

GMI Oil & Gas Subcommittee Meeting

Virtual



14 December 2023



Welcome!

James Diamond

GMI Oil & Gas Subcommittee Co-Chair

Environment and Climate Change Canada

Adoption of the Agenda

- Welcome and Opening Remarks, Adoption of the Agenda (2 min)
- GMI Secretariat Updates (10 min)
- Oil & Gas Subcommittee Business (5 min)
- GMI Activities and Tools (20 min)
- Presentations on Complementary Oil & Gas Tools (30 min)
- Forthcoming UNECE Needs Assessment (5 min)
- Discussion: Highlights from COP28 (10 min)
- Concluding Remarks and Next Steps; Adjourn (5 min)

GMI Secretariat Updates

Denise Mulholland
Director, Secretariat

Global Methane Initiative (GMI)

- GMI: an international partnership of 47 countries and hundreds of private sector and multilateral partners
- Unique expertise, tools, and resources that enable countries to reduce methane quickly and cost-effectively across key sectors:



■ GMI Partner Countries



Oil & Gas Systems



Coal Mines



Wastewater



Agriculture: manure



Municipal Solid Waste

www.globalmethane.org

Strategic Alliances



GMI has reduced methane emissions globally



Grown from 14 to 47 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, publications, guidances and site visits

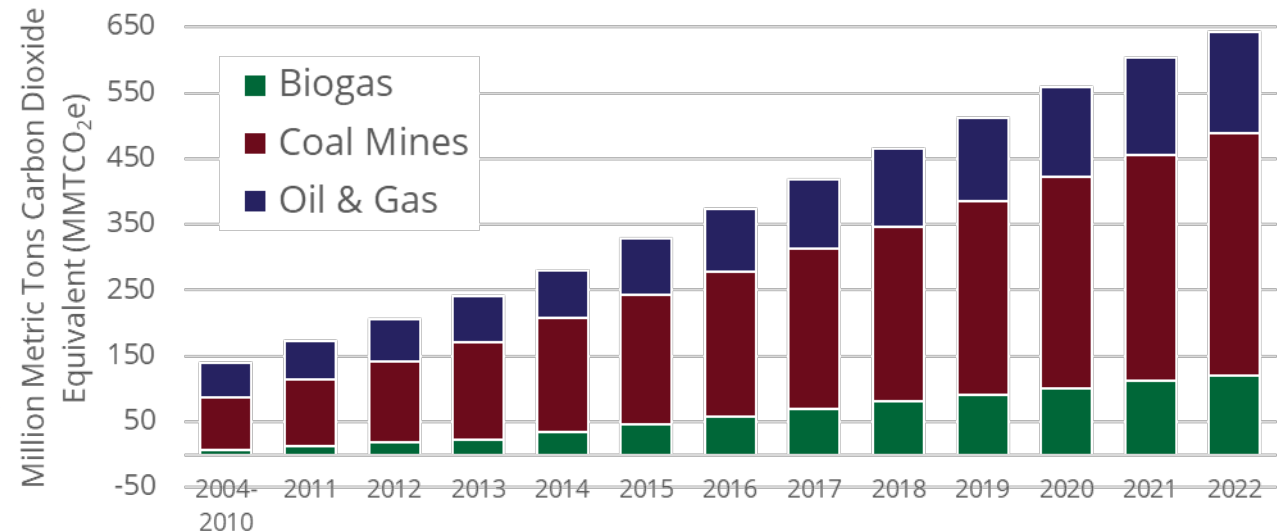


Provided training for more than 50,000 people on methane mitigation



Developed more than 60 tools and resources for methane mitigation

Since 2004, GMI has reduced CH₄ by more than **640 MMTCO₂e** including **approximately 40 MMTCO₂e** achieved in 2022



643 MMTCO₂e is approximately equivalent* to the CO₂ emissions from any one of the following:



274 Billion
liters of gasoline
consumed



327 Billion
kilograms of coal
burned



78 Trillion
smartphones
charged

* epa.gov/energy/greenhouse-gas-equivalencies-calculator

GMI "By the Numbers" for 2022

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

Through GMI in 2022:

9
countries

supported activities where more than

2,000
people

received a total of approximately

19,000
hours

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



Capacity Building/Information Sharing fostering best practices

4

Workshops/Trainings

India, Mexico, and United States

2

Manuals/Websites/Other Outreach

Partnership-wide



Assessments

identifying opportunities for emission reductions

13

Reports/Tools/Models

China, Colombia, India, Mexico, Serbia, United States, and Partnership-wide

3

Study Tours/Other Technical Assistance

India, Serbia, and Partnership-wide

3

Measurement/Pre-feasibility Studies

India, Kazakhstan, and Serbia



Partnerships

building relationships to foster action

24

GMI Meetings (Steering Committee/Subcommittees)

India, Mexico, Serbia, United States, and Virtual meetings (hosted from Switzerland and the United States)

3

Conferences

Serbia, United States, Partnership-wide

Secretariat Priorities Through 2024

- Provide support to countries working to aggressively reduce methane emissions, including signatories of the Global Methane Pledge
 - Conduct Partner Country Needs Assessment
 - Launch the GMI Policymaker Framework for Addressing Methane Emissions
- Enhance promotion of GMI and resources through targeted communications
 - Launch new quarterly newsletter
- Support Subcommittee Co-Chairs, including to expand GMI Subcommittee membership
- Increase engagement with Project Network Members
- Leverage strategic partnerships to improve collaboration
 - United Nations Economic Commission for Europe (UNECE), Climate and Clean Air Coalition (CCAC), Global Methane Hub, World Bank
- Plan the 2024 Global Methane Forum ●



Geneva, Switzerland
March 2024

2024 Global Methane Forum

- Planning is underway for the 2024 Global Methane Forum
 - **When:** 18-21 March 2024
 - **Where:** Palais des Nations and Geneva Convention Center; Geneva, Switzerland
- **Agenda-at-a-glance:**
 - High-level Plenary Sessions on 19 March
 - Three technical tracks: Coal Mines, Oil & Gas, and Biogas
 - Opportunities for networking
- Registration is open! Visit our website to register:
<https://www.globalmethane.org/2024forum/>



Global Methane Pledge Support and Implementation

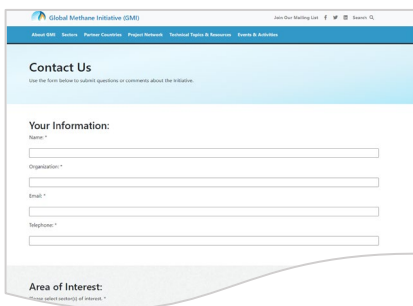


Global Methane Pledge



- 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

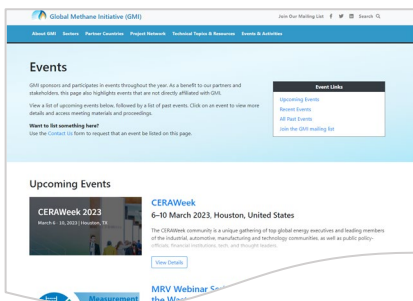


A screenshot of the 'Contact Us' page on the Global Methane Initiative website. The page has a blue header with navigation links: 'About GMI', 'Sector', 'Partner Countries', 'Program Initiatives', 'Technical Topics & Resources', and 'Events & Activities'. Below the header, there's a 'Contact Us' section with a sub-header 'Send the form below to submit questions or comments about the Initiative.' The form includes a 'Your Information' section with fields for Name, Organization, Email, and Telephone. Below that is an 'Area of Interest' section with a dropdown menu.

Submit a Contact Us Request

Let us know how we can help you:

globalmethane.org/contact-us/



A screenshot of the 'Events' page on the Global Methane Initiative website. The page has a blue header with navigation links: 'About GMI', 'Sector', 'Partner Countries', 'Program Initiatives', 'Technical Topics & Resources', and 'Events & Activities'. Below the header, there's an 'Events' section with a sub-header 'GMI sponsors and participates in events throughout the year. As a benefit to our partners and stakeholders, this page also highlights events that are not directly affiliated with GMI.' There's a list of 'Upcoming Events' with a 'View Details' button. Below that is a section for 'Upcoming Events' with a 'View Details' button. At the bottom, there's a 'Measurement' section with a 'View Details' button.

Share Events or Resources

Recommend items to publish on the GMI website:

globalmethane.org/resources/recommend.aspx



A screenshot of the 'Join the GMI Mailing List' form. The form has a blue header with the GMI logo and the text 'Global Methane Initiative'. Below the header, there's a sub-header 'Consider the form below to join GMI's mailing list. A confirmation email will be sent to you once you click the link provided in the email to complete the process.' The form includes a 'First Name' field, a 'Last Name' field, an 'Organization' field, and a 'Sector of Interest' dropdown menu.

Join the GMI Mailing List

Receive updates from GMI by joining at:

eepurl.com/ggwT3T

Follow GMI



www.linkedin.com/company/global-methane-initiative-gmi-/



www.facebook.com/globalmethane/



twitter.com/globalmethane

Thank you!

Denise Mulholland

Director, Secretariat

mulholland.denise@epa.gov

secretariat@globalmethane.org



Leading methane action since 2004

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



Oil & Gas Subcommittee Business

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
 - Planning for the 2024 Global Methane Forum in Geneva, Switzerland
 - Regularly promoting oil & gas-related events on GMI website
 - Sharing oil & gas news on GMI's social media platforms
 - Increase engagement with GMI's Project Network
- Objective 2: Facilitate policy and project implementation through capacity building and technical assistance
 - Finalizing the new Policymaker's Handbook and Emissions Factor-based tool

Oil & Gas Subcommittee Co-Chair Recruitment

- We are looking for two Co-Chairs!
 - Must be a government representative
- Responsibilities of GMI Subcommittee Co-Chairs:
 - Represent GMI in external events
 - Participate in Subcommittee meetings and GMI Steering Committee meetings
 - Help recruit Subcommittee delegates
 - Guide the members of the Subcommittee to reach consensus, provide strategic guidance, and identify opportunities
- Interested? Send an email to secretariat@globalmethane.org

Preview of the 2024 Forum Oil & Gas Technical Sessions

- Oil & Gas Technical Sessions will take place on 20-21 March in conjunction with the UNECE Group of Experts on Gas meeting
- Session themes:
 - Government and Industry as Vital Drivers to Mobilize Methane Action in the Oil & Gas Sector
 - The Importance of Data Collection and Reconciliation to Mobilizing Methane Action
 - Emissions Quantification Tools
 - Overcoming Challenges for Methane Management in the Oil & Gas Sector; a Joint Panel with the Global Methane Forum and CERAWEEK

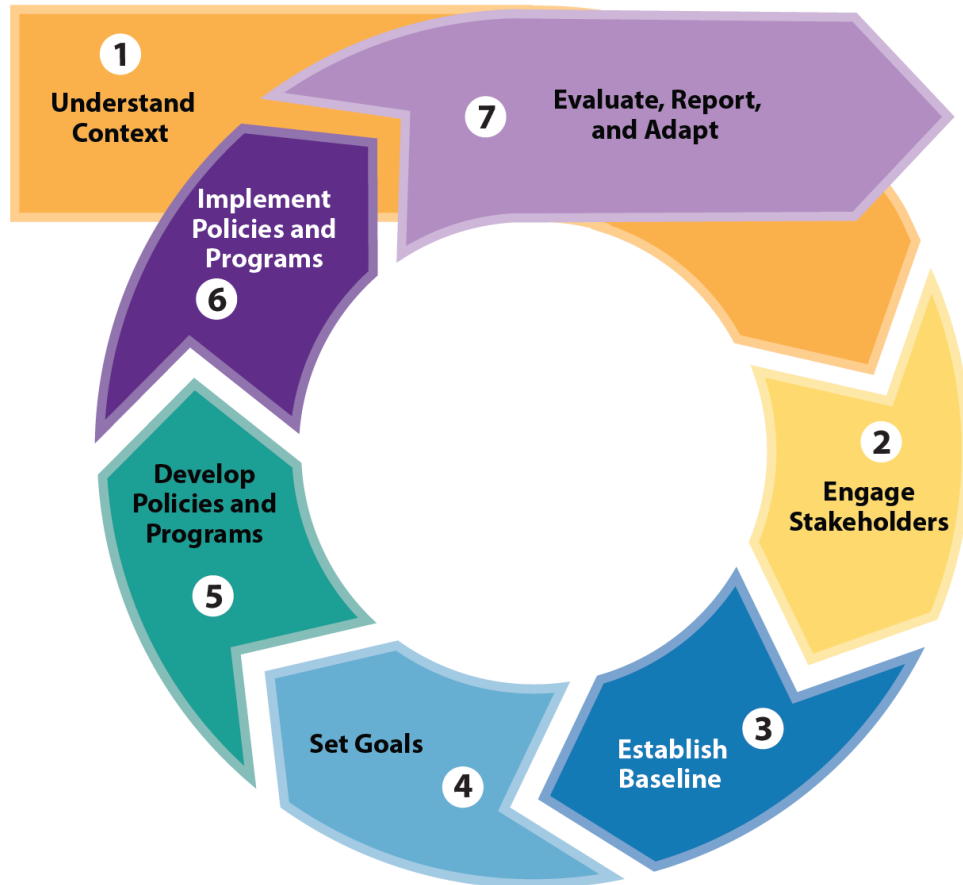


GMI Activities and Tools

Paz Aviles, Volha Roshchanka, and Andrew Meluch

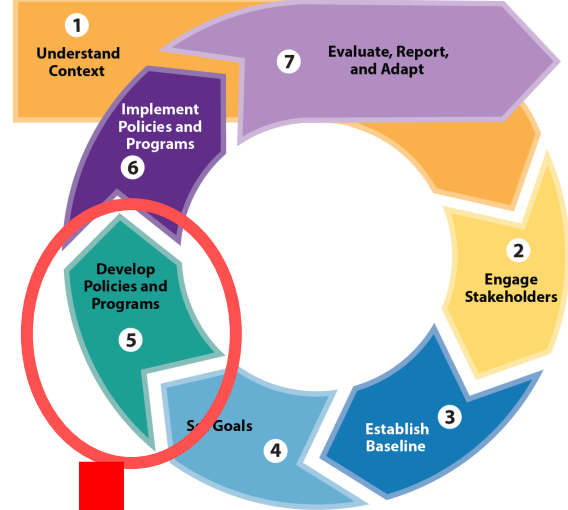
U.S. Environmental Protection Agency and Global Methane Initiative

Coming soon! GMI Policymaker's Framework for Addressing Methane Emissions



- **What:** A framework to help countries accelerate progress toward their methane emission reduction goals
- **How:**
 - Provides a step-by-step process for developing and implementing policies, programs, and partnerships to reduce methane emissions
 - Each step includes:
 - A description of information to help policymakers navigate each step,
 - Best practice activities that policymakers can consider,
 - General and sector-specific resource links that can provide additional guidance and support, and
 - Case study examples of policies and programs from around the world to help countries learn from others' experiences.
- **Who:** Primarily for national policymakers
- **When:** December 2023
- **Where:** www.globalmethane.org

GMI Policymaker's Framework for Addressing Methane Emissions



STEP 5: Develop Policies and Programs

Best Practice Activities

- Identify potential strategies to reduce methane emissions
- Develop criteria that will be used to evaluate and select mitigation strategies
- Quantify methane reductions expected from the identified strategies over the goal period
- Estimate net costs to implement the policy or strategy
- Quantify or assess benefits of the identified policies or strategies
- Analyze feasibility
- Select strategies using criteria and document decision-making

Sample of Key Resources and Tools for Oil and Gas under Step 5:

- [EPA's Methane Mitigation Technologies Platform](#)
- [GMI's Guidance on Identifying and Evaluating Opportunities for Greenhouse Gas Mitigation & Operational Efficiency Improvement at Oil and Gas Facilities.](#)
- [Best Practices for Effective Methane Management in the Oil and Gas Sector: Monitoring, Reporting and Verification and Mitigation \(UNECE and GMI, 2019\)](#)
- International Energy Agency [Methane Tracker Tool.](#)
- International Energy Agency [Driving Down Methane Leaks from the Oil and Gas Industry – A Regulatory Roadmap and Toolkit.](#)
- Clean Air Task Force [Oil and Gas Country Methane Abatement Tool.](#)

Waste Gas Recovery Project in Kazakhstan

**GMI Oil and Gas Subcommittee
Meeting (December 2023)**

**Volha Roshchanka, U.S. Environmental Protection
Agency**



Project Goals

- GMI worked with a local partner to develop a ***viable strategy to conserve waste associated gas*** (200 to 250 million Nm³ per annum) from the Mangghystau oilfield in SW Kazakhstan.
- Help mitigate a looming domestic natural gas shortage (President Tokayev, 2022).

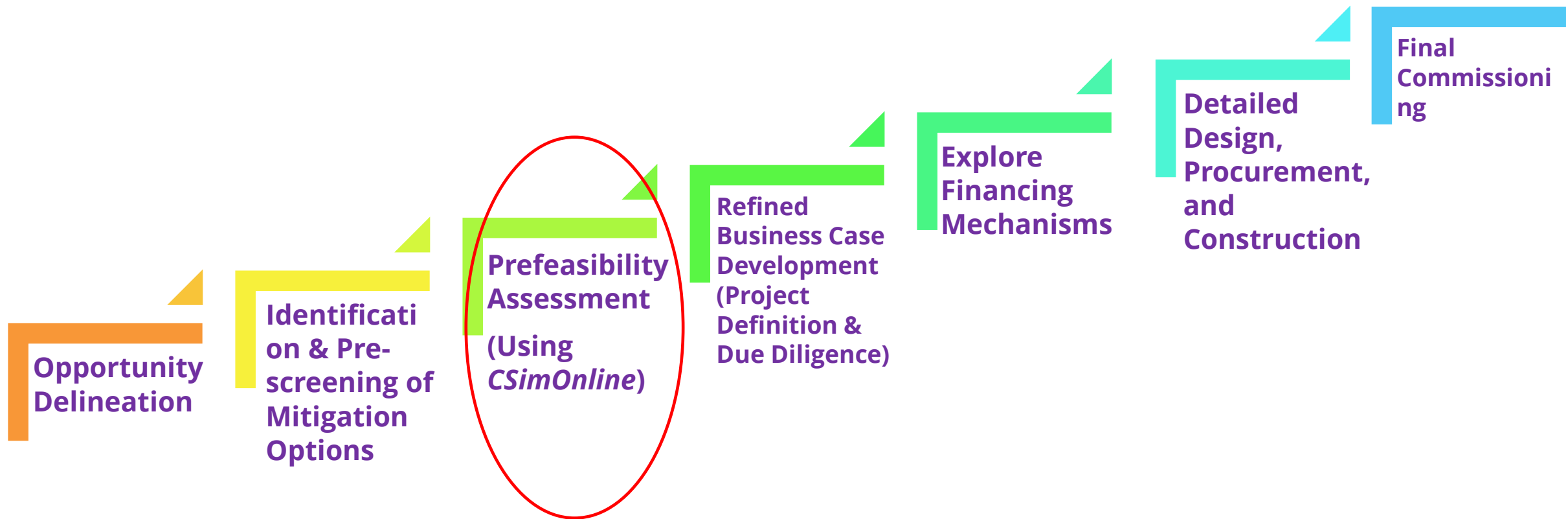


Dunga field area

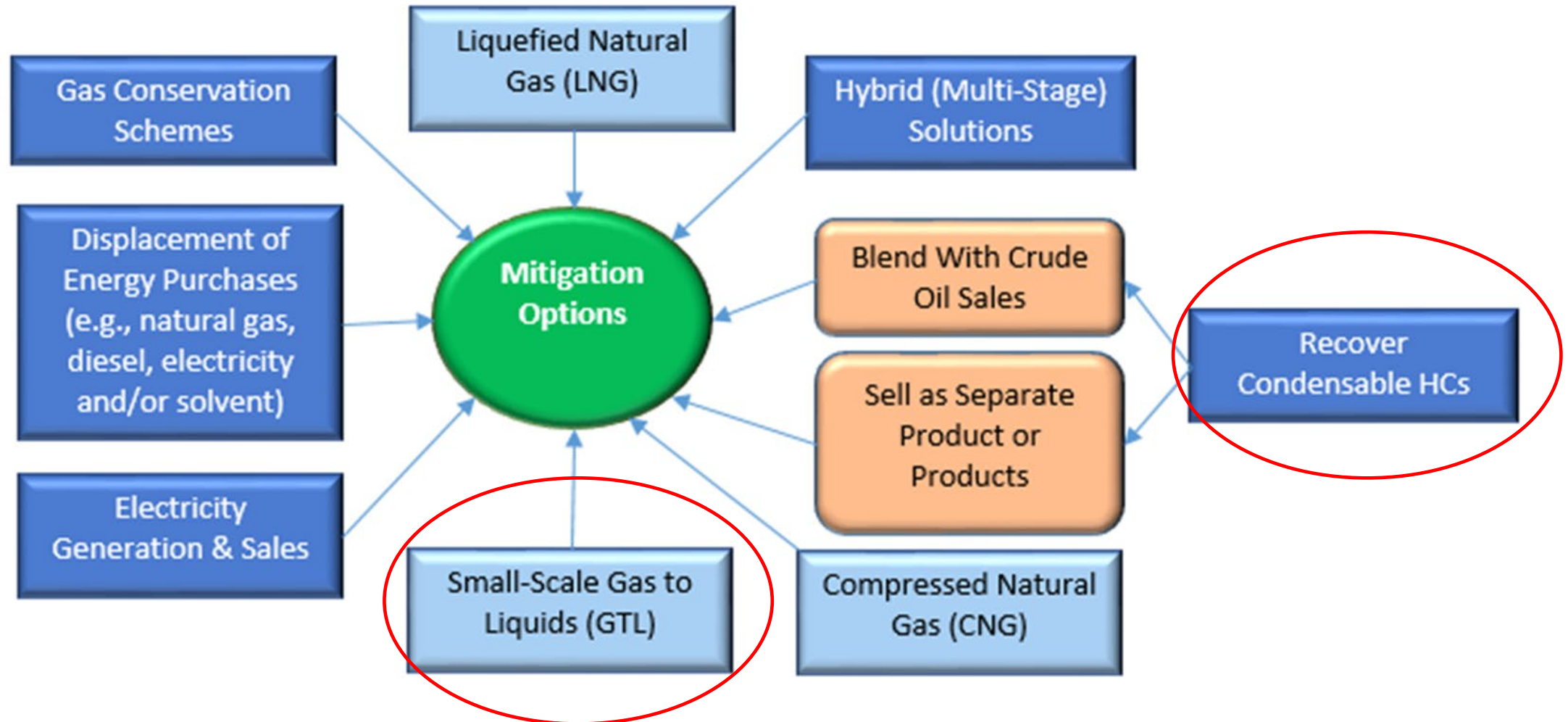
Challenges for the Gas Utilization

- The facility has already fulfilled its most of the onsite needs for associated gas.
- Selling electricity off-site is uneconomic, as prices for electric power prices are capped as part of the national policy to subsidize consumers.
- Sale of natural gas off-site is limited by underdeveloped gas gathering system and a current shortage of gas processing capacity.
- Additionally, selling gas off-site is uneconomic, as domestic natural gas prices are low because of a cap imposed by the government to keep fuel prices affordable.

Project Prefeasibility Assessment



Mitigation Technology Options



Technologies Evaluated

- **Two categories of mitigation technologies were evaluated:**

1. Mini gas-to-liquids (GTL) Fischer Tropsch (FT) technologies that convert natural gas to diesel and other liquid fuels.

Three different technology vendors are evaluated:

- a. CompactGTL (<https://www.compactgtl.com>)
- b. Emerging Fuels Technology (www.emergingfuels.com)
- c. Greyrock (<http://www.greyrock.com/>).

Technologies Evaluated

2. Liquids extraction technologies that recover condensable hydrocarbons from the waste gas and use the residue gas to power the process.

Two different technologies are evaluated:

- a. Joule-Thomson Plant
- b. Propane Refrigeration Plant

Advantages of Mitigation Option

1. Opportunity to produce more lucrative value-added products suitable for shipment to local and potentially export markets.
2. Mitigation of harmful emissions to the atmosphere (over 60% of CO₂).
3. Opportunity to increase oil production while reducing emission intensities and total emissions.
4. Aligned with Kazakhstan's National Environmental policy.

Summary of Economic Analysis using CSIMS Online Model

Table 1: Summary of the economic analysis results for the assessed mitigation options based on a 10-year project life.

Control Technology		Model	Capital Cost (USD)	Payback Period (y)	Net Present Value		Return on Investment		Internal Rate of Return (%)
Primary Category	Subcategory				Before Tax (USD)	After Tax (USD)	Before Tax (%)	After Tax (%)	
Mini-GTL	CompactGTL	Compact	403,254,379	No Payback	-86,392,664	-86,392,664	-21.42	-21.42	5.43
	Emerging Fuels Technology	GS50	192,538,522	3.21	316,738,227	316,738,227	164.51	164.51	38.74
		GS100	192,538,522	3.21	316,738,227	316,738,227	164.51	164.51	38.74
		GS250	201,306,281	3.38	307,767,731	307,767,731	152.89	152.89	36.90
	Greyrock	M	210,394,887	3.59	294,060,762	294,060,762	139.77	139.77	34.81
		P	210,394,887	3.59	294,060,762	294,060,762	139.77	139.77	34.81
Liquids Extraction	Joule Thomson Plant	Electric Compressor Driver	7,725,836	7.85	3,897,350	1,780,431	50.45	23.05	14.58
		Natural Gas Fueled Compressor Driver	8,489,070	6.24	7,028,148	4,152,943	82.79	48.92	19.39
	Propane Refrigeration Plant	Electric Compressor Driver	3,691,462	2.02	14,368,414	10,855,688	389.23	294.08	59.35
		Natural Gas Fueled Compressor Driver	3,660,544	1.89	15,376,245	11,667,305	420.05	318.73	63.12

Environmental Impacts

Table 2.A: Summary of the net reduction in short-lived climate pollutants, year project life for each of the assessed mitigation technologies (assessing 2022-2042)

Control Technology			CH ₄ (kt)	CO ₂ (kt)	N ₂ O (kt)	CO ₂ E (kt)	Net Reduction (kt)
Primary Category	Subcategory	Model					
Mini-GTL	<u>CompactGTL</u>	Compact	13.6	2,377.2	0.0	2,719.2	2.4
	Emerging Fuels Technology	GS50	16.0	2,793.9	0.0	3,195.9	2.4
		GS100	16.0	2,793.9	0.0	3,195.9	2.4
		GS250	16.0	2,793.9	0.0	3,195.9	2.4
	<u>Greyrock</u>	M	16.0	2,793.9	0.0	3,195.9	2.4
	P	16.0	2,793.9	0.0	3,195.9	2.4	
Liquids Extraction	Joule Thomson Plant	<u>Electric Compressor Driver</u>	0.0	198.5	0.0	199.1	0.2
		Natural Gas Fueled Compressor Driver	0.4	198.5	0.0	208.2	
	Propane Refrigeration Plant	<u>Electric Compressor Driver</u>	0.0	206.8	0.0	207.5	
		Natural Gas Fueled Compressor Driver	0.1	206.8	0.0	207.5	

TECHNICAL REPORT



3 August 2022 | A Technical, Economic and Environmental Analysis of Beneficial Use of Stranded Associated Gas in Kazakhstan

Prepared For: Methane Center PA
105 Sakena Seifullina Street
Karaganda, Kazakhstan

Prepared By: Tetra Tech Inc. and Clearstone Engineering Ltd.

At the Request of: U.S. Environmental Protection Agency in support of the Global Methane Initiative

Detailed report available on GMI website:

<https://www.globalmethane.org/resources/details.aspx?resourceid=5297>

CONCLUSIONS

- Mini-GTL and liquids extraction technologies are both viable options for stranded gas recovery, and with optimized designs they can achieve payback periods of less than 3 years.
- **Liquids recovery using propane refrigeration** offers the best economics and is a well-proven off-the-shelf technology but does not utilize the full economic potential of the opportunity.
 - Results in a smaller scale project with reduced capital costs but also reduced emission reduction potential.
- **Mini-GTL** offers much better utilization of the recovered gas, but at moderately reduced economics.

THANK YOU!

Volha Roshchanka
U.S. Environmental Protection Agency
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Overview of New EPA Tool for National GHG Inventory Refinement from Oil and Gas Facilities: SMART+

Andrew Meluch

GMI Oil and Gas Subcommittee Meeting

14 December 2023

Background

- In support of Paris Agreement climate goals, US EPA received funding from the US Department of State's Transparency Accelerator program to provide technical assistance to developing countries in refining their national greenhouse gas (GHG) inventories from oil and gas facilities.
- Through the Transparency Accelerator framework, EPA has created a user-friendly tool, called SMART+, that simplifies national GHG inventory estimation
 - Allows countries to report emissions from oil and gas facilities to the United Nations Framework Convention on Climate Change (UNFCCC)
 - Uses Intergovernmental Panel on Climate Change (IPCC) Tier 1, Tier 2, or Tier 3 approaches.
 - Provides countries the opportunity to apply the 2019 Refinement to the 2006 IPCC Guidelines to their emissions data, increasing the accuracy and transparency of their reporting.
 - Helps countries calculate IPCC Tier 2 (country-specific) emission factors
 - Can be translated into foreign languages (already includes English, Spanish, and Mandarin Chinese)
 - Will come with a step-by-step user manual
 - Will be available to be downloaded for free from GMI's website upon formal release

New Tool for O&G Sector GHG Inventory Refinement: Simplified Methane Assessment and Reporting Tool (SMART+)

■ What is SMART+?

- SMART+ is a flexible, user-friendly tool that can be used by national governments or oil & gas companies to assess methane emissions from oil & gas operations.
- It will help national governments compile and estimate GHG emissions – primarily of methane but including other UNFCCC gases – for the purpose of submitting a national GHG inventory for oil and natural gas systems.
- The tool consists of two components :
 1. A database application for compiling national-level GHG emissions estimates by “rolling up” emissions data from oil & gas facilities
 2. Spreadsheet templates for user input of measured and calculated GHG emissions at individual oil and gas facilities, including templates for both national level and facility-level

■ Who can benefit from using SMART+?


- National governments:
 - Staff responsible for compiling and submitting GHG inventories from oil and gas facilities
- Oil and gas companies:
 - Company- or facility-level staff responsible for GHG emissions monitoring, reporting, and mitigation
 - SMART+ will also support oil and gas company stakeholders who seek to understand their own emissions profiles and opportunities for high-impact mitigation actions


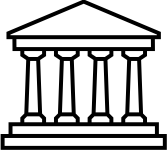


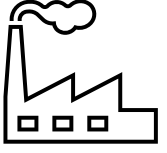
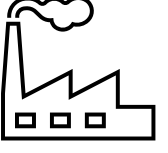


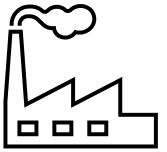
How Can Governments and Companies Benefit from Using SMART+?

Step 1 (in blue): Identify your goal

Key:

 = Government

 = Company

	Compile a GHG inventory using IPCC Tier 1 or Tier 2 approach	Compile a GHG inventory using IPCC Tier 3 approach	Calculate a country-specific (Tier 2) emission factor	Understand asset emissions at a company level	Understand asset emissions at a facility level
National-level spreadsheet template					
Facility-level spreadsheet template					
Database application					

**Step 2 (in gray):
Use these tool
components to
reach your goal**

SMART+ Tool is Compatible with and Complementary to Existing Tools, Programs, and Frameworks

- [CoMAT](#) (Clean Air Task Force)
 - This software allows national governments to estimate methane emissions from the oil and gas industry and helps them develop mitigation plans
 - SMART+ outputs, particularly those developed using Tier 2 or Tier 3 approaches, could be used as inputs for CoMAT for your country to further increase the accuracy of your oil and gas methane mitigation action plans
- [Mist](#) (Carbon Limits)
 - This tool allows oil and gas companies to create a methane emissions inventory across their facilities and is aligned with OGMP 2.0 reporting Levels 3 and 4
 - SMART+ outputs at the company level may present similar information to Mist outputs
- [OGMP 2.0](#) (UNEP)
 - This voluntary program, coordinated by UNEP, requires participating oil & gas companies to submit annual reports on their facility emissions through a five-tier system
 - SMART+ facility level template could help companies reach/achieve reporting Level 3
- [Methane Mitigation Technologies Platform](#) (US EPA)
 - This updated resources provides summaries of key emissions sources and mitigation options across the natural gas value chain, based on 20+ years of company experiences
 - SMART+ will include links to the Platform that correspond to facility-level emissions profiles and highlight technologies to reduce those emissions
- [Policymaker Framework](#) (Global Methane Initiative)
 - This resource compiles existing tools and information on developing policies, starting with assessing a baseline inventory to identify key emissions sources and mitigation opportunities at a sectoral or national level
 - SMART+ will be one of many resources highlighted in the *Framework* for methane policy stakeholders

Summary and Next Steps

- SMART+ is designed to help national governments improve their GHG inventories from oil and gas facilities in accordance with Paris Agreement climate goals and reporting requirements
- Next steps
 - Draft version currently being finalized and will be peer-reviewed
 - “Sneak preview” of the tool’s features planned for 2024 Global Methane Forum, with public release planned for spring 2024

Presentations on Complementary Oil & Gas Tools

Heny Patel, Clean Air Task Force

Anastasia Isaenko, CarbonLimits

Alberto Alva-Argaez, Process Ecology



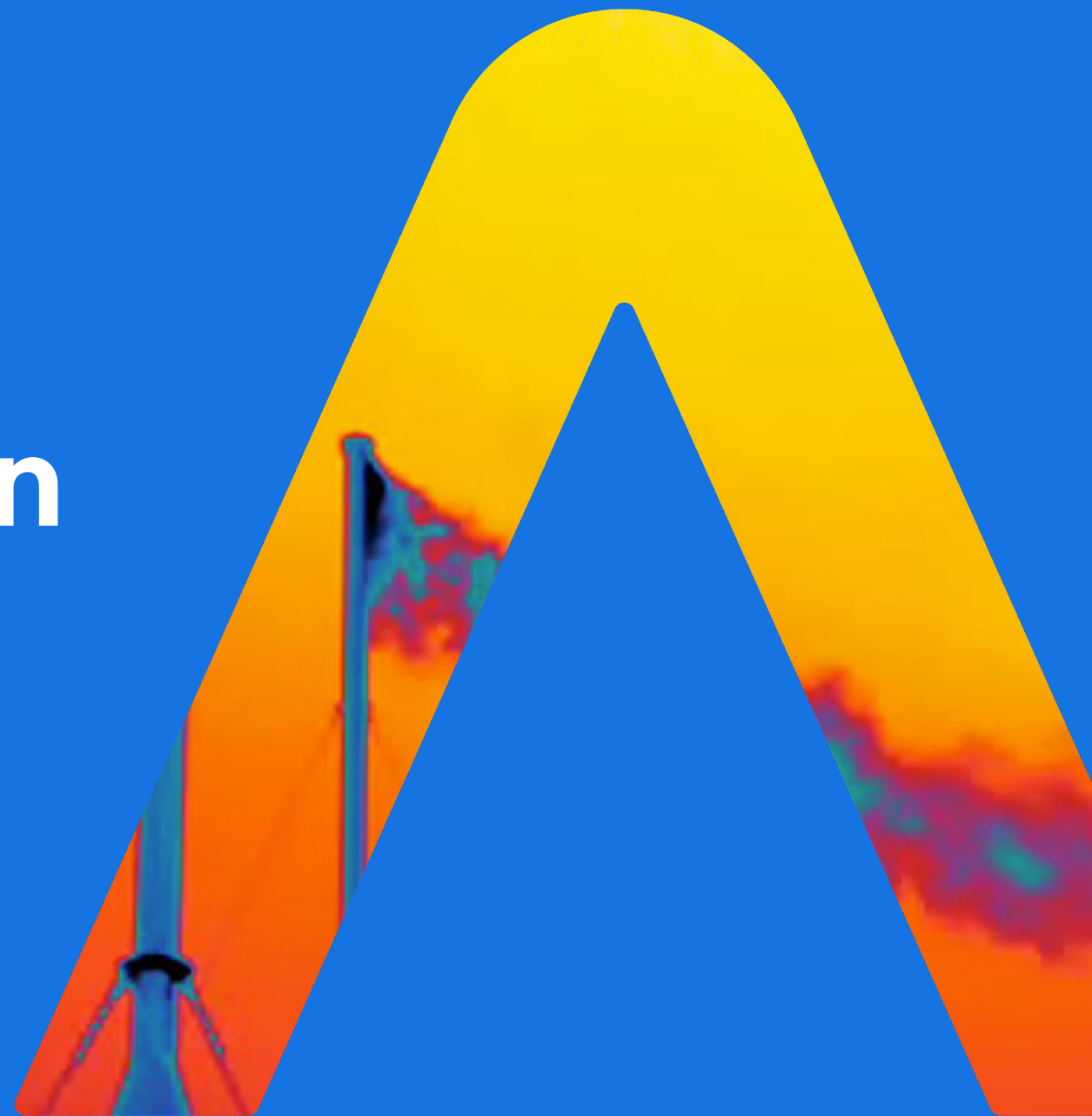
COMAT Country Methane
Abatement Tool

An Introduction to CoMAT

December 14, 2023

Global Methane Initiative (GMI)

Oil & Gas Subcommittee Meeting



Agenda

Why We Developed CoMAT

CoMAT in Action

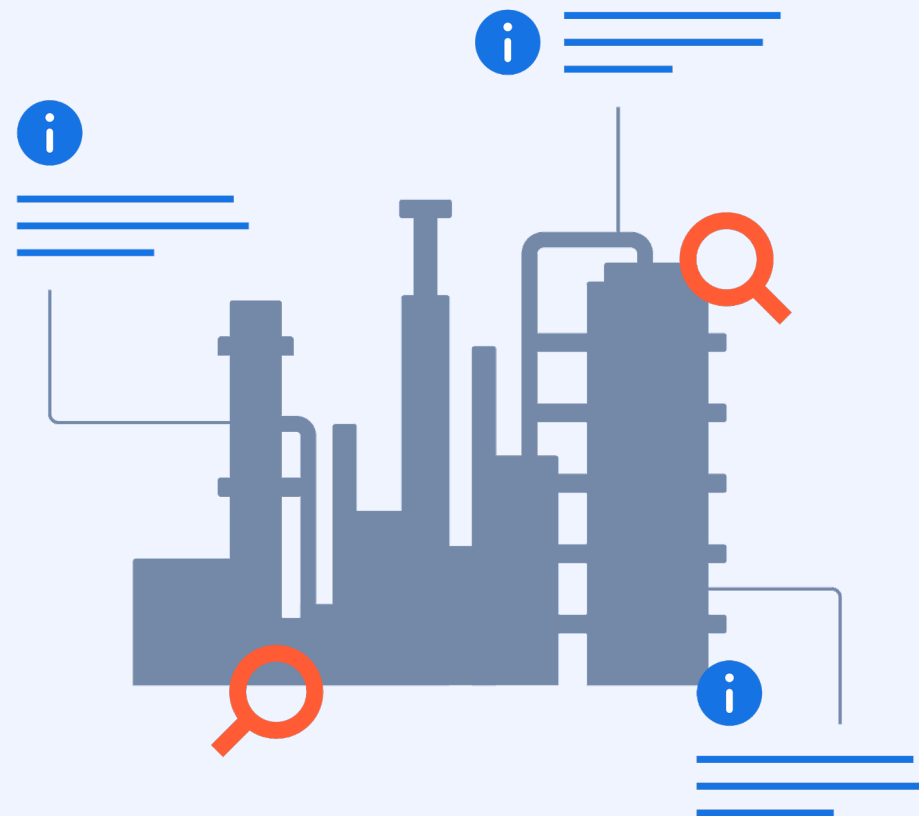
CoMAT App

Why We Developed CoMAT

The need

A significant barrier to the development and implementation of methane mitigation policies around the world, is that government officials **lack data** regarding the origin and magnitude of emissions in the oil and gas sector.

CoMAT was designed to efficiently help policymakers and governments understand and address methane emissions within their jurisdictions.



The solution: CoMAT

Country Methane Abatement Tool

The CoMAT App supports countries to gain a full picture of their unique oil and gas industry profile and associated methane emissions. The software is designed to guide policymakers in the creation of a robust mitigation plan that is intuitive and tailored to meet the needs of their specific situation.

The CoMAT software makes a complicated problem more trackable, efficient and organized.

As the keystone that supports CATF's international methane advocacy, which is based on one-on-one connections with regulators, CoMAT provides a platform that can be scaled across multiple countries at once.

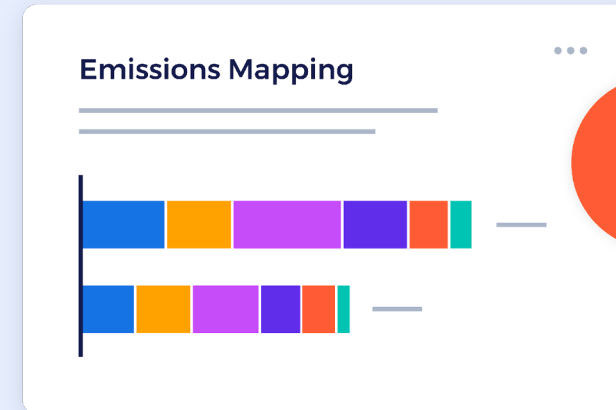


CoMAT is 100% free and customizable

CoMAT is design to allow for collaboration and transparency. All the **assumptions and calculations** inside of the tool can be viewed and **adjusted** as users see fit.

There is **no black box**. CoMAT is not intended to give users pre-packaged “answers” but to support, enable and inform the process of creating strong mitigation plans that lead to results.

CATF’s experts will work with every team to answer any technical questions related to emissions from the oil and gas industry and help design a country-specific comprehensive mitigation strategy!



Industry Information

CoMAT's Methodology

Core of the CoMAT methodology is based on:

- U.S. GHG Inventory (with some modifications)
- Country user input
- Potential for country-specific customization

Emissions estimates are driven by estimates of equipment, amount of gas produced, and other data points.

USER INPUT

1. Industry Parameters

Total active gas wells

2. Activity Drivers

Number of natural gas powered pneumatic controllers per well

3. Activity Data

Total number of natural gas-powered pneumatic controllers

4. Emission Factors

CH₄ emissions per natural gas-powered pneumatic controller

5. Emissions

CH₄ emissions from all natural gas-powered pneumatic controller

6. Mitigation

Abatement percentage or activity data change



The CoMAT workflow



CoMAT in Action

Current work

During the past couple of years, as part of our engagements in Africa and Latin America, we have used the non-app version of CoMAT with national governments to **facilitate the process of designing mitigation plans and identifying areas for strong policies.**

* Our recent engagements also extend to Iraq and Gabon



Welcome to the CoMAT Software App



COMAT

The CoMAT App was developed to offer an intuitive, easy to use tool that enable users to gain insights, analyze data, build consensus and develop **mitigation plans and policy solutions.**

COMAT key areas of functionality



Collaboration
and consensus
building



Industry
resources and
access to
information



Emissions
calculations and
estimations



Mitigation
approach
design and
planning



Digital policy
library, review
and design tools

The home dashboard

Country users will have individual accounts and can log in from anywhere in the world.

The dashboard displays the most important and timely information and actions.

Users can immediately view:

- The country's current annual emissions estimate
- The country's potential mitigated emissions

The screenshot displays the COMAT dashboard for 'COUNTRY A' under the user 'Henry Patel'. The main menu includes Dashboard, Industry Segments, Emission Sources, Mitigation Plan, Policy Library, and Team. The dashboard content includes a 'Hello Henry' greeting, a 'Methane Emissions and Mitigation Plan' section with three bar charts, and two smaller sections for 'Industry Segments' and 'Emission Sources'. A 'Welcome' login form is overlaid on the left side of the dashboard.

COMAT COUNTRY A HP Henry Patel

MAIN MENU

- Dashboard
- Industry Segments
- Emission Sources
- Mitigation Plan
- Policy Library
- Team

Hello Henry
Explore the latest updates on your country's mitigation plan.

Methane Emissions and Mitigation Plan [View Details >](#)

Hover over each color segment within the graphs to see values. Additionally, see how your CoMAT estimate compares to other estimated sources below.

2020 CoMAT Total Methane Emissions: **1,209.83 kt**

2020 CoMAT Methane Emissions with Mitigation: **590.2 kt (-620 kt)**

2022 IEA Methane Tracker Estimation: **1,974.32 kt**

1994 UNFCCC Inventory Submission: **882.18 kt**

0 kt 494 987 1,481 1,974

Industry Segments
Learn about industry segments and adjust your data to refine estimates. [View >](#)

Emission Sources
Learn about emission sources and adjust your data to refine estimates. [View >](#)

Welcome
Log into your account

Username or email

Password

[Login](#)

[I forgot my password](#)

Don't have an account yet? [Get started](#)

Have questions?
[Connect with an expert >](#)

Search the Policy Library
To build your own policy framework, start by exploring the CoMAT Policy Library. [Explore >](#)

Leading Methane Abatement Policies for Oil and Gas Operations
CATF's scientists and policy advisors have analyzed methane abatement policy precedents from governments across the world. We've compiled the most effective policies into our Leading Methane Abatement Policies Report. [Download >](#)

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Data validation and user input

Industry Segments Section

The Industry Segments section is organized by six main segment categories.

Users can click into any one and easily view the list of industry information pertaining to that industry segment.

Each industry segment is a container for content and data entry values for users to review and enter.

The screenshot displays the COMAT web application interface for 'COUNTRY A'. The top navigation bar includes the COMAT logo, the text 'COUNTRY A', and a user profile for 'HP Henry Patel'. A left-hand 'MAIN MENU' sidebar lists 'Dashboard', 'Industry Segments' (highlighted with a blue arrow), 'Emission Sources', 'Mitigation Plan', 'Policy Library', and 'Team'. The main content area is titled 'Industry Segments' and contains a descriptive paragraph: 'Explore variables that will lead to emission reductions by clicking into each sub-section below. Our default data has already been used within the tool to calculate your emissions estimate; however, you may choose to view that data to better understand it or modify it to get a more accurate estimate.' Below this is a list of six industry segments, each with an icon, title, contributor count, and a right-pointing arrow:

- Gas Exploration and Production**: 10 Contributors
- Oil Exploration and Production**: 8 Contributors
- Gas Processing**: 1 Contributor
- Gas Transmission and Storage**: 5 Contributors
- Liquefied Natural Gas (LNG)**: 3 Contributors
- Gas Distribution**: 16 Contributors

In the top right corner, there is a 'Have questions?' section with the text 'Request a meeting with a CATF expert today for additional support.' and a contact card for 'NK Nathaniel Kemp'.

Data validation and user input

Industry Segments

A table of industry contributors within that segment lists each associated value that can be reviewed, verified or updated by the user.

Users can see at-a-glance how many values are default and which ones have been modified.

COMAT COUNTRY A HP Henry Patel

MAIN MENU

- Dashboard
- Industry Segments**
- Emission Sources
- Mitigation Plan
- Policy Library

Team

Industry Segments > Gas Exploration and Production

Gas Exploration and Production

Gas exploration process involves the search for rock formations associated with natural gas deposits through detailed geological and geophysical surveys and exploratory drilling to determine nature of hydrocarbon presence. Gas production is the process of extracting hydrocarbons via drilling and hydraulic fracturing, and separating the mixture liquid hydrocarbons, gas, water, and solids.

Country's industry data imported from publicly available inventories (i.e. EIA, OPEC, NOAA) or calculated based on factors from the US EPA Greenhouse Gas Inventory.

Have questions?
Request a meeting with a CATF expert today for additional support.

NK Nathaniel Kemp

Industry Contributors

Contributor Groups	Subsegments	Status
Gas Production	Onshore gas production, Offshore gas production	Default
Gas Wells	Gas Exploration, Onshore gas production	Edited
Condensate Production	Onshore gas production	Default
Well Blowouts	Gas Exploration	Default
Gathering and Boosting Stations	Gathering and Boosting	Default

Data validation and user input

Value entry example

Users can adjust default values based on additional industry information they may have or revert to the default.

All previous and new changes are tracked and saved within the tool.

Any information available that is related to oil and gas activity in a user's country can be incorporated. The more information that's verified, the more accurate the emission estimate becomes resulting in a more tailored mitigation plan.

COMAT COUNTRY A HP Henry Patel

MAIN MENU

- Dashboard
- Industry Segments**
- Emission Sources
- Mitigation Plan
- Policy Library

Team

Sites

Industry Segments > Gas Exploration and Production > Gas Production

Gas Production i

Click the "i" icon to view details about calculations, sources of values and other contributor information.

Gross onshore gas production

MMcf

Marketed/Dry gas production

MMcf

Offshore gas production

MMcf

Leave a note describing your update (Required)

Include links, value changes, edits and any other important information related to your changes.

0/500

Save and return to contributors

[< Return to contributors without saving](#)

Notes:

NK Nathaniel
About this form

Click the "info" icon for contributor details including the source of the values and how the calculations are performed. Once your edits are complete, add a note describing your changes. Notes will show up here and are visible to the team.

Data validation and user input

Baseline Emission Sources

Once the industry information has been reviewed and verified, users can review baseline emission source data.

The emission sources page displays the various source areas users can click into for review.

COMAT COUNTRY A HP Henry Patel

MAIN MENU

- Dashboard
- Industry Segments
- Emission Sources**
- Mitigation Plan
- Policy Library

Team

- Team

Baseline Methane Emission Sources

Explore variables that will lead to emission reductions by clicking into each sub-section below. Our default data has already been used within the tool to calculate your emissions estimate; however, you may choose to view that data to better understand it or modify it to get a more accurate estimate.

Have questions?
Request a meeting with a CATF expert today for additional support.
NK Nathaniel Kemp

Associated Gas Venting and Flaring 1 Contributor	→	Blowdown Venting 12 Contributors	→
Centrifugal Compressors 3 Contributors	→	Combustion Exhaust 19 Contributors	→
Dehydrators 6 Contributors	→	Leaks 29 Contributors	→
Liquids Unloading 1 Contributor	→	Offshore 4 Contributors	→
Pneumatic Controllers 6 Contributors	→	Pneumatic Pumps 4 Contributors	→
Reciprocating Compressors 6 Contributors	→	Tanks 4 Contributors	→
Well Completions and Workovers 8 Contributors	→	Other Emission Sources 40 Contributors	→

Data validation and user input

Baseline Emission Sources

A table of emission source contributor lists display the baseline values that can be reviewed and/or modified.

Users can see at-a-glance how many values are default and which ones have been modified in the status column.

COMAT COUNTRY A HP Heny Patel

MAIN MENU

- Dashboard
- Industry Segments
- Emission Sources**
- Mitigation Plan
- Policy Library

Team

Methane Emission Sources > Dehydrators

Dehydrators

Methane vented from process units that remove water from gas by contacting high pressure wet gas with a liquid absorbent (including ethylene glycol, diethylene glycol, or triethylene glycol).

Have questions?
Request a meeting with a CATF expert today for additional support.

NK Nathaniel Kemp

Emission Contributors 6 Show All Subsegments

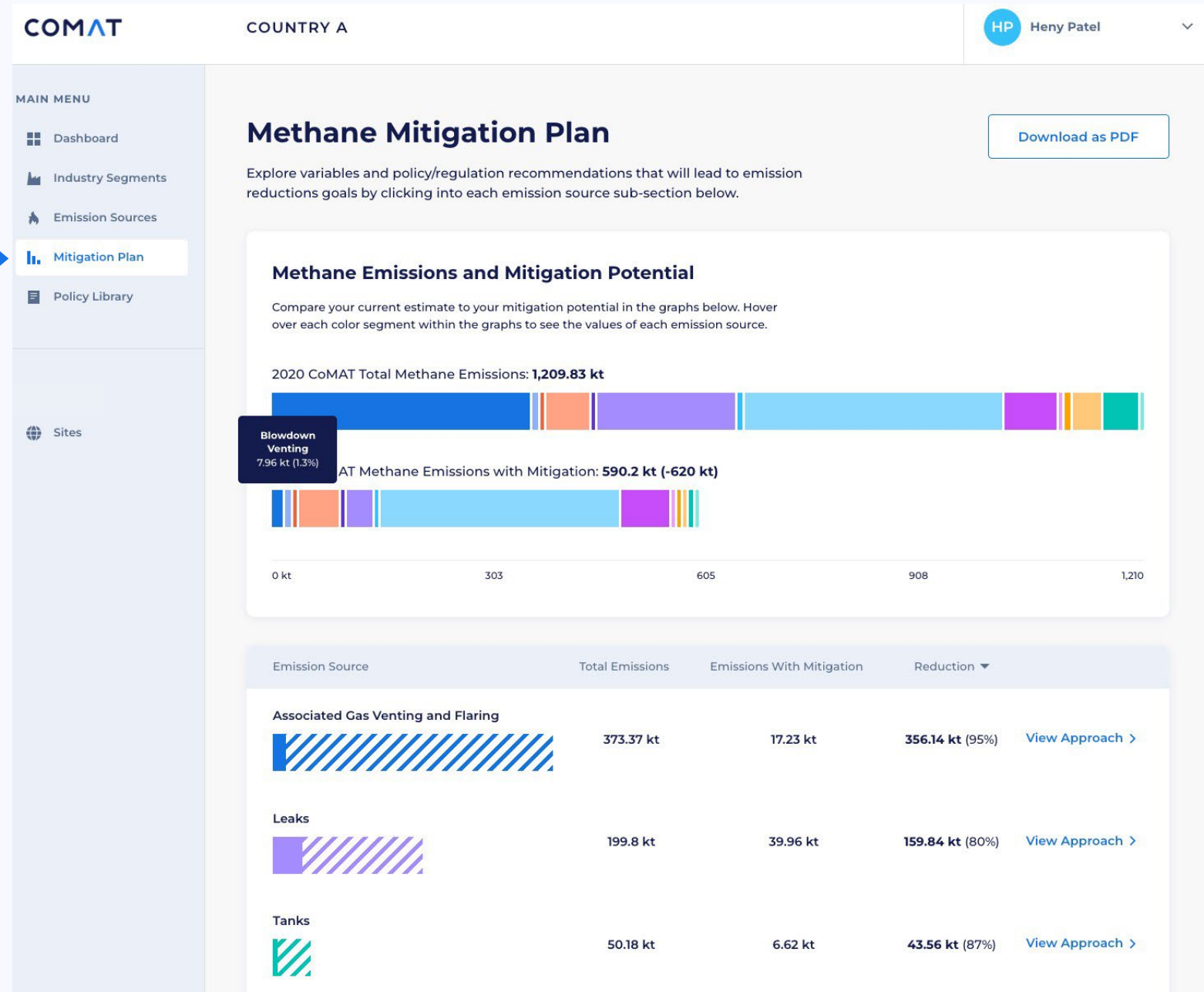
Contributor	Subsegment	Emissions Estimate	Status
Dehydrator Vents	Onshore gas production	0.78 kt	Default
Dehydrators	Gathering and Boosting	0.39 kt	Default
Desiccant Dehydrators	Gathering and Boosting	0.000416 kt	Default
Dehydrators	Gas Processing	0.89 kt	Default
Dehydrator vents	Gas Transmission	0.05 kt	Default
Dehydrator vents	Underground Gas Storage	0.37 kt	Default

Mitigation plan

All of the industry information and data that had been reviewed and verified will help generate a country-specific **mitigation plan**.

The mitigation plan page displays both the annual emissions estimate, and the country's mitigation potential based on the application of leading policy and regulatory recommendations.

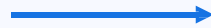
The CoMAT app assembles this data and provides countries with the ability to see how by applying some of the best-in-class policies and regulations can help clean up their oil and gas industries.



Mitigation plan

Emission source breakdowns

The mitigation plan is divided by an individual emission source. Users can arrange those segments in order of most or least mitigation potential.



Emission Source	Total Emissions	Emissions With Mitigation	Reduction	
Combustion Exhaust	62.2 kt	62.2 kt	0 kt (0%)	View Approach >
Leaks	199.8 kt	39.96 kt	159.84 kt (80%)	View Approach >
Associated Gas Venting and Flaring	373.37 kt	17.23 kt	356.14 kt (95%)	View Approach >
Blowdown Venting	7.96 kt	7.96 kt	0 kt (0%)	View Approach >
Tanks	50.18 kt	6.62 kt	43.56 kt (87%)	View Approach >
Pneumatic Controllers	3.78 kt	3.78 kt	0 kt (0%)	View Approach >
Reciprocating Compressors	40.71 kt	2.04 kt	38.67 kt (95%)	View Approach >
Pneumatic Pumps	8.3 kt	1.66 kt	6.64 kt (80%)	View Approach >
Well Completions and Workovers	2.4 kt	0.61 kt	1.79 kt (75%)	View Approach >
Dehydrators	2.48 kt	0.5 kt	1.98 kt (80%)	View Approach >

Mitigation by Emission Source

When viewing the mitigation plan for an emission source, users can see the best practices that have been applied to the plan and click to explore the list of policies and regulatory sources using CoMAT's digital policy library capabilities.

Users can dive deeper and click into each section of "leading policies" to see more details.

COMAT COUNTRY A HP Henry Patel

MAIN MENU

- Dashboard
- Industry Segments
- Emission Sources
- Mitigation Plan**
- Policy Library

Team

Mitigation Plan > Leaks

Leaks

Explore variables and policy/regulation recommendations that will lead to emission reductions goals by clicking into each recommendation/best practice below.

Mitigation Potential

Emission Source	Total Emissions	Emissions With Mitigation	Reduction
Leaks	199.8kt	39.96kt	159.84 kt (80%)

Leading Policies – Equipment Leaks

Methane released from sealed surfaces of above-ground process equipment including connectors, pressure relief devices, flanges, covers and closed vent systems, thief hatches or other openings on a controlled storage vessel, compressors, instruments, and meters. Also includes potentially large emission events from abnormal process conditions.

- Control Requirements →
- Recordkeeping →
- Reporting →

Leading Policies – Open Ended Lines and Valves and Sampling Connection System

Methane released from valves, open-ended lines, and sampling connection system during oil and gas operations.

Leading Policies

Detailed recommendations and best practices are provided as part of the mitigation plan. Every recommendation is supported by proposed or existing mitigation policies from around the world.

Each recommendation is displayed and tagged with its corresponding policy resource allowing users to view more detail about that policy.

Our experts can also provide specific approaches or guidance on what may need to be proposed or changed to fit a country's unique needs.



The screenshot displays the COMAT web application interface. At the top, the header includes the COMAT logo, 'COUNTRY A', and a user profile for 'HP Henry Patel'. A left-hand navigation menu is titled 'MAIN MENU' and contains items: 'Dashboard', 'Industry Segments', 'Emission Sources', 'Mitigation Plan' (highlighted), and 'Policy Library'. Below this is a 'Team' section with a person icon. The main content area is titled 'Mitigation Plan > Leaks > Leading Policies'. The primary heading is 'Leading Policies' with a sub-heading 'Equipment Leaks'. Below this, there is a 'Jump to:' section with links for 'Control Requirements', 'Recordkeeping', and 'Reporting'. The 'Control Requirements' section is expanded, showing an 'Inspection' sub-section with three paragraphs of text, each followed by a reference number (42, 43, 45). To the right of this section is a 'Policy References' list with numbered links (42-45) to various regulations. The 'Recordkeeping' section is also visible, showing a paragraph of text and a 'Policy References' list with a link (55). The 'Reporting' section is partially visible at the bottom, showing a paragraph of text and a 'Policy References' list with links (56, 57).

Policy Library

The CoMAT digital policy library allows users to browse various policies and regulations in one central place. The library dashboard allows users to filter through policies based on industry segments, emission sources and more.

The digital policy library is updated regularly to ensure the most current policies and regulatory approaches are used for the development of mitigation plans.

The screenshot displays the CoMAT Policy Library interface. At the top, the CoMAT logo and a user profile for Maria Sánchez are visible. A main menu on the left includes options for Dashboard, Industry Segments, Emission Sources, Mitigation Plan, and Policy Library (which is highlighted). The main content area is titled "Policy Library" and contains a list of 21 policies. A blue arrow points from the text on the left to the "Policy Library" menu item. Below the list, a detailed view of the "Colorado Air Quality Control Commission Regulation Number 7" is shown. This view includes a "Policy Overview" section with a text description and a "Policy Details" section with filters for Industry Segment and Emission Type. The "Policy Overview" text describes the regulation's history and purpose. The "Policy Details" section shows filters for "Gas Distribution", "Gas Exploration and Production", "Gas Processing", "Gas Transmission and Storage", "Import and Export Terminals", "Liquefied Natural Gas", and "Oil Exploration and Production". The "Emission Type" filters include "Combustion", "Flaring", "Fugitives", and "Venting".

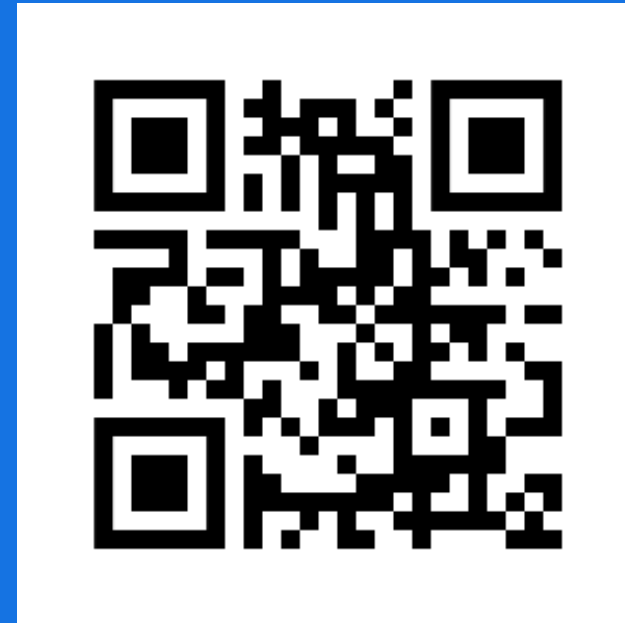
Name	Country	Subnational	Year	Status
Colorado Air Quality Control Commission Regulation Number 7	USA	Colorado	2014	Active
La Agencia de Seguridad, Energía y Ambiente (ASEA), Cuidelines for the Prevention and Comprehensive Control of Methane Emissions from the Hydrocarbon Sector	Mexico	-	2018	Active
Environmental Protection Agency, Final Rule Sector: Emission Standards for New and Modified Sources	USA	-	-	-
Bureau of Land Management, Waste Prevention Subject to Royalties, and Resource Conservation	USA	-	-	-
California Air Resources Board, California Fire Order, 17 C.C.R.	USA	California	-	-
Ohio Environmental Protection Agency, General Permit for Unconventional Natural Gas Operations and Remote Pigging Stations	USA	Ohio	-	-
Pennsylvania Department of Environmental Protection (DEP), General Permit for Natural Gas Compression Processing Facilities	USA	Pennsylvania	-	-
General Permit for Unconventional Natural Gas Operations and Remote Pigging Stations	USA	-	-	-
Utah Department of Environmental Quality, General Permit for Unconventional Natural Gas Operations and Remote Pigging Stations	USA	Utah	-	-

Thank You

Questions? Please Contact:

Heny Patel, hpatel@catf.us
Program Analyst, Methane Pollution Prevention
Clean Air Task Force

Find more information at
catf.us/CoMAT



Methane Inventory Systematic Tool (Mist)

A tool that enables methane emissions to be identified and mitigated

14 December 2023

Mist – What is it?



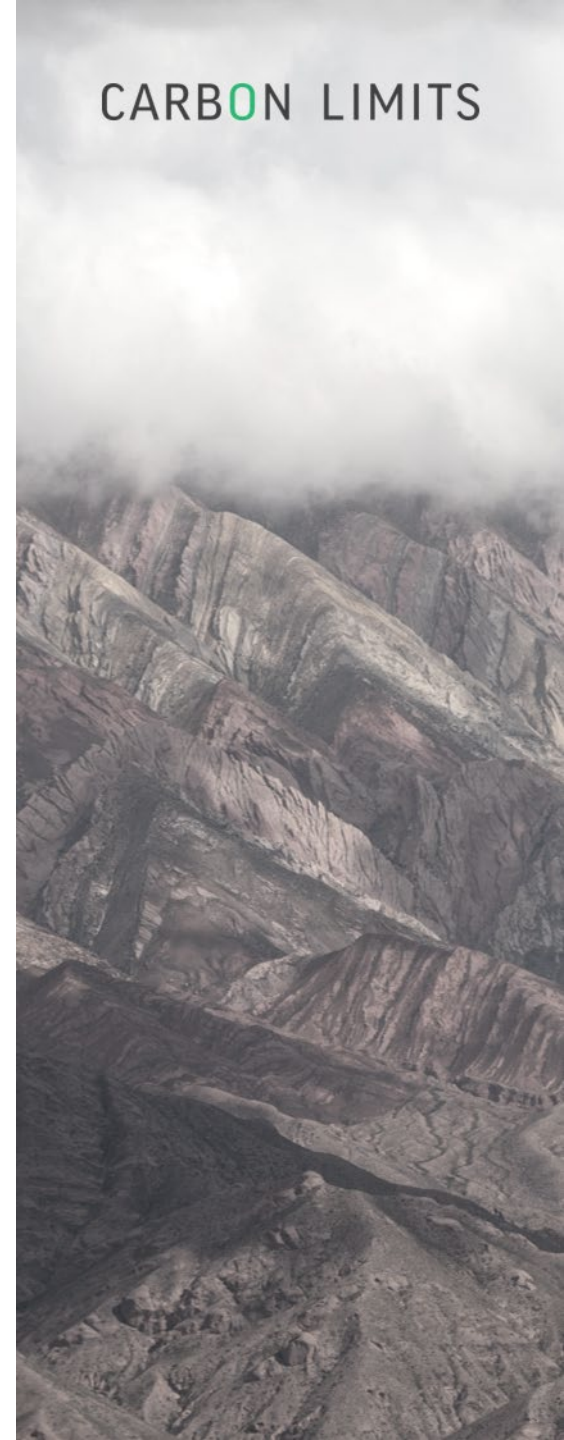
A step-by-step methane inventory tool



Targeted for oil and gas companies

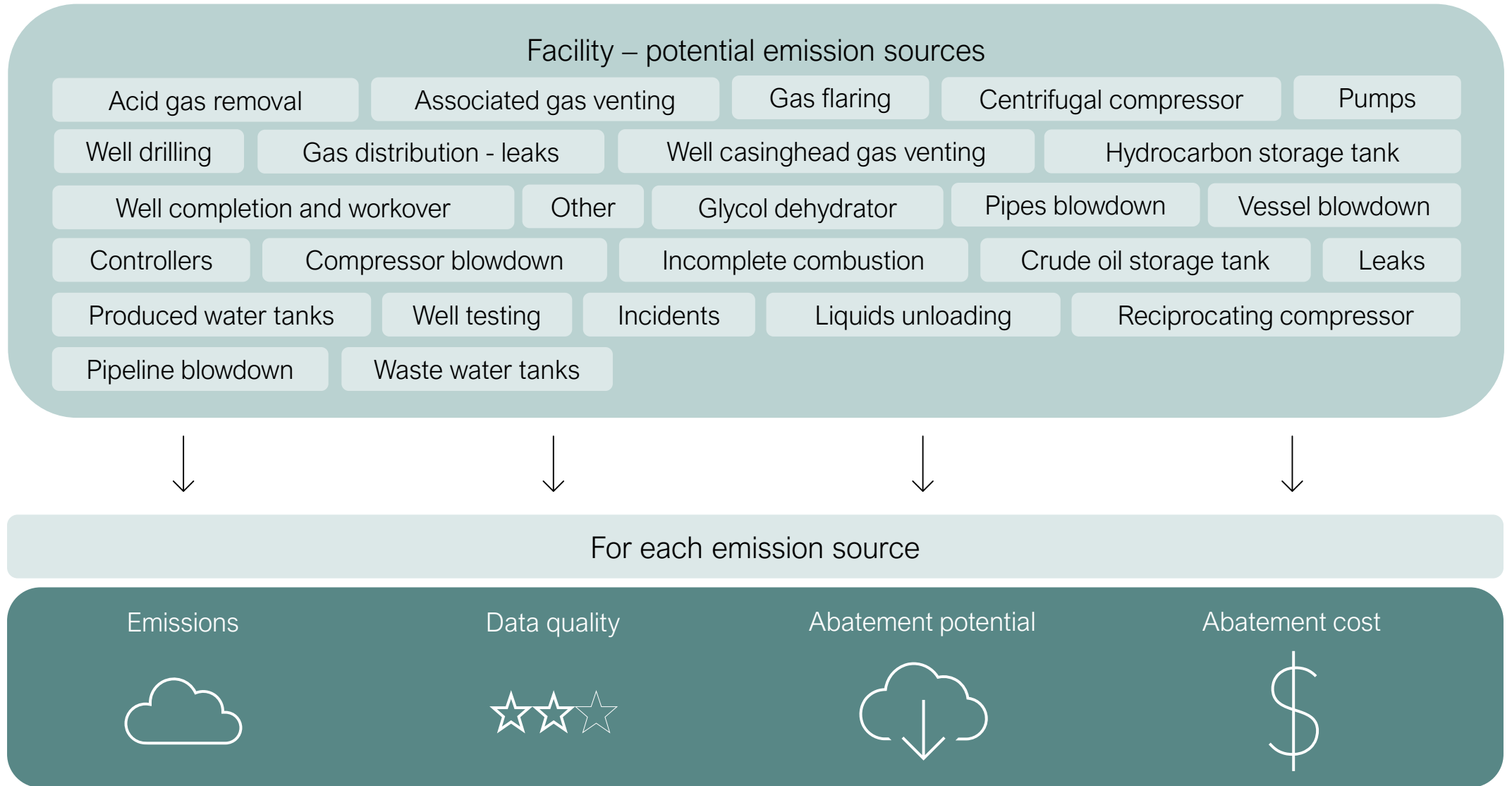


Key objective – Understand where your emissions are coming from to be able to address them



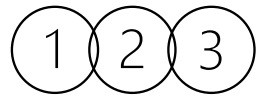
Methane inventory

Summarizing and reporting all the data calculated by Mist



Why use Mist?

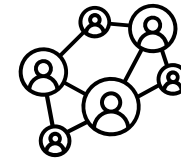
It enables a quick and easy creation of an emissions inventory that can be refined as more data is added



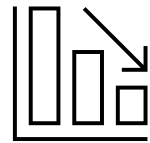
User-friendly software and guidance page



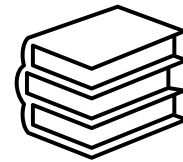
Grows in accuracy as more information added



Centralized and transparent



Integrated abatement potential and cost calculations



Uses the best available emissions factors and data

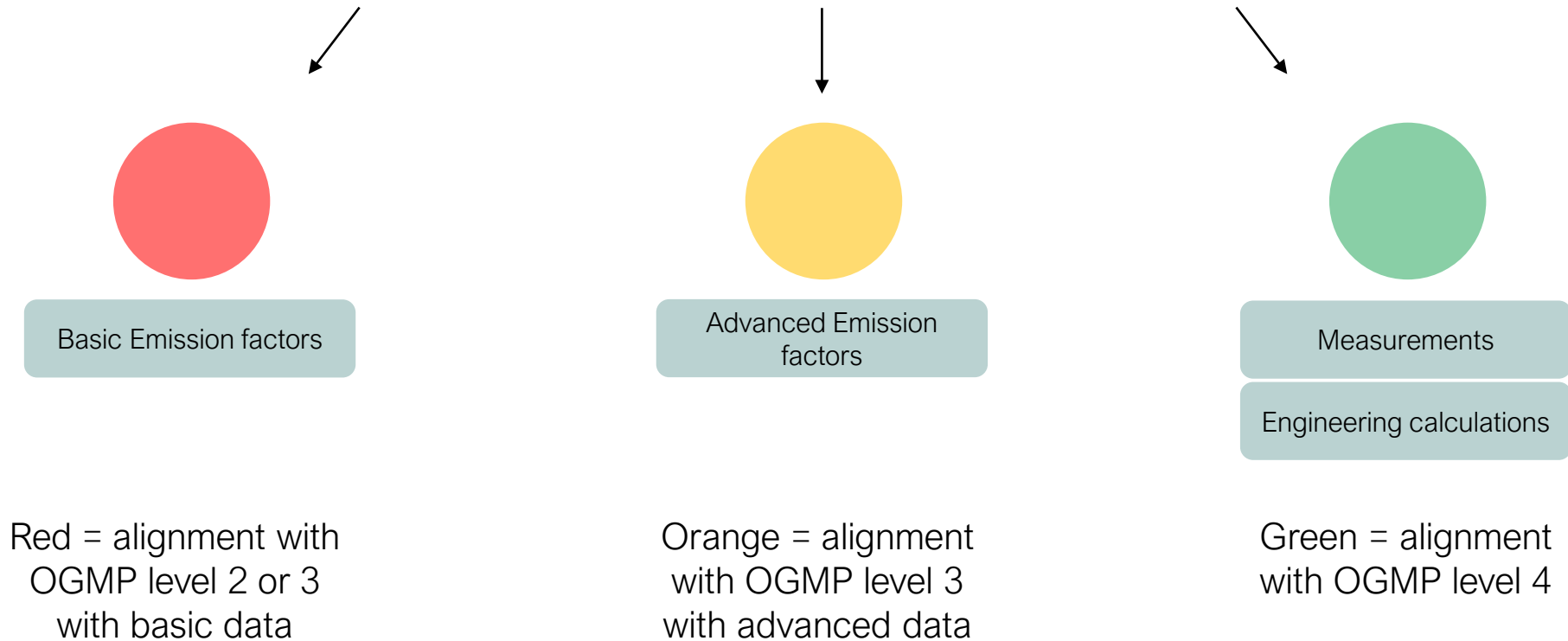
OGMP 2.0

Aligned with international best practice

Different levels of data inputs and data quality

Aligned with OGMP 2.0

Mist provides three levels of data quality

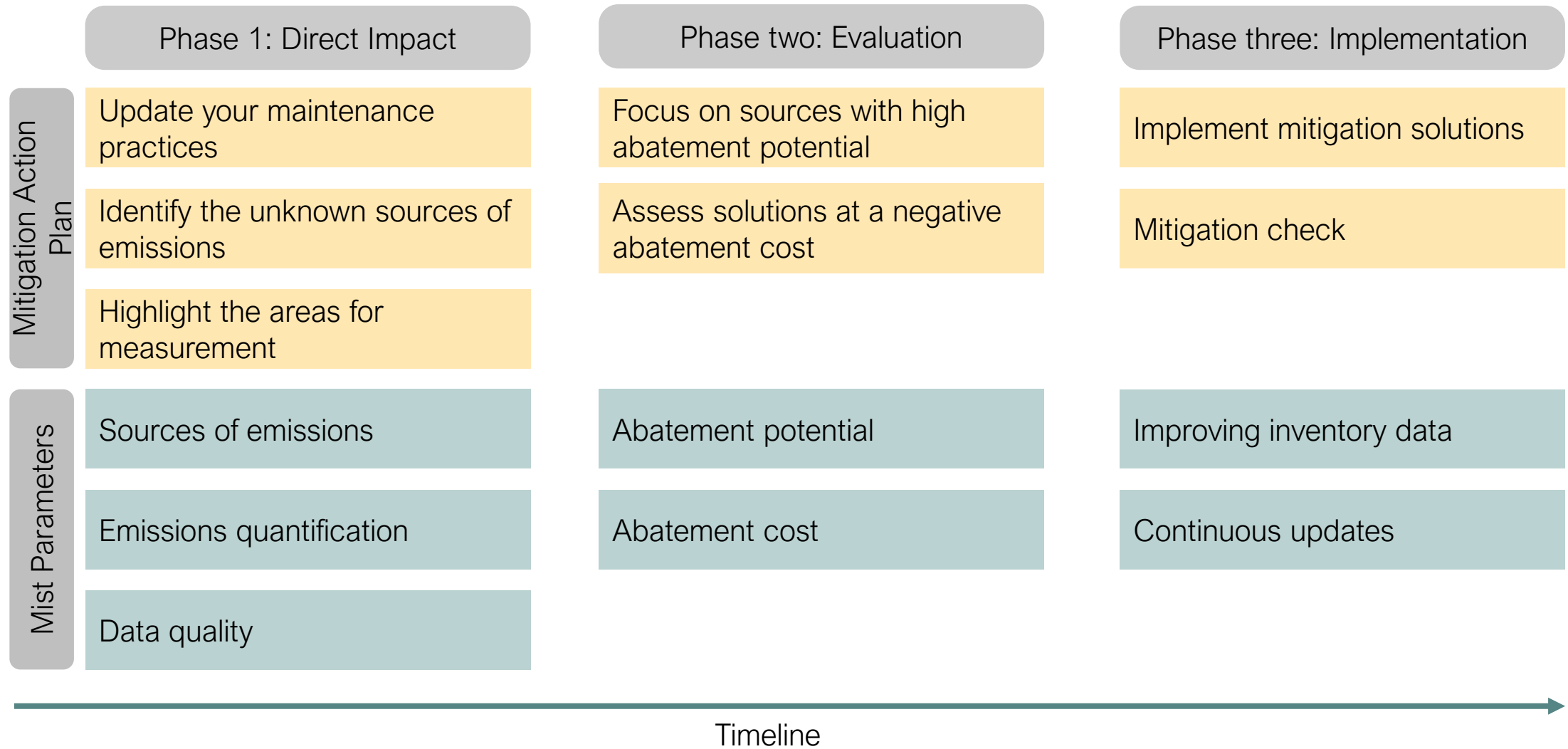


Data quality is provided at emissions level and aggregated at facility and company level

Mitigation action plan

How Mist helps build an action plan

CARBON LIMITS



Mist is a powerful tool to understand the issue and
start acting on it

Contact us for a demo
mist@carbonlimits.no

or scan the QR code below



Techno-Economic Analysis Model (TEAM)

Alberto Alva-Argaez
Process Ecology Inc.

What is TEAM?

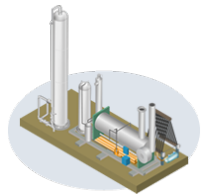


- TEAM is a web-based decision support tool that enables rigorous techno-economic evaluations and optimization of emissions mitigation strategies for key industrial sectors, while considering facility-level constraints and local economic parameters:

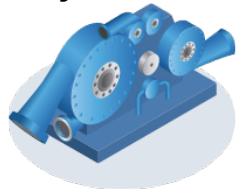
Evaluations can be performed at the site, company, industry-segment, regional and jurisdictional levels.

Emissions Mitigation in Upstream Oil & Gas

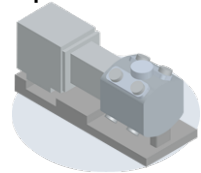
■ Which sources?



Glycol Dehydrators?



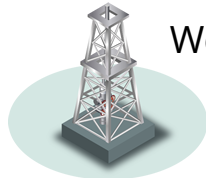
Centrifugal Compressors?



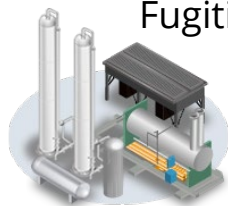
Reciprocating Compressors?



Tanks?



Wells?



Fugitives?

OTHERS?

■ Which technologies?

- Vapor recovery units?
- Seal replacements?
- LDAR?
- Combustors?
- Flares?
- Tie to gathering systems?
- Etc...

Integrated Data Platform (TEAM)

Integrated techno-economic and environmental analysis platform for developing emissions inventories **and** GHG mitigation strategies.

Features Three Underlying & Fully Integrated Analytical Pillars

Interactive output environment

Emissions Source Assessment

- 1 Develop a bottom-up geospatial assessment of emissions by facility and source: leaks, venting, flaring and fuel use.
- 2 Drive the assessment using activity and infrastructure data and tiered calculation procedures.
- 3 Bridge data gaps and simplify setup requirements using an auto-configuration feature.

Site and Source-Specific Mitigation Opportunities

- 1 Identity and size all relevant mitigation technologies.
- 2 Account for mutually exclusive and dependent technologies.
- 3 Assess emissions reduction potential (GHG, SLCP and CAC) by source and mitigation technology over the economic life of the projects.

Economic Analysis

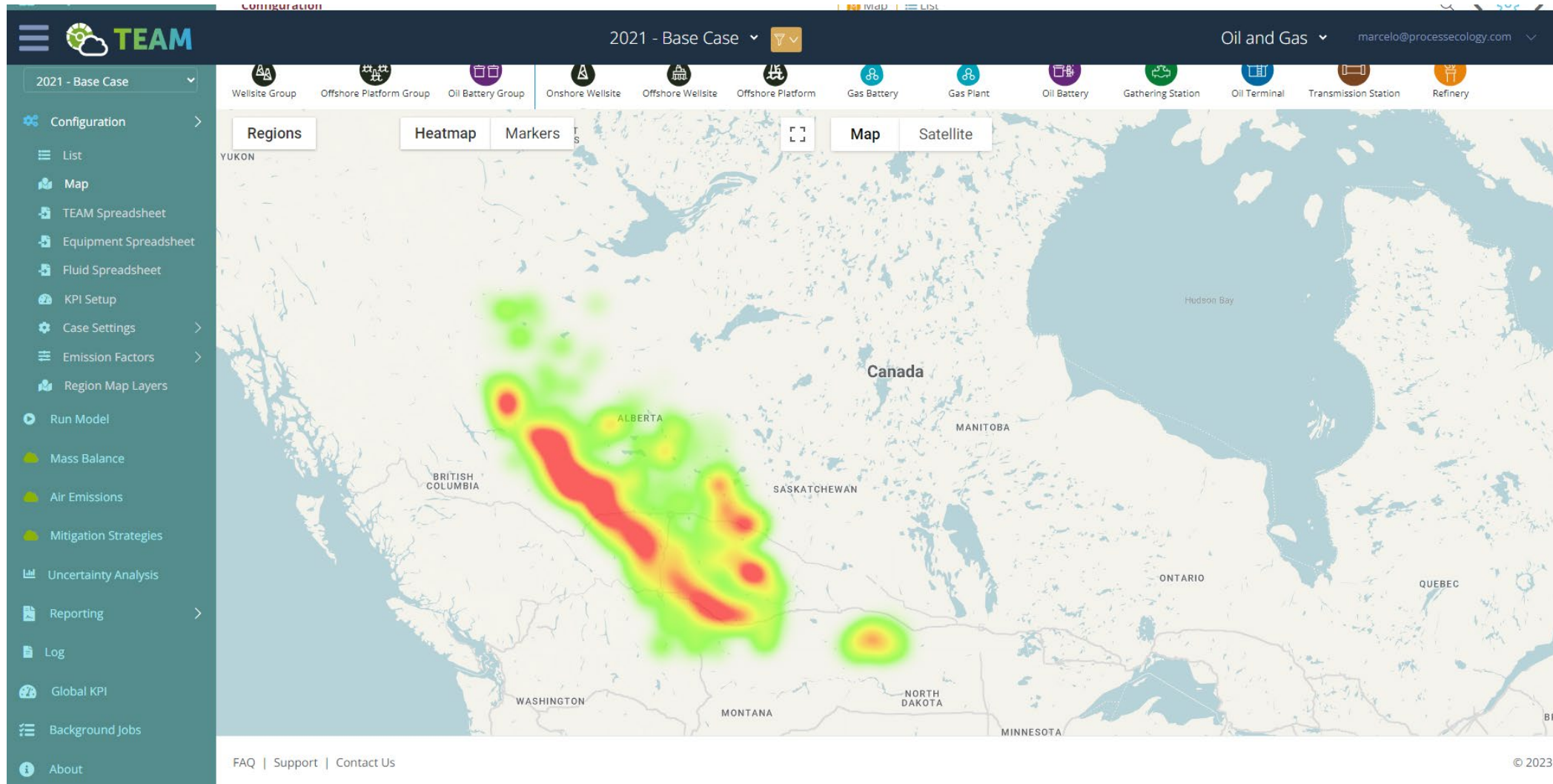
- 1 Evaluate capital and operating costs as well as economic benefits achieved over the project life.
- 2 Key input parameters: activity decline rates, commodity pricing, taxes, royalties, discount and inflation rates.

- 1 Emissions inventory/ Reporting
- 2 Portfolio of potential mitigation opportunities
- 3 Marginal abatement cost curves
- 4 Technology penetration potential as a function of marginal abatement costs
- 5 Development of optimal marginal abatement strategies

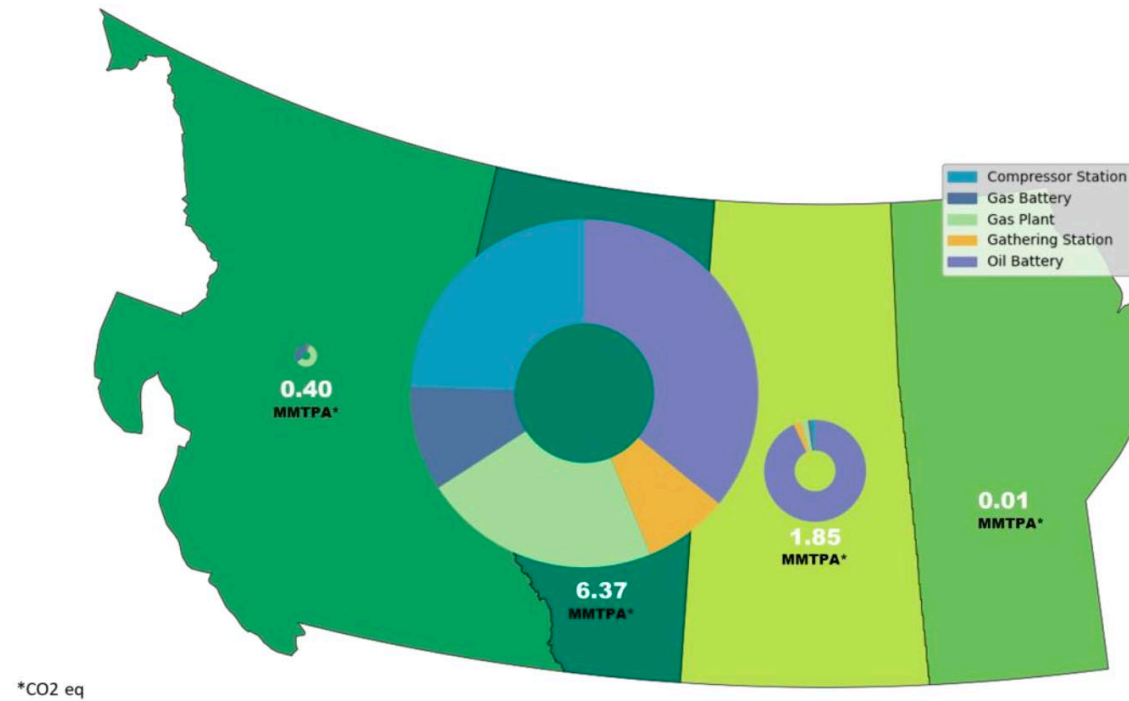
TEAM Setup: Example Western Canada



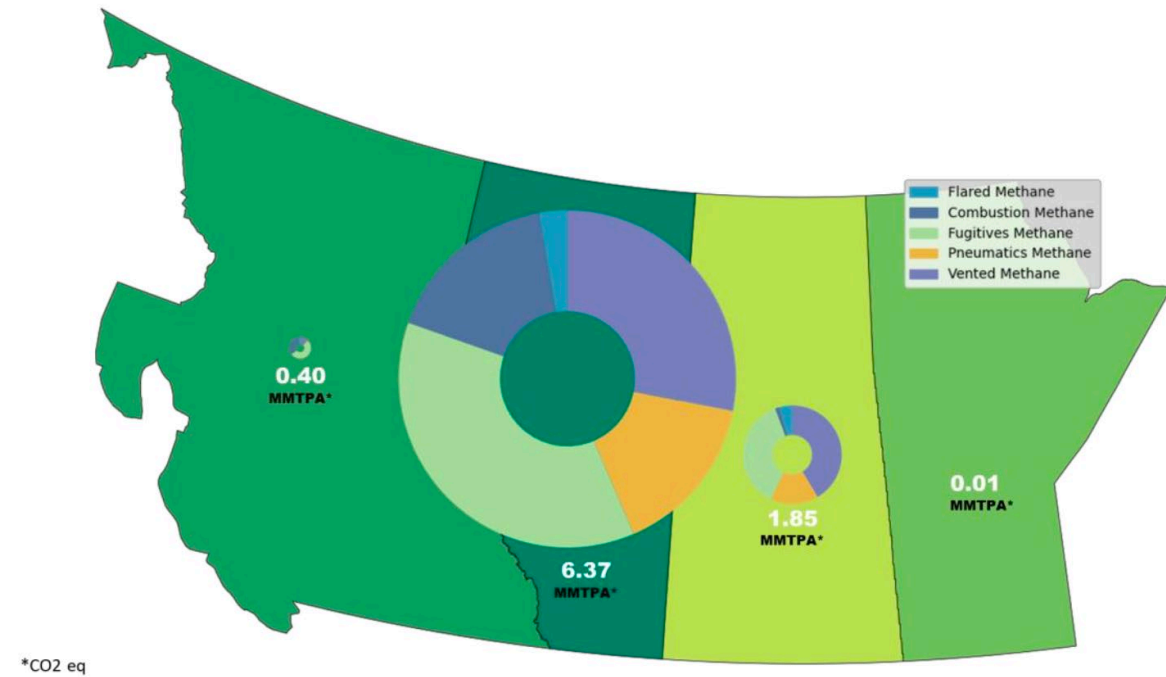
TEAM Western Canada



Methane Emissions Across Western Canada



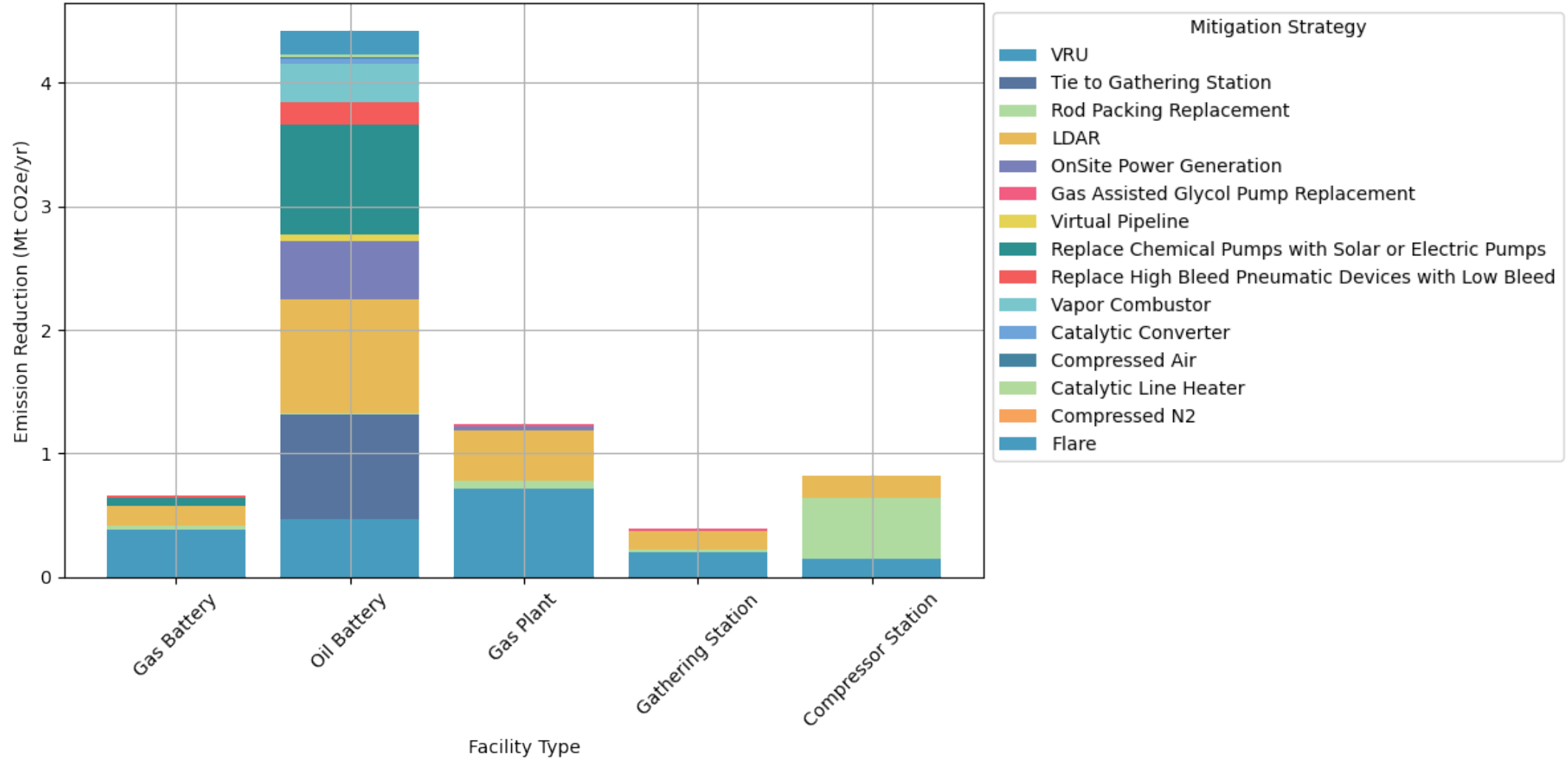
By facility type



By source type

*Wellsites excluded

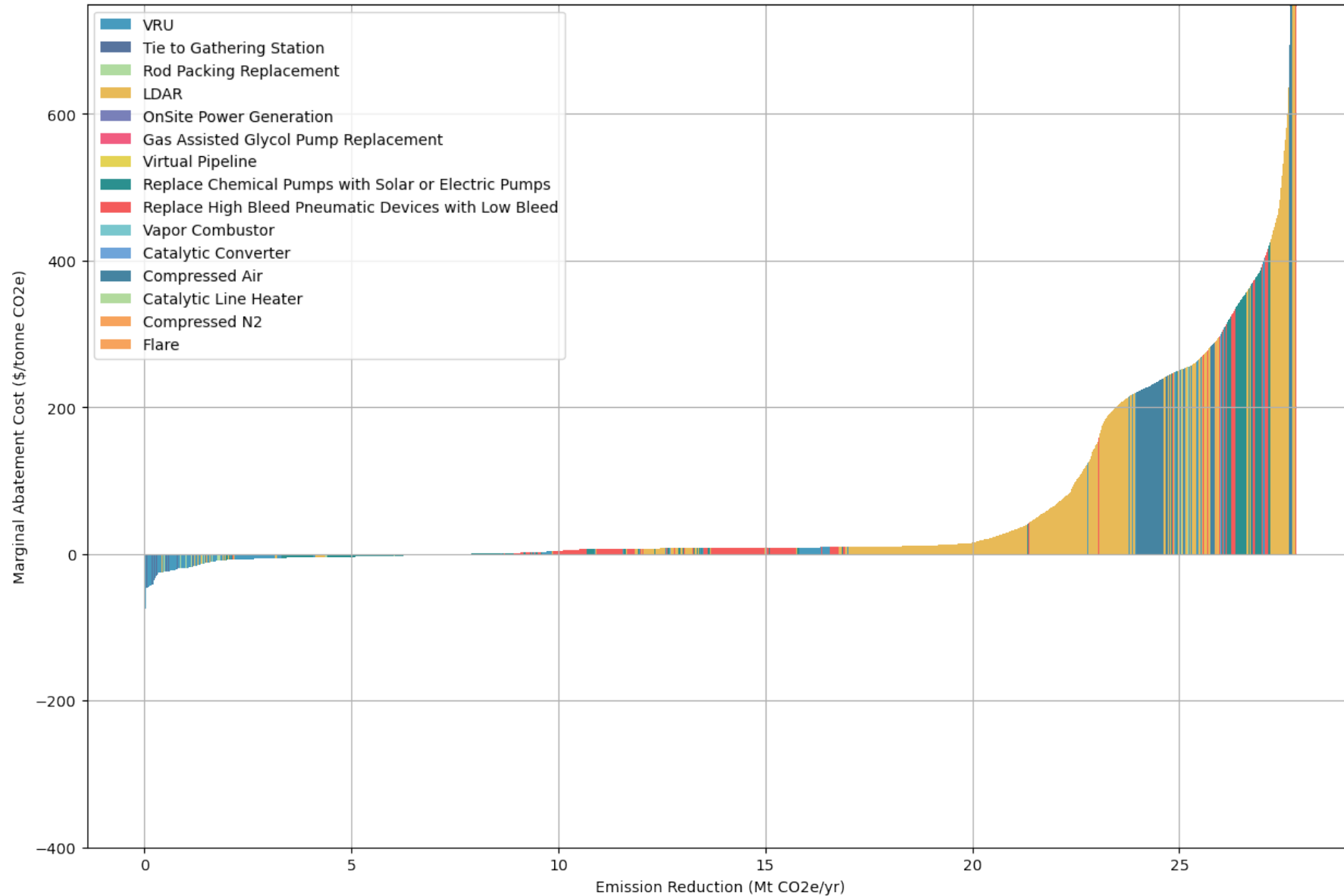
Distribution of Mitigation Technologies



Cost Data References

- A detailed literature review of 60+ references was completed
 - Recent reports were given higher priority
 - Interviews and communications with technology vendors and specialized consultants
- A databank was built-in to summarize and capture all the identified cost information- Methane Mitigation Data Bank (MMDB)
 - Information on CapEx, Opex, mitigation potential, reference, currency and reported year, etc.
 - TEAM reports cost data in 2023 dollars using CPI tables

Mitigation Roadmap Available- Project by Project



Final Remarks on TEAM

- The Techno-Economic Analysis Model (TEAM) presents a web-based digital platform to identify optimal mitigation strategies for upstream oil & gas operations at the regional/country level
- TEAM includes details of the facilities to characterize emissions source-by-source
 - Includes industry and engineering knowledge to fill data gaps
 - Enables incorporation of additional datasets as required (e.g. GGFR satellite data)
- Geospatially resolved to enable improved cost evaluations of mitigation technologies (e.g. distance to resources)
- Algorithms to identify mitigation pathways with lowest MAC

Thank You

alberto@processecology.com

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UNECE Needs Assessment

Andrew Meluch

Discussion: Highlights from COP28

James Diamond

COP28 Outcomes

- New Global Methane Pledge signatories:
 - Turkmenistan, Kazakhstan, Kenya, Romania, and Angola
- New methane regulations:
 - United States – EPA’s Final Rule
 - Canada – proposed oil & gas standards
 - Egypt – domestic regulations to curb methane emissions
- Announcement of the World Bank’s Global Gas Flaring Reduction Partnership
- Announcement of the RMI, CATF, and Global Methane Hub WasteMAP tool

EPA's Final Rule for Oil and Natural Gas Operations

- On December 2, 2023, EPA announced a **final rule to reduce methane and other harmful air pollution from both new and existing oil and natural gas operations.**
- EPA developed the final rule through a public process, considering nearly 1 million comments on two proposals (2021 and 2022)
- The final rule:
 - Recognizes and encourages innovation in methane detection technology.
 - Gives industry time to prepare to meet requirements and to secure necessary equipment
 - Includes a program to leverage third-party expertise to find large emissions known as “super emitters”
 - Gives states, along with Tribes that wish to, two years to develop and submit their plans for reducing methane from existing sources.
- The rule will sharply cut emissions from 2024-2038:
 - 58 million tons of methane (nearly 80 percent lower than expected emissions without the rule)
 - 16 million tons of VOCs
 - 590,000 tons of air toxics
- The benefits of the final rule far outweigh costs.
 - Estimated net climate and ozone health benefits are \$97 to \$98 billion dollars from 2024-2038 (\$2019), the equivalent of \$7.3 to \$7.6 billion a year, after accounting for the costs of compliance and savings from recovered natural gas.

Open Discussion

Thank You!

- Register for the 2024 Global Methane Forum!
<https://www.globalmethane.org/2024forum/register.aspx>
- Connect with GMI on social media
 - Facebook: www.facebook.com/globalmethane/
 - X: twitter.com/globalmethane
 - LinkedIn: <https://www.linkedin.com/company/global-methane-initiative-gmi-/>
- Send suggestions for events or resources as well as any questions or needs to the GMI Secretariat
at secretariat@globalmethane.org