CARBON LIMITS

Overview of Fugitive Emissions Management

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Methane emissions of National Oil Companies (NOCs)

Emission sources from installations owned and controlled by NOCs in Azerbaijan, Kazakhstan and Ukraine

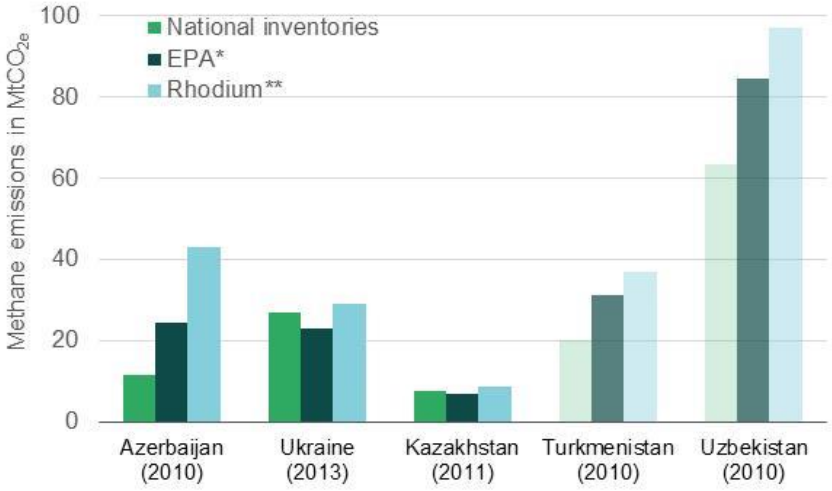
Objectives and activities

Awareness, knowledge and motivation	**Senior management Mid level decision makers. Technical staff training**
Identify opportunities	**Measurement campaigns Investment analysis**
	National inventories
Plan of action Implementation support	**Pilot projects**

Account for approx. 3% of global O&G methane emissions

but emission levels uncertain - also elsewhere in the region

Methane emissions from oil and gas sector installations in selected countries



* US Environment protection agency: values are taken for the year closest to the year of national inventory

** Rhodium Group: methane estimates for 2012 (for all countries)

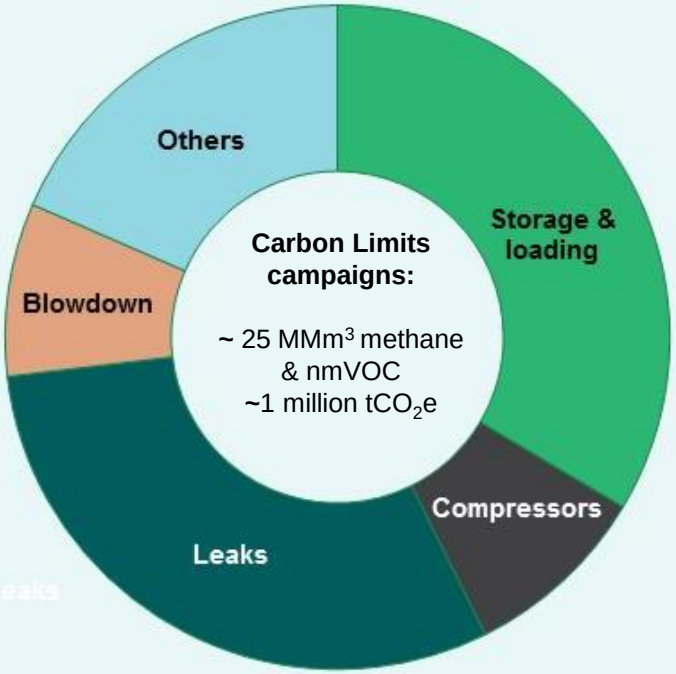
Overview of activities in three countries

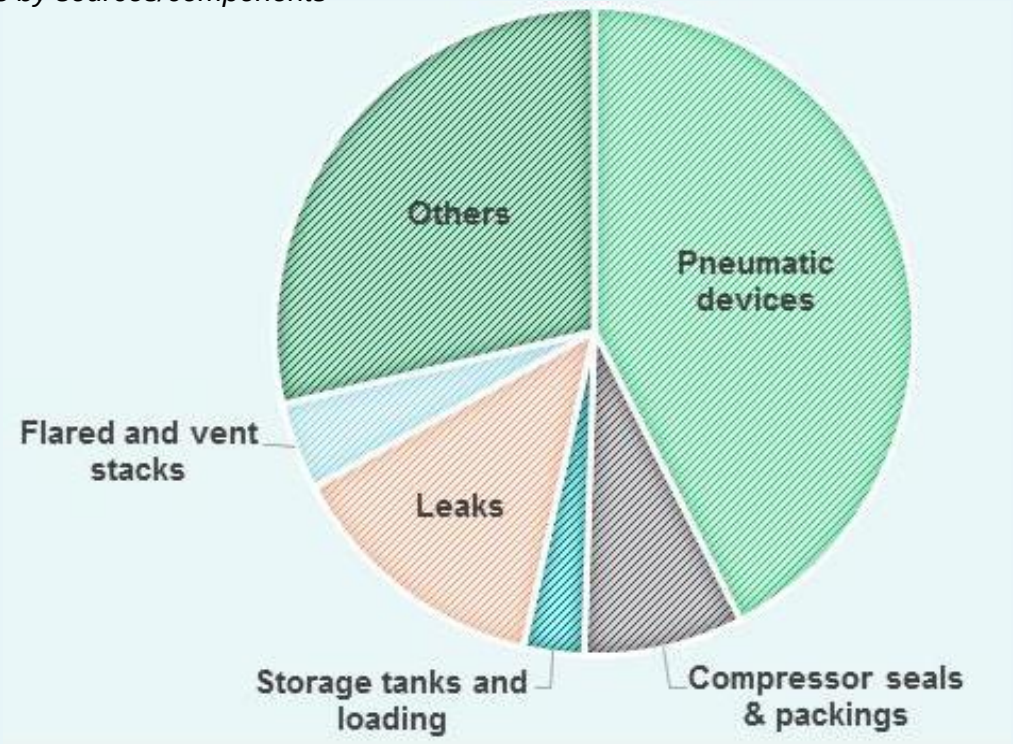
	Azerbaijan - SOCAR	Kazakhstan - KMG	Ukraine - UGV
Activities until end 2017	One campaign (Q1 2017) Investment analyses Workshop – broad group of stakeholders	Three campaigns (2015-17) Investment analyses National inventory–methane Workshops and meetings with senior management	Two campaigns (2015-17) Investment analyses Results presented to senior management
Installations covered	Three: gas processing, refinery, upstream compressor stations and oil storage tanks	10+ facilities: O&G treatment units, compressor stations, tank farms, distribution networks	10+ major facilities (gas pre-treatment units, compressor stations, tank farms. GPPs, well sites, …)
Planned 2018	Two campaigns National inventory-methane Pilot projects: VRU tanks and LDAR	One campaign Further work on national methane inventory Possible pilot projects	Under discussion – TBD

Emissions by components very different from North America

Azerbaijan - SOCAR | **Kazakhstan - KMG** | **Ukraine - UGV** | **USA**

Methane emissions by sources/components

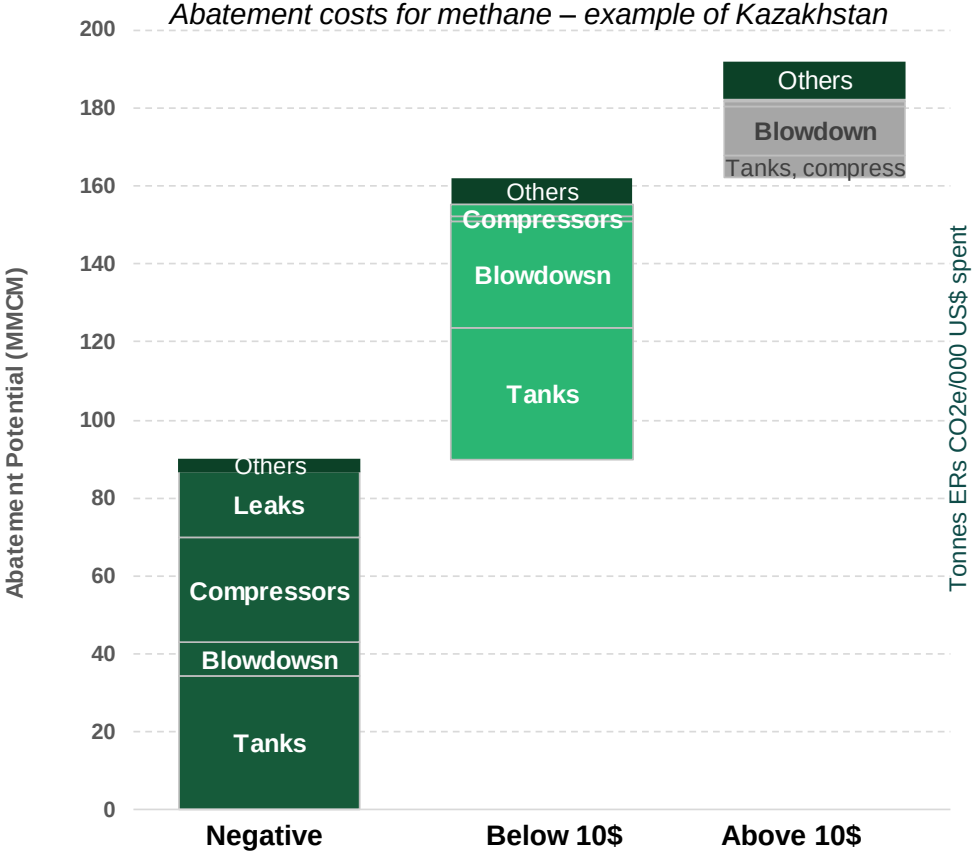




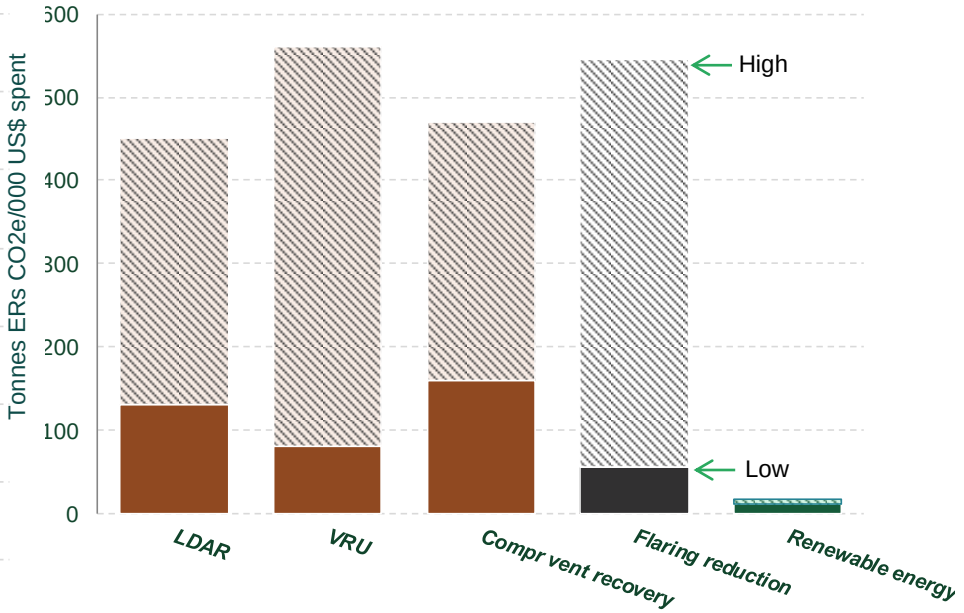
Methane and flare mitigation: Very effective and often profitable

Azerbaijan - SOCAR | Kazakhstan - KMG | Ukraine - UGV

Abatement costs for methane – example of Kazakhstan



Emission reductions per US$ spent by category of measure



Barriers to implementation

Barriers

Awareness, knowledge and priority

Economic- Financial

Too low profit (NPV)

Regulatory

Priority, institutional capacity and capability

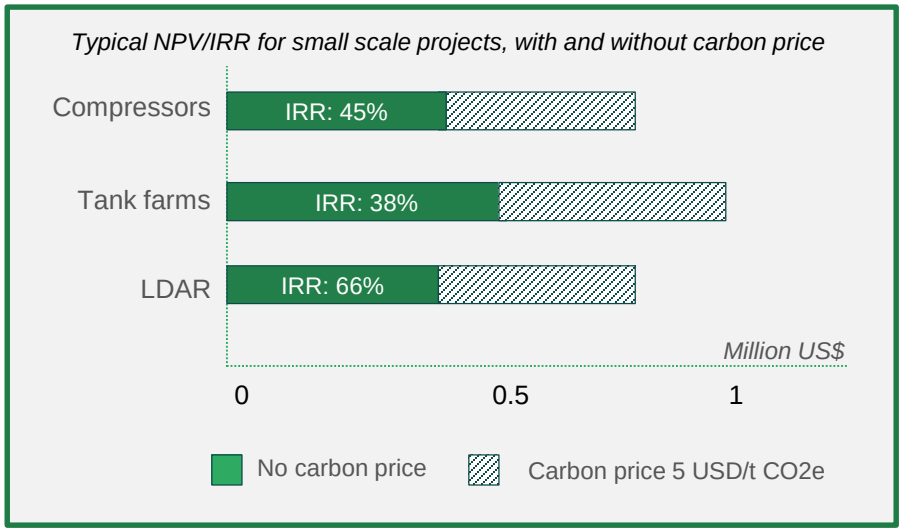
Information/knowledge bias

Structural

No benefits for decision-maker institution

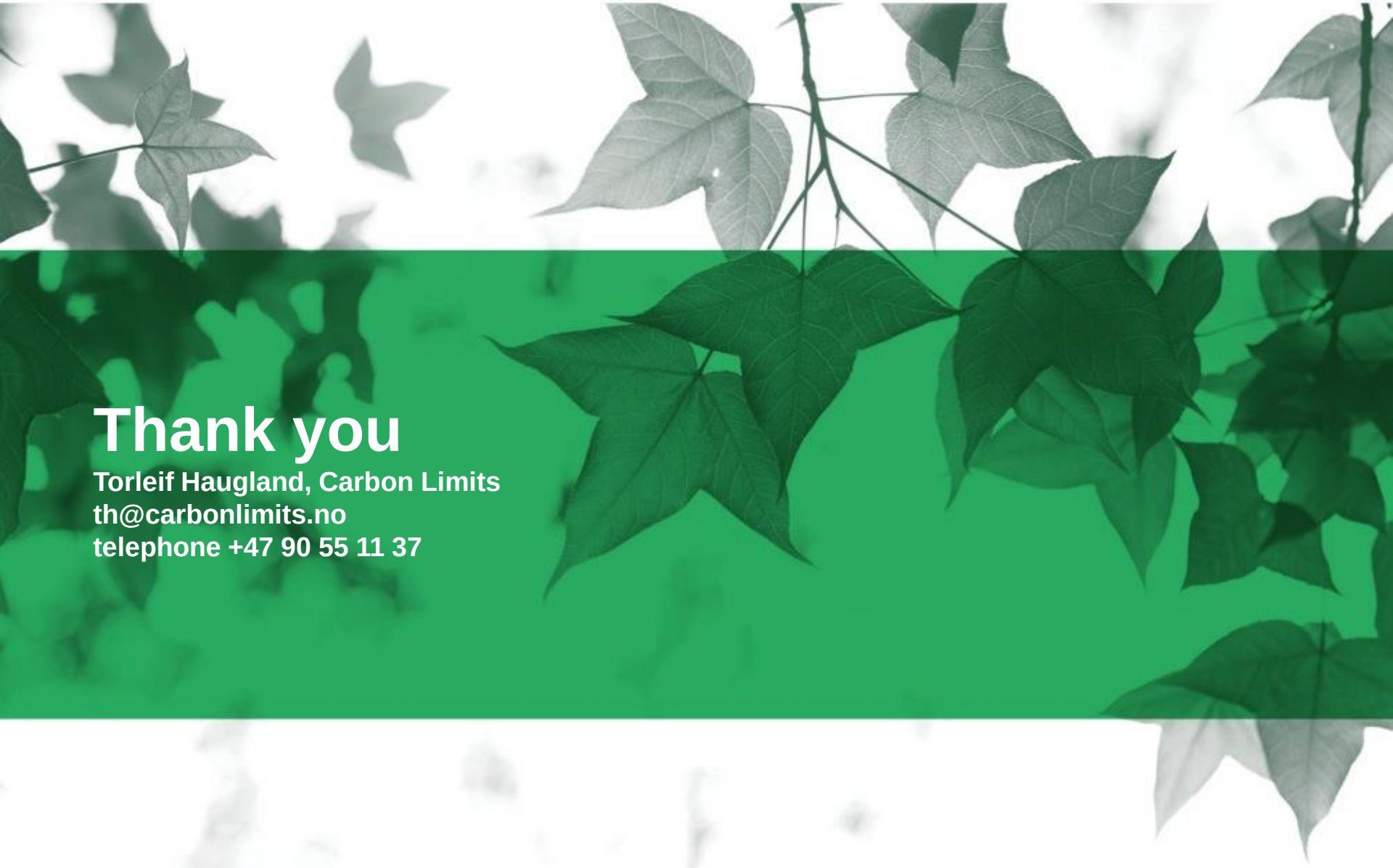
Are there real financial barriers ?

Carbon pricing can make a difference
… but how should it be structured?



Concluding remarks

- National Oil Companies (NOCs) control and/or operate installations representing a significant part of global O&G methane emissions
- Efforts needed to raise NOCs awareness and motivation to act
- Storage tanks suitable for early action: effective and financially profitable
- LDAR profitable on paper but not always in practice – depends on alternative value of the captured gas. Carbon pricing can help
- MRV essential, but noteworthy that it serves different purposes:
  - Corporate methane management,
  - National policies and regulations,
  - International reporting (e.g. NC, NDC, BUR to UNFCCC).
- Cooperation between industry and authorities is essential



Thank you

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