Successful Application of Gas Utilisation Technologies

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Flaring and Methane Emissions Connection

• Flaring directly results in methane emissions
  – Flares have < 100% combustion efficiency resulting in un-combusted methane emissions
  – Flame can be extinguished by weather, intermittent flow, or low heat-content gas resulting methane venting
  – Flaring undermines incentives to reduce fugitive and venting emissions of methane

• Flaring keeps saleable methane from reaching markets worldwide
  – At least 150 billion cubic meters\(^1\) (Bcm) of gas is flared and an additional 81 Bcm\(^2\) is vented/leaked annually
  – This is equivalent to $16.2 billion of lost sales revenues at $70 per thousand m\(^3\) gas price

\(^1\)GGFR website.
Fugitive and Vented methane has 21 x global warming potential as combusted
- 150 Bcm methane flared = 281 million tonnes of CO₂e (tCO₂e)
- 81 Bcm methane vented/leaked = 1,165 million tCO₂e

Methane to Markets has common goal with GGFR
- Recover vented gas for beneficial purposes in addition to flared gas

Participants have found cost-effective technologies to capture and utilize gas vented onsite
Background: Methane to Markets

• The **Methane to Markets Partnership (M2M)** is an international initiative that advances cost-effective, near-term methane recovery and use as a clean energy source in four sectors:

  ![Oil and Gas Systems](image1)
  ![Coal Mines](image2)
  ![Landfills](image3)
  ![Agricultural Waste](image4)

• The goals of the Partnership are to reduce global methane emissions to:
  - Enhance economic growth
  - Improve air quality and industrial safety
  - Reduce emissions of greenhouse gases
  - Strengthen energy security
Natural Gas STAR International

- Under the Methane to Markets Partnership, U.S. EPA expanded Natural Gas STAR internationally

Methane to Markets

- Oil and Gas Subcommittee

110 US Partner Companies
9 International Partner Companies
Natural Gas STAR International

- Natural Gas STAR is a **flexible, voluntary partnership** between EPA and the oil and natural gas industry designed to **cost-effectively** reduce methane emissions from natural gas operations.
- Companies world-wide are welcome to join Natural Gas STAR International
Tools Available for Project Identification

- Methanetomarkets.org/resources/oil-gas/index.htm
Flared and Vented Gas Utilisation Opportunities

- Technologies already exist to capture vented and flared gas
  - The key is to find a beneficial use for captured gas
- Oil and gas companies have implemented and found such technologies to be practical
- Projects are typically localized, focused on individual sites
- Localized projects typically do not need external financing
  - Capital investments are moderate
  - Payback periods vary, often <1 to 3 years
Flared and Vented Gas Utilisation Projects

- Oil and gas companies have cost-effectively initiated or implemented the following projects to reduce gas flaring and methane venting
  - Gas Utilisation Technology Overview
    - Flare Emissions and Efficiency – Past and Current Research
    - Operational Experience with Gas-Diesel Engine Running on Flare Gas
  - Case Studies
    - Angola: Elimination of Routine Flaring in Angola – The Onshore Solution
    - Brazil: Improving Natural Gas Utilisation in the Campos’ Basin
    - Colombia: Capture flared gas and vented tank vapors
    - Ecuador: Small-scale Power Generation from High-CO₂ Flared Gas
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