AMERICAS LNG SUMMIT & EXHIBITION

October 19-21, 2025 | Lake Charles, USA

Technical Conference

Streamlining the LNG regulatory landscape: A review of industry practices for methane mitigation and emissions management

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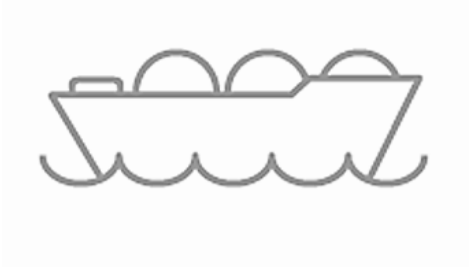
U.S. LNG Market

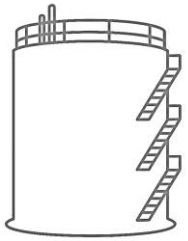


Past
- U.S. became the largest exporter in 2023

Present
- Exported 12 Bcf/d in 2024[1] and expects to export 14 Bcf/d in 2025[2]
- Export capacity – 17 Bcf/d[2]
- 9 large-scale LNG export facilities operational[2]

Future
- Additional export capacity in development – 33 Bcf/d[2]
- 7 LNG export facilities under construction[2]

- U.S. Exports have reached 48 countries around the world[1]
- In 2024, Europe received 53% of U.S. LNG exports, and Asia received about 33%[3]



- More than 150 non-export facilities in the U.S.: Peak Shaving, Storage, Merchant
- LNG reserves are important for energy reliability and emergency/peak demands

TECHNICAL CONFERENCE

1. U.S. Liquefied Natural Gas (LNG) Exports Fact Sheet_0.pdf
2. LNG Snapshot Sep 30 2025_final.pdf
3. The United States remained the world's largest liquefied natural gas exporter in 2024 - U.S. Energy Information Administration (EIA)

Standard LDAR Practices

Purpose

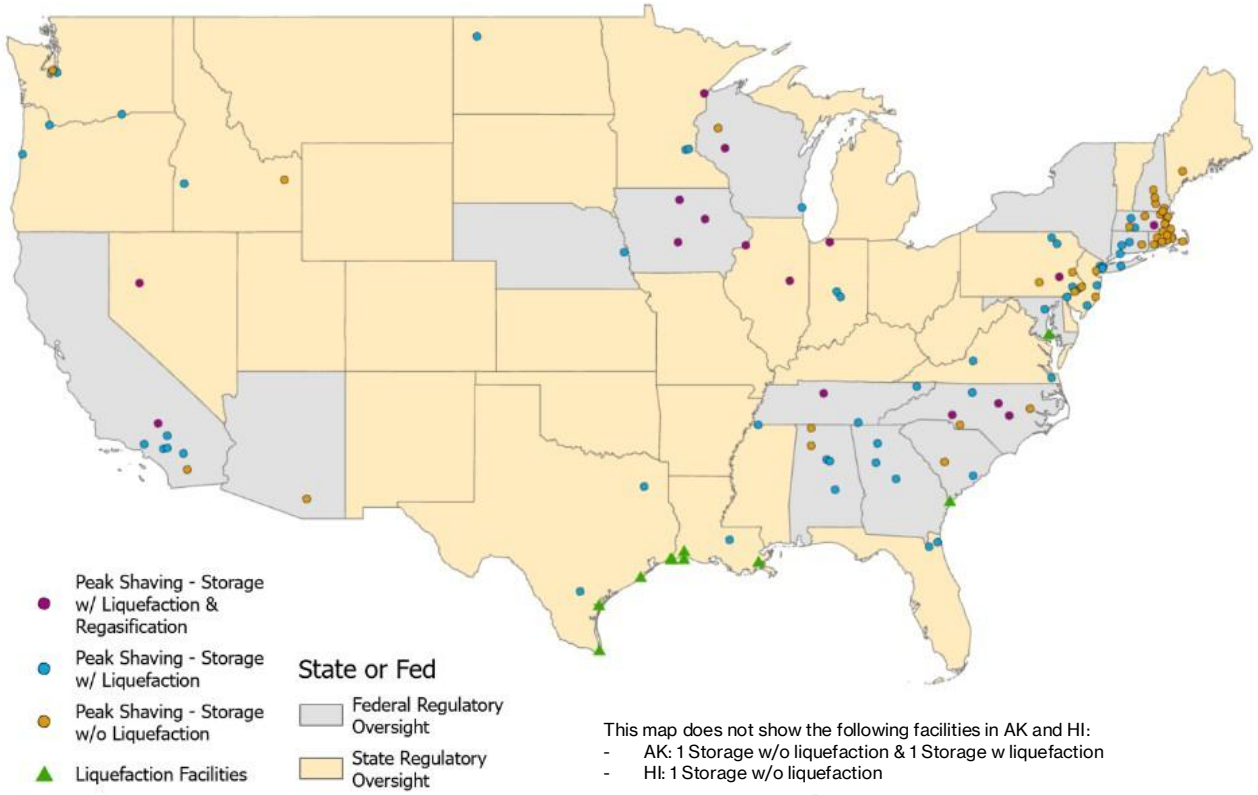
- Enhance and maintain safety for workers and surrounding community
- Support regulatory compliance
- Minimize CH_4 and VOC emissions from equipment leaks

Survey methods

- Optical Gas Imaging (OGI) cameras
- Leak Detection Sensor Networks
- EPA Method 21
- Advanced Methane Measurement Technologies: aerial survey and continuous monitoring sensors

U.S. Regulatory Oversight on LNG LDAR Practices

- No single regulation applies to all LNG facilities
- Most export terminals report to EPA GHGRP, while others follow state-level LDAR and air permit conditions
- PHMSA maintains a database of all LNG facilities, but does not require leak reporting from all facilities



Research Need

- Increased exports and operations lead to increased need for leaks monitoring
  - LDAR is a systematic approach to detect and mitigate leaks, and to keep product in the system
- Complexity of jurisdictional regulations at the federal and state level is vast for LNG
  - Gaps need to be filled to provide guidance and standardization to promote safety at all facilities
  - Redundancies need to be removed for more efficient reporting and tracking of leaks
- Cost-effective technologies and approaches are needed to prioritize leak response and repair

Project Scope & Objectives

Gap Analysis to Identify Opportunities to Inform Leak Detection and Repair (LDAR) Programs in LNG Facilities (Agreement No.: 693JK32410010POTA)

Objectives

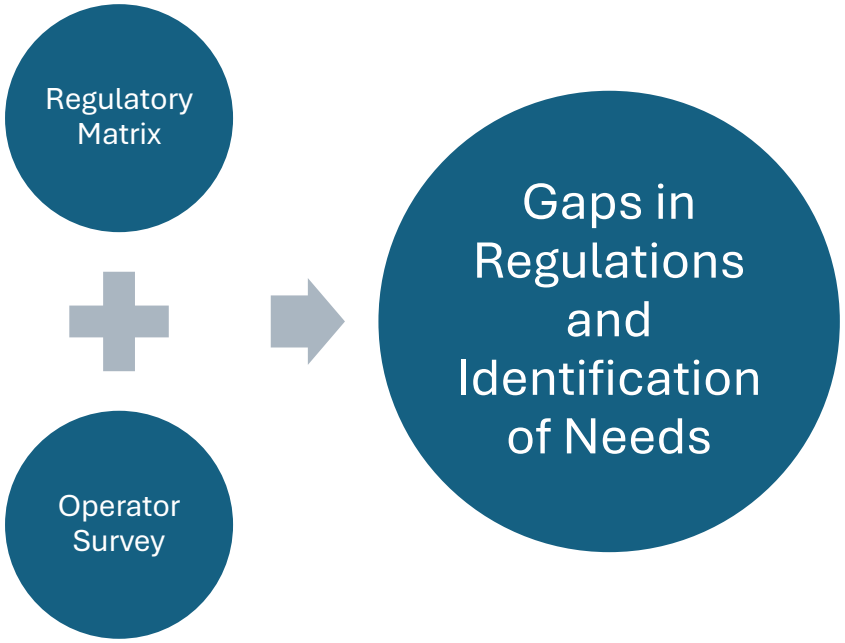
- Perform a gap analysis to identify federal and state regulatory gaps and duplications, as well as future opportunities to reduce regulatory compliance burdens for U.S. LNG operators
- Assess the feasibility of a centrally located, publicly available database for reports on leaks and emissions

Scope

- Leak Detection and Repair (LDAR) practices at LNG facilities
- LNG facilities include Liquefaction and Regasification terminals, Peak Shaving Plants, and Satellite Plants
- Limited to methane emissions only
- Currently operating facilities in the U.S. only

Industry	# of Collaborators
Liquefaction Terminal	3
Peak Shaving Operator	3
Upstream Operator/ Future LNG Investment	2
Academic Expert	2
Federal Regulatory Expert	1

Technical Approach



Regulatory Matrix

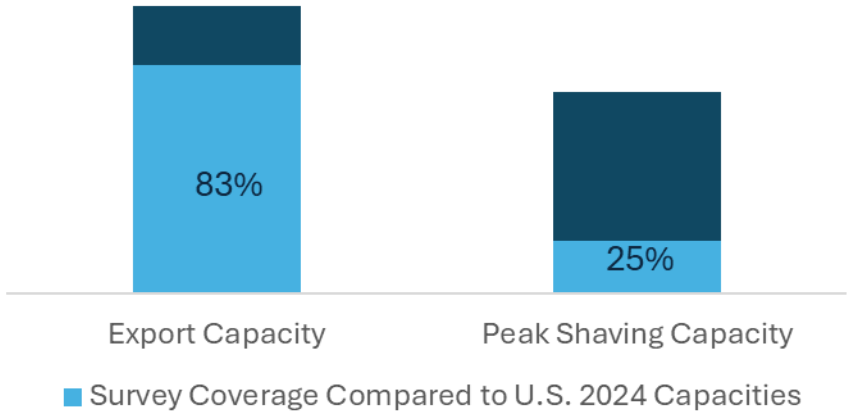
- Identify relevant regulations at federal and state level
- Conduct a thorough analysis of each regulation using a consistent set of 23 questions
  - Questions about the regulations include scope, technology requirements, leak repair requirements, and more

Operator Survey

- Understand the unique requirements of operators
  - Questions included facility characteristics and reporting requirements

Operator Survey Findings

- 4 export operators, 4 peak shaving operators, 1 merchant plant
- Most common requirements were state-level and air permit
- High variability among operators in the data that is gathered and reported
- OGI is the most common technology, followed by Low Detection Sensitivity Network and Method 21



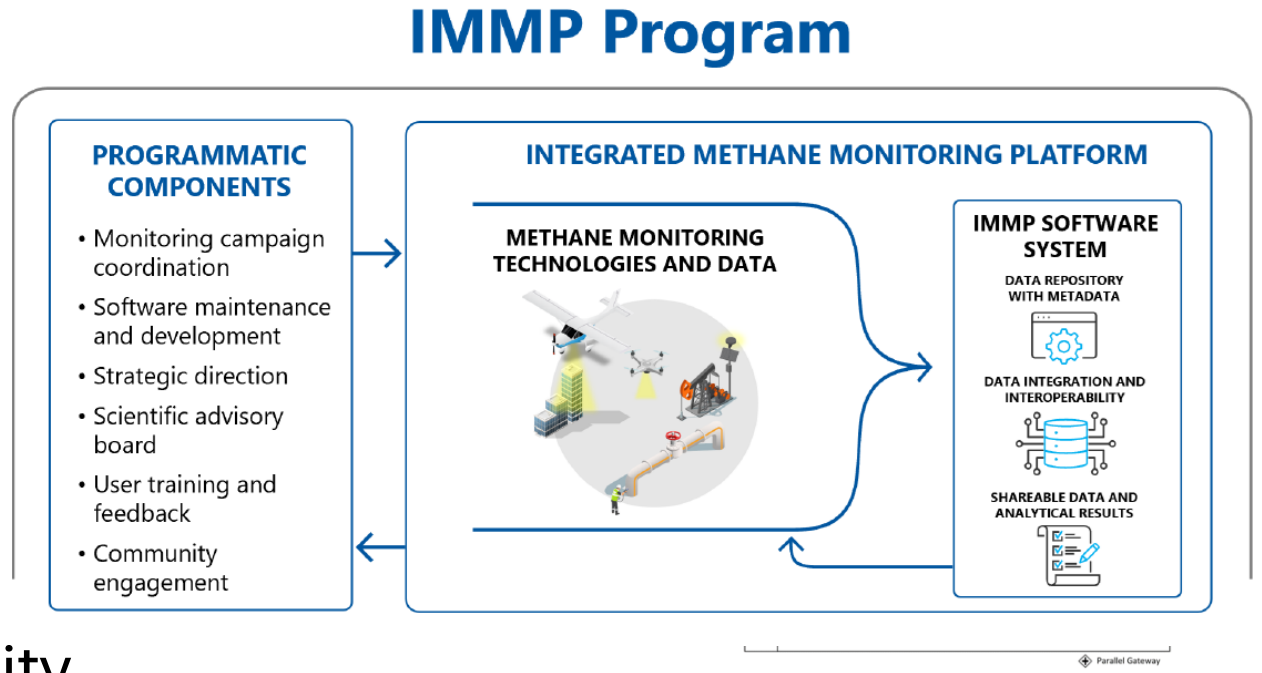
- Voluntary leak detection activities include:
  - Increase survey frequency and repair time
  - Measuring leak rates
  - Testing alternative measurement technology (i.e., drones)
  - Reporting to voluntary initiatives (ONE Future, NGSI, OGMP 2.0

Preliminary Conclusions from Regulations Matrix

- 22 Regulations analyzed (5 Federal Codes, 1 PHMSA Rulemaking, 1 Standards Document, 15 State Codes)
- Most state codes default to federal codes
- Significant emphasis on emergency/large leak events for reporting rather than routine detection procedures
- Federal Codes overall provide more specifications regarding technology requirements
  - NSPS OOOOb OGI minimum detection limits, EPA Method 21 Calibration criteria
- Most states refer to 40 CFR Part 193 which requires patrols semiannually and leak surveys annually and NFPA 59A
  - Maryland requires quarterly surveys

Feasibility Assessment for a Data Portal

- Key benefits: advance safety, improve operations
- Key risks/barriers: data sharing concerns, reporting burdens
- Approach:
  - Identify stakeholders
  - Document requirements
  - Develop hypothetical design
  - Outline potential implementation pathways
- Synthesize findings into a feasibility analysis to describe barriers and opportunities for implementation



Next Steps and Timeline

- Some findings will be presented at LNG2026 in Feb 2026, in Qatar
- Final report and recommendations to PHMSA will be submitted by March 2026
- Pending reviews, reports/papers will be published in mid-2026

GTI Energy – LNG Collaborative

Opportunity

- Future growth and credibility of LNG Markets will require consistency and transparency on supply chain emissions
- Key import markets remain committed to supply chain emissions transparency
- Domestic LNG stakeholders (financers, gas producers, LNG shippers) exporting into global markets recognize the need to align with emission expectations from buyers
- Provide leadership and direction in the absence (or significant lack of) U.S. policy, regulatory and funding support

Objectives

- Establish an industry-led collaboration that advances LNG research and technology development
  - Primary focus on emissions transparency, monitoring, measurement, and mitigation
- Convene stakeholders across industry, academia, finance, and policy to support the growth and flexibility of the global LNG market
  - Enhance transparency, interoperability, and credibility as an abundant lower-carbon energy source
- As the initiative matures, and successfully engages customers, expand into addressing broader R&D and technology needs such as low-emission fuel fuels, synthetic natural gas and digital innovations

Why GTI Energy?

- Will provide the industry sponsors with a highly adaptable and hands-on platform to pursue their specific research needs and collaborate with others in the industry
- Proven success with multiple industry collaboratives spanning the energy industry

VERITAS

QH_4 COLLABORATORY TO ADVANCE METHANE SCIENCE

center for METHANE RESEARCH

GTI ENERGY RAISE
Reliable Affordable Infrastructure for Secure Energy

GTI ENERGY SUSTAIN H_2

GTI ENERGY HyRes
Hydrogen Emissions Research Consortium

Questions?

Contact us for more information:

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