Methane Management in Extractive Industries (Upstream Oil and Gas / Downstream Gas)

-Joint UNECE/GMI Project

Torleif Haugland, Carbon Limits

Michal Drabik, UNECE

Geneva, March 2018

Outline

1. Data sources and emissions estimates
2. MRV
3. Mitigation and summary of gaps

1 Emission sources and levels

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Main sources of methane emissions in Oil and Gas operations

OIL PRODUCTION

- Associated Gas Venting and flaring
- Casing-head gas venting
- Storage tanks/ loading
- Pneumatic devices
- Well completion

GAS PRODUCTION

- Compressors
- Dehydrators
- Pneumatic devices
- Liquid unloading
- Well completion

GAS PROCESSING

- Compressors
- Dehydrators
- Pneumatic devices
- Maintenance/ blowdown
- Engines

GAS TRANSMISSION

- Compressors
- Dehydrators
- Pneumatic devices
- Engines
- Maintenance/ blowdown

GAS DISTRIBUTION

- Mishaps and blowdown

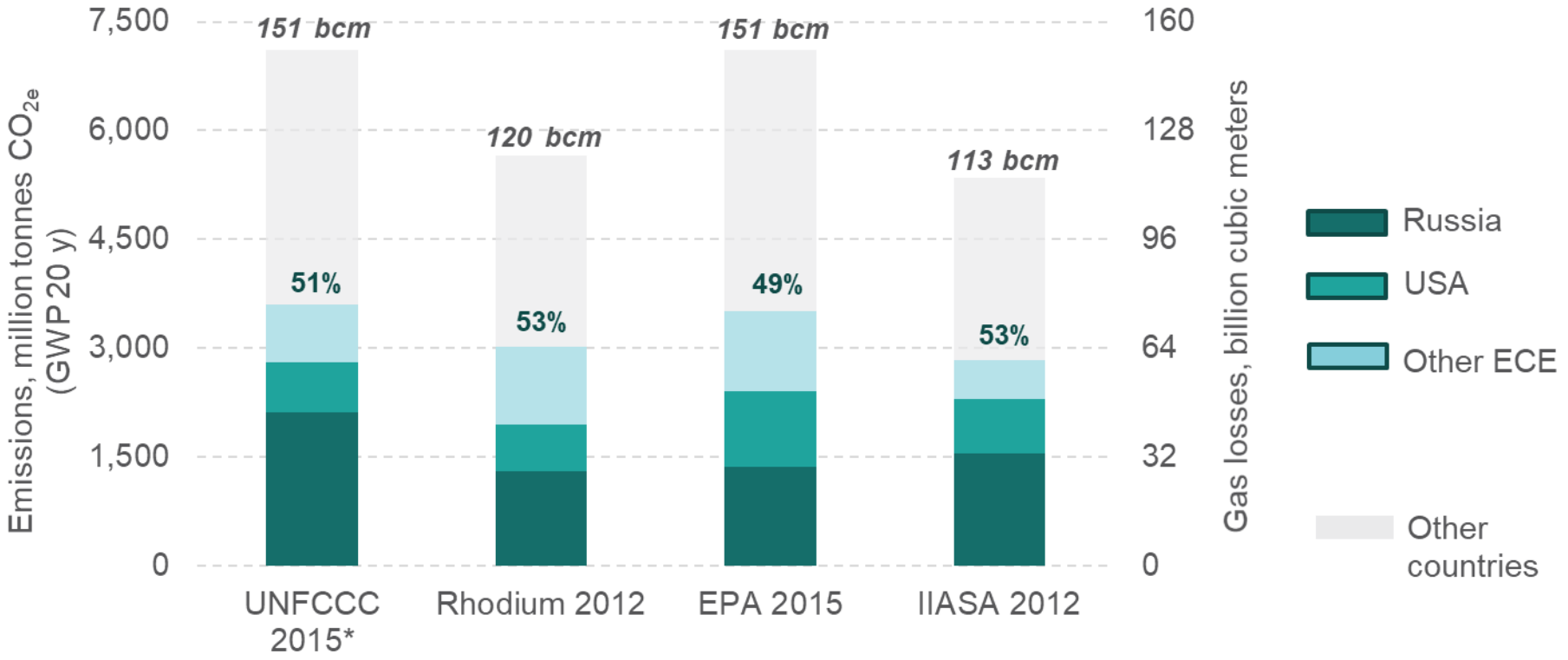
LEAKS / VENTS

UPSTREAM OIL AND GAS

DOWNSTREAM GAS

ECE region accounts for half of global oil and gas methane emissions

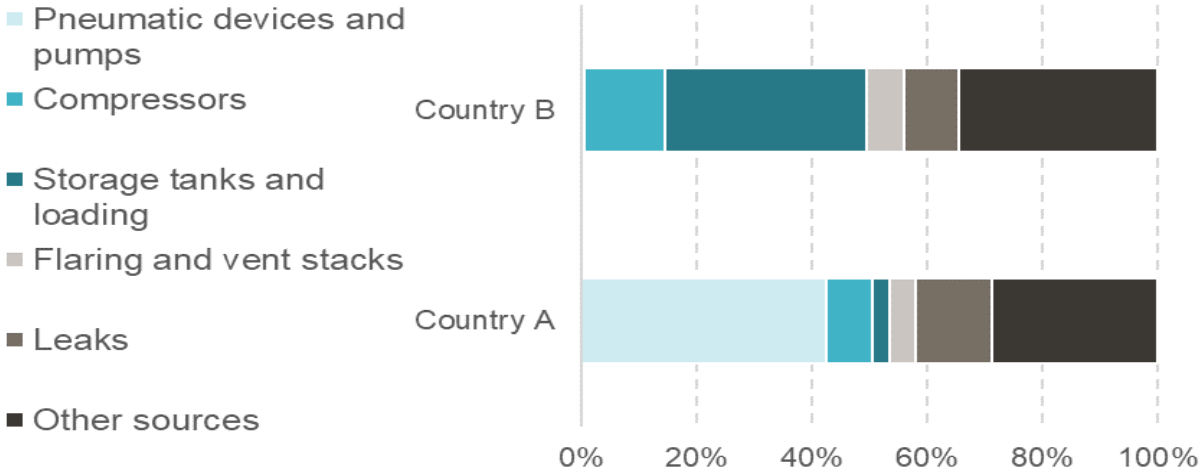
…country specific estimated differs greatly by data source



** Data for 2015 for Annex I countries and latest reports for non-Annex I countries. US EPA estimate is used for total global methane emissions from the oil and gas sector.*

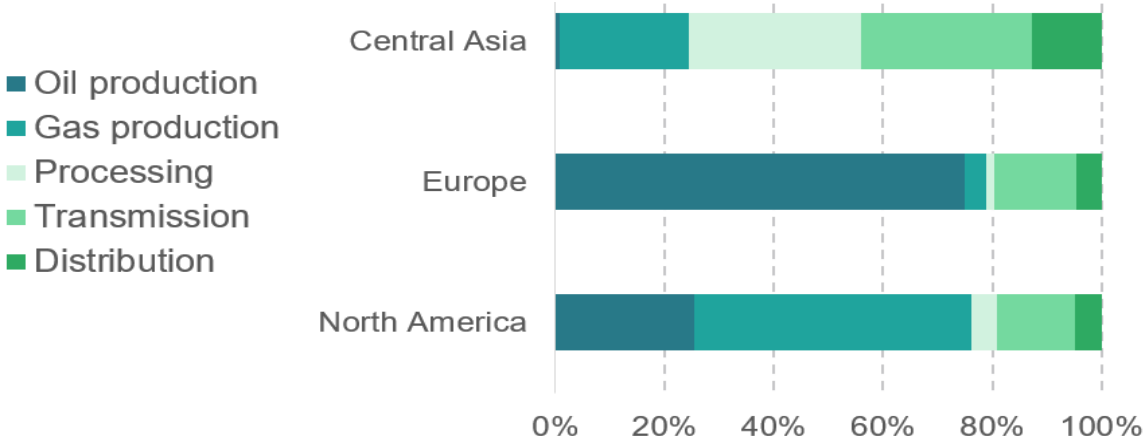
Operational practices vary a lot between countries

… reflected in large differences in emissions by source/equipment



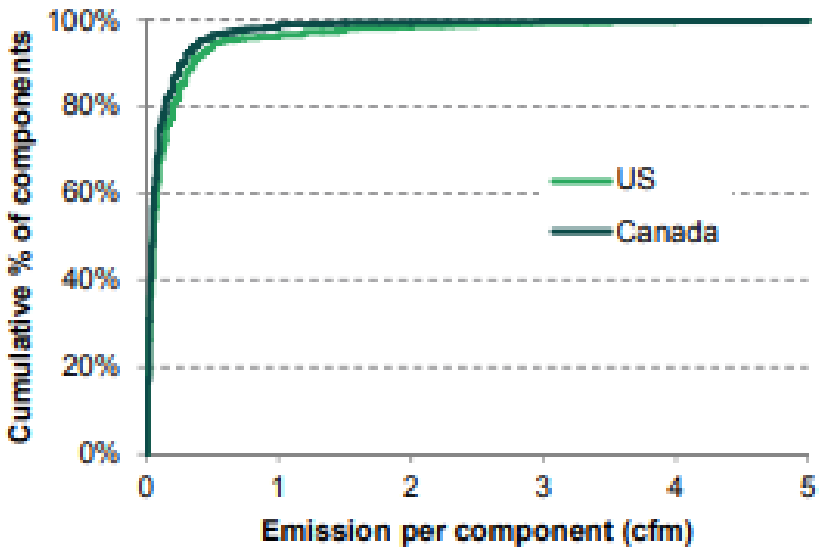
Differences in value chain emissions also reflect great variations in reporting practices

Share of upstream and downstream methane emission in ECE per region - UNFCCC reporting



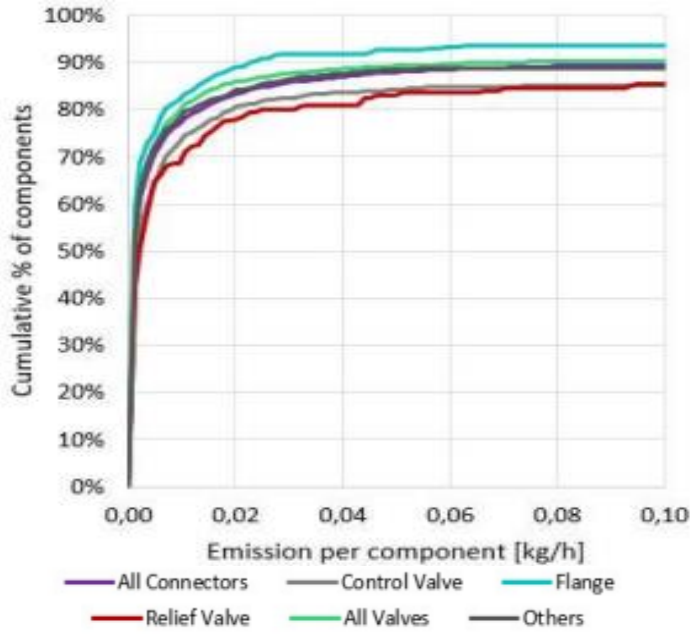
A small share of emission points represents a large share of the emissions. And they are generally not well accounted for in the overall methane emission reporting

Example from US and Canada: 5% of the emitting components represents about 50% of the emissions
(based on a sample of 60,000 measurements)



Source: http://carbonlimits.no/wp-content/uploads/2017/09/ECCC-Report-Main-and-Extension.pdf

Example from Europe: 11% of the emitting components is responsible for most of the emissions
(based on a sample of 800 000 data points)



Source: http://carbonlimits.no/wp-content/uploads/2017/11/LDAR_In_Europe-1.pdf

2 MRV

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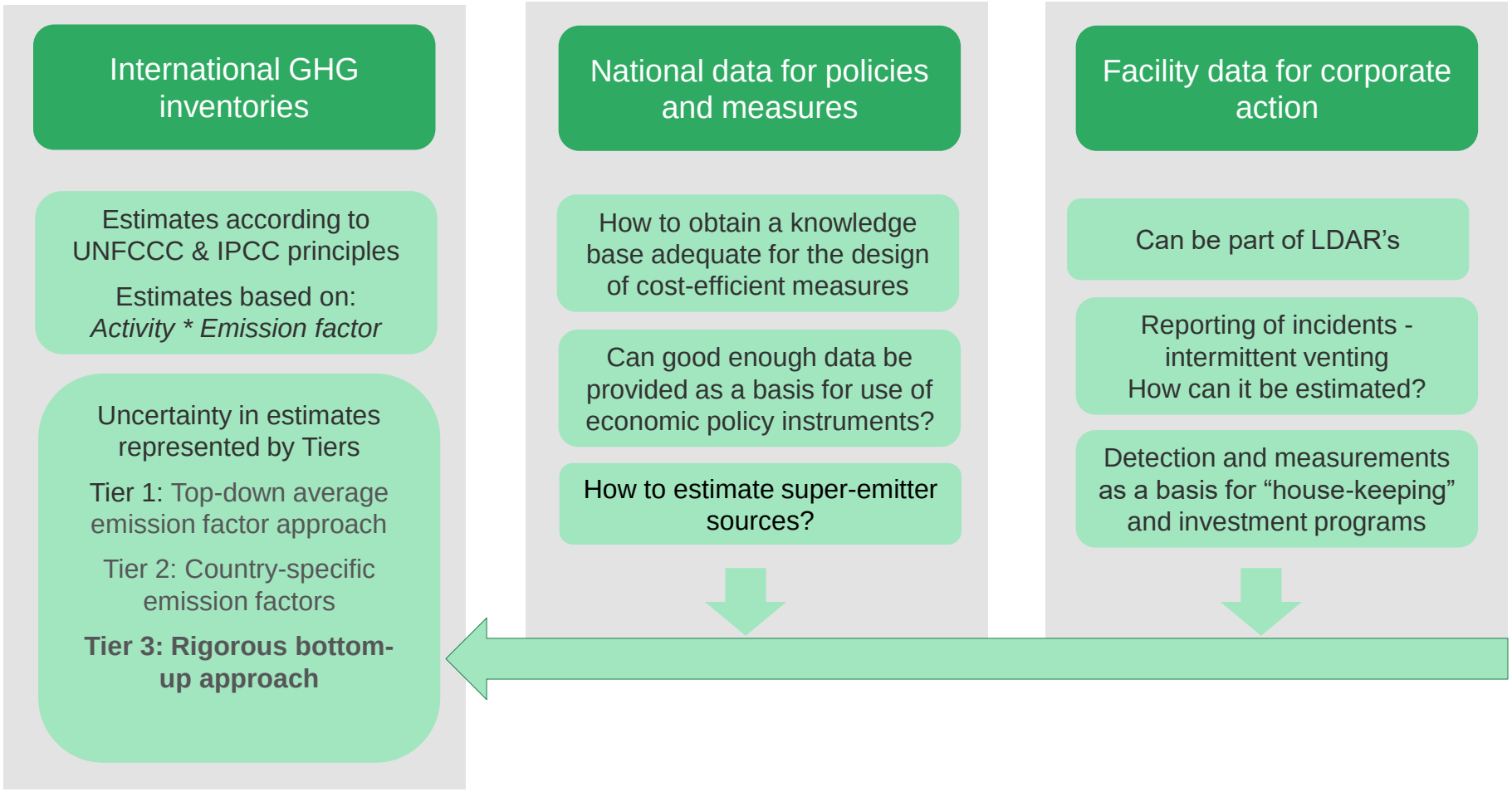
MRV at three levels – serving different purposes

… but for the same broader objective



… more on MRV challenges

Regulator	Gap between bottom up and top down analyses	How to estimate super-emitters?	How to estimate (intermittent) venting?
Operator	Quick and reliable quantification technologies	Cost effective detection of high emitters	

3 Mitigation

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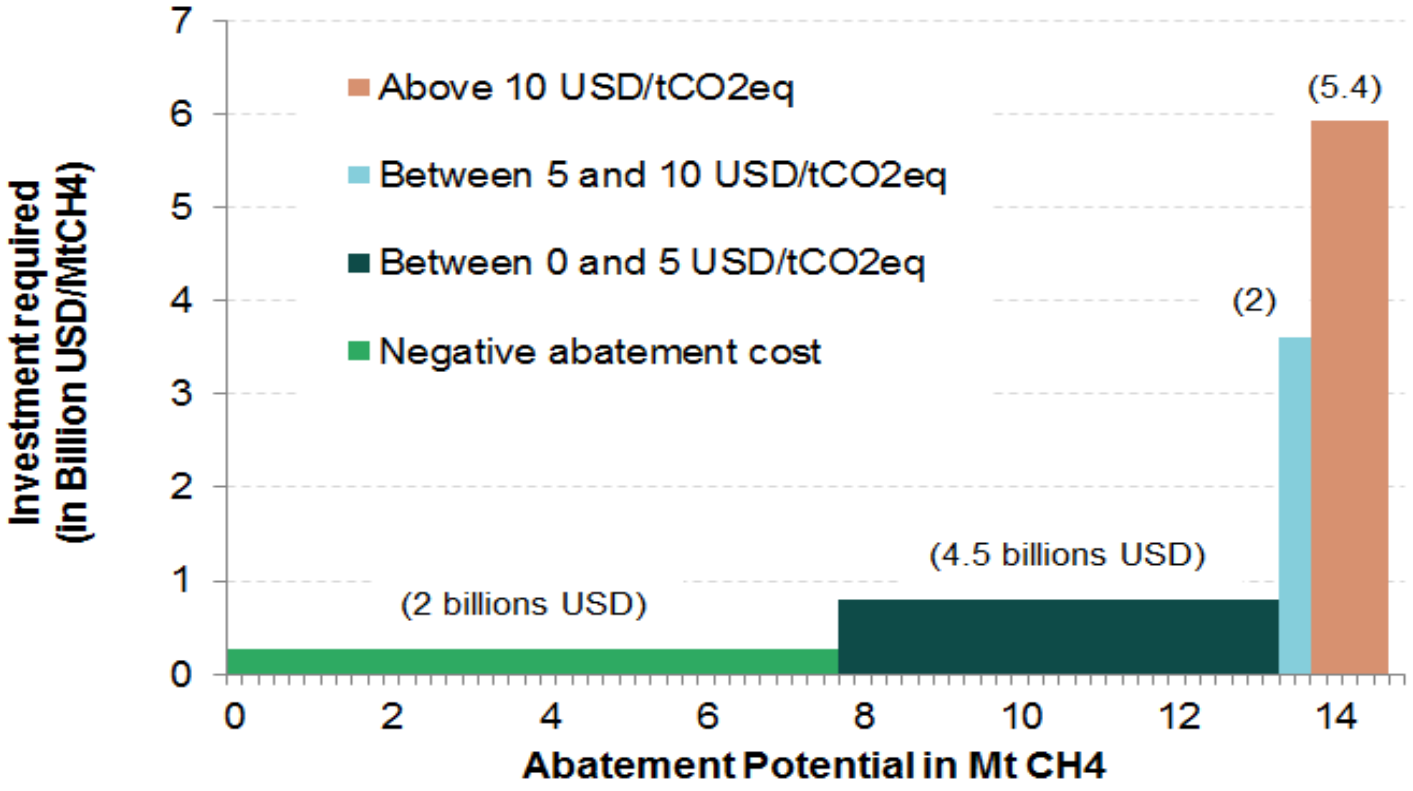
Low-hanging fruit

Abatement costs and Investment requirement in the “EBRD Region”



Mitigation options: some off-the-shelf technologies are available…

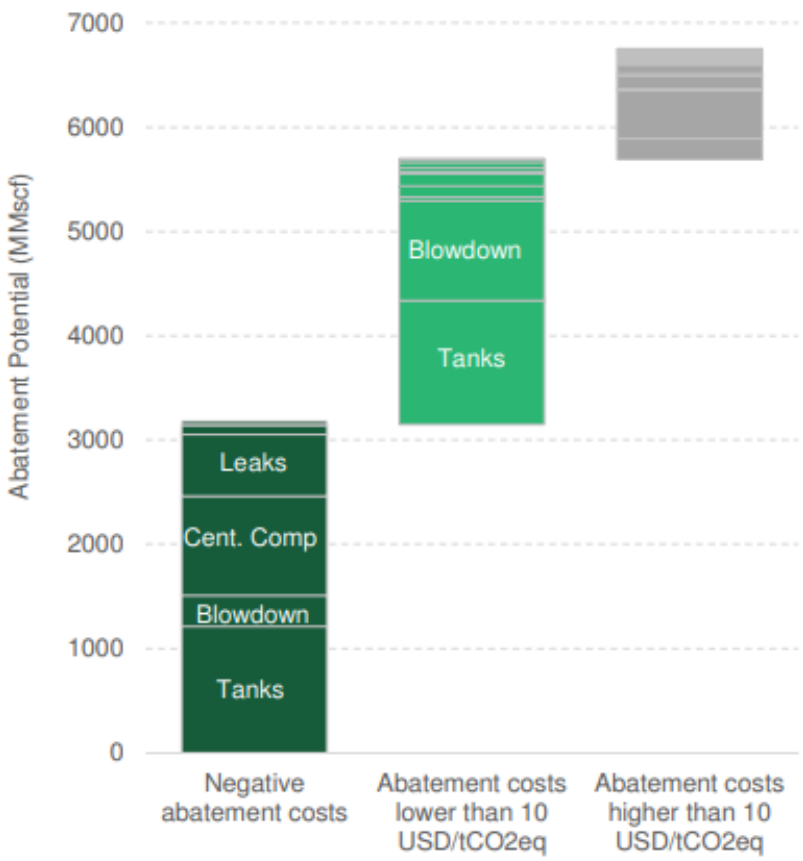
Some mature mitigation technologies are available but often not implemented, such as:

- Regular LDAR
- Storage tank venting - VRU
- Centrifugal compressor venting
  - Wet to dry seals
  - Reroute wet seal emissions
- Regular rod packing replacement
- Venting during pipeline maintenance - Mobile compressor stations

Cost and benefits of projects are **site specifics**

… but a large share of projects are **profitable**

Analysis of installations in Eurasia



4 Summary of gaps

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Summary of the gaps

Data sources and emissions estimates

- Different sources show large variations in estimates by country
- Specification by value chain components often poor
- Super-emitters & intermittent venting not fully accounted for
- Problematic that so much of estimates in ECE are Tier 1:
  - 75% upstream
  - 40% downstream

MRV

- Lack of transparency in estimates and reporting
- Quick & reliable quantification technologies needed, primarily at the plant level
- Much valuable site specific data is “lost” and not being used for mitigation and/or statistical purposes
- Some default emission factors show great variations

Mitigation

- Lack of awareness of negative cost options
- Societal vs company costs, lack of carbon pricing
- New approaches can help in spurring profitable emission reduction opportunities
- Knowledge base inadequate in order to design and implement effective and cost efficient policies and measures

5 UNECE and GMI Project

Michal Drabik, UNECE

Project Overview

- To assess methane emissions in Upstream Oil and Gas, and in Downstream Gas industries in the UNECE member States.

- To increase capacity of the UNECE Member States for MRV and reduce methane emissions in Upstream Oil and Gas, and in Downstream Gas industries.

Expected Project Deliverables

Preparation of two documents: (1) upstream oil and gas, and (2) downstream gas, that each contain -

1. A high-level assessment of methane emissions in UNECE member states;

2. Identification of best practices for MRV of methane emissions;

3. Identification of best practices for reducing methane emissions.

Expected Project Deliverables Continued…

1. Development of standard training modules on best practices for (1) MRV and (2) reduction of methane emissions;

2. Two capacity-building seminars to test and validate training modules;

3. Two capacity-building workshops on best practices for (1) MRV and (2) reduction of methane emissions

Project Stakeholders

- Principal implementing body: UNECE Group of Experts on Gas, in cooperation with Global Methane Initiative (GMI) Oil and Gas Subcommittee

- Sponsored by the US EPA

Stakeholder Involvement:

Executive Steering Committee: UNECE and GMI representatives

Technical Experts Drafting Group: Torleif Haugland (consultant)

Stakeholder Advisory Board: UNECE Group of Experts on Gas Bureau members + others (tbc)

Peer Review Group: UNECE Group of Experts on Gas members, GMI Oil and Gas Subcommittee members, CH4 Industry Meeting Group

Estimated Timeline

Reports on

1. Methane emissions and best practices for their MRV in Upstream Oil and Gas and Downstream Gas industries in the UNECE member States

2. Best practices for reducing methane emissions in Upstream Oil and Gas and Downstream Gas industries in the UNECE member States

- First Draft: 4 June 2018
- Second Draft: 1 October 2018
- Final Document: 17 December 2018

Estimated Timeline Continued…

1. Final Versions of:

- Best Practice Guidance for Effective Methane Management: Upstream Oil and Gas Sectors

  unifying in a consistent and a logical manner two substantive reports on:
  - methane emissions and best practices for their MRV in Upstream Oil and Gas industries in the UNECE member States;
  - best practices for reducing methane emissions in Upstream Oil and Gas industries;

- Best Practice Guidance for Effective Methane Management: Downstream Gas Sector

  unifying in a consistent and a logical manner two substantive reports on:
  - methane emissions and best practices for their MRV in Downstream Gas industry in the UNECE member States;
  - best practices for reducing methane emissions in Downstream Gas industry.

- **By 18 March 2019**

Thank you