Flaring in a Carbon World

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Outline

• Global Gas Flaring & Venting
  – A waste, and a major source of GHG’s

• Lessons from Russia

• From problem through liability to opportunity
GLOBAL GAS FLARING & VENTING
Global Gas Flaring

Global Gas consumption 2007

Global Flaring: Equivalent to total gas consumption of Japan & Germany

Source: BP statistical review, GGFR, & PFC Energy
Magnitude of Gas Flaring and Venting

Flaring and Venting

Source: PFC Energy GGFR, NOAA and PFC Energy estimate
LESSONS FROM RUSSIA
Russian Gas Flaring

- Official 19 BCM/yr
- Satellite imagery up to 60 BCM/yr
- Based on GOR levels, flaring is ~ 38 bcm/yr
Russian Gas Flaring – the Facts

Flaring concentrated in West Siberia – where all the gas infrastructure is located

High number of fields flaring small volumes
Expensive to connect!
Russian Horses for Courses

Prefered APG Utilization Envelope

- The maximum price that an owner of GPP, CCGT, Distributed power could pay the field owner after connections costs and still make a 10% real IRR

** At full Capacity. Larger plants will have better economics than shown

GPP more economic
Distributed power more economic
CCGT more economic

*Equivalent netback APG Price $/mmbtu*

APG Volume bcm/yr

Distributed Power
CCGT

Gas Processing Plant (~6 bcm capacity) **

*At full capacity.* Larger plants will have better economics than shown.
Russian Solutions

APG Prices and Estimated Utilization

- GPP prices “liberalized” Feb 2008
- Ignores any benefits from carbon credits – eg Rosneft deal

GPP and distributed Power
Historical prices
GPP Only

$2.40/mmbtu -> 100% utilization

APG price $/mmbtu
APG Utilized

0% 20% 40% 60% 80% 100%
0 1 2 3 4 5 6 7 8
FROM PROBLEM THROUGH LIABILITY TO OPPORTUNITY
Modeling the Total Value Chain

- Upstream
- Midstream
- Transport
- Downstream
- Transport

Emissions

Energy

End User Retail
Flaring Nearly as Big as Refinery Emissions - 2007

- IOC participation only. Excludes pure play NOC production
- Excludes retail or end use combustion
Value of Emissions: 2007 - 2012
Value of Emissions

base case 2012
Value of Emissions

Intensity per boe (kg CO2e/boe)

Potential Liability $ billions

Oil Sands
CCS
Value of Emissions

- Oil Sands CCS
- Additional 10% in energy efficiency
Value of Emissions

- Eliminate Flaring
- Additional 10% in energy efficiency
- Oil Sands CCS
• Flaring is environmentally and economically irresponsible
• Flaring (and Venting) is a major contributor to global GHG’s
• Wise government policies tailored to multiple lines of attack can provide major incentives
• Producers that flare highly exposed to future carbon regulation
• Reducing flaring has one of the largest, and quickest “returns” in a carbon constrained world
Thank You