Outline

1. The broader context of energy and climate change
2. Methane emission sources and projections
Energy & climate change today

- A major milestone in efforts to combat climate change is fast approaching – COP21 in Paris in December 2015

- Momentum is building:
  - Historic US-China joint announcement; EU 2030 targets agreed
  - Developed & developing countries are putting forward new pledges to reduce emissions
  - Many energy companies & investors are starting to engage

- Energy production & use accounts for two-thirds of global greenhouse-gas emissions

- Energy sector must cut GHG emissions, while powering economic growth, boosting energy security & increasing energy access
Energy emissions stall but economic engine keeps running

For the first time, energy-related CO₂ emissions stalled despite the global economy expanding by 3%
Emissions burden moves over time

Cumulative energy-related CO₂ emissions by region

Past emissions are important, although the source of emissions shifts with changes in the global economy.
One-quarter of the world’s energy supply is low carbon in 2030; energy intensity improves three-times faster than the last decade.

Renewables reach nearly 60% of new capacity additions in the power sector; two-thirds of additions are in China, EU, US & India.

Natural gas is the only fossil-fuel that increases its share of the global energy mix.

Total coal demand in the US, Europe & Japan contracts by 45%, while the growth in India’s coal use slows by one-quarter.

Climate pledges (INDCs) for COP21 are the right first step towards meeting the climate goal.
IEA strategy to raise climate ambition

Global energy-related GHG emissions

Savings by measure, 2030

IEA proposed five measures – shown in a “Bridge Scenario” – using only proven technologies & without harming economic growth
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What are the major methane sources?

Global methane emissions: 500-650 mln tons per year (IPPC, various studies)

Methane emissions from the oil and gas industry: 10-30%
How much methane does the oil and gas sector emit globally? What is the trend?

Global emission estimates vary widely – due to lack of data

US data suggests an overall declining trend in methane emissions over the last 20 years.

Global methane emissions from oil and gas industry

- US EPA, 2012
- IEA, 2015
- IPCC, 1997-2006

US methane emissions trend for oil and gas industry

Source: US EPA and EIA

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Modelling approach and uncertainties

**IPCC Tier 1 approach:**
emission factor \( \times \) activity level = emission level

- **Data quality** (bottom-up vs. top-down) for emission factors
- **Activity level** (oil and gas production) assumptions
- **Time-based abatement assumptions**
- **Infrastructure extent and status**
- **Regulation and enforcement status by country**
Where to focus the efforts?

The majority of global methane emissions come from upstream gas operations. Total emissions remain almost constant between 2013 and 2030 as assumed future improvement measures largely offset the anticipated higher oil and gas production.
A mixture of increasing and decreasing emissions between regions over time, driven by activity levels and announced policies.
Reducing Upstream Methane Emissions

Global oil and gas upstream methane emissions and required reductions

Oil activities

Gas activities

Good news: reductions are achievable with existing technologies
Bad news: insufficient detection/monitoring and implementation will take time
Addressing climate change is imperative and reducing methane emissions is one of the key measures that can help secure a peak in global GHG emissions by 2020 and thus provide a reasonable chance of limiting global warming by 2degC.

Technologies for reducing methane emissions are available but action is required now to achieve a peak in emissions.

Challenges ahead:
- How can we tackle the more difficult and costly emission sources?
- What remote sensing technologies can be used globally to identify major sources and track progress?
- Global commitment to a global problem

Policy changes are slowly emerging
- US goal: 40-45% reduction of 2012 methane emission levels by 2025
- INDCs from other countries such as Canada, Mexico and Gabon
Energy and Climate Change

www.worldenergyoutlook.org/energyclimate

10 November: launch of WEO 2015