



GGFR

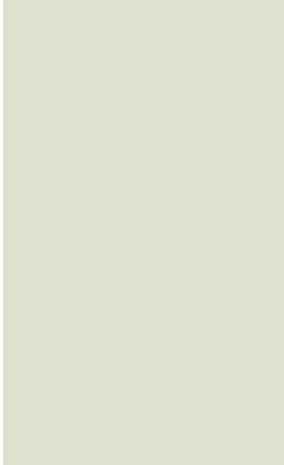
Global Gas Flaring Reduction
A Public-Private Partnership

Global Gas Flaring Reduction Partnership (GGFR):

IMPROVING ENERGY EFFICIENCY &
MITIGATING IMPACT ON CLIMATE CHANGE



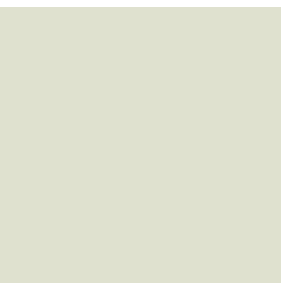
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What is gas flaring?

When crude oil is brought to the surface, gas associated with the oil comes to the surface as well. The gas may be used at the installation as fuel for generators, may be transported via pipelines and sold elsewhere, or may be injected into the ground. But in areas of the world lacking gas infrastructure and markets, this associated gas is usually released into the atmosphere, ignited (flared or burned) or un-ignited (vented).

Flaring and venting is also an important safety measure at oil production facilities, safely disposing of gas during emergencies, power and equipment failures, or other upsets in oil production that might otherwise pose hazards to workers or nearby residents. But in many oil-producing countries the practice goes far beyond normal operational and safety levels.





GGFR's work on gas flaring reduction illustrates a joint effort between oil-producing countries and companies to harness potential opportunities for reducing waste of a valuable resource, expanding access to a cleaner source of energy, and contributing to climate change mitigation - hence promoting sustainable development.


The GGFR partnership, a public-private initiative launched at the World Summit for Sustainable Development in 2002 and led by the World Bank, facilitates and supports national efforts to use currently flared gas by promoting effective regulatory frameworks and tackling the constraints on gas utilization, such as insufficient infrastructure and poor access to local and international energy markets in developing countries.

Its 2010-12 work program focuses on development of gas flaring reduction projects, including World Bank projects, promotion of stronger government-operators dialogue in key gas flaring countries and compliance with best industry practices. GGFR has more than 30 public and private-sector partners and is financed by the partner contributions.

Why Gas Flaring Matters

An estimated 150 billion cubic meters (or 5.3trillion cubic feet) of natural gas are being flared annually. That is equivalent to 25 per cent of the United States' gas consumption or 30 per cent of the European Union's gas consumption. Flaring gas also has an impact on climate change by adding about 400 million tons of CO₂ in annual emissions.

These total emissions from gas flaring represent about 1.2% of global CO₂ emissions. To put this in perspective, we need to consider the following:

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- Global emissions from gas flaring alone are more than half the annual Certified Emissions Reductions (624 million tons) currently issued under the Kyoto's Clean Development Mechanisms. (data as of June 2011)
 - Gas flaring emissions in some oil-producing countries (i.e. Nigeria) represent about one third of their total CO2 emissions. This specific source of GHG emissions can be effectively addressed through targeted interventions including the right mix of policies and incentives.

Overcoming the Barriers

Developing countries face important barriers to reducing gas flaring, including:

- Significant cost of capturing and utilizing the associated gas currently flared
- Undeveloped domestic gas markets and limited access to international markets
- Lack of financing to put the necessary gas infrastructure in place
- Undeveloped regulatory frameworks
- Inefficient gas pricing systems (mostly due to subsidies)

To help governments and companies overcome these barriers, GGFR's work program focuses on four key areas:

- Commercialization of associated gas through the identification of potential uses
- Regulations for flaring and venting, and the utilization of associated gas
- Implementation of the Global Standard for flaring and venting reduction
- Capacity building to obtain carbon credits for flaring and venting reduction projects

A Collaborative Global Standard

GGFR partners have established a collaborative Global Standard for gas flaring reduction. This Global Standard provides a framework for governments, companies, and other key stakeholders to consult with each other, take collaborative actions, expand project boundaries, and reduce barriers to associated gas utilization. GGFR partners that have endorsed the Global Standard are committed to no flaring in new projects, and to eliminate continuous production flaring unless there are no feasible alternatives.

GGFR's main goal is to facilitate viable solutions to flaring and help partners overcome the barriers to gas utilization so they can unlock the value of currently wasted natural gas to improve energy efficiency, expand access to energy, and contribute to climate change mitigation and sustainable development.

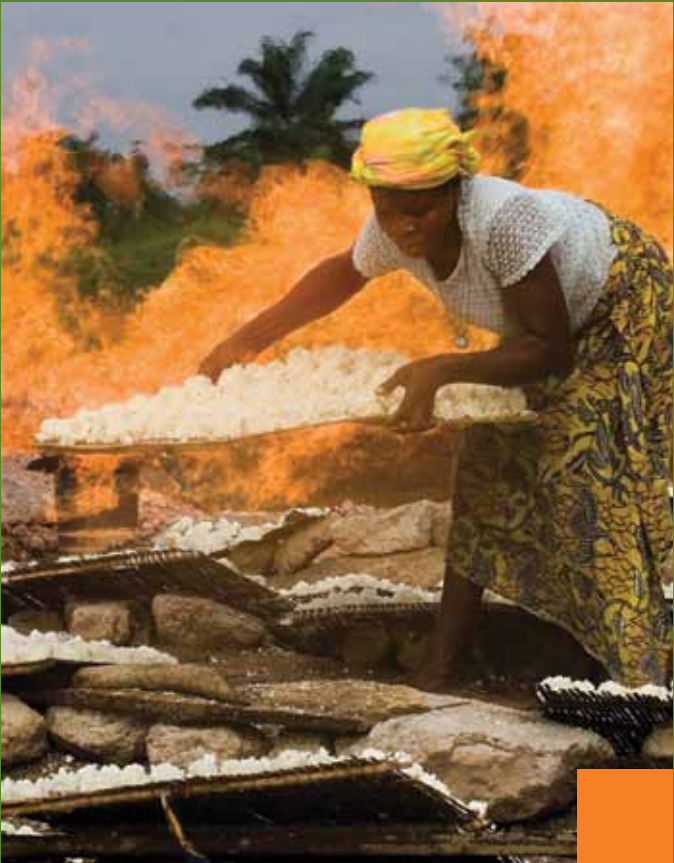
The Group of eight most industrialized nations (G8) joint statements reaffirmed, on two occasions, its support for GGFR's role in facilitating global gas flaring reduction and improving energy efficiency.



A New Phase

In 2010, the GGFR partnership launched the third phase of this World Bank-led initiative covering the period 2010-2012. The work program for this new phase focuses on implementing gas flaring reduction projects in high-impact countries. Key countries are Indonesia, Iraq, Kazakhstan, Mexico, Nigeria, Qatar and the Khanty-Mansiysk Autonomous Okrug – Ugra (KMAO) in Russia.

GGFR's work program is also active in Algeria, Azerbaijan, Cameroon, Ecuador, Gabon, Kuwait and Uzbekistan.





Three Networks

The GGFR Charter establishes three networks to share best practice on technical issues, carbon finance and communications. These networks include representatives from various public and private sector partners.

The **technical network** deals with issues related to the following six topics: measurement and reporting of flare volumes; production process optimization and operational procedure improvement; associated gas utilization technologies; flare optimization; preparing effective flare management plans; and industry (in-house) management practices for flare reductions.

The **carbon network** focuses on the potential use of carbon finance to make gas flaring reduction projects more economically viable. It looks into improving methodological aspects that will allow for more oil and gas projects to be registered under the Kyoto Protocol's Clean Development Mechanisms (CDM). This group brings together representatives from the oil and gas industry, CDM project developers and international organizations.

The **communications network's** main objective is to play an advisory role, particularly on major GGFR communications initiatives that aim to increase the visibility of the partners' efforts in reducing gas flaring around the world. The communications network aims to contribute to and provide guidance and advice on overall communications strategy, and on particular communications challenges/opportunities at the global and country-specific levels.

Achieving Milestones

Over the past 10 years GGFR has already achieved some encouraging results, including:

- Ten IOCs, ten NOCs, nine governments and the EU have already joined GGFR.

- The majority of partners have endorsed the Global Standard for gas flaring reduction
- GGFR has implemented demonstration projects for associated gas utilization in eight countries
- GGFR is assisting Indonesia, Kazakhstan, Mexico, Nigeria, Qatar, Russia and other countries to reduce flaring to minimum levels, through increased collaboration between operators, the national oil company and the regulator. (see examples further below)

Better Data through Innovation

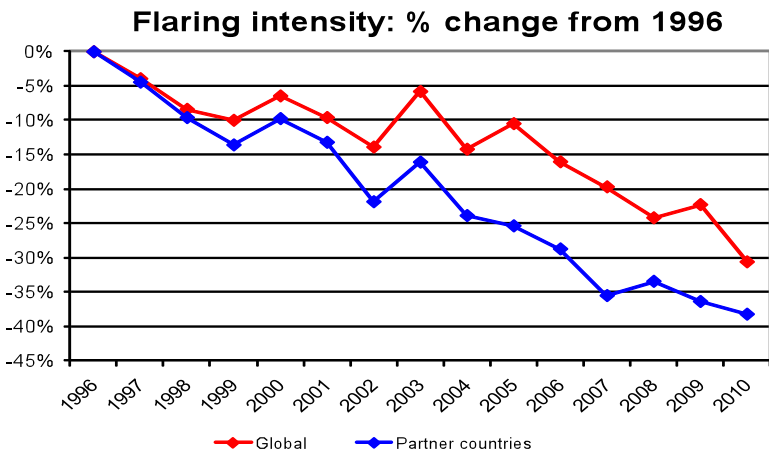


A major obstacle to reducing global gas flaring is poor data on flaring volumes. When GGFR started in 2003, flaring data reported by governments and companies were inconsistent and often under-reported. As a way of improving the reliability and consistency of global gas flaring data, the World Bank-led GGFR partnership, in cooperation with scientists at the US National Oceanic and Atmospheric Administration (NOAA), produced the first globally consistent satellite survey of gas flaring in 2006.

The survey was conducted using satellite data to produce a series of national and global estimates of gas flaring volumes covering a twelve-year period spanning 1995 through 2006. Since 2007 NOAA and GGFR have continued to produce annual estimates.

NOAA scientists use low-light imaging data from the U.S. Air Force Defense Meteorological Satellite Program to assess the volumes of gas burned in flares, which are visible in night-time observations under cloud-free conditions. Current and planned satellites will continue to provide data suitable for estimating gas flaring volumes for years to come.

A significant innovation in the utilized methodology was to confirm each light interpreted from satellite data as a flare using Google Earth. This visual confirmation ensured that data was interpreted correctly.



Global Trend

Satellite data on global gas flaring show that efforts to reduce gas flaring are paying off. From 2005 to 2010, the global estimate for gas flaring decreased from 172 billion cubic meters (bcm) to 134 bcm (22%). The most significant decreases in terms of volume were in Russia (40%) and Nigeria (29%).



The top 10 flaring countries for 2010 are: Russia, Nigeria, Iran, Iraq, Algeria, Angola, Kazakhstan, Libya, Saudi Arabia, and Venezuela. Countries which are members of the GGFR partnership have been relatively more effective in reducing their gas flaring when adjusted for oil production volumes (gas flaring intensity), than non-members. (See previous graph)

Reducing Flaring in Africa

GGFR is actively working in several African oil-producing countries (Angola, Cameroon, Gabon and Nigeria). Below is a sample of GGFR's engagement in Nigeria and Angola, two of the top 20 flaring countries in the world.

The work program in Nigeria is focused on supporting the Nigerian government, the oil & gas operators and other stakeholders in developing a rational approach to flare reduction in Nigeria through the "Nigeria Flare Reduction Committee" (NFRC), which was set up in 2007 and is chaired by the Ministry of Petroleum Resources. The NFRC's work program, which has been facilitated by the GGFR partnership, has analyzed a number of options to achieve and accelerate flare reduction. From 2005 to 2010, the estimated gas flaring decreased by 29% in Nigeria, 2/3 as a result of new gas utilization projects and 1/3 due to closing in of oil production.

Another major gas flaring reduction project in the region is Angola LNG, which is an integrated gas utilization project encompassing offshore and onshore operations to monetize gas resources, most of which are currently flared. All current sponsors of Angola LNG are partners in the GGFR, and have expressed a commitment to reduce gas flaring to minimum levels whenever economically possible. According to the satellite estimates, Angola flared about 4.1 bcm in 2010. The LNG project aims to reduce gas flaring in Angola by some 75% when commissioned (end of 2012), reducing CO₂ equivalent emissions by approximately 9 million tons per year.

MIDDLE EAST & NORTH AFRICA FORUM
ON FLARING REDUCTION & GAS UTILIZATION

THE WORLD BANK



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Increasing efforts in the Middle East

GGFR also has stepped up efforts in the Middle East where an increasing number of countries, such as Kuwait and Qatar, are more focused on reducing their flaring as a concrete contribution to energy efficiency and climate change mitigation.

The work program in Qatar, for instance, has kick-started a process through a series of workshops in which each operator has identified the key flaring issues and potential mitigation actions that will aim to increase the utilization of associated gas. A GGFR team has facilitated and supported the organization of these workshops.





“The global flaring challenge requires the strength of collaboration, through a Partnership like GGFR, combined with an effective regulatory framework to achieve the goal of reducing flares.”

Jim Dilay, Board member, Alberta Energy Resources Conservation Board

“The Government is keen to eliminate gas flaring in Kazakhstan and, thanks to the technical assistance and good advice of the GGFR partnership, is taking effective measures to address this issue as part of a long-term cooperation with GGFR to increase the utilization of associated gas.”

Mr. Serikkali Brekeshev, Head of Department for Gas Industry Development, Ministry of Oil and Gas, Republic of Kazakhstan

GGFR Partners Around the World*

COUNTRIES	OIL COMPANIES	OTHER PARTNERS
Algeria Angola Azerbaijan Cameroon France Gabon Indonesia Iraq Kazakhstan Khanty-Mansiysk (Russian Federation) Kuwait Mexico (Sener) Nigeria Norway Qatar Uzbekistan	BP Chevron ConocoPhillips Eni ExxonMobil Kuwait Oil Corporation Marathon Oil Maersk Oil & Gas Pemex Shell Sonatrach SOCAR SNH Statoil TOTAL Qatar Petroleum	European Union World Bank Group Wärtsilä

*AS OF SEPTEMBER 2011.