

Practical actions for a lower-carbon footprint

Methane Emission Reduction



OIL AND GAS CLIMATE INITIATIVE

13th November 2018



Oil and Gas Climate Initiative



OIL AND GAS CLIMATE INITIATIVE

- OGCI is a voluntary, CEO-led Oil and Gas industry initiative which aims to catalyze meaningful actions on climate change through collaboration and engagement
- 13 member companies, IOCs and NOCs, representing around 30% of the world's O&G production



ExxonMobil



أرامكو السعودية
saudi aramco



- Members companies share a will to collaborate, a support to the Paris agreement, and a commitment to work (direct engagement from the CEOs to drive the initiative, active participation in OGCI program)

What makes Oil and Gas Climate Initiative unique

Impact



Production

~30% of the global Oil & Gas Production



Global reach

Operations in 130 countries with 2.1M employees



Investments

\$1B+ Climate investment fund launched in 2017



Innovation

\$6.3B investments by members in low-carbon technologies and R&D in 2017

Governance



CEO-led

>Quarterly meetings setting OGCI's strategic direction



Improve together

Share best practices & define collective targets



Engage

Support together climate engagements (Paris agreement, SDGs, zero routine flaring, methane, etc.)



Collaborative effort

Both among OGCI companies and with external stakeholders

Scope



Catalyst

Unlock & scale-up critical climate solutions



Transparency

Support consistent reporting on climate related performance



Science & policies

Support science, education and market enablers for low carbon solutions



Full value chains

Engage on the energy, industry & transport full value chains

Operating Structure of OGCI



OIL AND GAS CLIMATE INITIATIVE

Catalysing and scaling GHG reduction actions and initiatives in our industry

Delivering the OGCI strategy, policy and stakeholder engagement

Reduce Methane Emissions

Reduce CO₂

Recycle CO₂ (CCUS)

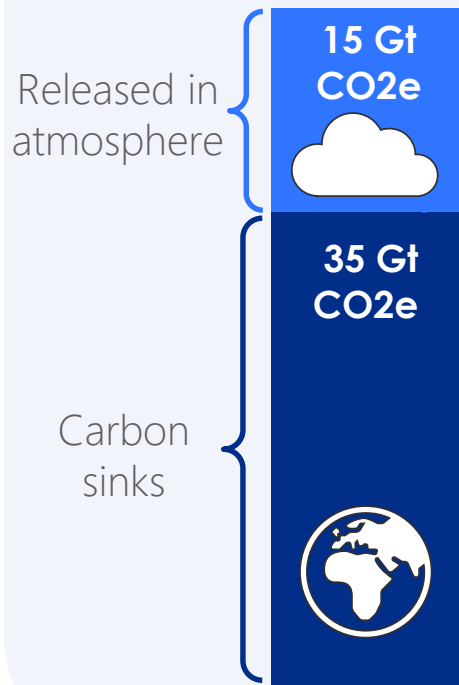


OIL AND GAS CLIMATE INITIATIVE

Climate Investments is a \$1B+ fund investing in technologies and solutions to lower the carbon footprint of the energy and industrial sectors

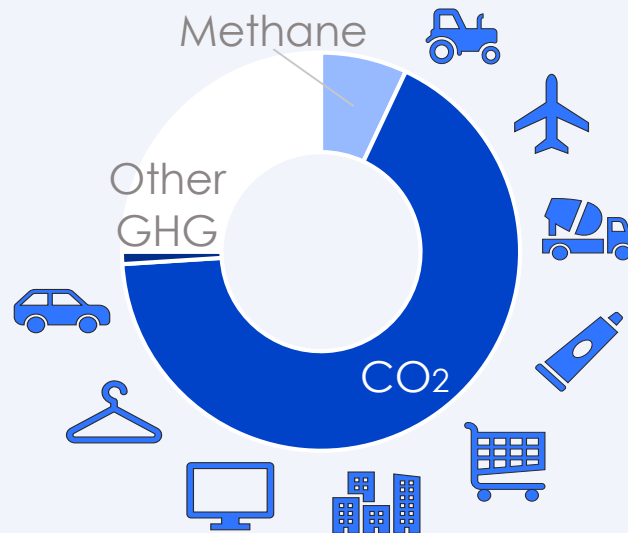
The Climate Challenge

Excess manmade GHG
going into the
atmosphere...



Source: IPCC (2014)

Energy & Industrial
~75% of manmade GHG



Source: Carbon Brief (2017) & IPCC (2014)

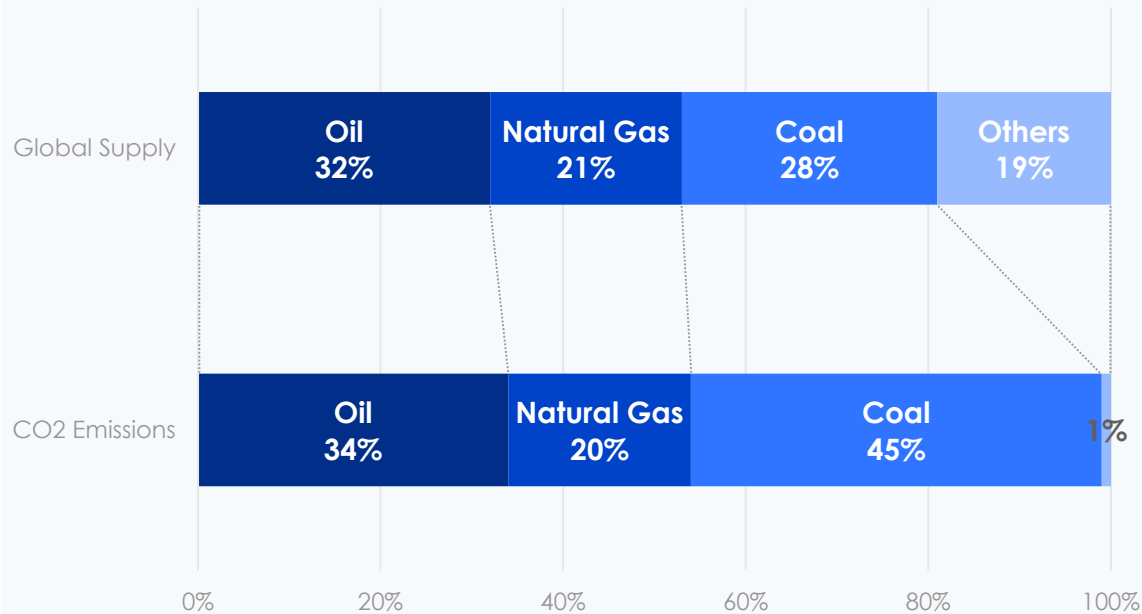
Dual Challenge
by 2050:

↑30% Energy
Demand
&
↓50% GHG
Emissions

Source: IEA WEO (2017)

Methane is a double-edged sword

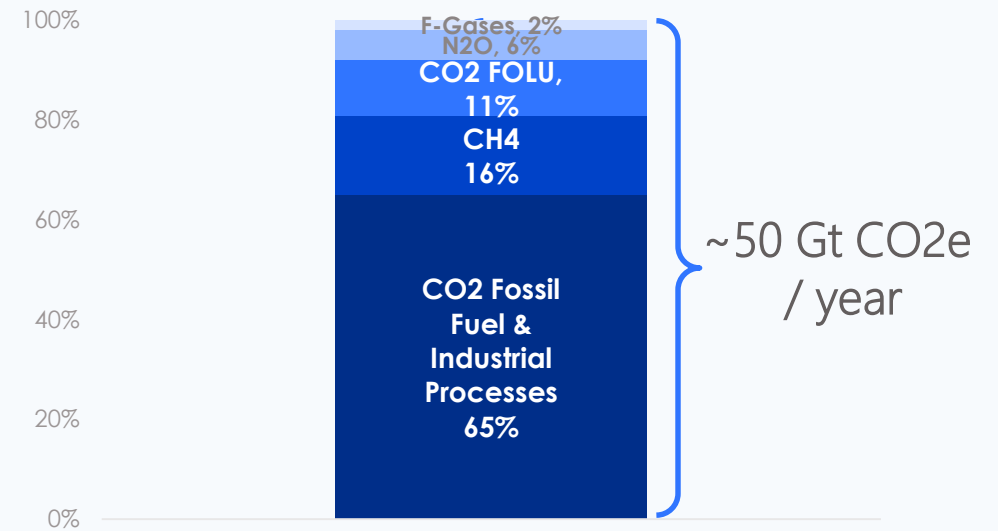
Advantage against coal is clear...



Primary Energy Supply and related CO₂ emissions

Source: IEA CO₂ from FF (2017) & IEA WEO (2017)

... yet the IPCC suggests that CH₄ accounted for ~25% of total global warming.

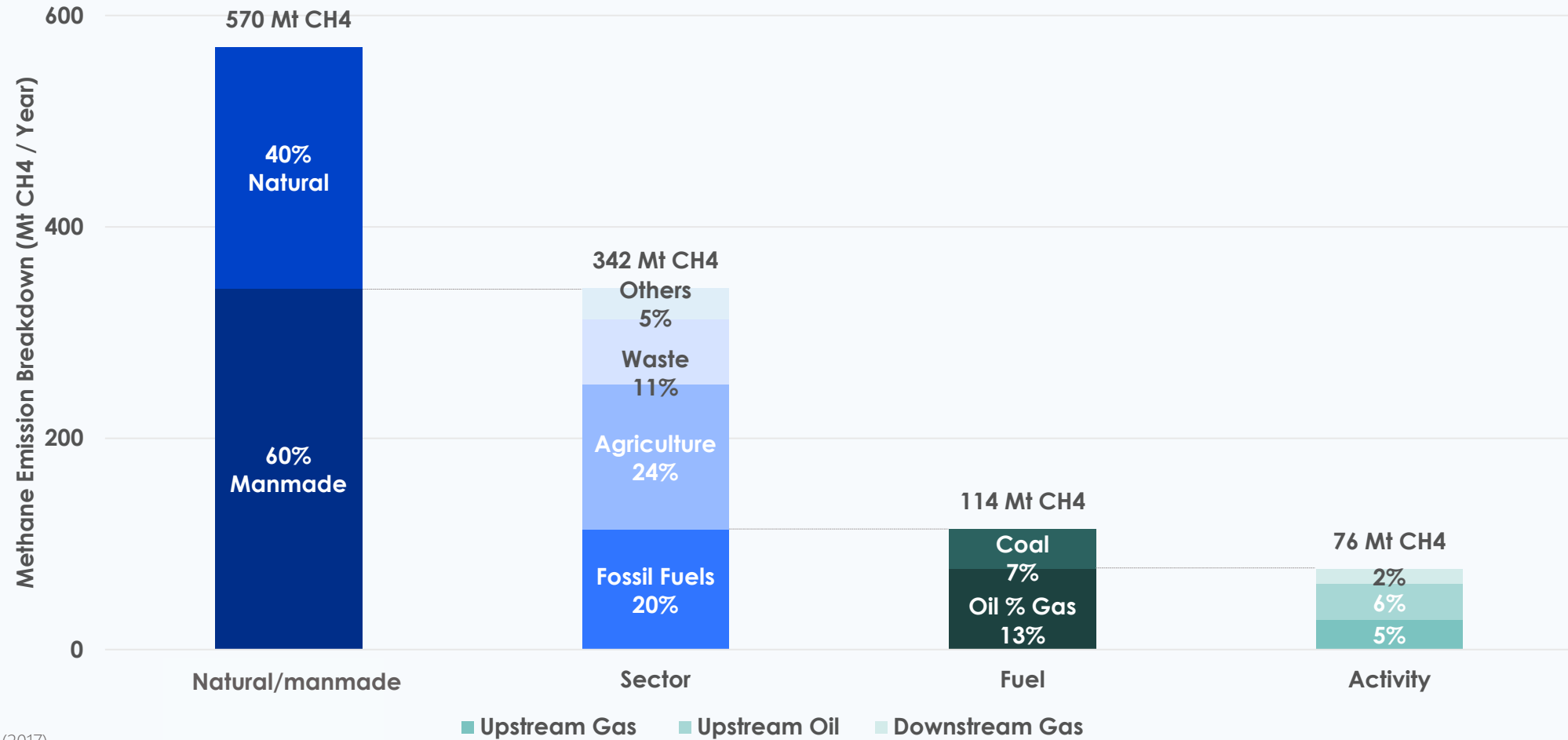


2010
Accounting for manmade GHG emissions only
Source: IPCC (2014)

Lifetime: CH₄: 12 years vs CO₂: 100 years
Global Warming Potential (GWP_{100y}): CH₄: 25 vs CO₂: 1

Source: IPCC (2014)

Oil & Gas Potential Contribution



Source: IEA WEO (2017)

Energy

Multiple emission sources across the value chain

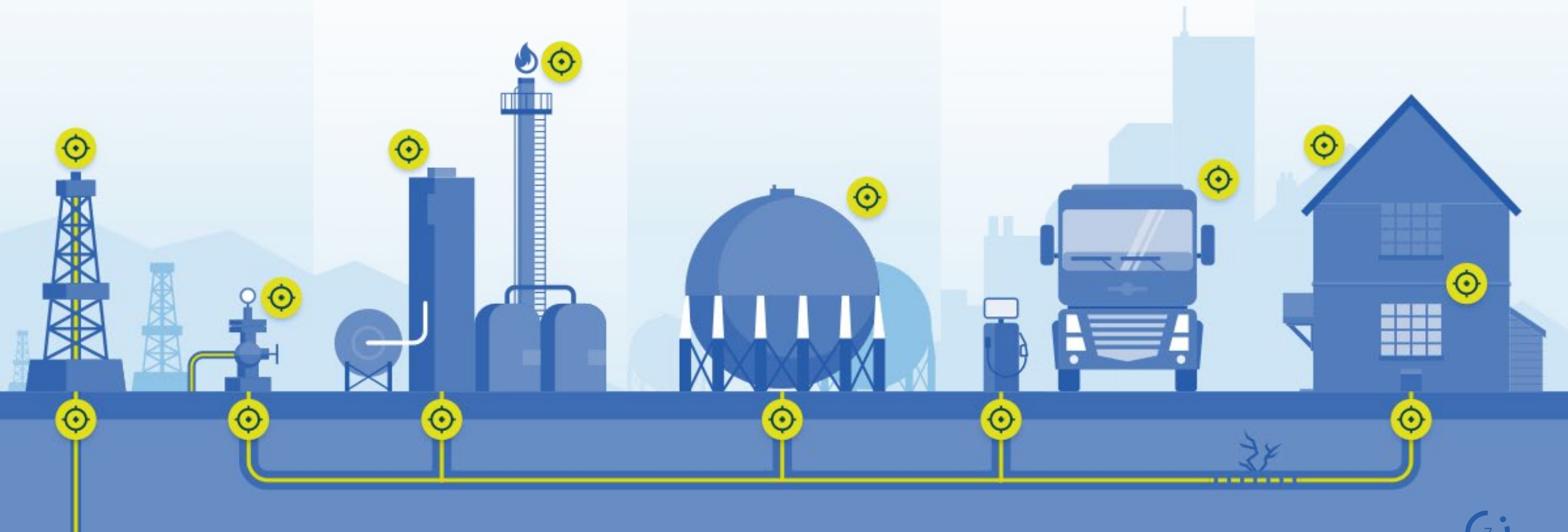
Exploration

Production
and processing

Storage and
transportation

Local
distribution

End user



2018 Methane Target



0.25%

Target

0.20%

Ambition

OGCI companies set a target to reduce the collective average methane intensity of our aggregated upstream gas and oil operations to **below 0.25% by 2025**, with the ambition to achieve 0.20%.

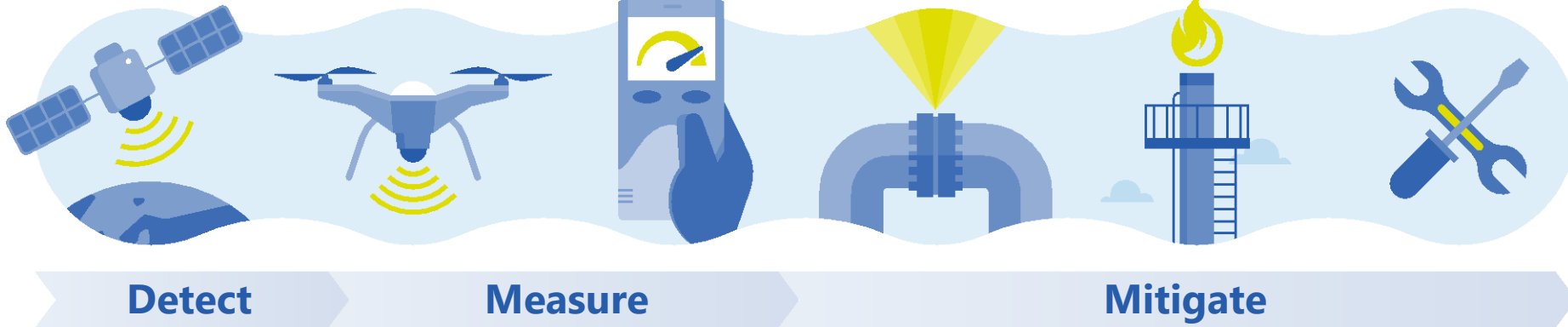
OGCI CI contributes to reducing methane emissions

across the oil and gas value chain

INVEST
in technologies
and solutions



DEPLOY
with members
and partners



Cost effective technologies to monitor, detect and coarse quantify methane emissions

Cost effective technologies to accurately pinpoint and measure methane emissions

Technologies tailored to equipment and source to fix emissions

Join Us

We invest in innovative companies with promising technology and business models that are ready to be commercialised. We collaborate with global co-investors and industrials to achieve speed and scale.



OIL AND GAS CLIMATE INITIATIVE



Apply for investment:

oilandgasclimateinitiative.com/apply-for-investment



OIL AND GAS CLIMATE INITIATIVE



Find out more online:

oilandgasclimateinitiative.com/climate-investments

Annexes

13th November 2018



About us

The Shutter Valve concept began as an embryonic idea some 20 years ago from our aerospace engineer/inventor/CEO, Mr. Kyle Daniels.

Clarke Valve™ is a scientific engineering company providing flow control valves with:

- Cutting edge flow performance technology
- Designed and built to exceed reliability benchmarks in all industries
- Reduction in process costs, including up to 50% reduction in electricity consumption
- 1/5th the weight, 5x smaller, 1/5 the cost of other valves

Clarke Valve™ supports clients with extensive experience in:

- Oil & Gas, Power, Chemical as well as others such as Pulp & Paper, Commercial Aviation and Navy Ships

Our technology

The Shutter Valve™ derives its design from proven aerospace industry design methodology for fluid control, sealing and mechanical systems.

- Countless millions of hours in service, and several years of testing in real-world environments with industry leaders
- Precise flow processing
- Low total cost of ownership
- Tested to the latest industry standards such as API 641 and ISO 9001:2015
- Engineered to be leak tight, compact, precise, inexpensive to operate and ultra-high quality for easy maintenance and maximum uptime
- Designed and built in the USA

FOCUS AREA

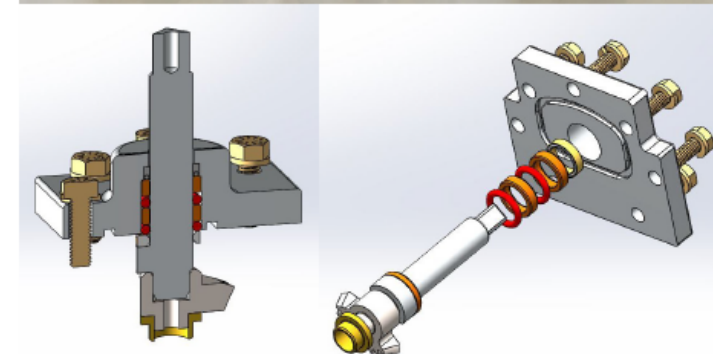
REDUCING METHANE EMISSIONS



ESTABLISHED
2014

EMPLOYEES
14

LOCATION
RHODE ISLAND
USA



WEBSITE

CLARKEVALVE.COM



About us

Kairos Aerospace provides safe, low cost, and fast aerial leak detection data using patented equipment and proprietary software.

Our surveys are:

- An efficient approach to leak detection
- Provide accurate, timely, and actionable information to oil & gas asset operators with no operational disruption.

To date, Kairos has:

- Surveyed over 4 million acres of oil and gas infrastructure
- Identified over 6 billion cubic feet of methane emissions, with a 95% accuracy

Our technology

Kairos uses a patented methane detection system to scan tens of thousands of acres in a single day, locating large methane emitters quickly. The data from these flights are processed automatically by a cloud computing pipeline capable of handling the survey data from entire continents.

FOCUS AREA

REDUCING METHANE EMISSIONS



ESTABLISHED

2013

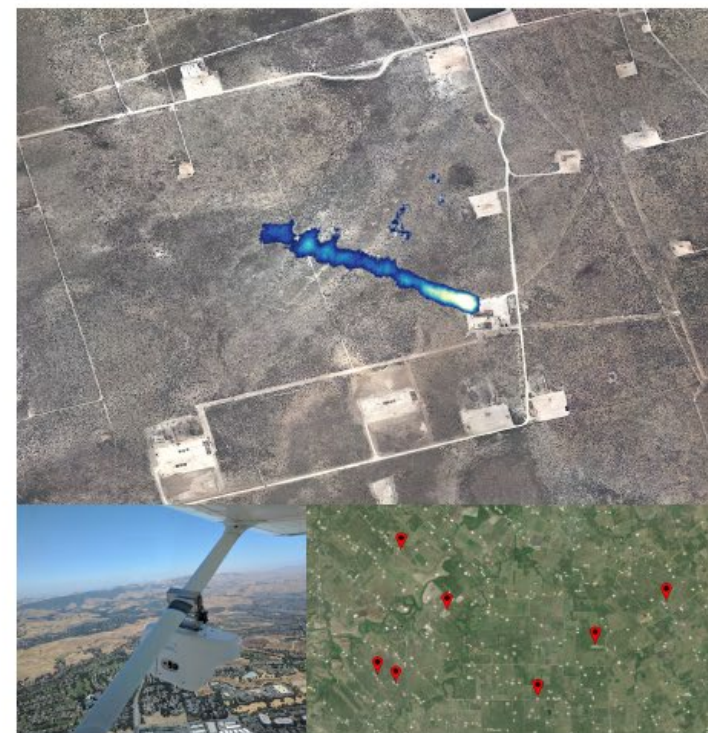
EMPLOYEES

18

LOCATION

MOUNTAIN VIEW

California USA



WEBSITE

KAIROSAEROSPACE.COM



About us

GHGSat's mission is to become the global reference for remote sensing of greenhouse gas (GHG), air quality gas, and other trace gas emissions from any source in the world.

- The world's first high-resolution satellite capable of measuring greenhouse gas (CO₂ & CH₄) emissions from any industrial facility in the world.
- Providing GHG monitoring technology at better accuracy and a fraction of the cost of alternatives
- Near-real-time monitoring for local and remote facilities, anywhere in the world

Significantly improved emissions information is enabling industries to better measure, control, and ultimately reduce emissions of GHGs.

Our technology

GHGSat products and services are delivered using:

- A patented, proprietary multi-platform system for collecting emissions data
- Unique algorithms ingesting both GHGSat and third-party data to generate valuable operational, environmental, health & safety, and regulatory insights, as well as market and government intelligence for our customers

GHGSat's instrument is designed to operate with:

- Limited volume, mass and power
- No on-site equipment at the source
- Public or private data that can be provided at or near the source (e.g. wind speed and direction) can be used to augment and improve GHGSat analyses of emissions

FOCUS AREA

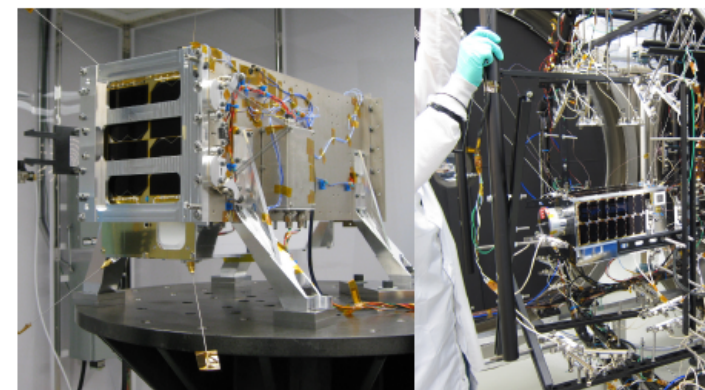
REDUCING METHANE EMISSIONS



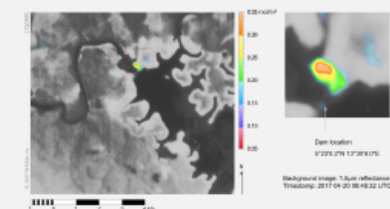
ESTABLISHED
2011

EMPLOYEES
21

LOCATION
MONTREAL
Canada



Lom Pangar Dam, Cameroon — April 20th, 2017
GHGSat-D excess CH₄ column measurement



WEBSITE

GHGSAT.COM