



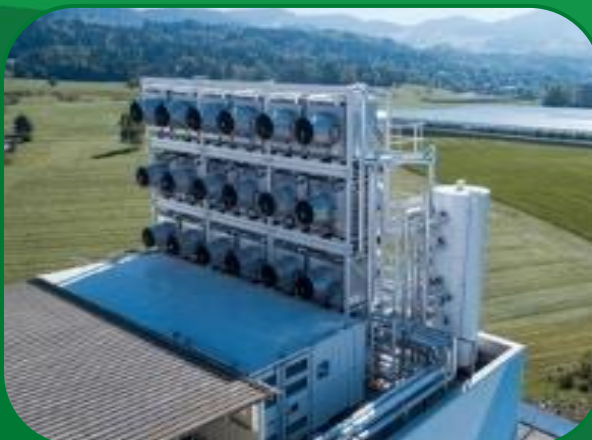
U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

# *Greenhouse Gas Supply Chain MMRV Framework U.S. Stakeholder Meeting*

Office of Fossil Energy and Carbon Management

March 14, 2024



Legend:

- Light Rare Earth Elements
- Heavy Rare Earth Elements
- Critical Rare Earth Elements
- Critical Minerals

H																	He															
Li	Be																	B	C	N	O	F	Ne									
Mg																	Al	Si	P	S	Cl	Ar										
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr															
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe															
Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn															
Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og															
																		La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
																		Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

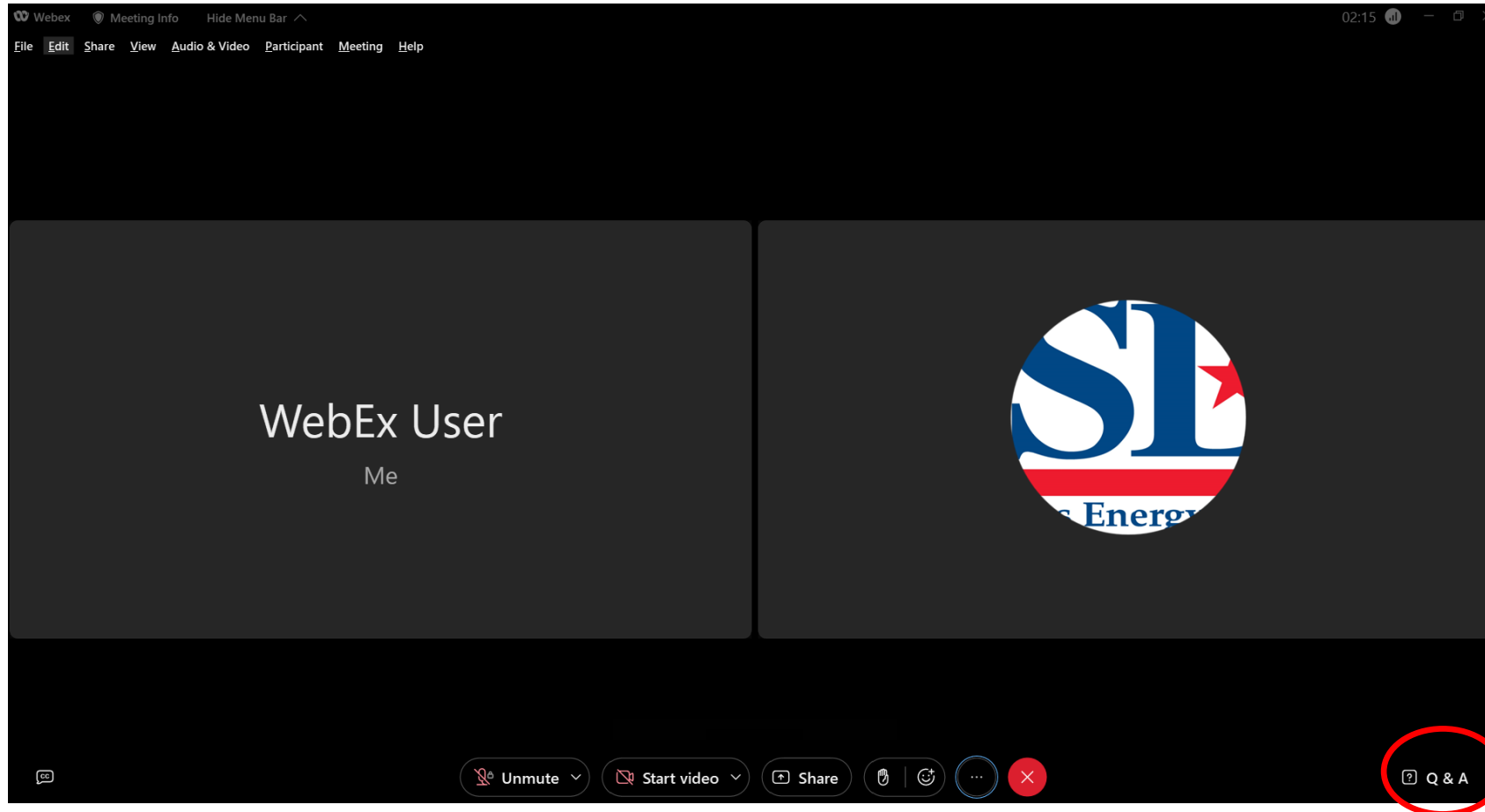
\* Gas RARE Light REE, UNCL Heavy REE, \*\* Excluded with rare earth elements



# Logistics

- The webinar will be about 1.5 hours; there will be approximately 60 minutes of remarks and slide presentation followed by Q&A.
- Please submit your questions and comments using the Webex Q&A throughout the presentation and we will respond to questions at the end of the presentation.
- If you have technical difficulties, please email Andrew Palmateer ([apalmateer@usea.org](mailto:apalmateer@usea.org)).
- If your comments are not addressed during the webinar, they can also be submitted via email to [FE-30correspondence@hq.doe.gov](mailto:FE-30correspondence@hq.doe.gov).
- The slides will be shared with all participants and posted to FECM's [MMRV Framework website](#).

# How to Participate in the Webex Q/A



1. Select the Q&A feature in WebEx in the lower right corner (circled in red above)

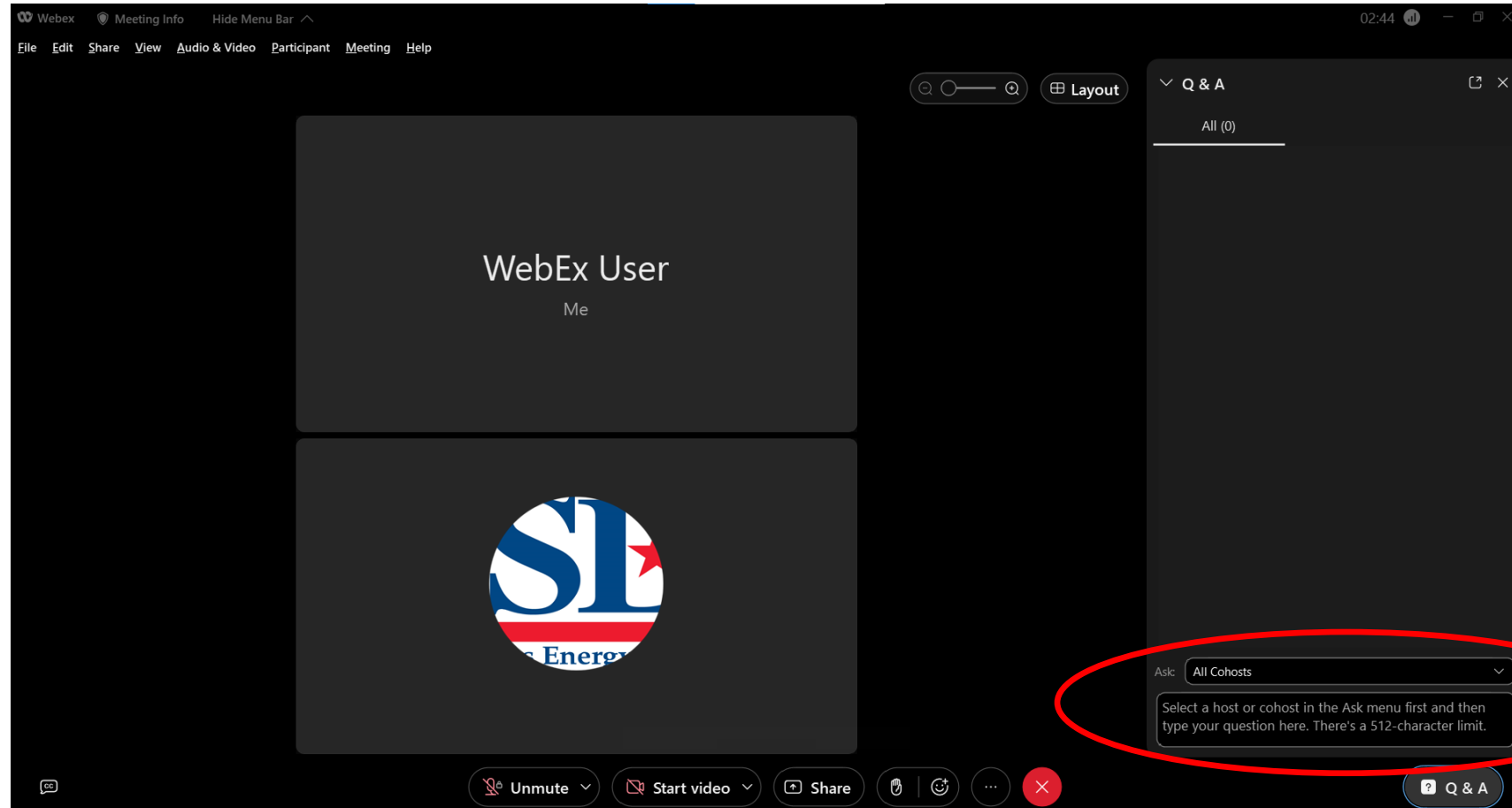


U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

[fecm.energy.gov](https://fecm.energy.gov)

# How to Participate in the Webex Q/A



2. Type your question into the Q&A text box and press “Enter” (circled in red above)

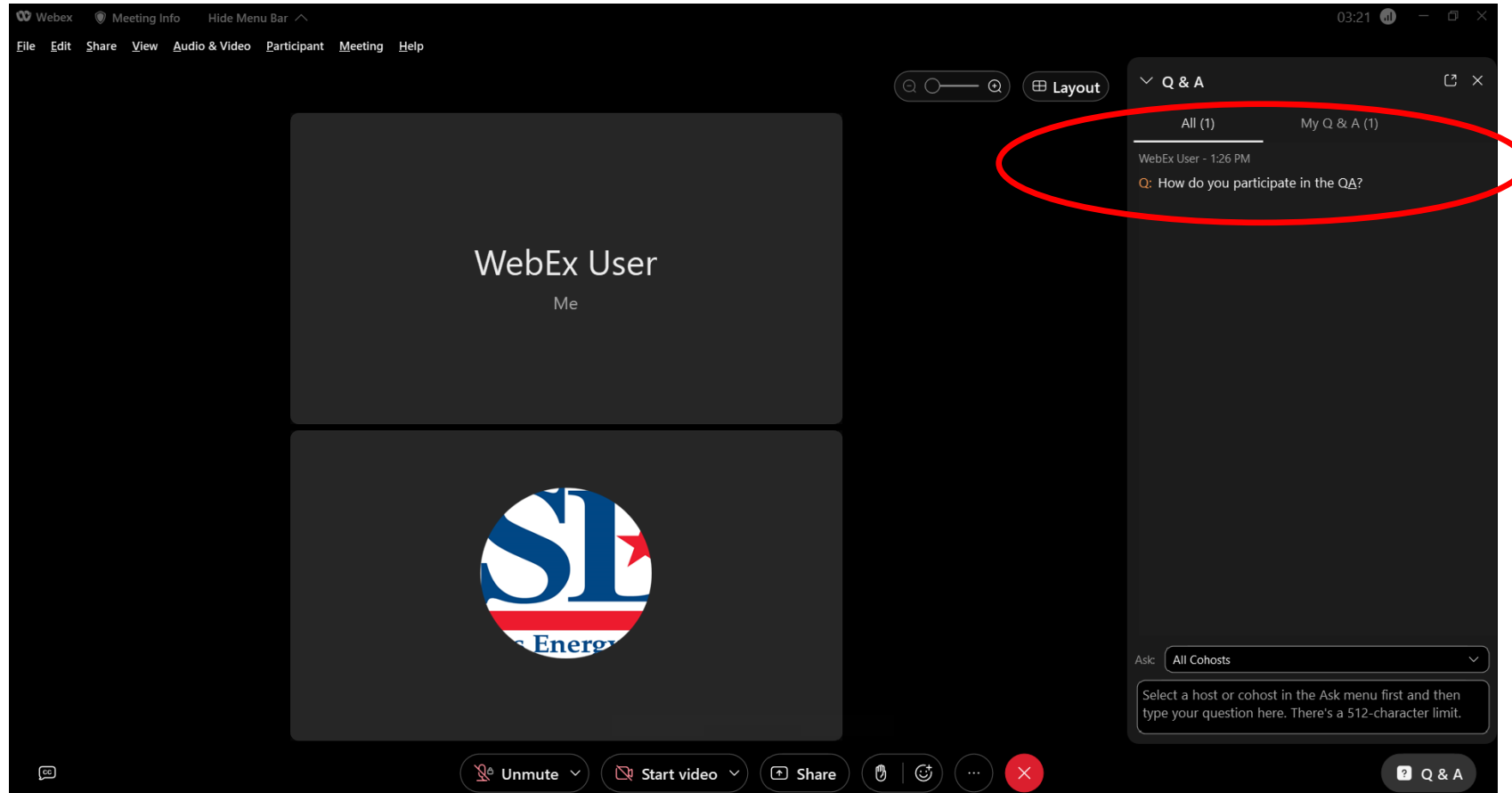


U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

[fecm.energy.gov](https://fecm.energy.gov)

# How to Participate in the Webex Q/A



3. Your submitted question will now appear in the Q&A (circled in red above)

# Agenda

- Welcoming Remarks
- Overview of MMRV Framework
- Recent Developments and Updates
- MMRV Design Architecture and Technical Development Work Streams for 2024
- Next Steps and Opportunities for Feedback
- Q&A



# Welcoming Remarks

**Brad Crabtree**

Assistant Secretary

Office of Fossil Energy and Carbon Management

U.S. Department of Energy



U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

# Overview of MMRV Framework

---



# Measurement, Monitoring, Reporting, and Verification (MMRV) Introduction

- MMRV is a multi-step process **used to account for the greenhouse gas (GHG) emissions and emissions intensity** associated with specific sources across the supply chain.
  - There is **considerable activity underway related to MMRV of methane, carbon dioxide, and other GHG emissions associated with delivered natural gas.**
  - However, there is **currently no consensus regarding what purchaser, regulator, or other stakeholder expectations** should be for a company making a claim about the GHG intensity of delivered or contracted gas.
  - In response, **FECM is working with international partners to develop a shared and broadly credible global framework for estimating GHG emissions across the international supply chain for natural gas.**
- **DOE is not introducing a regulatory standard** for natural gas, nor will DOE be certifying natural gas in the marketplace.
  - **DOE is working with other countries on an international framework for the MMRV of greenhouse gas emissions associated with the global natural gas supply chain** that can be used by both buyers and sellers or by individual governments.
  - **DOE's efforts align with the Biden Administration's U.S. Methane Emissions Reduction Action Plan** and pledge that the U.S. will work with global partners to reduce the world's methane emissions.

# Natural Gas Supply Chain Illustration

## Production & Processing

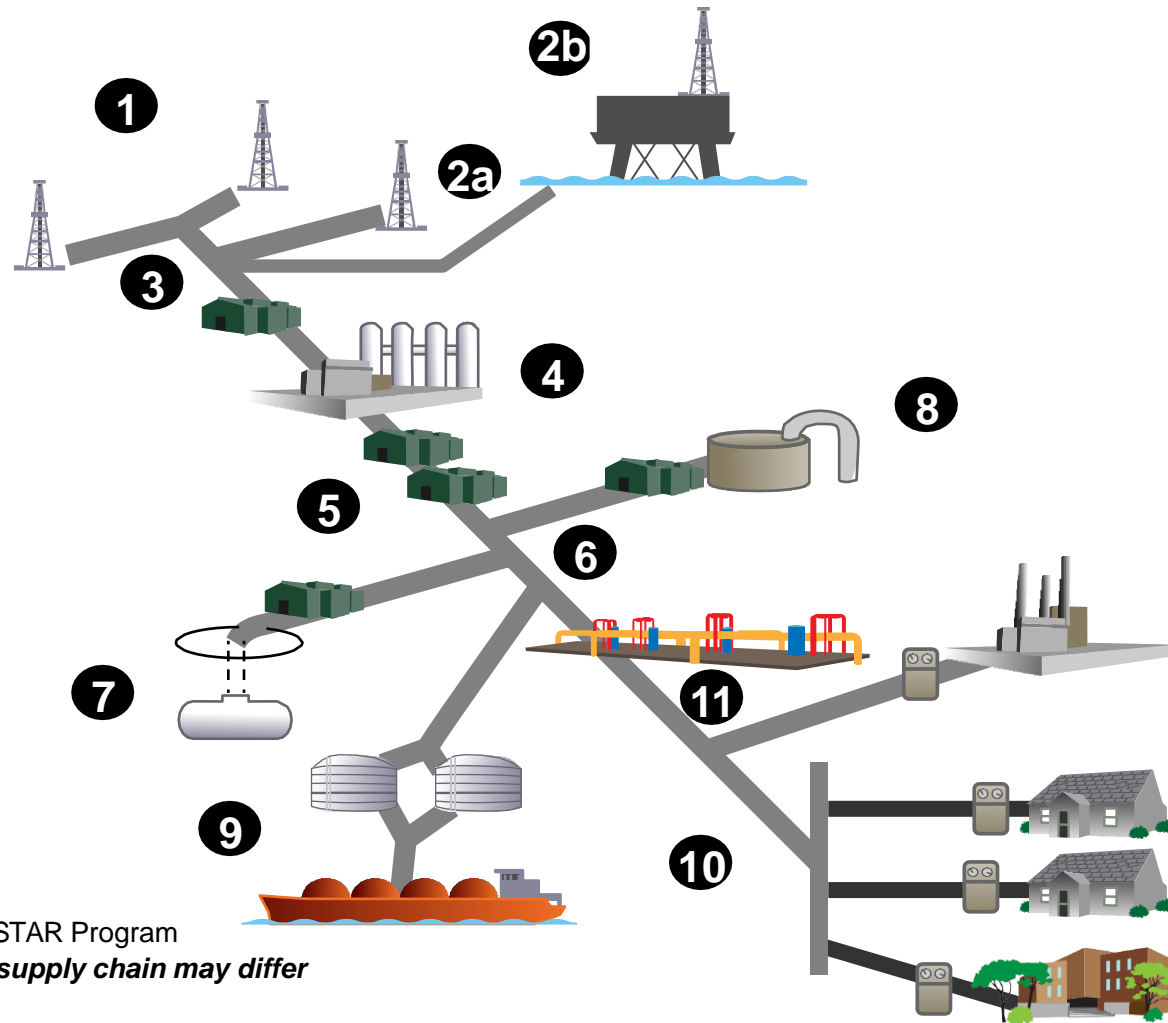
1. Drilling and Well Completion
2. Producing Wells
  - a. Onshore Wells
  - b. Offshore Wells
3. Gathering and Boosting
4. Gas Processing Plant

## Natural Gas Transmission & Storage

5. Transmission Compressor Stations
6. Transmission Pipelines
7. Underground Storage
8. LNG Storage
9. LNG Import-Export Equipment

## Distribution

10. Distribution Mains/Services
11. Regulators and Meters



Adapted from American Gas Association and EPA Natural Gas STAR Program

**Note: for illustrative purposes only; actual scope of MMRV supply chain may differ**

# Overview of the Framework

- This initiative aims to **identify key elements of an MMRV framework for GHG emissions across the international supply chain for natural gas**
- Such a framework would **enable comparable and reliable information on methane, carbon dioxide, and other GHG emissions across the supply chain** and provide market participants with verified information about life cycle GHG emissions volumes and intensity from pre-production through delivery.
- This effort will **build on the strengths of OGMP 2.0\* and other reporting approaches**, while addressing identified gaps to safeguard integrity and enhance credibility.
- Products of the initiative could include **guidance, protocols, and tools for voluntary use in natural gas markets**.

\*The Oil & Gas Methane Partnership 2.0 (OGMP 2.0) is a measurement-based methane emissions reporting framework for oil and gas companies. More information is available at <https://www.unep.org/explore-topics/energy/what-we-do/methane/oil-gas-methane-partnership-20-ogmp-20>

# Scope of MMRV Framework

- **Initially focused on methane and carbon dioxide from the natural gas supply chain;** in future, could include other hydrocarbons.
- Will allow differentiation of natural gas in the marketplace based on GHG intensity. However, **it will not establish specific GHG intensity standards or levels.**
- **Focus is on GHG intensity and quantification**, not on other aspects of existing certification programs, such as management practices, social impacts, or corporate governance commitments.
- The MMRV Framework **will not include economics of supply and demand, commodity pricing, or any attribute other than quantification** of GHG supply chain emissions.

# Participating Countries / Regions

Country / Region	Agency / Department
Australia	Department of Industry, Science and Resources
Brazil	Nat'l Agency of Petroleum, Natural Gas & Biofuels, Ministry of Mines & Energy
Canada	Natural Resources Canada
Colombia	Ministry of Mines and Energy
European Commission	DG-Energy
East Med Gas Forum	Secretariat
Egypt	Ministry of Petroleum & Mineral Resources
France	Ministry for the Energy Transition
Germany	Federal Ministry for Economic Affairs and Climate Action
India	Ministry of Petroleum and Natural Gas

Country / Region	Agency / Department
Italy	Ministry of Environment & Energy Security
Japan	Ministry of Economy, Trade and Industry
Korea	Ministry of Trade, Industry and Energy
Malaysia	Ministry of Economy
Mozambique	National Petroleum Institute
Nigeria	Nigeria Upstream Petroleum Regulatory Commission
Norway	Ministry of Petroleum and Energy
United Arab Emirates	Ministry of Energy and Infrastructure
United Kingdom	Dept for Energy Security and Net Zero
United States	Dept of Energy, Dept of State, Environmental Protection Agency

Government and regional entities listed on this slide have been participating in Working Group discussions. Inclusion on this list should not be interpreted as a commitment to endorse or use the framework or other work products of the Working Group.



U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

# Recent Developments and Updates

---

# 2023 Progress Summary

- Initiated Working Group in May 2023
- Held multiple meetings of the Working Group and Technical Group
- Engaged with global stakeholder community
- Developed and reached agreement on Public Announcement
- Reached agreement on foundational elements of related to criteria and data tools
- Initiated discussions on verification and accreditation
- Momentum is strong for continued technical development in 2024

# MMRV Public Announcement – November 2023

## Public Announcement of International Working Group to Establish a Greenhouse Gas Supply Chain Emissions Measurement, Monitoring, Reporting, and Verification (MMRV) Framework for Providing Comparable and Reliable Information to Natural Gas Market Participants

Reducing methane, carbon dioxide, and other greenhouse gas emissions across the fossil fuel energy value chain is essential for global energy decarbonization and to achieve the goals of the Paris Agreement. However, the lack of comparable and reliable information to characterize the greenhouse gas (GHG) intensity of deliveries of natural gas limits the ability of buyers to demand and suppliers to provide natural gas with a lower GHG profile, hindering market-driven emissions abatement efforts. Therefore, thirteen countries, the European Commission and the East Mediterranean Gas Forum have formed a multi-national working group to develop a consensus-based approach for the measurement, monitoring, reporting and verification (MMRV) of GHG emissions across the international supply chain from pre-production through final delivery to enable the provision of comparable and reliable information.

Natural gas producers and exporters, importers and end users, governments, and other key stakeholders have made significant progress towards addressing this challenge through various measurement, reporting and verification protocols at local and international levels. A number of well-established domestic and international emissions reporting approaches already exist, our efforts are aimed at building on these existing approaches. This includes, but is not limited to, the United Nations Environmental Program's Oil and Gas Methane Partnership 2.0 (OGMP 2.0).

The MMRV Working Group will advance comparability by reviewing and building upon existing standards and protocols to provide a consistent set of technical criteria for reporting emissions and

[DOE Press Release](#) with a link to the full text.

- Provide a **consistent set of technical criteria for reporting emissions and operating data** at various levels of data availability.
- Support comparability by **using transparent and consistent tools for estimating GHG supply chain emissions and data quality** from pre-production through final delivery of the natural gas.
- Support **independent third-party verification of the accuracy and representativeness** of the emissions data and the aggregate supply chain GHG emissions intensity.
- Support **accreditation to ensure that certifiers are independent** of the reporting entity and are technically qualified to conduct reviews.



# Recent Developments and Updates

- MMRV Working Group meetings have continued into 2024
- Developed design architecture and conceptual workflows
- Established technical Work Stream objectives and timelines
- Over 70 volunteers across the globe from the MMRV Technical Group to support the Work Streams to date
- Stakeholder engagement will remain a critical part of the MMRV Framework process in 2024

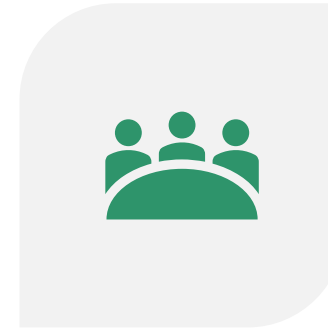
# Thanks for your Feedback!



YOUR PARTICIPATION  
AND FEEDBACK IN 2023  
WAS INCREDIBLY  
VALUABLE TO THE MMRV  
FRAMEWORK EFFORTS



FEEDBACK WAS USED  
TO INFORM KEY AREAS  
OF DISCUSSION AND  
DEVELOPMENT OF THE  
DESIGN ARCHITECTURE



YOUR CONTINUED  
FEEDBACK IS  
IMPORTANT TO THE  
MMRV FRAMEWORK  
EFFORTS



U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

[fecm.energy.gov](https://fecm.energy.gov)



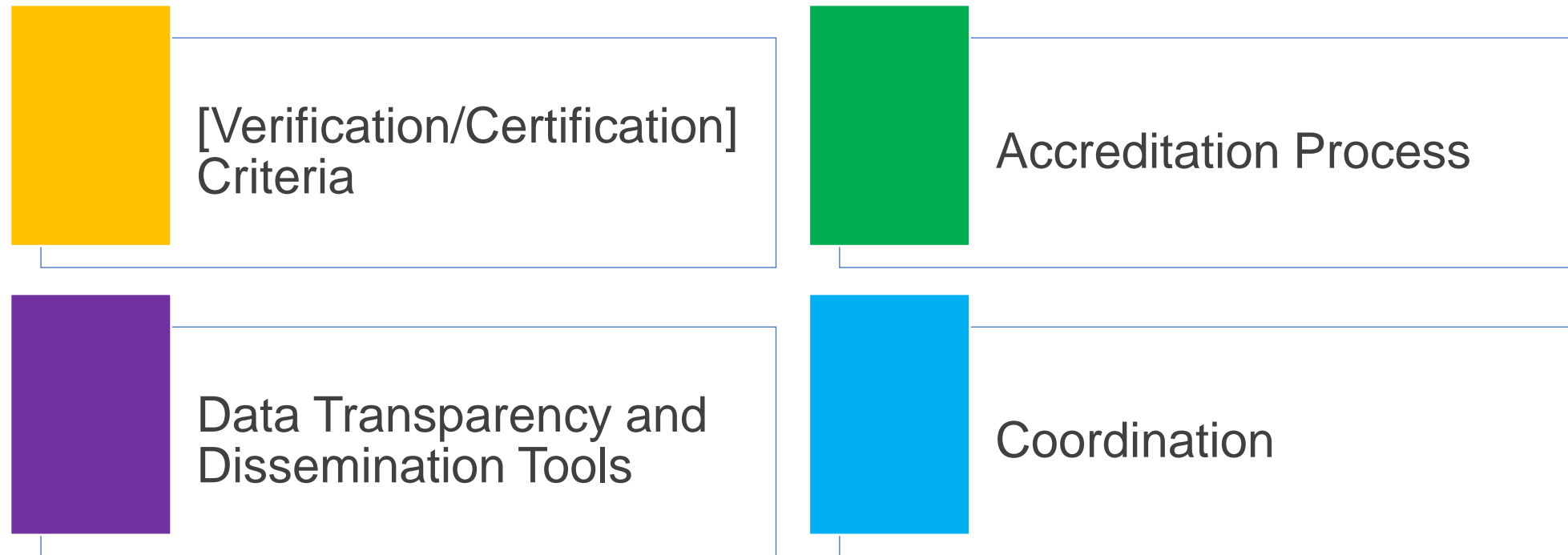
U.S. DEPARTMENT OF  
**ENERGY**

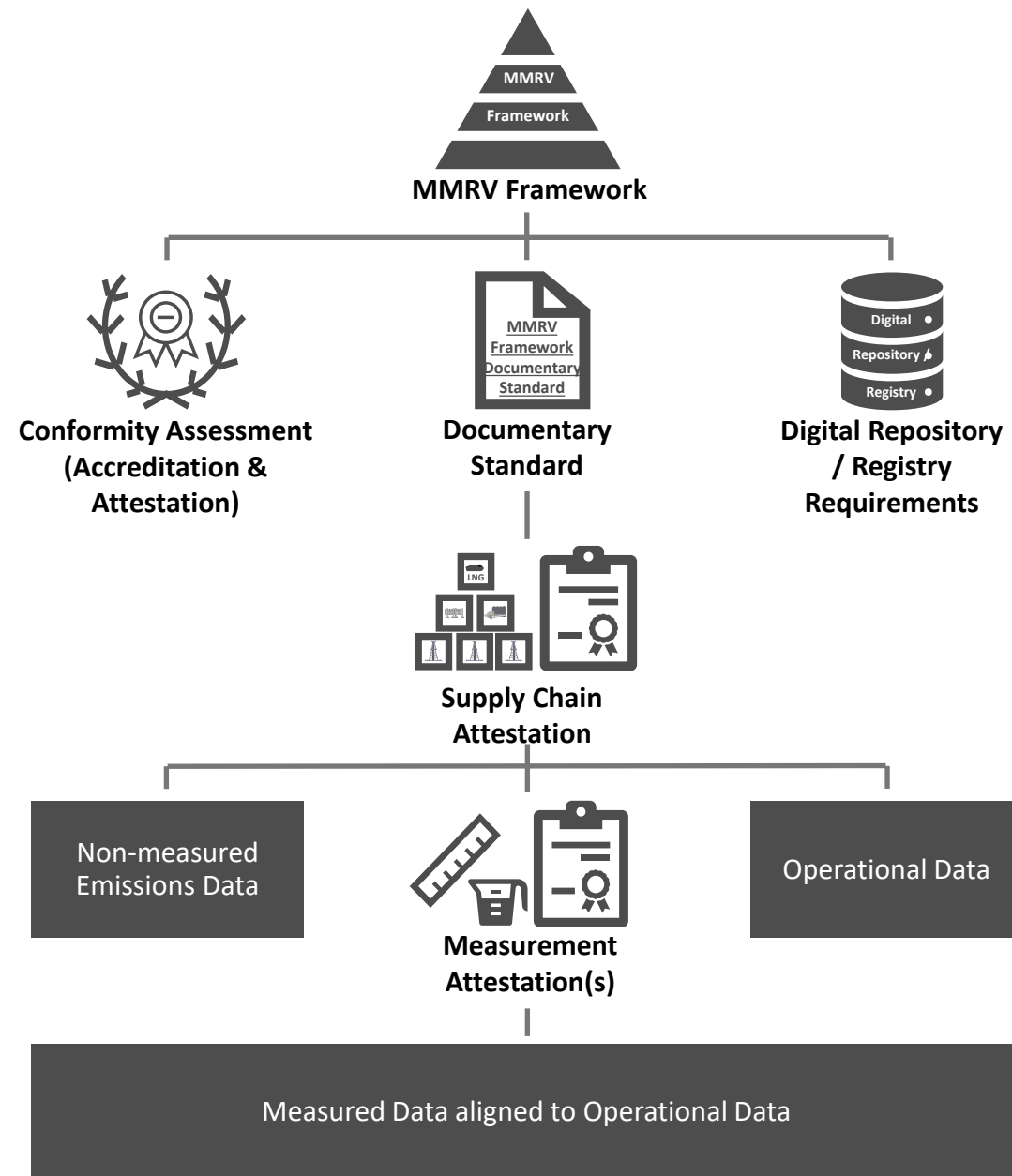
Fossil Energy and  
Carbon Management

# MMRV Design Architecture and Technical Development Work Streams for 2024

---

# MMRV Framework Elements





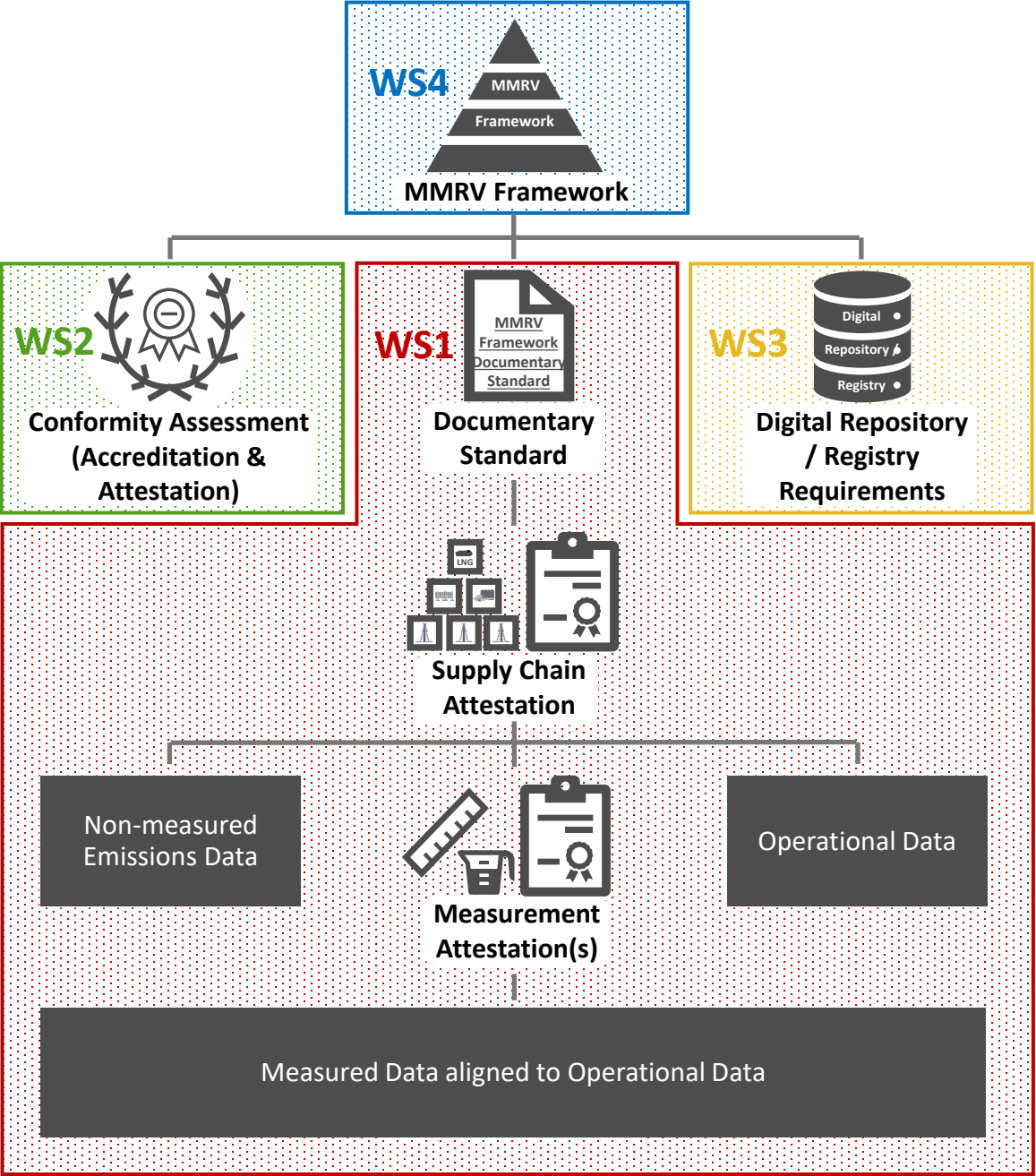
**WS1: Criteria & Data Tools**

**WS2: Accreditation & Attestation**

**WS3: Attestation Management**

**WS4: MMRV Framework Coordination & Training Support**

WS = Work Stream

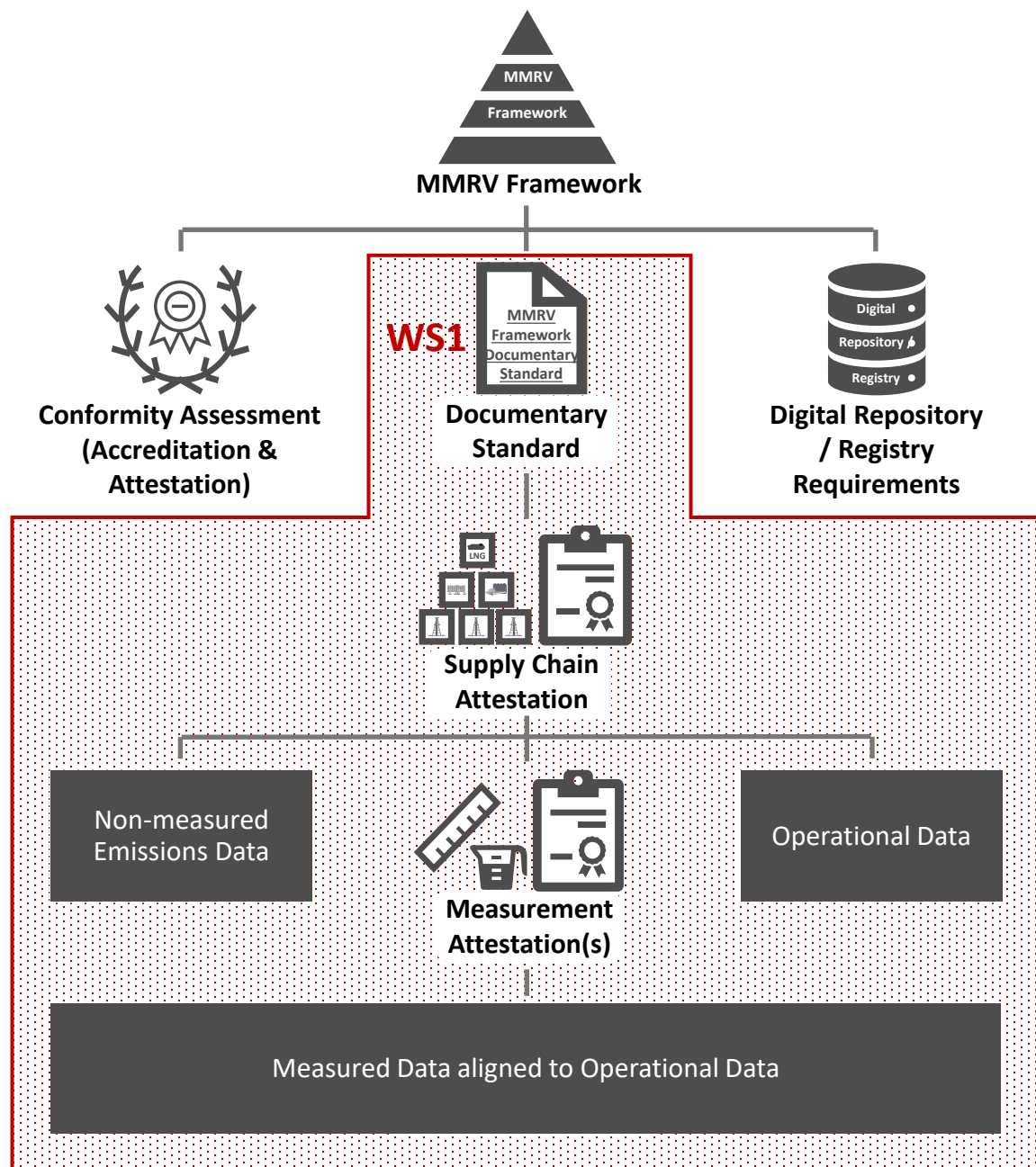


## WS1: Criteria & Data Tools

## WS2: Accreditation & Attestation

## WS3: Attestation Management

## WS4: MMRV Framework Coordination & Training Support



### WS1: Criteria and Data Tools

Establishment of Data Quality Metrics and Coordination of WS1 Subgroups

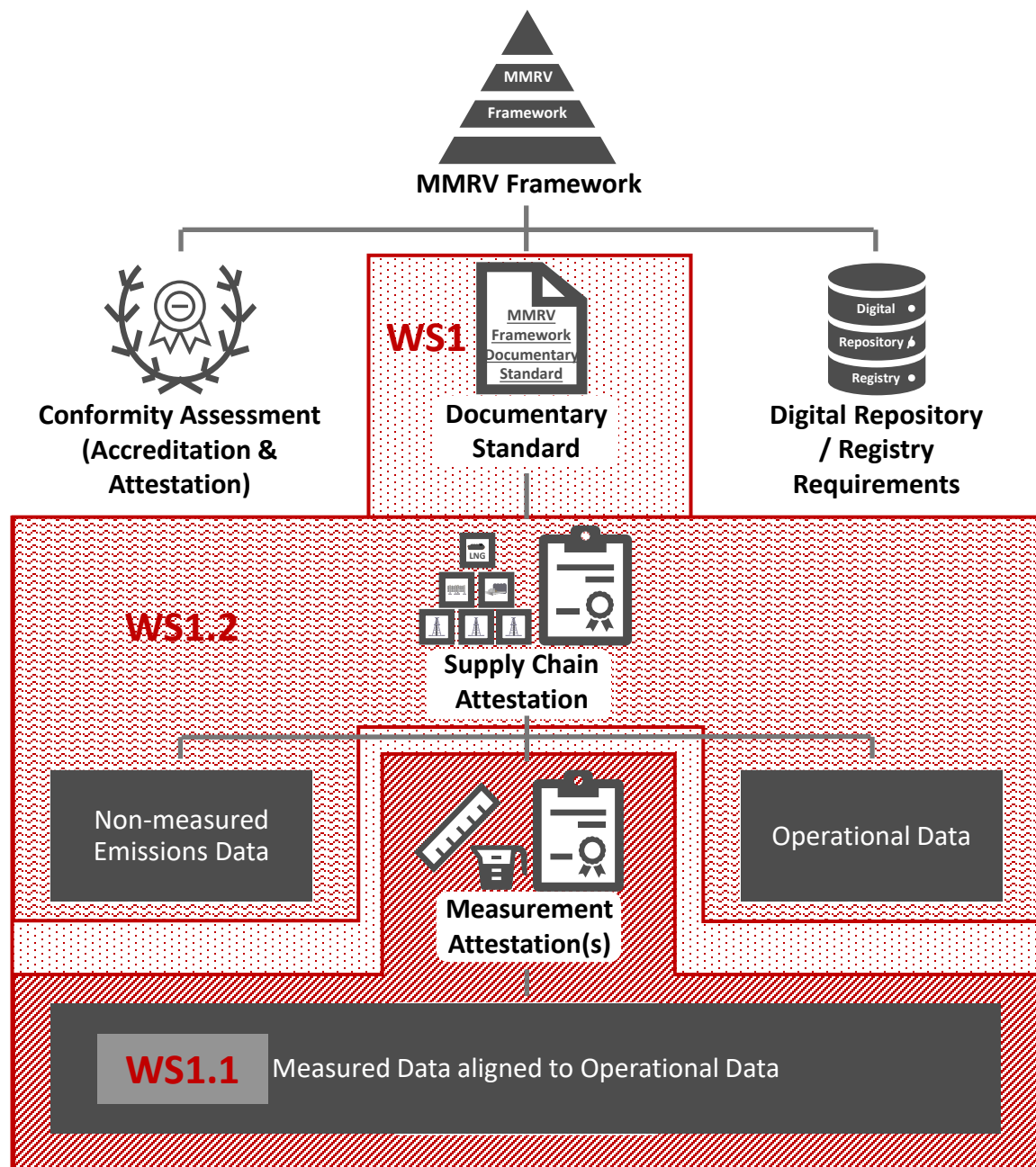
- ▶ Establish a data quality metric approach for assessing data quality based on the accuracy and representativeness of the reported data.
- ▶ Coordination of WS1 Subgroups
  - ▶ WS1.1: Measured Emissions
  - ▶ WS1.2: Supply Chain Aggregation

## WS1: Criteria & Data Tools

### WS1.1: Measured Emissions

#### Technical Criteria for Reporting Emissions and Operating Data

- ▶ Value measured data over modeled data – goal is to improve accuracy, completeness, and transparency of reported emissions.
- ▶ Review and build upon existing protocols and standards to establish a consistent set of technical criteria for reporting emissions and operating data (e.g., gas throughput) at various levels of data availability.
- ▶ Coordinate with WS1 on establishment of data quality reporting requirements.



### WS1.2: Supply Chain Aggregation

#### Transparent and Consistent Tools for Estimating GHG Supply Chain Emissions and Data Quality

- ▶ Develop a consistent and transparent tool for estimating GHG supply chain emissions using a combination of measured and modeled data capable of supporting varying levels of data representativeness (asset to basin/jurisdictional level).
- ▶ Coordinate with WS1 on the establishment of a data quality metric for reporting data reliability (accuracy) and data representativeness of the estimated GHG supply chain emission intensity to provide additional information to differentiate GHG emissions intensity estimates based on “quality” of the data.



## WS1: Criteria & Data Tools

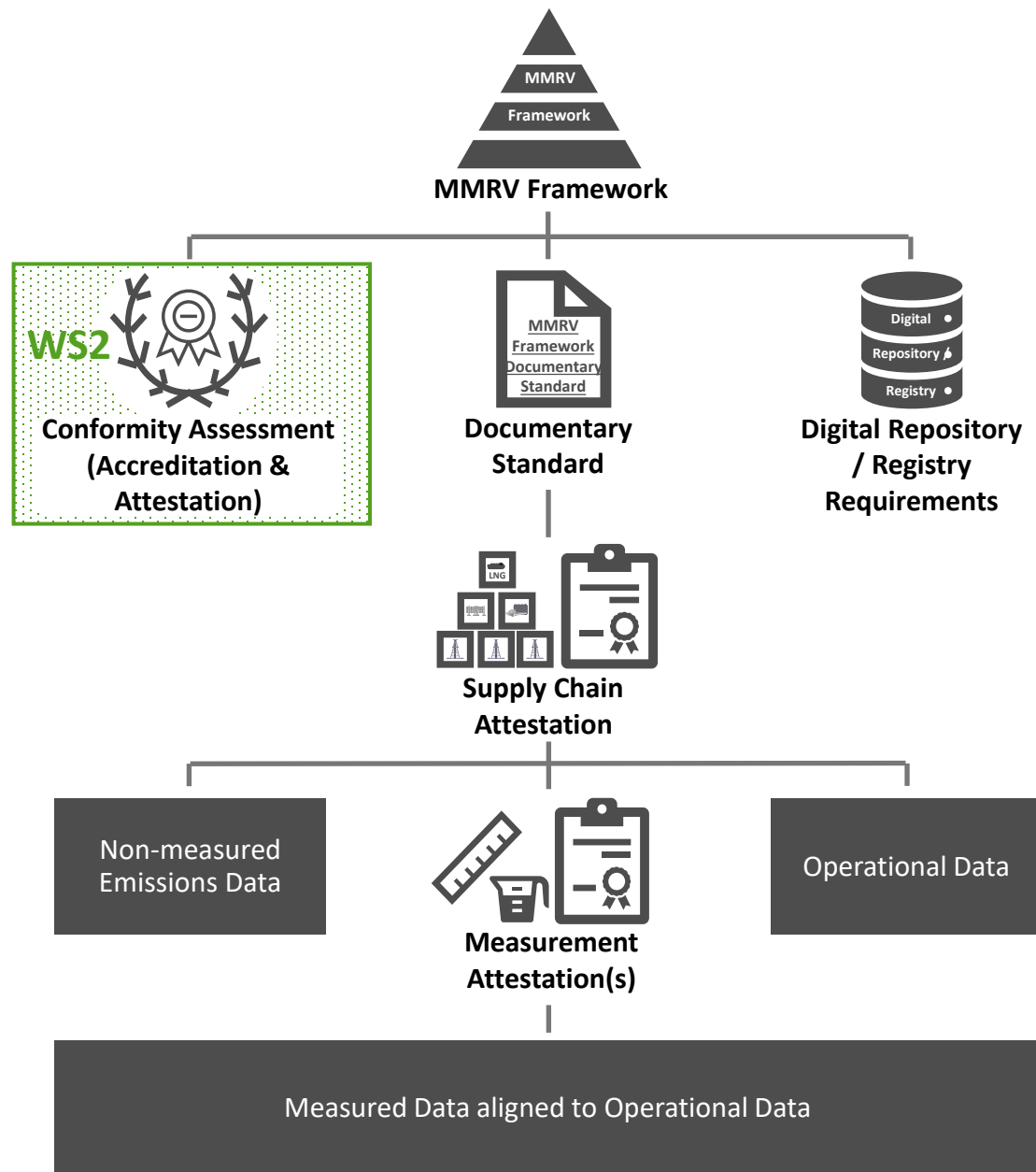
WS1.1: Measured Emissions

WS1.2: Supply Chain Aggregation

## WS2: Accreditation & Attestation

### WS2: Conformity Assessment (ISO/IEC 17000 series or alternative mechanism) Design and Implementation

- Conformity Assessment Elements
  - International Accreditation System
  - Accreditation Body
  - Accredited Certification Body
  - Accredited Auditor Body



## WS2: Accreditation & Attestation

Establish Conformity Assessment requirements and business model for independent third-party certification and accreditation of GHG supply chain emissions and data quality.

- Define the attestation documentation for reporting the GHG supply chain emissions intensity and data quality metrics for the supplied product to the buyer.
- Develop common requirements that an independent certifier would use to assess GHG emissions intensity accuracy, representativeness, and completeness of (1) measured and modeled data inputs and (2) aggregated life cycle supply chain result.
- Establish an accreditation process through which certifiers are confirmed as employing consistent protocols as identified through the framework including a mechanism for independent oversight of the accreditation process.

## WS1: Criteria & Data Tools

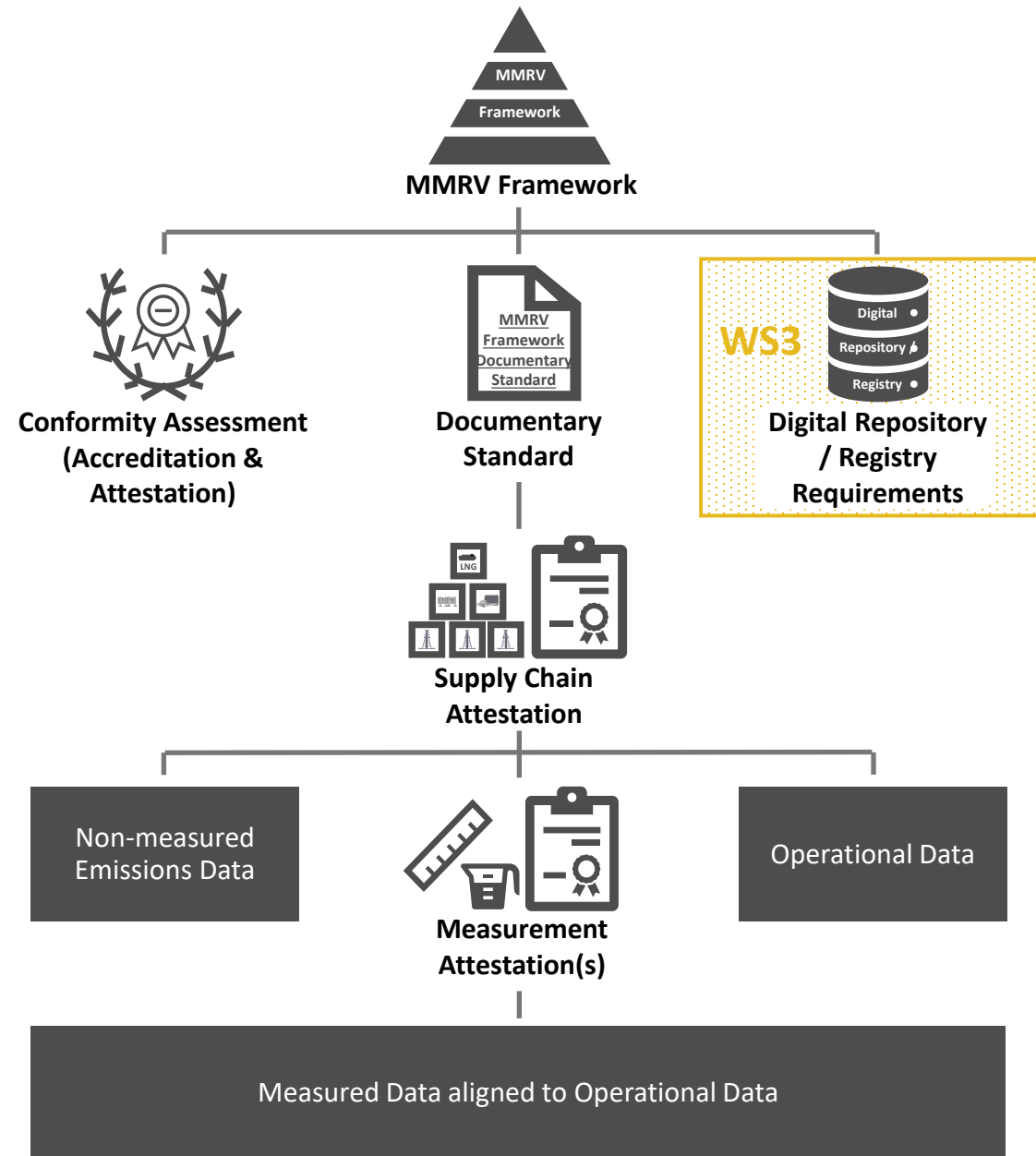
WS1.1: Measured Emissions

WS1.2: Supply Chain Aggregation

## WS2: Accreditation & Attestation

## WS3: Attestation Management

## WS4: MMRV Framework Coordination & Training Support



### WS3: Attestation Management

Establish requirements for tracking and retiring measurement and supply chain statements of attestation of conformance.

- ▶ Define the requirements for receiving, tracking, and retiring measurement and supply chain attestations to ensure reliable access to natural gas operators, sellers, and buyers.
- ▶ Establish model for entity(ies) to manage a Digital Repository / Registry for managing the statements of attestation.
- ▶ Ensure MMRV emissions data and quality information integrity and interoperability is maintained to enable comparability and reliability by natural gas buyers.

## WS1: Criteria & Data Tools

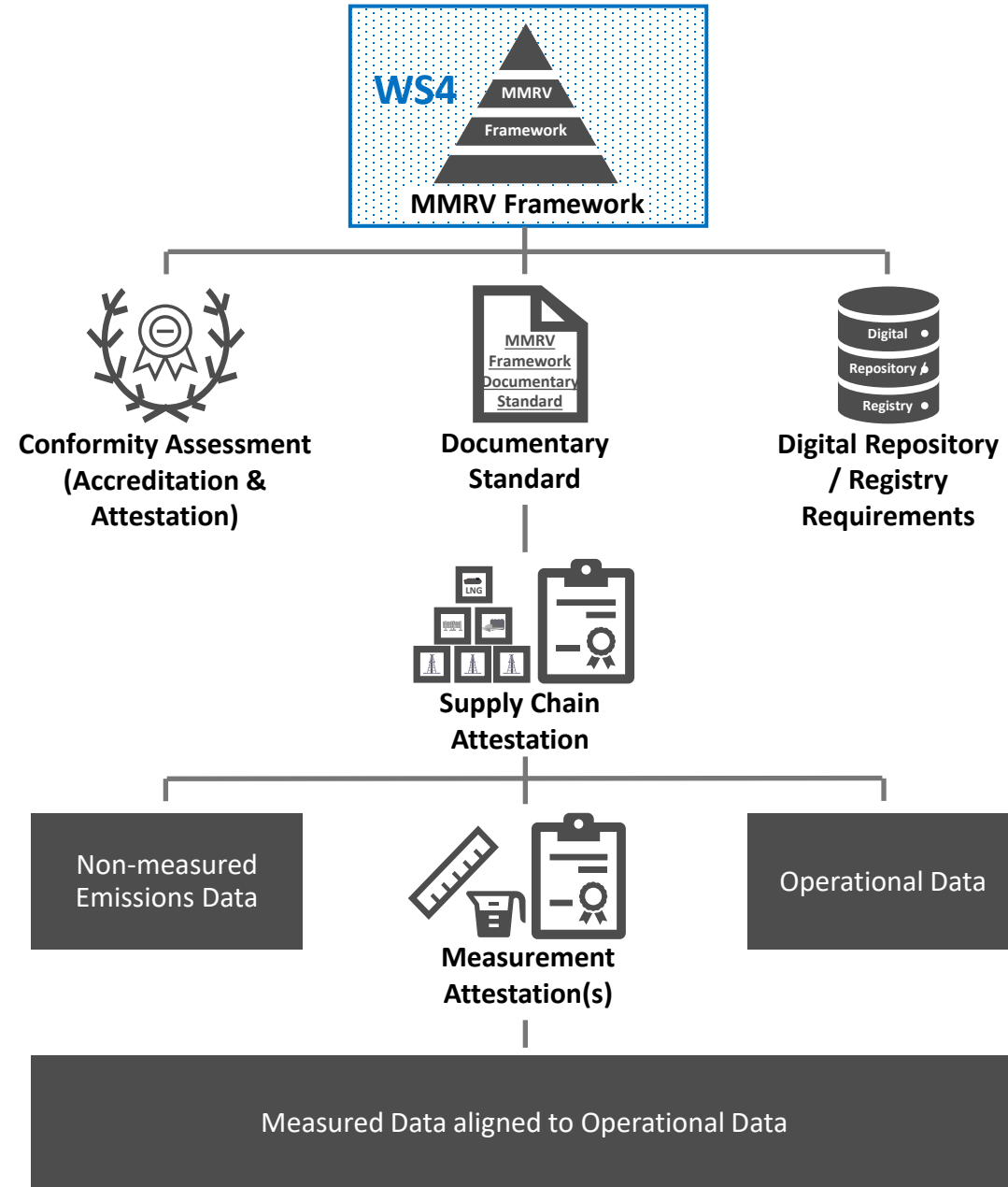
WS1.1: Measured Emissions

WS1.2: Supply Chain Aggregation

## WS2: Accreditation & Attestation

## WS3: Attestation Management

## WS4: MMRV Framework Coordination & Training Support



## WS4: MMRV Framework Coordination & Training Support

Process for continuous improvement to ensure long-term relevance of MMRV Framework.

- ▶ Define requirements and expectations for long-term management of the MMRV Framework.
- ▶ Ensure viable business model for MMRV system to enable trust and confidence.
- ▶ Identify and enable training support and other resources to ensure acceptance and efficient implementation of the MMRV Framework.

## WS1: Criteria & Data Tools

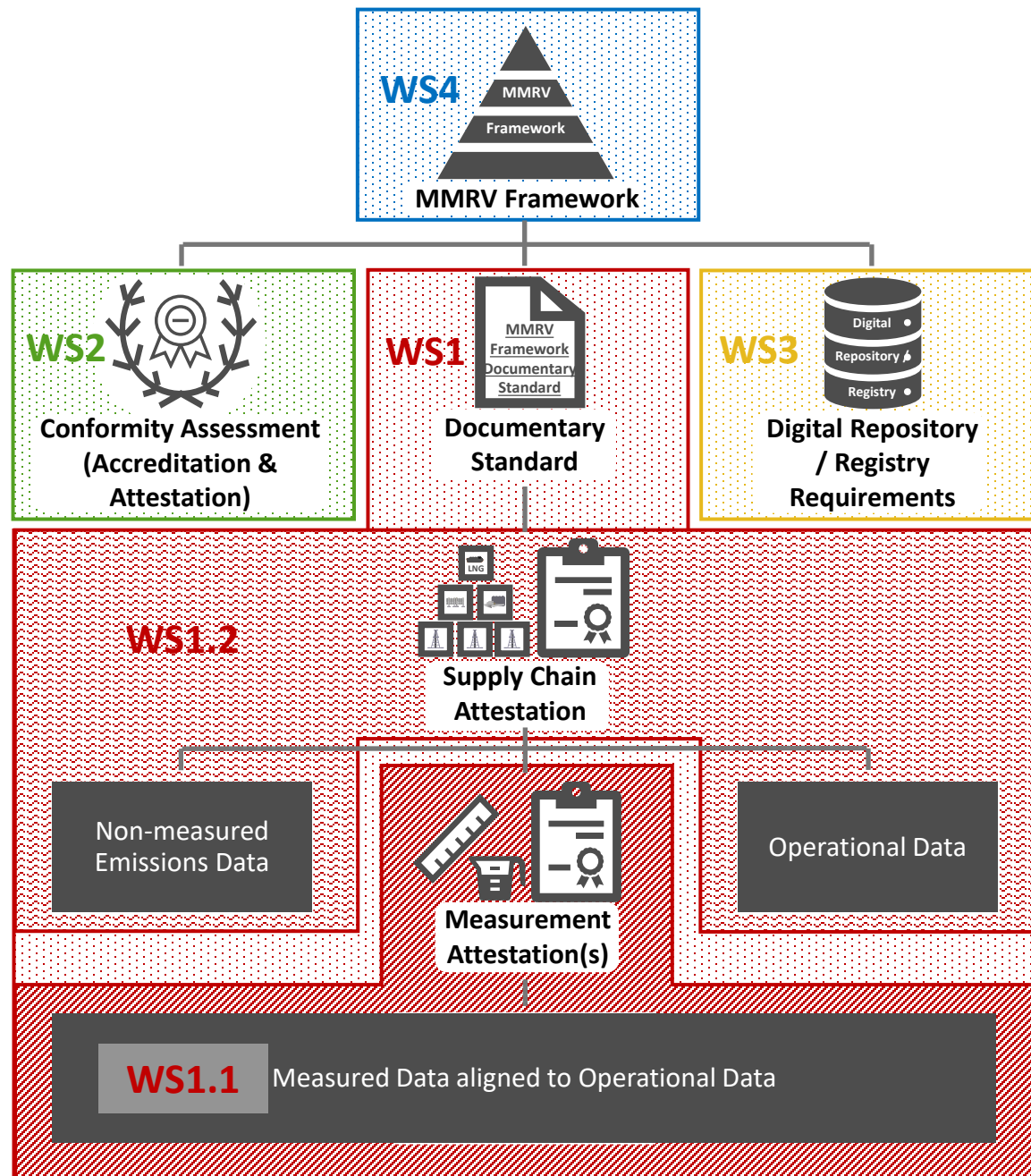
WS1.1: Measured Emissions

WS1.2: Supply Chain Aggregation

## WS2: Accreditation & Attestation

## WS3: Attestation Management

## WS4: MMRV Framework Coordination & Training Support



## Work Stream / MMRV Timeline Goals

- ▶ WS1: Q1-2024 to Q4-2025
- ▶ WS2: Q1-2024 to Q1-2025
- ▶ WS3: Q3-2024 to Q4-2024
- ▶ WS4: Q3-2024 to Q2-2025

# MMRV Ecosystem Overview

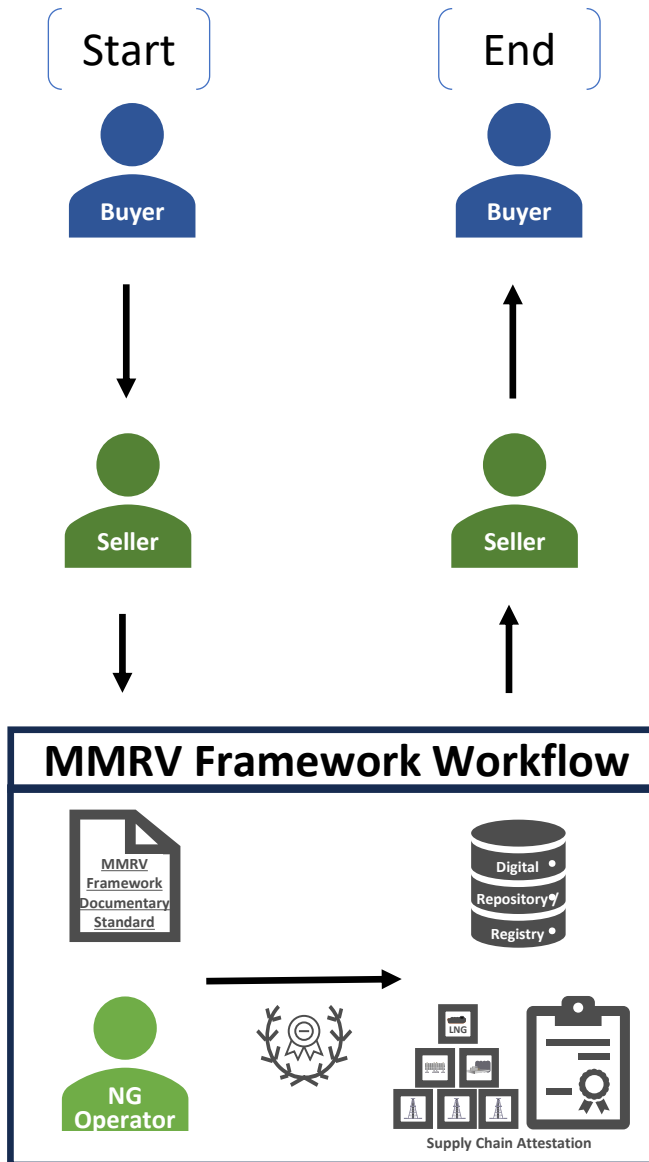
## MMRV Ecosystem Workflow

Natural Gas Market (Buyer) requests MMRV Certified Natural Gas from Natural Gas Seller

Natural Gas Seller requests Supply Chain Attestation for the natural gas from Natural Gas Supply Chain Operators in accordance with the MMRV Framework Documentary Standard

Natural Gas Supply Chain Operators quantify & report emissions certified in accordance with the MMRV Framework Documentary Standard

A Supply Chain Attestation for the natural gas is procured by the Natural Gas Supply Chain Operator who then provides it to the Natural Gas Seller to provide to the Natural Gas Buyer with the purchased natural gas



## Enabling and Supporting Actors & Resources



Ensures long-term relevance of system



Supports broad acceptance and use



Verification of measurement technology capability



Provides resources to support effective implementation

# MMRV Framework Overview

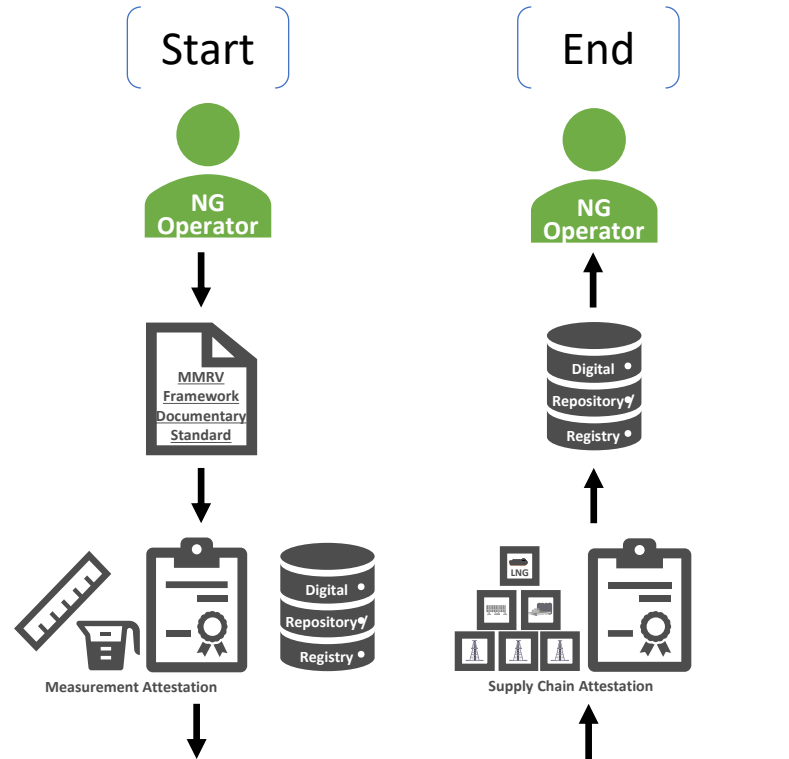
## MMRV Framework Workflow

Natural Gas Supply Chain Operator receives request from Natural Gas Seller for MMRV Certified Natural Gas

Natural Gas Supply Chain Operator acquires Measurement Attestation from Digital Repository / Registry\*

Natural Gas Supply Chain Operator combines Measurement Attestations with non-measured emissions data and operational data to complete supply chain GHG representativeness

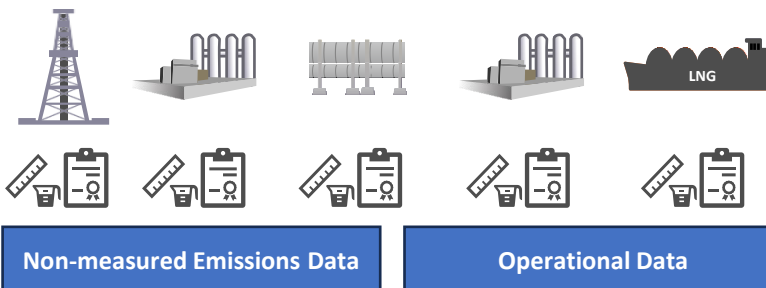
\* Points of (Partial) Supply Chain Certificates can also be acquired to complete supply chain representativeness.



A "Supply Chain Attestation" is created and stored in Digital Repository / Registry for access by Natural Gas Seller

Natural Gas Supply Chain Operator contracts with MMRV Accredited Certification Body to Audit supply chain GHG performance in accordance with the MMRV Framework Documentary Standard

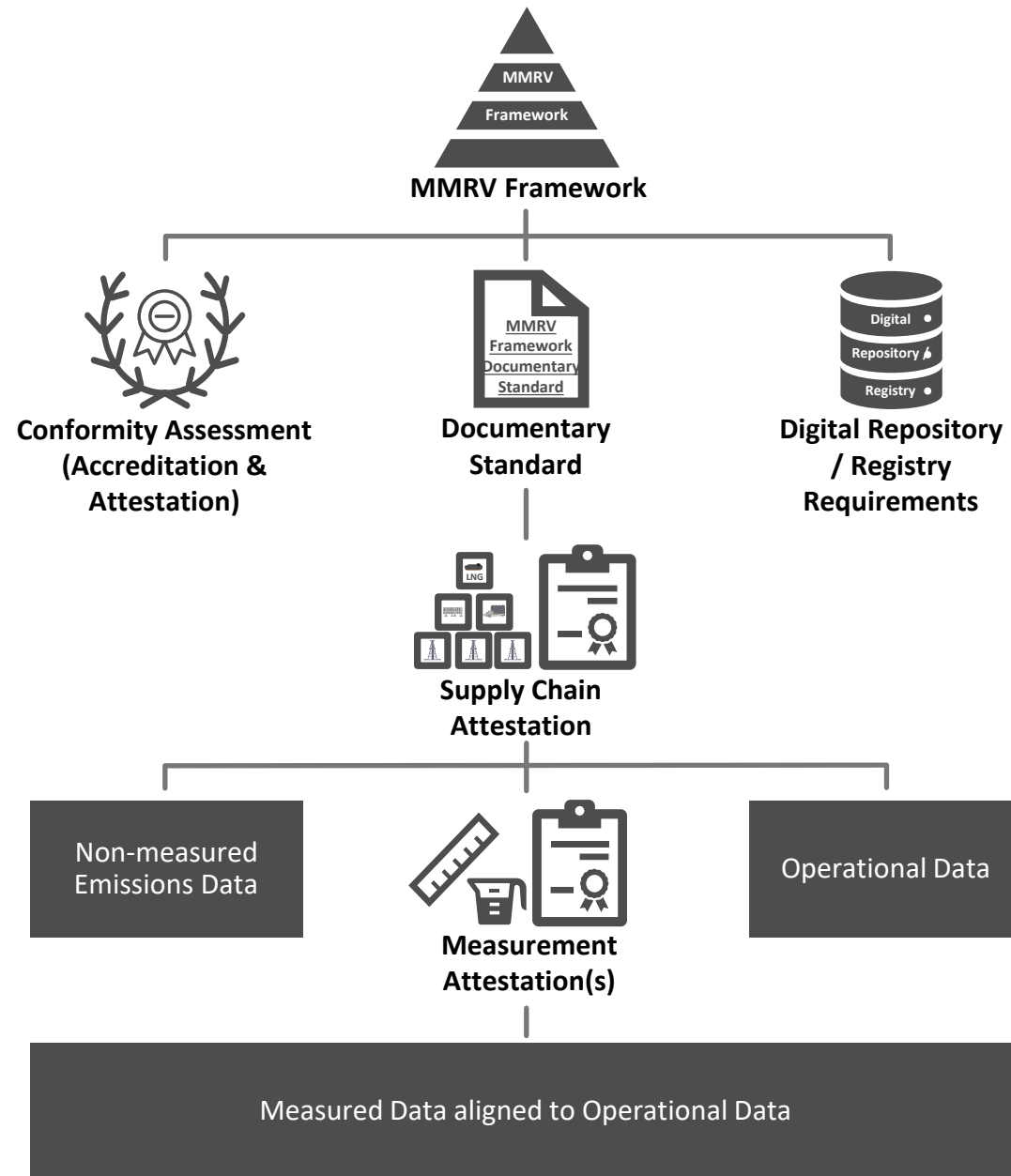
## Supply Chain Certification Workflow



## MMRV Accreditation & Attestation Workflow



## MMRV Ecosystem





U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

# Opportunities for Feedback

---



# Next Steps and Stakeholder Feedback

We greatly appreciate the input we have received to date and welcome continued feedback!

Updates on this initiative will be posted via our web site:

[Greenhouse Gas Supply Chain Emissions Measurement, Monitoring, Reporting, Verification Framework | Department of Energy](#)

Comments or feedback can also be shared via email to

[FE-30correspondence@hq.doe.gov](mailto:FE-30correspondence@hq.doe.gov)



Office of  
FOSSIL ENERGY AND CARBON MANAGEMENT

[ABOUT US](#)[MISSION](#)[SCIENCE & INNOVATION](#)[RESOURCES](#)[SERVICES](#)

# Greenhouse Gas Supply Chain Emissions Measurement, Monitoring, Reporting, Verification Framework

Office of Fossil Energy and Carbon Management

[Office of Fossil Energy and Carbon Management »](#)

Greenhouse Gas Supply Chain Emissions Measurement, Monitoring, Reporting, Verification Framework



U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

# Q&A

---



U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

# Thank You

---