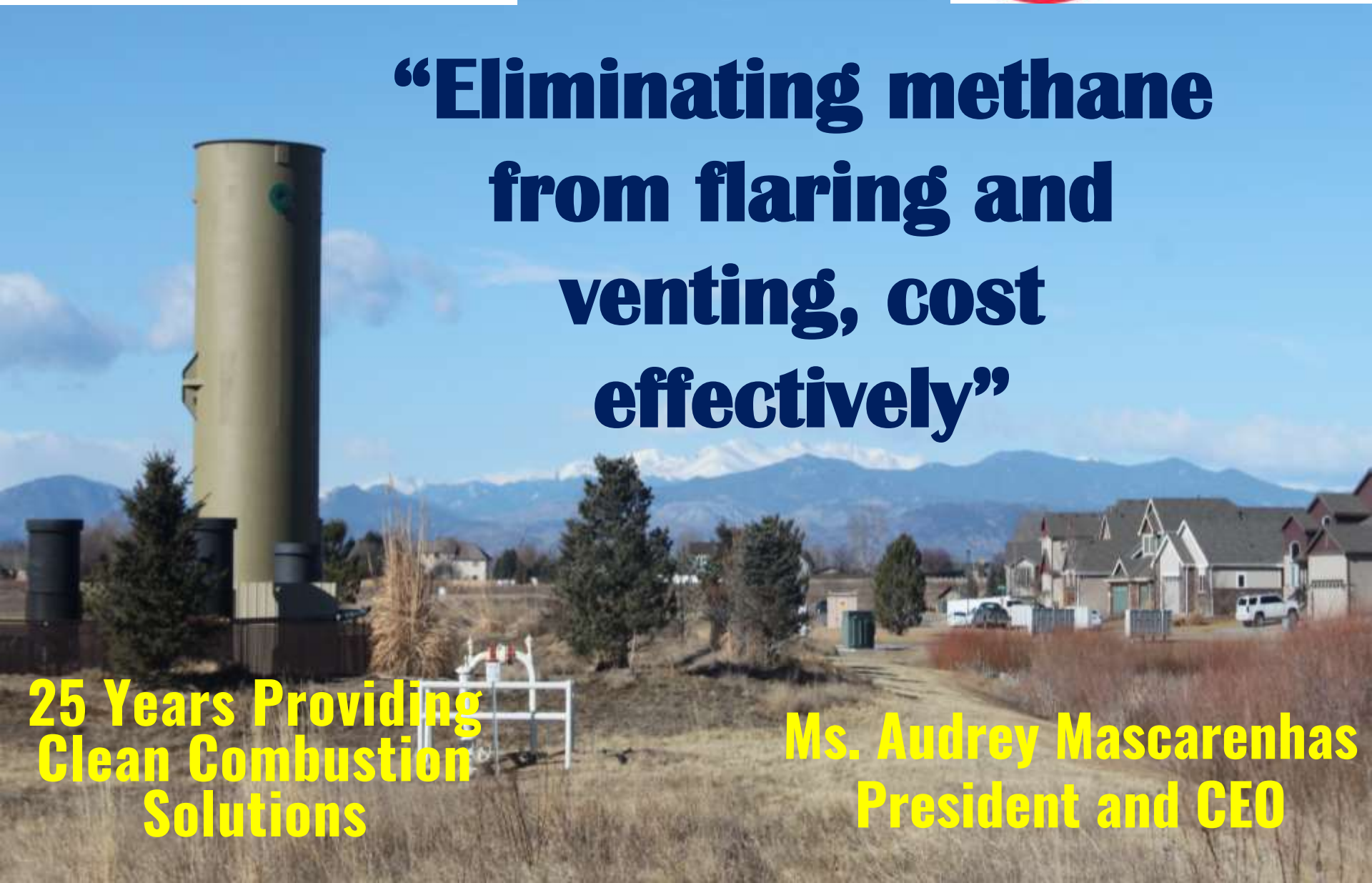
Questor

SEOGS
Suriname Energy, Oil and Gas Summit
Paramaribo - Suriname
19-22 June 2023

"Eliminating methane from flaring and venting, cost effectively"



25 Years Providing Clean Combustion Solutions

Ms. Audrey Mascarenhas
President and CEO


Jambi Merang - Indonesia
Loading - Canada
Well drilling, completions and production - Europe
EUROPE
Zohr H_2S- Egypt
Dehy - US
Zero flaring and venting compressor site - US
Global Experience
Utility- US
Pipeline - US
Power - Mexico

Who We Are

Leaders in clean combustion and waste heat to power technology

Permanent installation

Portable unit

PUBLIC COMPANY

- Founded in 1995
- Public in 1998 on the TSX-V QST
- Patented clean air technology

SUPERIOR TECHNOLOGY

- ISO certified 14034 > 99.99% combustion efficiency
- Safe and quiet = community acceptance
- Reliable equipment requiring minimal maintenance

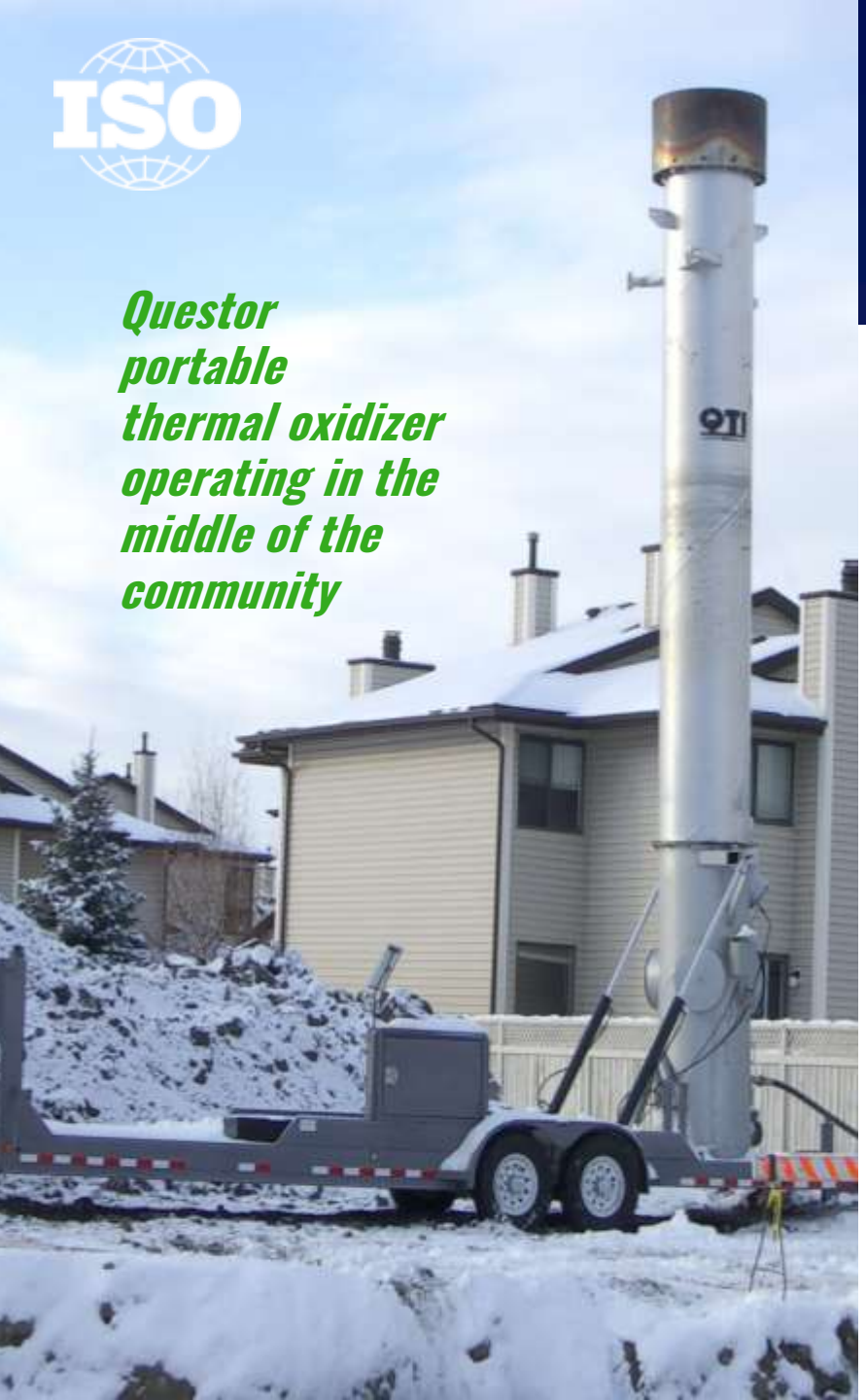
PROVEN TRACK RECORD

- 25-years of providing global clean combustion solutions
- Performance recognized by regulators
- Global leader considered best in class - BACT
- Strong technical team with deep understanding of our clients

25+ YEARS OF EXPERIENCE

1000+ Q – SERIES PLACED WORLDWIDE

>99.99% Q – SERIES COMBUSTION EFFICIENCY



Questor portable thermal oxidizer operating in the middle of the community

What We Do

Questor's Clean Combustion Units

Cleanly combust all types of waste gas at 99.99% efficiency

Waste Heat to Clean Power

Convert low-grade waste heat to power from clean combustion of flared and vented gas, industrial processes, engine exhaust, etc.

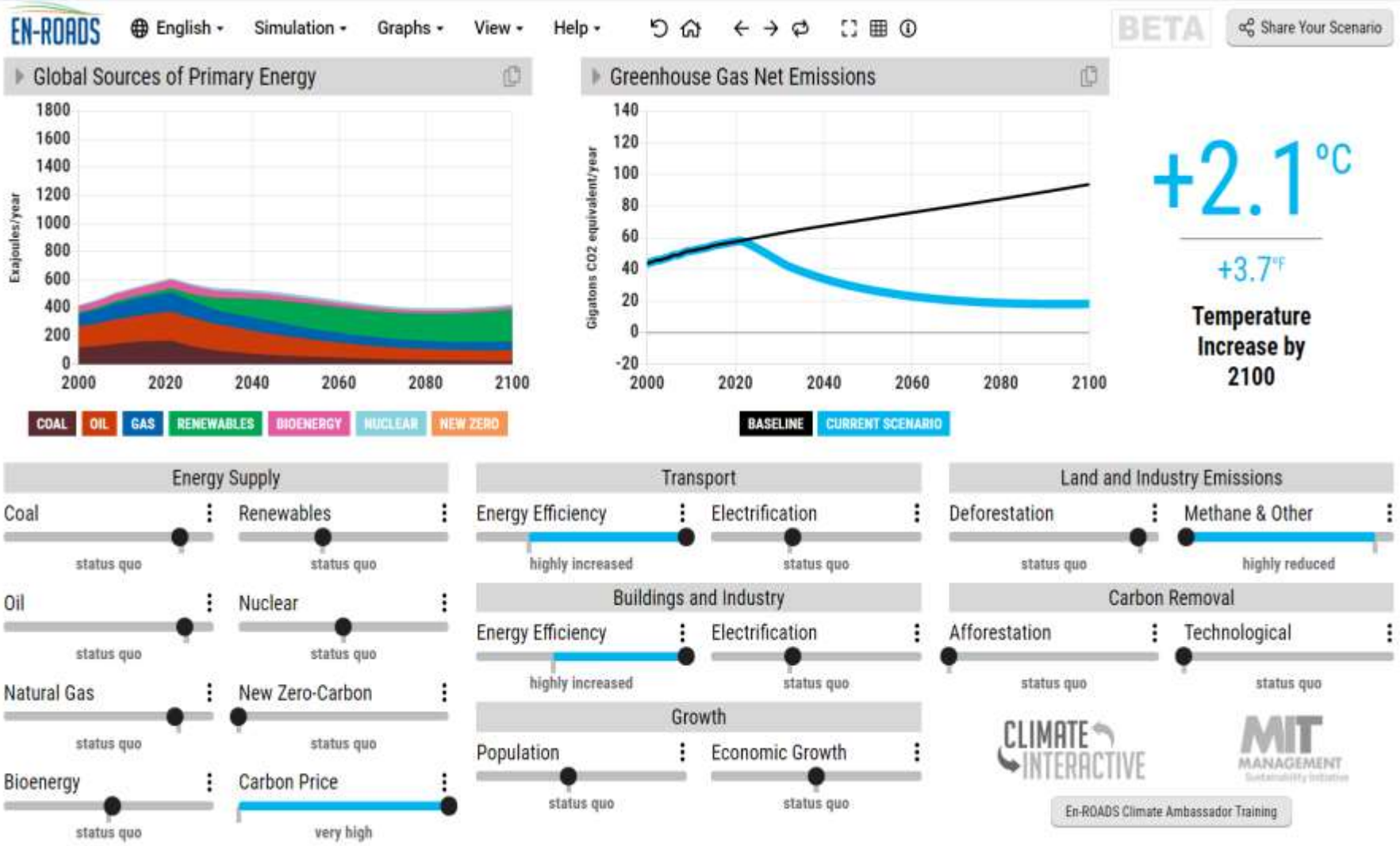
Q-Data

Verifies our solutions deliver regulatory compliance eliminating GHG, HAP's, VOC's, NOx, H_2S, and methane emissions

H_2S expertise recognized globally

Stopping The Temperature Rise

IT'S ELIMINATING METHANE AND BETTER ENERGY EFFICIENCY



Why Methane?

- Methane is ***more than 84 times*** more potent than CO_2 over a 20-year time horizon.
- Methane's lifespan is ***10 to 12 years*** so cutting methane emissions yields an immediate reduction in the rate of warming, while also delivering air quality benefits.
- About 60% of global methane emissions are due to human activities.
- Cutting methane emissions by ***45 per cent*** by 2030 could help us meet the Paris Agreement's goal of limiting global warming to 1.5°C.

The Magnitude

- Greater than 40% of methane emissions in Energy sector unaccounted for
- The oil & gas industry alone globally flares over 14.5 billion standard cubic feet per day[1] of associated gas
- Kayrros[2] estimates from satellite imagery that over 1Gt CO_2e annually comes from non-routine flaring
- The IEA[3] estimates annually over 79 million Tonnes of methane is emitted, equivalent to more than 2 billion Tonnes of CO_2e from routine flaring

1. Global Gas Flaring Tracker Report, GGFR, The World Bank, July 2020
2. Kayrros flaring report
3. IEA 2022 Global Methane Tracker report,

The Entire Process Emits Methane

From Well to Wheel

- Emission profiles are different at each stage of the oil and gas value chain
- Wellsite is different from a oil battery which is different from a compressor station
- We cannot lump them all together and use emission factors thinking our job is done.
- Proactive approach along the whole value chain recognizing the uniqueness of each stage and designing to reduce the fugitives, flaring and venting

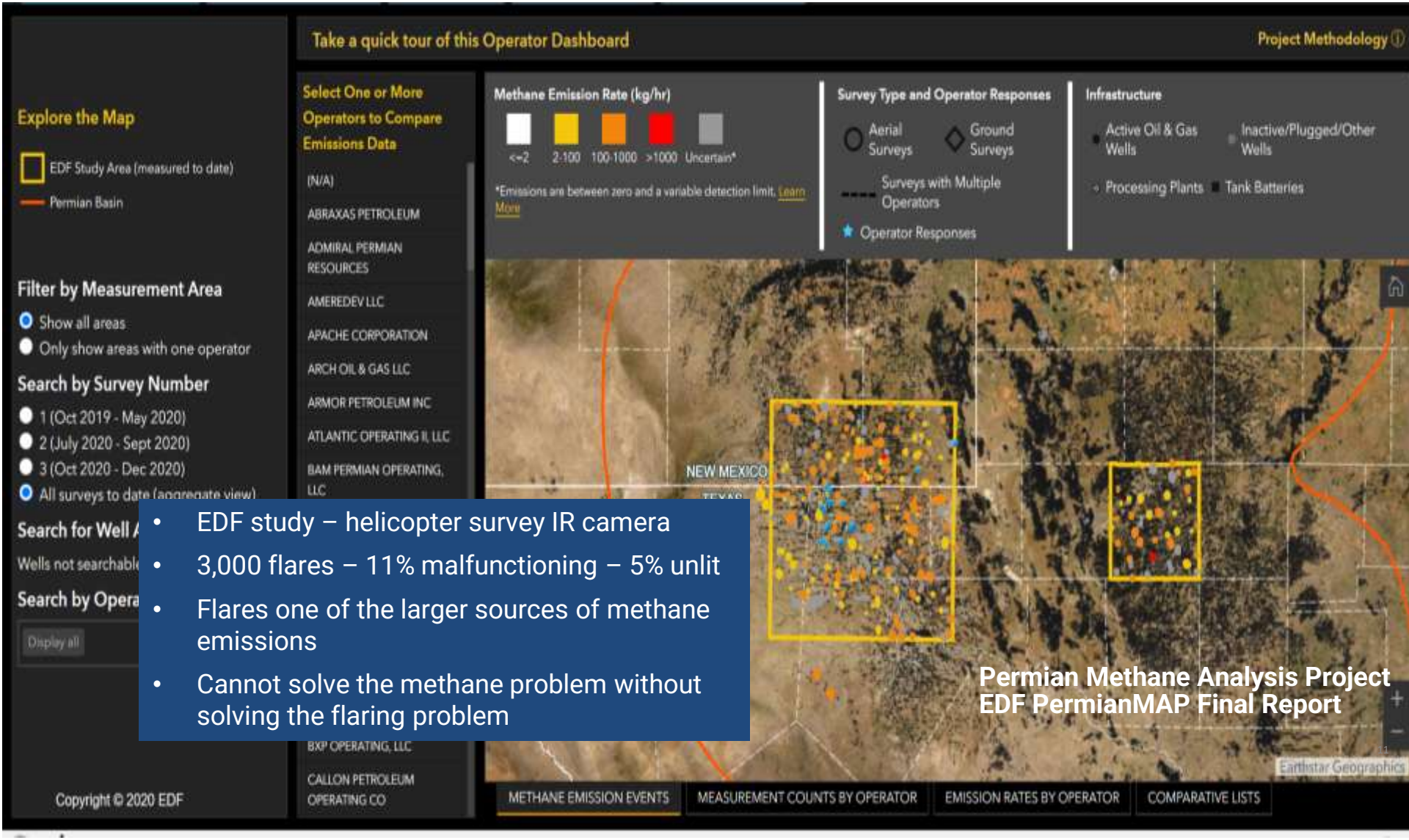
The Elephant In The Room

- Assumption that a flare is 98% efficient
- Non-routine flaring and venting ignored
- Maintenance, equipment failure and well unloading emissions not accounted for

3X HIGHER

Over the course of the project, aircraft measurements have revealed Permian emissions are **2-3 times higher** than what the Environmental Protection Agency estimates in their inventory of greenhouse gas emissions.

Satellites, Airplanes, Drones, Sensors, Handhelds….



- EDF study – helicopter survey IR camera
- 3,000 flares – 11% malfunctioning – 5% unlit
- Flares one of the larger sources of methane emissions
- Cannot solve the methane problem without solving the flaring problem

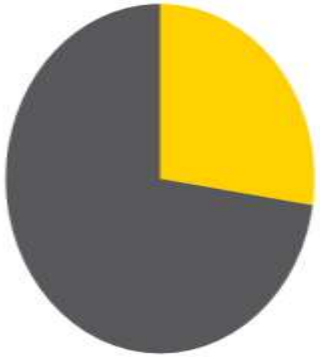

"I knew we would find a lot of pollution, but I had no idea flaring emissions would be this bad."
David Lyon
Senior Scientist
Environmental Defense Fund

FLARING INSIGHTS

8

Total surveys

1,320 Emission sources detected



- 362 Malfunctioning Flares
- 958 Other sources (Tanks, vents, valves)

50%

of super emitters come from midstream operations.

Super emitters are sites that produce a disproportionate amount of methane pollution, releasing 10 kilograms of methane an hour or more.

- Gathering and boosting
- Transmission and storage
- Pipelines and compressors

Mobile laboratory measurements indicate low-producing "marginal wells" are responsible for half of the Permian Basin's well pad emissions. More than 75% of these are owned by major corporations.

Midstream and Compressor Stations

ZERO FLARING AND VENTING FACILITIES

COMPRESSOR STATION - NEW YORK STATE

Non-Routine and Maintenance

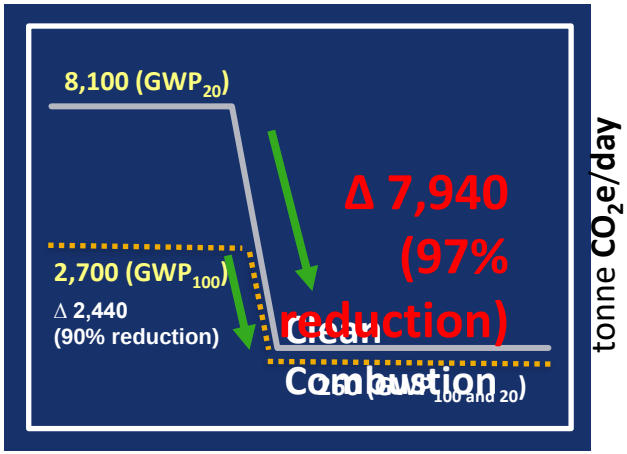
- Maintenance – pipeline, engines,
- Pipeline blowdowns and pigging
- Soft starts
- Equipment failure

Routine Process

Dehy Still Column, Tank, Amine, Process Units, PSV's, etc.

Non-routine Pipeline Maintenance Operations

Questor unit eliminating the venting of 5MMSCF/D Methane



Methane:
GWP_{20} = 84 tonne CO_{2e}
GWP_{100} = 28 tonne CO_{2e}

Ref: (IPCC-AR5)

PIPELINE BLOWDOWN – COLLEGE STATION, TX.
5MMSCF/D

Stranded Associated Gas

14.5 billion SCF everyday is flared and vented

- Air Quality Impact
- Harmful emissions
- Greenhouse gas emissions
- Significant waste of energy
- Community impacts
- Quality of life

Production Facilities

Well Testing/Early Production Facility
DENVER, COLORADO

Zero flaring or venting

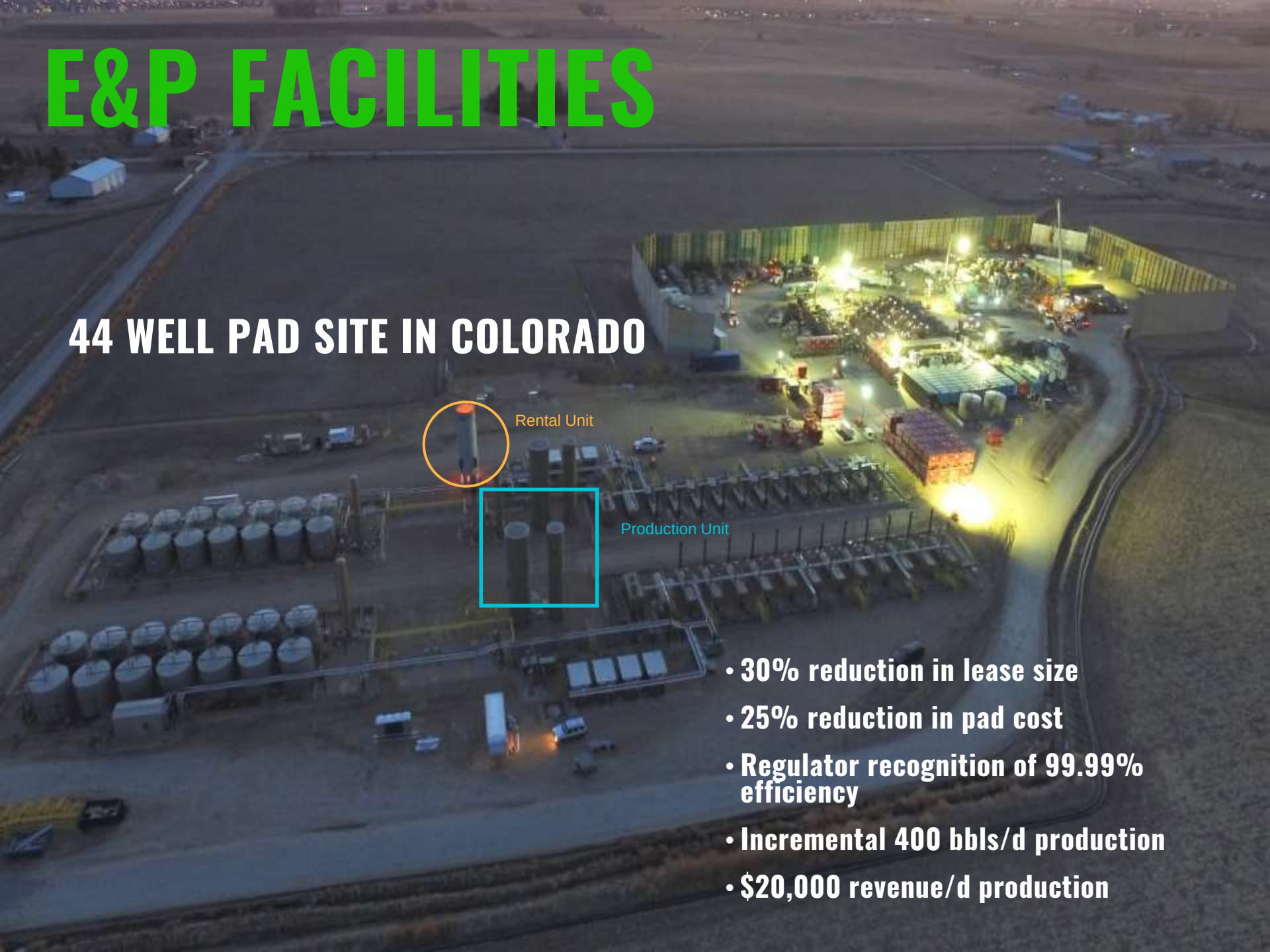
- 99.99% guaranteed combustion efficiency
- No black smoke, odors, or visible flame
- Low noise

All Gas Sources Tied in

- Wellbore gases from HP and LP separation
- Liquid storage tanks
- Truck-out vapors
- The single unit handles multiple streams with varying pressures and flowrates

E&P FACILITIES

44 WELL PAD SITE IN COLORADO



- 30% reduction in lease size
- 25% reduction in pad cost
- Regulator recognition of 99.99% efficiency
- Incremental 400 bbls/d production
- $20,000 revenue/d production

Proven Performance

NORTH DAKOTA FIELD TESTING

Combustor	Parameter	Test Result				
		Test 1	Test 2	Test 3	Test 4	Average
SITE 1 Q5000-17-164 (west)	VOC DRE %	99.997%	99.998%	100%	100%	100%
	NOx (lb/MMBtu)	0.158	0.200	0.233	0.212	0.206
	CO (lb/MMBtu)	0.110	0.074	0.017	0.067	0.067
	Stack Temperature (˚F)	1125	1412	1649	1823	1502
SITE 1 Q5000-17-173 (west)	VOC DRE %	100%	100%	100%	100%	100%
	NOx (lb/MMBtu)	0.140	0.182	0.220	0.287	0.207
	CO (lb/MMBtu)	0.049	0.008	0.002	0.011	0.018
	Stack Temperature (˚F)	1046	1348	1522	1852	1442

		Test 1	Test 2		Average
SITE 2 Q5000-17-183 (east)	VOC DRE %	100%	100%		100%
	NOx (lb/MMBtu)	0.279	0.258		0.263
	CO (lb/MMBtu)	0.001	0.002		0.001
	Stack Temperature (˚F)	1758	1860		1792
SITE 2 Q5000-17-173 (west)	VOC DRE %	100%	100%	100%	100%
	NOx (lb/MMBtu)	0.244	0.279	0.281	0.268
	CO (lb/MMBtu)	0.002	0.004	0.002	0.003
	Stack Temperature (˚F)	1743	1763	1775	1760

VERIFIED ISO 14034

		Test 1	Test 2	Test 3	Average
SITE 3 Q5000-17-123 (east)	VOC DRE %	100%	100%	100%	100%
	NOx (lb/MMBtu)	0.178	0.173	0.202	0.184
	CO (lb/MMBtu)	0.092	0.013	0.005	0.037
	Stack Temperature (˚F)	1737	1706	1688	1710
SITE 3 Q5000-17-164 (west)	VOC DRE %	100%	100%	100%	100%
	NOx (lb/MMBtu)	0.205	0.198	0.204	0.202
	CO (lb/MMBtu)	0.046	0.049	0.042	0.046
	Stack Temperature (˚F)	1735	1754.000	1745	1745

Advantages Of Enclosed Clean Combustion


Power Generation

HEAT EASILY TRANSFERRED

- ✓ Directly with an internal heating coil
- ✓ Slip stream of flue gas

POWER, PROCESS OR WATER EVAPORATION

Opportunity to utilize the Heat;

- ✓ Process heat
- ✓ Break the oil/water emulsion
- ✓ Produced water evaporation
- ✓ Power generation

Post combustion gas capture for Carbon Capture, Utilization or Storage (CCUS)


Water Evaporation


Heat Recovery for Process

Community Wins

NEWS AND REVIEWS

Silently so

Extensive planning
well workover on (

With the recer
west of Edmc
idea of sour gas makes
people very anxious. So
it comes to a sour gas w
workover, no news is good
news.

In late October 2004, Nexen Canada Ltd. moved a service rig on to its sour gas wellsite facility, located on the east side of 84 Street NE just north of 16 Avenue NE, to complete maintenance on the well.

Nexen had suspended and isolated the wellsite in October 2003 following a routine inspection that identified a maintenance requirement. The workover entailed inspecting the casing, running new production tubing and sub-surface safety landing nipple and valve to ensure the continued safe operation of

we knew where the H2S or SO2 plume would travel."

The use of the Questor Incinerator for combusting the sour gases (35 per cent H2S) vented from the well and the inclusive method that Nexen used when planning the project allowed for smooth passage of the workover with the EUB, the City of Calgary, the Municipal District of Rockyview and the many residential stakeholders.

"We used Questor because of the quality of the units. They're the most effective with almost 100 per cent efficiency in burning all the gas off. It's a proven unit," said Seredynski.

Although no sour gas was released during the workover,

> **"We used Questor because of the quality of the units. They're the most effective with almost 100 percent efficiency in burning all the gas off. It's a proven unit"**

Compton Petroleum Corporation
Suite 3100, 150-6 Avenue SW
Petro Canada Centre, West Tower
Calgary, Alberta
T2P 3Y7

June 13, 2001

To Whom It Ma

I live one kilom
When this comp
incinerate sour gas I w
Now after several mont
from the plant from wh

The noise level coming from the plant is such that I can hear it while outside at night if I listen for it, but it is not at a level that would bother anything. I am unable to hear the plant while in the house. The noise might be comparable to that of a large farm tractor working the same distance away – one-kilometer.

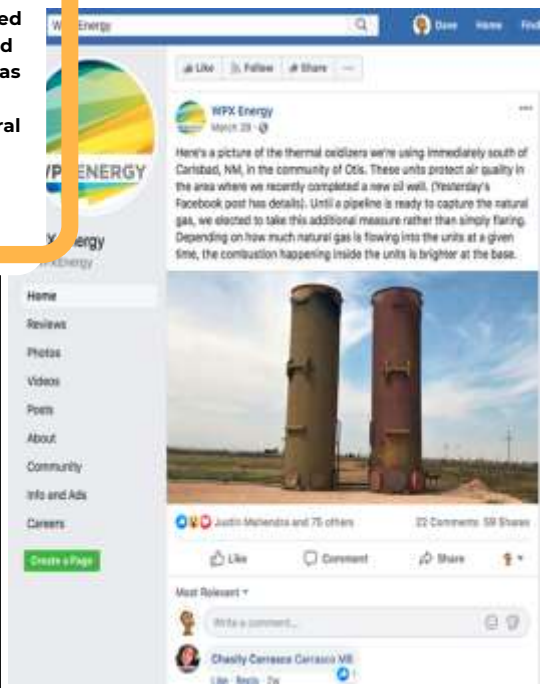
Compton is monitoring air quality in the area on an ongoing basis.

Thank you,

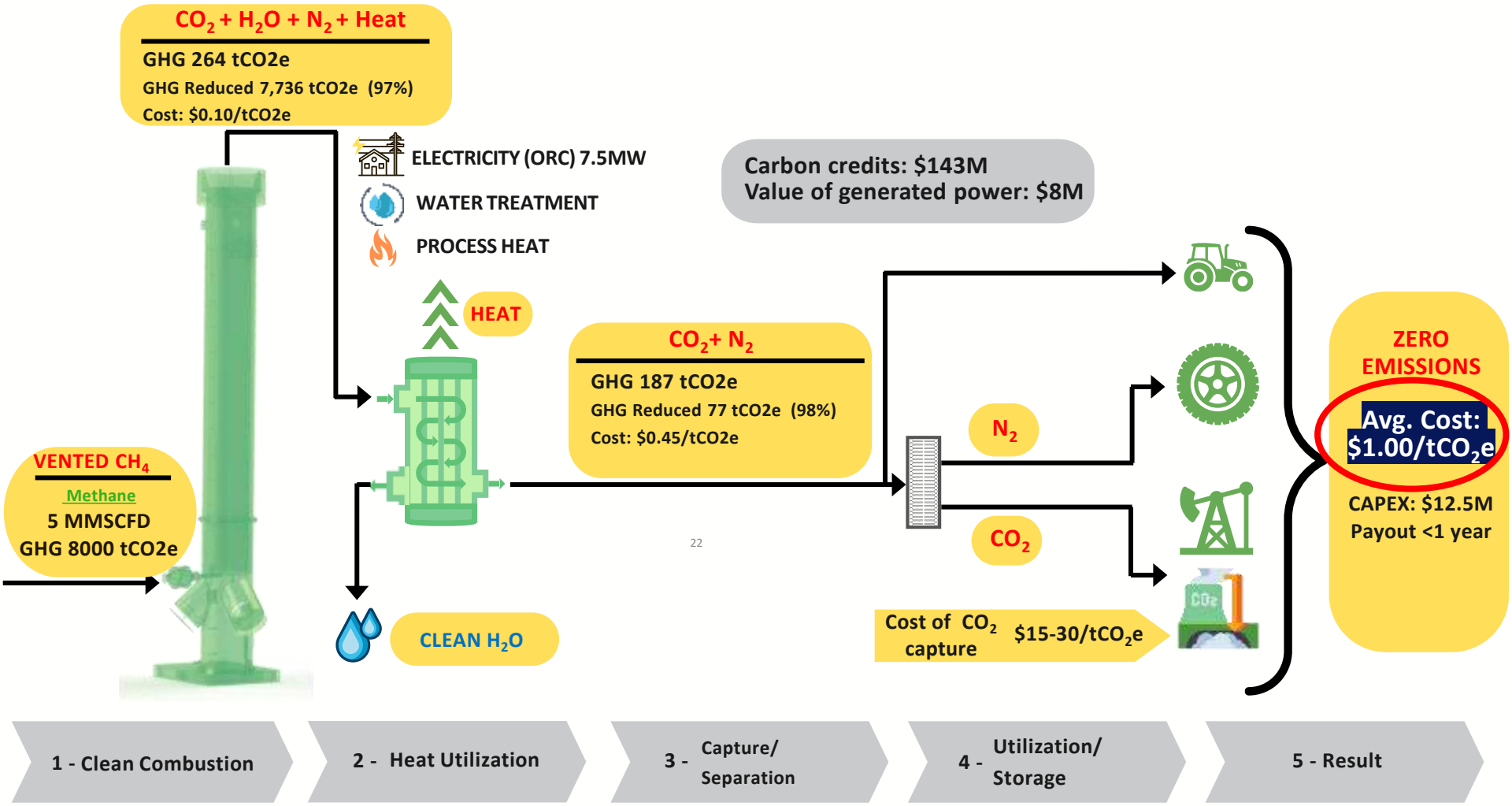
Nelson Ferris

Nelson Ferris
Hines Creek, Alberta

> **"I live one kilometer downwind of a natural gas plant owned by Compton Petroleum. When this company wanted to expand their operations and applied for a permit to incinerate sour gas I was concerned about air quality and bad smells that may result. Not after several months of operations can say that I have never detected any smalls from the plant where I live"**
>
> Nelson Ferris, Hines Creek, Alberta



Attainable Path To Net Zero



Conclusions

- Focusing on eliminating methane emissions from oil and gas operations is an opportunity with many benefits;
  - Cost effective GHG emission reduction
  - Improvement in air quality
  - Path to Net Zero
  - Low hanging fruit – proven technology solutions exist
- Creates a win with community concerned with their health
- Addresses investor concerns – ESG
- Quickly reduce the global temperature rise and buy us time

Clear Solutions. Clean Skies

PRESENTOR

Audrey Mascarenhas
President and CEO

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QUICK UPLOAD

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