Reducing Methane Leaks: Actions and Challenges

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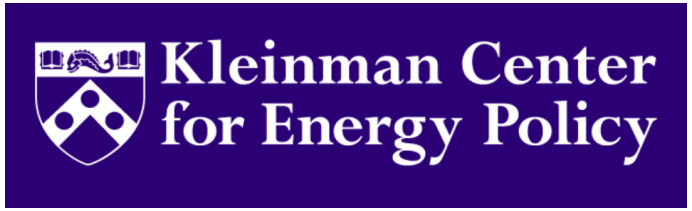
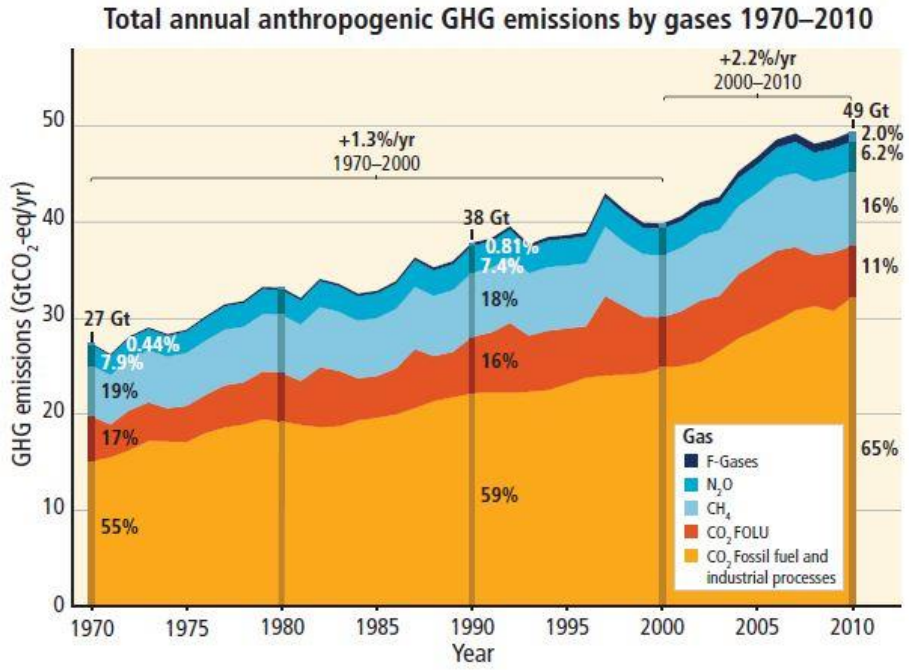


What are methane leaks?

- Methane (CH4) contributes about 16% of greenhouse gas emissions*
- It is substantially more potent than CO2, especially in the short-run and medium-run.

*on a CO2-eq basis

Source: IPCC AR5



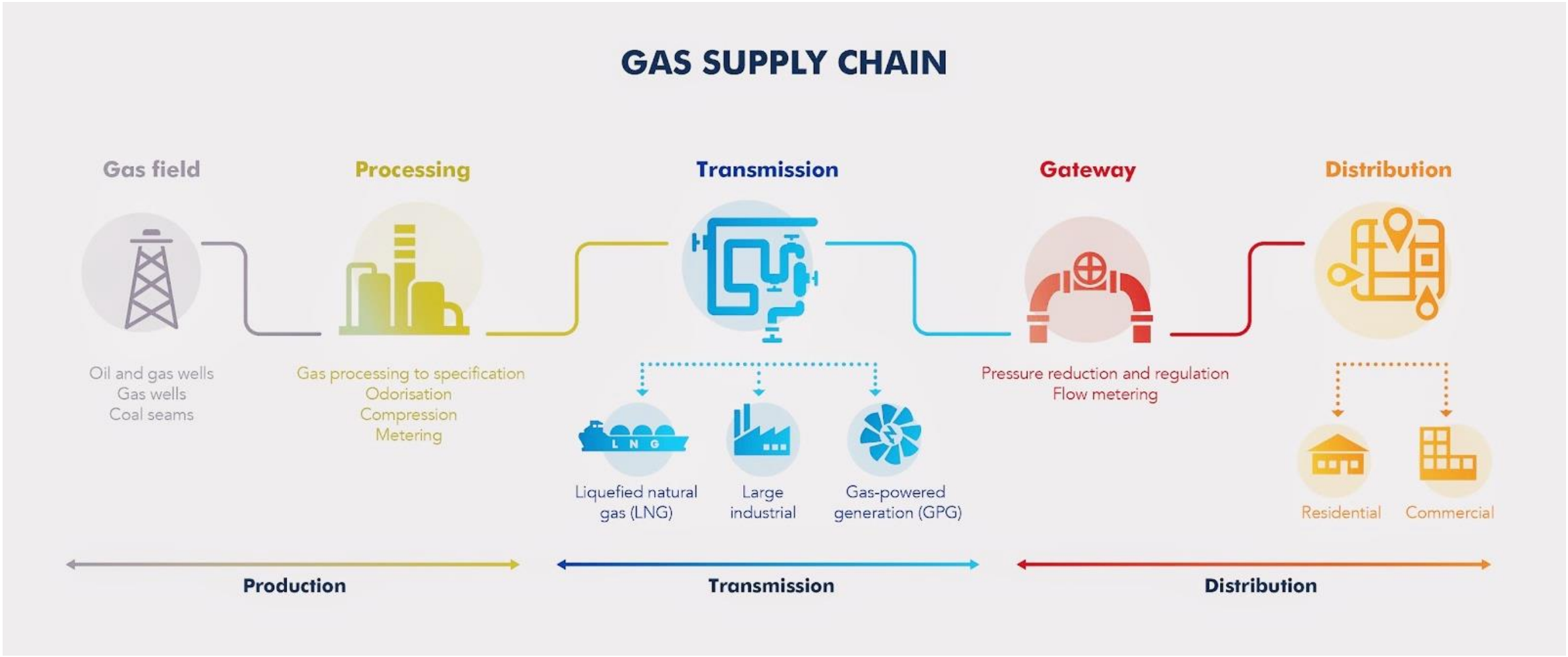
Oil and gas extraction

- Around 1/3rd of US methane is from the oil and gas sector.
- The primary component of natural gas is methane.
- Over two percent of natural gas escapes from the supply chain.

Oil and gas extraction

- Climate damages from methane leaks from the US natural gas sector = **almost $20 billion annually**.
  - *Using the Interagency Working Group's (2013) Social Cost of Carbon, a GWP of 34, and Alvarez et al. (2018) for the leak volume.*

- Recent academic work has estimated much higher damages from greenhouse gases, and would put the methane damages from US natural gas substantially higher.
  - *E.g. Ricke et al., Nature (2018); Pindyck, NBER WP (2016)*



http://australianenergymarketoperator.blogspot.com

Both a climate and a public safety issue

At the same time, a valuable product

Three reasons to plug leaks:

- Public safety
- Climate change
- Market value of the natural gas

The industry's incentive to plug leaks

- "Drillers oppose the rule, saying they are reducing emissions on their own because they have a financial incentive to capture as much methane as they can in order to put it on the market."
  - *TheHill.com*

- "Energy firms have a financial incentive … every molecule of methane emitted is lost energy — and lost revenue."
  - *WashingtonPost.com*
- "Because methane is the primary ingredient in natural gas, energy companies have a financial incentive to keep it bottled up"
  - *Bloomberg.com*

Econ 101

- Environmental ***externality*** implies:
- Because the company is not on the hook for the environmental damages, the natural gas company lacks the full financial incentive to avoid a leak.

Econ 101

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- Climate change externality is far greater: $27+/Mcf.

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- Imagine that a technology exists that will prevent leaks
- It costs $10 per Mcf to implement.
- The private company won’t implement that technology, although it would be worthwhile for society based on the social costs of methane.

Local distribution companies

- Primarily utilities with local monopoly status.
- Retail prices set by state-level commissions.
- Allowing utilities to recover costs plus a fair return for investors.

Local distribution companies

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- “Lost and unaccounted for gas”
  - Volume of gas bought versus sold
  - Note: not exactly equal to leaks

Our research

- Too little is spent repairing leaks:
  - We estimate expenditures well below $5/Mcf,
  - I.e., less than the commodity value of the leaked gas.
  - Consistent with low-hanging fruit being ignored.
  - Consistent with reimbursement of leaked gas.

"Price Regulation and Environmental Externalities: Evidence from Methane Leaks." With Lucija Muehlenbachs. Accepted, *Journal of the Association of Environmental and Resource Economists*.

Policy design for distribution utilities

- Local utilities need to recover costs,
- But incentive regulations that have been used in other contexts (e.g. electric utilities) could point a way forward.

- Example: reimburse utilities for the national average leak rate.

Other parts of the supply chain

- Remember that transmission and extraction are also under-incentivized because of the lack of comprehensive climate policy.
  - $2-4/Mcf versus $27+/Mcf

- Price greenhouse gas emissions

Thank you!

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