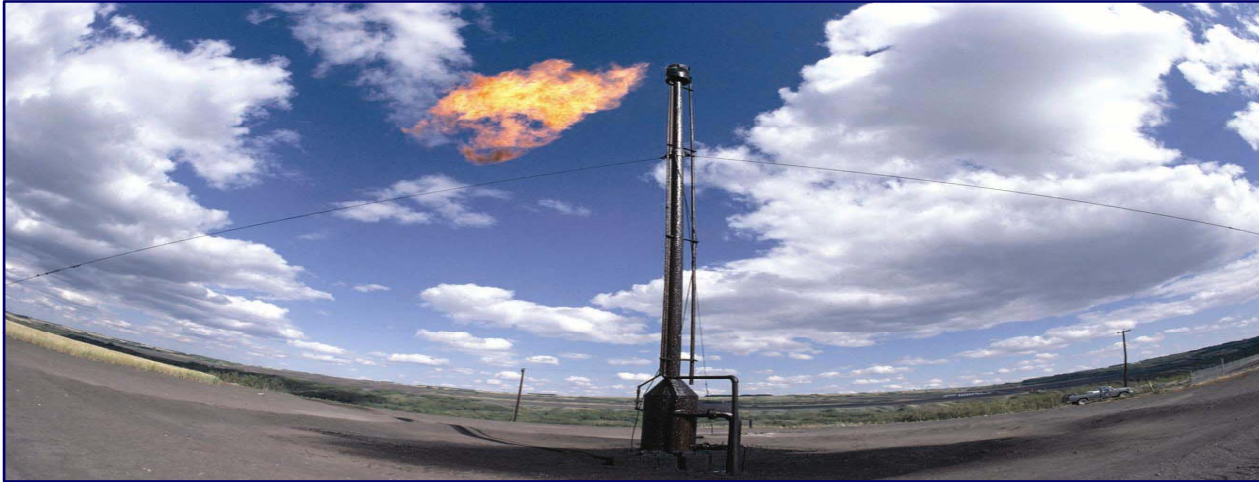


Global Gas Flaring Reduction Public-Private Partnership



**World Energy Council
Conseil Mondial de l'Énergie**

CFFS Committee Workshop on

**“Mitigating the Growing Contributions in
Global Emissions.”**

Dead Sea, April 25, 2007



GGFR Background and Overview

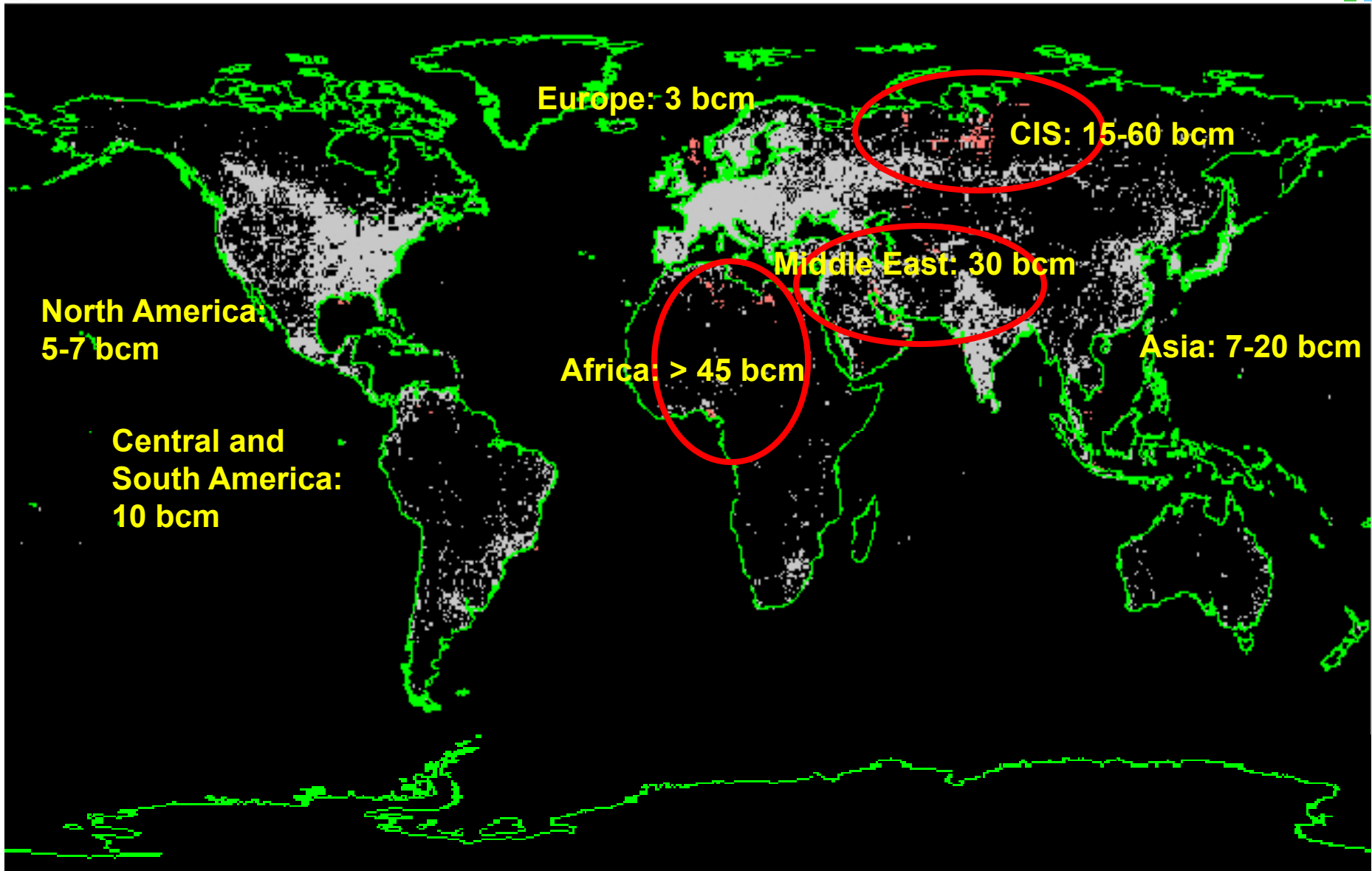
✓ **Gas Flaring fundamentals :**

- Where is it flared ?
- Why is gas flared?
- How much gas is flared?

✓ **GGFR's role: Identify & facilitate solutions**

- Who are the GGFR partners ?
- An example of GGFR activities : Gulf of Guinea Region
- Some other GGFR activities
- GGFR and Carbon Finance
- GGFR work program in Middle East

Where gas is flared ?



Why is gas Flared ?

Some typical barriers

“Hard” causes :

- ✓ Risks of gas re-injection in oil reservoir
- ✓ Distance from significant gas markets
- ✓ Reliability of supply from associated gas
- ✓ Gas Infrastructure constraints
 - Lack of
 - or access to it

Why is gas Flared ?

Some typical barriers

“Soft” causes :

- ✓ Limited institutional, legal and regulatory framework for gas, including associated gas : Gas terms (or absence of) in existing oil development agreements
- ✓ Supporting fiscal terms (gas price, equity share, tax structure, etc)
- ✓ Underdeveloped domestic market for gas and gas products (LPG, CNG, fuel methanol, power etc) and gas product pricing
- ✓ Funding constraints and need for coordinated actions by multiple stakeholders

Why is gas Flared ?

...**impact on the environment**

- Each m³ of gas flared is a waste of resources, and generates nearly 2 kg of CO₂ in atmosphere
- If vented, a m³ of methane is 5 times more damaging than when it is flared
- In many countries, but not all, venting is therefore prohibited

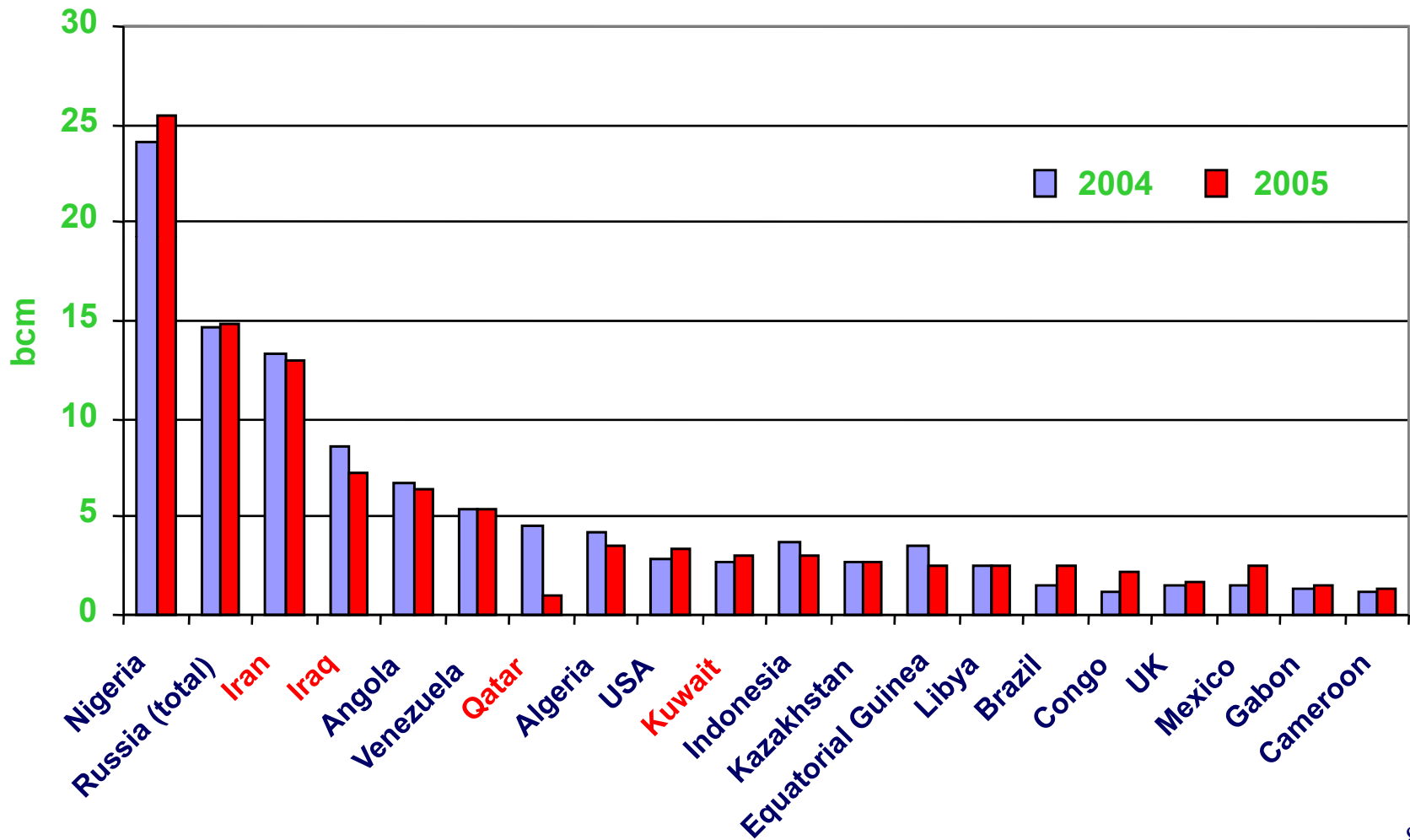
**→ Gas Flaring and Venting have to be reduced:
It wastes resources, prevent gas
development, and harms the atmosphere**

How Much Gas is Flared ?

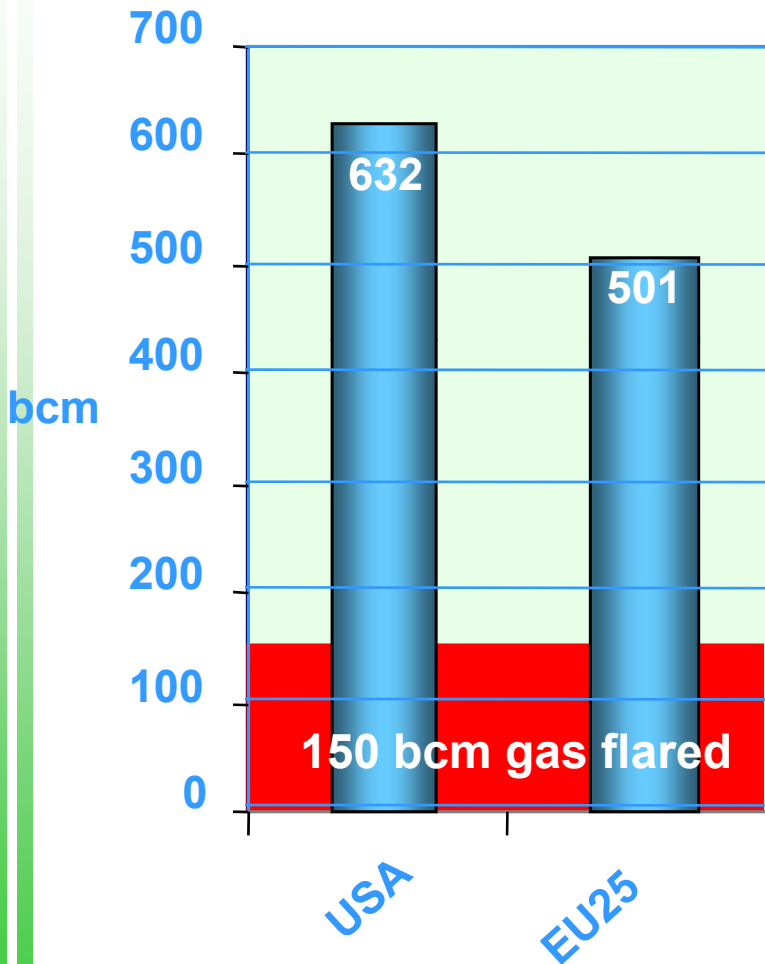


- GGFR estimates that global flaring is around **150 to 200 bcm** or **>400 MTCO₂e per year**
- Major areas are: Russia, Africa and Middle East
- Flaring in Africa alone could be used to produce 50% of current power consumption of the continent

Reported flaring levels : 2004 & 2005



Gas flared vs gas consumption in 2004



- 25% of US gas consumption !
- 30% of EU gas consumption !
- The equivalent of the worldwide 2005 LNG Trade !

Source: CEDIGAZ for gas consumption.

GGFR Background and Overview

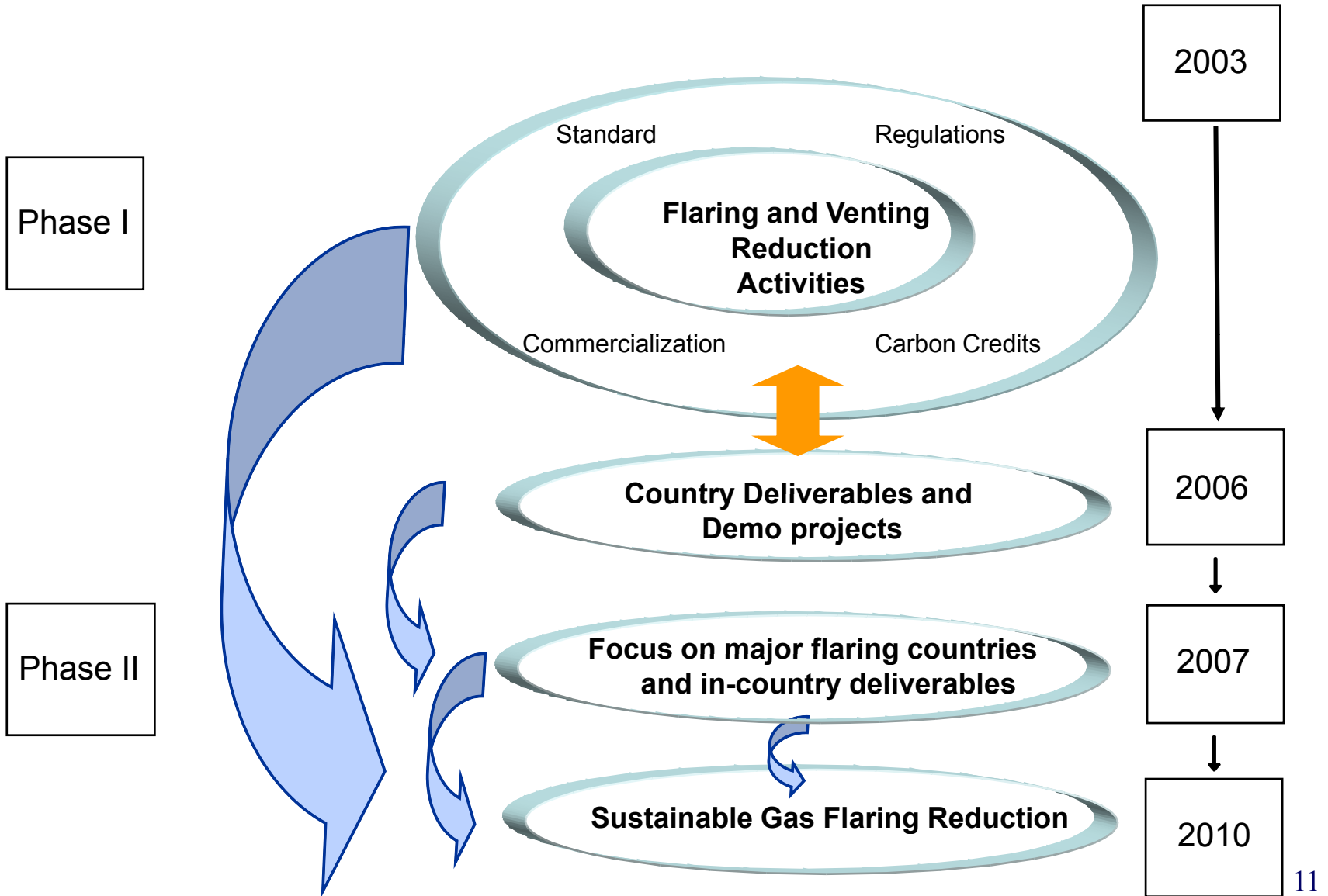
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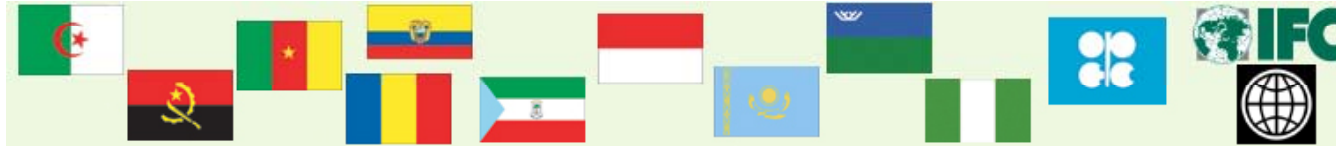
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GGFR Program



GGFR Public and Private Partners



Countries/NOCs

Algeria (Sonatrach)
Angola
Cameroon (SNH)
Chad
Ecuador
Equatorial Guinea
Indonesia
Kazakhstan
Khanty Mansiysk (Russia)
Nigeria

Qatar (as of 2007)

Donors

Canada
European Union (as of 2007)
France (as of 2007)
Norway
USA

IOCs

BP
ChevronTexaco
ENI
ExxonMobil
Marathon Oil
Norsk Hydro
Shell
Statoil
Total

Multilateral Organizations

The World Bank
OPEC Secretariat



GGFR partnership success

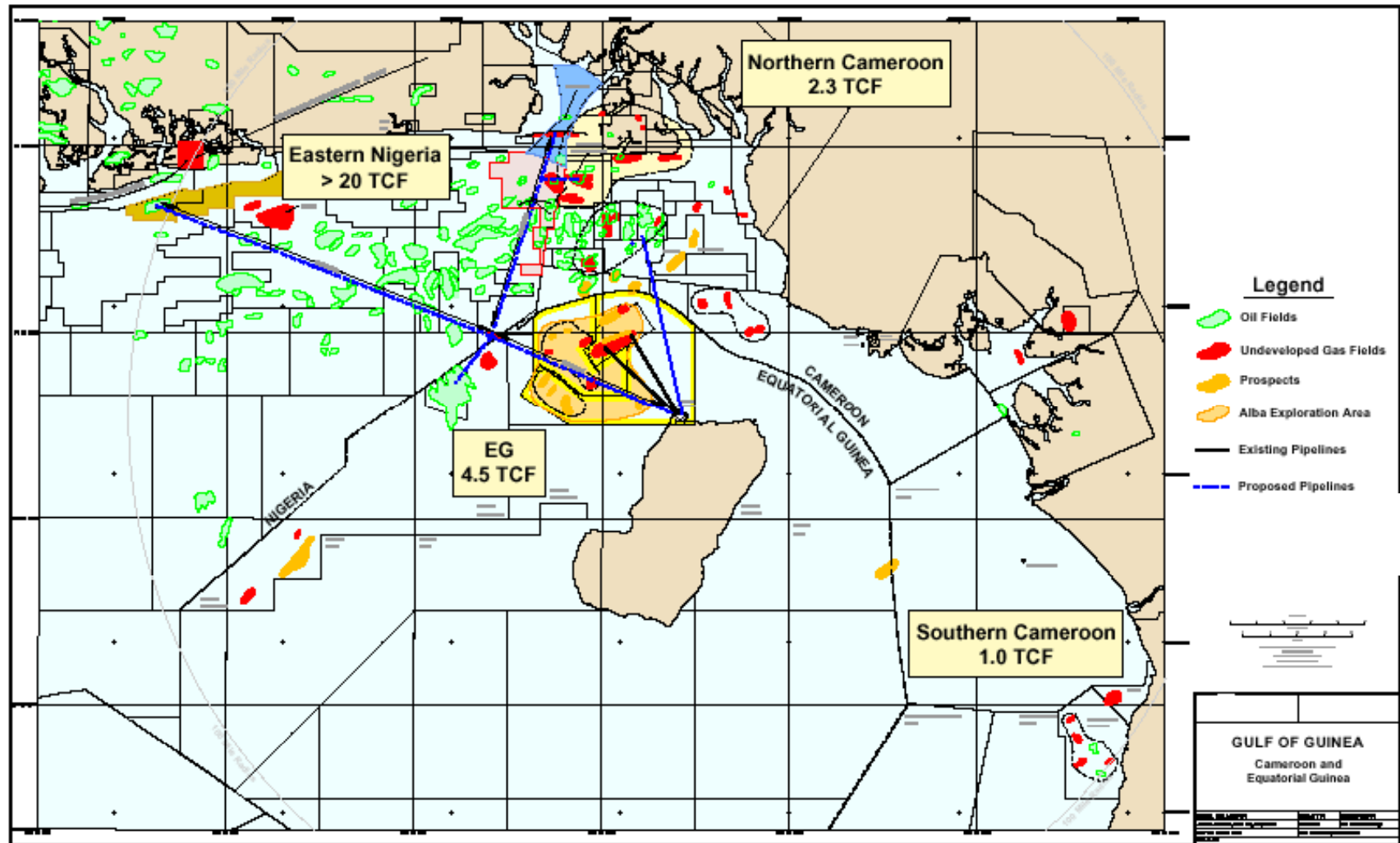
- The right set of partners and growing...
- Leverage of World Bank Group :
 - Convening power leading to top level commitment (Ministries/Corporate)
- Partnership strength built on Diversity (NOCs, IOCs, Governments)

To achieve global objectives, need for:

➔ Demonstration projects

➔ Country Implementation Plans

Demo Projects in Gulf of Guinea: A Regional Facilitation Approach



Demo Projects in Gulf of Guinea: A Regional Facilitation Approach

Nigeria/Cameroon/Equatorial Guinea

Regional feasibility Study presented in November 2005 to collect and supply gas to EG LNG terminal (mainly Train II)

As a result, **two HoA have been signed** with EG and :

- Nigeria : Feb. (HoA) and June 2006 (Export Agreement)
- Cameroon : March 2006 (HoA).
- Technical and commercial studies are now ongoing between

NOCs and IOCs

→ **Regional cooperation achieved
through GGFR**

Country Implementation Plans (CIP) Zero flaring policy deadline

- GGFR is facilitating some CIPs to eliminate flaring. First submitted CIP received from Canada end 2006
- GGFR is helping countries to implement zero flaring policies : Nigeria, Algeria, Qatar, Cameroon...

Other GGFR activities...

The GGFR Data Tool

There was a great uncertainty in the data

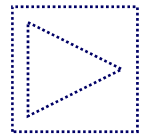
- **Partners decided to develop a web based data tool/data base to :**
 - gather consistent data
 - better understand flared and vented gas volumes per country
 - report data
 - track flaring reduction versus forecasts
- **Data tool roll out in 2006/2007**

Other GGFR activities...

Satellite imagery

With the US National Oceanic and Atmospheric Administration (NOAA), **a quantitative study** is currently being carried out :

- ✓ GGFR partners have provided historical flare volume and location data
- ✓ NOAA is using this data to calibrate flare satellite image brightness



→ This calibration should help better monitor flaring worldwide: Q1-2007

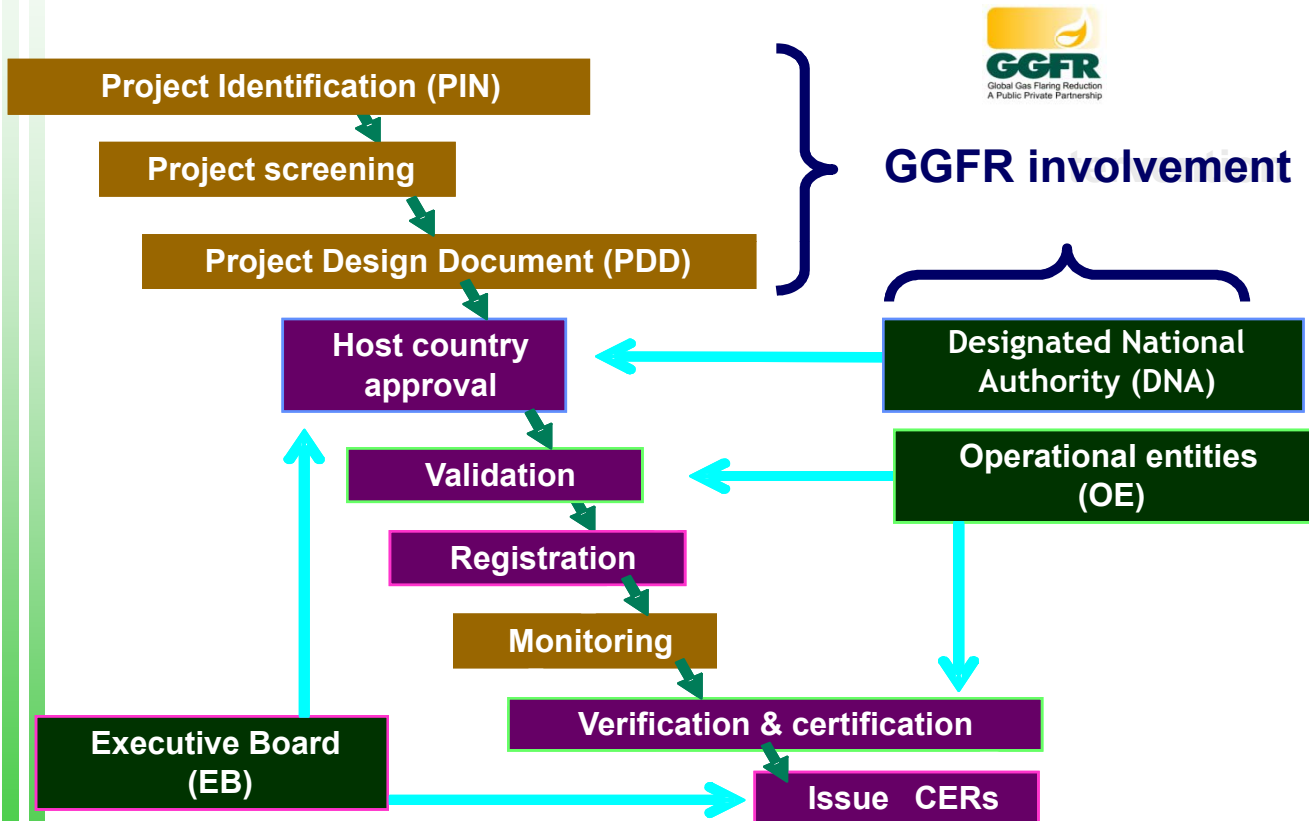
GGFR and Carbon Finance

GGFR involved in 7 Flaring Reduction demo project

- Seven demo projects initiated (1 registered, 1 in validation)
- One project recently submitted new methodology to Meth Panel (Afam)
- One new methodology proposal on gas to reinjection (not submitted yet)
- One JI project in Russia

Country	Company	Project	Project Type	CER/EUR/ y (k)	CER/EUR < 2012 (k)	Status	Method
Angola	Chevron	Angola LNG	Gas to LNG	14,300	42,900	Dropped by proponent at PDD stage	AM0009+
Algeria	Sonatrach	TFT	Gas to pipeline	200	1,000	In progress (at PDD stage)	AM0009
Indonesia	Mepco	Kaji	Gas to LPG (power)	123	1,034	In validation	AM0009
Nigeria	Eni	Kwale	Gas to power	1,513	10,540	Registered	AM0009
Nigeria	Shell	Afam	Gas to power	740	3,700	Meth submitted	NM
Nigeria	Eni	ObOb	Gas to reinjection	2,000	10,000	On hold	NM
Russia	Regionenergogas (JI)	N. Danilovsk	Gas to power	162	813	Pre determination	JI
				19,038	69,987		

GGFR and Carbon Finance



- Early stages of project cycle
- Supports project proponents & host country
- Can leverage expertise from World Bank Carbon Finance Unit (if needed)
- Can link to WB Group lending program

GGFR Background and Overview

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Update on GGFR Work Program in Middle East

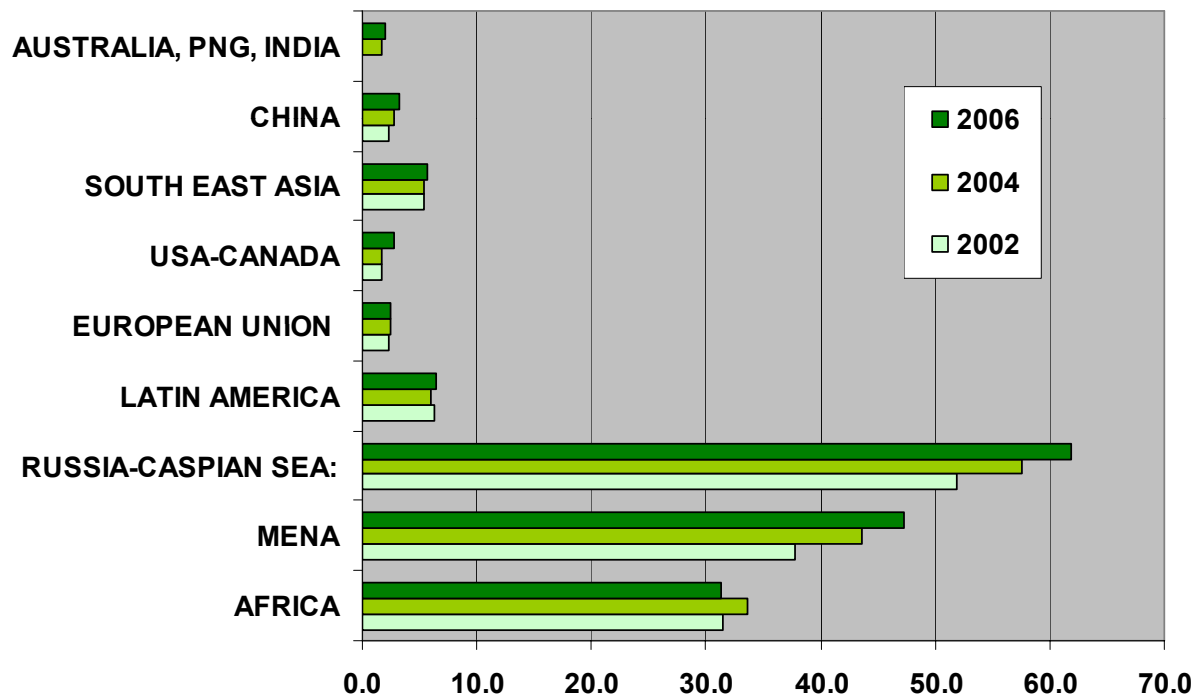
Strategy

Focus on high-impact regions/countries that are willing to cooperate with GGFR

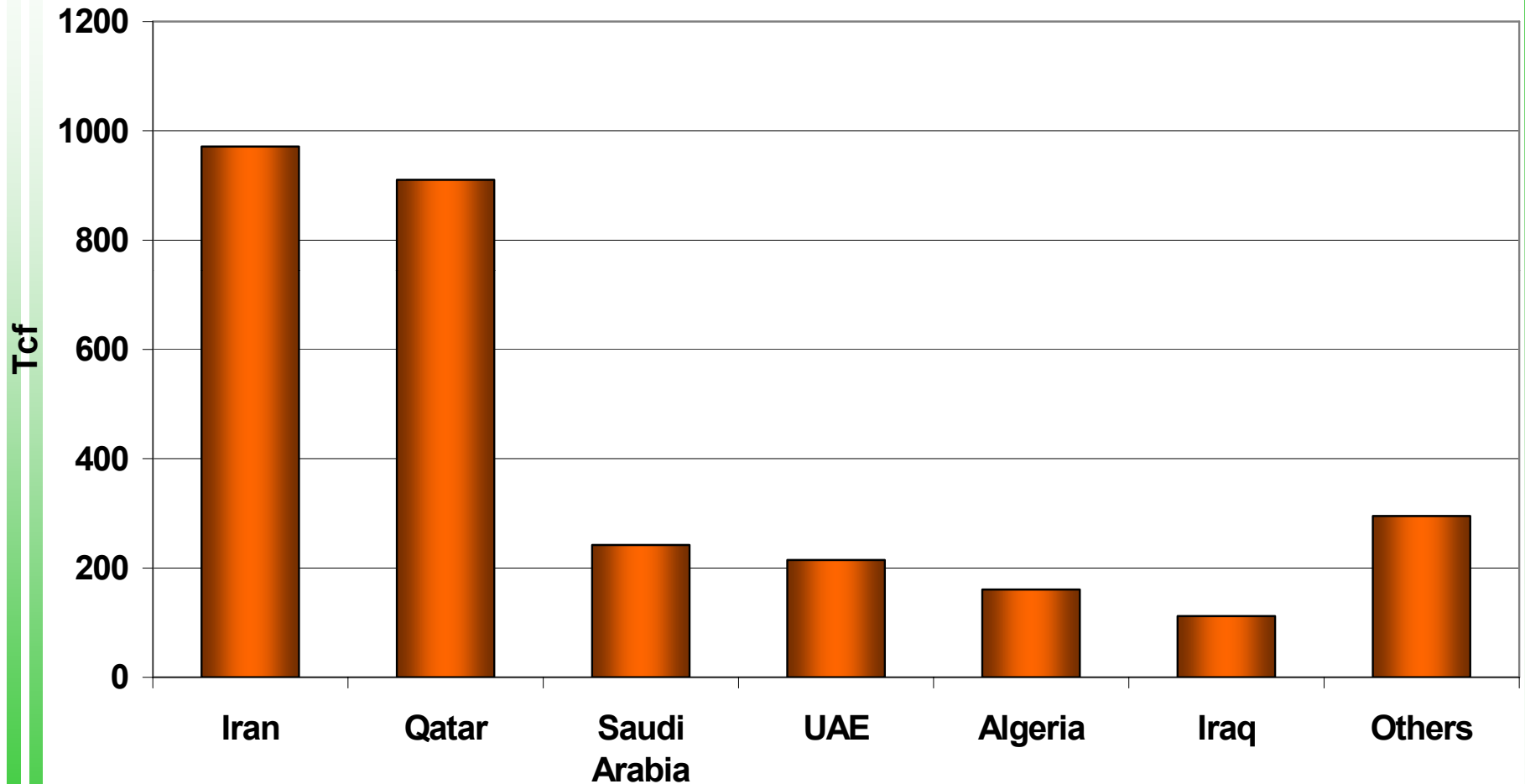
High-Impact Regions

- Russia and the Caspian Region
- The Middle East and North Africa
- The Gulf of Guinea

*Flared Volumes per Region Based on Satellite Imagery
(BCM per year)*

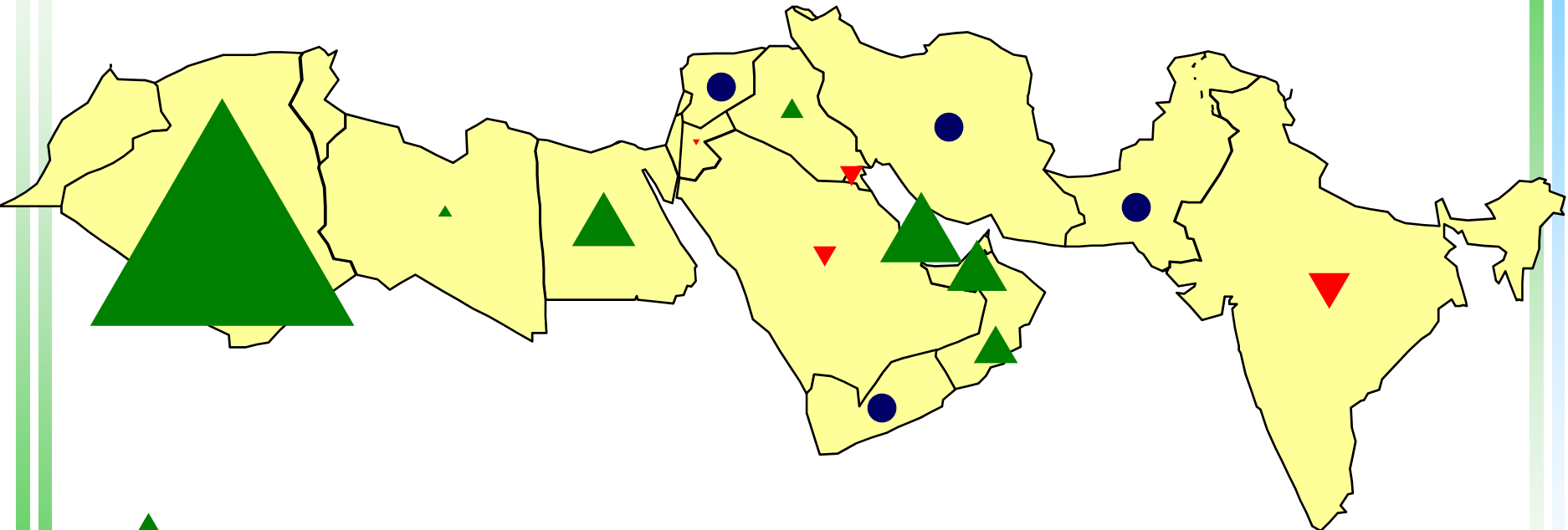
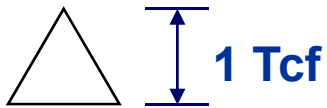


Iran & Qatar together have 64% of the MENA region's proven natural gas reserves



Source: The US Energy Information Administration

In 2005, the MENA region had available 5.2 Tcf gas for export

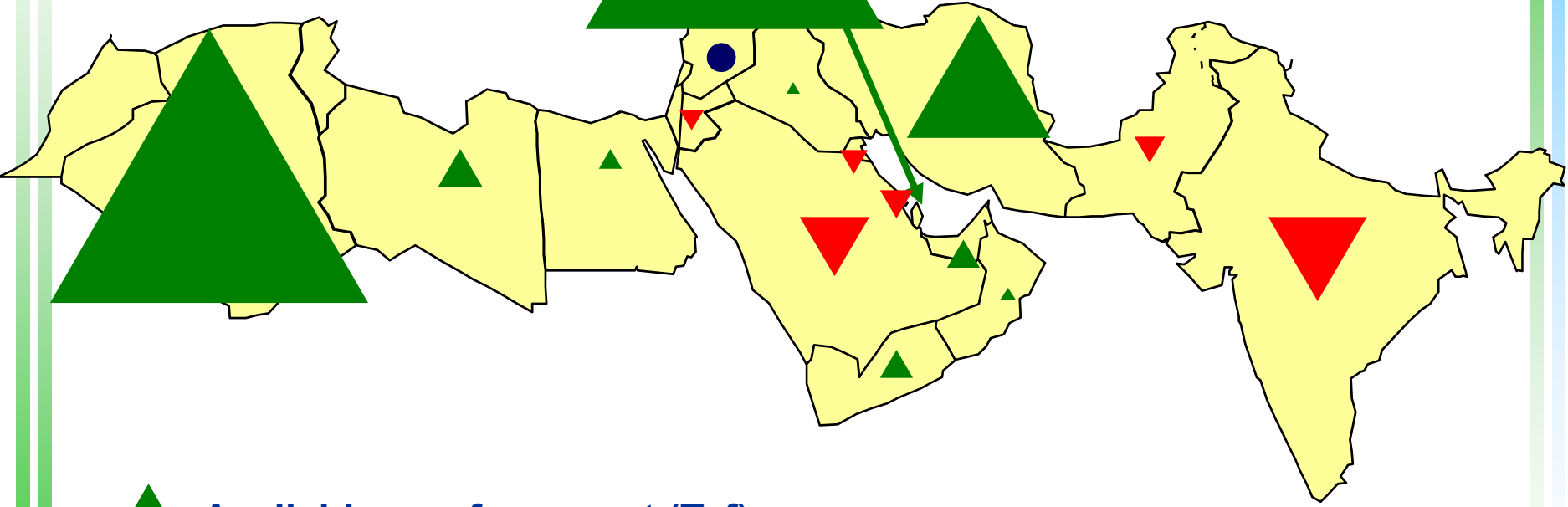
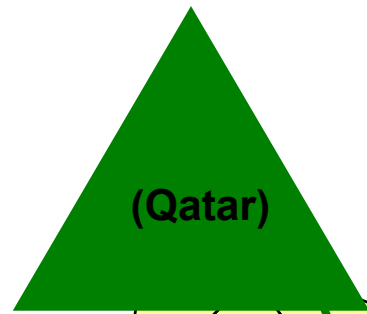
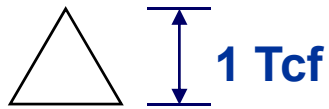


- ▲ Available gas for export (Tcf)
- ▼ Required import/alternate fuel to meet demand (Tcf)
- Supply/Consumption balanced

Available for Export = Production less re-injection less domestic consumption excluding exports

Sources: International Energy Agency , The US Energy Information Administration, Shell Sources, Arthur D. Little, BMI, ARPC

By 2015, the MENA region will grow to 10.4 Tcf gas export per year



- ▲ Available gas for export (Tcf)
- ▼ Required import/alternate fuel to meet demand (Tcf)
- Supply/Consumption balanced

Regional Overview

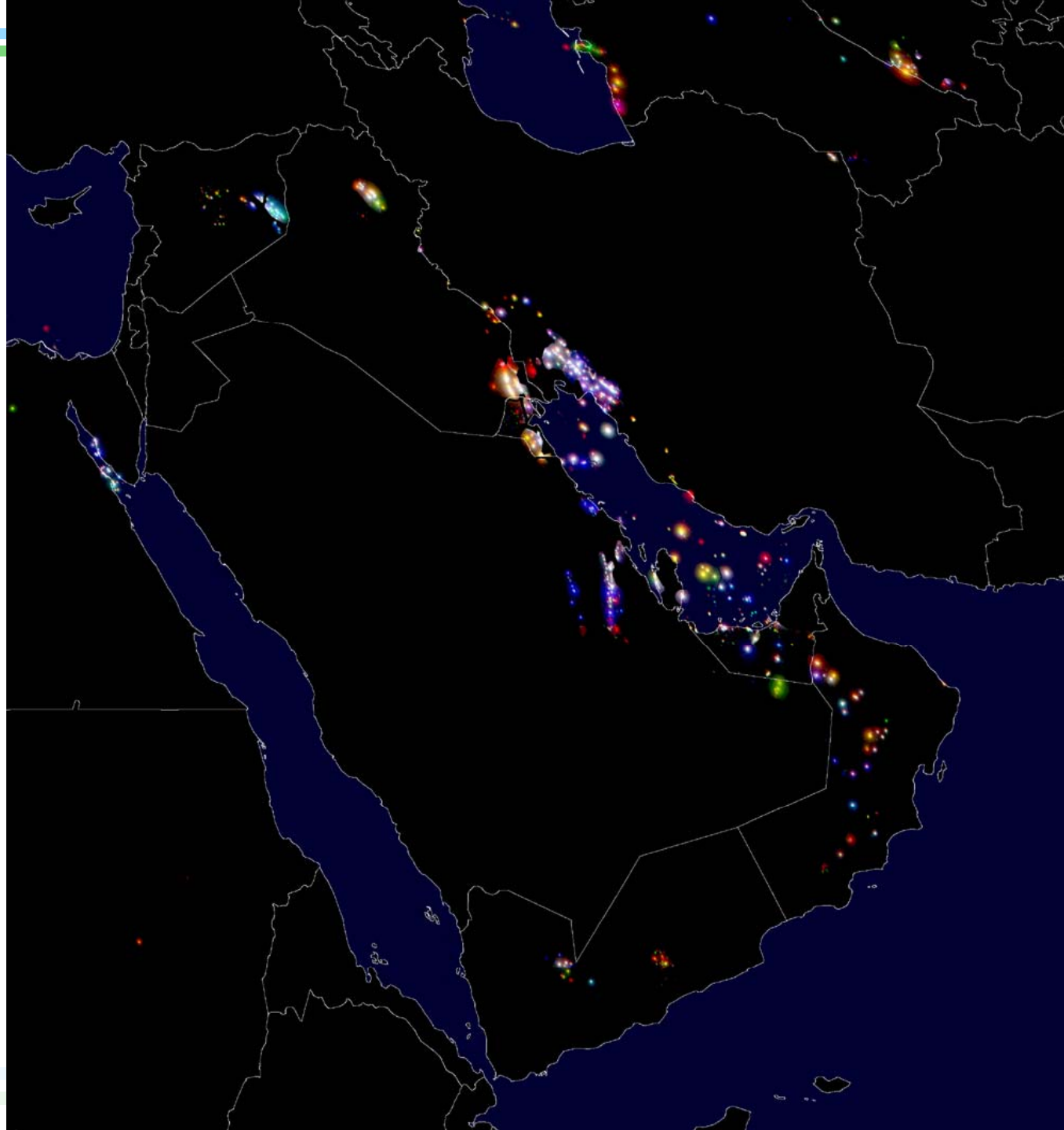
Flares

Red - 2004

Green - 1998

Blue - 1992

Earth Observation Group
U.S. NOAA
National Geophysical
Data Center



Update on GGFR Work Program in Middle East

Country	Gas Production (bcm) / 2004	Reported Flaring (bcm) / 2004	Estimated Flaring (bcm) / 2004 satellite images
Iran	136	13.3	10.9
Iraq	??	8.6	7.7
Saudi Arabia	76.46	0.1	2.9
Qatar	48.47	4.5	3
Kuwait	12	2.7	2.5
Oman	27.5	0.8	2.4
UAE	59.00	0.7	1.4
TOTAL		31/9*	31/12*

* Excluding Iran and Iraq



Update on Work Program in the Middle East

Mission findings

- Region is lacking of gas
- Flaring remains a major issue in the region (Kuwait, Qatar, Saudi, Iran and Iraq)
- In-country workshops preferred to a regional conference
- In the GCC region, priority are:
 - Qatar
 - Kuwait
 - Saudi Arabia
 - UAE
 - Oman

Update on Work Program in the Middle East

Next Steps

- Finalize administrative matters for Qatar formally to join GGFR in Q2 2007
- Contact and start collaboration with Kuwait
- Further engage with Oman and Saudi Arabia to discuss their interest in joining GGFR
- Pursue collaboration with “Masdar initiative” in UAE (CDM)
- Conduct in-country workshops