Monitoring Methane Emissions

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About the Handbook

A ‘how-to’ action guide to empower legislators, ministries, regulators, and NOC officials to adopt and enforce legal instruments that will rapidly and effectivel reduce methane emissions from the oil an gas sector.

Available here:

https://cldp.doc.gov/methane-abatement-resources

About the Handbook (Cont.)

- Sponsored by **U.S. Department of State, Bureau of Energy Resources.**
- Drafted over one week in an intense session with 13 expert co-authors.
- Co-written by authors representing:
  - Government (U.S., Sri Lanka, and Bangladesh)
  - NGOs
  - Multilaterals
  - Industry
  - Academia

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Monitoring

Key Takeaways

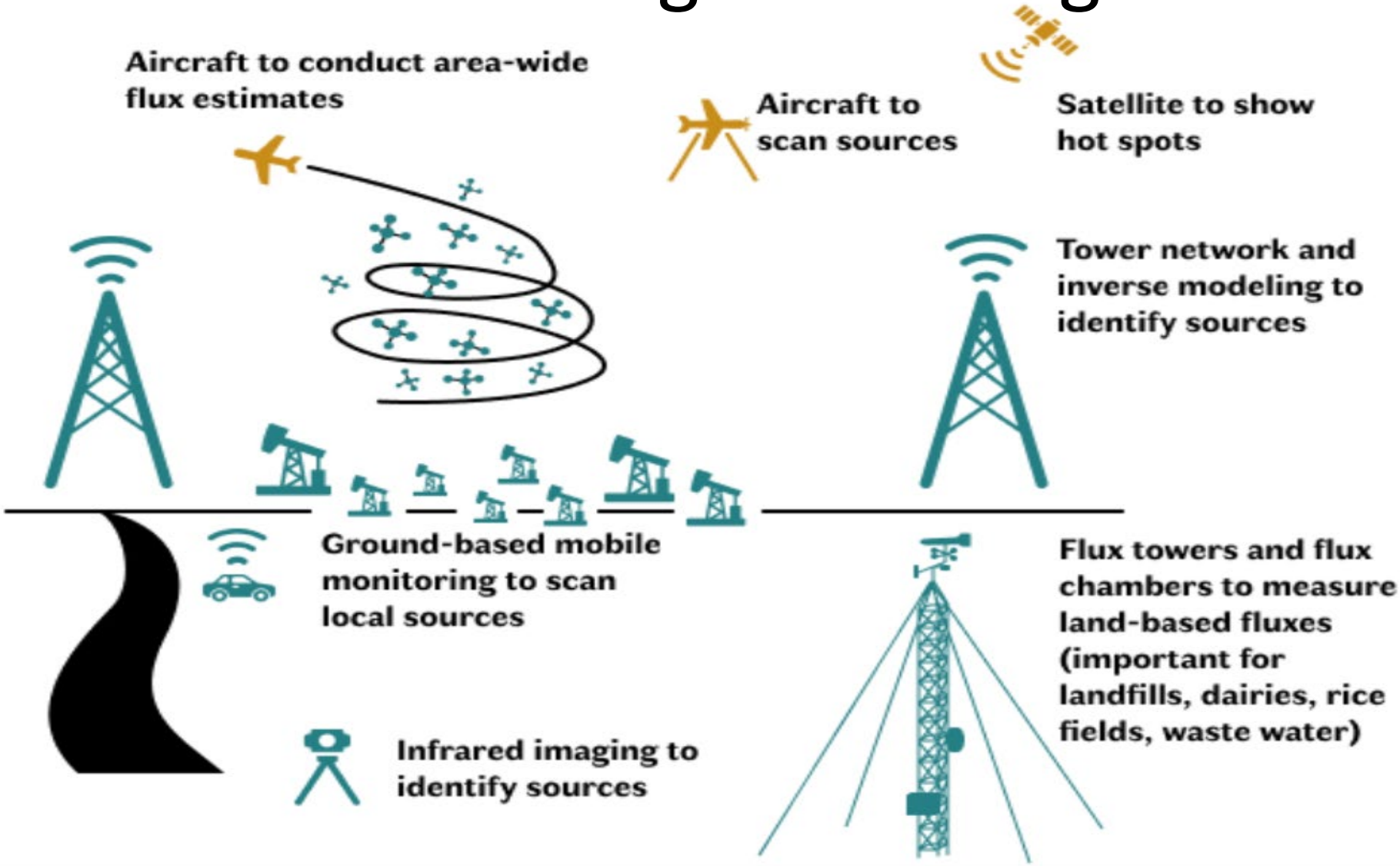
- There are various monitoring technologies available on the market
- Technologies for measuring emissions have different limitations and optimal use cases.
- Regulations can include requirements that improve data and reporting and lay groundwork for the future.
- Governments can take advantage of the different resources from international organizations and NGOs to improve monitoring
  - including one-time aerial surveys and satellite monitoring

Monitoring

Available Technologies

- Most mature monitoring technologies involve source-level detection by instruments
  - Ie: optical gas imaging ; the use of EPA Method 21 sniffer surveys
- New and emerging technologies allow for aerial sensing and continuous monitoring of methane emissions
  - Multiple technologies, such as sensors that screen a number of sites for methane emissions on satellites, planes, drones or vehicles; sensors permanently installed on-site for near-continuous monitoring
  - Continuous process monitoring & digitization : combining these data can link real-time methane data with information on process activities
  - Tiered Approaches: combining regular instrument surveys, aerial and satellite surveys, and continuous monitoring can enhance detection and mitigation of emissions

Available Monitoring Technologies

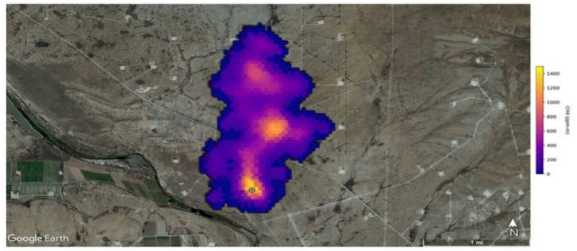


Monitoring

Different Monitoring Technologies

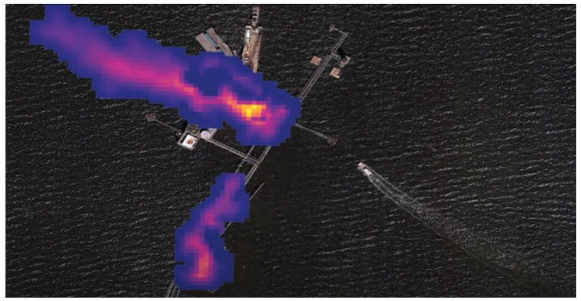
Episodic Monitoring

Satellite



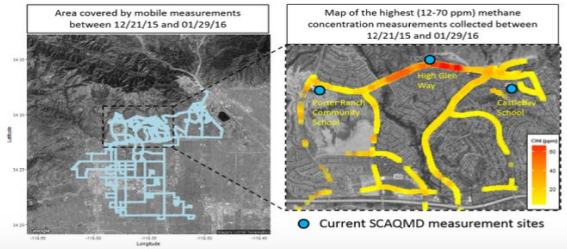
Source: NASA/JPL-CalTech

Aerial



Source: Carbon Mapper

Mobile



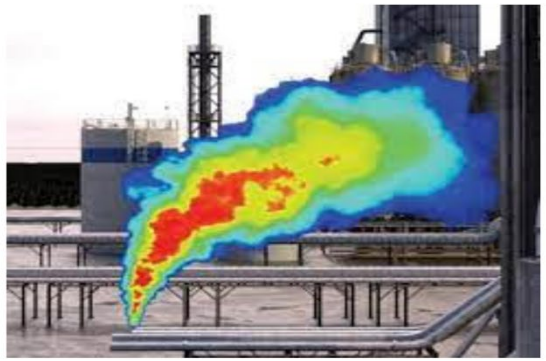
Episodic Monitoring

Handheld camera

Source: U.S. EPA[97]

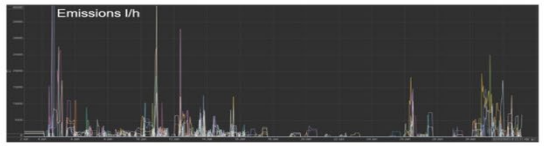
Continuous Monitoring

Fixed camera



Source: Honeywell

Fixed sensors



Source: Honeywell[98]

Monitoring

Supporting Regulatory Frameworks

- Economic measures
  - such as fee for emissions above a certain threshold

- Economic and performance measures typically require robust reporting based on active monitoring and measurement.
  - although some use proxy measures

- As technologies improve, regulators should consider including requirements that enhance data and reporting while laying groundwork for future improvements.

Monitoring, Reporting and Verification

- Monitoring, Reporting and Verification (MRV)
  - Monitoring - creation of emissions data through measurement
  - Reporting - dissemination of emissions data
  - Verification - independent assessment of reported data

- Technologies for measuring emissions have different costs, limitations, and optimal use cases

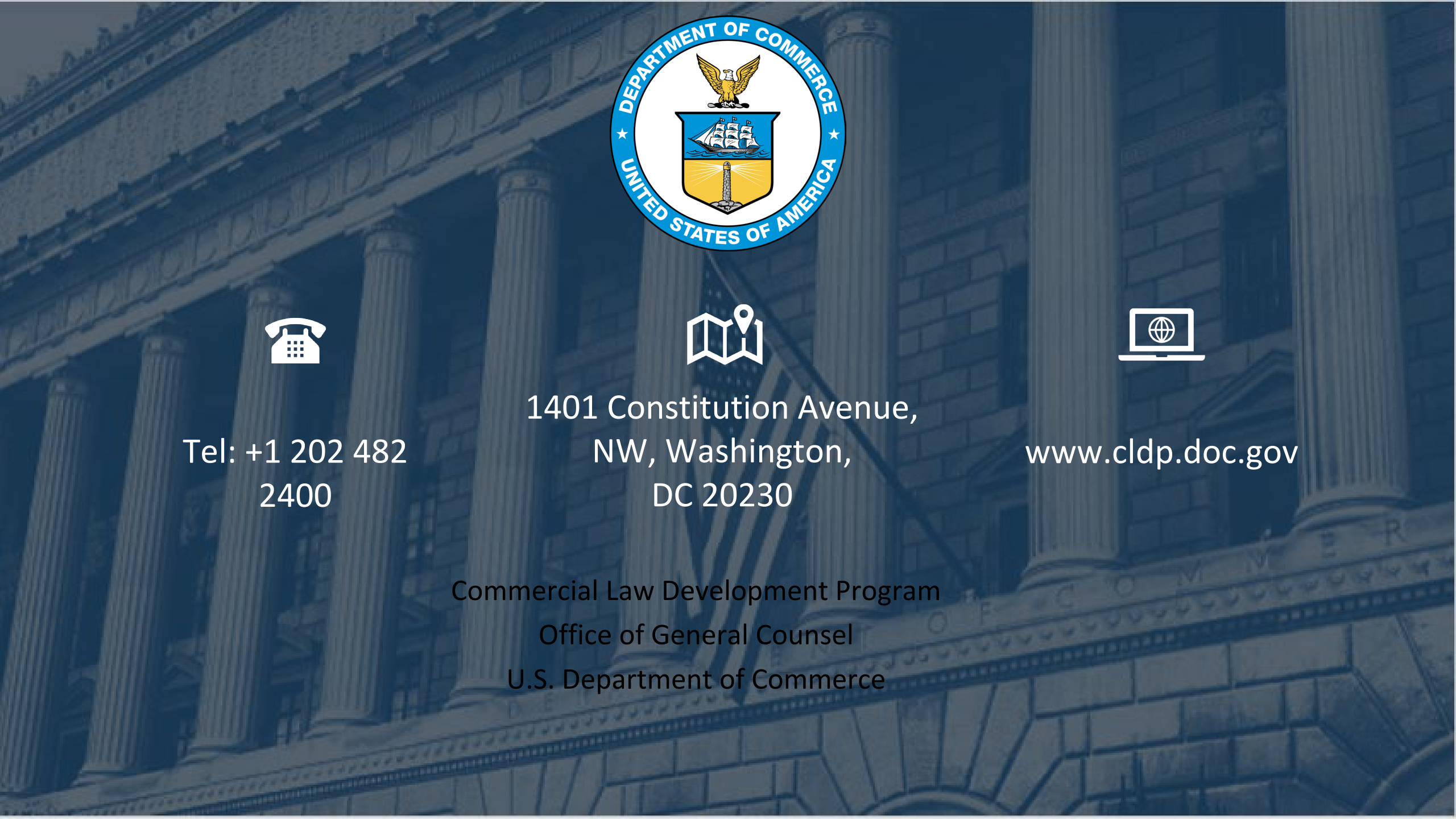
Monitoring

Available Support for Governments

- Support is available for detecting and estimating emissions with various technologies:
  - CCAC Methane Science Program
  - United Nations Environment Program (UNEP) Methane Alert and Response System
  - Philanthropy-funded satellite missions such as those led by the Environmental Defense Fund and Carbon Mapper

Resources Available to Support Monitoring Efforts

- This is a non-exhaustive list of resources/services to support monitoring programs:
  - The International Methane Emissions Observatory
  - Carbon Mapper
  - MethaneSAT
  - Climate Trace
  - NASA EMIT
  - TROPOMI
  - Satellite Point Source Emissions Completeness Tool (SPECT)
  - Global Methane Initiative 2023: Oil and Gas Sector Resources



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