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Advancements in methane reduction and recovery technology and policy in KSA

KSA – O&G GMI Update

www.moenergy.gov.sa

KSA has reached an upstream methane intensity of 0.05% in 2021 through flare minimization, leak detection & repair programs and plans to push even further

KSA's upstream methane intensity and reduction efforts

KSA achieved an upstream methane intensity[1] of

0.05%

in 2021

This has been reached through...

1. Flare minimization
2. Leak detection and repair programs
3. Deploying breakthrough technologies

And will be enhanced by...

4. Commitments and pledges

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1) Methane emissions from upstream operations per volume of marketed natural gas

Source: Saudi Aramco

KSA has reduced its flaring intensity in 2022 to 4.61 scf/boe (vs. 5.51 scf/boe in 2021) – And is committed to reach zero routine flaring no later than 2030

Flare minimization achievements and targets

KSA achieved a flaring intensity[1] of

4.61 scf/boe

in 2022 through…

…the master gas system

Developed in the 1970s **to capture** and **reuse gas,** which **eliminated associated gas flaring**

…flare minimization roadmaps

A **flare minimization roadmap** has **identified priorities** across **Aramco operations – Every operating facility** has a **flare minimization plan** and **targets**

…flare minimization technologies

These include **innovative flare gas recovery systems**, **high integrity pressure protection systems**, and Aramco's operations in real-time at our 4th Industrial Revolution Center in Dhahran

As part of the **ZRF[2], Aramco works** with more than **100 governments**, **oil companies & development institutions** to **eliminate routine flaring by 2030**

THE WORLD BANK
IBRD • IDA

GGFR
Global Gas Flaring Reduction Partnership

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1) Volume of hydrocarbon gas flared per barrel of oil equivalent produced; 2) ZRF = Zero Routine Flaring

Source: Saudi Aramco

In addition, a comprehensive leakage detection program covering all operating facilities and tagging millions of components is deployed

Methane leak detection and repair program

The leak detection program…

Detect & quantify

Repair leaks

Verify leak reduction

…is exhaustive by design

- Leak detection is applied in **all operating facilities**
- **Millions of components** (such as valves, flanges, connectors, pumps, compressors, and tanks are covered)
- LDAR[1)] field measurements have been assessed by an independent reviewer – Strong performance on asset level confirmed

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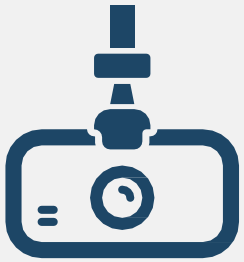
1) LDAR = Leak Detection and Repair

Source: Saudi Aramco

This program is continuously enhanced e.g., through breakthrough technologies such as methane detecting cameras, drones & geospatial solutions

Example innovative technologies



Methane detecting cameras

Methane detection drones

Geospatial solutions

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Source: Saudi Aramco

Striving for even more KSA pledged to reduce upstream methane emissions to near zero and to participate in the efforts to cut 30% of methane emissions by 2030

KSA's methane commitments and pledges

Near zero-methane initiative

Aramco is an **establishing member** of the **zero-methane initiative** which **signatories** are **aiming** for:

- Achieving near zero methane emissions from operated upstream oil & gas assets by 2030[1]).
- Putting in place reasonable means to avoid methane venting and flaring and to repair detected leaks.
- Annual and transparent reporting on methane emissions.
- Continuously improving methane measurement, reporting and verification as technology evolves.
- Supporting the implementation of sound regulation to tackle methane emissions and encourage the inclusion of methane emissions in national climate strategies.

The global methane pledge

Saudi Arabia is a **participant** in the **global methane pledge committed to**

- Work with other signatories to collectively reduce global anthropogenic methane emissions by at least 30% by 2030.
- Focus on achieving all feasible reductions in the energy and waste sectors and seek abatement in agricultural sector.
- Move towards highest tier IPCC good practice inventory methodologies to quantify methane emissions.
- Maintain up-to-date, transparent, publicly available information on policies and commitments.
- Support existing international methane emission reduction initiatives.

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1) In 2018 OGCI announced a collective target of 0.20% upstream methane intensity by 2025

Source: The global Methane Pledge, OGCI, Saudi Aramco

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Thank You