



Methane Emissions Abatement in the Oil and Gas Sector:

Keeping a Traded Commodity Out of the Air

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ENERGY
IS RMI's
NORTH STAR.

OUR GOAL
IS CLEAR.

.....

We know that
energy is 70%
of the climate
problem and,
therefore,
must be
at least
70% of our
solution.

“We must transform
how we produce
and use energy to
cut waste in half by
2030.

IPCC, Sixth Assessment Report, 2023

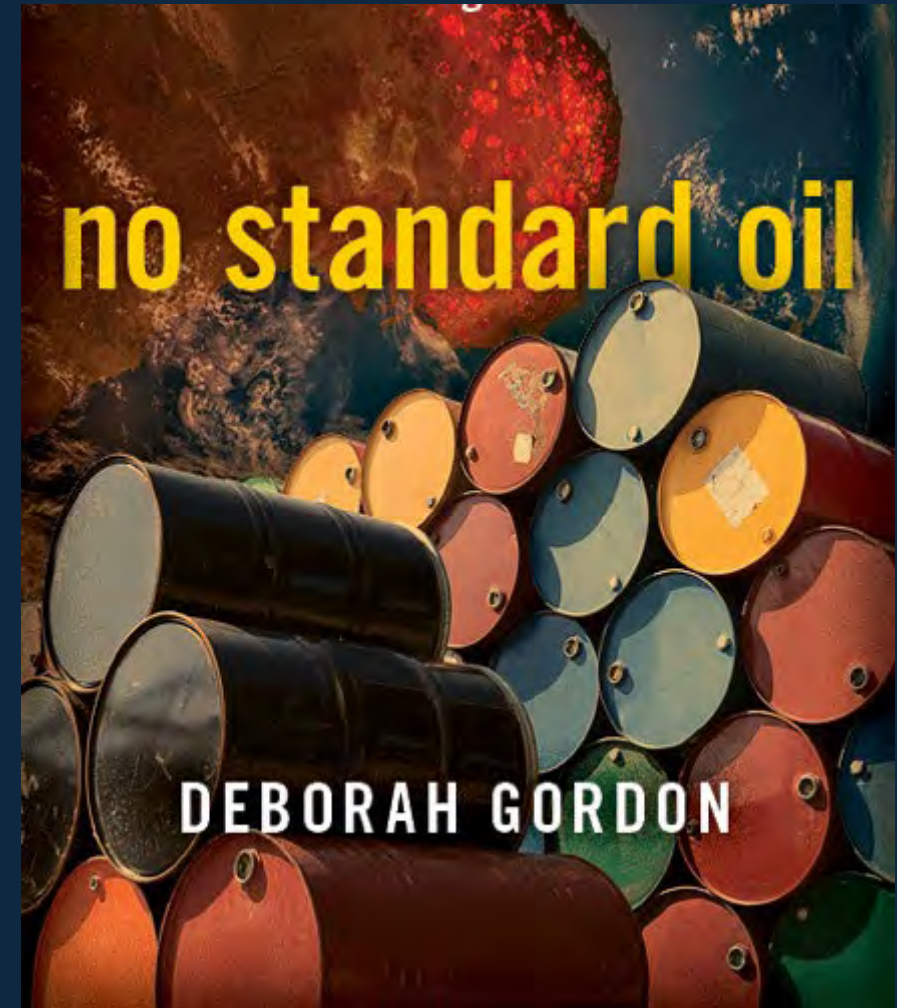
Differentiating Oil and Gas Methane Intensity

My Hypothesis:

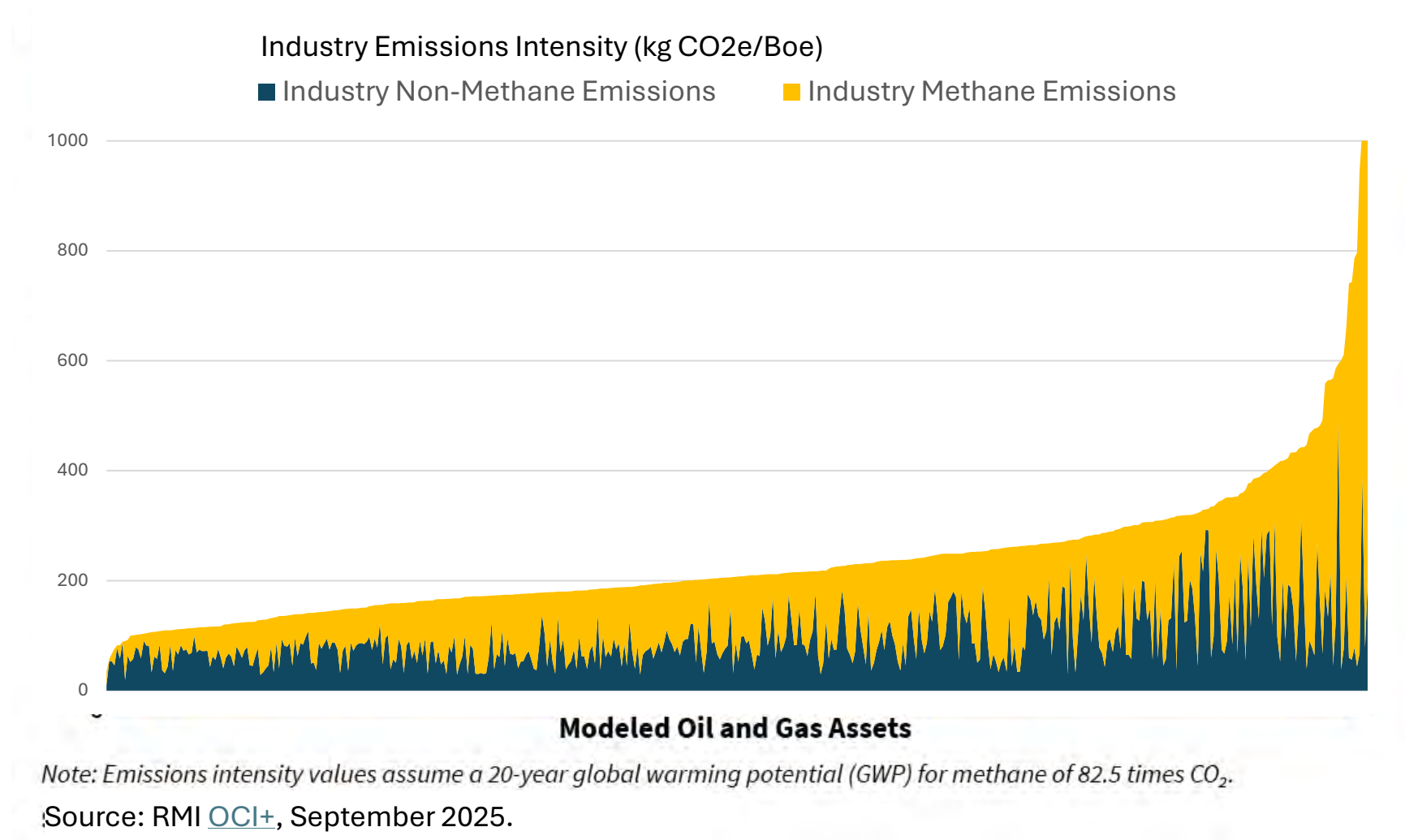
- If the chemical and physical characteristics of oil and gas resources and the operations to extract and process them vary widely, so too will their emissions.
- This assertion gave rise to the OCI+, an open tool that estimates methane intensities of equivalent barrels of oil and gas.

Findings:

- There is no standard oil or gas.
- Analyzing where in the supply chain the greatest emissions occur targets mitigation.
- Reducing equivalent barrels to the lowest intensity in practice can cut methane emissions by an estimated 90% (IEA).



Methane is Responsible for Over One-half of Estimated O&G Industry GHG Emissions



Continually Updated Global Emissions Data on O&G Methane (and Other Gases)



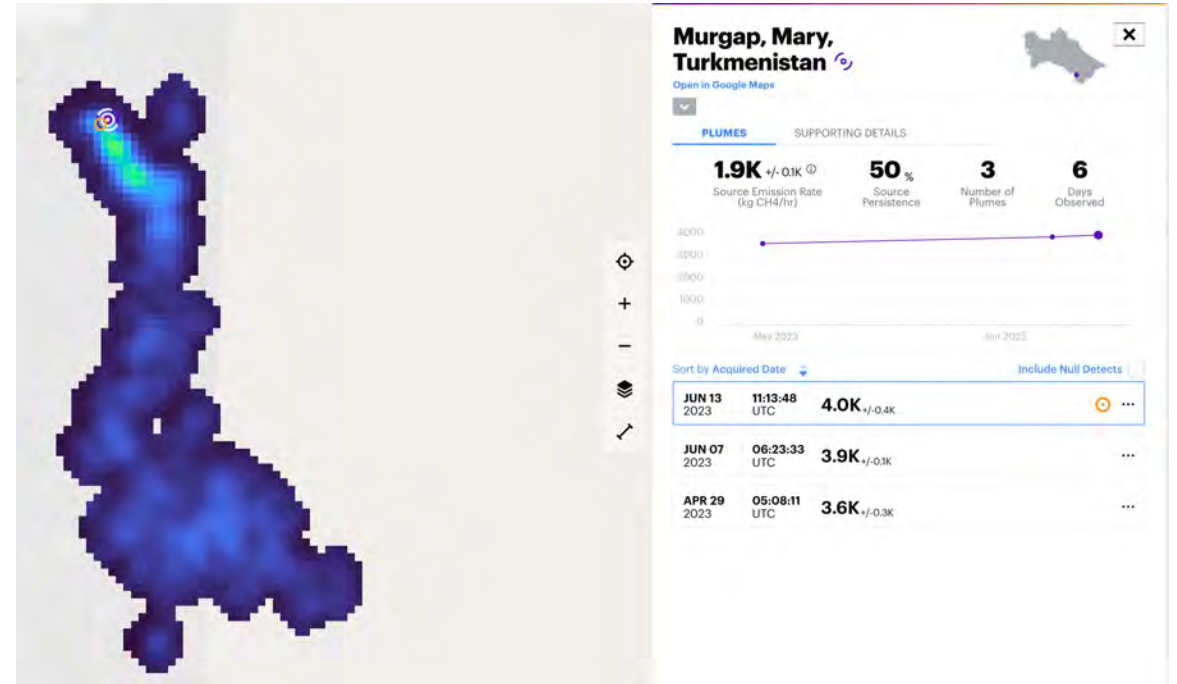
Source: [ClimateTRACE](https://climate TRACE.com), downloaded Sept 2025.

Satellite Detected Methane Super Emissions are a Major Contributor

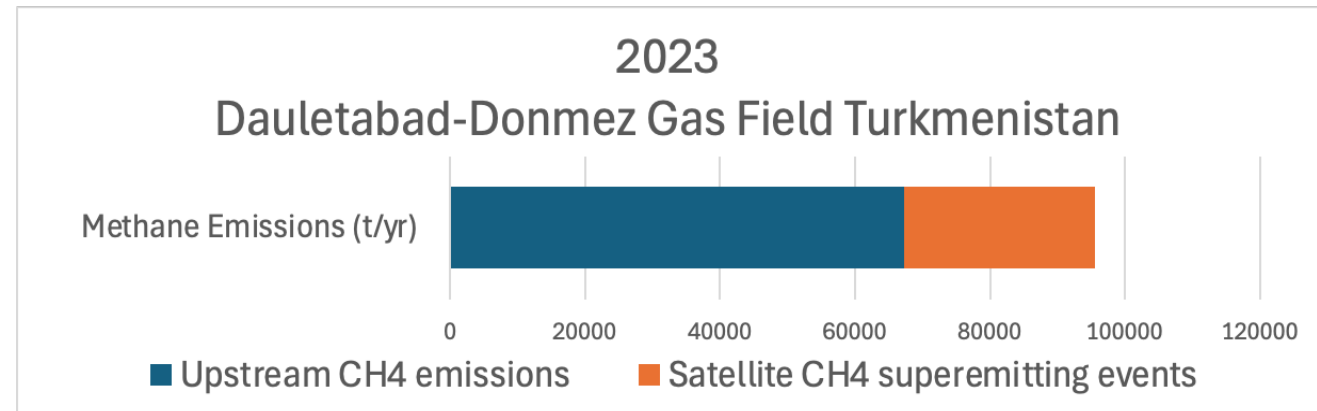
Example

Integrating Carbon Mapper/EMIT and OCI+ data

- Assume emissions events of ~100+ kg/hour are non-routine, abnormal operating conditions
- Use plume persistence to convert instantaneous observations into annual estimate of emissions rate
- Add to OCI+ emissions, which model "normal" conditions

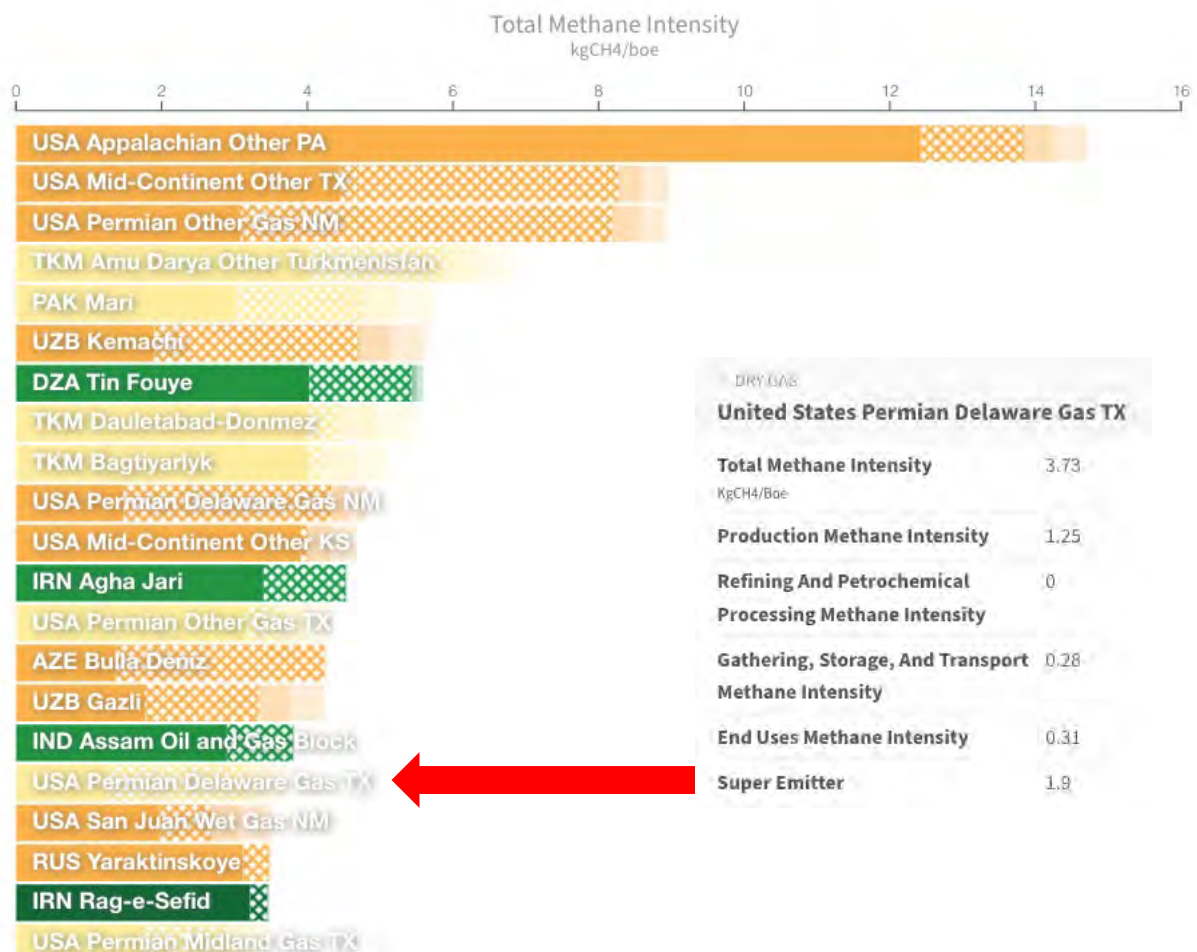


Carbon Mapper Data Portal, <https://data.carbonmapper.org/>



Map Supply Chain Benchmark Crude Analysis Flaring Risk Map

Production Super Emitter Refining And Petrochemical Processing Gathering, Storage, And Transport End Uses



DRY GAS

United States Permian Delaware Gas TX

Total Methane Intensity	3.73
KgCH₄/Boe	
Production Methane Intensity	1.25
Refining And Petrochemical Processing Methane Intensity	0
Gathering, Storage, And Transport Methane Intensity	0.28
End Uses Methane Intensity	0.31
Super Emitter	1.9

Data Model

Global Warming Potential

20

100

Emission Metric

Total Emissions Intensity

Methane Intensity

Carbon Dioxide Intensity

Units

● kgCH₄/boe

gCH₄/MJ O&G
Produced

Resource Type

● Ultra-Light Oil

● Dry Gas

● Light Oil

● Acid Gas

● Medium Oil

● Wet gas

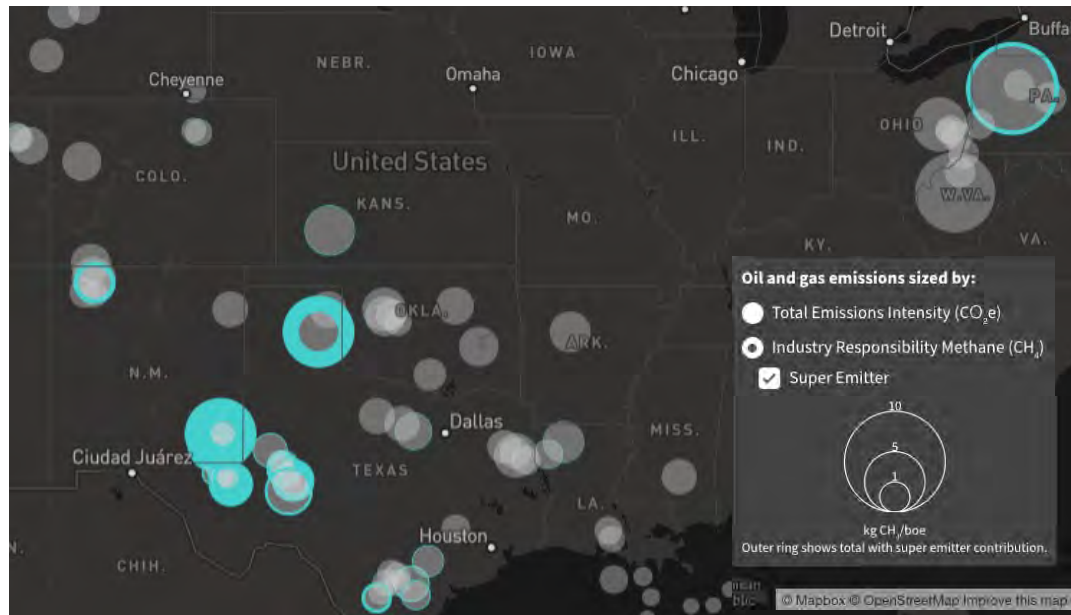
● Heavy Oil

● Condensate

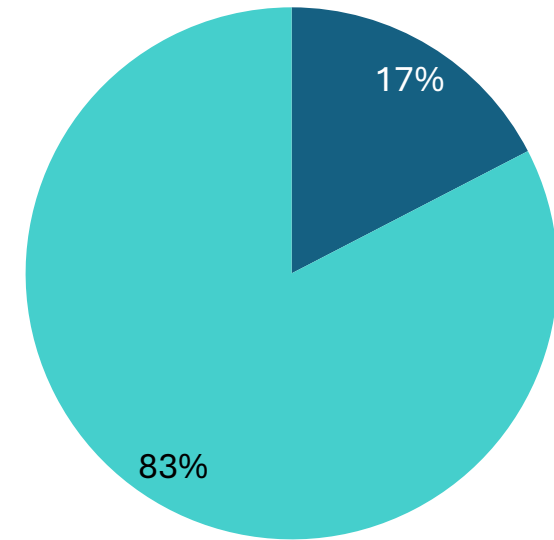
● Extra-Heavy Oil

Visualizing methane emissions show both detected super-emitting and modelled methane emissions

Share of OCI+ Modeled Assets with Methane Super-Emission Detections. These non-routine events added an estimated 30% methane to routine emissions.



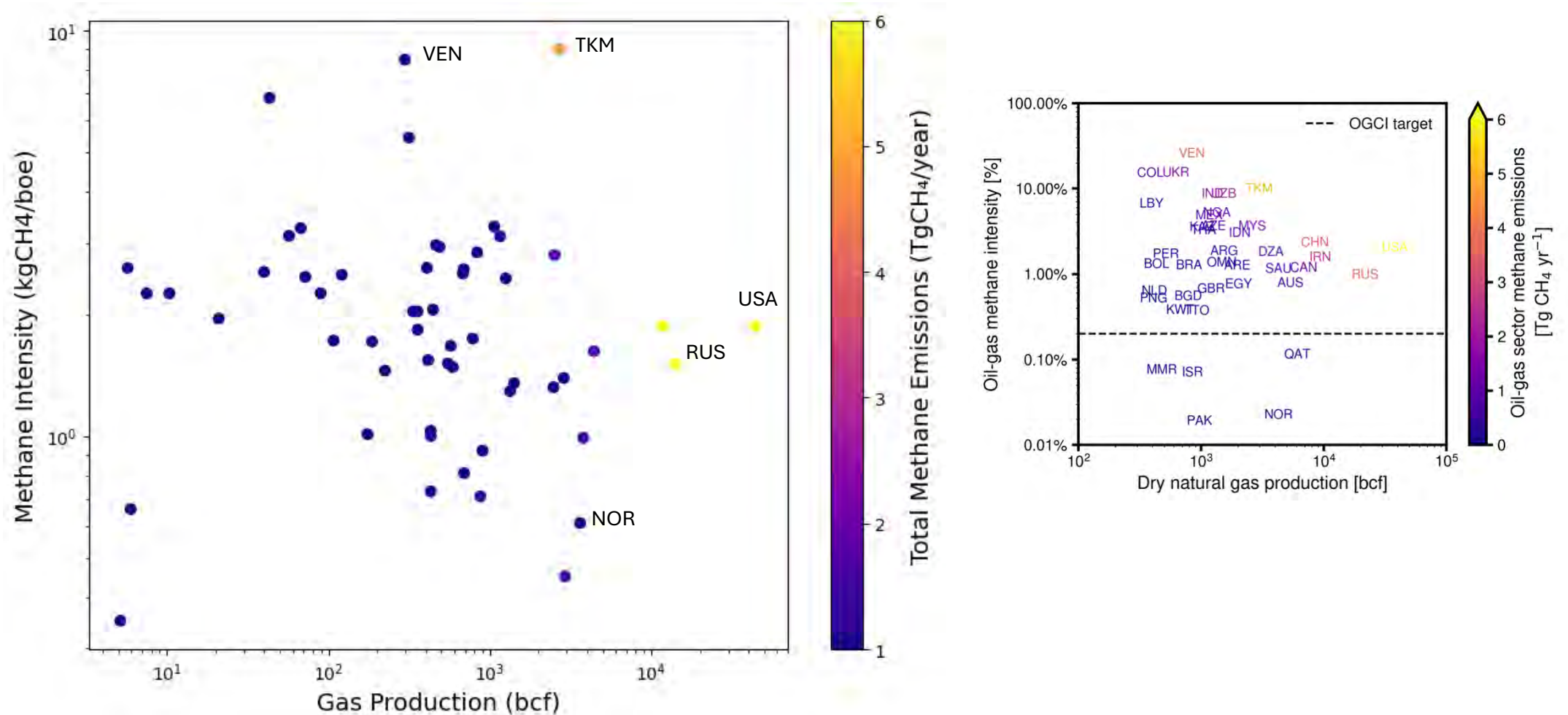
Source: [OCI+](#), September 2025.



- Fields with Super Emissions Detected
- Fields without Super Emissions Detected

Increased detection capabilities are needed to identify additional non-routine events and provide independent, verifiable data.

Comparing Bottom-up Modeled to Top-Down Measured Analyses



Sources: RMI, OCI+, 2024 and ClimateTRACE, 2025 (left); forthcoming publication by James East, et. al. (right)

Know your oil and gas

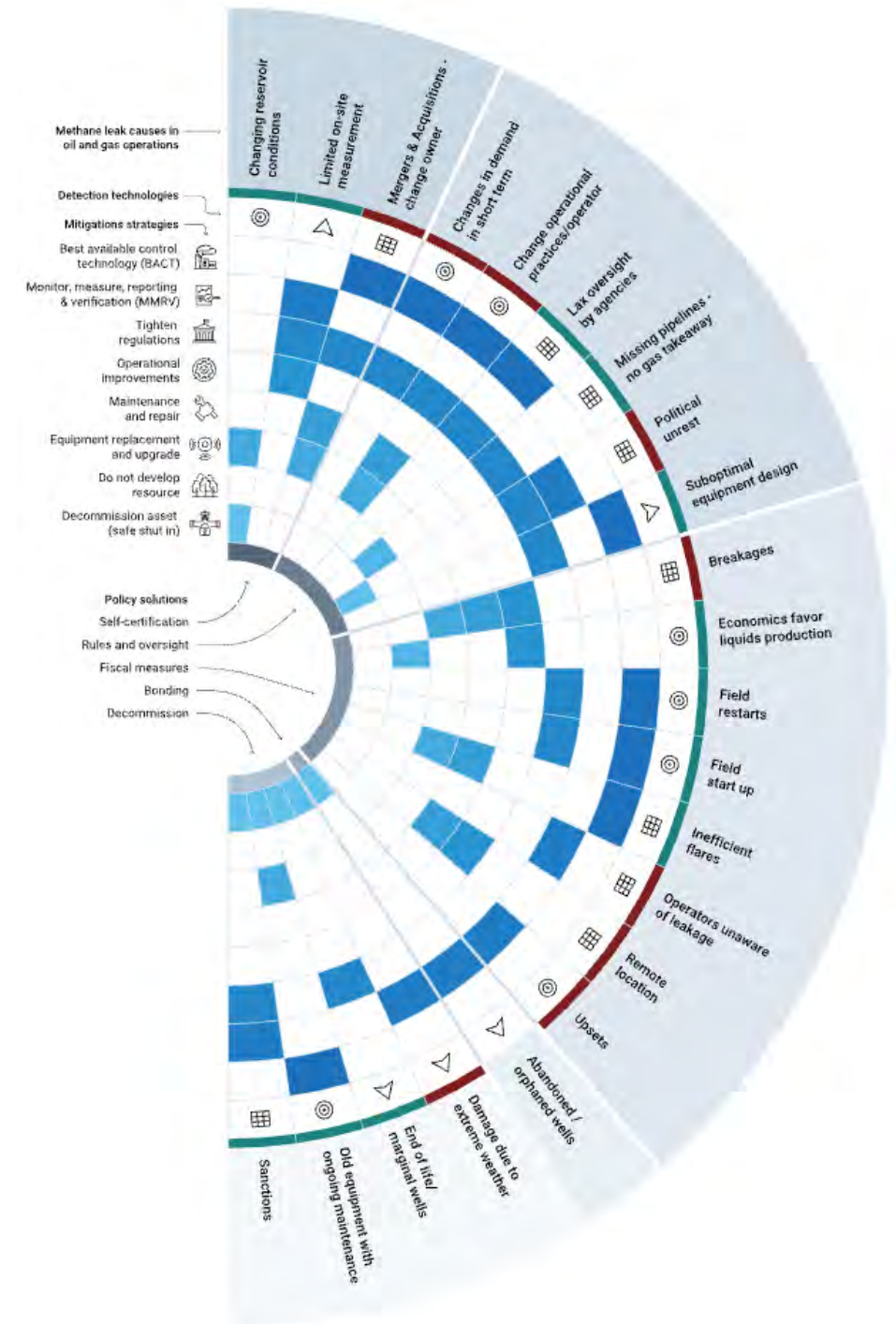
- Routine emissions
- Non routine emissions
- Exogenous events

ID Emissions Type

- Venting
- Fugitives
- Flaring
- Breakage

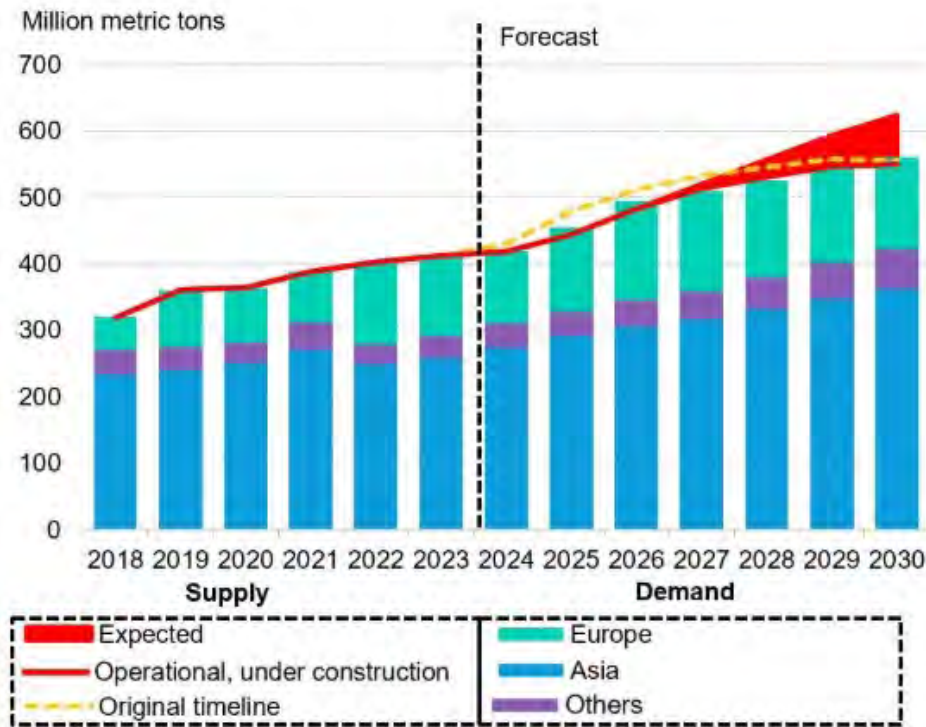
Target Actions

- Economics
- Geopolitics
- Physical realities
- Policy environment



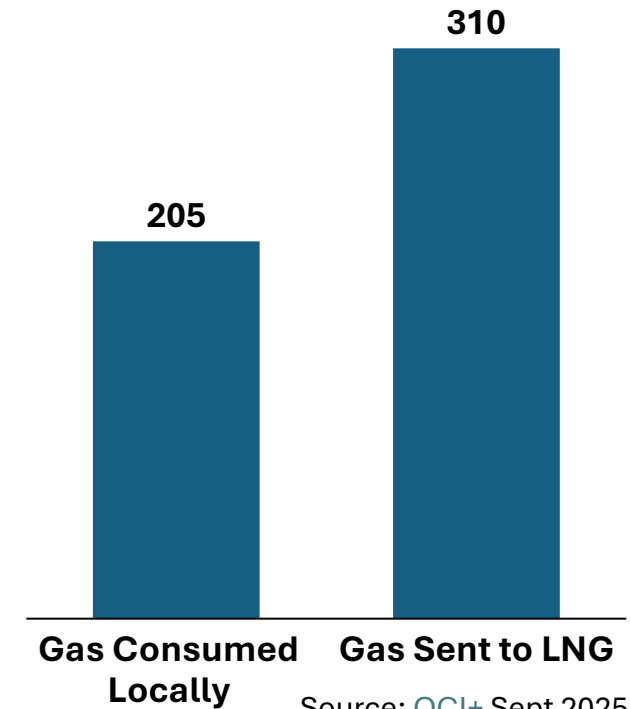
Changes in Global Gas Trade Will Influence Oil & Gas Methane

Global LNG capacity is expected to increase significantly in the coming years



Source: BloombergNEF

Average industry emissions intensity (kg CO₂e/boe) increases >50% for natural gas shipped as LNG compared to gas consumed locally



Average estimate of emissions of over 20 fields on GWP₂₀ basis. Gas is either sent 100% to LNG facility or consumed locally and distributed via pipeline.

Targeted Mitigation Action is Most Effective

Diving into O&G

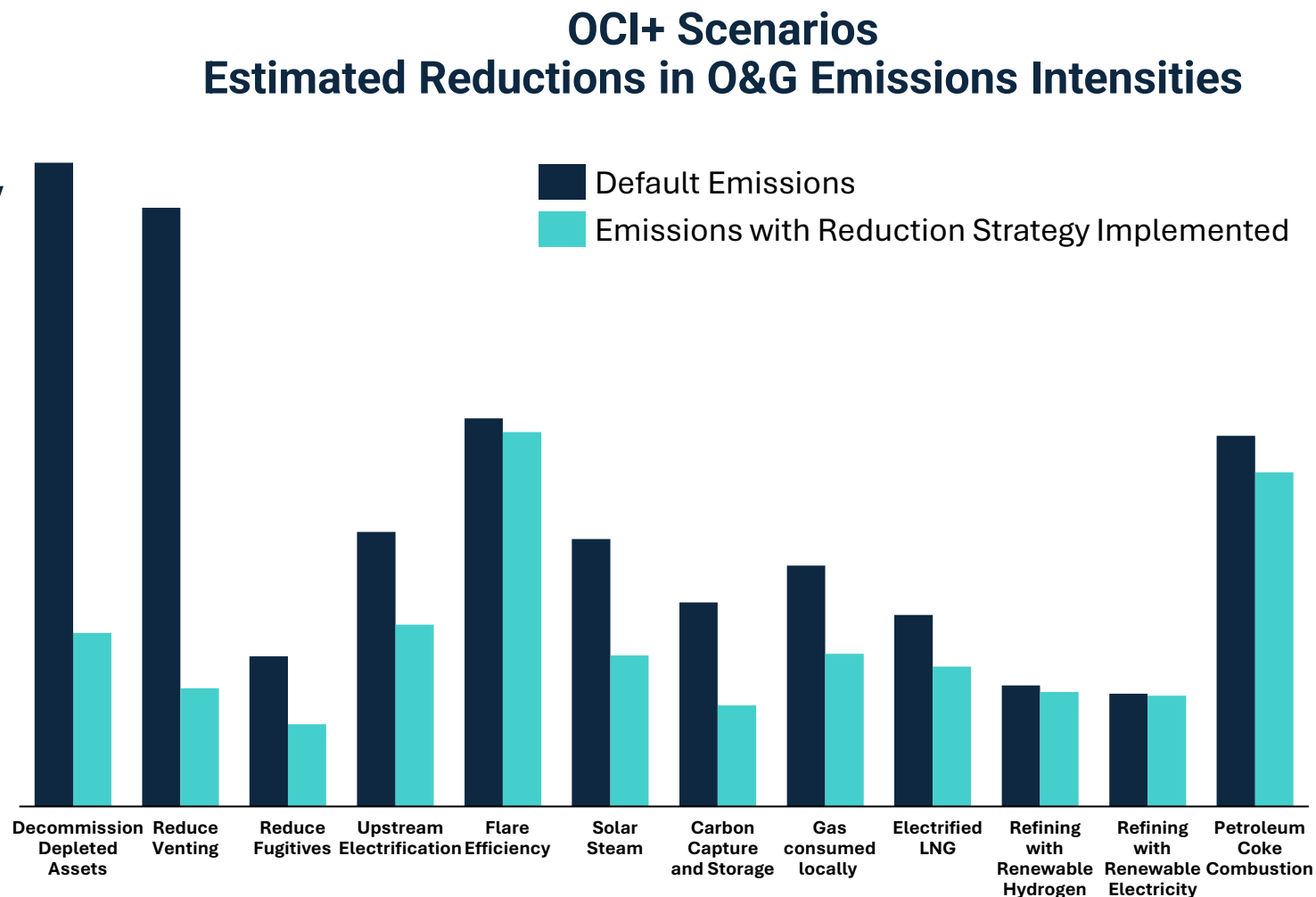
- Use engineering models for systems' analysis
- Compare bottom-up activity + top-down measurements

Parsing emissions

- Untangle routine from non-routine events
- Prioritize where to cut

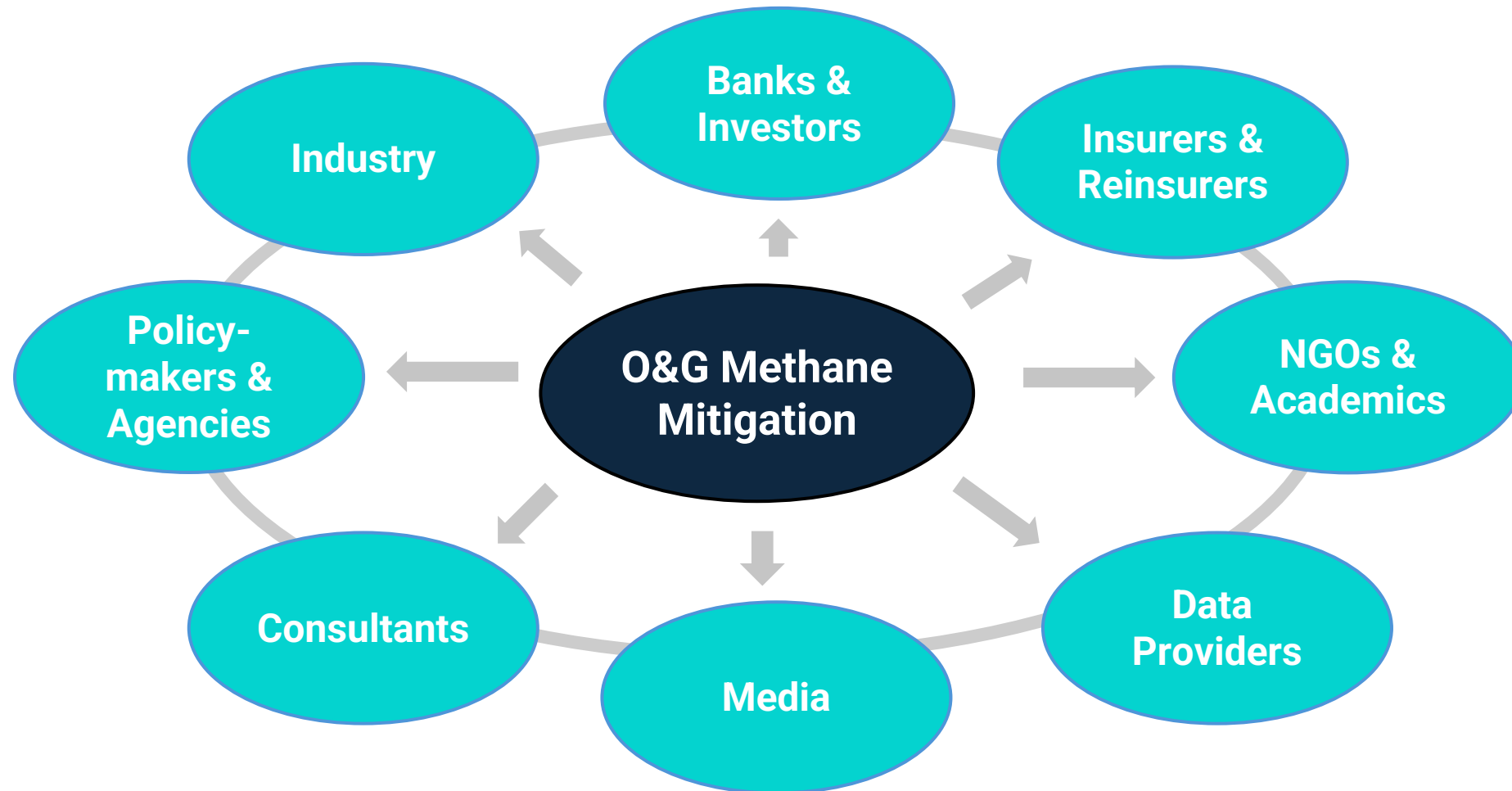
Targeting Action (Σ 2%)

- Voluntary Certification
- Mandates/Regulation
- Fiscal Measures
- Redesign/Retrofit
- Decommission



Source: RMI OCI+ 2025 and updates forthcoming Climate TRACE, 2025; Note: Assumes GWP20 for methane climate forcing.

Engage Different Actors in O&G Methane Abatement



Thank You!

