



PROJECT CAFE

COFFEE & CLEANTECH CRIN Network Innovative Projects

October 8, 2024

powered by

CRIN
Clean Resource
Innovation Network

Network of Networks

CRIN does not replicate or compete, we are committed to amplifying and supporting the existing networks in the cleantech ecosystem, providing opportunities to collaborate, convene and collide.



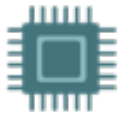
A few of CRIN's active industry members (including Canada's largest oil & gas producers):

- Arc Resources
- Cenovus Energy
- ConocoPhillips Canada
- Canadian Natural Resources Limited
- Imperial Oil Limited
- Pacific Canbriam Energy
- Suncor Energy
- Tourmaline Oil

Seven Technology Themes across Five Sectors



CLEANER FUELS - REDUCING CARBON INTENSITY



DIGITAL OIL AND GAS TECHNOLOGY



CARBON CAPTURE AND VALUE-ADDED PRODUCTS



METHANE MONITORING, QUANTIFICATION AND ABATEMENT



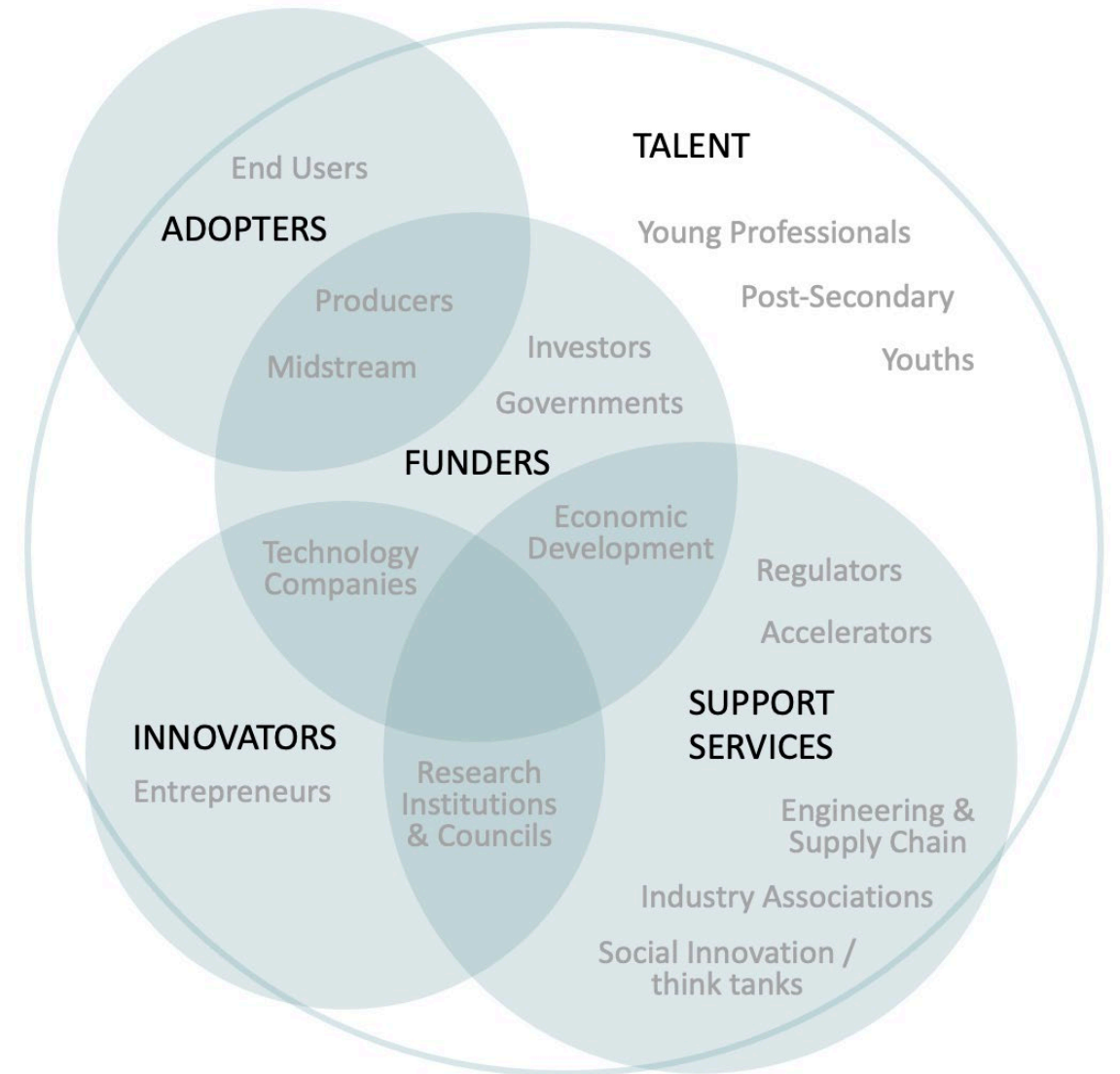
NOVEL HYDROCARBON EXTRACTION



NOVEL LAND AND WELLSITE RECLAMATION



WATER TECHNOLOGY DEVELOPMENT



Join CRIN



- Free to join
- Network with others across the ecosystem
- Access CRIN theme discussion groups on LinkedIn
- Access CRIN events calendar
- Marketing opportunities for your organization
- CRIN newsletters
- Participate in events/panels
- Follow CRIN on Twitter and LinkedIn

Join the CRINetwork!

Land Acknowledgement

Acknowledgement of the land is an important step toward reconciliation. Today, we are gathering from across Canada, please take a moment to recognize the land where you reside and work.

This event is being hosted from Calgary, where we acknowledge and pay tribute to the traditional territories of the peoples of Treaty 7, which include the Blackfoot Confederacy (comprised of the Siksika, the Piikani, and the Kainai First Nations), the Tsuut'ina First Nation, and the Stoney Nakoda. The City of Calgary is also home to the Métis Nation of Alberta (Districts 5 and 6).



AGENDA

1. Welcome
2. Kathairos Solutios Inc.
Simple Methane Elimination Using Nitrogen
3. OptiSeis Solutions Ltd.
EcoSeis: Environmental Footprint Reduction for Subsurface Exploration Programs
4. Scovan Innovations
HipVap Indirect Fired Steam Generator (IFSG) Commercial Pilot Demonstration
5. Q&A, Wrap-up, Coffee!



Marc Godin

Kelly Doody

Andrea Crook

Emily Munro

CRIN PROJECT CAFE



Profoundly simple well site methane elimination





An enormous challenge.

Methane venting is the most pressing emissions issue facing the oil and gas industry.

Producers require a technology that can address the issue effectively, economically, and at the speed and scale necessary to meet regulatory deadlines.

“Conversion of pneumatic controllers to zero-emitting technologies, and the elimination of associated gas venting, will be required.”

600,000

North American well sites require conversion to zero-vent by 2028 (US) and 2030 (CAN)



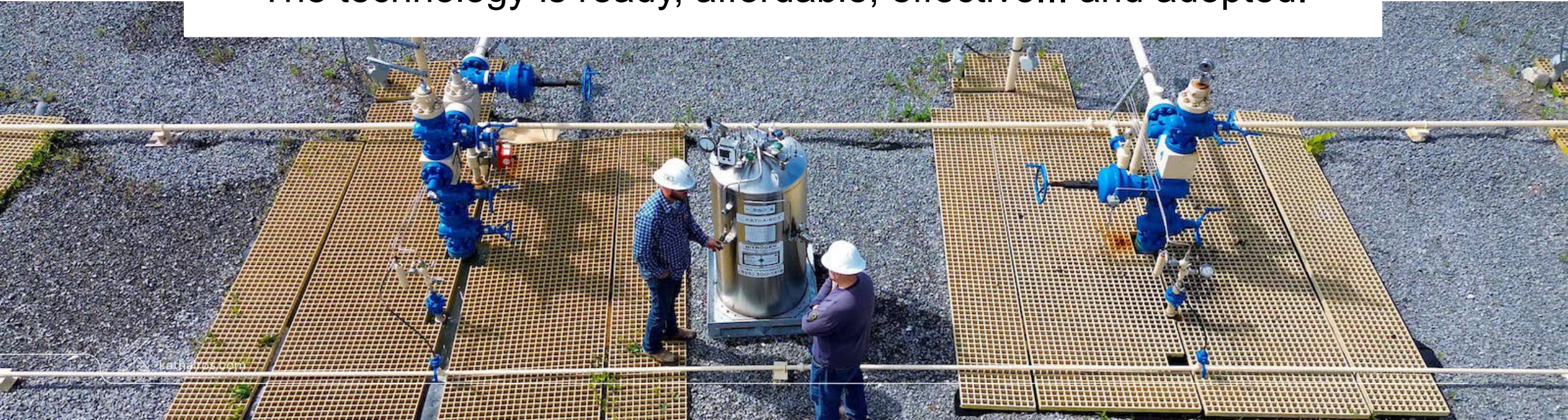


The race to deploy is real



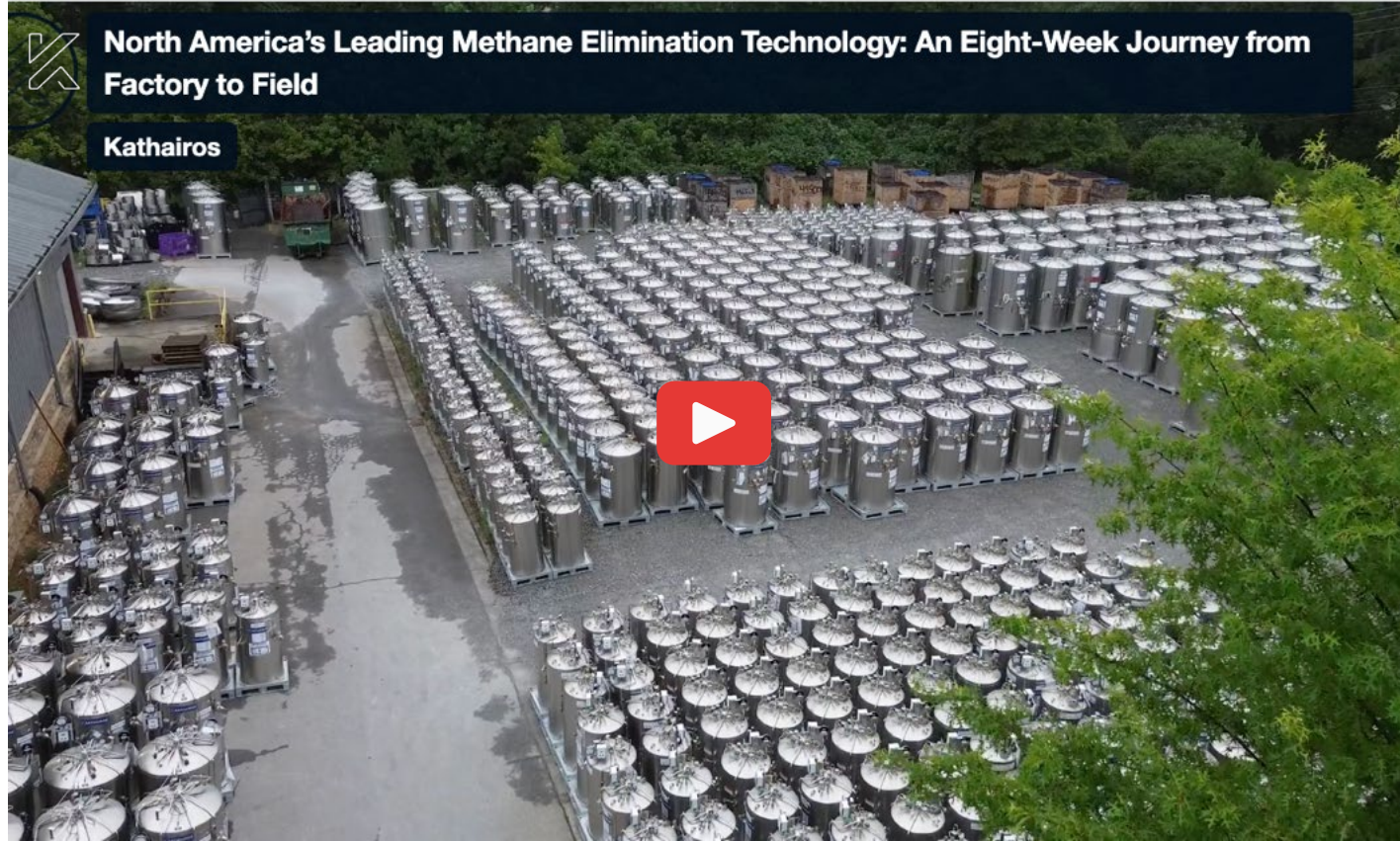


The technology is ready, affordable, effective... and adopted.

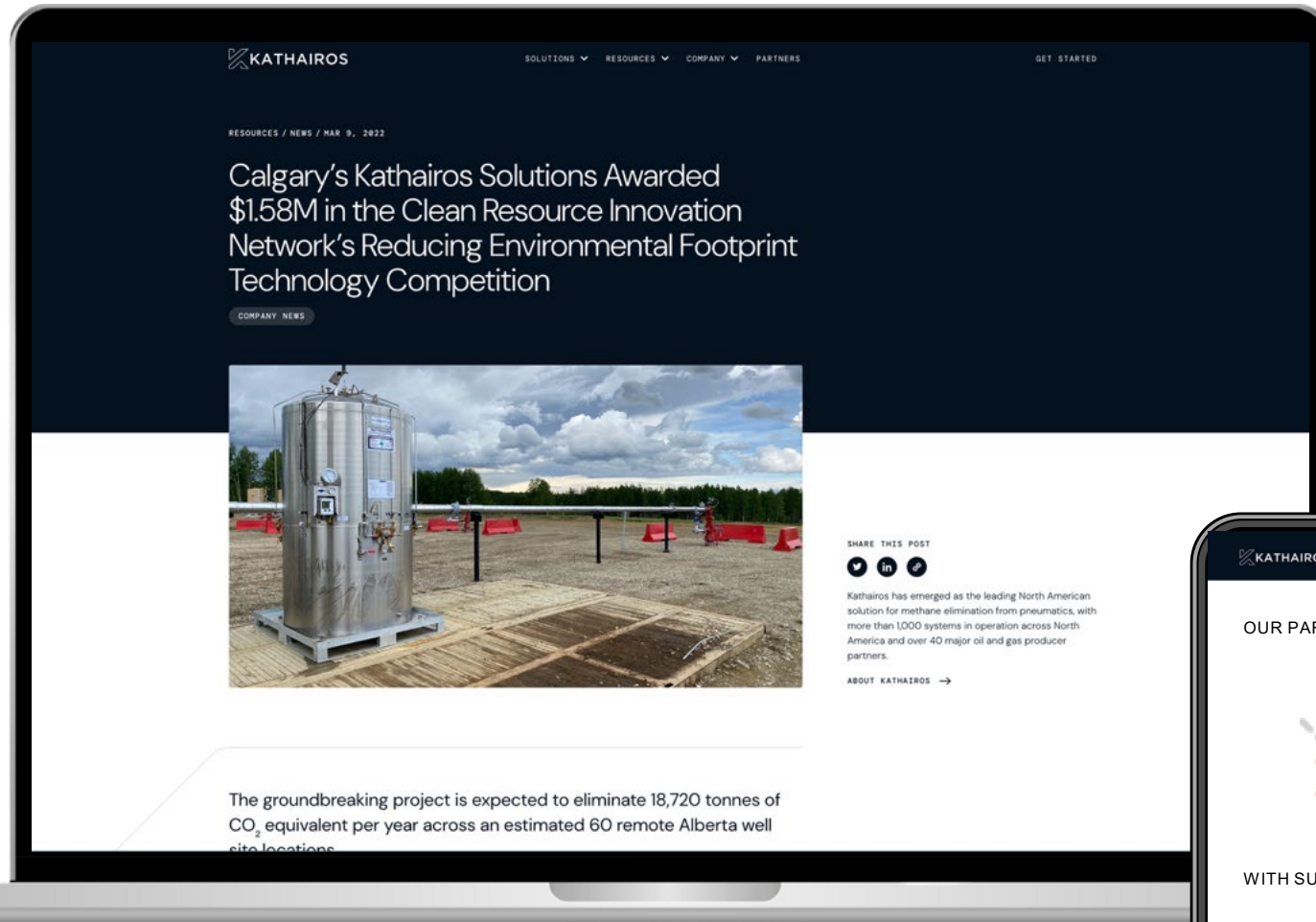


VIDEO:

Speed,
scale &
adoption
in action

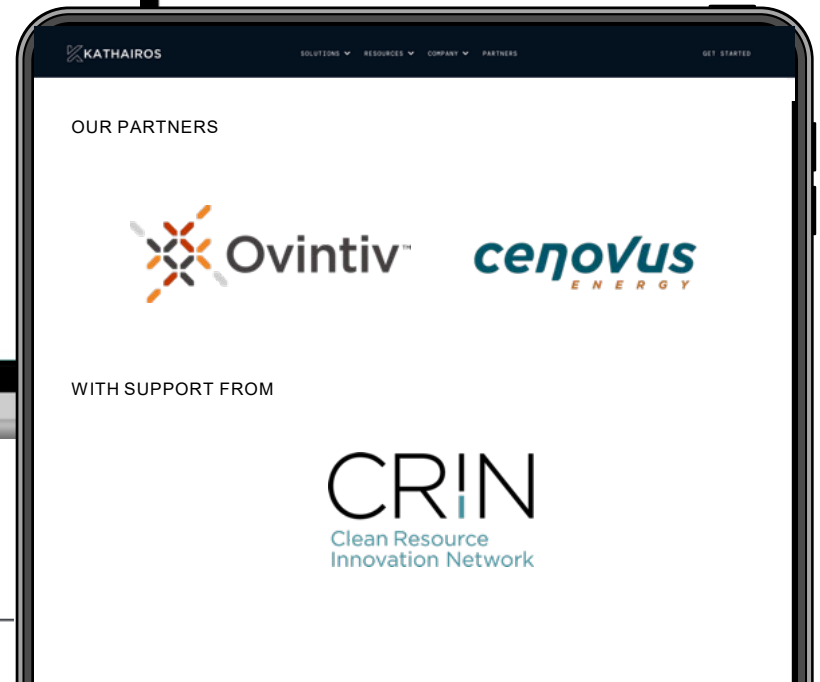


March 2022



CRIN-funded for:

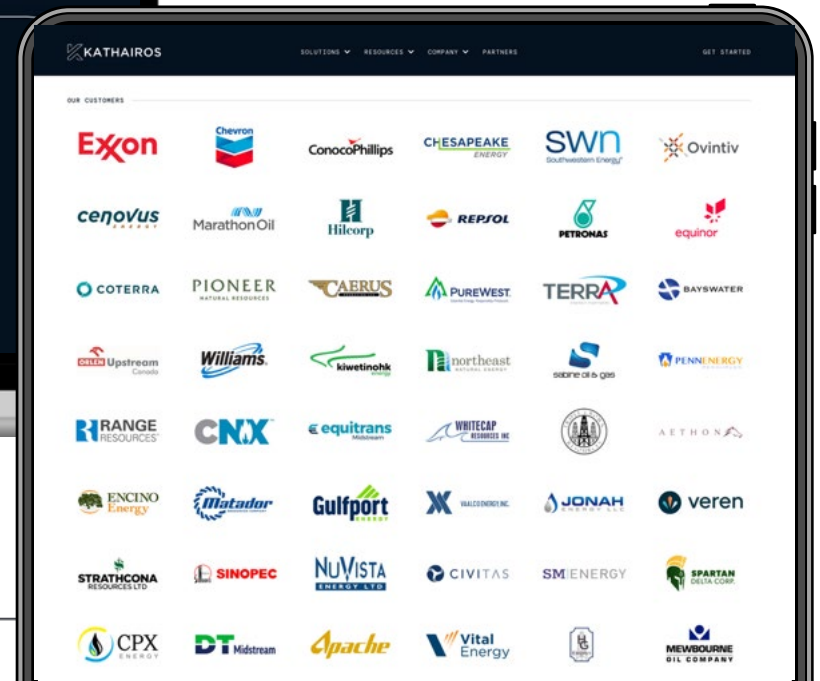
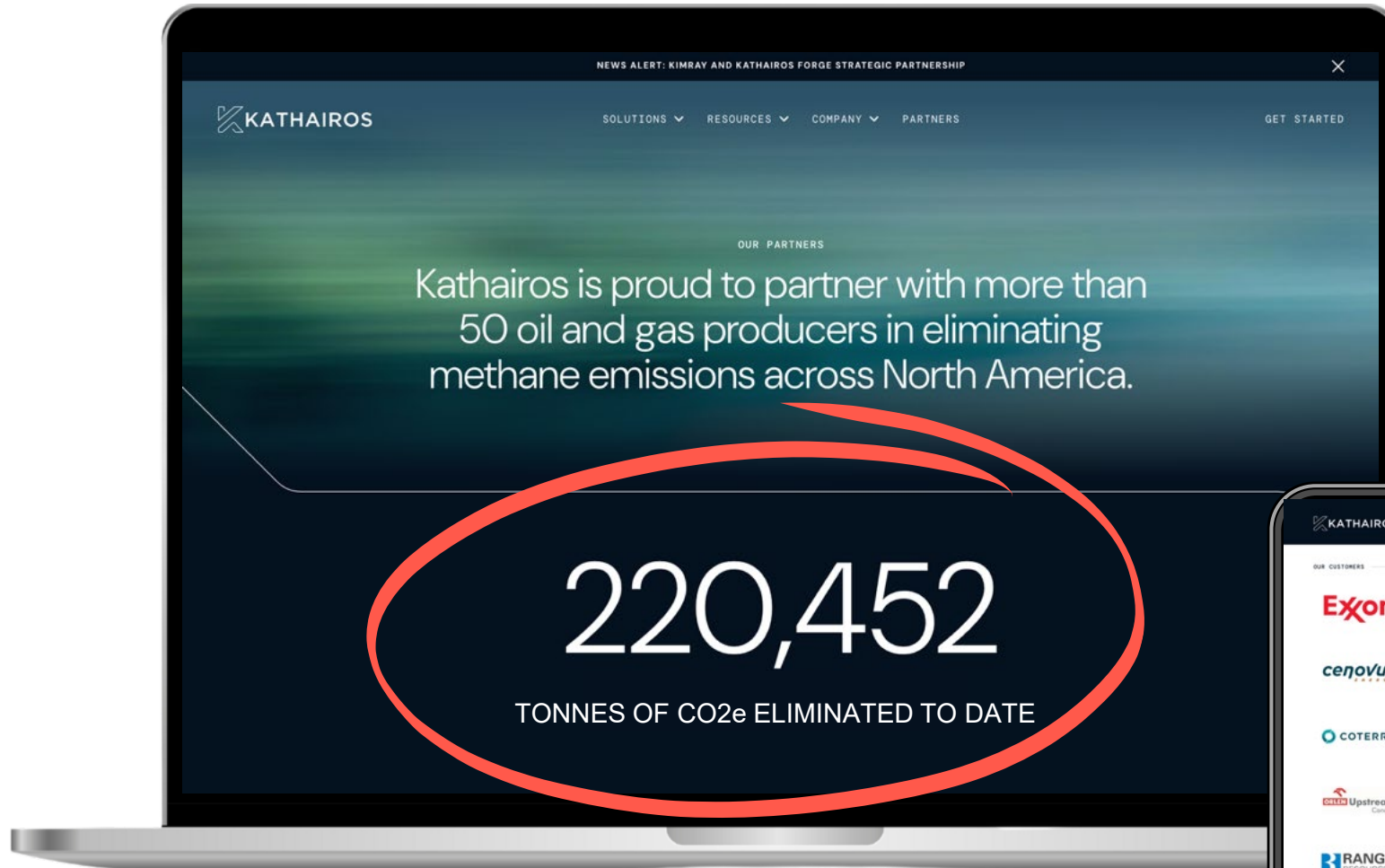
- 60 remote AB well sites
- 18,720 tCO₂/yr abated
- 2 producer partners involved



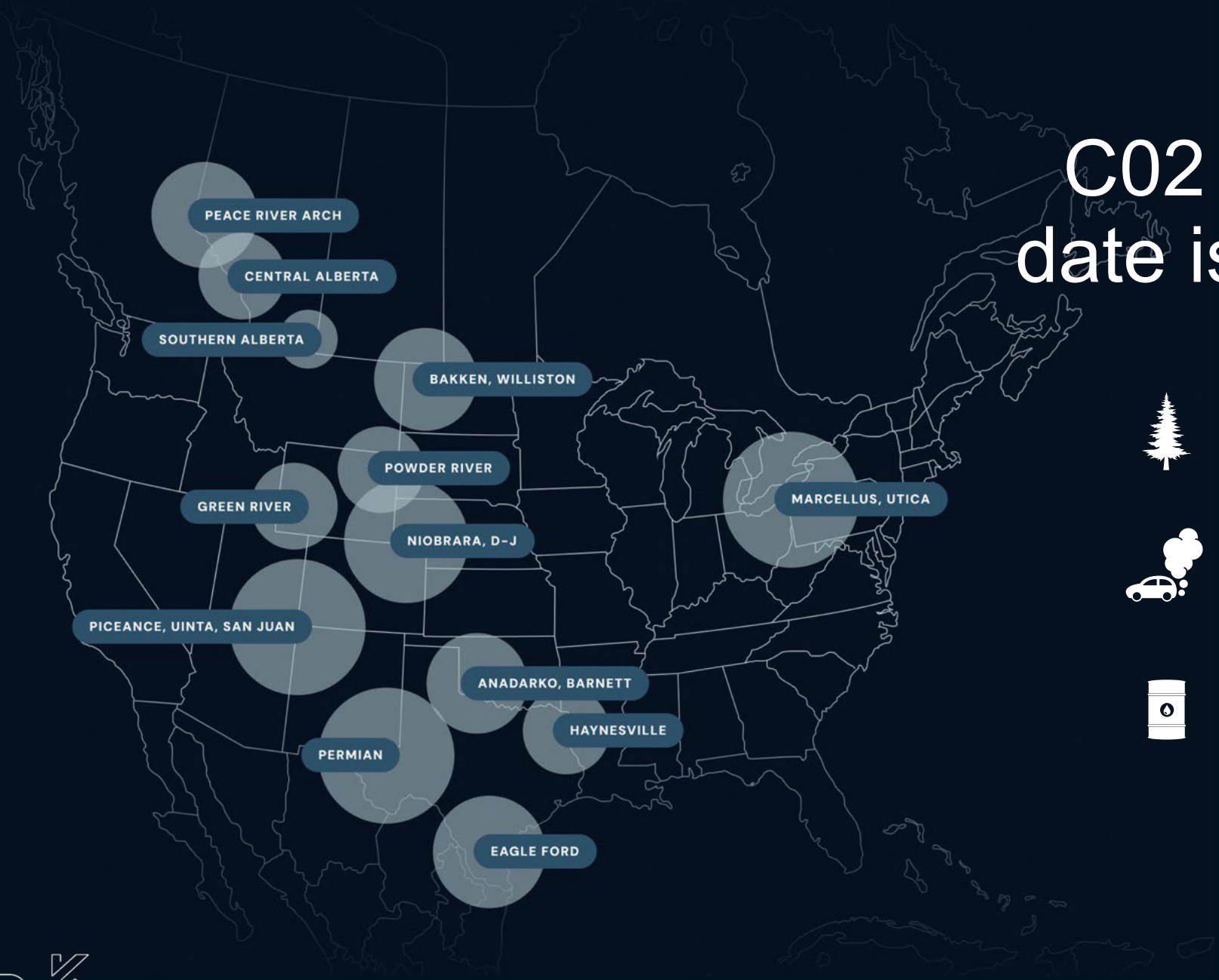
Today

Scaled to:

- >2100 North America-wide well sites and 20,000 individual wells addressed
- >220,000 tCO2 abated
- >50 active producer partners



C02 abatement to date is equivalent to:



3.6 MM trees planted



52,000 gas vehicles driven for a year



510,000 barrels of oil consumed

Next Steps



New technology addressing hardest-to-abate wells

Kathairos submitted a major funding application through the Biden Climate Plan's Methane Emissions Reduction Program (MERP) for \$200 MM in Aug '24.

In partnership with numerous US States and industry associations, we intend to eliminate methane venting at 20,000 marginal well sites across the US using our newest low-vent nitrogen tank.



Kathairos Digital Platform and empirical data dashboard

The value of Kathairos' empirical abatement data has become increasingly apparent with the passing of strict new monitoring, measuring and reporting regulations across the US and Canada.

Our revamped digital platform will launch in Q1 2025, providing unparalleled access to the verifiable and certifiable emissions metrics producers require.



Powerful partnerships enabling continued growth

Kathairos' formal partnership with Kimray, the world's leading manufacturer of pneumatic control systems, is a strategic win for both parties.

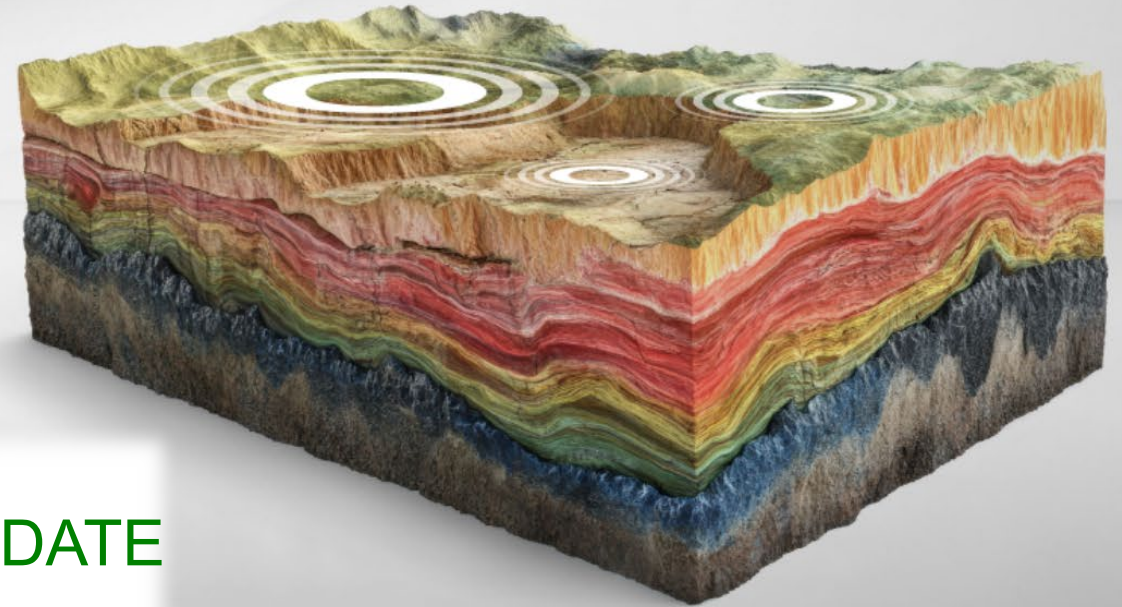
Such partnerships allow us to further our mission of bringing effective and affordable methane elimination to today's energy producers, with more to come.

Thank you for your continued support and collaboration on
the path to zero-emissions energy production

[KATHAIROS.COM](https://kathairos.com)



Subsurface Imaging & Analytics



ecoSeis PROJECT UPDATE



Oil & Gas



Critical Minerals



CCS

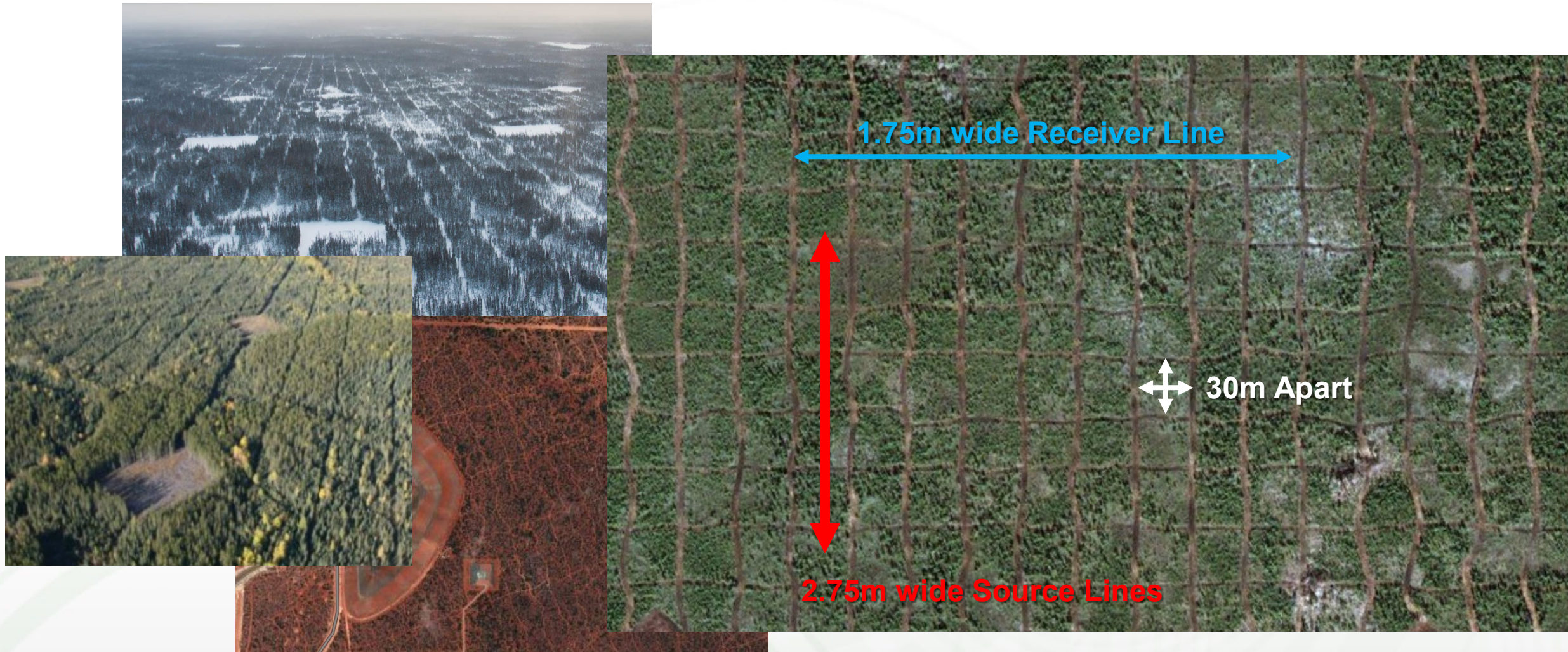


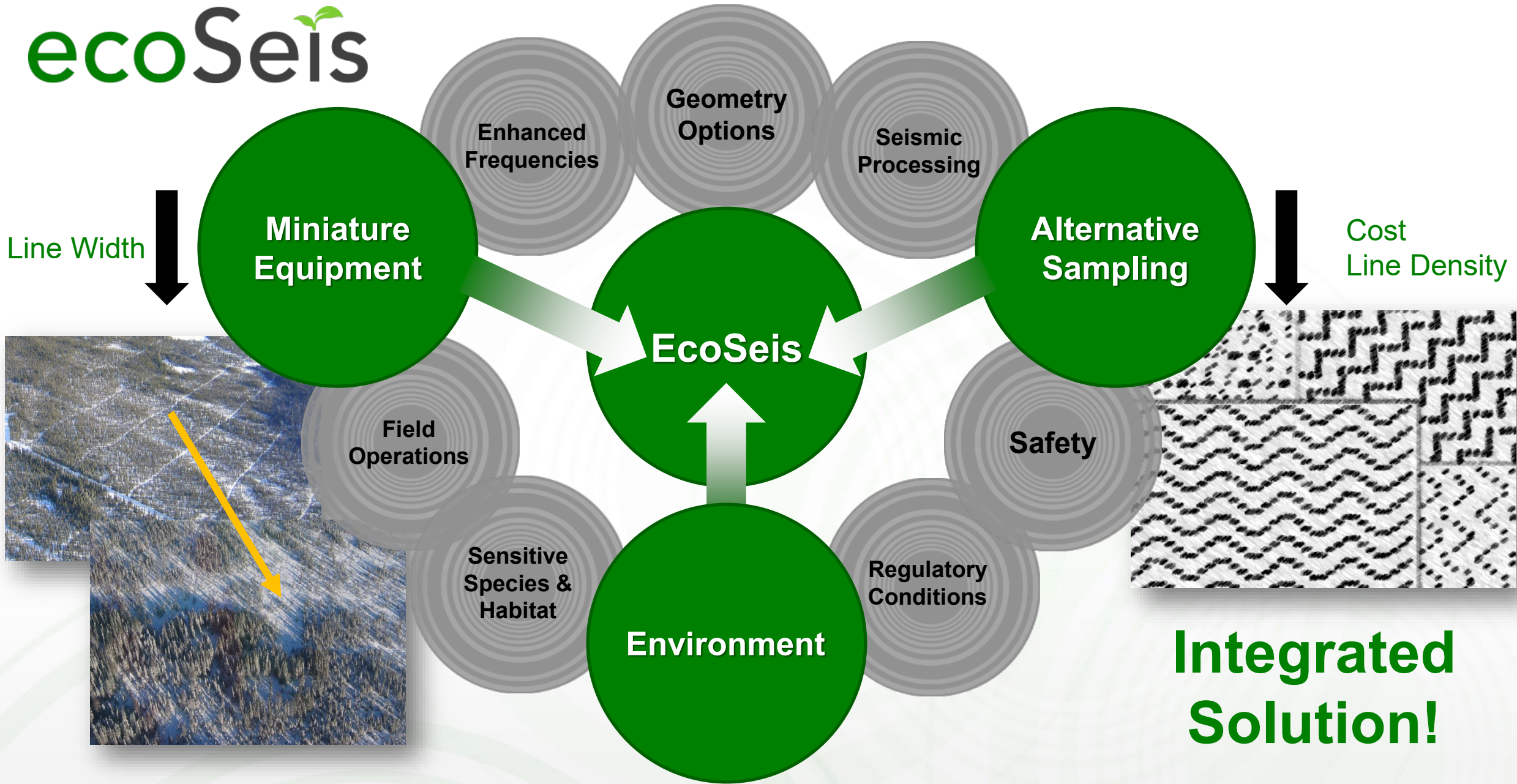
Geothermal



Nuclear

PROBLEM: SEISMIC ACQUISITION FOOTPRINT





**Integrated
Solution!**

PROJECT GOALS



LAND
FOOTPRINT
& GHG
EMISSIONS
REDUCTIONS
BY >35%

MAINTAIN
SUBSURFACE
RESOLUTION



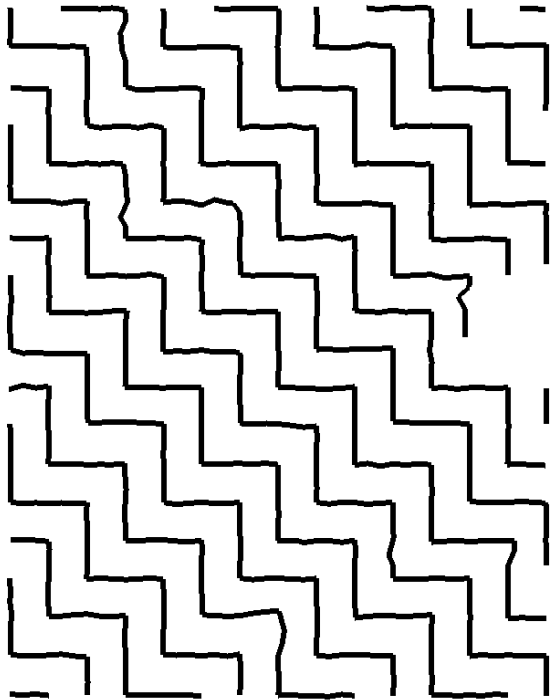
SAFE &
EFFICIENT
OPERATIONS

COST
REDUCTIONS

ACHIEVEMENTS: ENVIRONMENT

45-55%

Footprint Reduction



Restricting

Line of Site & Easy Access



ecoSeis

Sustaining

Wildlife Populations



ACHIEVEMENTS: EMISSION REDUCTIONS

Reduced
Direct Emissions



Less
Biomass Decomposition



Less
Peatland Compaction

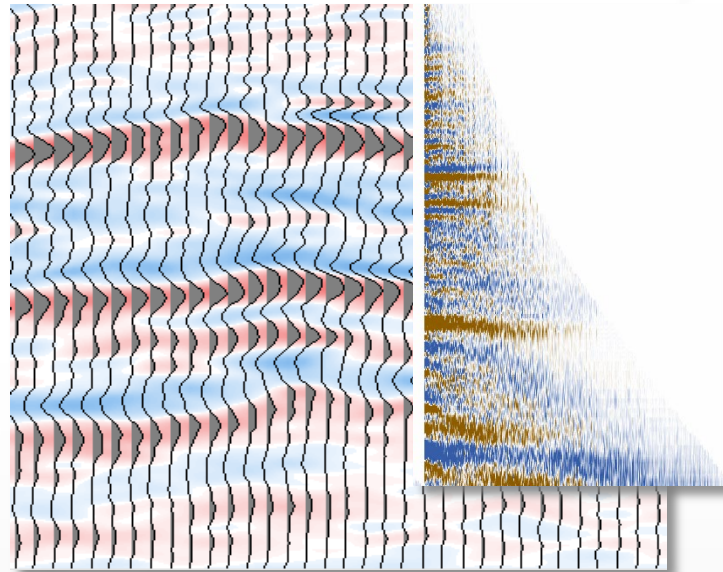


46-58% Reduction in CO₂ and 44-53% Reduction in Methane

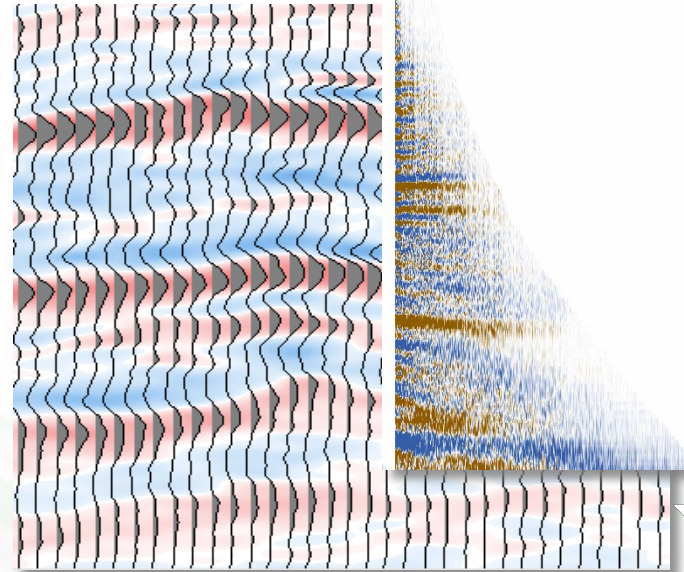
ACHIEVEMENTS: TECHNICAL

ecoSeis

Conventional Seismic
NO REDUCTION



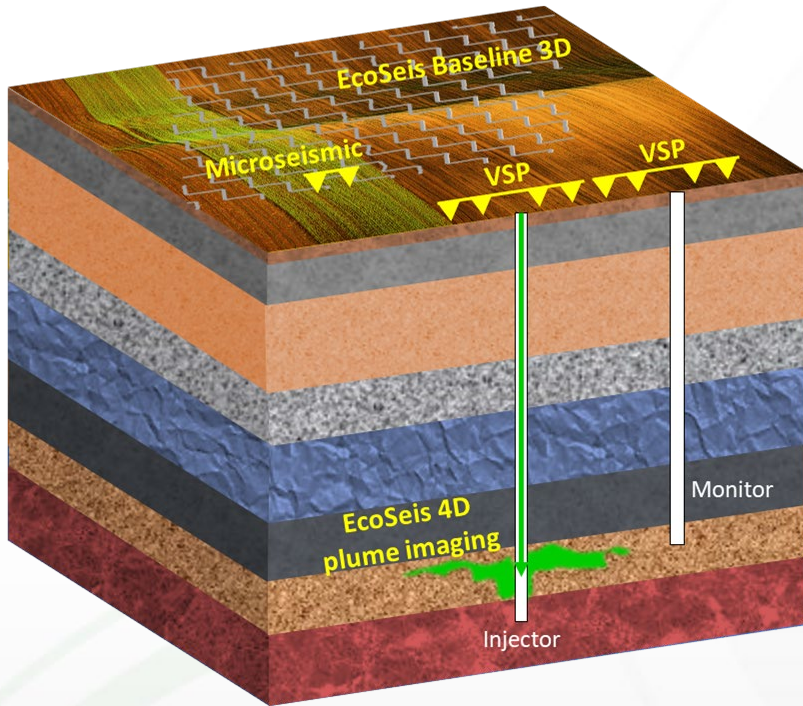
53%
LAND FOOTPRINT
REDUCTION



NEXT STEPS...

ecoSeis PHASE 3

>45% REDUCTION IN LAND FOOTPRINT & GHG EMISSIONS WHILE MAINTAINING DATA QUALITY & PROVING...

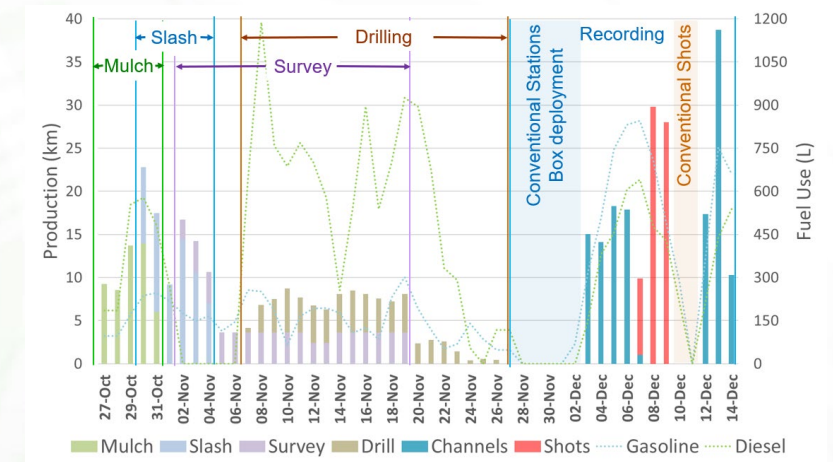


DEEP DATA QUALITY FOR CCS 4D



SAFE OPERATIONS IN VARYING TERRAIN

optiSeis
OptiSeis Solutions Ltd.
 ERA Funding: **\$5,000,000**
 Project Value: **\$16,200,000**



EFFICIENT & COST-EFFECTIVE





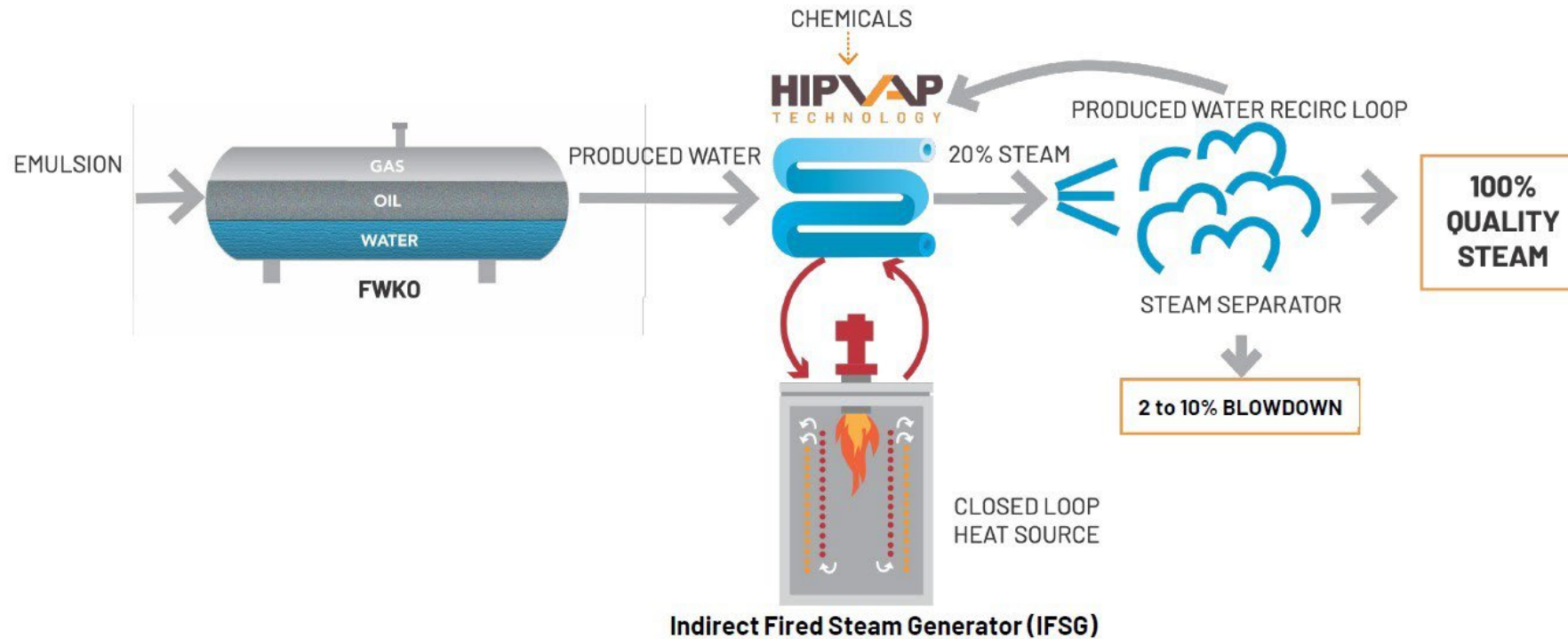
HIPVAP IFSG COMMERCIAL PILOT DEMONSTRATION

Scovan 

OCTOBER 8, 2024

HIPVAP
TECHNOLOGY

PROJECT OVERVIEW



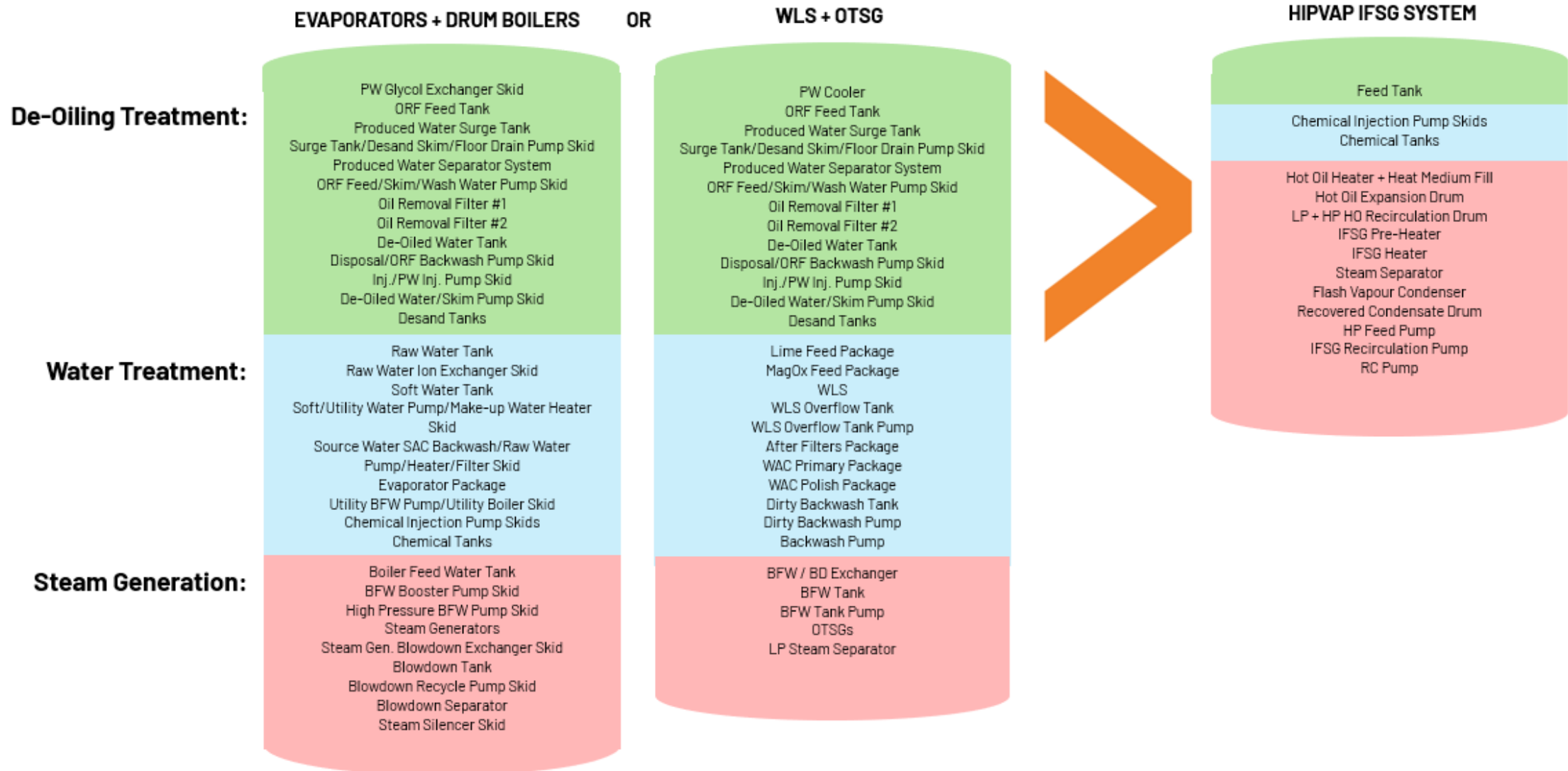
Objectives:

- Advance the HipVap technology from current TRL 6 up to 8. This is the last major step for commercialization of the technology.
- Integrate an AI/ML component into the design and operation of the IFSG for continuous optimization and performance improvements.

PROJECT OVERVIEW

Replace this:

With this:



SUCCESSSES TO DATE



- Successfully designed and commissioned the pilot.
- Process generates steam from produced water (PW) taken directly from the FWKO and treaters upstream of the PW coolers. Steam was sent straight into the steam header of the host site.
- Operations fully tied into the live facility without disruption to the base plant.
- Generated over 10,000 m³ of steam to date.
- Successfully completed several test series:
 - 5 baseline tests.
 - 39 technology validation & exploratory tests.
 - ~830 total hours of optimization and performance testing
 - Completed testing on up to 8 times higher hardness concentration feedwater than industry average.
 - Conducted 2 ORSIL bench tests.
 - Currently in operation performing additional limit and use case testing until mid November 2024.
- Developed data visualization and analytics board, along with a digital twin and soft sensors. AI work is ongoing and continues to drive towards valuable AI-insights for HipVap operations.

LESSONS LEARNED

- **Schedule delays due to non-technology related equipment failures:** The cost savings in procuring lower-end equipment was eaten up (and more).
- **Recirculated Brine Pump Seal:** Seal failures due to the composition of the recirculated brine was a primary cause of pilot downtime. Changing to a hard seal face design later in the pilot helped with this; further changes to the pump seal design are planned for the commercial unit.
- **Anti-Scalant Requirement:** Anti-scale chemical injection may not provide enough scale prevention to outweigh cost trade-off.
- **Design Improvements:** Numerous instances of “it would have been better if we had done ...” have all been transferred to our commercial design.
- **AI-Platform Development:** More focus on commercial product vision in collaboration with Drishya AI early on would have reduced the development time for the AI-powered optimization platform.

OPPORTUNITIES

- Technology suppliers with opportunities to further reduce carbon footprint.
- Chemical suppliers with cost saving opportunities.
- End users wanting to support further testing or target specific use cases, and/or engage in a **FEED study for a commercial installation.**

NEXT STEPS

- Complete additional steady state, challenge, and use case testing by November 2024
- Continue to gather data and validate/advance the Brains platform
- Engage with prospective clients for future commitment to a FEED study and first commercial installation





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Scovan.ca



How did we do today?



October 8, 2024
9:00am MT

CRIN

Clean Resource Innovation Network



Are you a member?
Join us today!