



G L O B A L F O R U M

On Flaring and Venting Reduction  
and Natural Gas Utilisation

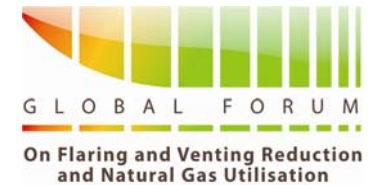
# Successful Application of Gas Utilisation Technologies

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Methane to Markets Partnership,

U.S. EPA Natural Gas STAR International Program

# 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<sup>1</sup> (Bcm) of gas is flared and an additional 81 Bcm<sup>2</sup> is vented/leaked annually
  - This is equivalent to \$16.2 billion of lost sales revenues at \$70 per thousand m<sup>3</sup> gas price

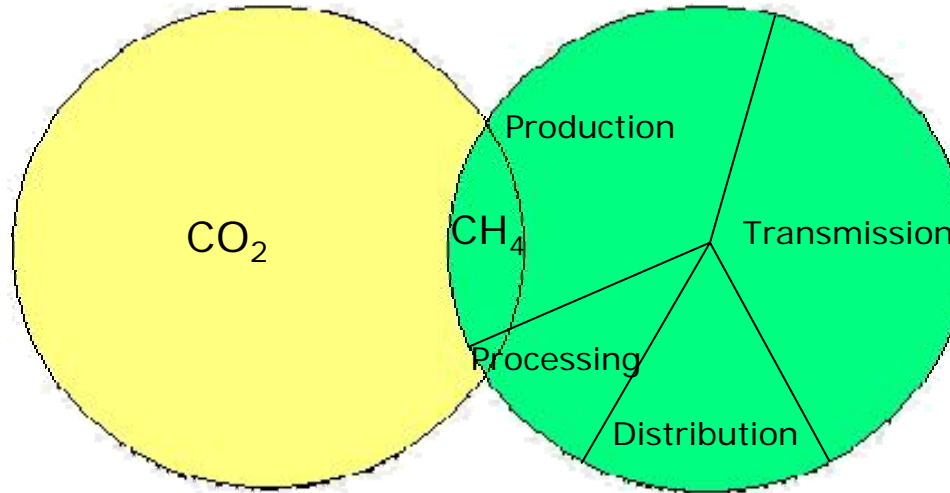
<sup>1</sup>GGFR website.

<sup>2</sup>EPA. "Global Anthropogenic Non-CO<sub>2</sub> Greenhouse Gas Emissions: 1990-2020." June, 2006

# Methane to Markets Role



**150 Bcm of gas wasted in flares**



**81 Bcm of gas wasted in vents and leaks**

- Fugitive and Vented methane has 21 x global warming potential as combusted
  - 150 Bcm methane flared = 281 million tonnes of CO<sub>2</sub>e (tCO<sub>2</sub>e)
  - 81 Bcm methane vented/leaked = 1,165 million tCO<sub>2</sub>e
- 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*



*Coal Mines*



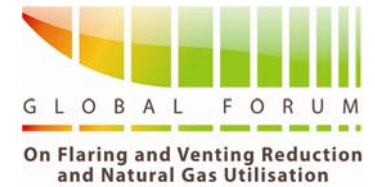
*Landfills*



*Agricultural Waste*

- 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



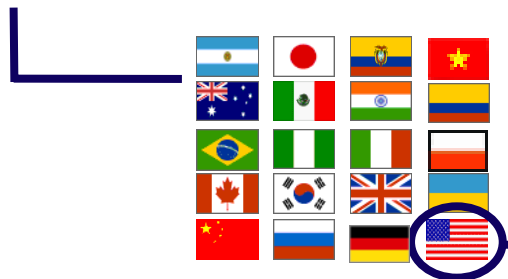
- Under the Methane to Markets Partnership, U.S. EPA expanded Natural Gas STAR internationally



## Methane to Markets

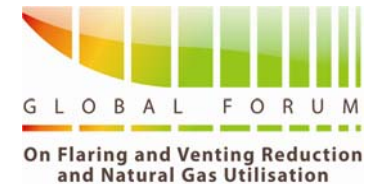


• Oil and Gas Subcommittee



110 US Partner Companies  
9 International Partner Companies

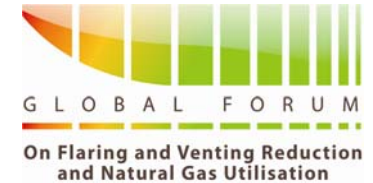
# Natural Gas STAR International



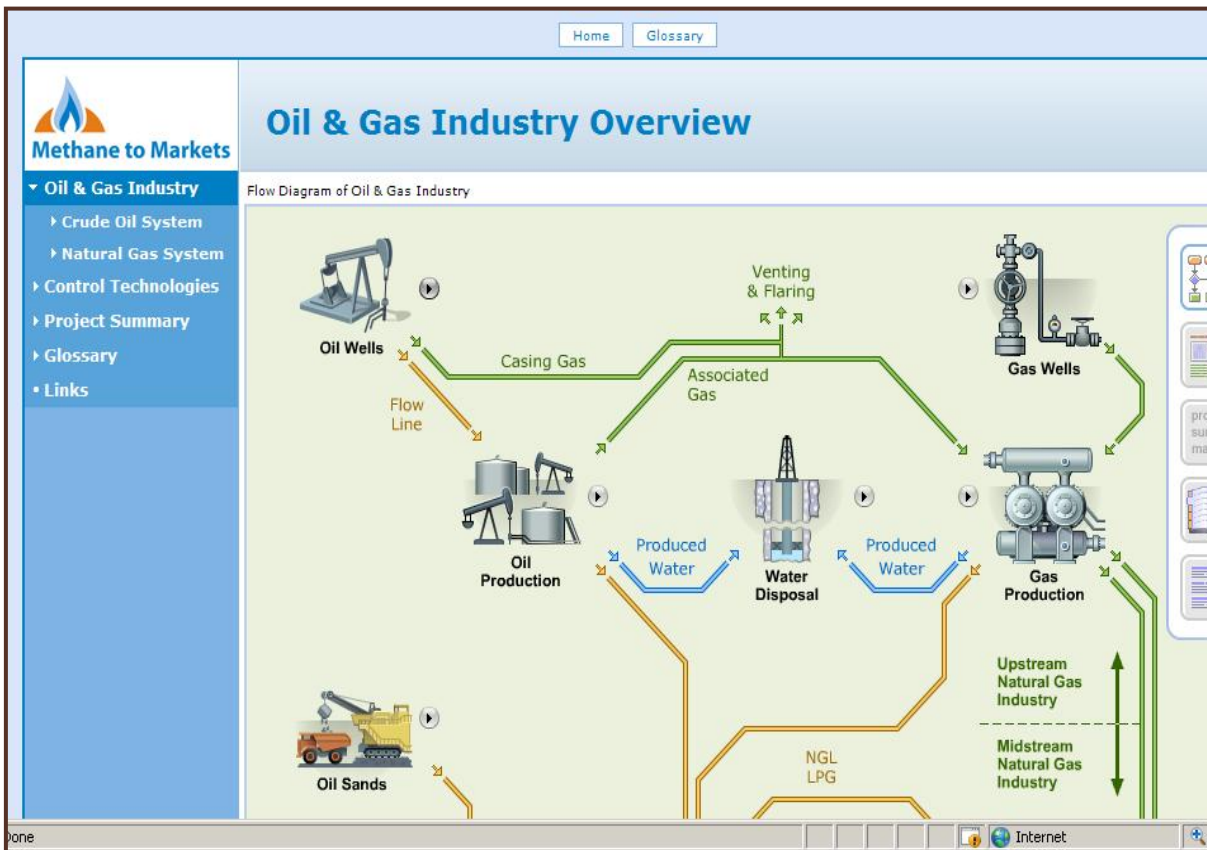
- Natural Gas STAR is a ***flexible, voluntary partnership*** between EPA and the oil and natural gas industry designed to ***cost-effectively*** reduce methane emissions from natural gas operations.
- Companies world-wide are welcome to join Natural Gas STAR International



# Tools Available for Project Identification



- [Methanetomarkets.org/resources/oil-gas/index.htm](http://Methanetomarkets.org/resources/oil-gas/index.htm)



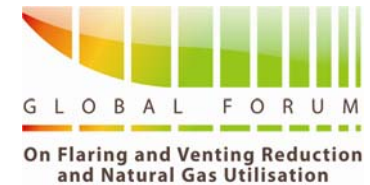
**Install Electronic Flare Ignition Devices**  
 PRO Fact Sheet No. 503

<b>Applicable sectors:</b> <input checked="" type="checkbox"/> Production <input checked="" type="checkbox"/> Processing <input checked="" type="checkbox"/> Transmission and Distribution	<input type="checkbox"/> Compressors/Engines <input type="checkbox"/> Drilling <input type="checkbox"/> Pumps <input type="checkbox"/> Pneumatics/Controls <input type="checkbox"/> Tanks <input type="checkbox"/> Valves <input type="checkbox"/> Wells <input type="checkbox"/> Other
<b>Partners reporting this PRO:</b> Chevron U.S.A. Production Company (now Chevron/Taseco Corporation)	<b>Other related PROs:</b> Install Flares, Install BASOP Alarms
<b>Technology/Practice Overview</b> <b>Description:</b> Flares are used to safely dispose of combustible gas and avoid releasing it to the atmosphere. Some flares have one or more continuously burning pilot flames, while others have gas by only lighting pilot flames in preparation for use. Pilots can be blown out by wind and gas leakage and/or waste gas is occasionally released to an unlit flare. Both of these situations lead to methane, volatile organic compounds (VOCs) and hazardous air pollutant (HAP) emissions to the atmosphere. <b>The technology:</b> This technology replaces the intermittently or continuously burning flare pilots with electronic sparking pilots similar to a modern gas stove. These sparking pilots require low electrical power that can be supplied from a battery with solar recharging in remote sites. In addition to using electronic flare ignition devices for pilots, facilities may also install sensors to detect the pilot flame and shut off fuel gas if the pilot is extinguished. <b>Operating Requirements:</b> A low ampere electrical power supply is required, such as solar recharged batteries. <b>Applicability:</b> This technology can be applied to all pilot flame ignition systems, including flares and heaters.	<b>Methane Savings: 1.68 Mbd per year</b> <b>Costs:</b> Capital Costs (including installation) <input type="checkbox"/> < \$1,000 <input type="checkbox"/> \$1,000 - \$10,000 <input type="checkbox"/> \$10,000 - \$50,000 Operating and Maintenance Costs (annual) <input type="checkbox"/> < \$100 <input type="checkbox"/> \$100 - \$1,000 <input type="checkbox"/> \$1,000 - \$5,000 <b>Payback (Years)</b> <input type="checkbox"/> < 1 <input type="checkbox"/> 1 - 3 <input type="checkbox"/> 3 - 10 <input type="checkbox"/> > 10 <b>Benefits:</b> Reducing methane emissions was an associated benefit of the project.
<b>Methane Emissions Reductions:</b> Methane emissions occur from leaking or venting un-combusted natural gas through an unlit flare. Leakage may occur through emergency relief valves and blowdown valves connected to a flare. Venting occurs when flare pilot flames are occasionally blown out by highwinds, causing release of methane at 70 scf per hour per pilot until they are left or shut out.	

## Technical Documents

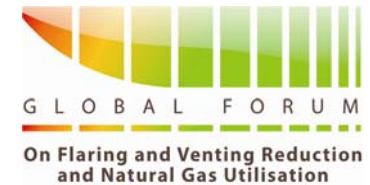
ON TIME Tool

# 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-CO<sub>2</sub> Flared Gas

# Contact Information

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methanetomarkets.org  
epa.gov/gasstar