Financing Oil and Gas Sector Methane Emissions Reduction Projects through Carbon Markets

Oil and Gas Subcommittee Technology Transfer Workshop

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Climate Change and Sustainable Development in the O&G Industry

- Production processes and energy consumption have an impact on the environment.

- Sustainability is attainable. It depends on:
  - Public policies and regulations
  - Modification of individual and corporate habits/practices
  - Voluntary initiatives in companies
Challenges for 21st Century O&G Companies

- Peak oil: 2010 – 2030
- Geopolitical crisis – Oil availability shortages
- Environmental pressure – Climate Change
- Forecasts on depletion of critical natural resources – Growth or expansion limits
- Kyoto Protocol
- Emerging markets – Energy companies
Climate Change Challenges

- Greenhouse gases (GHG) intensity reductions for processes and products
  - Increased sustainability, mitigation of climate change effects

- Objectives
  - Minimize exposure to climate change associated risks
  - Strengthen strategies and actions aiming at climate change mitigation and make them more visible
GHG Intensity Indicators for the O&G Industry

- E&P: kgCO₂e / ton crude oil equivalent production
- Refining: kgCO₂e / Equivalent distillation charge
- Transport: kgCO₂e / ton–km transported
- Utilities: kgCO₂e / MWh generated
- Other operations: kgCO₂e / BOE produced
O&G Industry Initiatives

- Technology improvements / Revamping
- Energy efficiency / Utilization of currently vented or flared gas
- Cogeneration / Power generation
- Renewable energy development
- Biofuels / Ethanol fuel mixes
Climate Change Related Organizations / Agreements

- 1992: United Nations Framework Convention on Climate Change (UNFCCC)
- 1997: Kyoto Protocol (KP)
- 2005: Kyoto Protocol Ratification
Kyoto Protocol Agreements

- Focal point: GHG reduction or limitation targets.
  - Annex 1 countries – Commitments
  - Non Annex 1 countries – Signatory countries with no GHG reduction or limitation commitments (Mexico)

- Due to emission reduction goals adopted by Annex 1 countries, emissions reductions acquired a market value.
Kyoto Protocol Goals

- Annex 1 countries must achieve on average GHG emission reductions so as to have net GHG emissions generation levels below 95% of those they had in 1990. This must be achieved in the 2008 – 2012 period.
GHG Emissions Market Value

- Emissions over and above the assigned amounts could involve potential imposed costs.
- Due to this, organizations surpassing their GHG emissions reduction goals have an asset equivalent to the market value of such “surplus” reductions.
- Therefore, emission reductions are treated as a new commodity

- Main GHG: CO$_2$, “Carbon market”
- Carbon (CO$_2$) is traded as any other market commodity.
Carbon Market Actors

- Public Sector
  - Multilateral Development Banks (e.g. World Bank)
  - Government Agencies
  - UN Agencies
  - NGO’s
Carbon Market Actors

- **Private Sector**
  - Organizations with emission reductions (ER) obligations
  - Organizations with voluntary emissions reductions commitments
  - ER project developers
  - Banks
  - Investment funds
  - Financial agents
  - Law firms
  - Accounting firms
  - Technology developers
  - Consulting firms
Carbon Markets
Flexible Mechanisms

- Emissions trading
- Joint Implementation (JI)
- Clean Development Mechanism, (CDM)
Flexible Mechanism Goals

- Contribute to sustainable development in non Annex 1 countries
- Technology transfer to developing countries
- Possibility of an alternative for compliance with emission reduction goals by Annex 1 countries
Emissions Trading Units

- Trading Unit: 1 tCO\textsubscript{2}e (all)
  - AAU (Assigned Amount Units) Issued by an Annex 1 party as part of its assigned emissions amount.
  - RMU (Removal Units) Issued by an Annex 1 party on the basis of land use, land use change and forestry (LULUCF) activities.
  - ERU (Emission Reduction Units) Generated by a Joint Implementation project
  - CER (Certified Emission Reductions) Generated from a Clean Development Mechanism project
  - VER (Verified Emission Reductions) Tradable credits for GHG emission reductions generated to meet voluntary demand for carbon credits
Emissions Trading

- Exclusively to take place among Annex 1 countries
- An Annex 1 country buys ERUs from another Annex 1 country to meet its reduction goals
- There is a system and software that guarantees safe tracking and trading of ERUs
- Regulated by the European Union Emissions Trading Scheme
Joint Implementation (JI)

- Project based
- Implemented among Annex 1 countries
- An emission reduction project is implemented in one Annex 1 country to credit the ERs obtained to an organization in another Annex 1 country
- Eligibility criteria must be met, and UNFCCC approved CDM methodologies must be used
Clean Development Mechanism (CDM)

- Project based
- Implemented between Annex 1 and non Annex 1 countries
- An emission reductions project is implemented in a non Annex 1 country to credit the ERs obtained to an organization in an Annex 1 country
- Eligibility criteria must be met, and UNFCCC approved methodologies must be used
JI and CDM Common Elements

- Project based
- Baseline and monitoring required
- Parameters and development conditions for projects must be validated
- Reduced emissions must be verified as a condition to issue ERUs or CERs
CDM Features

- Basis: GHG Emission Reductions achieved in developing countries can be certified and sold to Annex 1 countries

- Goals:
  - Contribute to sustainable development in non Annex 1 countries
  - Alternative emission reductions goal compliance possibility for Annex 1 countries

- Rules, procedures and modalities as defined in Kyoto Protocol, Marrakech Agreements and CDM Executive Board Decisions
CDM Eligible Projects

- In principle, any Kyoto Protocol referred GHG reduction project (CO$_2$, CH$_4$, N$_2$O, PFC’s, CFC’s, SF$_6$):
  - Carbon “sinks” are also considered:
    - Afforestation and reforestation
    - Carbon capture and geological storage, CCS (rules under consideration)

- Exclusions:
  - Nuclear energy
  - Forest conservation
CDM Project Cycle

1. Project Idea
2. Project Design Document (PDD)
3. Approval by Host Country
4. New Methodology Approval
5. Validation
6. Registration
7. Emissions Reduction Monitoring
8. Emissions Reduction Verification / Certification
9. CER’s Issuance
Emissions reduction calculation and baseline determination

- According to selected methodology
- Accepted factors utilization
  - IPCC (Intergovernmental Panel on Climate Change)
  - USEPA (United States Environmental Protection Agency)
  - National factors and indicators
  - Global Warming Potential Factors
  - Internationally recognized technical references
Baseline and additionality for CDM projects
Registered CDM Projects (1,662)

Distribution of registered project activities by scope

- (01) Energy industries (renewable / non-renewable sources) (57.64%)
- (02) Energy distribution (0.00%)
- (03) Energy demand (1.08%)
- (04) Manufacturing industries (4.99%)
- (05) Chemical industries (2.53%)
- (06) Construction (0.00%)
- (07) Transport (0.12%)
- (08) Mining/mineral production (0.90%)
- (09) Metal production (0.18%)
- (10) Fugitive emissions from fuels (solid, oil and gas) (7.28%)
- (11) Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride (1.08%)
- (12) Solvent use (0.00%)
- (13) Waste handling and disposal (18.59%)
- (14) Afforestation and reforestation (0.06%)
- (15) Agriculture (5.54%)
Case Study: Flare Gas Recovery and Utilization at Al-Shaheen Field

- **Project description:**
  - Platform flare gas recovery. New gas pipeline required
  - Recovered gas will be used as feedstock in an onshore facility

- **Selected additionality demonstration method:**
  - Barriers
    - Project is not a common practice
    - “One of a kind” project
    - Technological barriers due to project operation
Case Study: Flare Gas Recovery and Utilization at Al-Shaheen Field

- Sector: Exploration and Production
- Date: October, 2006
- Company: Qatar Petroleum, Maersk Qatar Oil
- Country: Qatar
- Estimated emission reductions:
  - 2,499,649 tCO₂e / year
- Approved UNFCCC Methodology: AM0009
  “Recovery and utilization of gas from oil wells that would otherwise be flared”
CDM Projects in PEMEX

- Project identification under way in all four subsidiary companies
- Project Idea Note (PIN)
- Additional cash flow estimation
- Main lines of activity
  - Cogeneration
  - Energy efficiency improvement
  - Reduction in flaring / recovery of gases with high energy content
  - Leak reduction
Conclusions

- Climate change mitigation project development is in line with PEMEX operational safety, energy security and profitability policies.

- CDM projects have a relevant role in this effort, representing examples and developing standards to spread environmental, safety and economic benefits throughout the whole organization.