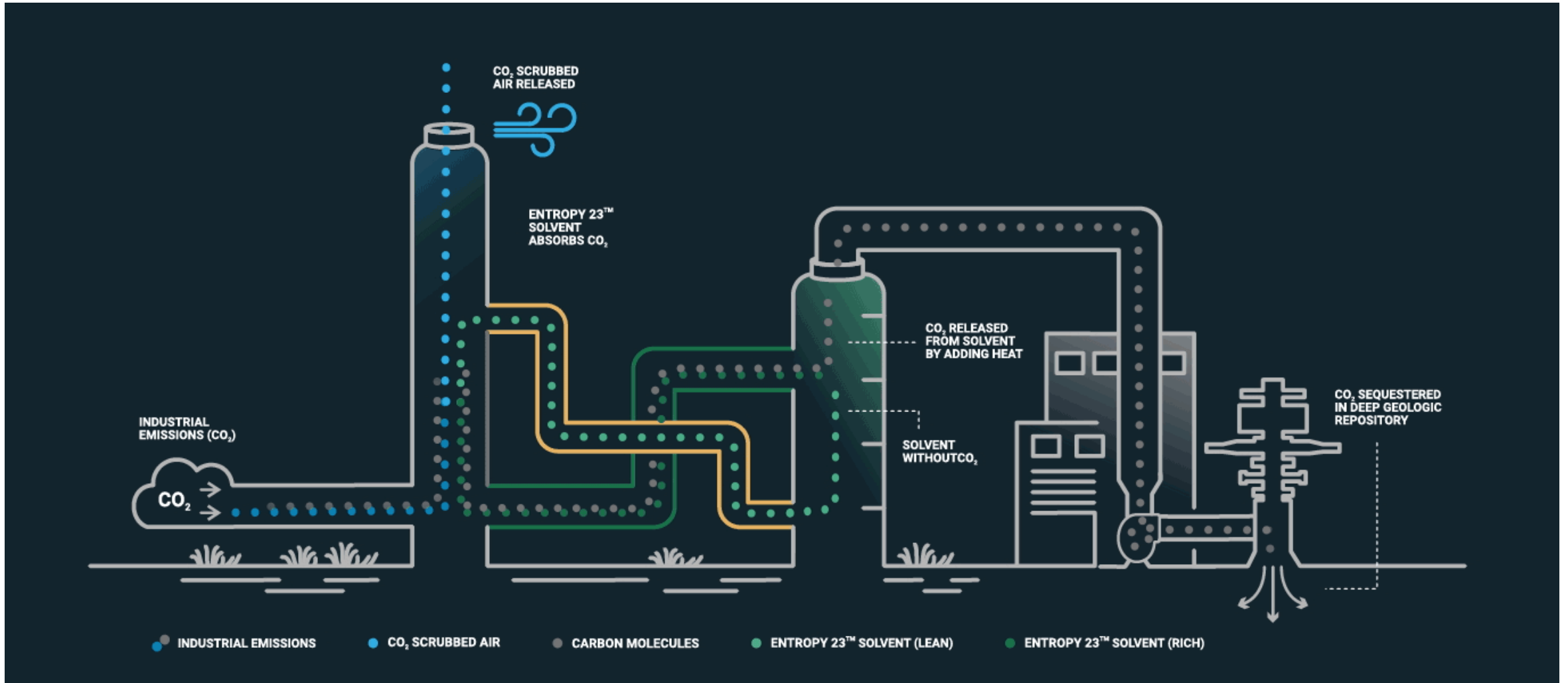
Entropy Funded for Scale

- \$300 million to fund near-term projects including Glacier
- Significant potential for follow-on capital
- Reinforces value of proprietary tech
- Enhanced project pipeline

*Part of World's largest transition fund – Brookfield **\$15B***

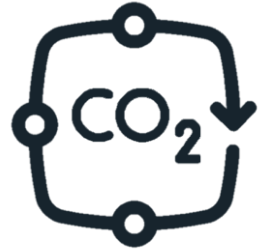
REVERSE ENTROPY CARBON CAPTURE™ (RECC™) – NEXT GEN SOLVENT TECHNOLOGY

TECHNOLOGY ADVANTAGE: *Equipment Cost Reduction* • *Maximizing Recovery Efficiency* • *Minimizing Operating Costs*



CCS PARTNER OF CHOICE

Entropy is a full-scope CO₂ Development Company that provides Source-to-Sink Service



- Proven, proprietary technology
- World-leading energy efficiency
- Design, build and operate critical infrastructure (pipelines and compression)
- Design, permit and maintenance of subsurface reservoir

- Operating the world's only commercial scale gas combustion CCS project
- In-house engineering and design
- Decades of experience in construction and operation of natural gas transportation systems
- In-house subsurface team
- Over a decade of sequestration experience



**Entropy Build, Own, Operate
Fee-for-Service
or
Licencing Model**



Brookfield

#GlobalReach #CleanEnergySuperMajor #AccessToCapital



WHY ARE WE DIFFERENT?



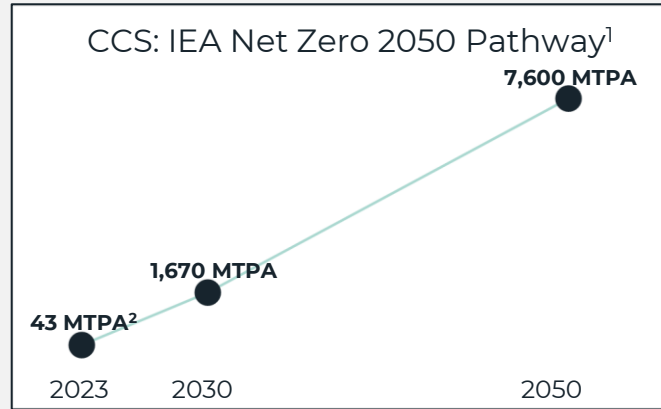
EXECUTIVE SUMMARY

Leading the way globally on post-combustion carbon capture



Massive Market Opportunity

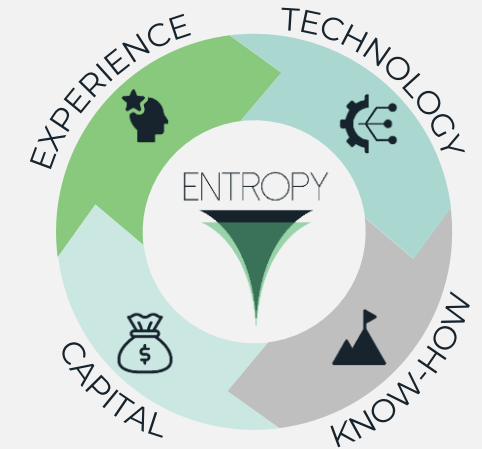
CCS to play an essential role in global decarbonization



Positioned For Success

Pure-play, full-scope CCS offering

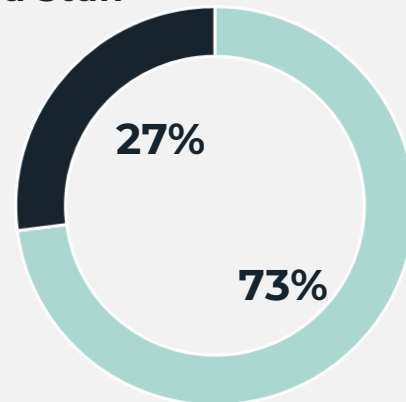
- Novel carbon capture solution
- Permitting/Licensing
- Subsurface Evaluation
- Measurement, Monitoring & Verification
- CO₂ Validation & Monetization



Doing The Hard Stuff

Combustion accounts for the majority of Canada's emissions³ – post combustion capture is challenging due to low CO₂ partial pressure and concentration (4-12%)

Entropy designed, built and operates the only natural gas combustion CCS facility in the World⁴



■ Pre-Combustion Emissions (CAN) ■ Post-Combustion Emissions (CAN)

Learning By Doing – Glacier Phase 1a



Glacier CCS Operating Runtime⁽⁵⁾

97%



Solvent Performance

2.4 GJ/Tonne



FID to Commission
16 Months



Capture Rate
90-98%

(1) Net Zero by 2050: A Roadmap for the Global Energy Sector (IEA, 2021)
 (2) Global Status of CCS 2022 (Global CCS Institute, 2022)
 (3) NRCan Sources and Sinks Executive Summary (2022)
 (4) Global CCS Institute CCS Database 2023
 (5) March to May 2023

ENTROPY R&D AT CETRI: LEADERS IN POST-COMBUSTION CCUS FOR 30 YEARS

Nobel Peace Prize: CETRI founder Dr Malcolm Wilson was recognized for contributions to CCS in concert with the UN IPCC (2007)

- Entropy has unique access to world-leading R&D facility and researchers for Entropy solvent and process development
 - One of the few in the world with the full capability of developing and testing carbon capture solvent technology

Professors



- Co-founder of CETRI, advisor to Entropy
- Work has been cited over 12,500 times
- Focused on carbon capture since 1991

Dr. Paitoon Tontiwachwuthikul (“PT”)



- Founding director of CETRI, advisor to Entropy
- SaskPower Clean Energy Research Chair
- Research has been captured in over 200 publications

Dr. Raphael Idem

Key Awards and Recognitions



2020 Top Researchers in Carbon Capture, Usage and Storage Technologies



One of Top Ten Cited Articles in 2018-2019 in “International Greenhouse Gas Control”



Helping grow Saskatchewan's tech sector.

2008 Award for Innovation – Carbon Capture Research



2006 Synergy Award for Innovation



Greenhouse Gas Technology Centre



Solvent Testing Facility

Select Prior CCS Project Sponsors and Clients

Partner	Country	Date	Description
	China	2019	CCUS comprehensive technical training
	Qatar	2015-2019	Development of advanced CO ₂ separation technology for natural gas processing
	Thailand	2012-2015	Development of separation technologies for improving biogas separation process
	U.K.	2010-2011	Testing and evaluation of Boundary Dam pilot plant for carbon capture processes
	U.S.	2010-2011	Testing and evaluation of novel solvents for carbon capture technologies
	Netherlands	2009-2010	Pilot testing and process optimization of gas turbines for carbon capture
	Norway	2007-2008	Feasibility study and staff training of carbon capture demonstration project

GENERATING RETURN ON INVESTMENT



- 1 Entropy commits capital to build the CCS facility in exchange for most environmental attributes (including carbon credits, clean fuel regulation credits, refundable incentive tax credits, etc.)
 - Entropy's feedstock is the "waste product" of the emitting facility

Feedstock



Large emitters commit exhaust gas under long-term contracts with associated make-whole payments in the event of feedstock interruptions



Environmental attributes, incl. Carbon Credits, Clean Fuel Regulation Credits, and CCS Refundable Incentive Tax Credits, are generated and monetized

Carbon Marketing



Carbon Credits



Tax Credits

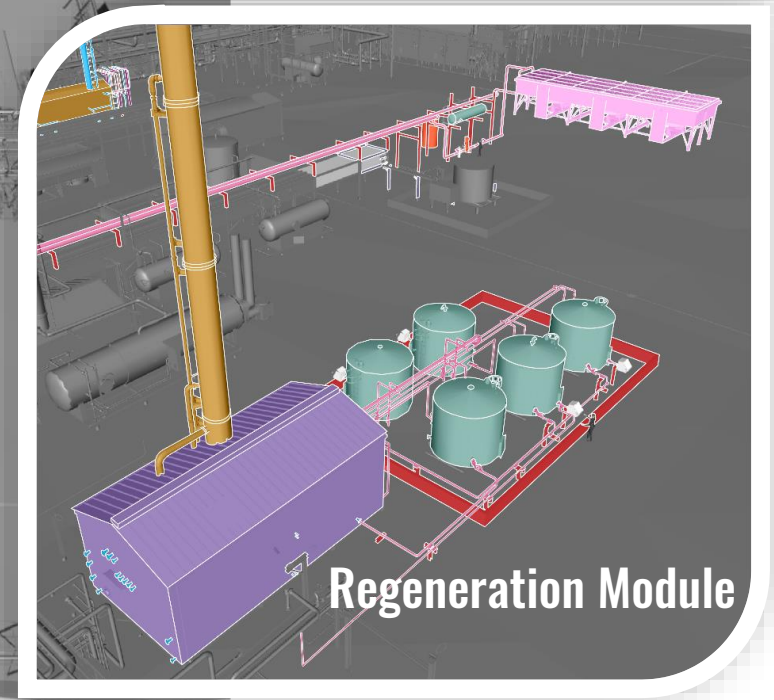
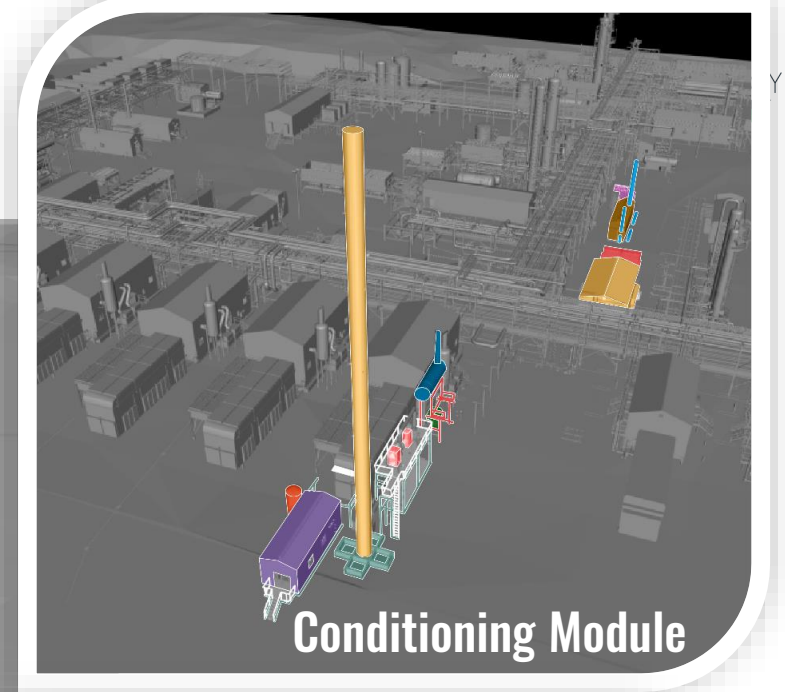


CFR Credits

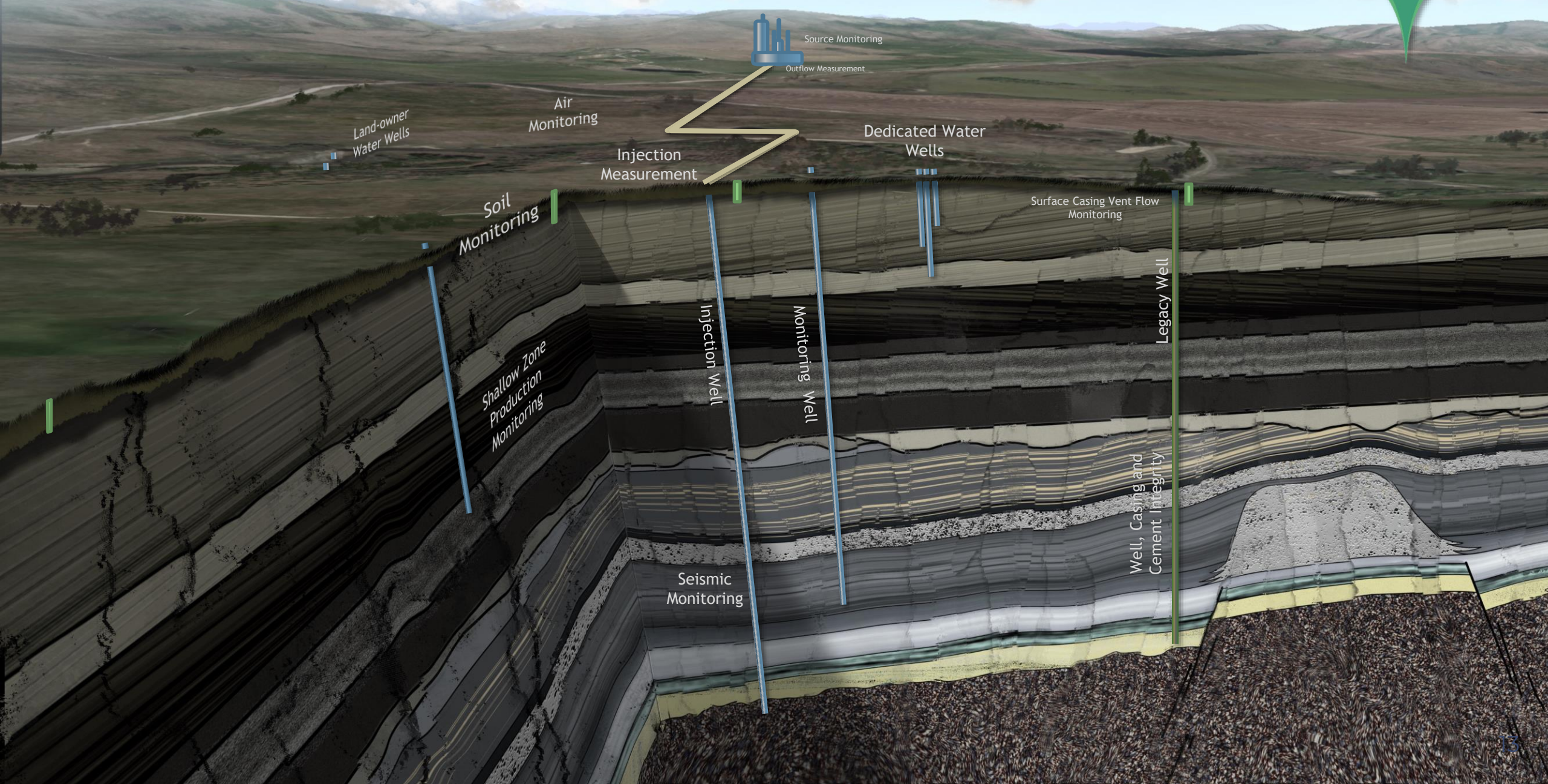
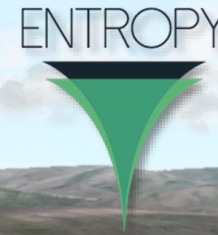
- 2 Benefits to the host facility include the following:
 - Helps achieve decarbonization commitments without deploying requisite capital
 - Underlying production can be marketed as carbon neutral (potentially fetching premium pricing)
 - Small revenue share is available as carbon prices rise, helping offset carbon tax exposure

Entropy generates compliance-based carbon credits and sells them in well-established carbon markets

GLACIER PHASE 1A MODULAR APPROACH



Experience in CO₂ Geological Storage





WHAT HAVE WE ACCOMPLISHED?



WHAT WE HAVE ACCOMPLISHED

ENTROPY



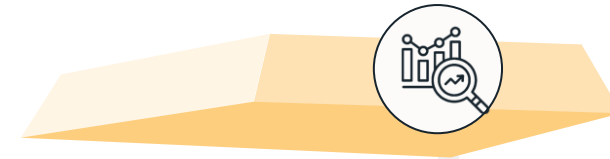
Intellectual Property

- 3 patents pending on chemistry
- 2 patents pending on process
- Research chair at the university of Regina
- 6 different research initiatives directly related to de-carbonization
- Multiple trade secrets
- Proprietary software for process optimization and reporting

Glacier/Lessons Learned



EntropyIQ



Patents



Research



Intellectual Property



GLACIER NATURAL GAS PLANT AND CCS PROJECT



- 30-meter tall contactor tower
- First carbon captured in August of 2022
- Currently in operation for both capture and sequestration
- Requires ongoing 24x7 operations
- 18-months from FID to first capture
- The Glacier Natural Gas plant supplies the natural gas heating needs of more than 1.5 million homes
- \$800 million asset built by Advantage Energy



GLACIER PHASE 1 ON-STREAM: FUTURE EXPANSIONS



Glacier Gas Plant Details

- Natural gas fired reciprocal compressor engines totaling 37,500 HP = 5 x 5,000 HP + 5 X 2,500 HP
- Compressors create 220,000 tpa of CO₂
- Phase 1: Currently on-stream. 5,000 HP compressor, 16,000 tpa sequestration + 31,000 tpa abated emissions (waste-heat capture)
- Phase 1b: 16,000 tpa planned on-stream Q4/23
- Phase 2: 136,000 tpa, planned on-stream 2025

Phase 1A



Phase 1B



Phase 2

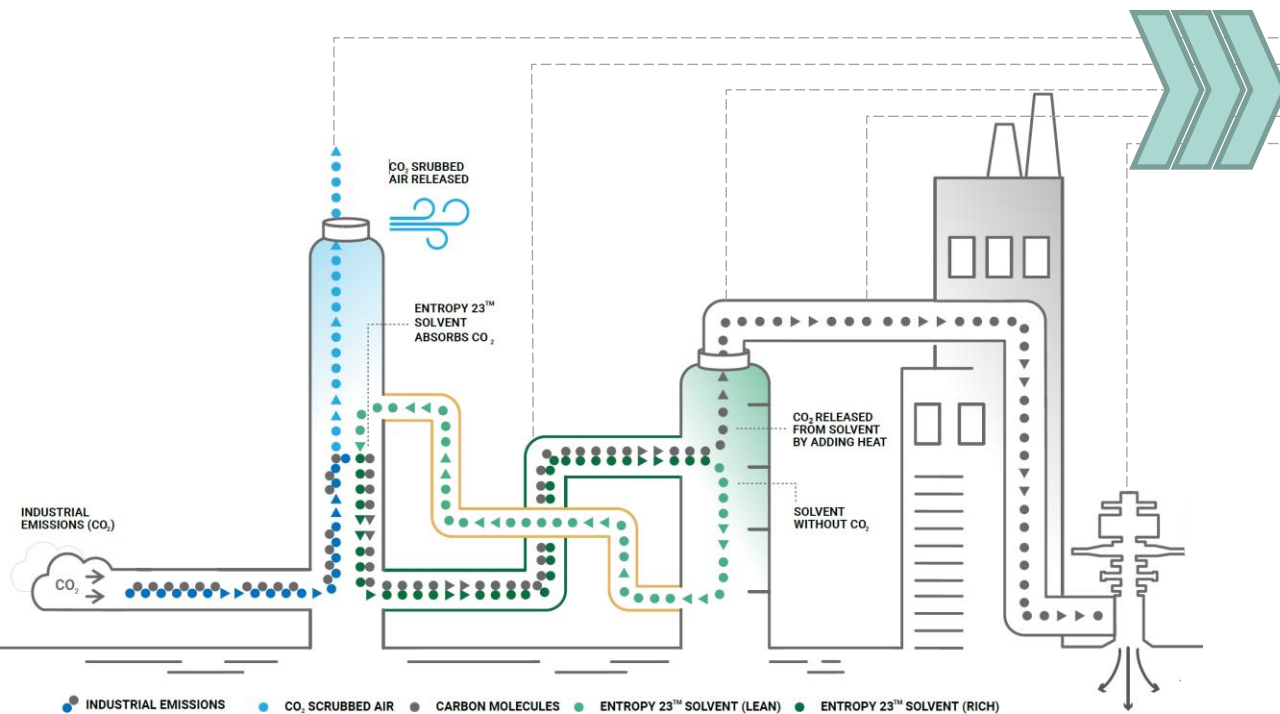


DATA MANAGEMENT AND REPORTING FOR CCS



Generating Offsets Requires Difficult Data Management

- Important to integrate of all control systems and emissions information to achieve the following datapoints for Offsets
 - Carbon Injected (Flow, Temperature, Pressures, CO2 Composition)
 - Carbon Sources and Sinks
 - Waste Heat Recovery, Electrical Usage, Fuel Usage from Boilers/Heaters/Compressors





WHERE ARE WE GOING?



ENTROPY POST-COMBUSTION CAPTURE OFFERINGS

iCCS Recip™



Capture on reciprocating engines, commonly used for gas compression

Commercial Project:
Glacier Gas Processing Facility

iCCS Thermal™



Capture on boilers/steam generation

Pre-FID Projects:
Leismer (ATH)¹
Kern (CRC)²

iCCS Turbine™



Capture on simple or combined cycle gas turbines, commonly used for power generation

Multiple Pre-FID Projects

TAKING ACTION TODAY TO DE-RISK TOMORROW

FIRST-OF-KIND



Reciprocating Engines
GLACIER 200k tpa



OTSGs (Boilers)
LEISMER 440k tpa



Gas Turbines & Integrated Facility
BOW VALLEY 500k tpa²



1.1 mtpa

ITC
Carbon Price Certainty
Value Gap (IRA), SIF, other

SCALE UP

(Canada only)

20 mtpa¹

Gas Plants

40 mtpa¹

Thermal Oil Production
(Other Industrial Applications)

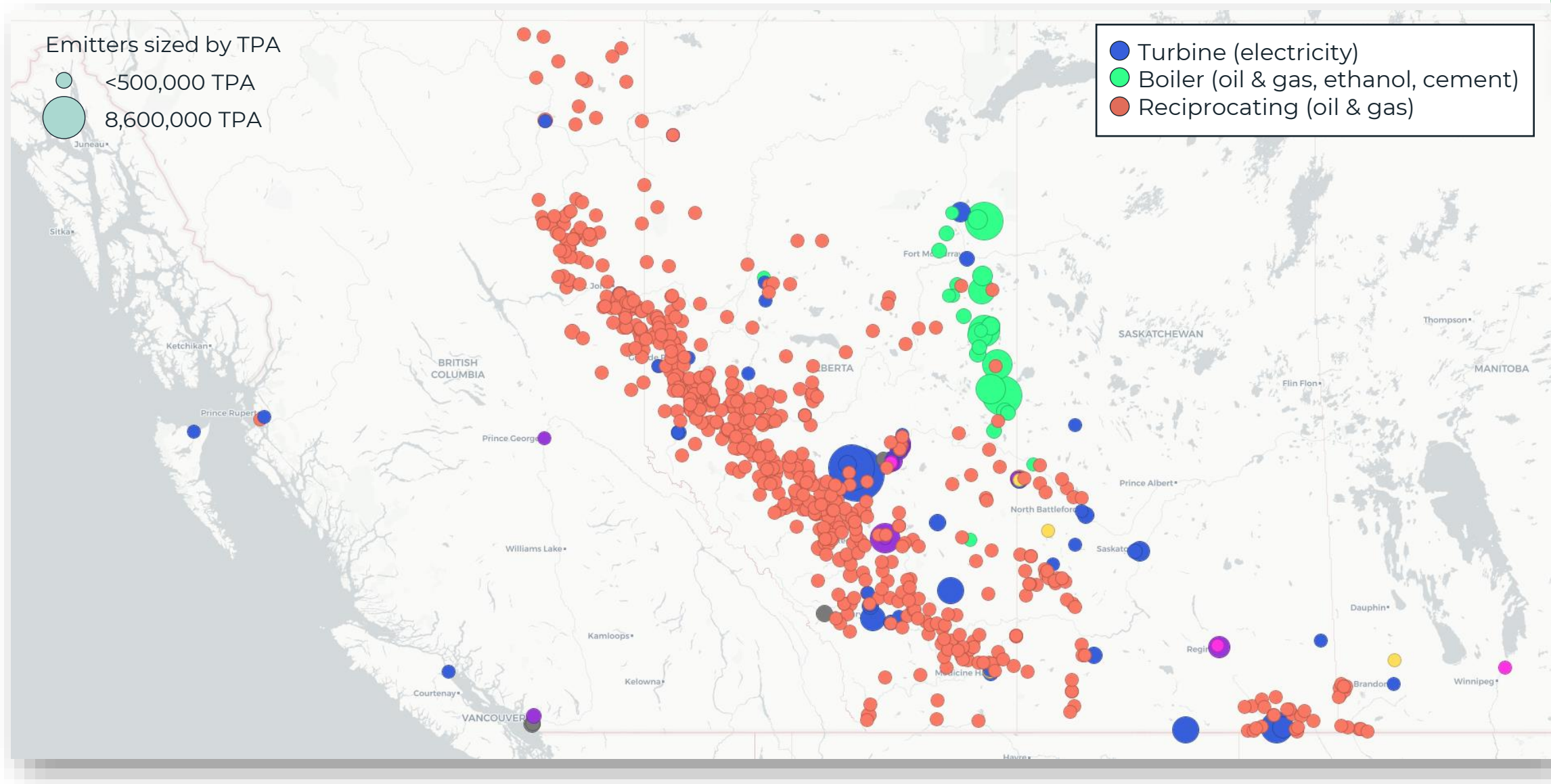
50 mtpa¹

Simple/Combined Cycle Turbines

110 mtpa

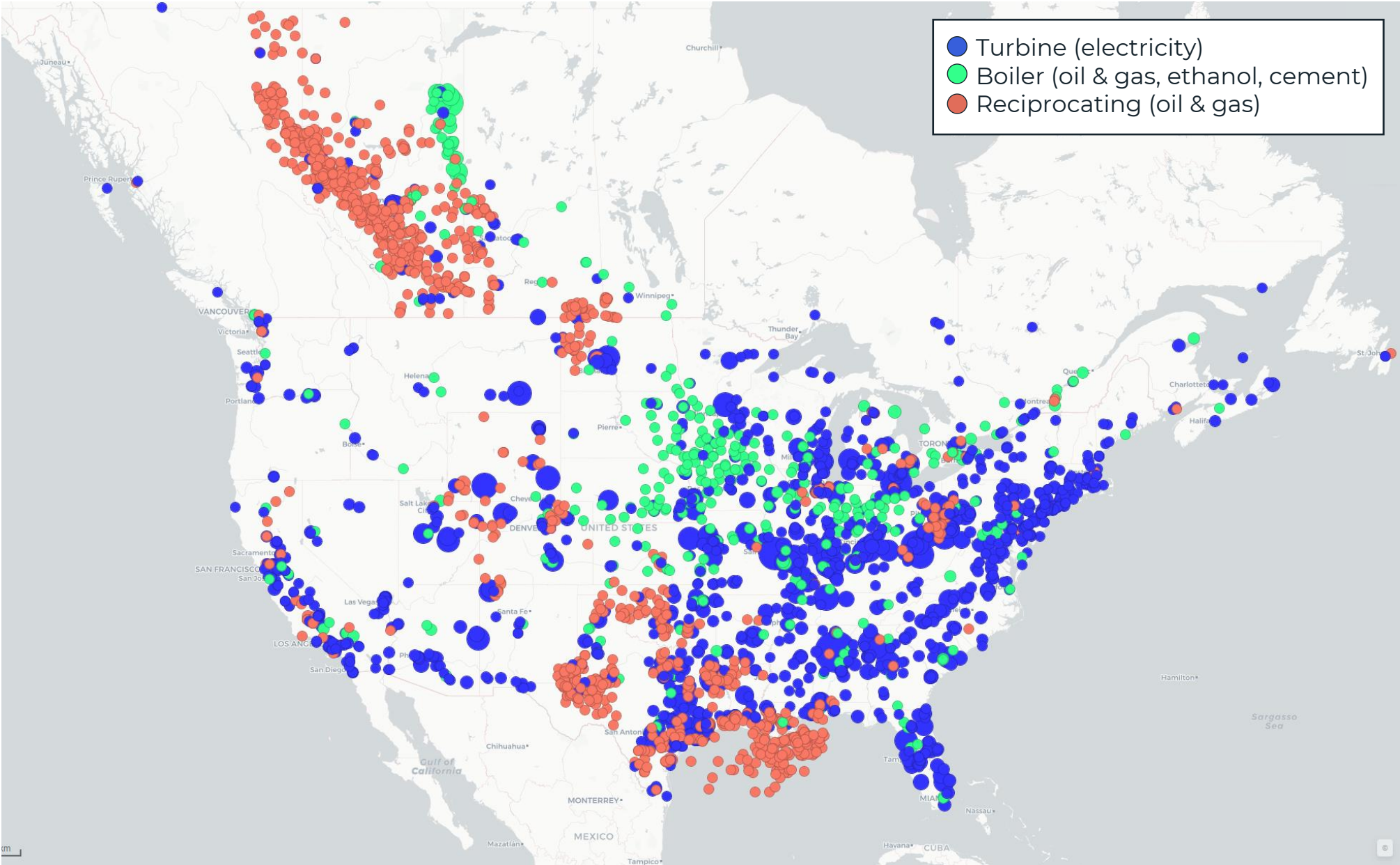
(1) Source: NRCan Sources and Sinks Executive Summary (2022); Western Canada
(2) Bow Valley Hub emissions include turbine and pre-combustion emissions

WESTERN CANADIAN POST-COMBUSTION EMISSIONS



Notes:
(1) Emissions Data from Environment and Climate Change Canada's Greenhouse Gas Reporting Program (2020)

NORTH AMERICAN POST-COMBUSTION EMISSIONS



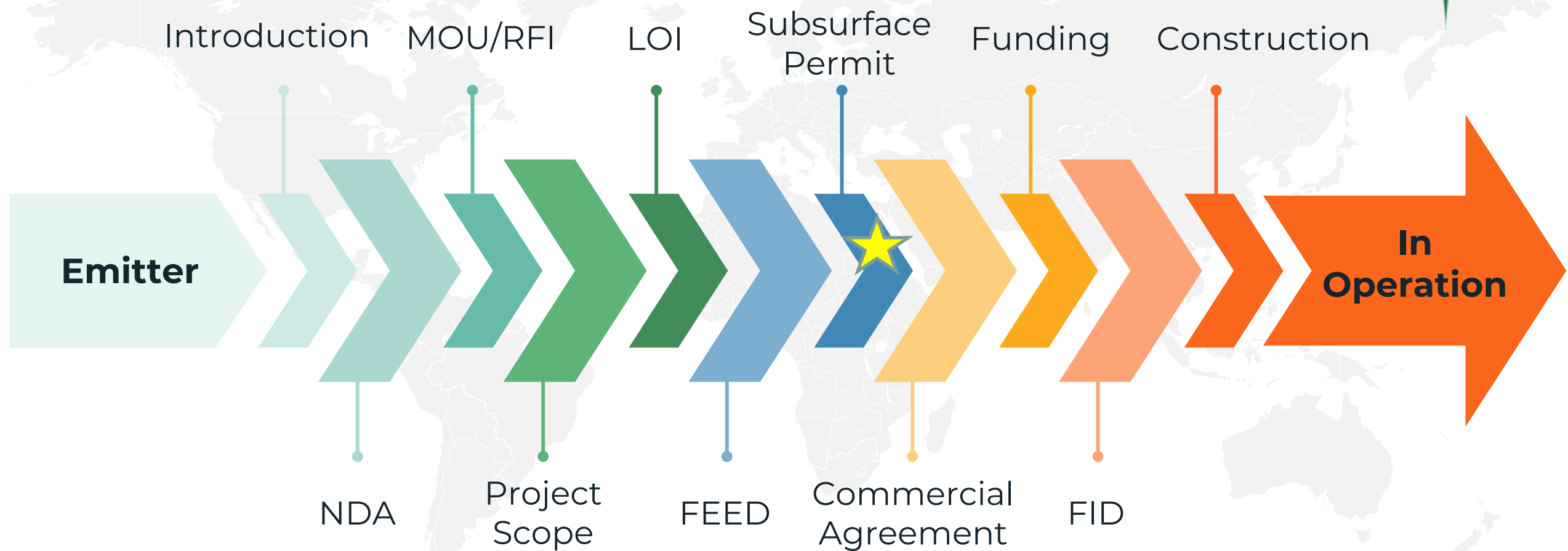


HOW WE WORK WITH EMITTERS



Entropy Roadmap

Enabling the acceleration of emissions reduction



Advancing Technology



Deploying Capital



De-risking CCS on OTSGs



Enabling Scale-up

ENTROPY BUSINESS MODELS – DEVELOP, OWN, OPERATE OR LICENCE



- Comprehensive CCS solution with highly competitive costs driven by Entropy23™ and process optimization
 - Entropy provides end-to-end, fully integrated and comprehensive CCS solutions
 - Initial focus has been “develop own operate” model to maintain and control pace of growth
 - Entropy now offering “license and support” model (capital light, where emitters choose to finance their CCS project independently) which provides incremental growth without the need for external financing
 - Joint capital funding and other arrangements available, depending on counterparty preference

A Project Selection			B Development		C Operation			D Marketing	
Identifying and evaluating prospective projects, partnerships and opportunities			Initial investment to design and build capture, transport and sequestration equipment		Full-cycle operations of capturing the CO ₂ , including the supply of the solvent			Maximize value of environmental attributes	
Business Model	Partnerships / Commercial Structure	Location / Scoping / Geology	Sign MOU	System Design and Engineering	Project Management and Construction	CO ₂ Capture	CO ₂ Transport	CO ₂ Sequestration and Measurement, Monitoring & Verification (“MMV”)	Carbon Credit Monetization
Entropy Develop, Own, Operate	✓	✓			✓	✓	✓	✓	✓
Entropy License and Support	✓	✓		✓	✓	<i>At option of project sponsor</i>			

✓ - Entropy to provide full range of service

Comprehensive business model represents a compelling solution for any emitter to achieve emissions reduction targets



WHAT PEOPLE GET WRONG ABOUT OUR BUSINESS



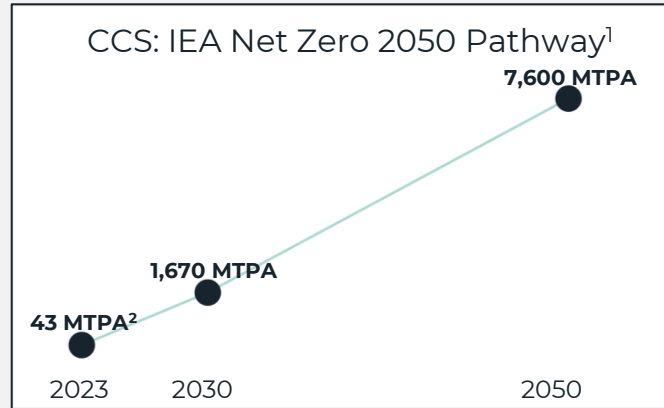
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Leading the way globally on post-combustion carbon capture



Massive Market Opportunity

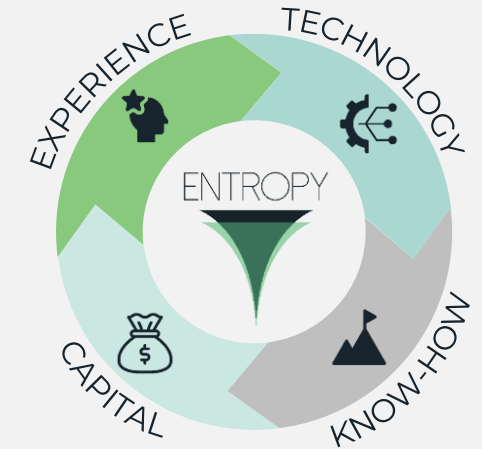
CCS to play an essential role in global decarbonization



Positioned For Success

Pure-play, full-scope CCS offering

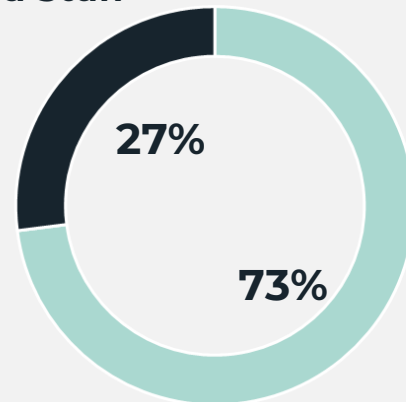
- Novel carbon capture solution
- Permitting/Licensing
- Subsurface Evaluation
- Measurement, Monitoring & Verification
- CO₂ Validation & Monetization



Doing The Hard Stuff

Combustion accounts for the majority of Canada's emissions³ – post combustion capture is challenging due to low CO₂ partial pressure and concentration (4-12%)

Entropy designed, built and operates the only natural gas combustion CCS facility in the World⁴



■ Pre-Combustion Emissions (CAN) ■ Post-Combustion Emissions (CAN)

Learning By Doing – Glacier Phase 1a



Glacier CCS Operating Runtime⁽⁵⁾

97%



Solvent Performance

2.4 GJ/Tonne



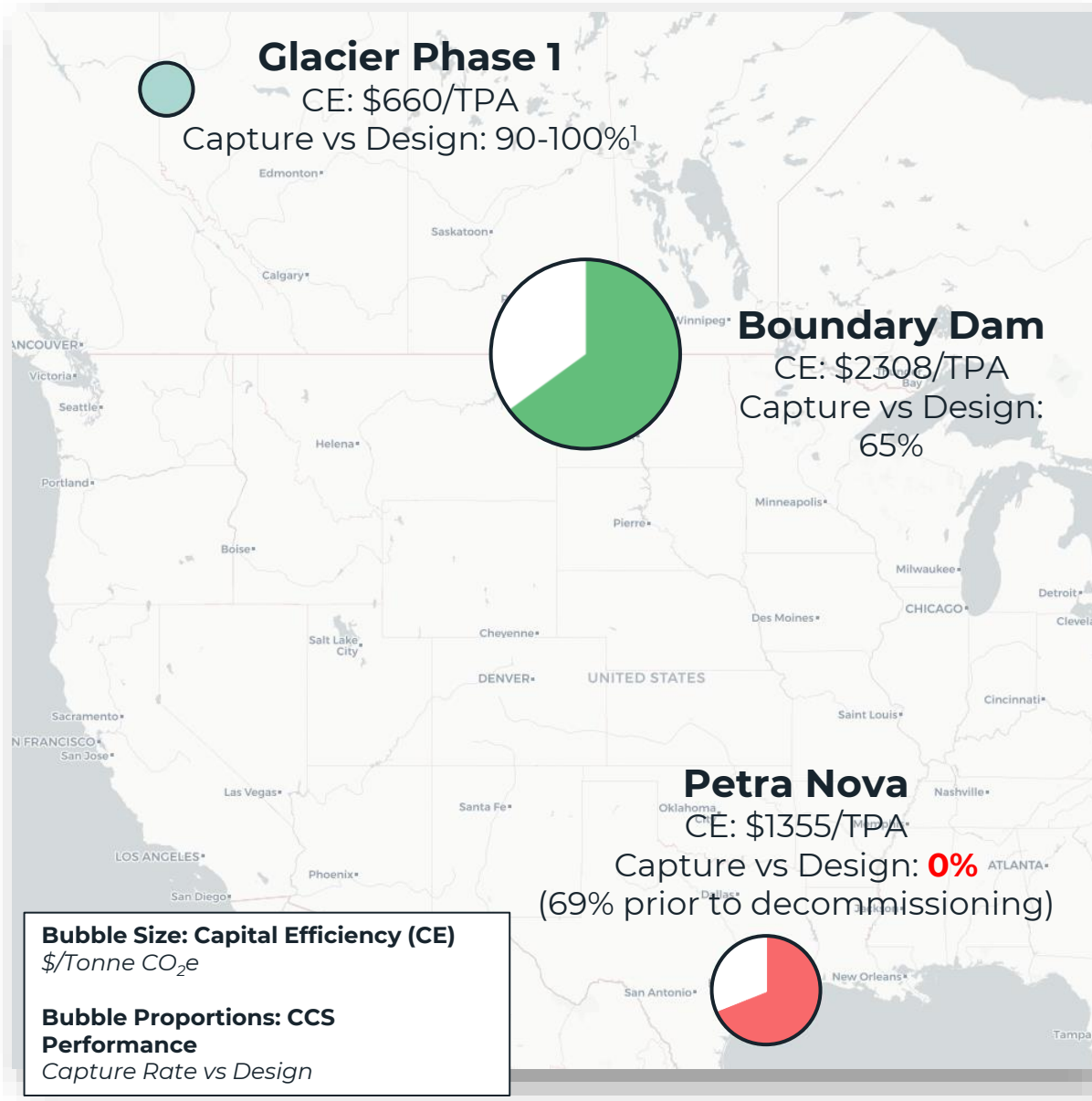
FID to Commission
16 Months



Capture Rate
90-98%

(1) Net Zero by 2050: A Roadmap for the Global Energy Sector (IEA, 2021)
 (2) Global Status of CCS 2022 (Global CCS Institute, 2022)
 (3) NRCAN Sources and Sinks Executive Summary (2022)
 (4) Global CCS Institute CCS Database 2023
 (5) March to May 2023

POST-COMBUSTION CCS PROJECTS GLOBALLY (TWO OPERATING)



Operational

Glacier Phase 1

Average Annual Abatement Rate: 47,000 TCO₂e
Public Funding: C\$20MM Alberta Government
Capital Cost: C\$31MM
On Stream Date: August 2022
Storage Type: Saline Aquifer
Combustion Type: **Natural Gas**

Operational

Boundary Dam

Average Annual Abatement Rate: 650,000 TCO₂e⁽²⁾
Public Funding: C\$240MM Federal Government
Capital Cost: C\$1.5B
On Stream Date: 2014
Storage Type: Enhanced Oil Recovery
Combustion Type: **Coal**

Re-Started

Petra Nova

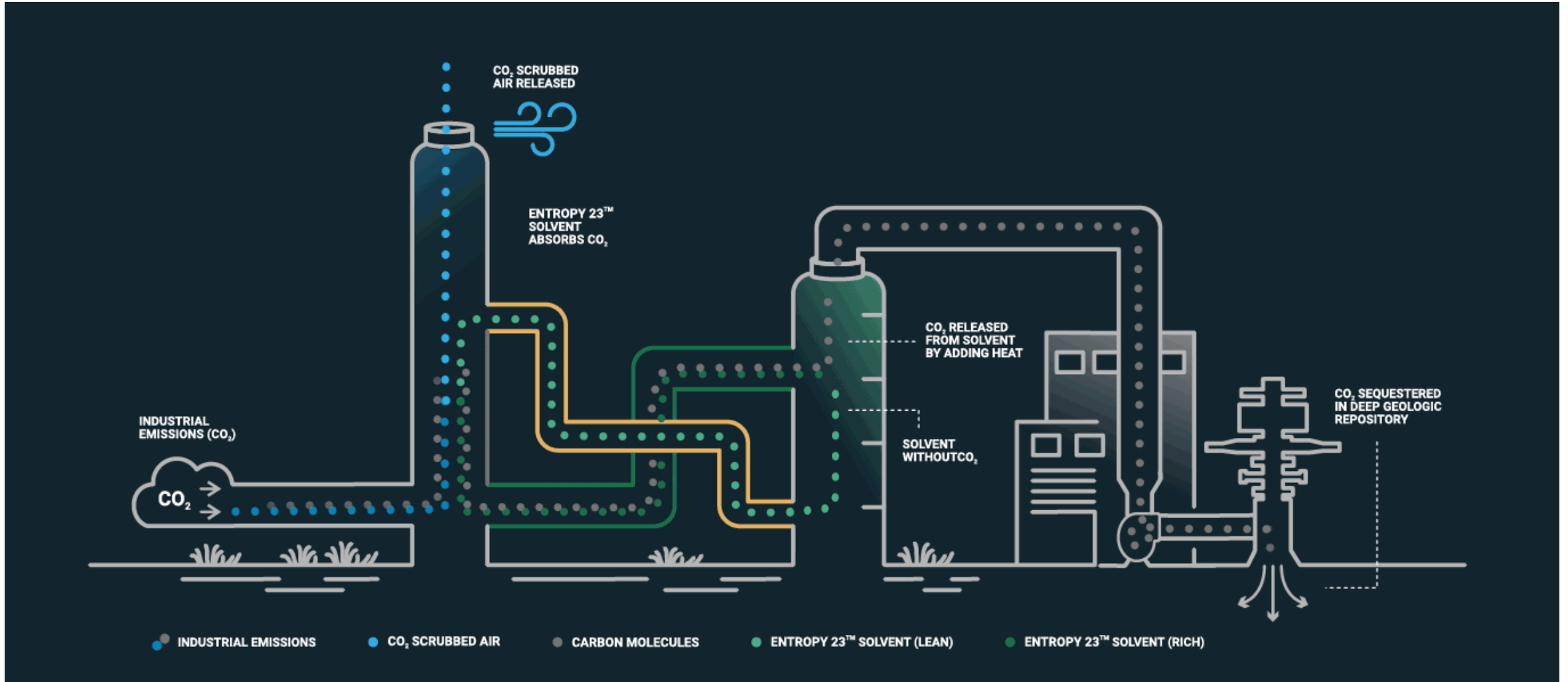
Average Annual Abatement Rate: 959,514 TCO₂e⁽³⁾
Public Funding: C\$254MM⁽⁴⁾ US Department of Energy
Capital Cost: C\$1.3B⁽⁴⁾
On Stream Date: 2017
Storage Type: Enhanced Oil Recovery
Combustion Type: **Coal**

Only Three Post-Combustion CCS Projects Globally

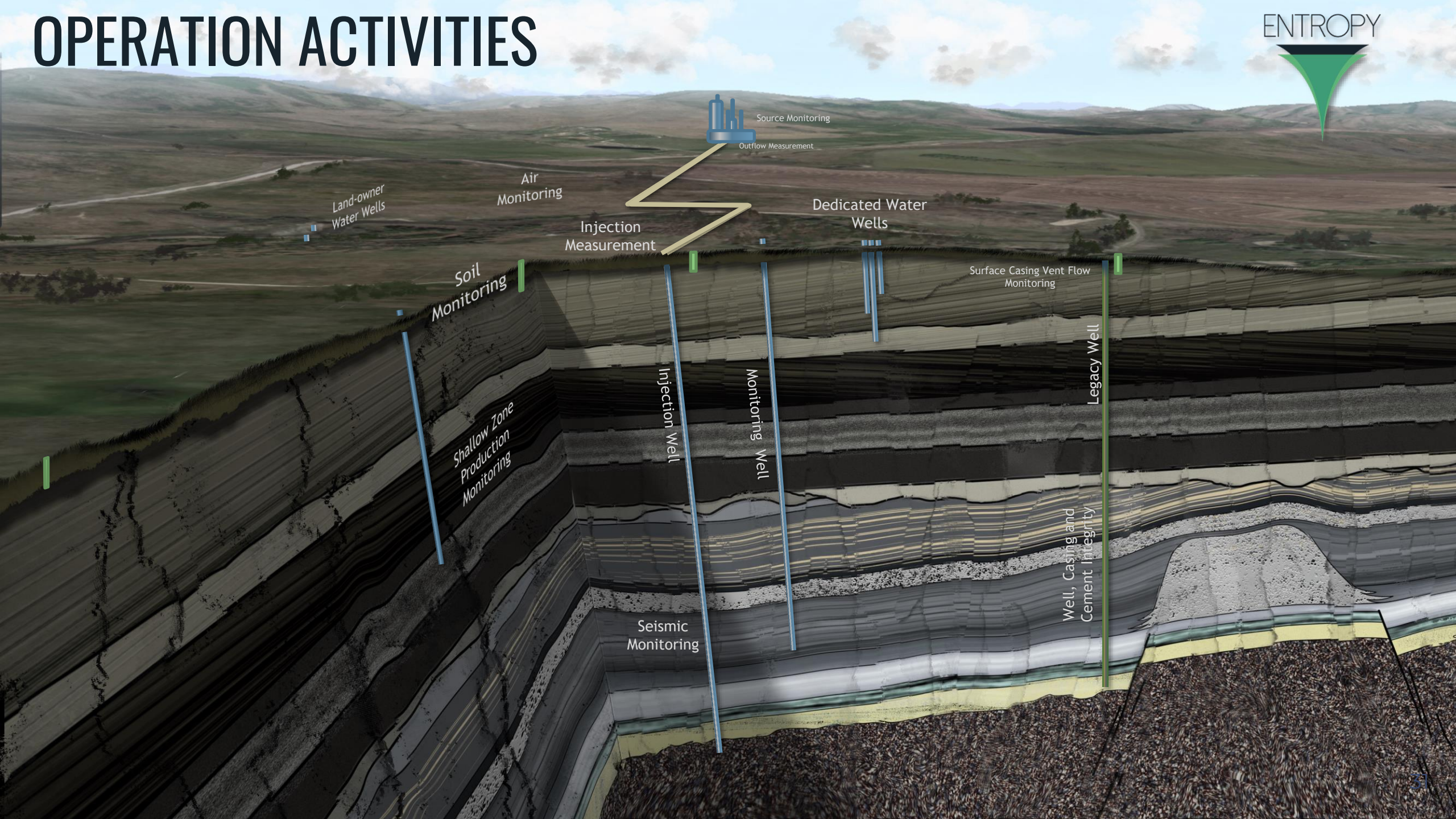
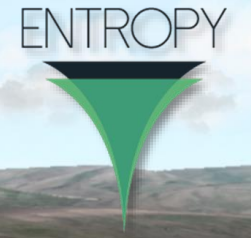
(1) Early operational data
 (2) Based on S&P Global Market Intelligence "Only still-operating carbon capture project battled technical issues in 2021". Rives (2022)
 (3) Based on United States Environmental Protection Agency "Petra Nova - West Ranch Oil Field CO₂ Monitoring, Reporting and Verification Plan" (July 2021)
 (4) Assumes USD to CAD conversion rate of 1.3

REVERSE ENTROPY CARBON CAPTURE™ (RECC™) – NEXT GEN SOLVENT TECHNOLOGY

TECHNOLOGY ADVANTAGE: *Equipment Cost Reduction* • *Maximizing Recovery Efficiency* • *Minimizing Operating Costs*



OPERATION ACTIVITIES



Source Monitoring

Outflow Measurement

Air Monitoring

Land-owner Water Wells

Dedicated Water Wells

Injection Measurement

Surface Casing Vent Flow Monitoring

Soil Monitoring

Legacy Well

Shallow Zone Production Monitoring

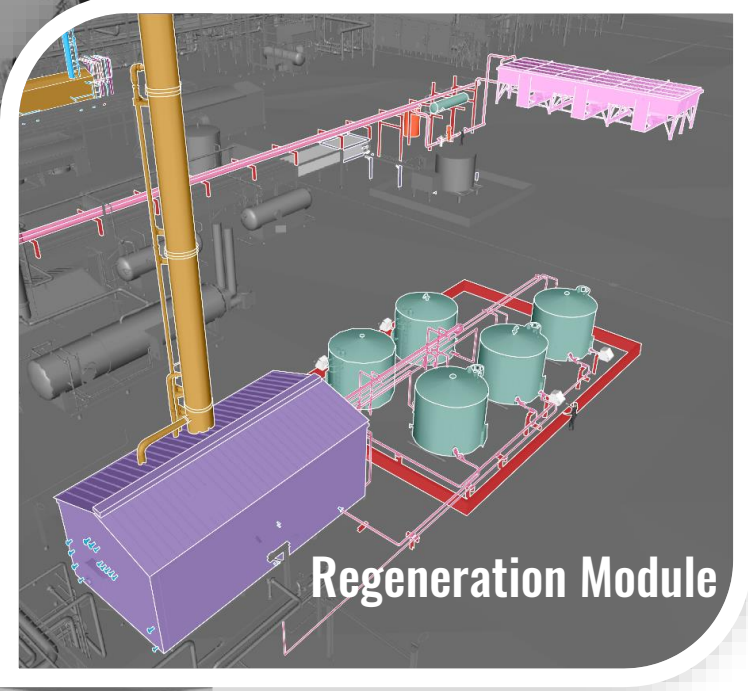
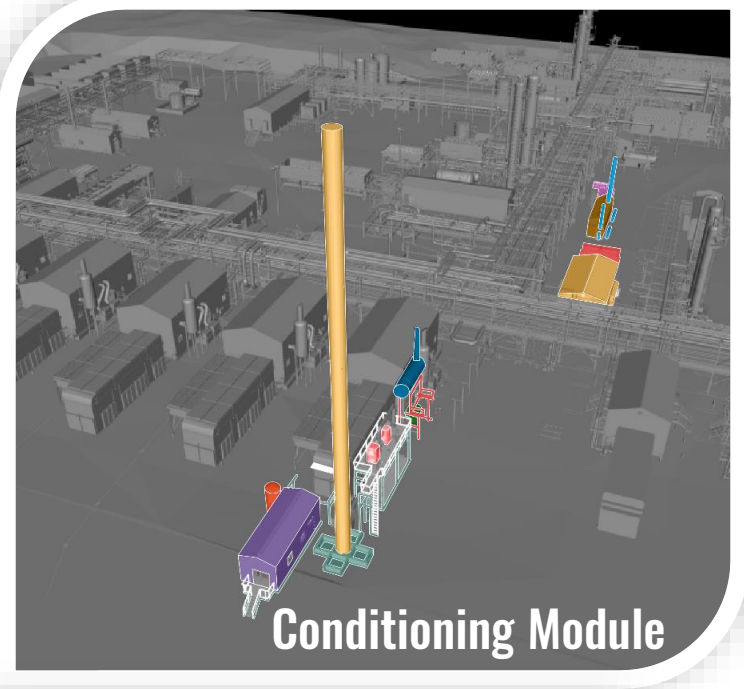
Injection Well

Monitoring Well

Well, Casing and Cement Integrity

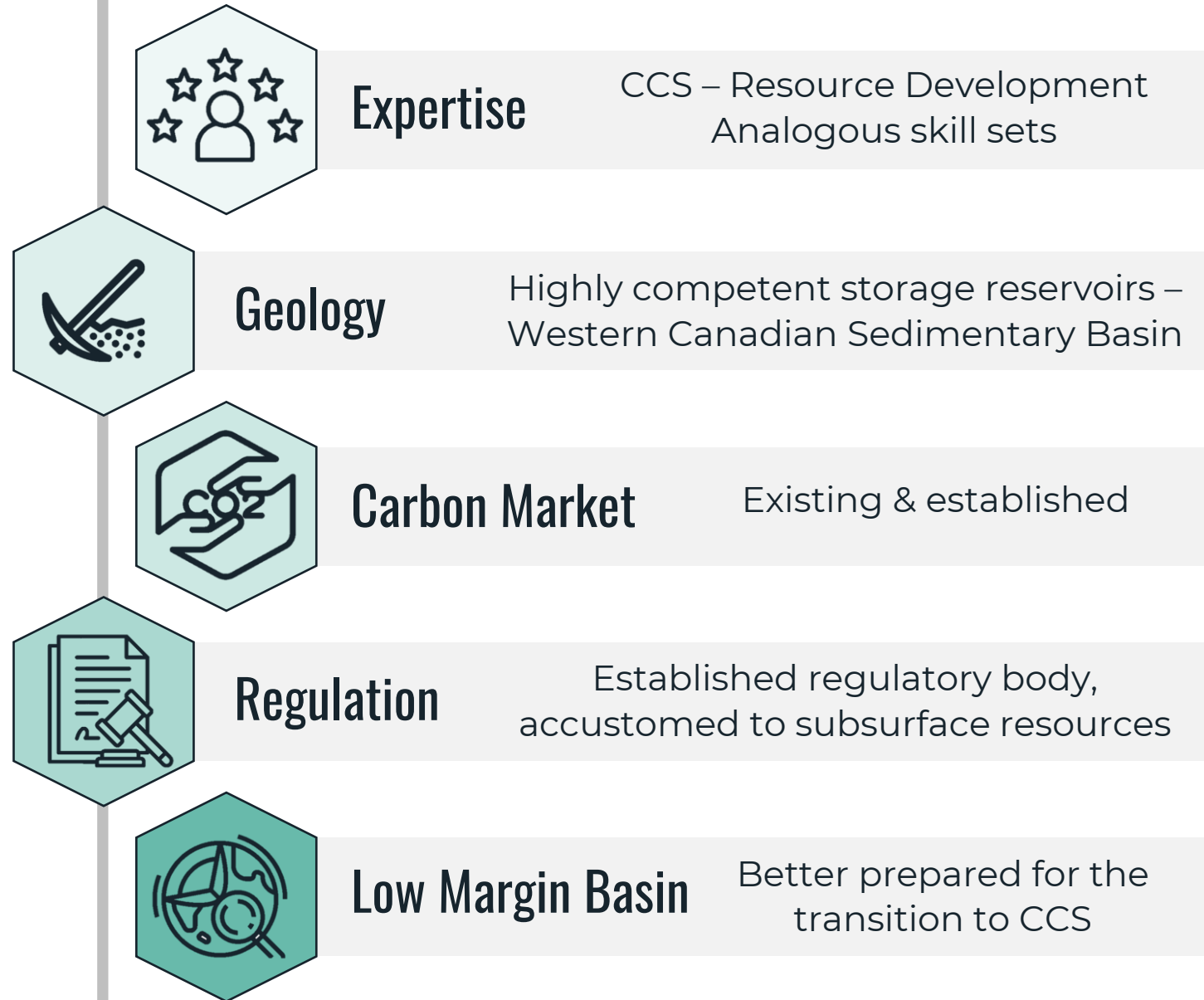
Seismic Monitoring

GLACIER PHASE 1A MODULAR APPROACH



Why is Alberta Leading the way?

ENTROPY





QUESTIONS?

