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R E G I O N A L F O R U M

Fundamentals of oil vs. gas

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SCC MENA overview

What we are:

A Bahrain based clean energy and low carbon project developer

We invest in:

Renewable Energy
(RE)

Waste to Energy
(WTE)

Energy Efficiency
(EE)

Example projects
Include:

Wind

Solar thermal

Solar PV

**Gas flare
reduction**

Landfill gas /
Municipal Solid Waste

Agricultural waste
methane

Industrial waste heat
recovery to:

power

steam

cooling

Demand side
management:

High
efficiency
light bulbs

solar water
heaters

High
efficiency
HVAC etc.

How we do it:

Identify &
structure
projects

Fully finance &
build projects

Generate clean
energy & carbon
revenues

Create long term
IRR of 15-20%
for investors

SCC has experience in gas flare reduction

Tambun project summary

Capture & utilisation of associated gas that would otherwise have been flared

- Baseline: the Tambun oil field was flaring ~15mmscfd of associated gas
- Project: LPG plant built to produce LPG, condensate, & lean gas

CDM

AM0009v.2 "Recovery & utilization of gas from oil wells that would otherwise be flared"

- Baseline Emissions: 450,000 tCO₂ per year
- Project Emissions: 50,000 tCO₂ per year
- Emission Reductions: 400,000 tCO₂ per year

Bottom Line

- One revenue stream from sale of LPG, condensate & lean gas
- Second revenue stream from carbon credits

One of only two gas flare reduction project in the world to be issued with CERs

Agenda

- Fundamental differences between oil and gas
- Benefits of gas
- Associated gas vs. non-associated gas
- Gas flaring around the world
- Why is gas flared?
- What is required to reduce flaring?

Fundamental differences – oil vs. gas

In order to understand flaring, important to appreciate the differences between oil and gas:

	Oil	Gas
Energy density	● High	● Low
Storage	● Easy / cheap	● Expensive / difficult
Transport	● Easy / cheap	● Expensive / difficult
Infrastructure	● No need for pressure vessels	● All pressurised or cryogenic
Market	● Fungible	● Has to be tied to dedicated infrastructure
Environment	● More pollution / higher CO ₂	● Lower CO ₂ / cleaner burning

Oil and gas markets develop in different ways

- Oil is fungible and markets can develop quickly
 - Global markets and infrastructure can develop gradually
 - Lower risk – multiple producers and customers
- Gas requires integrated infrastructure before markets can develop
 - Initially supplies local markets
 - Substantial investment required for longer distance infrastructure
 - Initially requires reliable paying customers on longer term contracts
 - Once extensive infrastructure is installed, barriers to entry come down and gas become more like oil with spot markets etc. (i.e. US, UK etc.)

Gas is difficult to store and requires dedicated, integrated infrastructure linking the reservoir to a reliable paying market

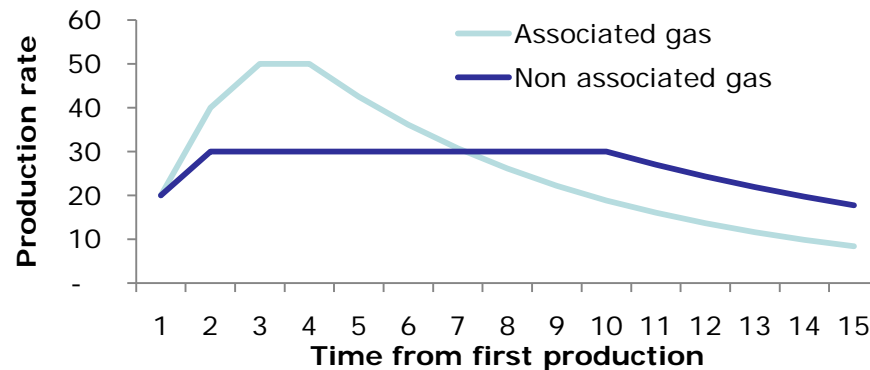
Benefits of gas

- While oil is cheaper to transport and store, gas enjoys some critical advantages over oil
 - Gas is cleaner than alternative fossil fuels
 - Less local pollution (SO_x, NO_x, particulates etc.)
 - Lower CO₂ emissions
 - Gas is fuel of choice for many stationary applications
 - Gas fired power - quicker to install and lower capex than coal or oil
 - Cleaner to use in industry
 - Health benefits for domestic users vs. alternative fuels
 - As technology develops (i.e. GTL, shale gas, CNG etc.) and opens new markets, gas increasingly displaces dirtier coal and oil

Where gas is available, it is the fuel of choice for stationary users
(power, industry, residential)

Associated gas has more barriers than non-associated gas

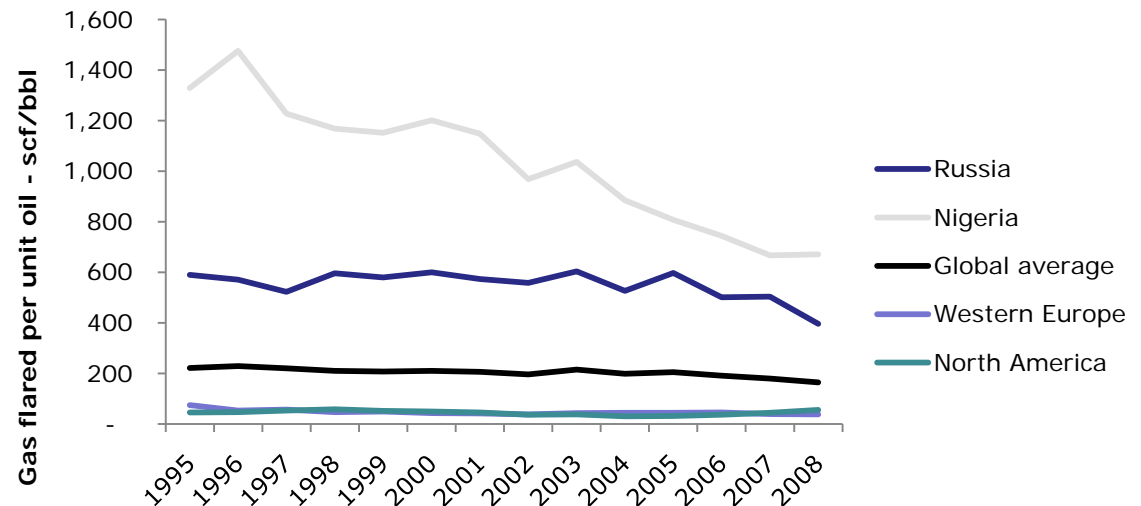
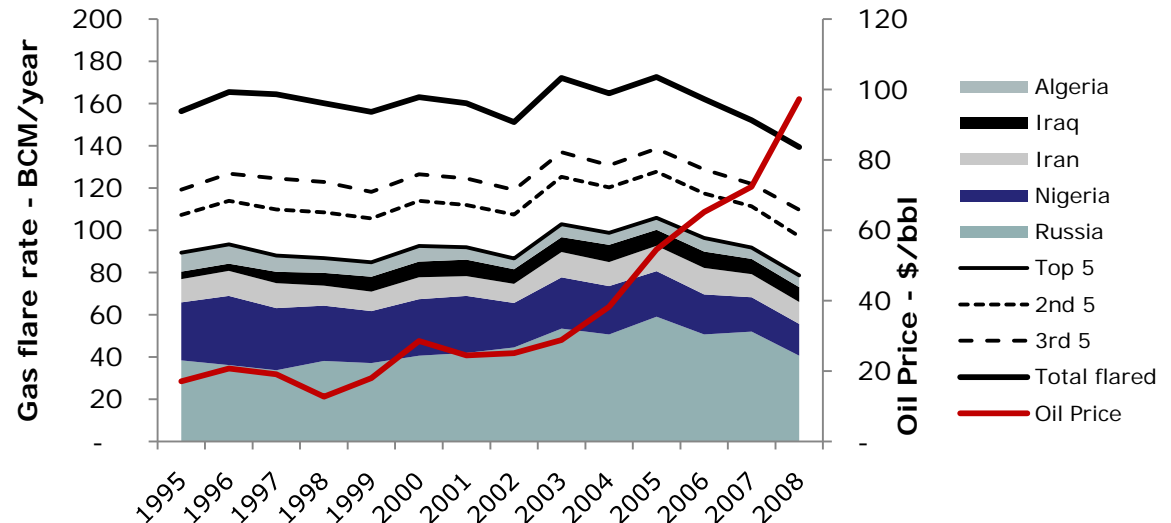
- AG is a bi-product
 - Oil production takes priority over gas
- Volume uncertainty
 - AG rates vary with oil production:



- Yet consumers want volume certainty
 - Infrastructure investment often requires volume commitment
- Remote location
 - Oil often produced in regions far from markets (i.e. Russia / Nigeria)
 - Infrastructure difficult to finance on the back of uncertain supply volumes

Flaring is not evenly spread around the world

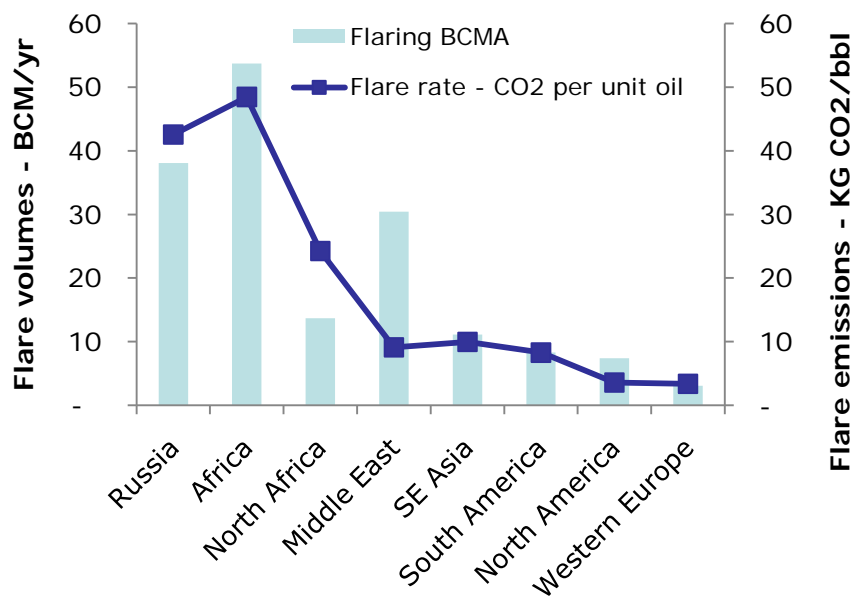
- The top 5 nations produce over 55% of the flaring
- Decrease since 2005 due to Russia and Nigeria – rest of the world flaring almost flat
- In Nigeria, 2007/08 reduction in flaring is due to reduced oil production
- If Russia and Nigeria reduced flaring to global average per bbl, would save 35 bcma
- America / Western Europe lead the way in flaring per bbl oil produced



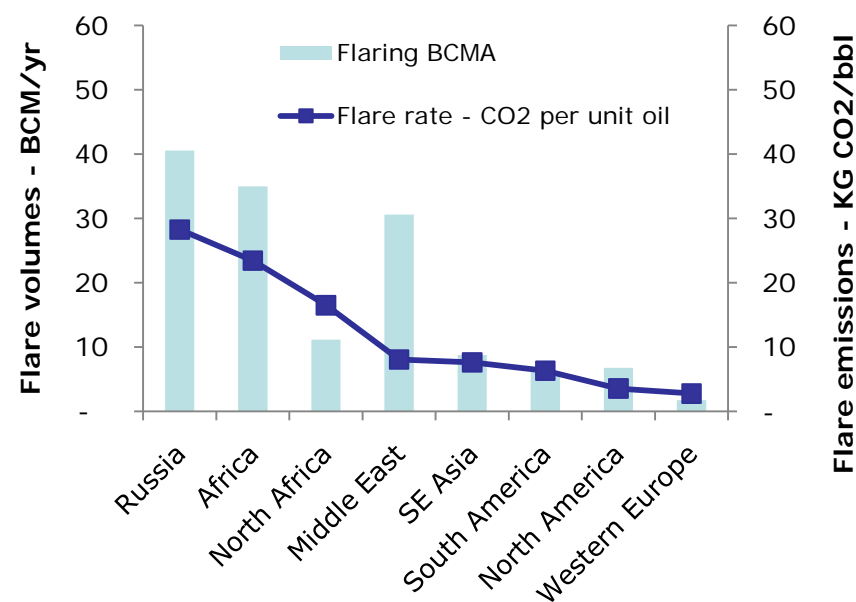
Source: NGDC / BP

Global flaring: 1998 - 2008

Flare Data for 1998



Flare Data for 2008



- 1998 – 2008: Global flaring down 13% from 160 to 139 BCM (oil production up from 74 to 82 mmbd)
- Biggest flare reductions in Africa
- Middle East flaring has not changed
- Flare rates in Western Europe and North America are lowest

Why is gas flared?

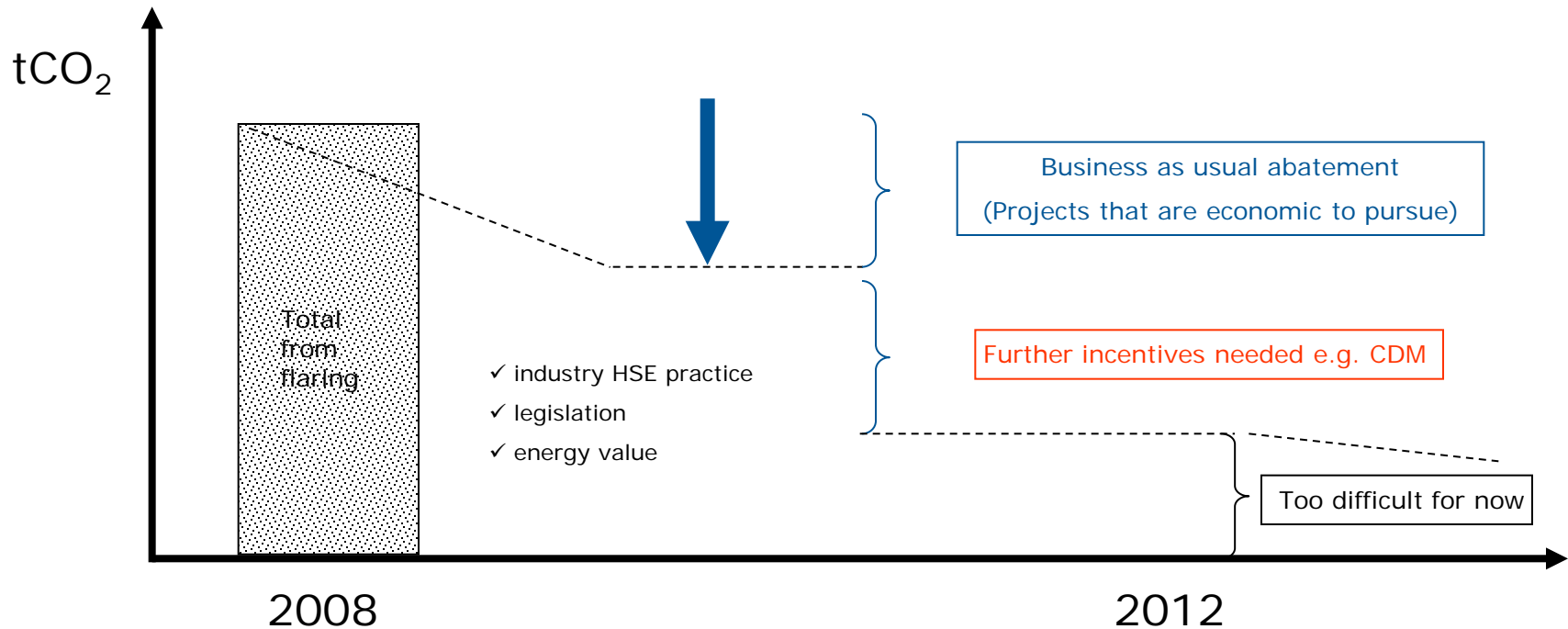
- Two main sources of flaring – continuous flaring and upset flaring
- Upset flaring:
 - Occurs when there is a problem with a facility
 - More difficult to prevent
 - Requires integrated approach and continuous facility improvement
- Continuous or routine gas flaring occurs due to:
 - Lack of infrastructure
 - Individual field AG production rates low / uncertain
 - Price of gas is too low
 - Regulations not sufficient or not enforced
 - Local people lack representation / influence
 - Violence / instability

How can gas flaring be stopped?

- Infrastructure investment
 - Improve facilities to minimise upset flaring
 - Put infrastructure in place to link supply with demand
- Aggregate supply
 - Bring several AG sources together to create a larger supply
- Technology improvements (mini LNG, CNG, GTL, gas-by-wire etc)
 - Enable gas to be moved to market more cheaply
 - Create new markets for gas (i.e. GTL to clean fuels)
 - Reduce costs / increase potential revenue and so reduce the size of gas reserves required for commerciality
- Regulatory changes
 - Increase the cost of flaring (fines / taxes / social pressure etc.)

Most of these require finance – and in the absence of a robust local gas price, carbon finance could make a material contribution

Associated gas flare abatement



- Business as usual efforts are being made to reduce flaring, but much of this volume may not be viable on a purely commercial basis
- Carbon finance can help increase gas flare abatement

How can carbon finance help?

- Carbon finance benefits
 - Provides an additional market for the gas (i.e. carbon abatement) and an incremental revenue stream
 - Provides additional finance to overcome infrastructure problems
 - Brings in additional expertise and focus from project developers
- Challenges
 - Baseline assessment and monitoring
 - Need to have a clear baseline agreed and then monitor reductions
 - Some methodologies (AM37 / AM77) are not compatible with reality
 - Gas flare reduction is limited to continuous gas flaring
 - No framework to use carbon finance to reduce upset flaring
 - Market uncertainties post 2012

SCC has experience of taking gas flare reduction projects through the whole CDM process to CER issuance

Thank you



If you have any questions, please contact:

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