GMI Oil & Gas Subcommittee Meeting

Virtual

Global Methane Initiative

Leading methane action since 2004

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

CLIMATE & CLEAN AIR COALITION TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

UNECE

iea

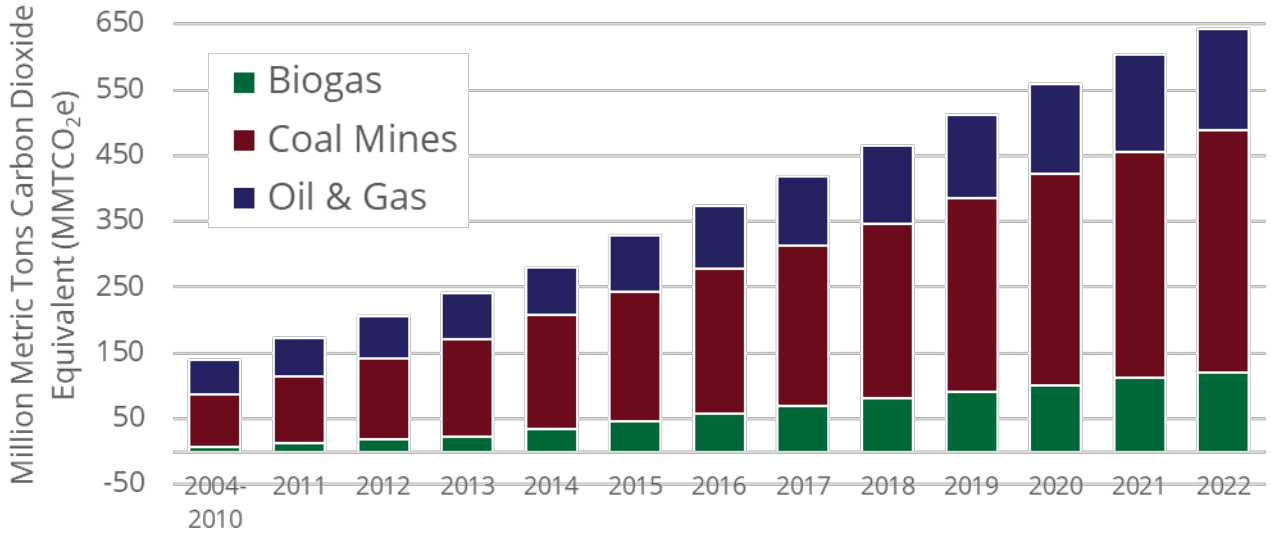
UN environment programme

THE WORLD BANK IBRD • IDA

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 CH_4 by more than **640 $MMTCO_2e$** including **approximately 40 $MMTCO_2e$** achieved in 2022



643 $MMTCO_2e$ is approximately equivalent* to the CO_2 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/

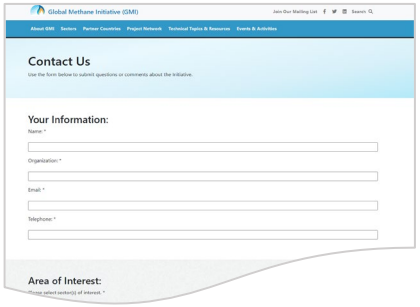
Global Methane Pledge Support and Implementation

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

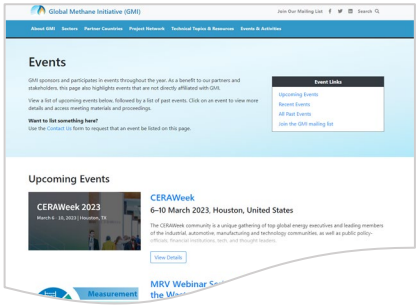
Global Methane Initiative
Leading methane action since 2004

Engage with GMI



Submit a Contact Us Request

Let us know how we can help you:
globalmethane.org/contact-us/



Share Events or Resources

Recommend items to publish on the GMI website:
globalmethane.org/resources/recommend.aspx

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

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secretariat@globalmethane.org

Global Methane Initiative
Leading methane action since 2004

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

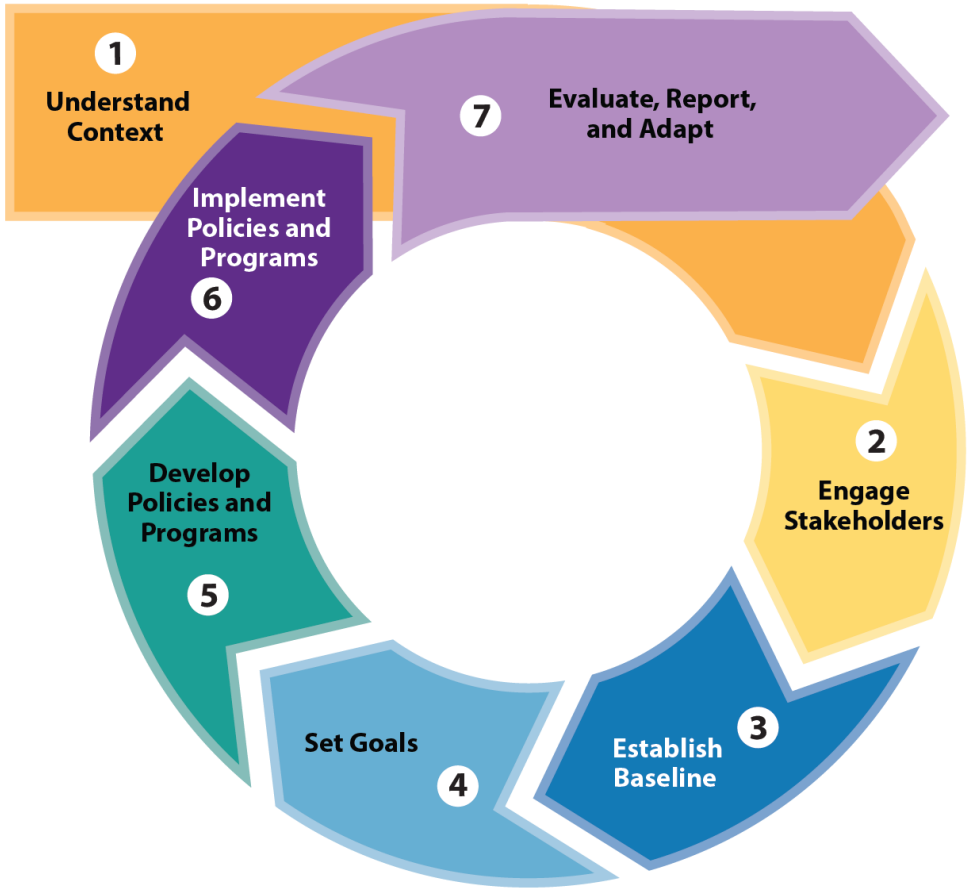
- Oil & Gas Technical Sessions will take place on 20-21 March in conjunction with the UNECE Group of Experts on Gas meeting
- Session themes:
  - Government and Industry as Vital Drivers to Mobilize Methane Action in the Oil & Gas Sector
  - The Importance of Data Collection and Reconciliation to Mobilizing 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

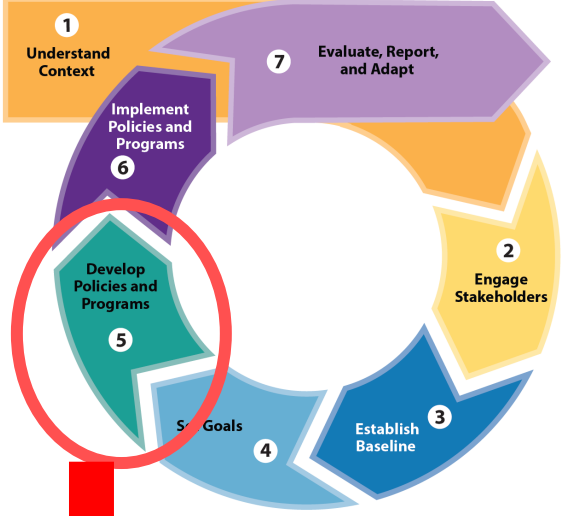
U.S. Environmental Protection Agency and Global Methane Initiative

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

Global Methane Initiative

Leading methane action since 2004

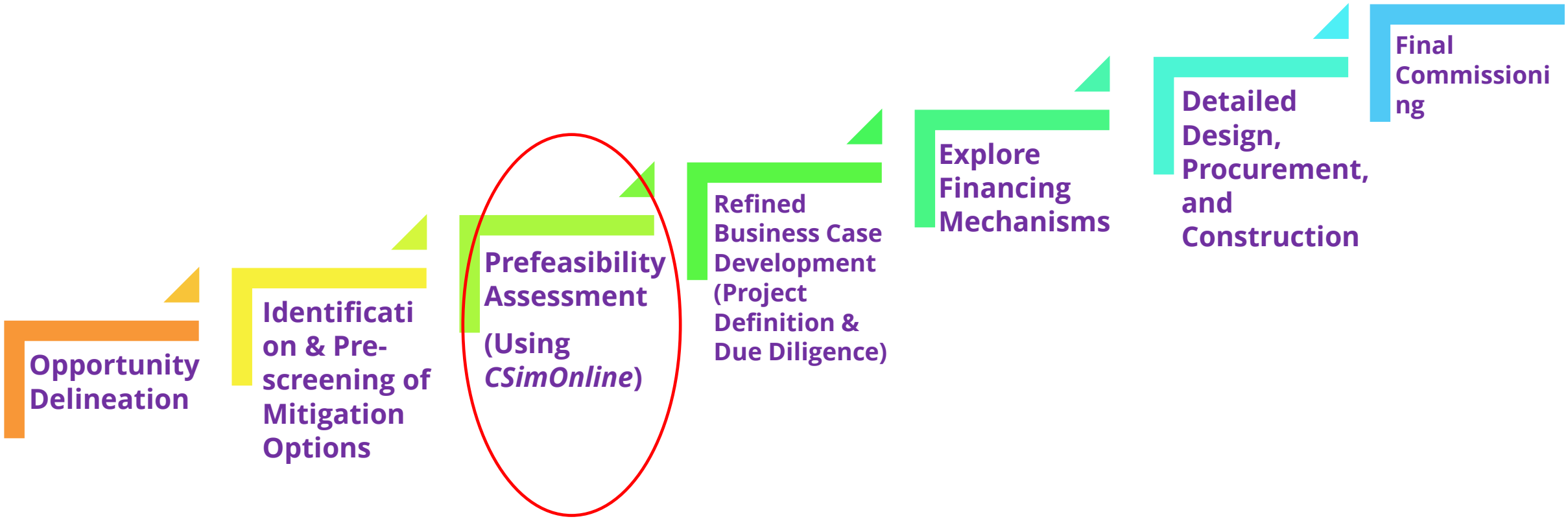
Project Goals

- 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).

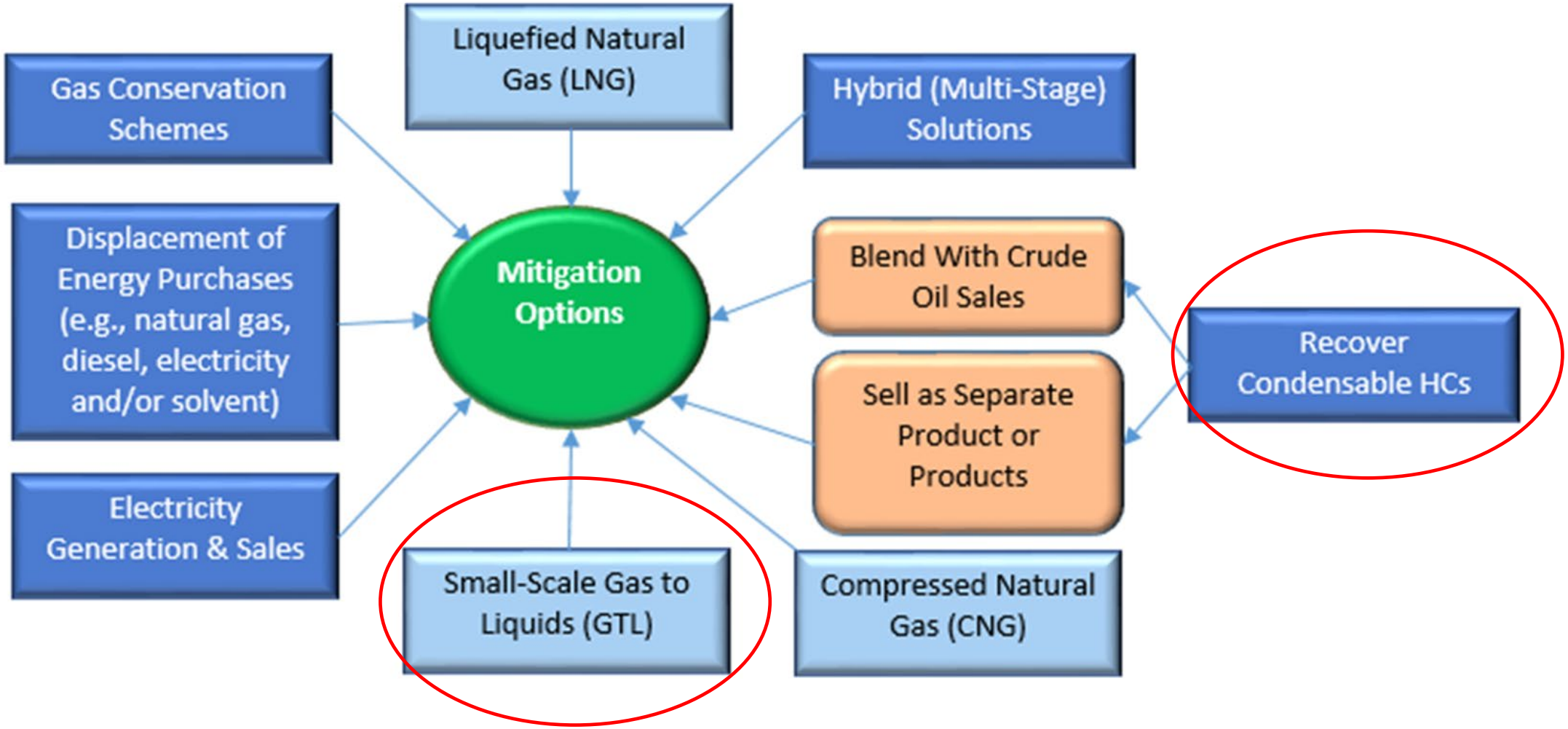
Challenges for the Gas Utilization

- 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 CO_2).
3. Opportunity to increase oil production while reducing emission intensities and total emissions.
4. Aligned with Kazakhstan's National Environmental policy.

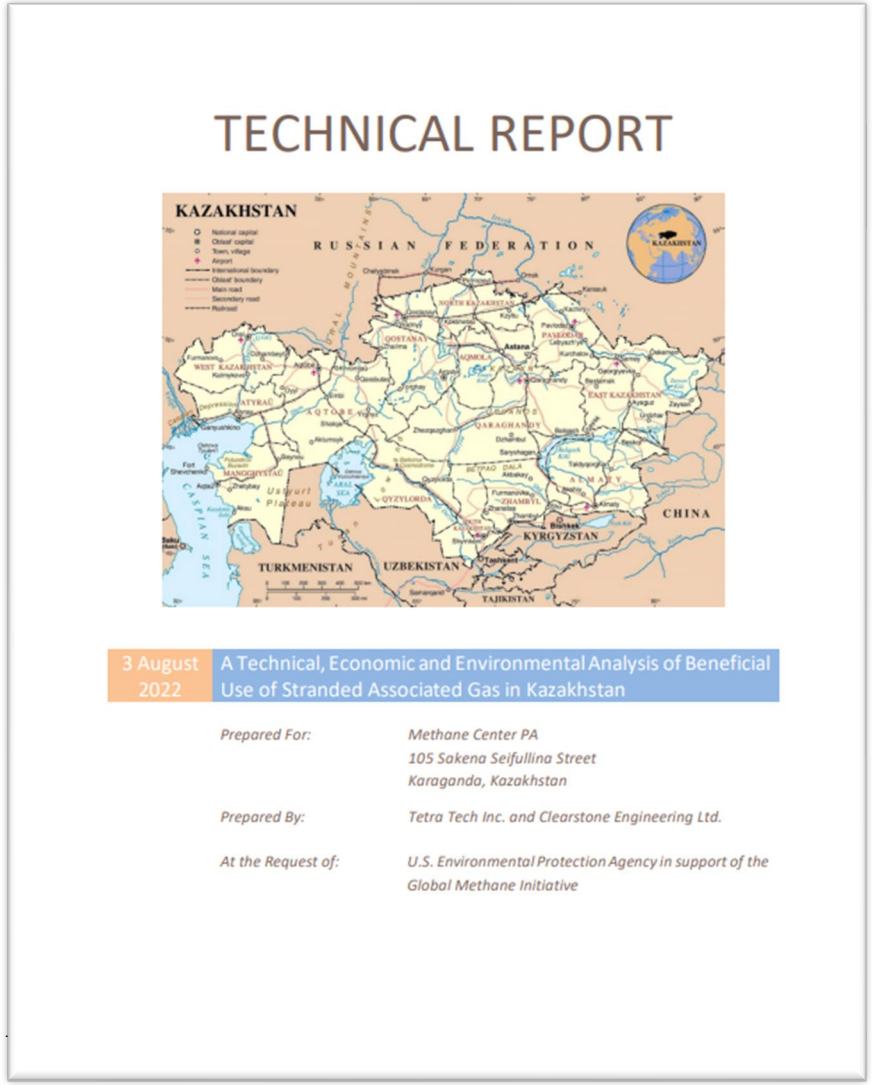
Summary of Economic Analysis using CSIMS Online Model

Table 1: Summary of the economic analysis results for the assessed mitigation options based on a 10-year project life.									
Control Technology			Capital Cost (USD)	Payback Period (y)	Net Present Value		Return on Investment		Internal Rate of Return (%)
Primary Category	Subcategory	Model			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 (ass…

Control Technology			CH_4 (kt)	CO_2 (kt)	N_2O (kt)	CO_2E (kt)	
Primary Category	Subcategory	Model					
Mini-GTL	CompactGTL	Compact	13.6	2,377.2	0.0	2,719.2	…
	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
	Greyrock	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	Electric Compressor Driver	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	Electric Compressor Driver	0.0	206.8	0.0	207.…	
		Natural Gas Fueled Compressor Driver	0.1	206.8	0.0	2…	



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!

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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

Global Methane Initiative

Leading methane action since 2004

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+?

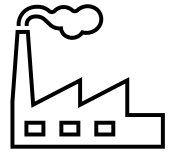
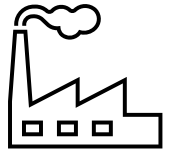
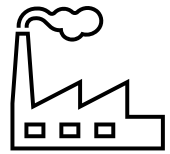
Key:

= Government

= Company

Step 1 (in blue): Identify your goal

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

	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					

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

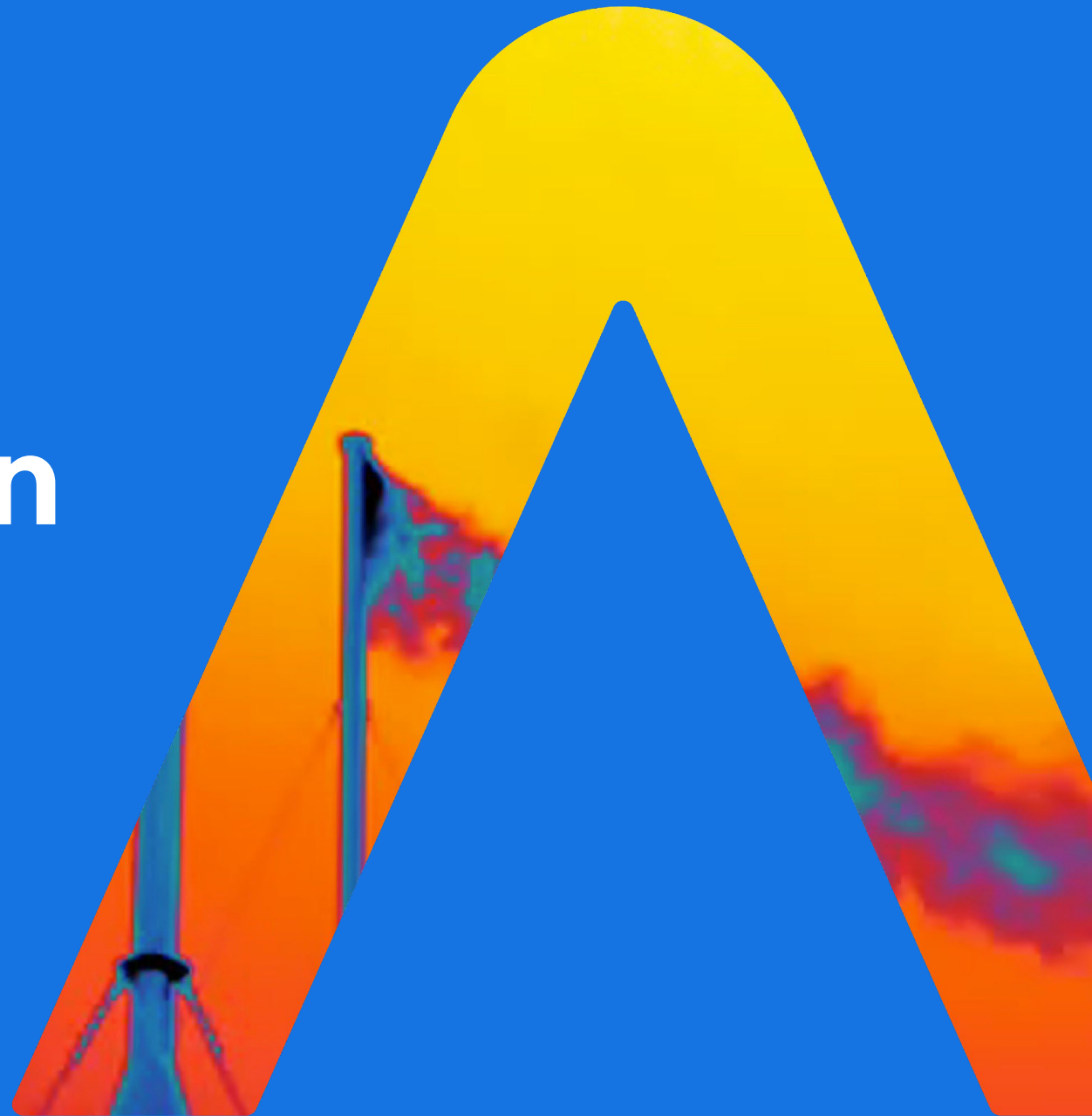
CATF | COMAT Country Methane Abatement Tool

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

COMAT

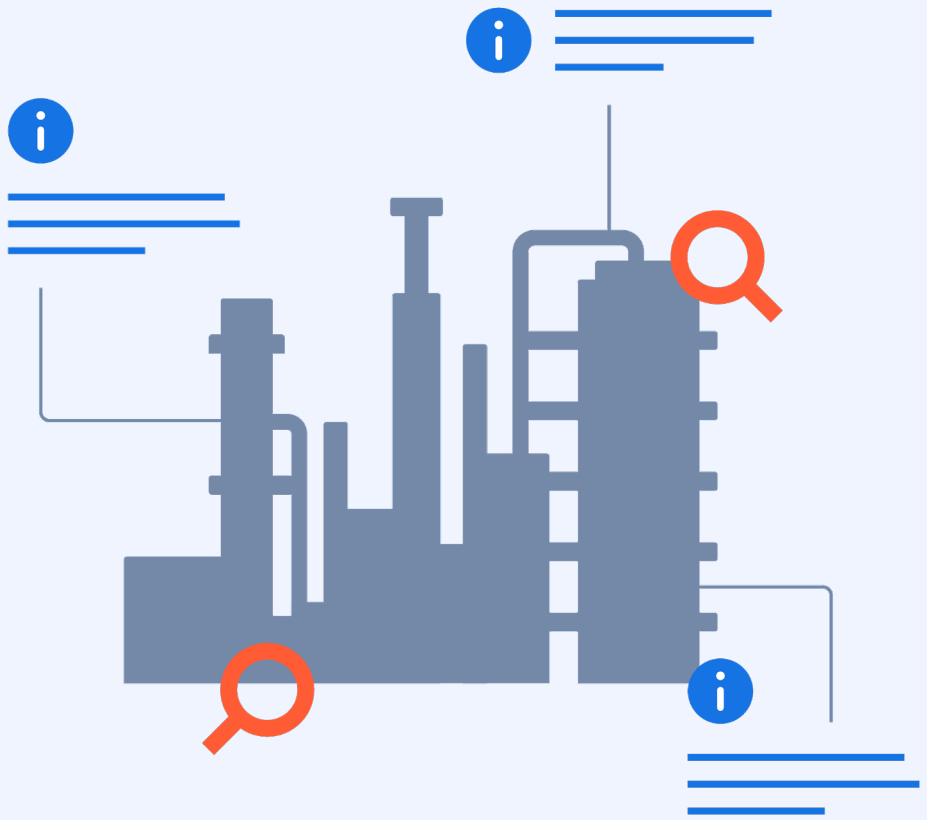
Why We Developed CoMAT

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.



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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.

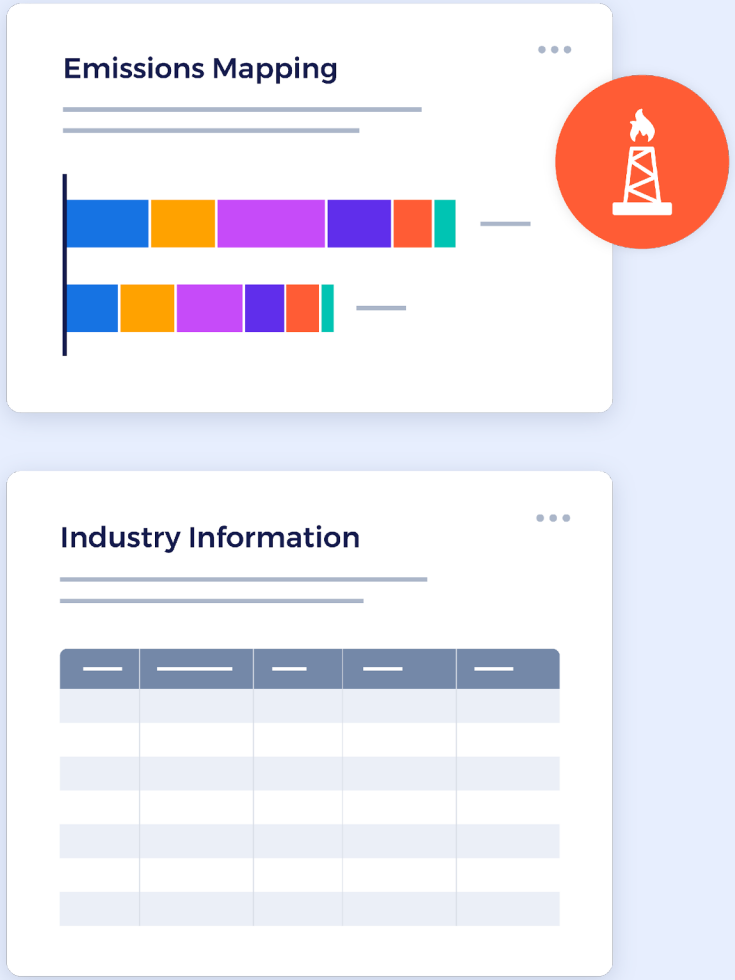
COMAT

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!



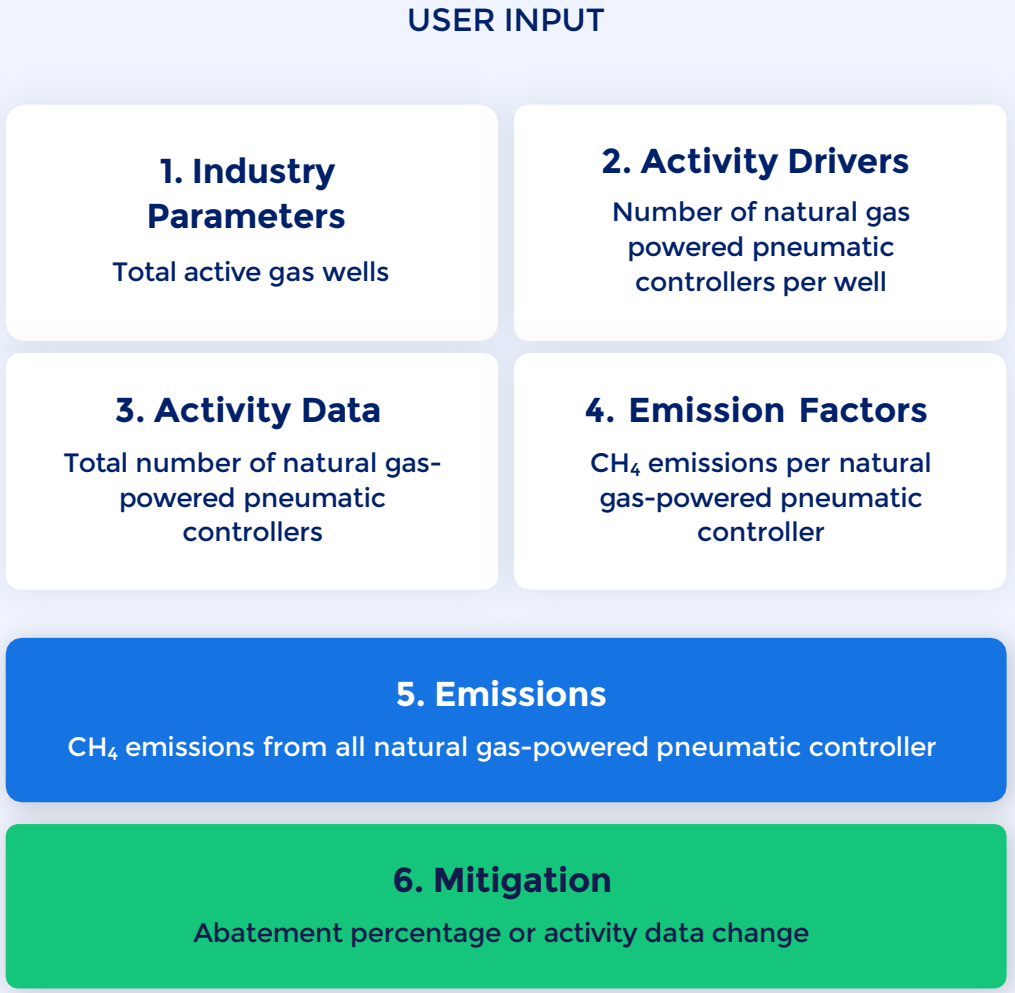
COMAT

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.



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The CoMAT workflow

Data gathering, analysis and validation

Mitigation approach design and planning

Policy review and integration of leading regulatory requirements

COMAT

CoMAT in Action

COMAT

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

COMAT

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

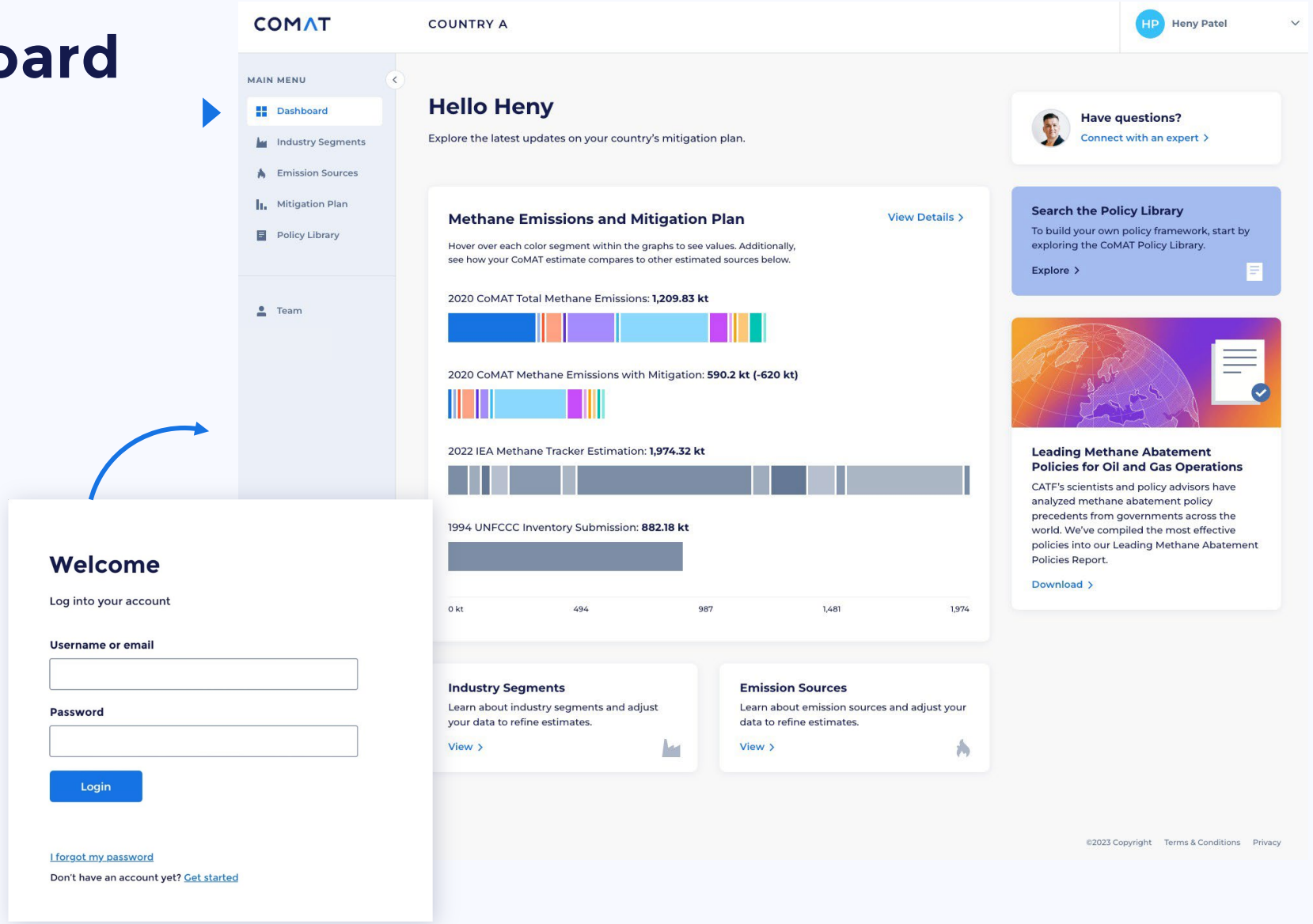
The home dashboard

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**



COMAT

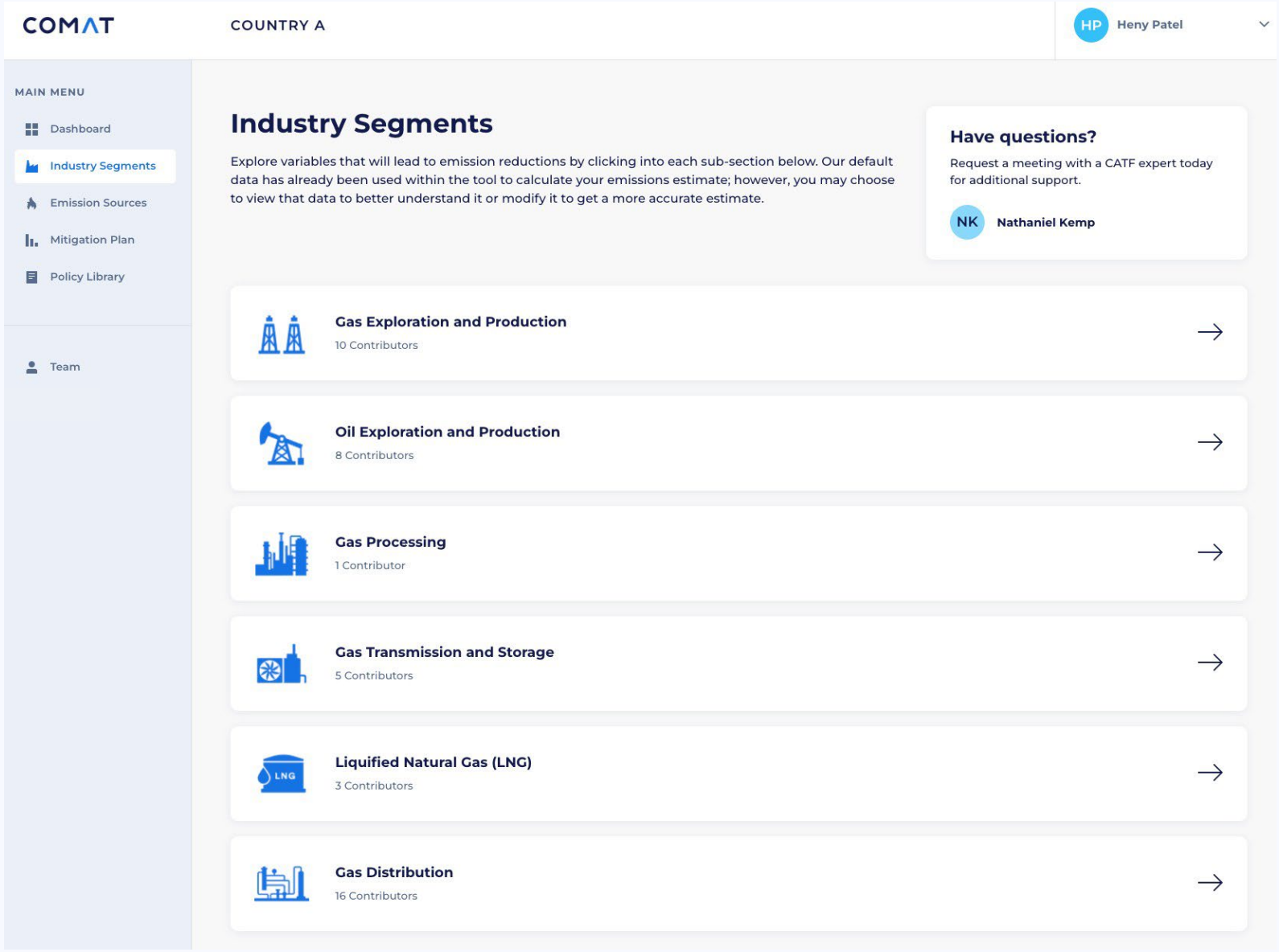
Data validation and user input

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.



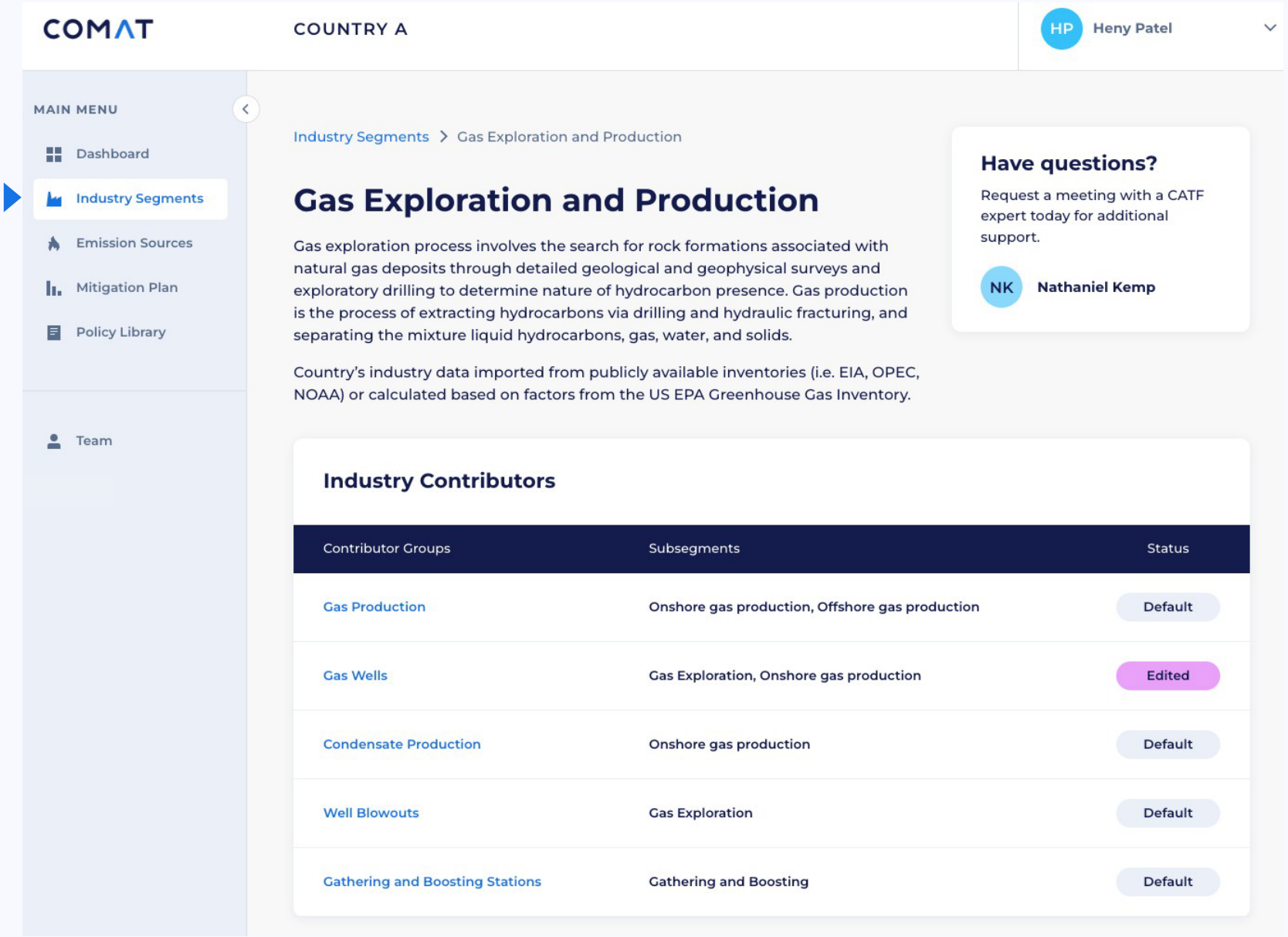
COMAT

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

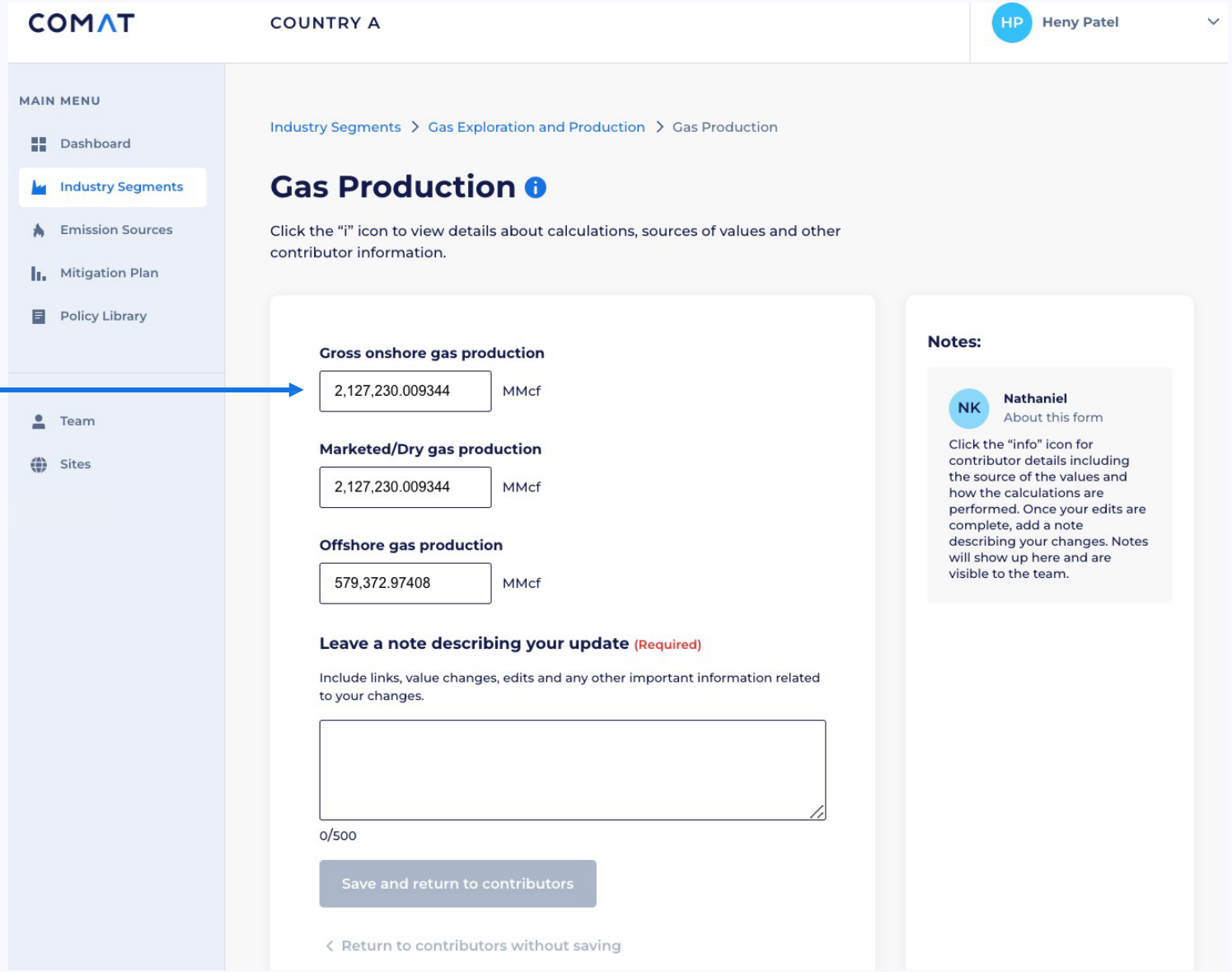
Data validation and user input

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.**



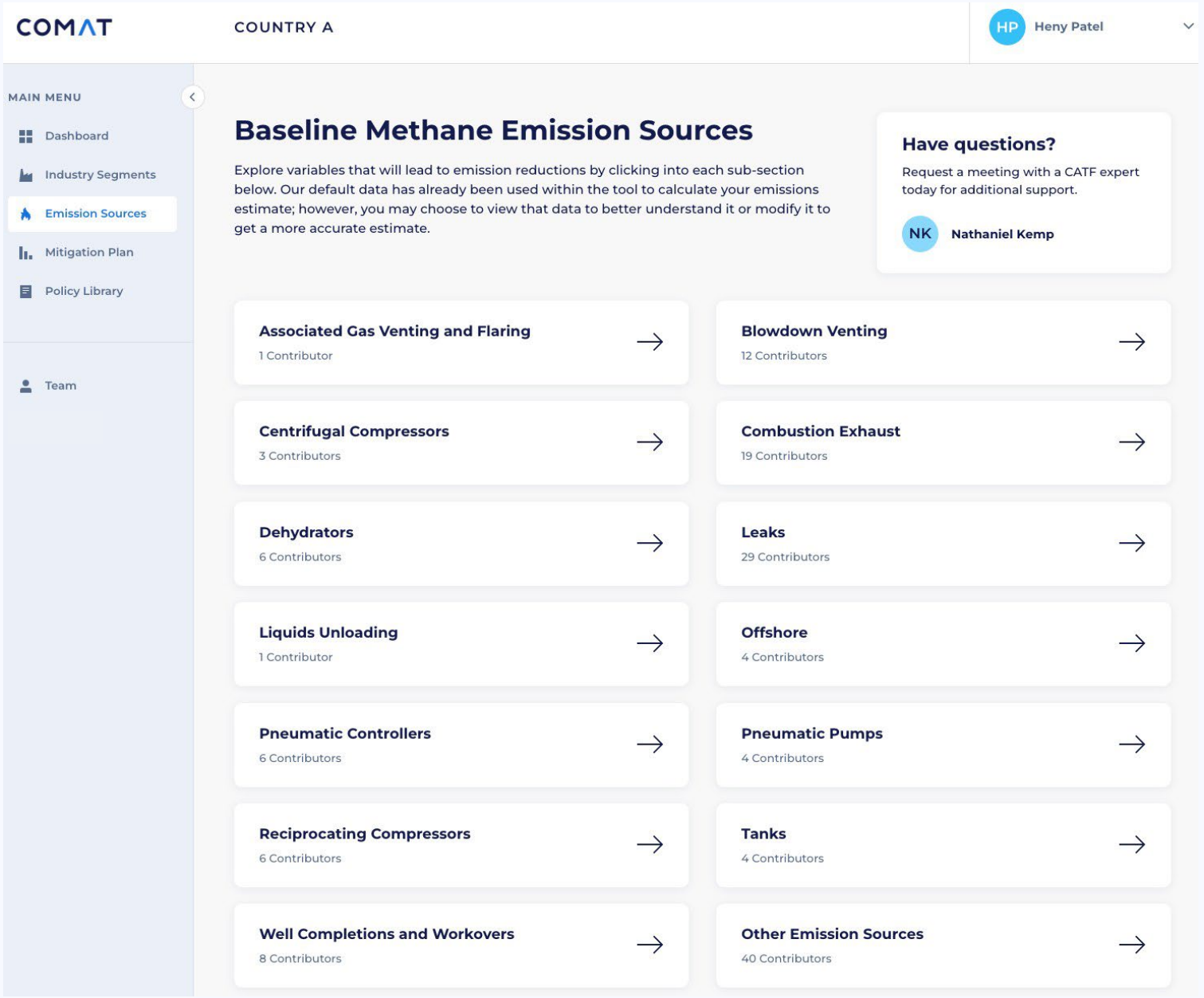
COMAT

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.



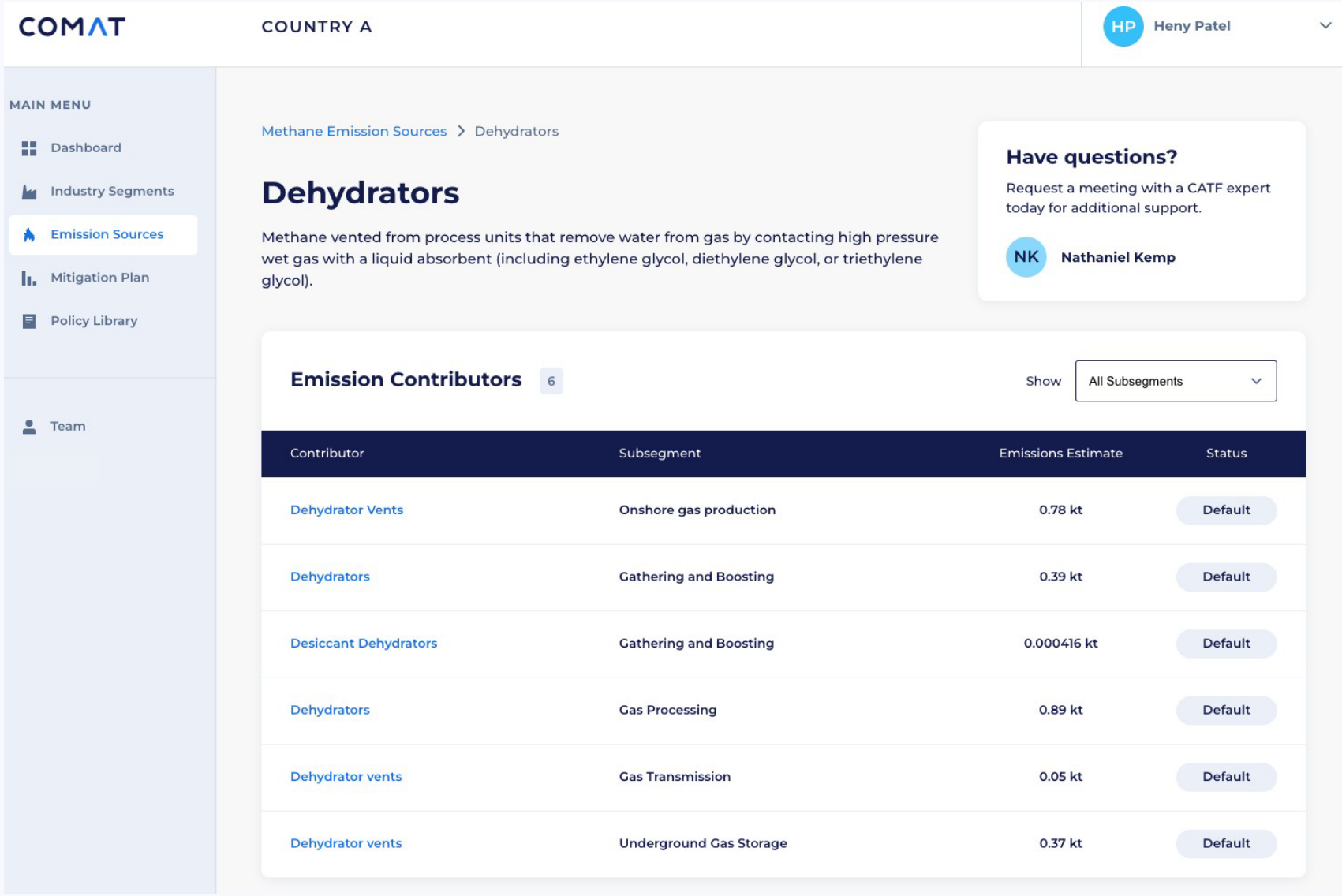
COMAT

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.



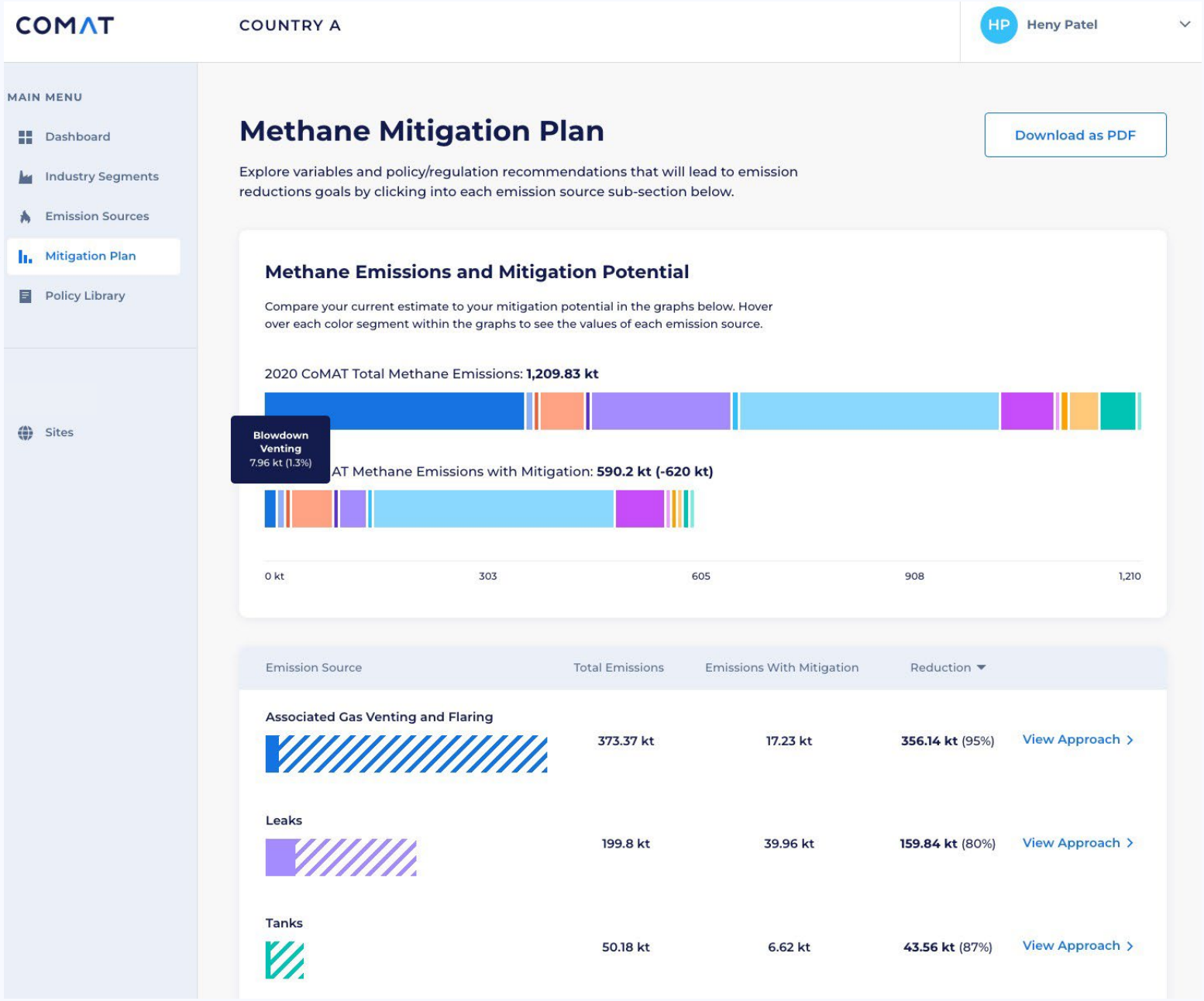
COMAT

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.

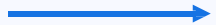


COMAT

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.

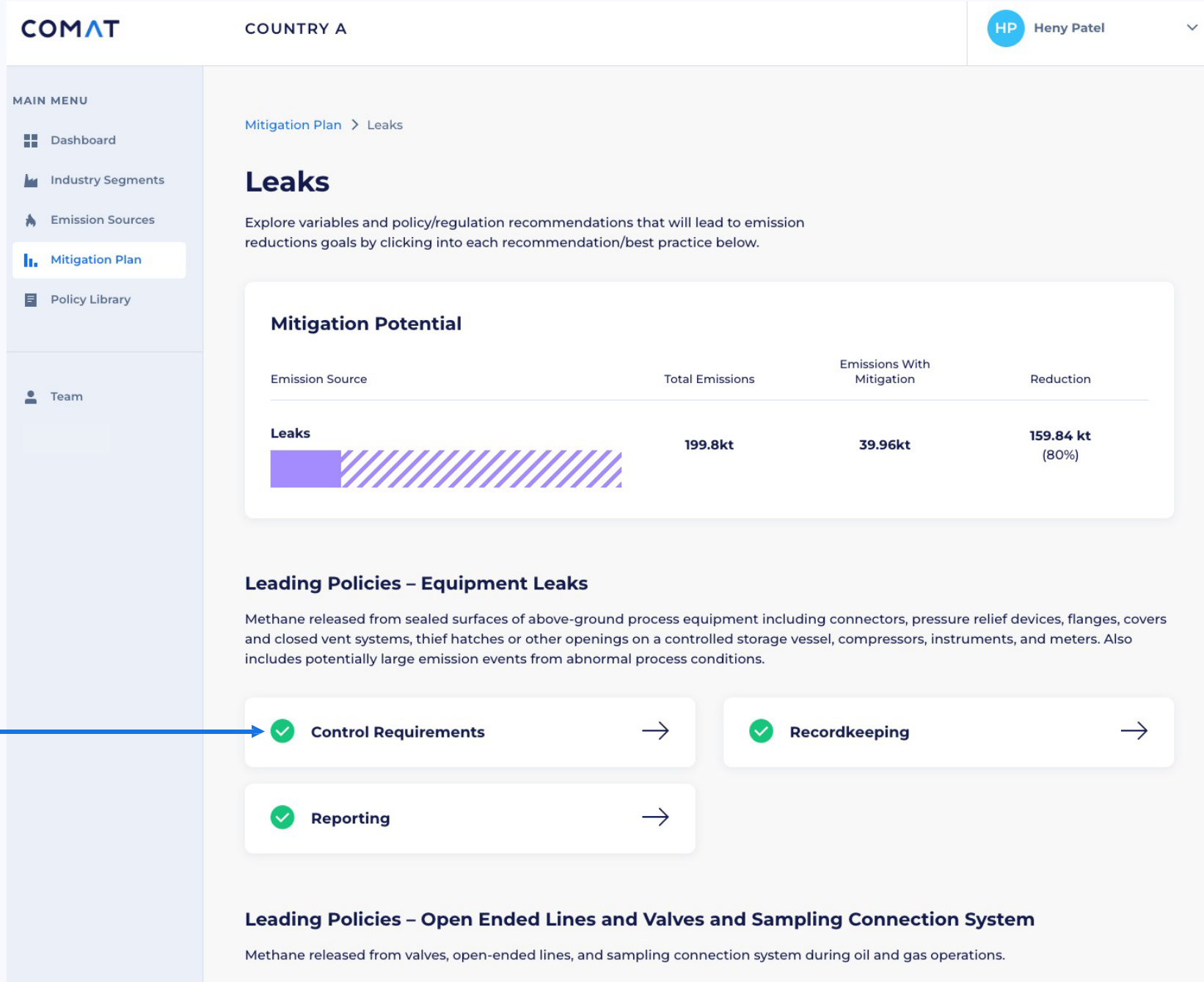


Emission Source	Total Emissions	Emissions With Mitigation	Reduction	
Combustion Exhaust	62.2 kt	62.2 kt	**0 kt** (0%)	View Approach >
Leaks	199.8 kt	39.96 kt	**159.84 kt** (80%)	View Approach >
Associated Gas Venting and Flaring	373.37 kt	17.23 kt	**356.14 kt** (95%)	View Approach >
Blowdown Venting	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.

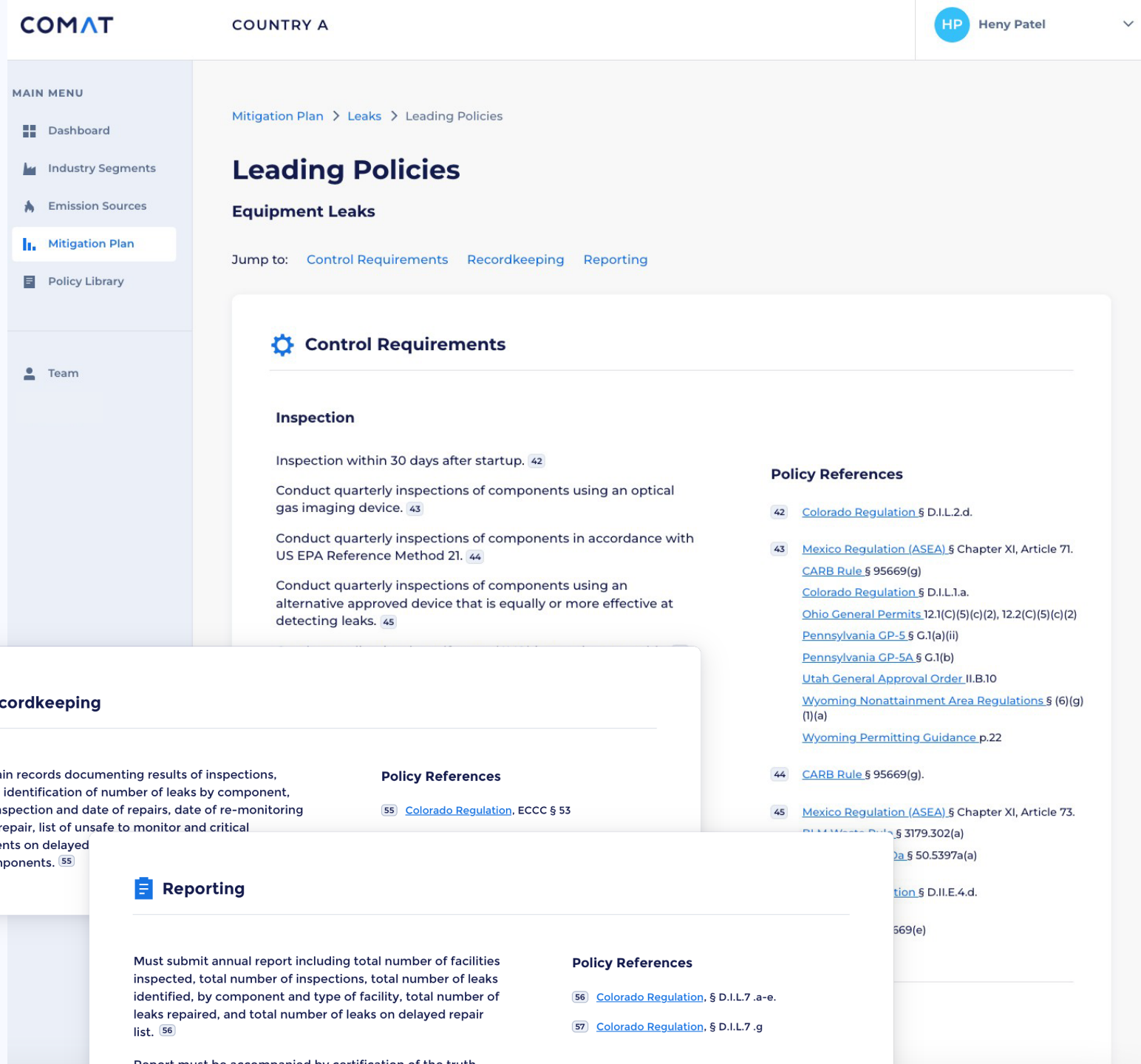


Leading Policies

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.

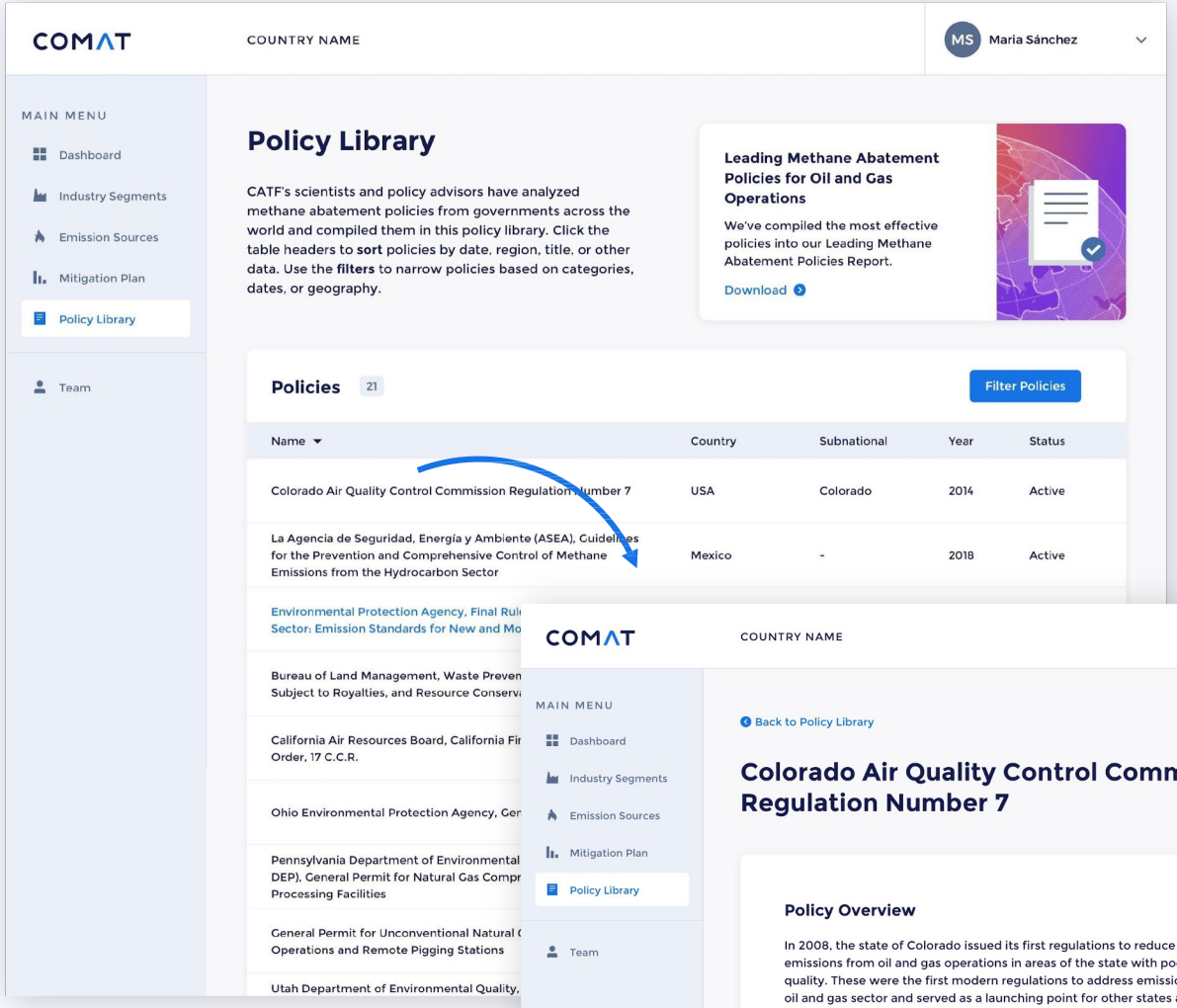
Our experts can also provide specific approaches or guidance on what may need to be proposed or changed to fit a country's unique needs.



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.



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

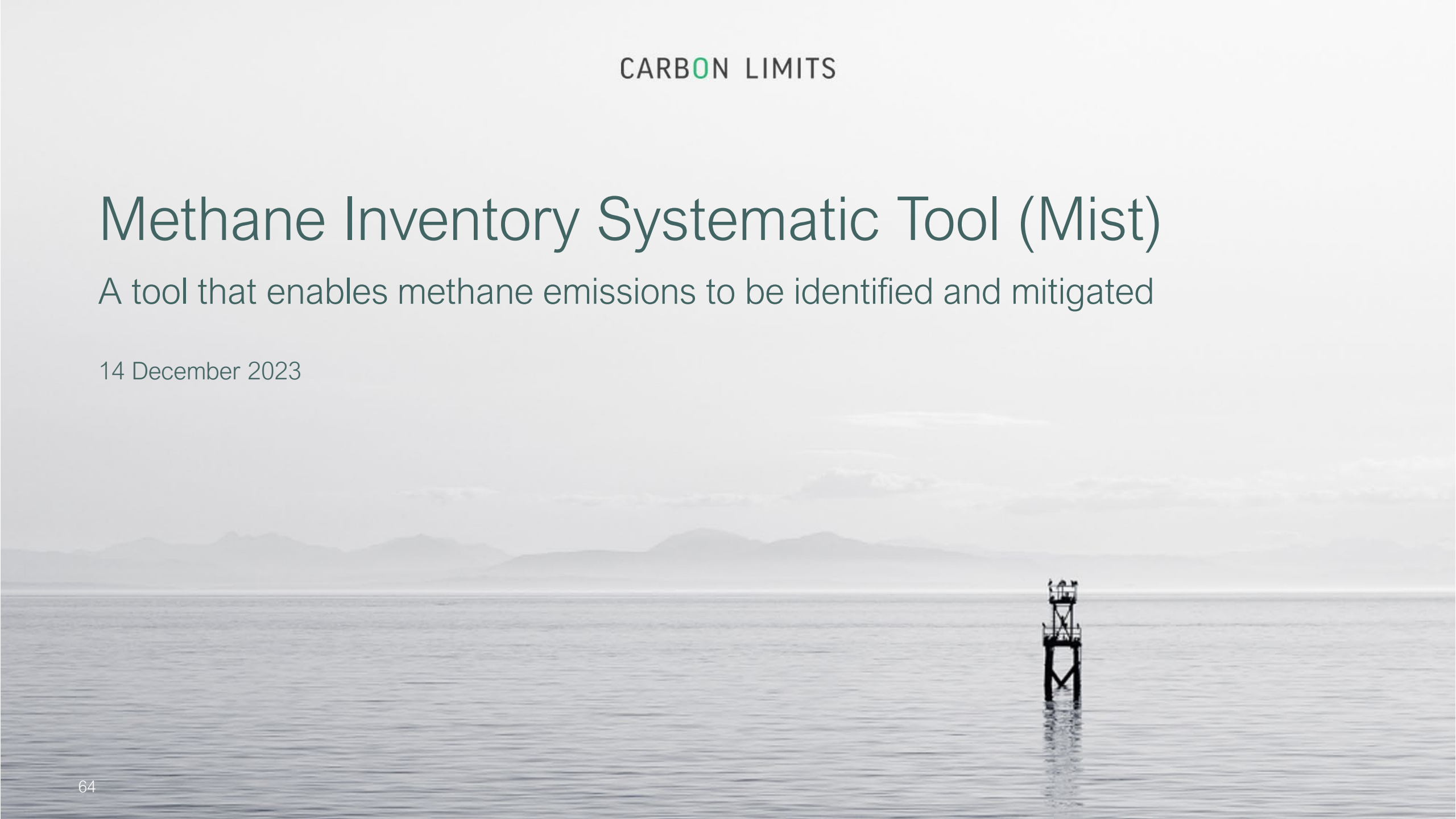
COMAT

CARBON LIMITS

Methane Inventory Systematic Tool (Mist)

A tool that enables methane emissions to be identified and mitigated

14 December 2023

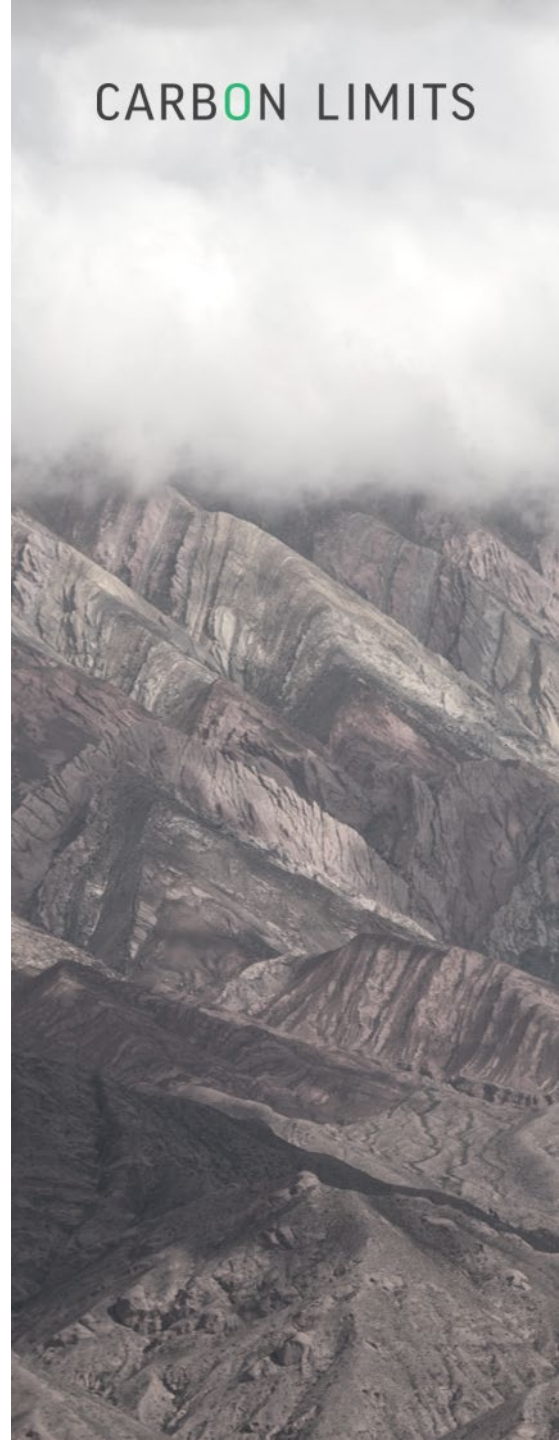


Mist – What is it?

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



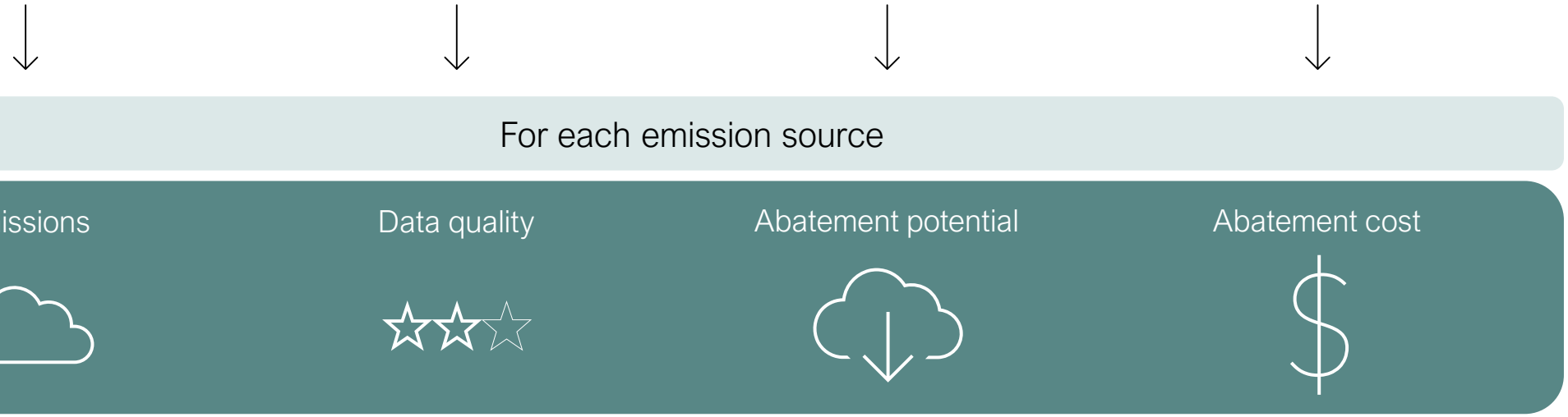
Methane inventory

CARBON LIMITS

Summarizing and reporting all the data calculated by Mist

Facility – potential emission sources

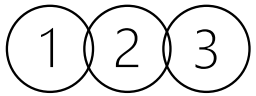
- Acid gas removal
- Associated gas venting
- Gas flaring
- Centrifugal compressor
- Pumps
- Well drilling
- Gas distribution - leaks
- Well casinghead gas venting
- Hydrocarbon storage tank
- Well completion and workover
- Other
- Glycol dehydrator
- Pipes blowdown
- Vessel blowdown
- Controllers
- Compressor blowdown
- Incomplete combustion
- Crude oil storage tank
- Leaks
- Produced water tanks
- Well testing
- Incidents
- Liquids unloading
- Reciprocating compressor
- Pipeline blowdown
- Waste water tanks



Why use Mist?

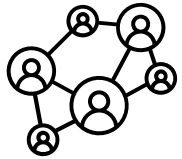
CARBON LIMITS

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

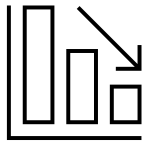


User-friendly software and guidance page

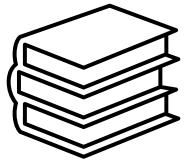
Grows in accuracy as more information added



Centralized and transparent



Integrated abatement potential and cost calculations



Uses the best available emissions factors and data

OGMP 2.0

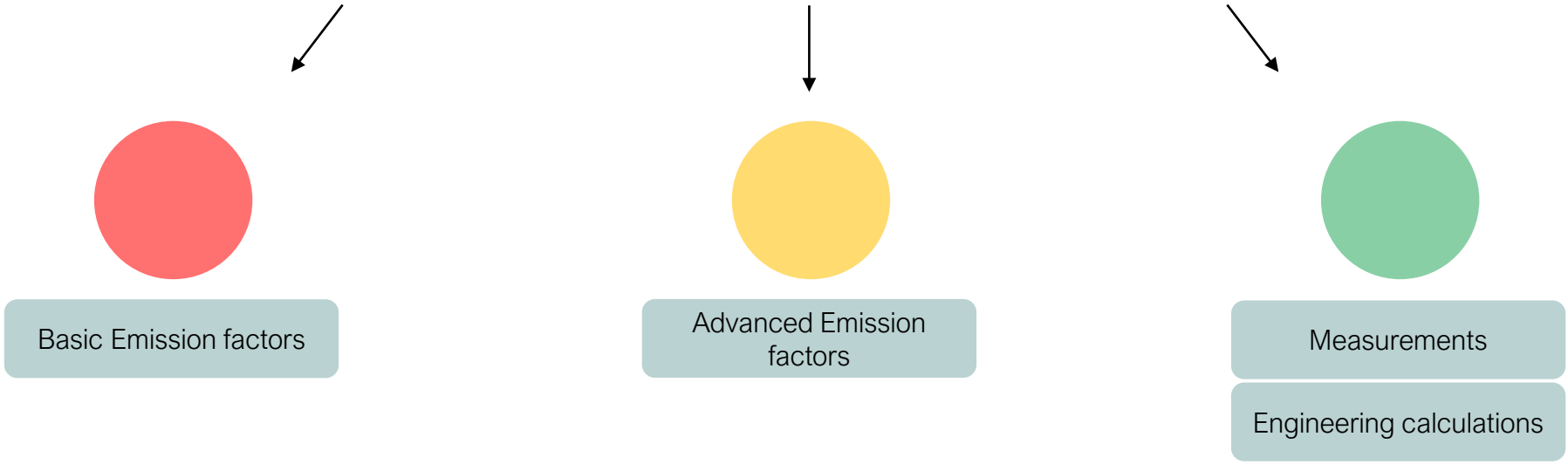
Aligned with international best practice

Different levels of data inputs and data quality

Aligned with OGMP 2.0

CARBON LIMITS

Mist provides three levels of data quality



Red = alignment with OGMP level 2 or 3 with basic data

Orange = alignment with OGMP level 3 with advanced data

Green = alignment with OGMP level 4

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

	Phase 1: Direct Impact	Phase two: Evaluation	Phase three: Implementation
Mitigation Action Plan	Update your maintenance practices	Focus on sources with high abatement potential	Implement mitigation solutions
	Identify the unknown sources of emissions	Assess solutions at a negative abatement cost	Mitigation check
	Highlight the areas for measurement		
Mist Parameters	Sources of emissions	Abatement potential	Improving inventory data
	Emissions quantification	Abatement cost	Continuous updates
	Data quality		

Timeline

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.

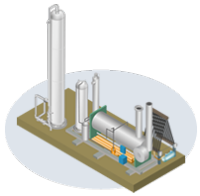
What is TEAM?

- 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:

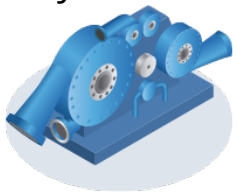
Evaluations can be performed at the site, company, industry-segment, regional and jurisdictional levels.

Emissions Mitigation in Upstream Oil & Gas

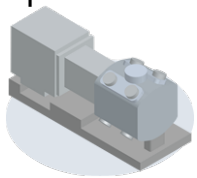
- Which sources?



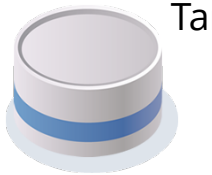
Glycol Dehydrators?



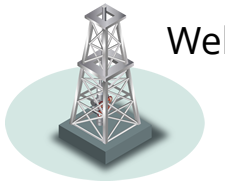
Centrifugal Compressors?



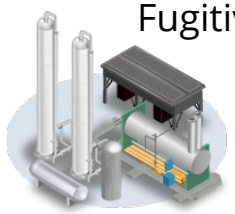
Reciprocating Compressors?



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

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 infraestructure 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

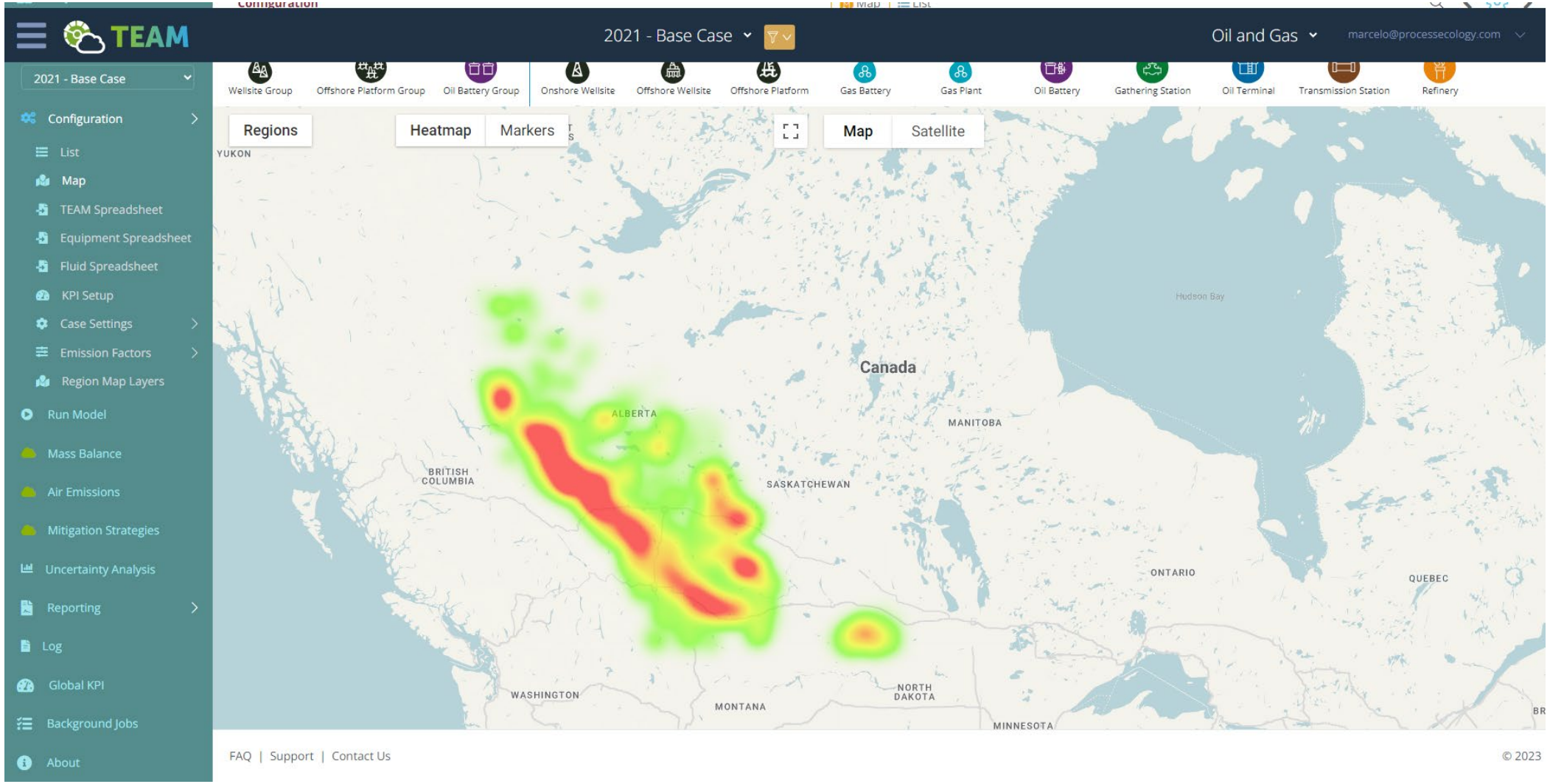
1. Evaluate capital and operating costs as well as economic benefits achieved over the project life.
2. Key input parameters: activity delcine rates, commodity pricing, taxes, royalties, discount and inflation rates.

Interactive output environment

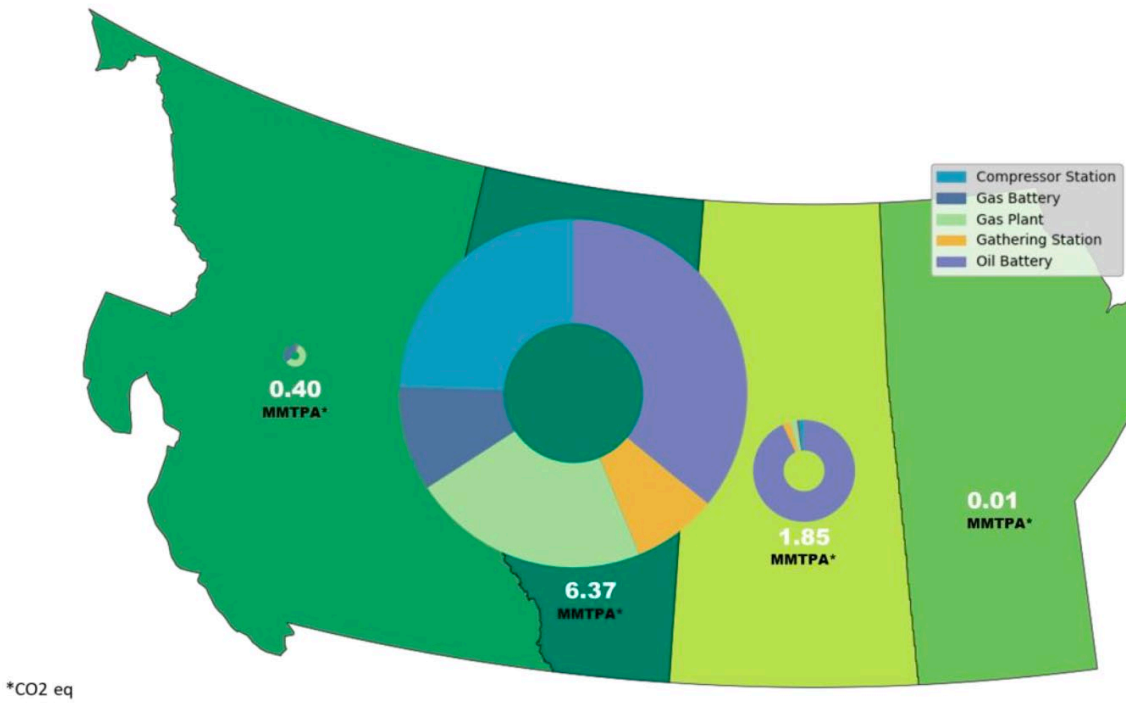
1. Emissions inventory/ Reporting
2. Portfolio of potential mitigation opportunities
3. Marginal abatement cost curves
4. Technology penetration potential as a function of marginal abatement costs
5. Development of optimal marginal abatement strategies

TEAM Setup: Example Western Canada

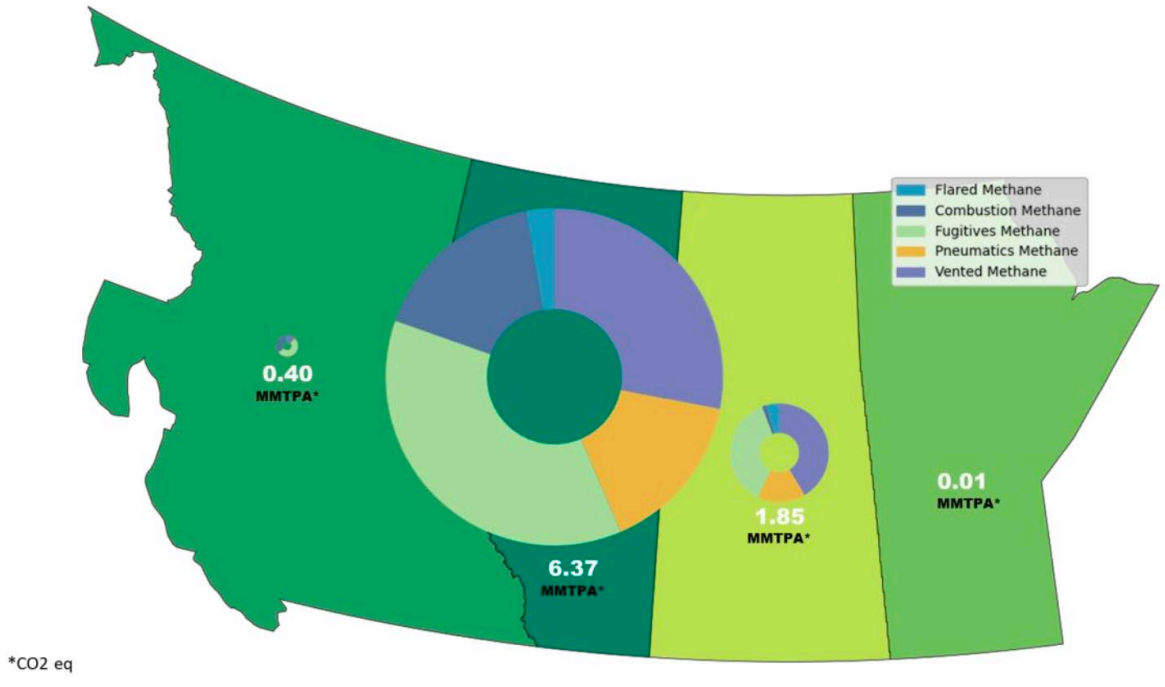
TEAM Western Canada



Methane Emissions Across Western Canada



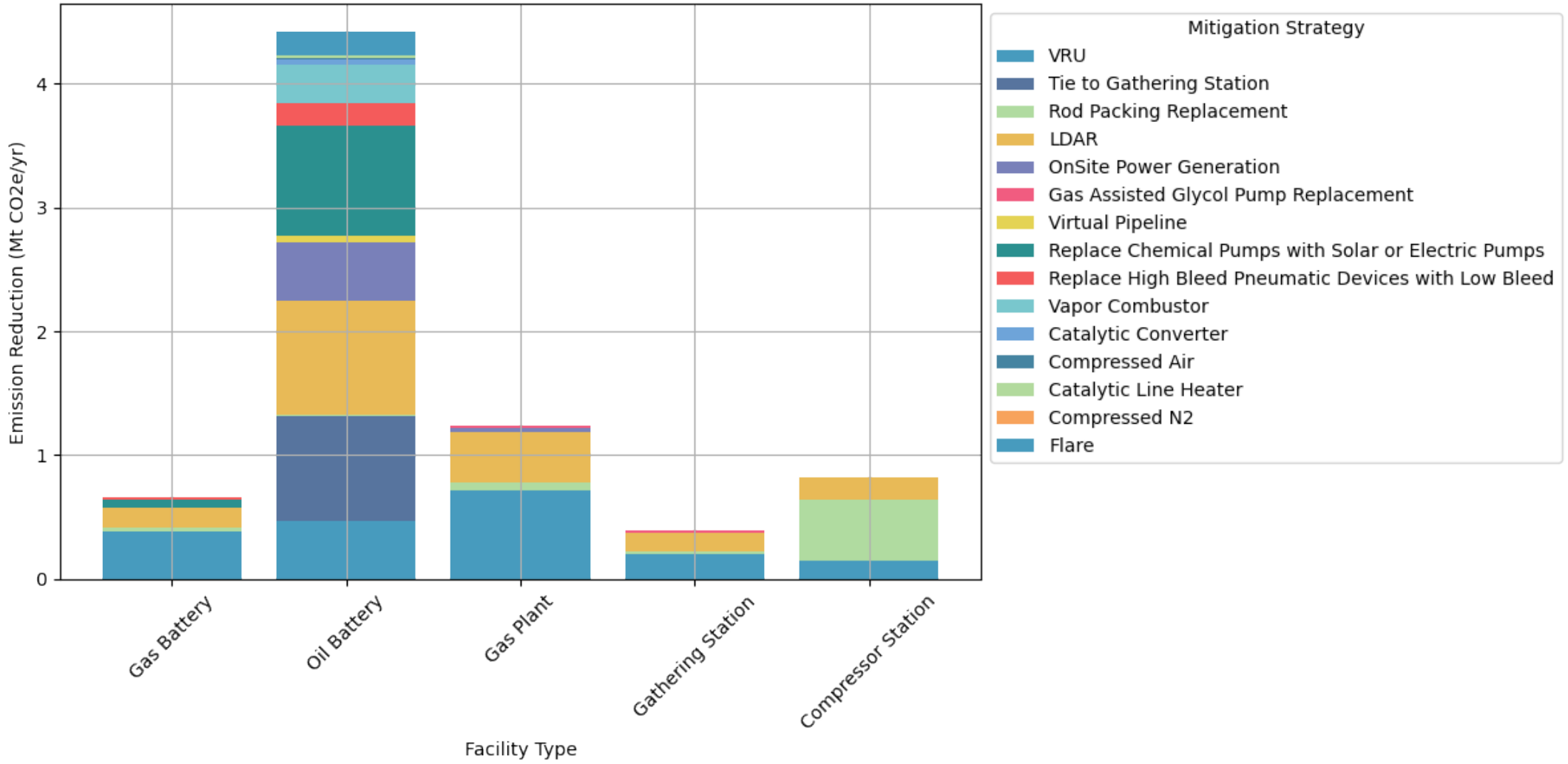
By facility type



By source type

*Wellsites excluded

Distribution of Mitigation Technologies

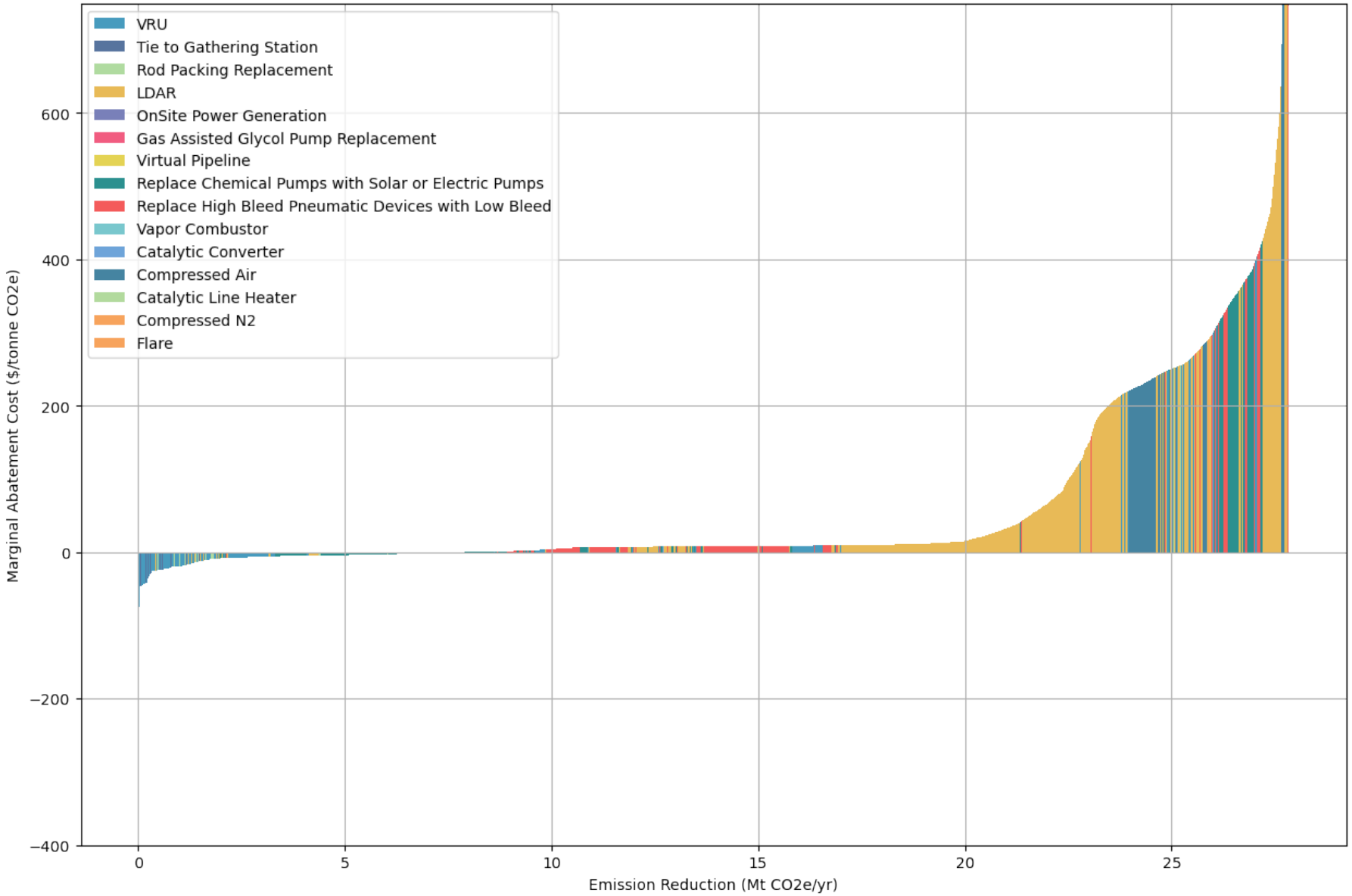


Cost Data References

- 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

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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

Global Methane Initiative

Leading methane action since 2004

globalmethane.org