

# Experience with methane emission mitigation in Eurasia

Background, challenges and achievements

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Carbon Limits AS

## Agenda

**Carbon Limits Methane Mitigation in Eurasia**

**Methane Programme in Kazakhstan**

**Concise Summary of Results in Kazakhstan**

- Methane Mitigation Programme
- O&G national inventories and abatement costs

**Challenges Experienced**



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## Carbon Limits

### Who are we?

- Carbon Limits was established in 2005.
- Carbon Limits has built an extensive experience on
  - ✓ Monitoring reporting and verification of GHG
  - ✓ Gas flaring reduction
  - ✓ Methane emission reduction
  - ✓ Emission Trading Systems
- **A large number of techno-economic studies of mitigation in the O&G sector**
- We have projects in more than 20 countries including Norway, Russia, Kazakhstan, Ukraine, Azerbaijan, Turkey, Iran, Qatar, Egypt, Tunisia, Nigeria, Gabon, Sri Lanka, ...

### SOME OF OUR CLIENTS



THE WORLD BANK



NORWEGIAN MINISTRY OF THE ENVIRONMENT



Statoil



NORWEGIAN MINISTRY OF FOREIGN AFFAIRS



European Bank



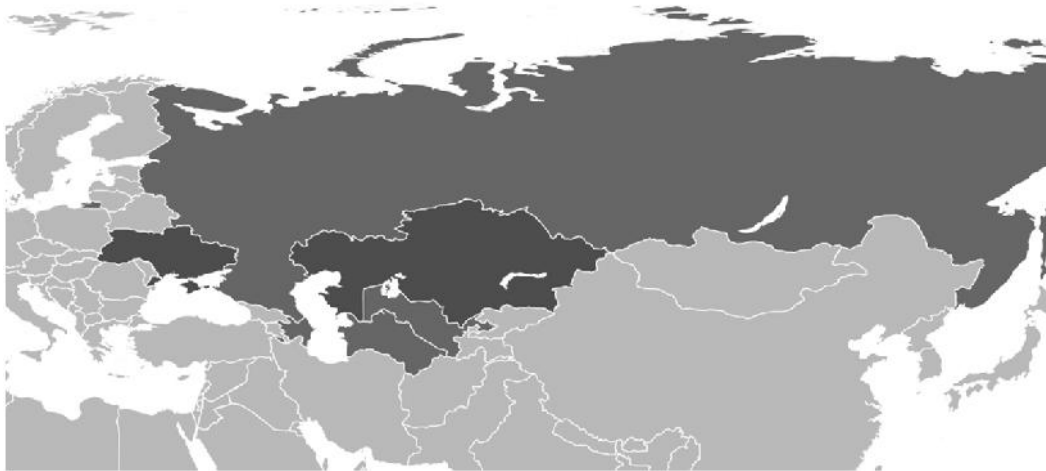
قطر للبترول  
Qatar Petroleum



CLEANAIR  
TASK FORCE

## Why O&G methane is important in the region?

Countries where CL has done some work of methane



- ✓ Ukraine
- ✓ Kazakhstan
- ✓ Russia
- ✓ Azerbaijan
- ✓ Uzbekistan
- ✓ Turkmenistan

- The 6 countries together represent **30 – 35 % of world's O&G methane** emissions  
(Source: EPA Non-CO2 inventories for 2015)
- Russia alone represents ~ 19% of world's O&G methane emissions in 2015 (EPA)
- Share of the 5 countries of Ukraine, Kazakhstan, Azerbaijan, Uzbekistan and Turkmenistan at a total of 200 MMtCO<sub>2</sub>e/y is just slightly less than US magnitude of methane emissions from O&G sector (220 MMtCO<sub>2</sub>e/y)

**...there are considerable uncertainties though!**

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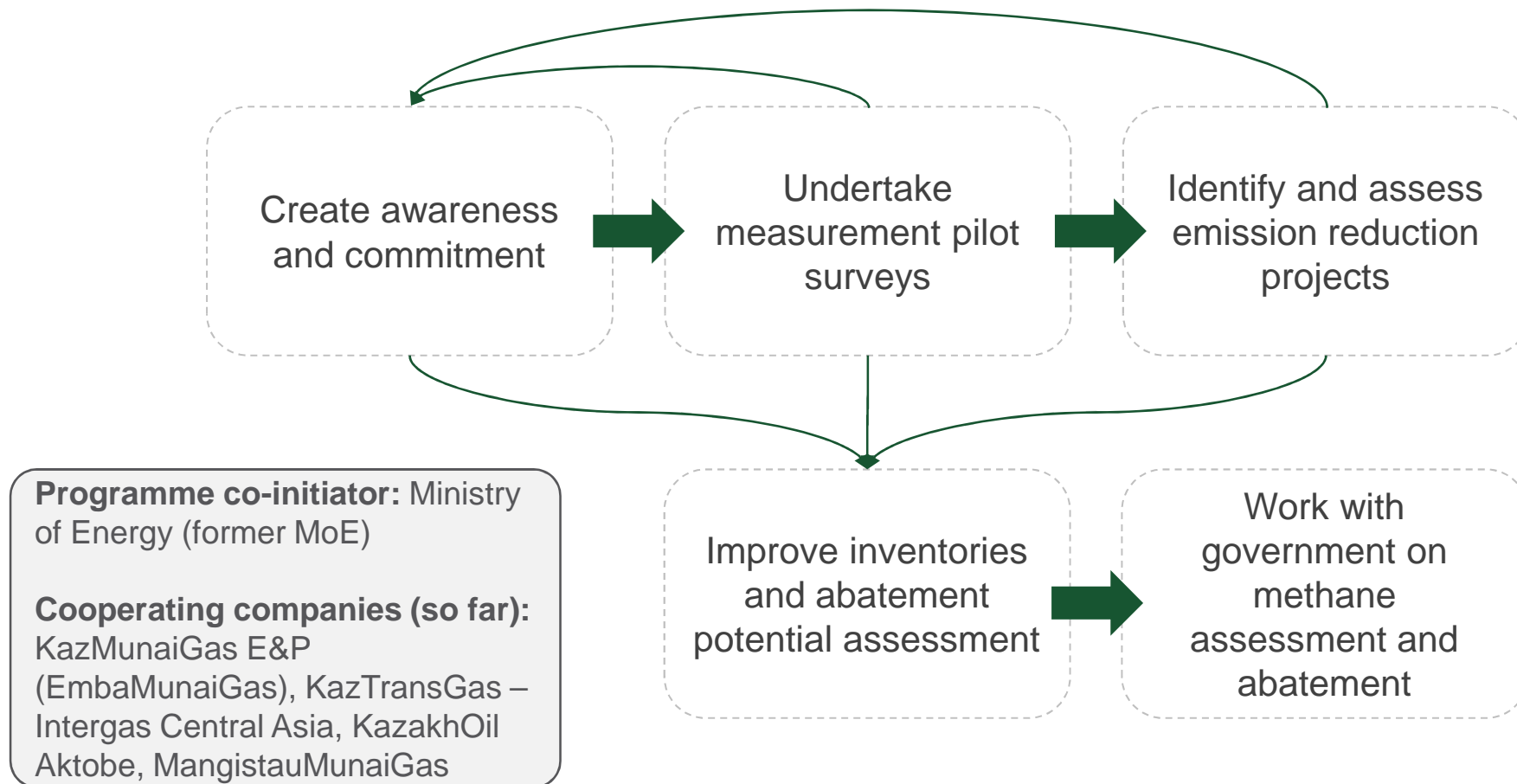
Challenges Experienced





# Methane Programme in Kazakhstan

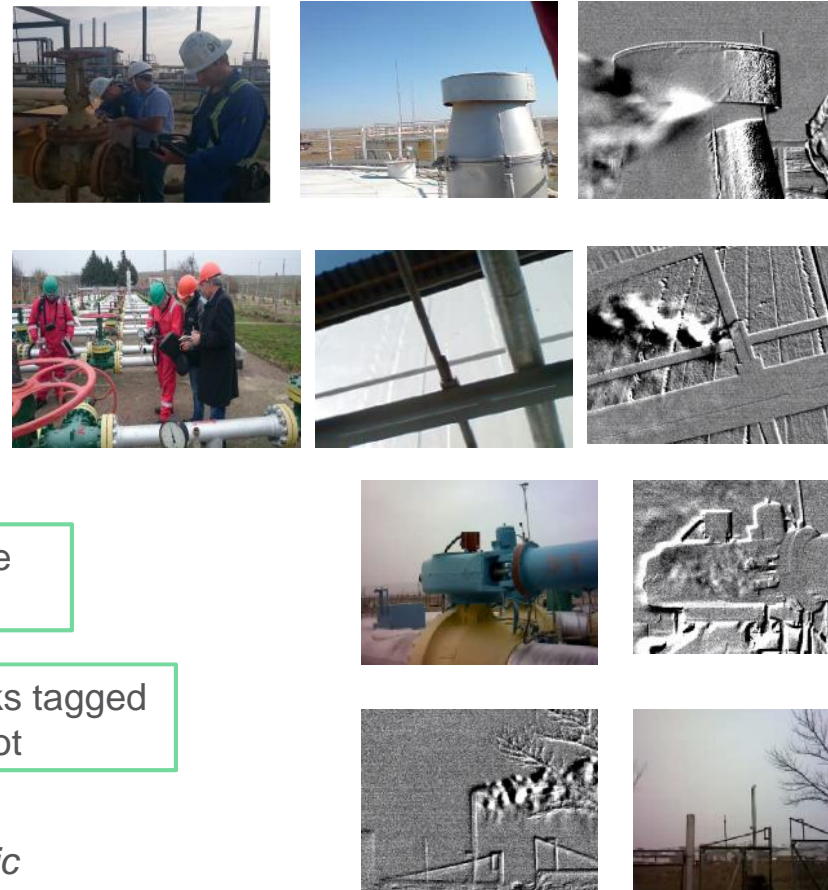
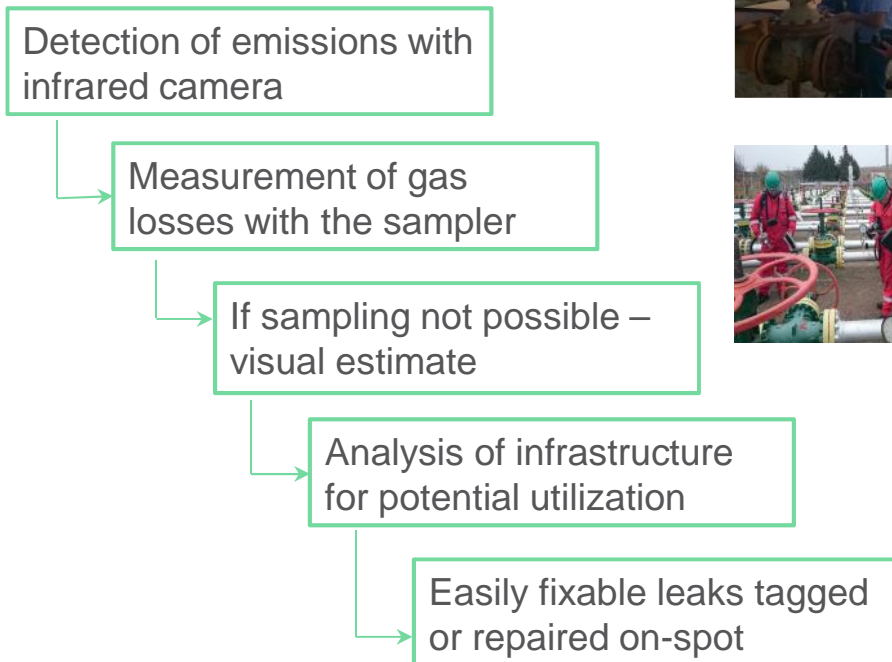
## Overview – Key objectives



# Direct Detection & Measurement Campaigns

## September 2015 and November 2015 – West and South Kazakhstan

### What was done?



*Campaign results are used for techno-economic analysis of potential projects...*



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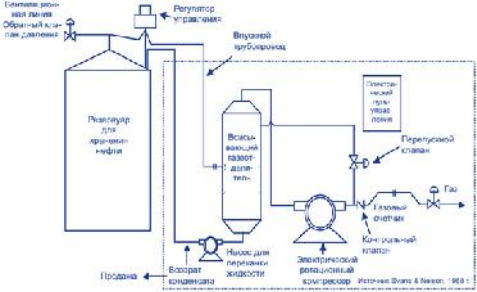
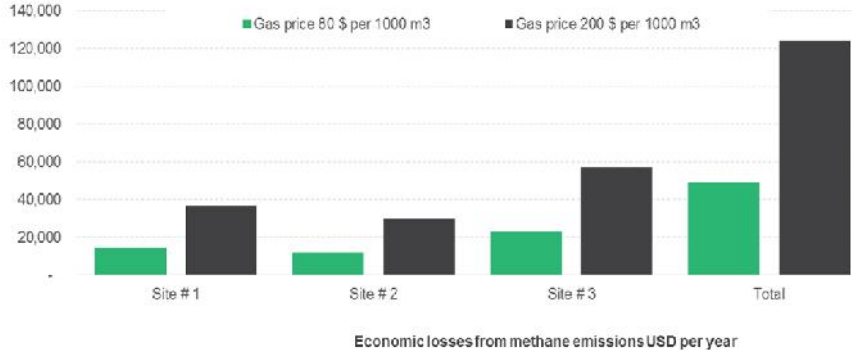


**A number of case-studies developed**  
 ...demonstrate real-life cost, benefit and technical applicability

**Case study 1 – Vapour recovery units for storage tanks**  
 (12,000 tonnes CO<sub>2</sub>eq/y, payback period<5 years, CAPEX~ 1.1 mil \$, ...)

**Case study 2 – Systematic Detection & Repair of Fugitive Emissions**  
 (Investment ~400k\$ over 15 years, ~0.5 MMm<sup>3</sup>/y gas savings, a positive NPV of 350k\$,...)

**Case study 3 – Vent gas capture from compressor stations**  
 (~10,000 tonnes CO<sub>2</sub>eq/y, payback period<3 years, CAPEX~ 0.6 mil\$, ...)



**Assumptions:**  
 CAPEX:  
 OPEX:  
 VOCs value:

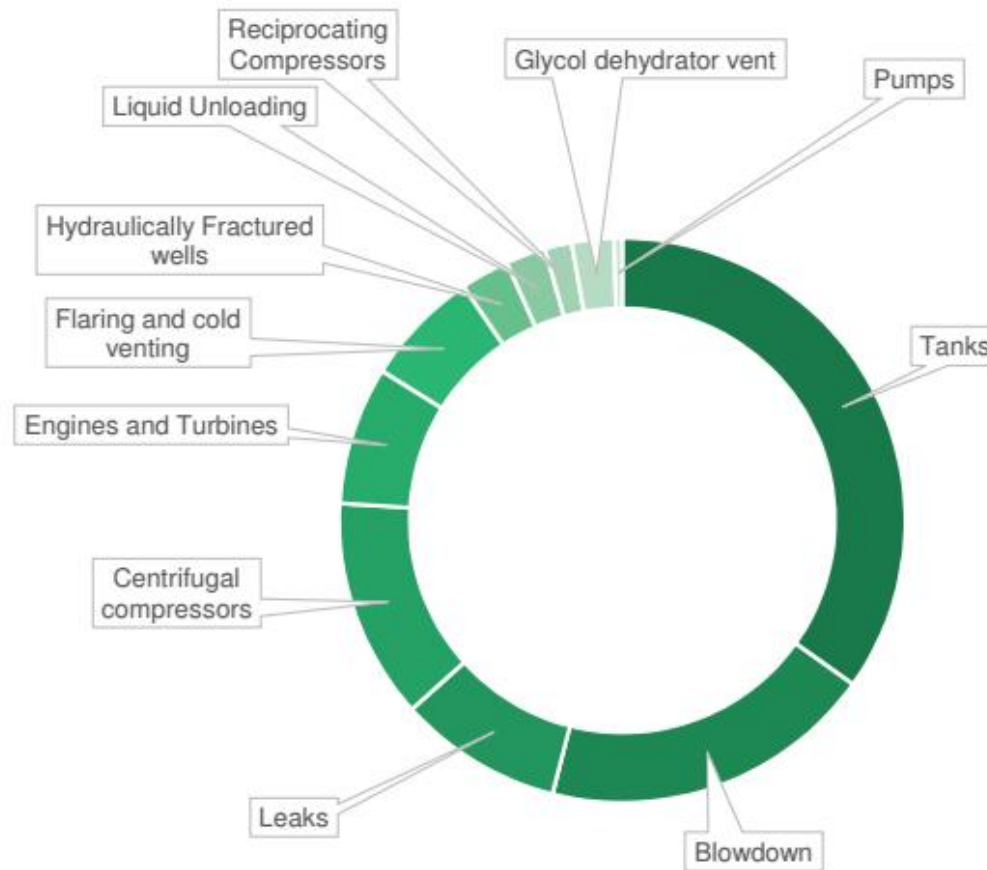
~1.7 million USD  
 ~1.7 million USD per year  
 200 USD/tonne

**Results:**  
 NPV  
 IRR  
 Payback



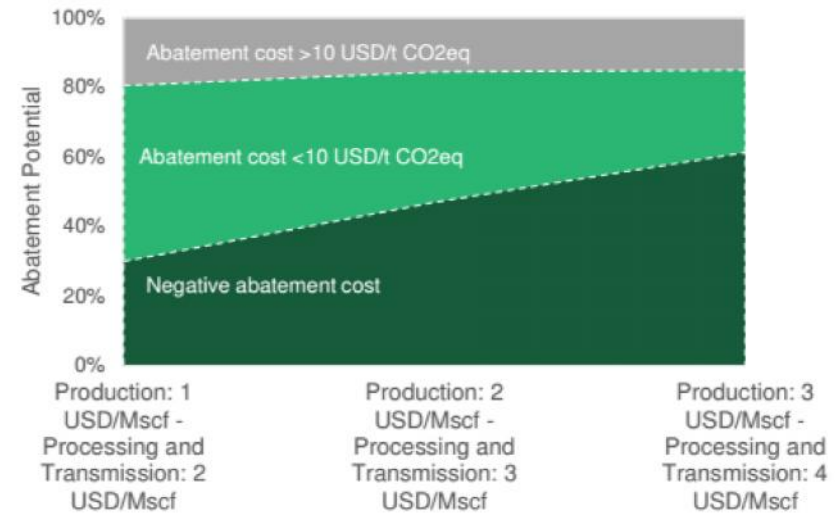
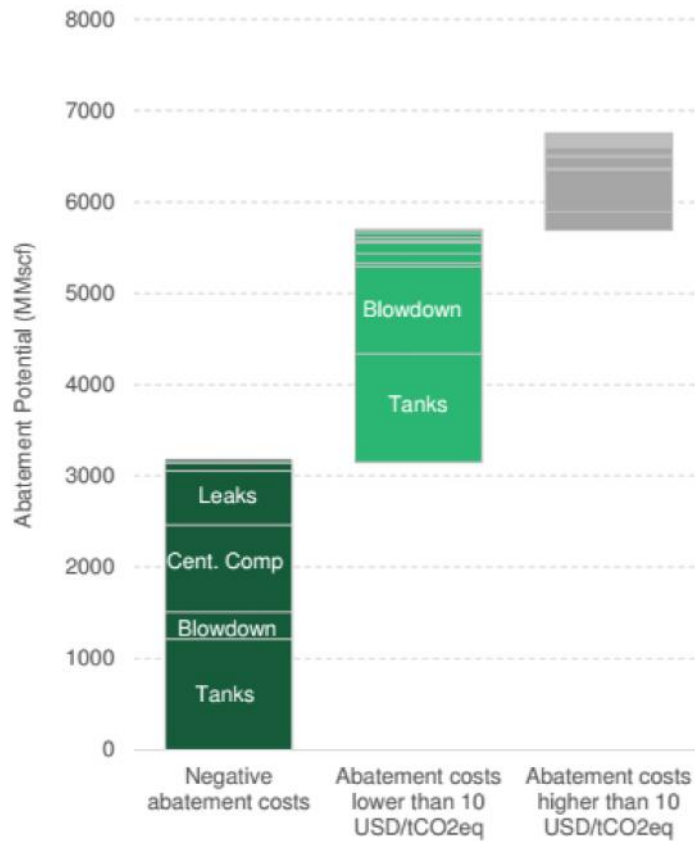
## Main results

Split of emissions by emissions categories



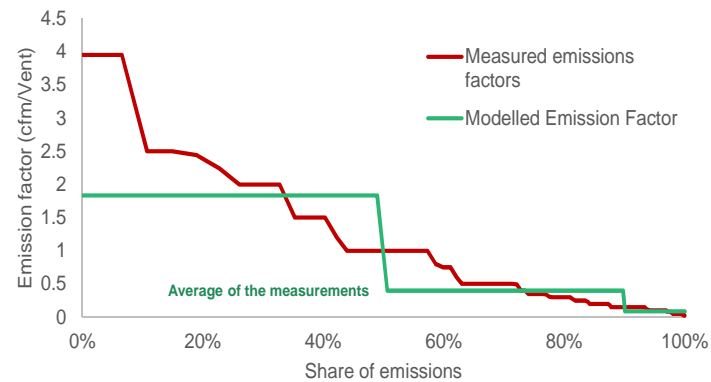
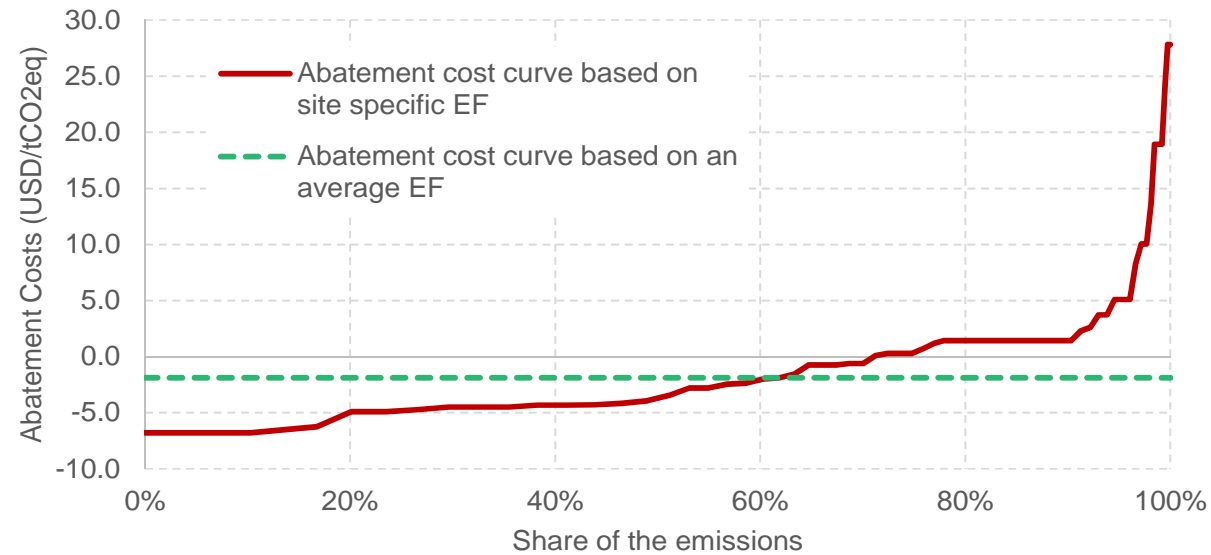
## Main results

### Abatement potential and abatement costs estimates



## A look at the big picture

### Methane abatement costs for upstream oil and gas industry



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## Challenges experienced

- Building trust – creating enthusiasm!
  - Lack of awareness about sources and impacts of methane emissions
  - Accessing the data and having doors open for surveys
- Technical challenges
  - Huge uncertainties on current international estimates
  - Significant shortage of similar works done outside North America
  - Variations of current practices between countries

## Lessons learned

- New knowledge is created through measurements and understanding of local conditions
- Measurements and mitigation should run in parallel
- Collaborative processes essential for success (no finger pointing)
- Patience is needed to bring along a strong local network; local partners are essential for success

Will continue to engage actively with others who are working on this issue, including policy makers, NGOs, international organizations.

### EXPERIENCE WITH CARBON LIMITS

**Before start:** Companies focused only of safety, not on resource waste and the environment

**Soon after:** Expanded interest from companies. Focus grows to cover resource management and environment.

**Key benefit of this approach:** Time needed to bring along a strong local network; partners are essential for success, especially for companies where this is new territory

Thank you!