

# **GMI Oil & Gas Subcommittee Meeting**

**Geneva, Switzerland**



22 March 2023



**Welcome!**

## **James Diamond**

GMI Oil & Gas Subcommittee Co-Chair

Environment and Climate Change Canada

## **Francisco de la Flor Garcia**

Chair, Group of Experts on Gas

United Nations Economic Commission for Europe (UNECE)

## **Branko Milicevic**

Secretary, Group of Experts on Gas

United Nations Economic Commission for Europe (UNECE)

# Adoption of the Agenda

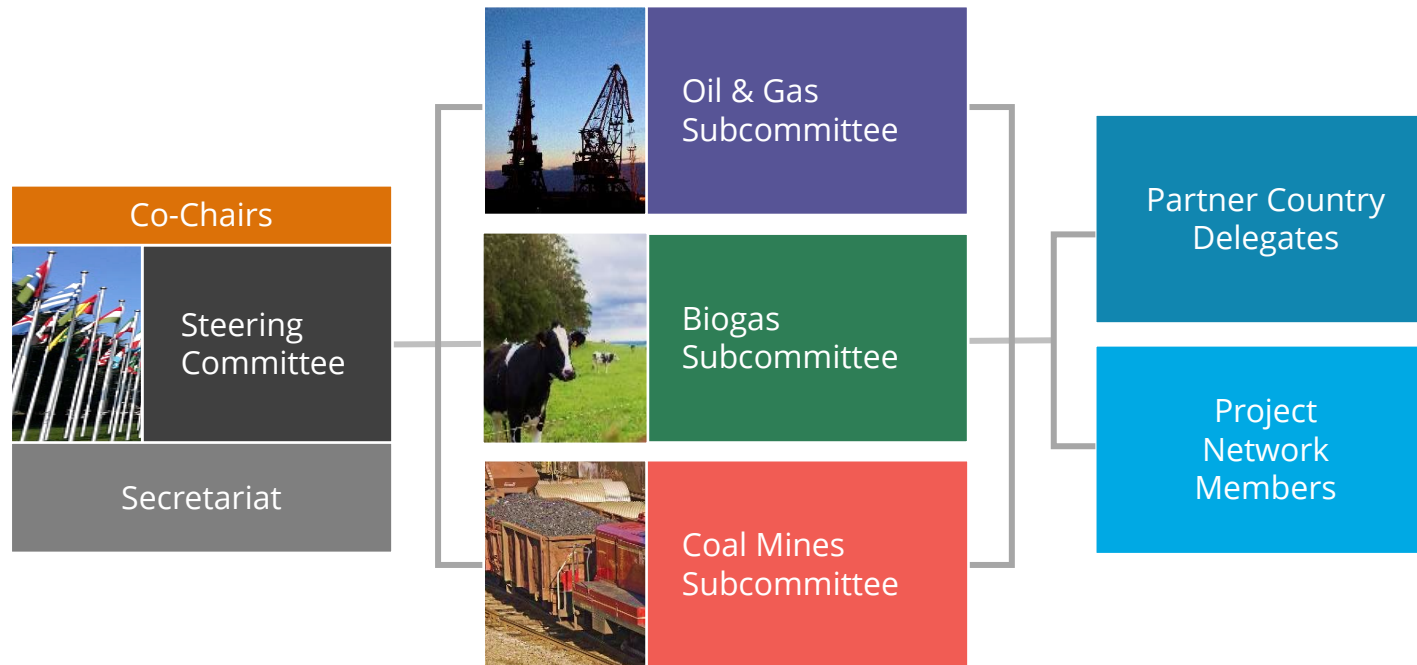
- Welcome and Opening Remarks, Adoption of the Agenda (10 min)
- GMI Secretariat Updates (10 min)
- Oil & Gas Subcommittee Updates: Action Plan/Activities (10 min)
- Partner Country Updates (30 min)
- Discussion: Technical Topics of Interest to the Subcommittee (10 min)
- Presentations/Case Studies (40 min)
- Preview of the UNECE Group of Experts on Gas Meeting (5 min)
- Concluding Remarks and Next Steps; Adjourn (5 min)

# GMI Secretariat Updates

**Denise Mulholland**  
Director, Secretariat

# Global Methane Initiative (GMI)

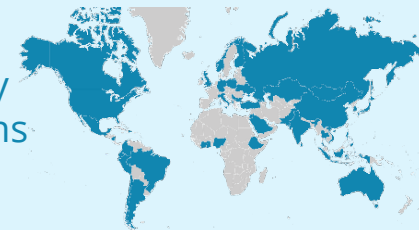
GMI is an international public-private partnership focused on reducing barriers to the recovery and use of methane as a valuable energy source.



- 46 Partner Countries
- 700+ Project Network members
- Alliances with international organizations focused on methane recovery and use



GMI Partner Countries represent approximately 75% of methane emissions from human activities.



# Steering Committee and GMI Partner Countries

-  Canada (Chair)
-  India (Vice Chair)
-  United States (Vice Chair)







## Steering Committee Members

-  China
-  Colombia
-  Ecuador
-  Finland
-  Ghana
-  Indonesia
-  Nigeria
-  Saudi Arabia
-  Serbia
-  Turkey

## Other GMI Partner Countries

- |   |   |   |
|---|---|---|
|  Albania               |  Georgia     |  Pakistan          |
|  Argentina             |  Germany     |  Peru              |
|  Australia             |  Israel      |  Philippines       |
|  Brazil                |  Italy       |  Poland            |
|  Bulgaria              |  Japan       |  Republic of Korea |
|  Chile                 |  Jordan      |  Russia            |
|  Cote d'Ivoire         |  Kazakhstan  |  Sri Lanka         |
|  Denmark               |  Mexico      |  Thailand          |
|  Dominican Republic   |  Mongolia   |  Ukraine          |
|  Ethiopia            |  Nicaragua |  United Kingdom  |
|  European Commission |  Norway    |  Vietnam         |

# GMI Accomplishments Since 2004

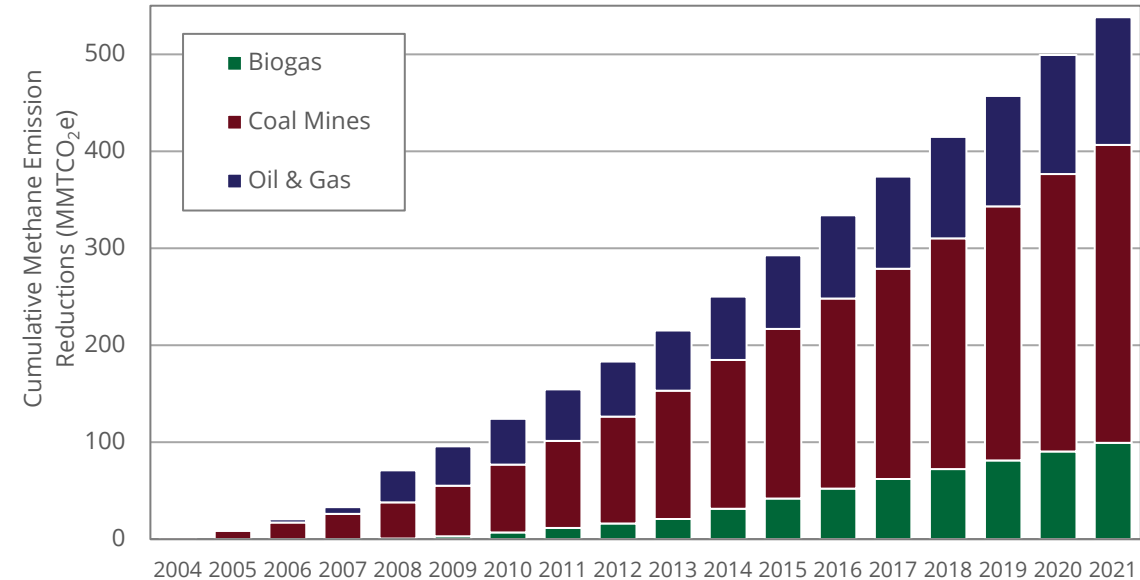
-  Grown from 14 to 46 Partner Countries
-  More than \$650 million in leveraged funding for projects and training
-  More than 700 Project Network members
-  Conducted or developed nearly 2000 assessments, pre-feasibility studies, feasibility studies, study tours, reports, guidances and site visits
-  Provided trainings for more than 50,000 people in methane mitigation
-  Developed more than 60 tools and resources for methane mitigation



Since 2004, GMI has reduced CH<sub>4</sub> by nearly

## 540 MMTCO<sub>2</sub>e

including approximately 40 MMTCO<sub>2</sub>e achieved in 2021



540 MMTCO<sub>2</sub>e is approximately equivalent\* to the CO<sub>2</sub> emissions from any one of the following:



**230 Billion**  
liters of gasoline  
consumed



**270 Billion**  
kilograms of coal  
burned



**65.4 Trillion**  
smartphones  
charged

\* [epa.gov/energy/greenhouse-gas-equivalencies-calculator](https://epa.gov/energy/greenhouse-gas-equivalencies-calculator)

# GMI

## “By the Numbers” for 2021

- Leveraged virtual platforms to maintain and increase engagement with stakeholders
- Expanded direct communications with social media
- Promoted GMI’s technical expertise

Through GMI in 2021:

**11**  
countries

supported activities where more than

**1,100**  
people

received a total of approximately

**1,000**  
hours

of training about reducing methane emissions and capturing methane for productive uses



**Capacity Building/Information Sharing**  
fostering best practices

**3**

**Workshops/Trainings**

China, European Commission, United States, and Partnership-wide

**9**

**Manuals/Websites/Other Outreach**

India, Mexico, Serbia, Partnership-wide



**Assessments**

identifying opportunities for emission reductions

**7**

**Reports/Tools/Models**

Partnership-wide

**7**

**Study Tours/Other Technical Assistance**

Colombia, India, Indonesia, Serbia

**11**

**Measurement/Pre-feasibility Studies**

Poland, Ukraine, United States



**Partnerships**

building relationships to foster action

**12**

**GMI Meetings (Steering Committee/Subcommittees)**

Virtual meetings hosted from the United States

**2**

**Conferences**

Virtual conferences hosted from Switzerland and the United States





# Global Methane, Climate and Clean Air Forum

a joint event sponsored by GMI and CCAC

## Forum Highlights

- 400 in-person attendees from 60 countries and 450 virtual attendees from 29 countries
- 5 high-level plenary sessions on global efforts to reduce emissions from methane and other short-lived climate pollutants
- 36 technical sessions bringing together practitioners, policymakers and technical experts
- 3 site visits to an anaerobic digester, landfill, and wastewater facility

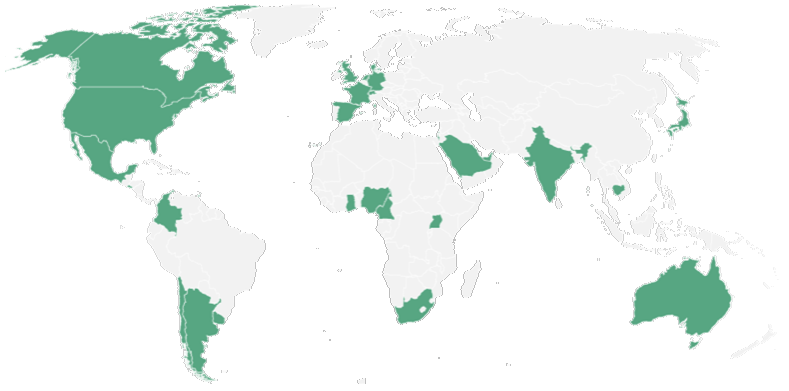
# Overview of Participation

## Virtual Attendees

**29**  
**countries**

were represented by  
approximately

**450 virtual**  
attendees

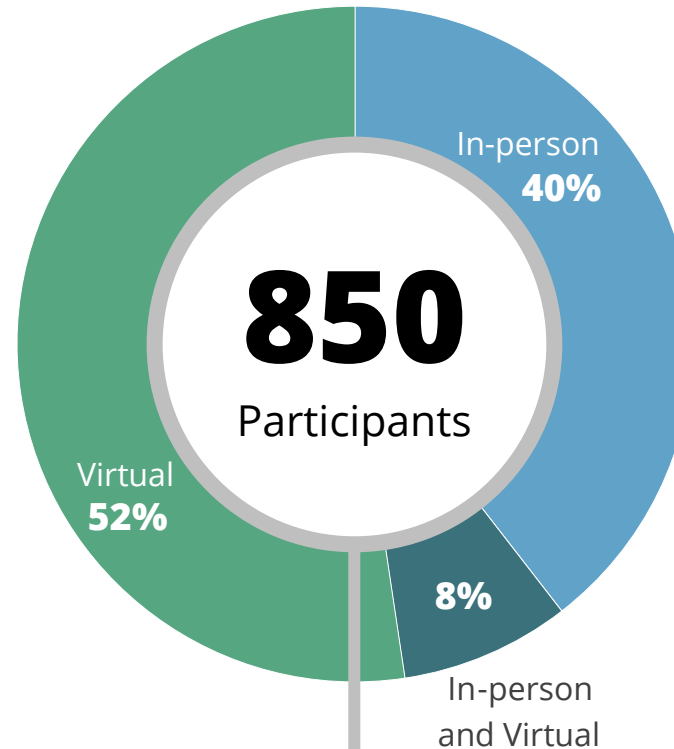
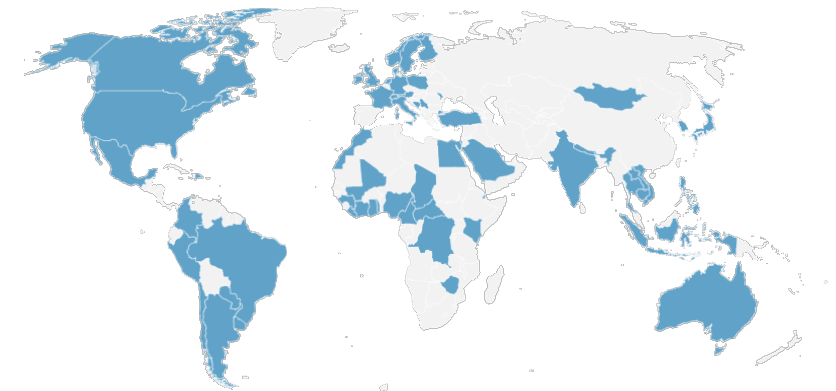


## In-Person Attendees

**60**  
**countries**

were represented by  
more than

**400 in-person**  
attendees



Participants  
from more than  
**350**  
Organizations

# Secretariat Priorities Through 2023

- Provide support to countries that are working to aggressively reduce methane emissions, including signatories of the Global Methane Pledge
- Support Subcommittee Co-Chairs to expand GMI Subcommittee membership
- Enhance promotion of GMI through targeted communications
- Leverage strategic partnerships to improve collaboration
  - For example, with the United Nations Economic Commission for Europe (UNECE), Climate and Clean Air Coalition (CCAC), and Global Methane Hub
- Plan the 2024 Global Methane Forum



Geneva, Switzerland  
March 2024

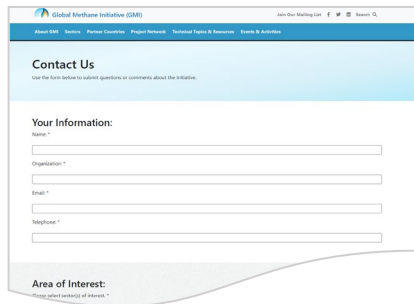
# Global Methane Pledge Support and Implementation

## Global Methane Pledge



- 30% reduction of methane emissions by 2030, compared to 2020 levels
- Leverage momentum
- Engage and connect stakeholders to analyze needs and jointly develop tools and resources
- Provide technical support and capacity building

# Engage with GMI

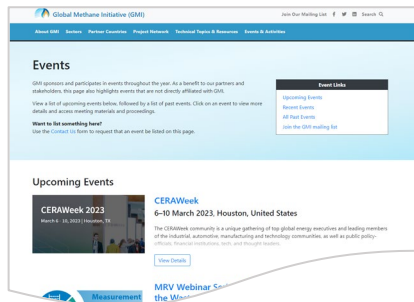


The screenshot shows the 'Contact Us' page on the Global Methane Initiative website. It includes a navigation bar with links like 'About GMI', 'Services', 'Partner Countries', 'Program Initiatives', 'Technical Topics & Resources', and 'Events & Activities'. The main content area is titled 'Contact Us' and contains a form with fields for 'Name', 'Organization', 'Email', and 'Telephone'. Below the form is a section for 'Area of Interest' with a dropdown menu.

## Submit a Contact Us Request

Let us know how we can help you:

[globalmethane.org/contact-us/](http://globalmethane.org/contact-us/)



The screenshot shows the 'Events' page on the Global Methane Initiative website. It features a navigation bar and a main content area with the heading 'Events'. Below the heading, there is a list of 'Upcoming Events' and a 'View Details' button. The first event listed is 'CERAWeek 2023' on 6-10 March 2023 in Houston, United States. There is also a 'Want to be something here?' section with a 'Contact Us' link.

## Share Events or Resources

Recommend items to publish on the GMI website:

[globalmethane.org/resources/recommend.aspx](http://globalmethane.org/resources/recommend.aspx)



The screenshot shows the 'Join the GMI Mailing List' form. It features the Global Methane Initiative logo at the top. Below the logo, there is a form with fields for 'First Name', 'Last Name', and 'Organization'. There is also a 'Section of Interest' dropdown menu and a 'Subscribe' button.

## Join the GMI Mailing List

Receive updates from GMI by joining at:

[eepurl.com/ggwT3T](http://eepurl.com/ggwT3T)

## Follow GMI



[www.facebook.com/globalmethane/](http://www.facebook.com/globalmethane/)



[twitter.com/globalmethane](http://twitter.com/globalmethane)



[www.linkedin.com/company/global-methane-initiative-gmi/](http://www.linkedin.com/company/global-methane-initiative-gmi/)

**Thank you!**

**Denise Mulholland**

Director, Secretariat

[mulholland.denise@epa.gov](mailto:mulholland.denise@epa.gov)

[secretariat@globalmethane.org](mailto:secretariat@globalmethane.org)



[\*\*globalmethane.org\*\*](http://globalmethane.org)



# **Oil & Gas Subcommittee Updates: Action Plan/Activities**

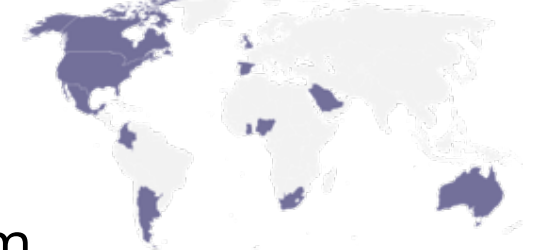
**James Diamond**

# Updates on the GMI Oil & Gas Subcommittee Action Plan (2022-2025)

## ■ Objective 1: Serve as a methane knowledge center for the oil & gas sector

- In September 2022, hosted 6 oil & gas technical sessions led by 29 speakers at the Global Methane, Climate and Clean Air Forum
- Regularly promoting oil & gas-related events on GMI website
- Sharing oil & gas news on GMI's social media platforms

### Oil & Gas (6 Sessions)



<b>13</b>	Countries Represented*
<b>342</b>	Total Virtual Attendees
<b>57</b>	Virtual Attendees/Session

## ■ Objective 2: Facilitate policy and project implementation through capacity building and technical assistance

- Providing technical assistance and resources to country partners to improve inventories, identify mitigation opportunities, and advance methane policy
  - Colombia, Kazakhstan, Indonesia, Nigeria, and Mexico



# 2022 Global Methane, Climate and Clean Air Forum

## *Key Messages from the Participants of the Oil & Gas Technical Sessions*

- Emphasized the importance of turning data into action; we have the ability and opportunities to address 80-90 percent of detected methane emissions now.
- Suggested planning a science- and policy-focused forum with the “right players” involved - academia, industry, financing institutions, authorities.
- Recommended workshops to facilitate technology transfer between experienced operators and operators beginning their mitigation journey.
- Encouraged sharing more success stories about implemented methane mitigation projects and their co-benefits, including financial incentives.
- For future forums, involve financial institutions to learn about opportunities and application requirements for methane abatement projects.

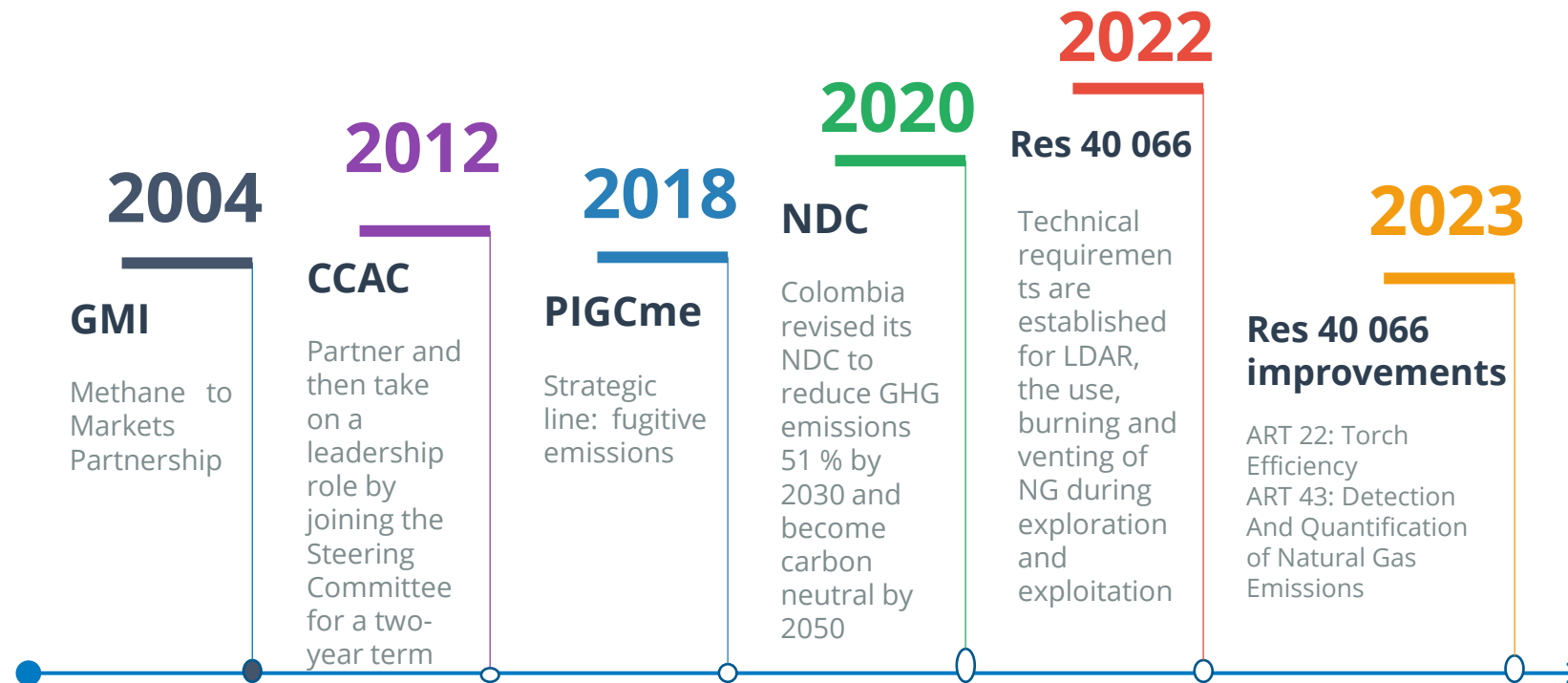
# Partner Country Updates

# Colombia Update

Lina María Castaño Luján  
Ministry of Mines and Energy

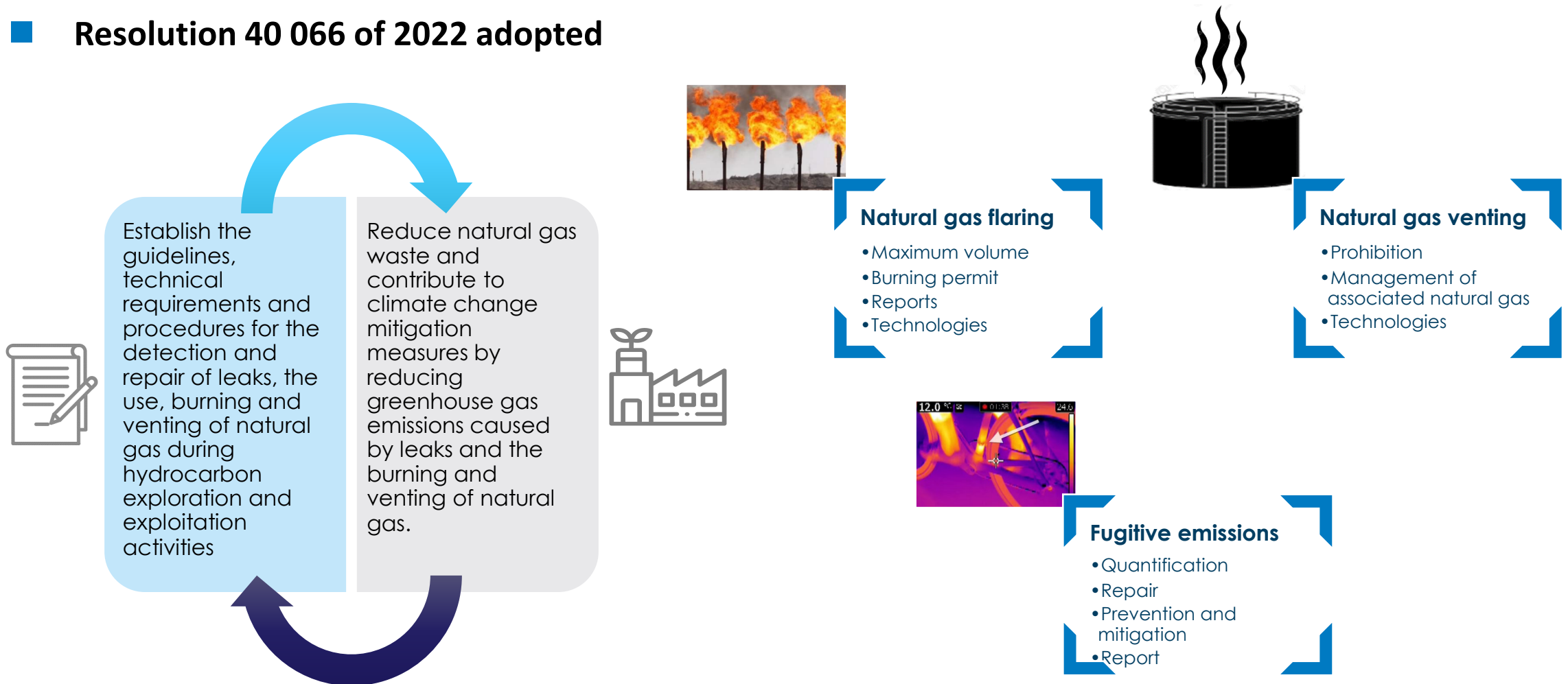


## ■ Background on Colombia action on methane





## ■ Resolution 40 066 of 2022 adopted



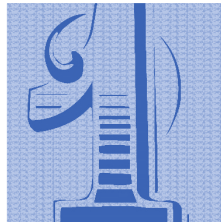


## ■ Res 40 066 improvements



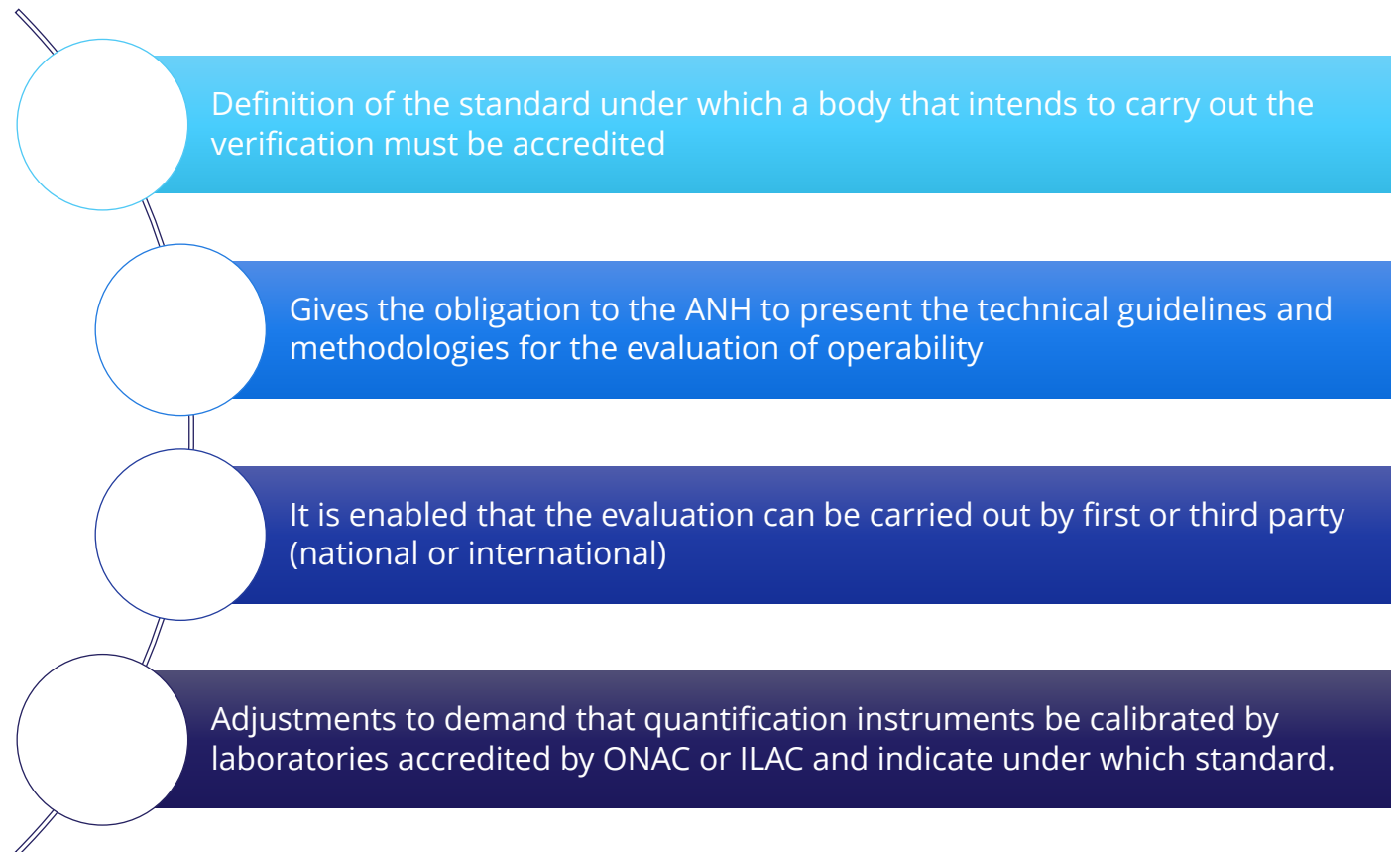
Inspection Bodies Accredited by ONAC? under which standard?

Technical requirements and methodologies to present the first operational report



Quantification instruments

Detection and quantification can be carried out by specialized third parties or by the Operator



## ■ Next steps

### Emission Factor

- Information that allows considering an EF for O&G-E&P activities (at facility level)

### Challenges around Monitoring, Reporting and Verification

- Need for articulation of all the information that will reach the ANH with the MRV of the mining and energy sector

### Extension of the scope of the current regulation

- Development of technical elements for new regulations that allow the reduction of methane emissions in the stages of transportation, refining, storage and distribution of hydrocarbons



**MINISTERIO DE MINAS  
Y ENERGÍA**

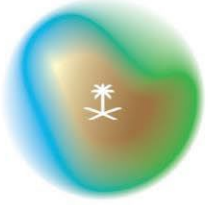
# **THANK YOU**

**Lina María Castaño Luján**

**[lmcastano@minenergia.gov.co](mailto:lmcastano@minenergia.gov.co)**







# Advancements in methane reduction and recovery technology and policy in KSA

KSA – O&G GMI Update

# KSA has reached an upstream methane intensity of 0.05% in 2021 through flare minimization, leak detection & repair programs and plans to push even further

KSA's upstream methane intensity and reduction efforts

**KSA achieved an upstream methane intensity<sup>1)</sup> of **0.05%** in 2021**

## This has been reached through...

- 1 Flare minimization
- 2 Leak detection and repair programs
- 3 Deploying breakthrough technologies

## And will be enhanced by...

- 4 Commitments and pledges



# KSA has reduced its flaring intensity in 2022 to 4.61 scf/boe (vs. 5.51 scf/boe in 2021) – And is committed to reach zero routine flaring no later than 2030

## Flare minimization achievements and targets

KSA achieved a flaring intensity<sup>1)</sup> of

**4.61** scf/boe

in 2022 through...

### ...the master gas system

Developed in the 1970s to capture and reuse gas, which eliminated associated gas flaring

### ...flare minimization roadmaps

A flare minimization roadmap has identified priorities across Aramco operations – Every operating facility has a flare minimization plan and targets

### ...flare minimization technologies

These include innovative flare gas recovery systems, high integrity pressure protection systems, and Aramco's operations in real-time at our 4th Industrial Revolution Center in Dhahran

As part of the ZRF<sup>2)</sup>, Aramco works with more than 100 governments, oil companies & development institutions to eliminate routine flaring by 2030



# In addition, a comprehensive leakage detection program covering all operating facilities and tagging millions of components is deployed

## Methane leak detection and repair program

### The leak detection program...

Detect & quantify



Repair leaks



Verify leak reduction



### ...is exhaustive by design



Leak detection is applied in **all operating facilities**



**Millions of components** (such as valves, flanges, connectors, pumps, compressors, and tanks are covered)

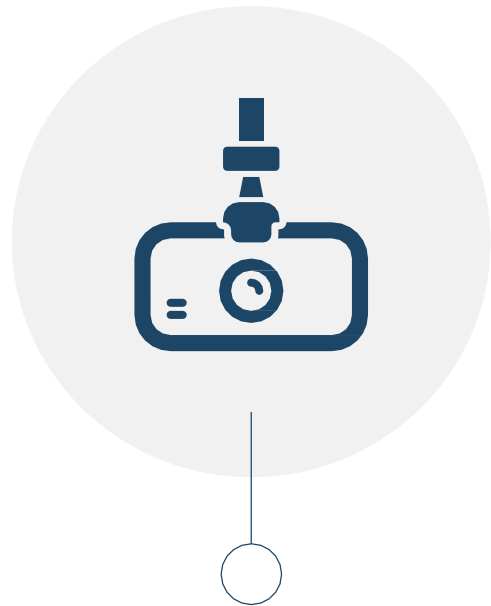


LDAR<sup>1)</sup> field measurements have been assessed by an independent reviewer – Strong performance on asset level confirmed

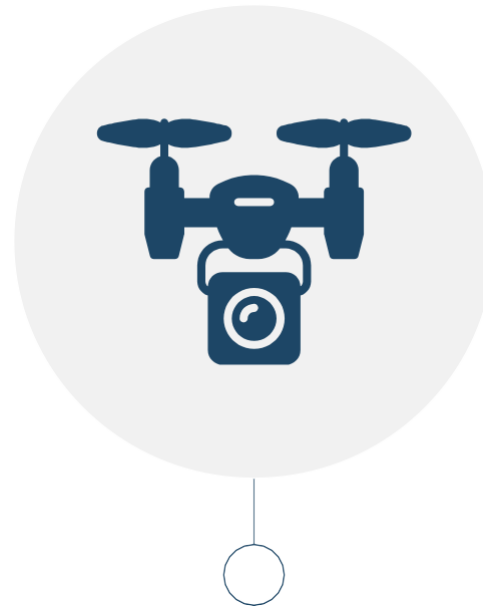


**This program is continuously enhanced e.g., through breakthrough technologies such as methane detecting cameras, drones & geospatial solutions**

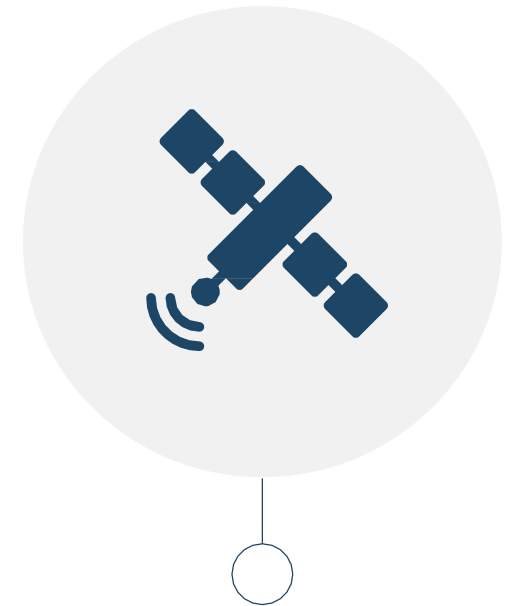
Example innovative technologies



**Methane detecting cameras**



**Methane detection drones**



**Geospatial solutions**

# Striving for even more KSA pledged to reduce upstream methane emissions to near zero and to participate in the efforts to cut 30% of methane emissions by 2030

KSA's methane commitments and pledges

## Near zero-methane initiative



Aramco is an **establishing member** of the **zero-methane initiative** which **signatories** are **aiming for**:

- Achieving near zero methane emissions from operated upstream oil & gas assets by 2030<sup>1)</sup>.
- Putting in place reasonable means to avoid methane venting and flaring and to repair detected leaks.
- Annual and transparent reporting on methane emissions.
- Continuously improving methane measurement, reporting and verification as technology evolves.
- Supporting the implementation of sound regulation to tackle methane emissions and encourage the inclusion of methane emissions in national climate strategies.

## The global methane pledge

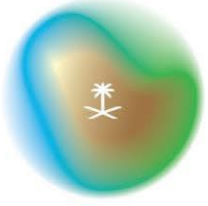


Saudi Arabia is a **participant** in the **global methane pledge** committed to

- Work with other signatories to collectively reduce global anthropogenic methane emissions by at least 30% by 2030.
- Focus on achieving all feasible reductions in the energy and waste sectors and seek abatement in agricultural sector.
- Move towards highest tier IPCC good practice inventory methodologies to quantify methane emissions.
- Maintain up-to-date, transparent, publicly available information on policies and commitments.
- Support existing international methane emission reduction initiatives.



1) In 2018 OGCI announced a collective target of 0.20% upstream methane intensity by 2025



**Thank You**

# United States Update

Paz Aviles

U.S. Environmental Protection Agency



# EPA's Proposed Requirements for Oil and Natural Gas Operations

## Overview of Rulemaking

In 2030 alone, the supplemental proposal would reduce methane emissions from the sources it covers by 87 percent below 2005 levels



Proposal

### November 2021

Proposed to:

- Update and strengthen methane and VOC standards on the books for new sources
- Add standards for currently unregulated new sources
- Establish first nationwide Emission Guidelines for states to regulate existing sources

EPA received over 470,000 comments and held three days of public hearings



Supplemental Proposal

### November 2022

Proposing to:

- Make proposed standards more comprehensive
- Promote use of innovative technologies
- Modify and refine proposed standards based on public input
- Provide implementation details for states
- Provide regulatory text



Final Rule

2023

# EPA's Proposed Requirements for Oil and Natural Gas Operations

- **Updated New Source Performance Standards, which require methane reductions from new, modified and reconstructed sources. Requirements include:**
  - Fugitive emissions monitoring and repair at well sites;
  - Stronger requirements for flares;
  - Zero emissions standards for pneumatic pumps;
  - New standards for dry seal compressors, and
  - A program to allow approved third parties to identify super-emitting events for prompt mitigation.
- **Emissions Guidelines, which would require states to develop plans that establish, implement and enforce performance standards for hundreds of thousands of existing sources across the country.**
  - Reflect the reductions achievable by applying the Best System of Emission Reduction that EPA has determined has been adequately demonstrated.
  - Submit plans including their requirements to EPA for review.
- **The Clean Air Act standards in the proposal will work hand in hand with new resources and programs in the Inflation Reduction Act.**

# Inflation Reduction Act: Methane Emissions Reduction Program

- Inflation Reduction Act provides new authorities under Clean Air Act Section 136 to reduce methane emissions from oil and gas operations

## Financial and Technical Assistance

**Allocates \$1.55 billion to reduce methane emissions** through financial assistance (grants, rebates, contracts, loans, and other activities) and technical assistance. Of this funding, \$700 million is allocated specifically for activities at marginal conventional wells.

### Use of funds can include:

- Preparing and submitting greenhouse gas reports.
- Monitoring methane emissions.
- Reducing methane and other greenhouse gas emissions (e.g., deploying equipment to reduce emissions, supporting innovation, shutting in and plugging wells, mitigating health effects in low-income and disadvantaged communities, improving climate resiliency, and supporting environmental restoration).

**Funds are available until September 30, 2028.**

## Waste Emissions Charge

**Establishes a waste emissions charge** for methane from applicable facilities that report more than 25,000 metric tons of CO<sub>2</sub> equivalent per year to the Greenhouse Gas Reporting Program (GHGRP) and that exceed statutorily specified waste emissions thresholds.

- Covers upstream and midstream oil and gas facilities in the GHGRP.
- Waste emissions charge starts at \$900 per metric ton in 2024 and increases to \$1,500 in 2026.
- Includes certain exemptions and flexibilities related to the waste emissions charge.
- EPA directed to revise GHGRP regulations for petroleum and natural gas systems facilities (Subpart W) within 2 years to ensure that reporting is based on empirical data and accurately reflects total methane emissions.

# Discussion

## Discussion Questions

- What technical topics are of greatest interest to the Subcommittee?
  - Share topics of interest: Leak Detection and Repair? Other?
- What kind of technical assistance is needed?
- Is there interest in hosting technical webinars?
  - Subcommittee hosted a successful technical webinar series in 2020 and 2021
    - Brought together policy makers, industry leaders, technical experts, and researchers
    - Topics included methods for detecting and quantifying methane emissions and emerging mitigation technologies
    - More than 460 participants attended 5 webinars
- Are there any future events where GMI should participate in or promote?

# Case Studies

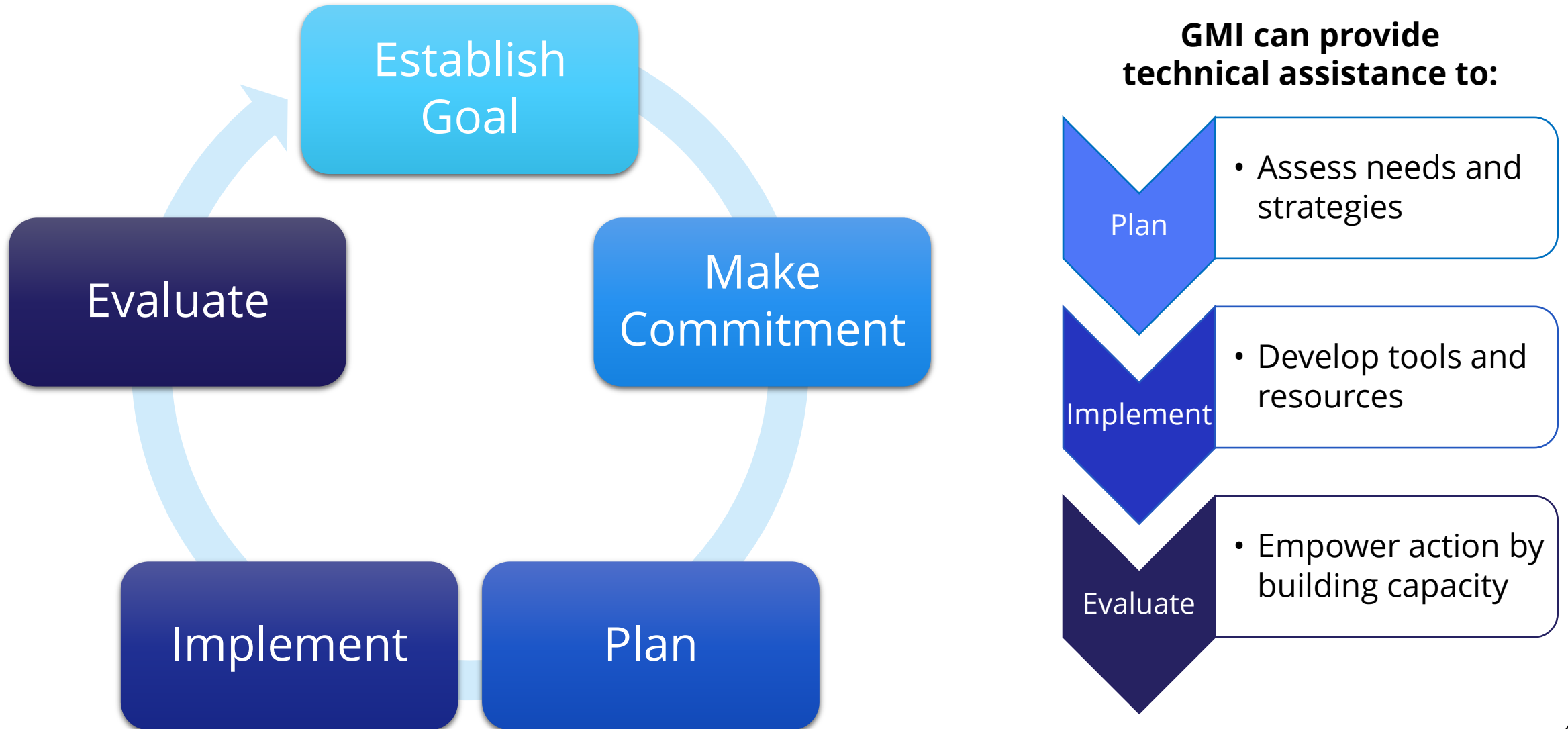
# **GMI Oil and Gas Sector Activities in Southeast Asia**

Andrew Meluch

US Environmental Protection Agency and Global Methane Initiative

22 March 2023

# How countries can leverage GMI's expertise to reach climate goals

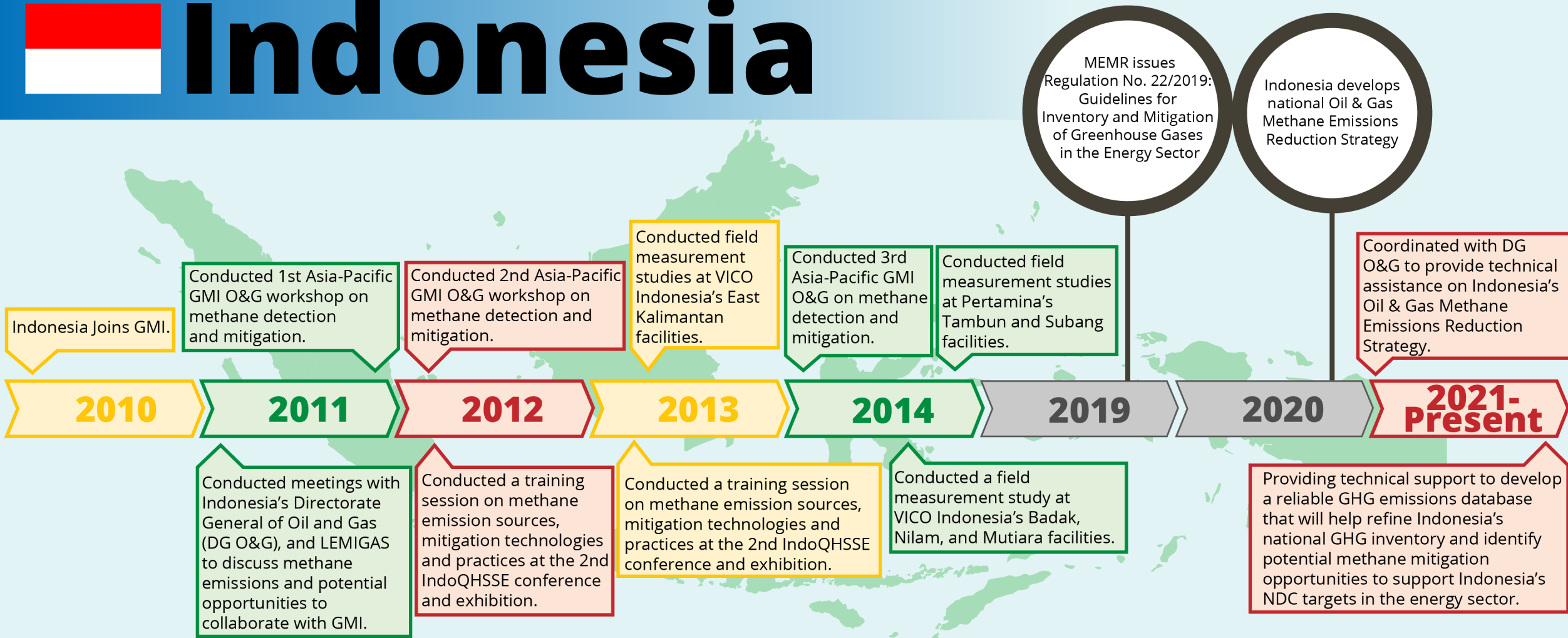




# GMI Activities and Methane Mitigation Actions by Indonesia.



# Indonesia



**PERTAMINA**



# GMI Activities and Methane Mitigation Actions by Thailand.



# Thailand

Thailand Joins GMI.

**2008**

Conducted meetings with PTT to discuss methane emissions and potential opportunities to collaborate with GMI.

**2012**

Conducted desktop analysis and methane measurement field studies at PTT's onshore production facility, substation servicing a natural gas vehicle (NGV) compressed natural gas system, NGV daughter stations, and conventional CNG station.

**2013**

Conducted a workshop on methane detection and mitigation.

**2015**

Conducted desktop analysis and methane measurement field studies at PTT's Khanom Gas Separation Plant and NGV/GTM Nam Phong Facility.

PTT establishes a Direct Inspection and Maintenance program

**2015-2020**

PTT installed a variety of equipment aimed at reducing methane emissions.

Based on GHG reductions through 2019, PTT is on track to achieve a 20% reduction in GHGs from 2012 baseline by 2030

Discussed further opportunities to provide technical support in collaboration with USAID Asia EDGE.

**2020**



# Reestablishing connections: Regional oil and gas methane workshop

**Location:** Bangkok, Thailand

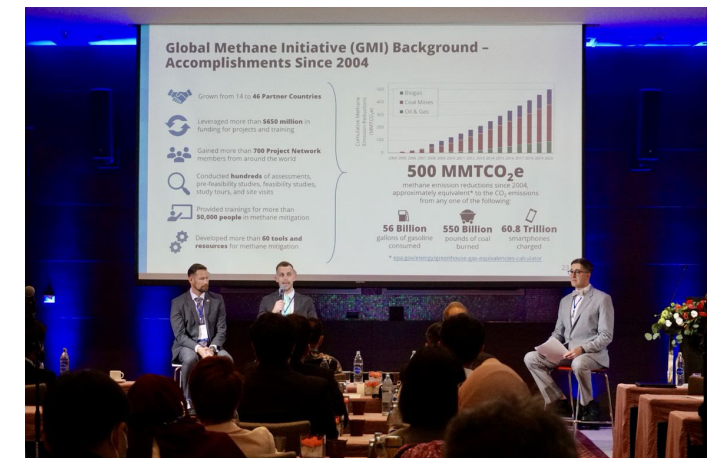
**Date:** 7-8 December 2022

**Strategic partner:** US Agency for International Development (USAID), Regional Development Mission to Asia (RDMA), Smart Power Program (SPP)

**Theme:** Innovative Technologies to Identify and Measure Oil and Gas Methane Emissions in Southeast Asia

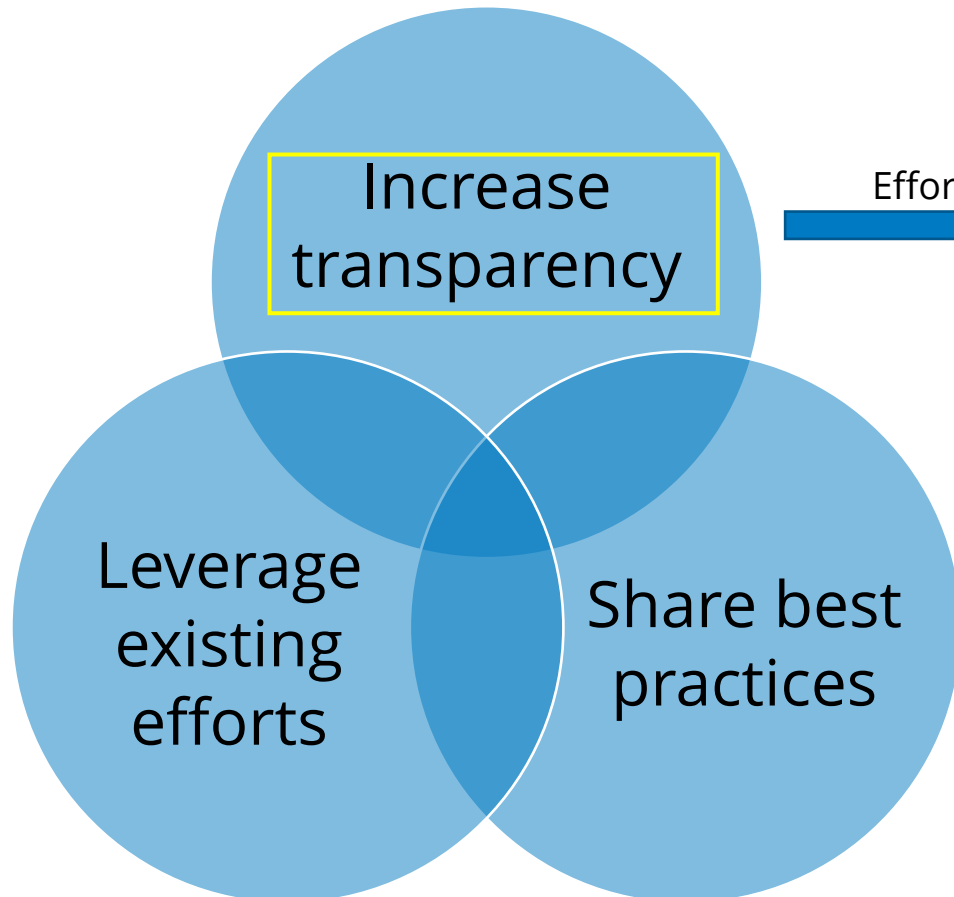
**Attendees:** Over 60 government, industry, and NGO guests from 5 countries – Indonesia, Malaysia, Philippines, Thailand, and Vietnam

**GMI Outcome:** Renewed engagement with Indonesia and Philippines



# Department of State funding support

## GMI Actions to Support Global Reductions of Methane



Efforts supported by



Funding from the US Department of State's Transparency Accelerator program for GMI's technical assistance efforts resulting in a refinement of a country's greenhouse gas inventory.

# Indonesia: Emission factor approach to improve GHG inventory



## Stakeholders

- National Government: Ministry of Energy and Mineral Resources, Directorate General for Oil and Gas (DGOG)
- State-owned company: Pertamina

## Project

- Collaborate with DGOG to assist oil and gas companies in compiling their GHG inventories
- Develop and update a tool using US and Canada-specific emission factors
- Train DGOG and company staff to implement the tool

# Screenshot of inventory refinement Excel tool output

Primary Source Category		CH4	CO2	N2O	CO2E
Primary Source Category		(tonnes)	(tonnes)	(tonnes)	(tonnes)
Fuel Combustion:					
- Solid Fuels	Included	0.00	477.79	0.00	477.79
- Liquid Fuels	Included	0.00	157.26	0.00	157.26
- Gaseous Fuels	Included	0.80	216.22	0.00	236.13
Acid Gas Removal	Included	3.65	204.15	0.00	295.41
Flaring & Venting (Hydrocarbon Gas)	Included	31.76	110.41	0.00	904.37
Fugitive Equipment Leaks	Included	20.45			511.37
Wells:					
- Casing Vents	Not Included	---			
- Workovers	Not Included	---			
Pneumatic Devices:					
- Pneumatic Controllers:	Included	87.33			2183.23
- Chemical Injection Pumps:	Included	9.59			239.78
- Compressor Starts	Included	0.76			18.89
Process Venting:					
- Dehydrators	Included	23.27			581.81
- Sweetening Units	Included	126.05			3151.35
- Tanks	Included	0.00			0.00
Inspection & Maintenance Activities:					
- Equipment Depressurization & Purging Events.	Included	0.10			2.41
Mishaps:	Included	24.09			602.26
Recycled and Utilized Emissions:	Not Included				
Indirect Emissions from Power & Heat Purchases:	Included	0.06	4,939.06	83.20	29734.82
<b>Total</b>	<b>Included</b>	<b>327.91</b>	<b>6,104.90</b>	<b>83.20</b>	<b>39,096.88</b>

**Data:** Facility-level

**Input:** Activity data, infrastructure data, and gas composition data

**Results:** Can be screened by primary source category (e.g., leaks, venting, flaring, energy use) to identify potential mitigation opportunities.

# Philippines: Direct measurement approach to improve GHG inventory



## Stakeholders

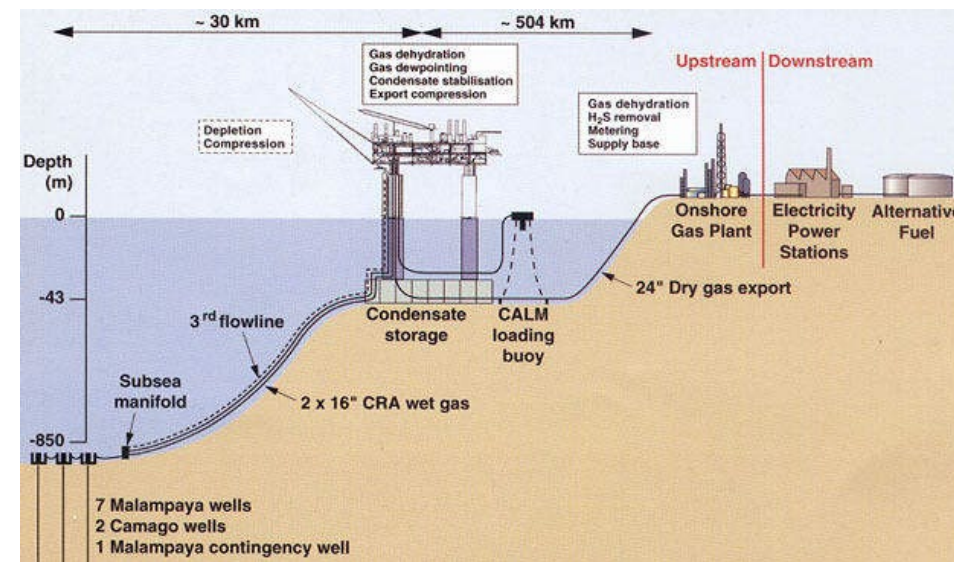
- National Government: Climate Change Commission and Dept. of Energy
- State-owned company: Philippines National Oil Company (PNOC)

## Project

- Conduct measurement campaign of oil and natural gas value chain from production through transmission

# Malampaya natural gas field

- Deep water gas-to-power project that began operations in 2001
- Powers up to 20% electricity requirement for Luzon, including the city of Manila
  - The Manila metro area relies on gas for up to 60% of its electricity demand
- Production:
  - ~425 million cubic feet (12 million cubic meters) per day of natural gas
  - ~ 11,000 barrels per day of crude oil condensate
- Projected to run dry in 2027/2028





# Thank you!

Contact information:

Andrew Meluch

Email: [meluch.andrew@epa.gov](mailto:meluch.andrew@epa.gov)

GMI website: [globalmethane.org](http://globalmethane.org)

# Global Methane Initiative (GMI) Oil & Gas Subcommittee meeting



## Ecopetrol's participation in OGMP 2.0.



**Martha Herrera**

**Ecopetrol S.A**

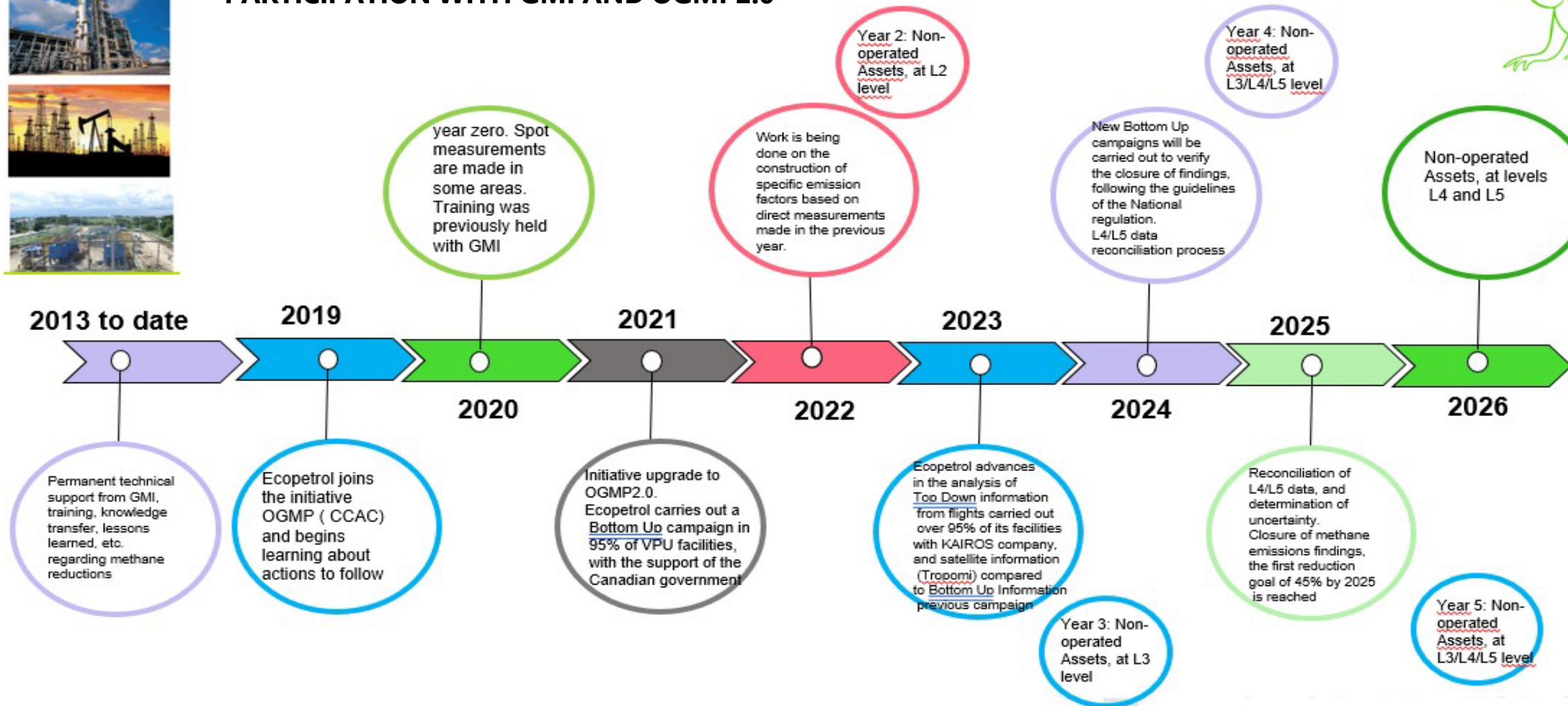
22 March 2023

Geneva

# ECOPETROL ACTIONS TO REDUCE ITS METHANE EMISSIONS

## Ecopetrol action timeline to reduce methane emissions

### PARTICIPATION WITH GMI AND OGMP2.0



# REDUCTION TARGETS AND PROGRESS TOWARDS THESE TARGETS

- Ecopetrol adheres to the OGMP reduction goal guidelines in terms of absolute reductions emissions.

## **45% emissions reductions in methane emissions over estimated 2019 levels by 2025**

The company is committed to doing its best efforts to reduce additional methane emissions by 2030 and, is analyzing different alternatives for it. It is a statement that we have already stated in our Sustainability Report from the previous year

- Achieve compliance with the sectoral goal of reducing methane emissions from member companies of the Climate and Clean Air Coalition (CCAC) by 2025, **in absolute terms of**

**45%**  
between  
**60%** and **75%**

by 2030, exceeding the levels estimated for 2015. In 2022, Ecopetrol will establish its own methane emission reduction goal.

- Report a maximum of **100%** of operated assets in 2024 and

**100%** of non-operated assets in 2026, at the **4/5 MEASUREMENT LEVEL**

in accordance with the commitments established for OGMP 2.0 members. (Oil and Gas Methane Partnership).

### **Public Policy efforts related to climate change**

Ecopetrol articulates its climate change strategy with the National Government's public policy and contributes to the construction of technical and regulatory guidelines to strengthen the country's institutional capacity in the area of climate change.

In 2021, Ecopetrol participated in working groups to draft the following documents, regulations, and strategies associated with climate change:

- (i) Colombia's Long-Term Climate Strategy E2050,
- (ii) Update to the Comprehensive Climate Change Management Plan for the Mines and Energy sector,
- (iii) The Climate Action Law,
- (iv) Conpes "Public policy to reduce disaster risk conditions and adapt to climate variability phenomena",
- (v) The Energy Transition Law and the promotion of Non-conventional sources of energy,
- (vi) Colombia's The Hydrogen Roadmap, and (vi) The proposed resolution for the regulation of fugitive emissions, vents, and flaring.

Furthermore, the Company joined the Carbon Neutrality Program led by the Ministry of Environment and Sustainable Development of Colombia and signed a Voluntary Agreement with the MME to promote carbon neutrality and climate resilience in the hydrocarbon sector.

In terms of global initiatives, the Company is part of the Climate and Clean Air Coalition (CCAC) led by the United Nations, the International Petroleum Industry Environmental Conservation Association (IPIECA), and Zero Routine Flaring by 2030 led by the World Bank.



# APPROACH FOR SELECTING THE ASSETS TO REPORT

- Since joining OGMP, Ecopetrol seeks to include 100% of its operating assets in its reports, as found in our official company greenhouse gas inventory tool.
- For its greenhouse gas inventory, Ecopetrol assumed the guidelines of ISO14064:1 (clauses 4.1 and 4.2) regarding the definition of limits at 2 levels: the organizational level and the operational level.
- Ecopetrol operates and controls a wide range of oil and gas facilities in Colombia, with which crude oil production, transportation and refining activities are carried out. The organizational inventory limit is divided into three business areas (Vice Presidencies) and has been designed to include the majority of GHG emissions under Ecopetrol's control. In this way, data collection efforts enable the most complete and accurate inventory possible. Items not controlled by Ecopetrol are not included in the inventory or in any report.
- In summary, the organizational limit refers to the facilities over which Ecopetrol has operational control, that is, where it performs operations and daily maintenance, additionally where it has decision-making control in aspects of Health, Safety and Environment (HSE), which above includes facilities in which Ecopetrol has majority or minority participation or in those cases where it is the operator by contract.
- On the other hand, the operating limits refer to whether the emissions are direct or indirect.

# REPORTING LEVEL AND QUANTIFICATION METHODS USED

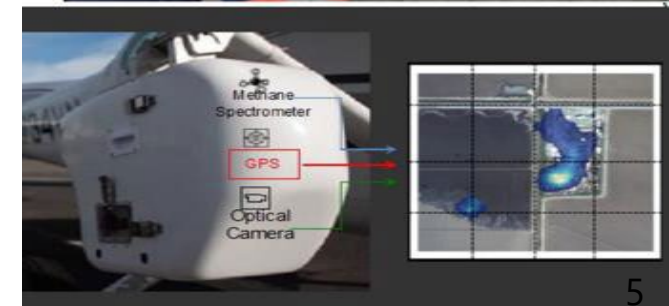
## L4 QUANTIFICATION METHOD BOTTOM UP MEASUREMENTS

Emission Category	Instrumentation Classification		Description
	Category	Subcategory	
Fugitive emissions and leaks	Camera for Optical Gas Visualization (OGI)	With cooling	Intrinsically safe OGI chamber for temperature measurement and gas detection with leak flow quantification option.
	Portable Gas Sensor	Detector	Gas-Explorer gas Detector (0% to 100% Natural Gas Detection or 0% to 100% LEL)
	Hi-Flow Sampler		Hi-Flow Sampler for quantification of detected leaks.
Wellhead Gas Venting	Tablet for data collection in the field		Tablet for data systematization
	Transit Time Ultrasonic Flow Meter	Portable	To detect flow (200 kHz to 500 kHz operating frequency).
	Portable thermometer	Digital	For vented gas temperature measurement (includes digital display and RTD sensor).
	Portable Barometer	Digital	Traceable digital barometer.
Venting in Tanks	Tablet for data collection in the field		Tablet for data systematization
	Camera for Optical Gas Visualization (OGI)	With cooling	High resolution non-intrinsically safe OGI chamber for temperature measurement and gas detection with leak flow quantification option.
	Infrared pyrometer		Mini infrared thermometer with additional type K thermocouple for contact temperature measurement.
	Portable thermometer		For vented gas temperature measurement (includes digital display and RTD sensor).
	Portable Barometer	Digital	Traceable digital barometer.
	Portable Blade Anemometer		Unit with digital display, probe and accessories.
	Vortex Flow Meter		Insertion flow meter (0.5 m/s to 80 m/s)
	Tablet for data collection in the field		Heavy-duty tablet with 12" screen.



## L5 QUANTIFICATION METHOD TOP DOWN MEASUREMENT

- SATELLITE SURVEY
- FLIGHT WITH AIRBORNE SENSOR-KAYROS



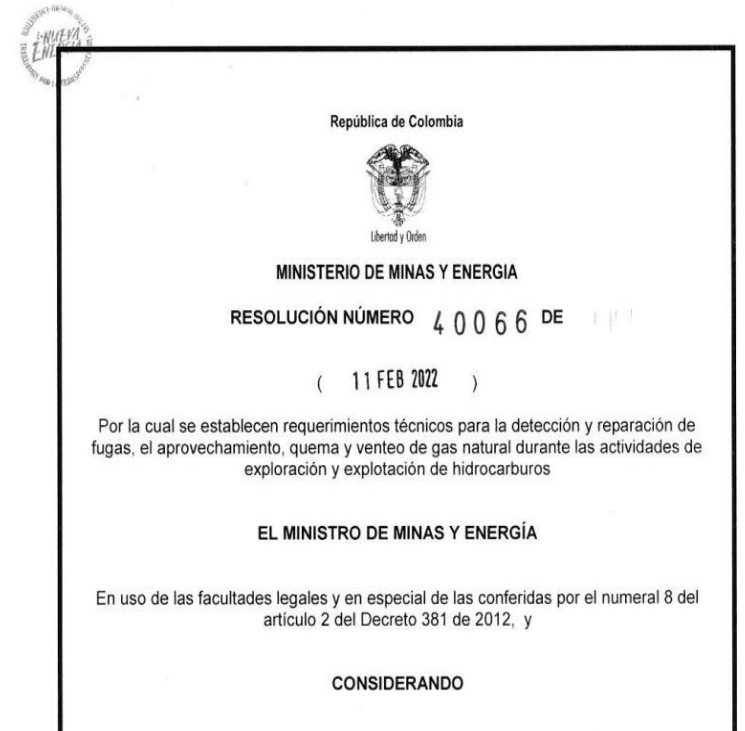
# STRATEGIES FOR ENHANCING QUANTIFICATION METHODS TO INFORM MITIGATION

In line with the new regulation in Colombia, Ecopetrol will comply with what is requested therein, which in turn will allow compliance with the reports to OGMP2.0

Some of the main aspects in which the regulation enables reports in OGMP 2.0 are:

- Measurement of fugitive emissions and vents twice a year
- Implementation of action plans to reduce emissions and reporting
- Reduction of routine burning in torches and reporting
- Flare destruction efficiency report

The alignment of the different Ecopetrol reports will allow a closer follow-up and an audited process regarding reduction plans of the organization's methane emissions.



# CHALLENGES AND LESSONS LEARNED IMPLEMENTING OGMP 2.0

## CHALLENGES AROUND THE EMISSION REDUCTION GOAL

- ❑ Increased emissions associated with higher production
- ❑ Incorporation of assets abroad
- ❑ Alignment of goals with assets with partners
- ❑ Conversations with operators regarding safety aspects in methane reduction actions

## CHALLENGES AROUND FUGITIVE EMISSIONS AND FLARING

- ❑ Definition of specific emission factors for fugitive emissions and venting and subsequent inventory adjustment.
- ❑ Incorporation of design criteria and best engineering practices to reduce flaring, fugitive emissions and venting
- ❑ Establishment of the roadmap and guidelines for the fulfillment of the goal of zero routine flaring by 2030 for the Business Group

## REGULATORY CHALLENGES AROUND FUGITIVE EMISSIONS AND FLARING

- ❑ The new regulation in Colombia for the reduction of gas emissions presents a challenge at the country level in terms of the certification of companies and methods endorsed by the authority.
- ❑ Regarding technology, the measurement of destruction efficiency in flares represents a challenge.





**Thankyou**



**Martha Herrera**

[martha.herrera@ecopetrol.com.co](mailto:martha.herrera@ecopetrol.com.co)

**Ecopetrol S.A**

22 March 2023

Geneva

# **PETRONAS Methane Emissions Management Journey**


Hasnor Hassaruddin Hashim

Project Delivery & Technology, PETRONAS

# PETRONAS' systematic approach in strengthening methane emissions management


2022

## PETRONAS

- Global Methane Pledge Energy Pathway
- 2<sup>nd</sup> ASEAN Energy Sector Methane Roundtable
- 3<sup>rd</sup> ASEAN Energy Sector Methane Roundtable and workshop, in partnership with USAID
- OGMP2.0  OGMP2.0
- 507.5 tonnes of methane emissions reduction (from 2021 levels, PETRONAS Upstream)

2021

## PETRONAS

- 1<sup>st</sup> ASEAN Energy Sector Methane Roundtable
- World Bank's Zero Routine Flaring by 2030 Initiative  GGFR
- Internal methane emissions standard & guideline aligned to OGMP2.0
- 134,393 tonnes of methane emissions reduction (from 2020 levels, PETRONAS Upstream)

## Malaysia

- Global Methane Pledge  Global Methane Pledge

2020

## PETRONAS

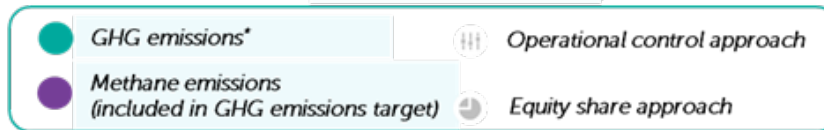
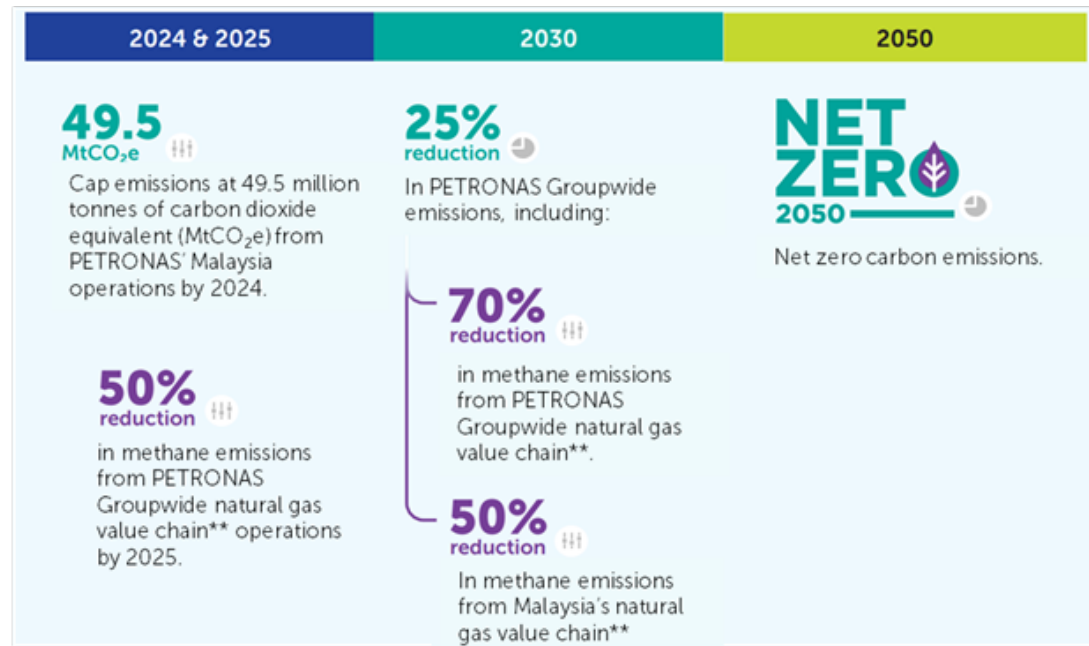
- Methane Guiding Principles  METHANE GUIDING PRINCIPLES

# PETRONAS' systematic approach in strengthening methane emissions management

## Directly supports

- PETRONAS' Net Zero Carbon Emissions by 2050 pathway

### GHG emissions reduction targets (Scope 1 and Scope 2)



- PETRONAS' target of Zero Routine Flaring by 2030



- Global Methane Pledge



# Highlights of PETRONAS' progress in OGMP2.0 delivery

- **Technical standard** on Methane Quantification & Reporting aligned with OGMP 2.0
- **Methane targets** in PETRONAS' net zero carbon emissions by 2050 pathway
- Improving **quantification** baseline & expanded quantification boundary
  - 11 sources, Upstream & Gas facilities
- **Methane emissions reductions**
  - Routine flaring & venting reductions projects, Upstream facilities
- Exploring & piloting latest methane **measurement technologies** with third parties
  - E.g., methane satellite, drones with mounted sensors & quantitative optical imaging, etc.
- **Methane emissions of upskilling** of PETRONAS personnel & Joint Venture partners
- **Advocacy efforts**
  - In Malaysia, as the designated regulator for Upstream operation
  - Led collaborative efforts on methane advocacy & engagement in ASEAN

# ENERGY ASIA

26 – 28 June 2023

[officialenergyasia.com](http://officialenergyasia.com)



By:



Knowledge Partner:



Organiser:



# **The Methane Alert and Response System (MARS)**

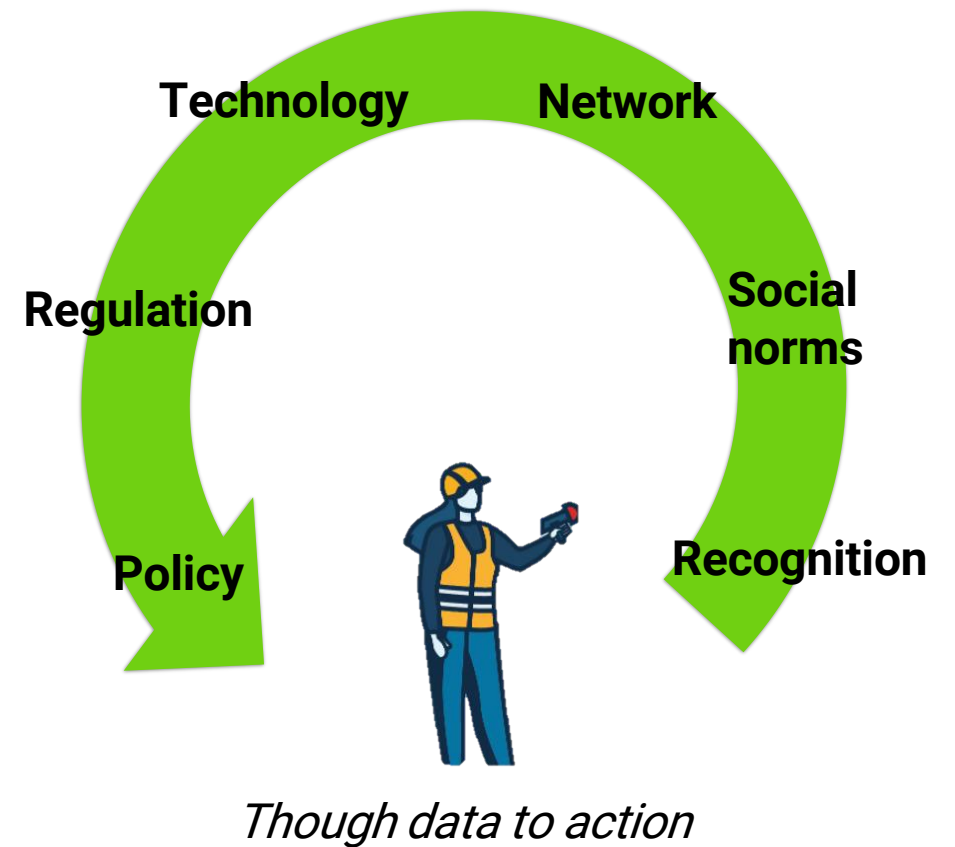
**An initiative of UNEP's International Methane Emissions Observatory**

Manfredi Caltagirone

UN Environment Programme

# UNEP's International Methane Emissions Observatory is centered around the **agent of change**

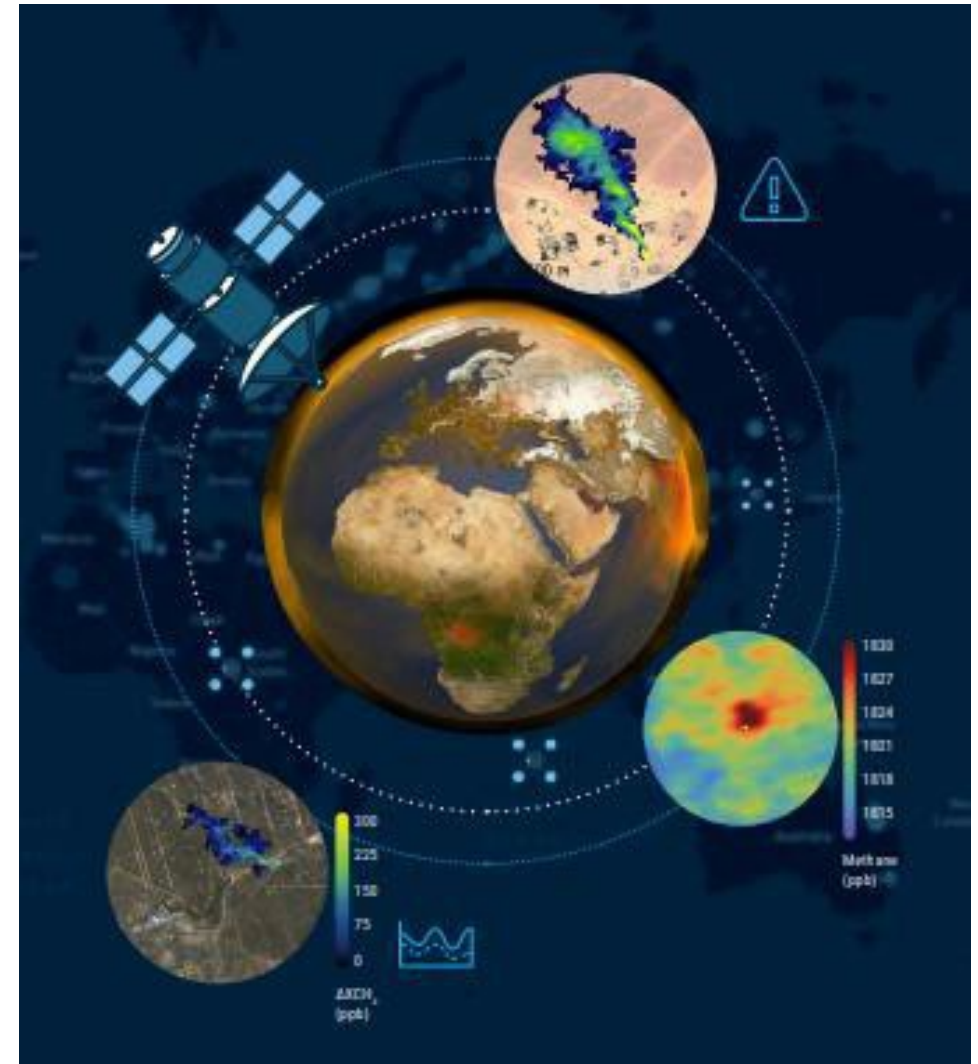
- The International Methane Emissions Observatory exists to provide open, reliable, and actionable data *to the individuals* that can act to reduce methane emissions





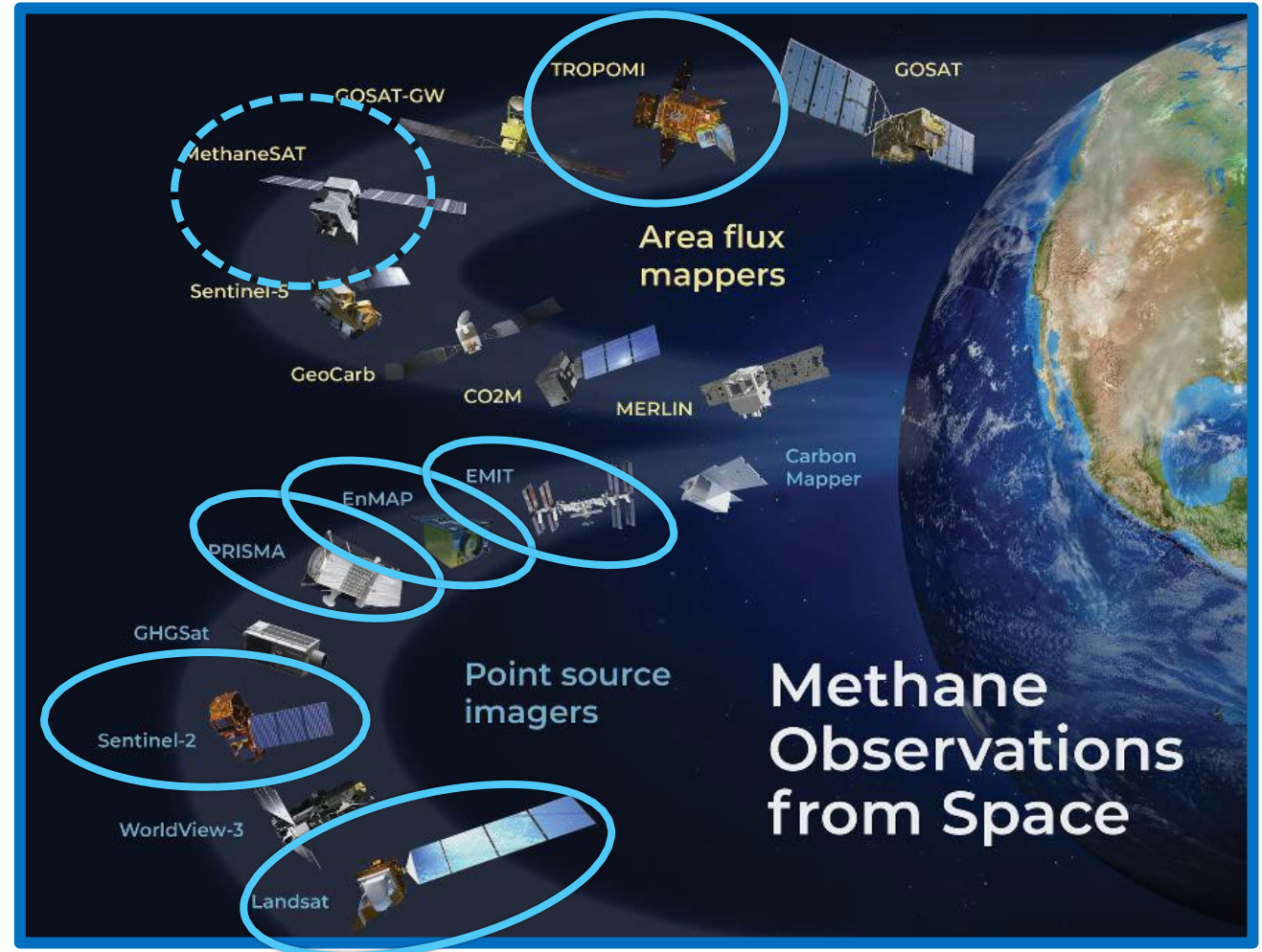
# The Methane Alert and Response System (MARS) uses satellites to provide **open, reliable, and actionable data** to stakeholders

- **Component 1** – Detect and Attribute
- **Component 2** – Notify and Engage Stakeholders
- **Component 3** – Stakeholders Take Action
- **Component 4** – Track, Learn, Collaborate, Improve



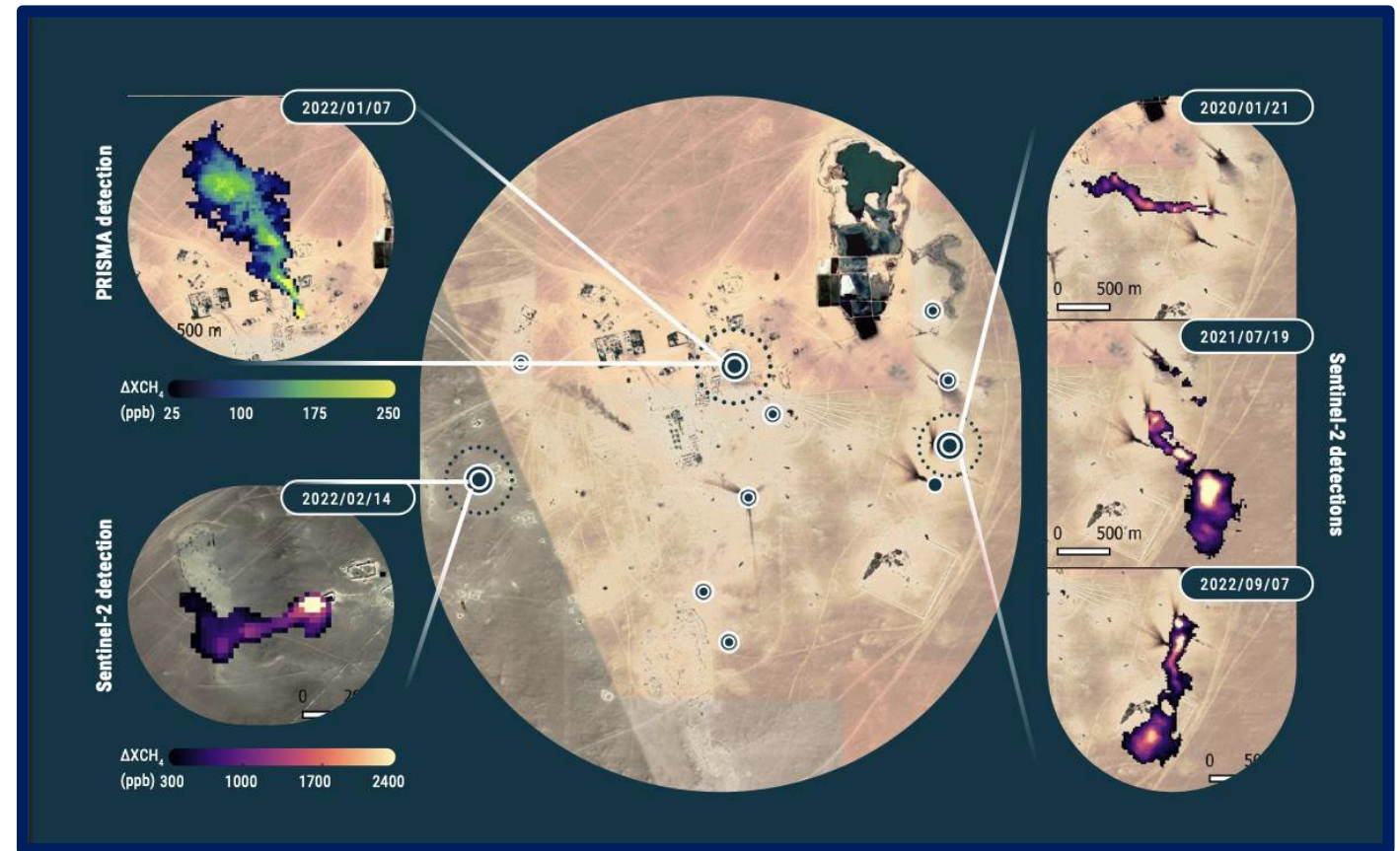
# Component 1: MARS uses **state-of-the-art, publicly available satellite data** to drive notification and mitigation processes

- **Global mapping satellites** are used to identify very large methane plumes and methane hot spots
- Further analysis using other satellites and datasets enables attribution




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- Further analysis using other satellites and datasets enables attribution




# Component 2: MARS notification process (Initial and Full)

  
**Initial Notification**  
 1-3 days after  
 detection of the plume




Governments and  
 MARS-participating  
 OGMP 2.0 companies  
**notified simultaneously**

If non-OGMP 2.0,  
 government **then**  
 companies


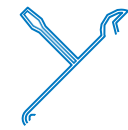
  
 Preliminary notice + feedback

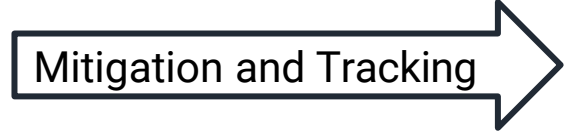
- 1-2 days for acknowledgment
- 5 days for initial feedback

  
**Full Notification**  
 Maximum 2 weeks  
 after detection



Governments and  
 companies notified  
**simultaneously**

   
**Mitigation and Tracking**



After 45-75 days, all non-proprietary data and metadata is made publicly available

# MARS improves **global transparency** on methane emissions

- MARS supports IMEO's objective to provide

**open**

**reliable**

**actionable**

methane emissions data globally.

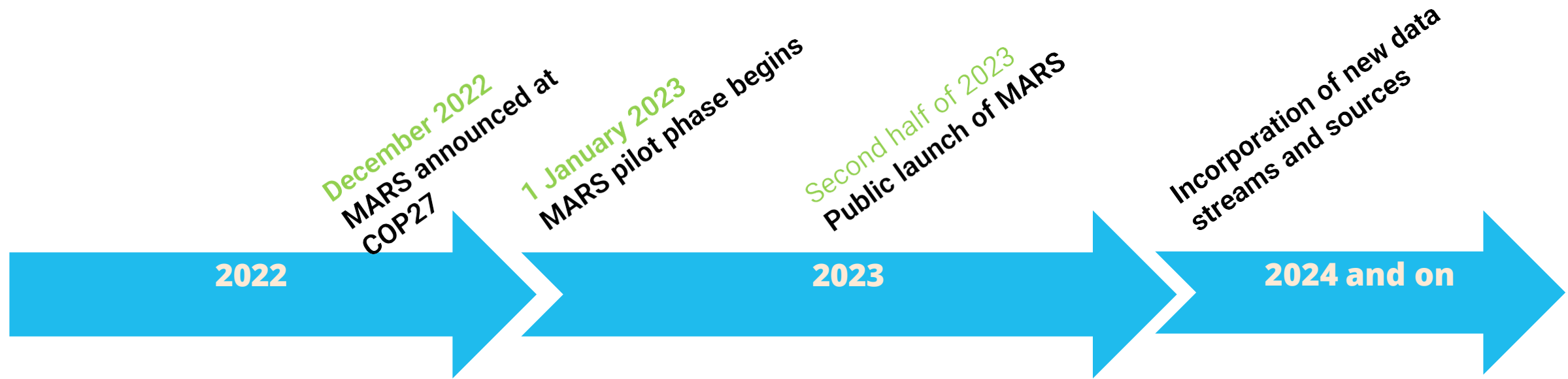
- Active participation in MARS enables stakeholders to demonstrate leadership on methane emissions and a commitment to best-in-class operations.

## **MARS Data Publication Policy**

After 45-75 days, MARS data will become publicly available, including:

- IMEO-gathered satellite data and related metadata (e.g., visual data)
- Summary of company and/or country response(s) to notification process
- Summary description of mitigation efforts and/or plans
- Any future MARS detections linked to the event location

# MARS data will become public later this year



# Upcoming Oil & Gas Events

- Petroleum Technology Alliance Canada (PTAC) Methane Leadership Summit
  - 26-27 April; Banff, Canada
- Global Energy Show
  - 13-15 June; Calgary, Canada
- Society of Petroleum Engineers (SPE) Latin American and Caribbean Petroleum Engineering Conference
  - 14-15 June; Port of Spain, Trinidad and Tobago
- Energy Asia 2023 Official Side Event: ASEAN Methane Roundtable
  - 26-28 June; Kuala Lumpur, Malaysia
- We invite you to share events and resources that GMI can promote:  
<https://www.globalmethane.org/contact-us/index.aspx>

# Preview of the UNECE Group of Experts on Gas Meeting

James Diamond and Andrew Meluch



# Thank You!

Send suggestions for events or resources as well as any questions or needs to the GMI Secretariat at [secretariat@globalmethane.org](mailto:secretariat@globalmethane.org)



[globalmethane.org](http://globalmethane.org)

