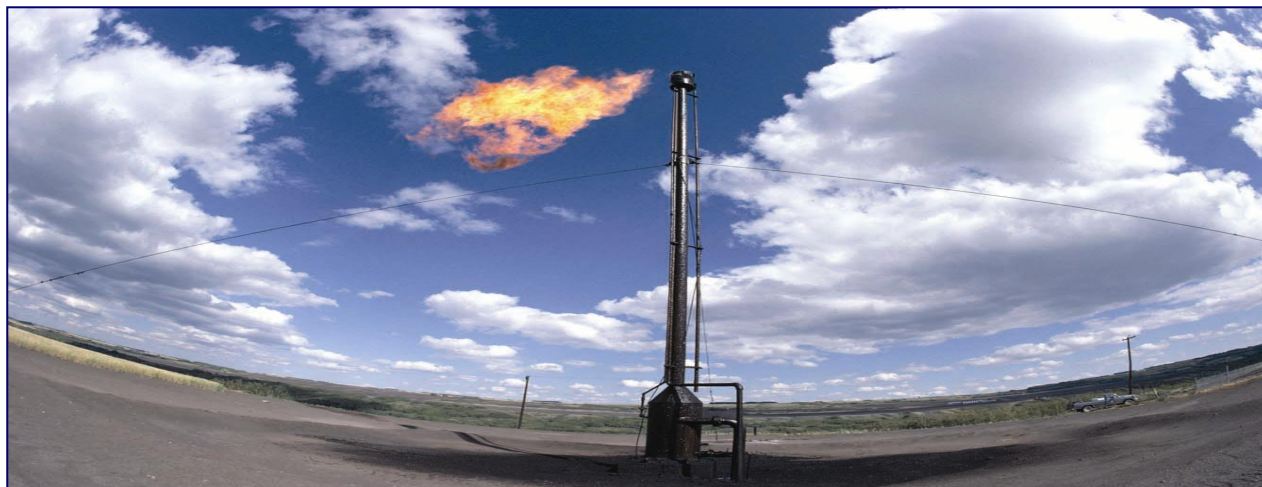


# Joint OPEC/World Bank Group Workshop on Gas Flaring Reduction



Vienna, 30 June – July 1, 2005



**Calliope Webber**



## Overview – GGFR Carbon Credits

- **Carbon credits as global deliverable**
  - Basics & Background
- **Scope of GGFR activity**
  - Overview of GGFR work on carbon credits
  - Rang Dong provides the precedence
  - Project examples, work in progress Nigeria & Indonesia
- **Summary**
- **Sources of Information**
  - GGFR Report No 6 update
  - website

# Kyoto Protocol

- UN Framework Convention on Climate Change
- Industrialized countries (except US, Australia) commit to reduce GHG emissions by 5.2% on average in 2008-12 (vs. 1990)
- Target can be met by:
  - Reducing emissions: CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>
  - CO<sub>2</sub> “sequestration” via land use change and forestry
  - Purchasing ERs from other ratifying countries
    - “Joint Implementation” – Industrialized countries (EEur, FSU)
    - “Clean Development Mechanism” – Developing countries
    - “International Emissions Trading”
- Entered into force on 2/16/05

## Kyoto Protocol: key principles and definitions

Carbon credits enable additional finance to flow to an investment project which demonstrates reduction in Greenhouse gas

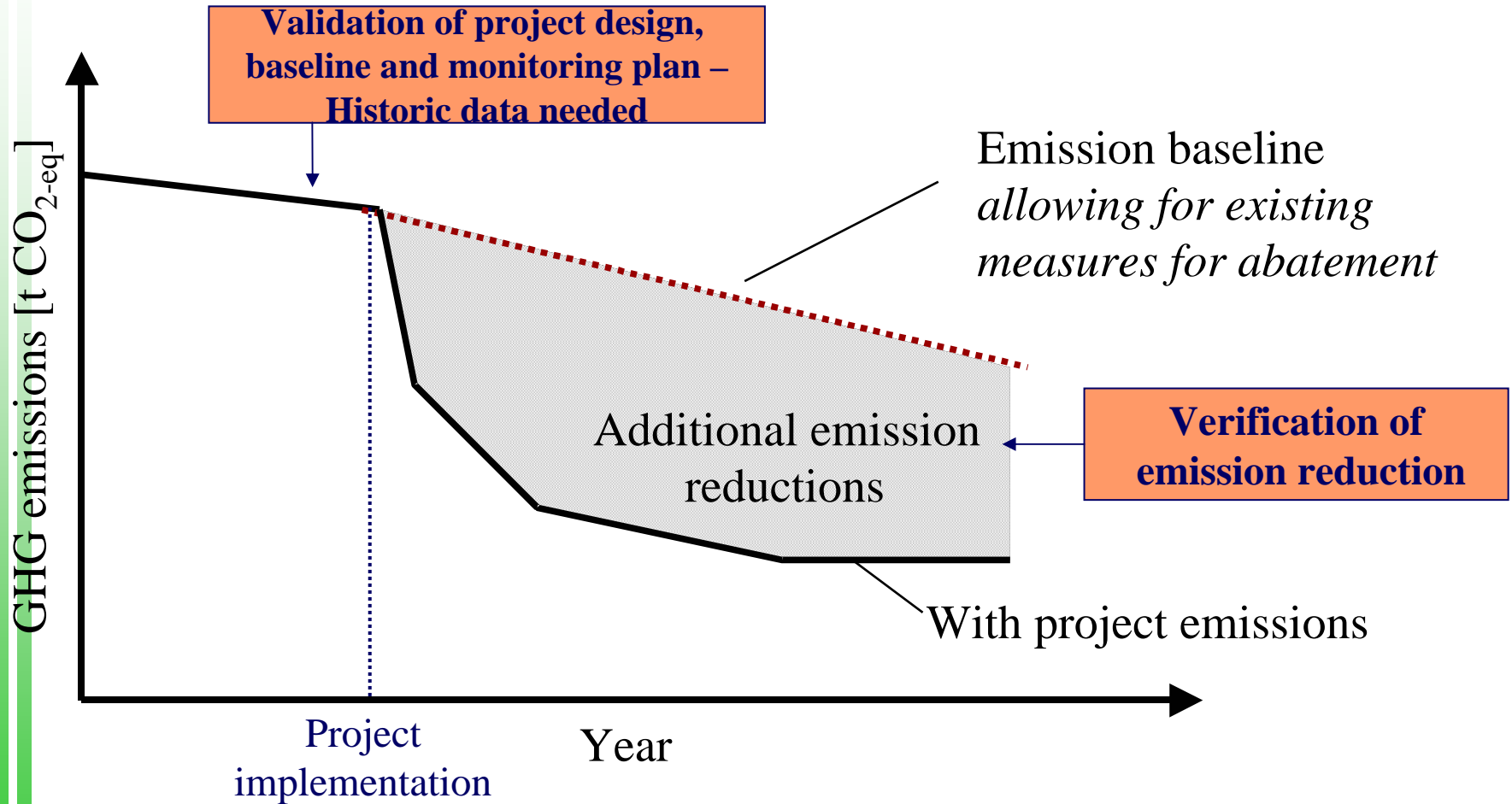
(e.g. carbon dioxide and methane) -

Flare reduction projects are applicable

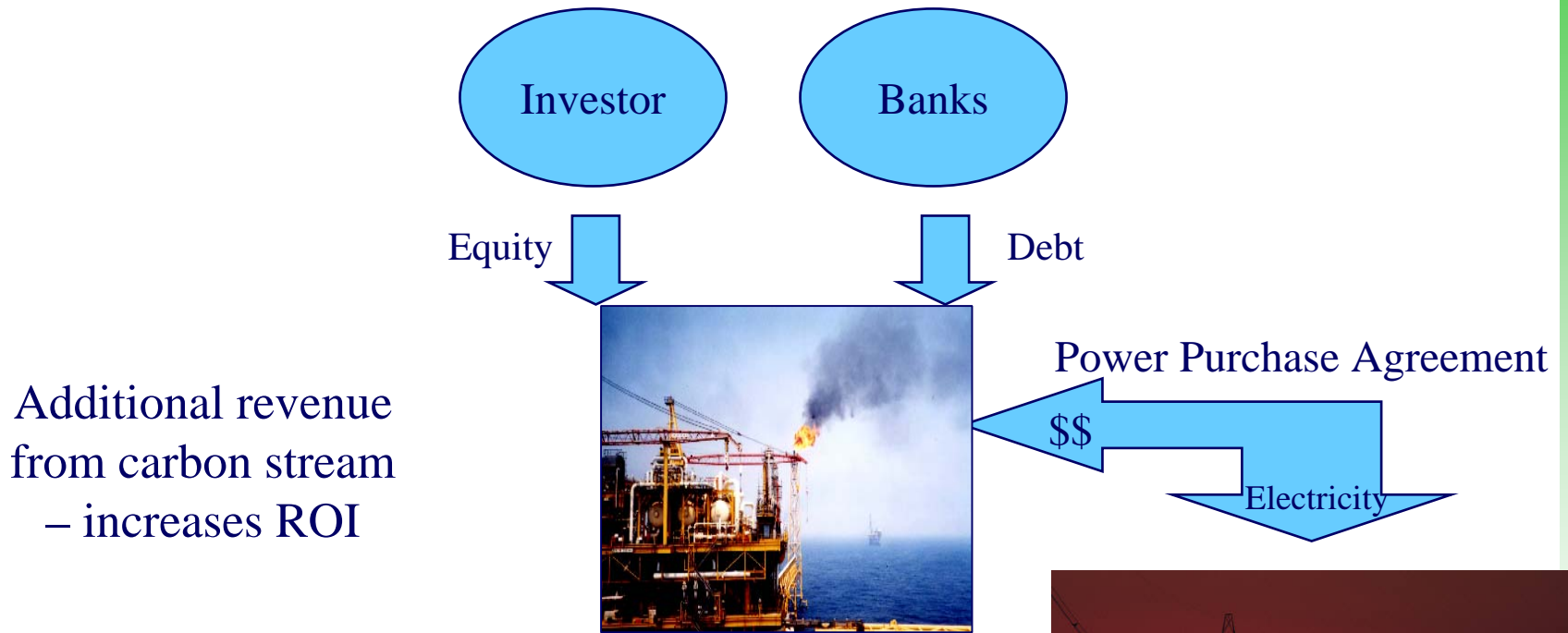
An emissions reduction credit/unit is:

“...any specified amount of Greenhouse gas emissions reduction achieved which can be quantified, verified and owned by a legal entity.” measurement is co<sub>2</sub>equivalent per tonne

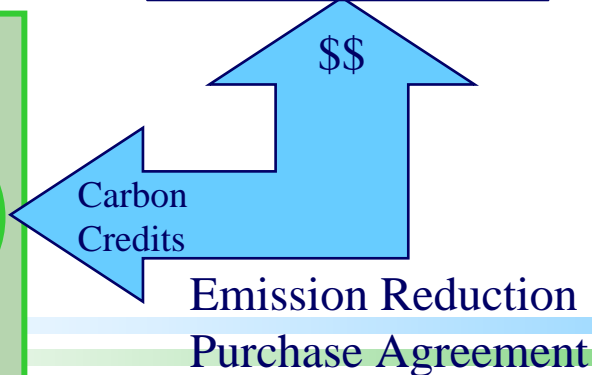
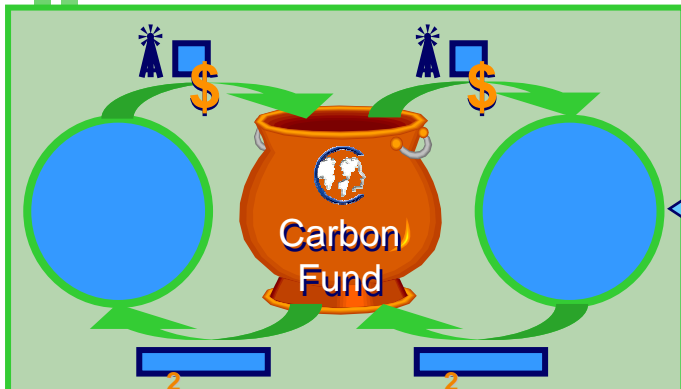
# How to determine Emission Reductions from CDM Projects



# Nature of Carbon Financing Contract



Additional revenue from carbon stream – increases ROI



# Rules

# Project Cycle

# Institutions

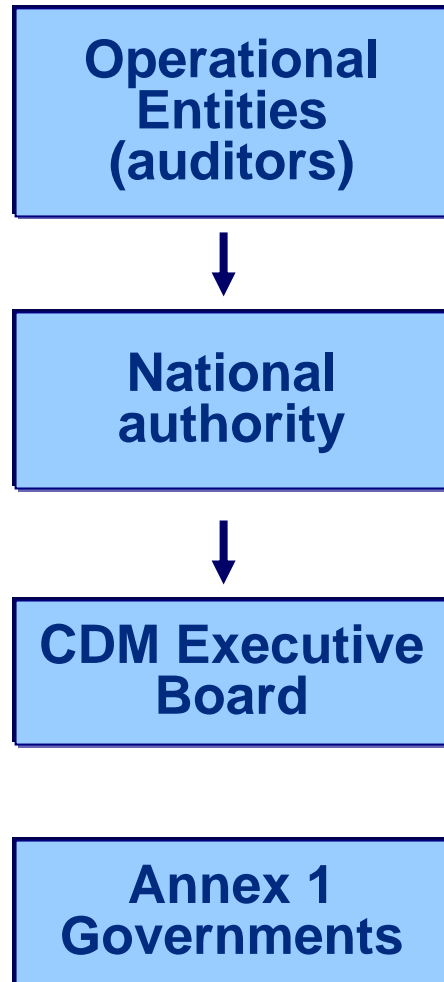
**International**  
Additionality test  
Technically feasible  
Measurable results

**National**  
Sustainable development criteria  
EIA and other legal requirements  
Stakeholders consultations

**Pre-implementation**  
Project development  
Validation and registration

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**Post-implementation**  
Monitoring  
Verification  
Certification  
Issuance of CERs



# GGFR Strategy on Carbon Credits

- Reduce financial barriers through utilization of carbon credits on associated gas projects via
  - demonstration projects
  - institutional capacity building
- Workprogram
  - Assist in designing Financing Mechanisms for Carbon Credits to be realized through:
    - Gas Flaring reduction projects &
    - institutional development

# Offshore Viet Nam, Rang Dong

# Background on Rang Dong

- First of its kind methodology (NM0026)
  - Submitted to Executive Board in Sept 2003
  - No “challenge” from NGOs & stakeholders
  - Recommended for approval by Meth Panel at meeting 4-6th February 2004
- Project participants
  - Japan Viet Nam Petroleum Co
  - PetroVietnam
  - Conoco Phillips Gama Ltd (UK)
- Location
  - Remote location 140 km off shore SE coast of Vietnam

## Background on Rang Dong (2)

- Project has commenced Dec 2001
  - Tests “grandfathering” clauses of Marrakech Accords
  - Great demands on proving additionality
- Fixed crediting period sought (10 years)
- Project generates 6.7m tCO<sub>2</sub>e

# The Project Activity

- **Capital investment programme**
  - **Retrofitting of gas compression facilities to recover & transport AG (9MW unit)**
  - **Construction of 46 km pipeline to a neighbouring field for onward transmission to onshore processing plant**
- **AG processed to**
  - **Dry gas for power (substitutes diesel / natural gas)**
  - **Dry gas for fertiliser production (substitutes imports)**
  - **LPG for home cooking fuel (imported LPG)**
  - **Condensate for octane enhancer of gasoline (imported)**
- **CAPEX \$42m, CER value \$20m@\$3/tCO<sub>2</sub>e**

## Additionality

- Based on economic attractiveness & lack of national laws prohibiting flaring
  - Project would not have been implemented without CERs
  - IRR complex calculation (not just size of field)
  - 8-9% against hurdle rate of 10%
  - Para 48(b) of CDM modalities and procedures
- Proximity of IRRs cause of concerns, further information & justification sought
  - Costs and revenue categories
  - Sources of data & transparency of assumptions
  - Justification of IRR threshold requested
  - General comment on transparency - spreadsheet

# The Baseline

- Baseline
  - Flaring
  - In-house combustion of AG (small proportion)
- Emission reductions achieved through
  - Utilising gas, compressing and processing to LPG, condensates & dry gas
  - Gas products displace same or other fossil fuels in various downstream applications
  - Emission reductions are total  $C_{AG} - C_{\text{gas products}}$

# General Approach

- Investment or scenario analysis based
  - Identify all plausible project alternatives
  - Include BAU, proposed activity & all options which meet local legal & regulatory requirements
  - After applying legal, technical & economic barriers
  - Calculate risk adjusted IRR (or NPV) and rank
- Highest IRR (or NPV, or least cost) option is selected as baseline
- Current practices usually form baseline
- *Key : Demonstrate through use of methodology that project activity is not the baseline*

# Assessment of Development Options

Development Options	Rang Dong
Venting (release to atmosphere)	Prohibited by law in Vietnam
Re-injection in oil reservoir for EOR	Technically feasible but water injection cheaper & more efficient
Recovery, transport & use (project)	Judged to be commercially unattractive
Local (on-site) consumption	Current practice (small)
Flaring (conversion to CO <sub>2</sub> )	Current practice

# Strengths & Weaknesses

- Strengths
  - Relatively simple and clear
  - Regarded as conservative (100% flaring)
  - Data availability and accuracy generally good
  - Widely applicable in region and internationally
- Weaknesses
  - Baseline emissions from oil production may be variable (overcome through measurement)

# Nigeria – Work in Progress

## Nigeria - Today's Situation

- Nigeria has acceded to the Kyoto Protocol.
- The Ministry of Environment remains the focal point for the climate change activities while the PIC-CDM remains focused on the CDM.
- The Presidential Implementation Committee on Clean Development Mechanism (PIC-CDM) was set up in Jan. 2004 to be a precursor to the Designated National Authority. This was necessary to allow the process of crafting the law and the instruments to go through the normal legislative process.
- The PIC-CDM is already processing three + project PINs.

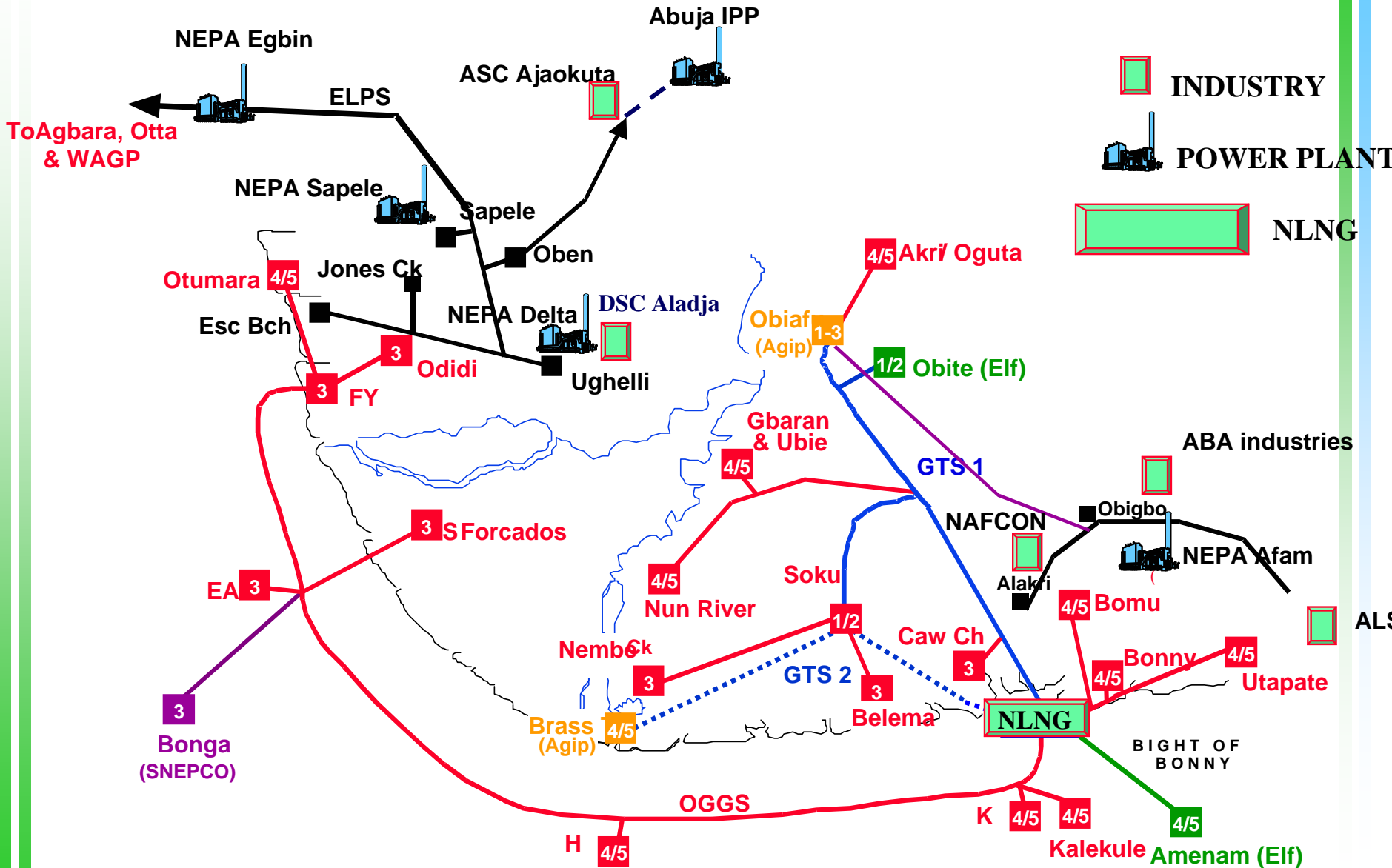
## PIC-CDM Goal and Objective

- The Goal of the PIC-CDM is to make Nigeria a major centre of sourcing robust CDM projects in Nigeria.
- Our objective is to encourage projects that are environmentally robust with emphasis on a least cost option.
- To encourage Nigerian Business to engage in unilateral CDM projects in Nigeria and the West African Region.

# Target sectors for CERs

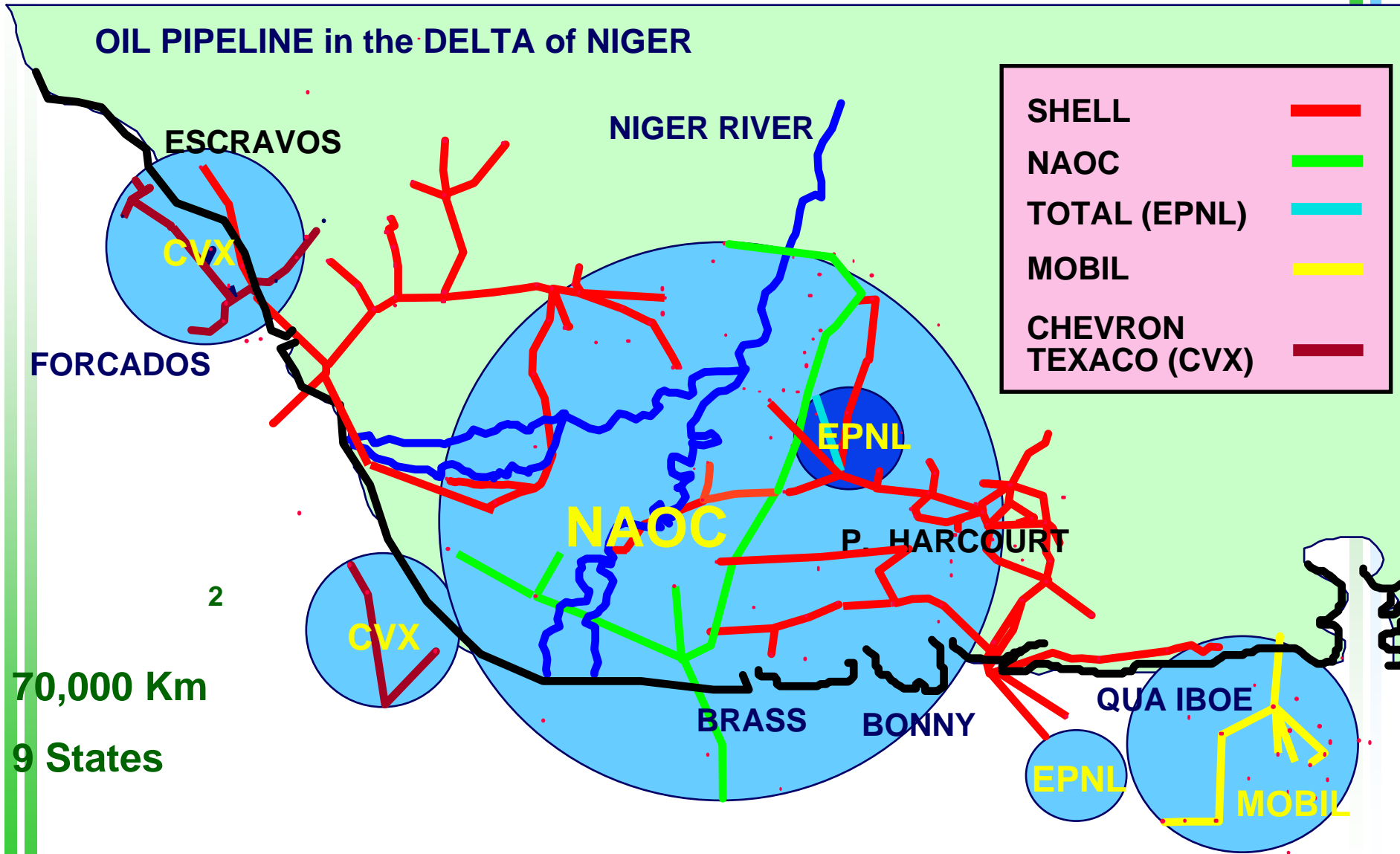
- **Petroleum sector**
  - Gas flaring reductions (GGFR project with PICCDM)
  - Leakage from petroleum infrastructure
  - Efficiency and environment improvements in refineries
- **Industry sectors**
  - Fuels switching to natural gas
  - Power & Cement industries –efficiency improvements
  - Food processing – efficiency improvements and fuel switching
  - Palm oil effluents
- **Waste management sector**
  - Municipal Solid Waste – for flaring or energy use
- **Renewable energy**
  - Small scale hydro
  - Biomass generation
  - Solar PV
  - Wind energy (coastal area and far north)
- **Re-forestation**
  - Shelter belt

# Markets and Infrastructure



# NIGER DELTA – Gas Infrastructure

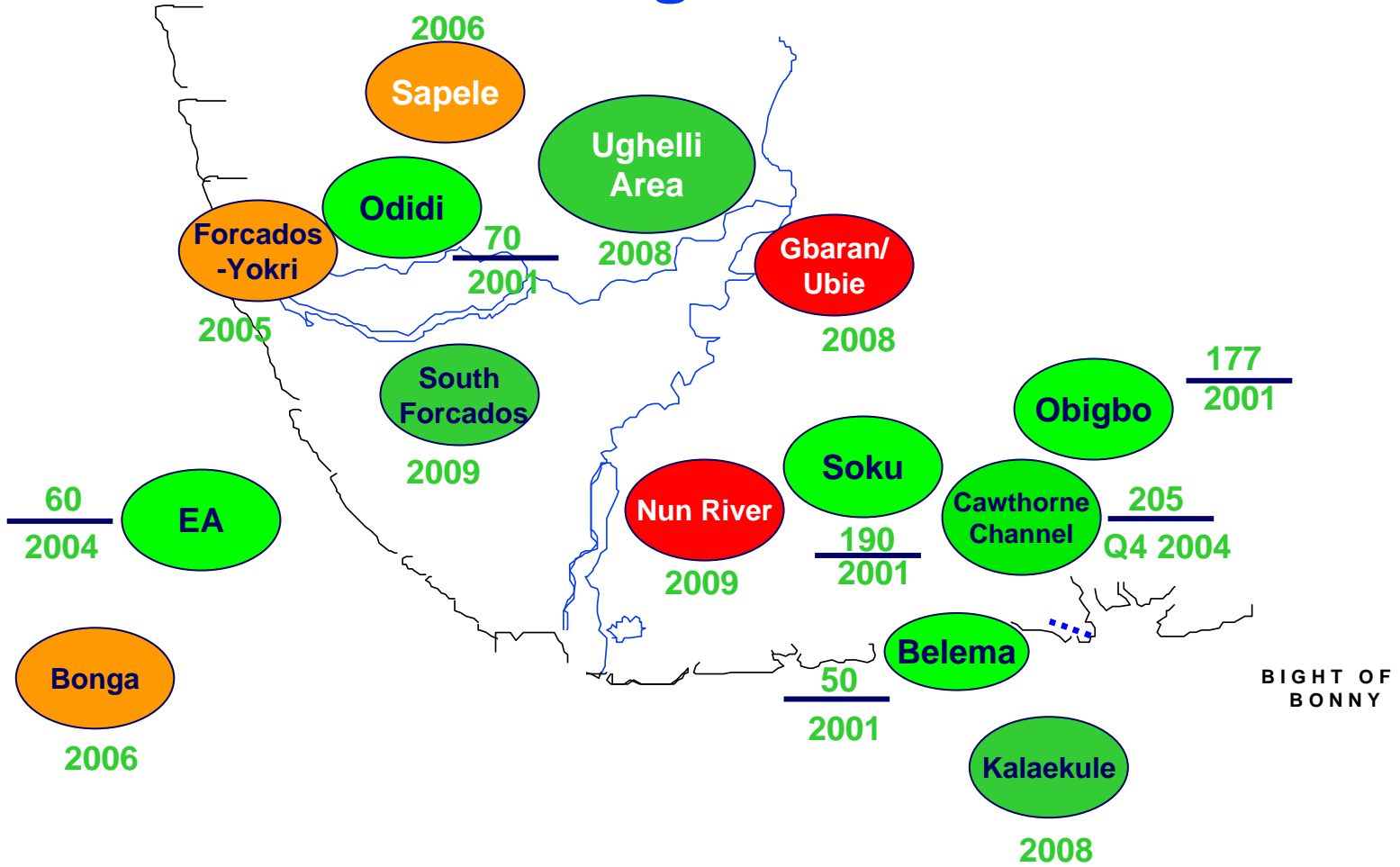
OIL PIPELINE in the DELTA of NIGER



# Example of Potential Flares Out Programmes

Flares out Data

- Currently on
- 2005 - 2006
- 2007 - 2008



# The Afam Project

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## ■ Power Project

- Replacement of old GT units (I-IV) with new CCGT units (VI)
- Take-over (bring up to required condition) and operation of existing GT units (V)

## ■ CDM Project

- Displacement of low efficiency capacity (small diesels) with higher efficiency CCGT reducing carbon intensity of electricity generation
- Use of Associated Gas for part of fuel supply (GGFR)
- Supply of electricity to local market
- Private and Public Participation



# Afam CDM – Background

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- Afam has potential to qualify for CDM through economic displacement of less efficient diesel-fired distributed generating equipment
- Afam could also qualify as a Global Gas Flaring Reduction (GGFR) project because of the associated gas in the fuel mix
- Endorsement of Afam as a GGFR Demonstration Project using the CDM by World Bank (WB) & GGFR Partnership was confirmed end 2004
- Afam will provide a source of cleaner and lower carbon intensity electricity using predominantly high efficiency CCGT, than the alternative options. This electricity is much needed in Nigeria.
- Development of CDM process in Nigeria would provide valuable capability building for Nigeria for future CDM opportunities



# Working with the World Bank

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- Shell and World Bank are both members of the GGFR Partnership, with common goals and complementary skills and experience.
- WB will facilitate Capacity building in Nigeria to build CDM expertise
- WB has objective criteria for SD definition and targets. SD criteria are inherent constituent of CDM creation.
- Working together provides an opportunity to explore and develop practical solutions for AG utilisation and its treatment within the CDM
  - Valuable learning for Shell and Partners in Nigeria



## Other Gas Strategies

- West African Gas Pipeline. Here flare reduction may take place upstream in Nigeria while downstream CDM activities may take place in other countries.
- Supply of gas to LNG plants (Trains 1 to 6) while preparing for future expansion.
- Elimination of gas flaring by 2009 for old fields while a no flaring policy is a requirement for new projects.

# Indonesia – Work in Progress

## Indonesia – Work in Progress

- Indonesian GGFR Capacity Building Project
- Potential for flaring projects as CDM candidates in Indonesia
- Implementation issues – in particular, carbon ownership
- Options to address ownership issues

# GGFR Assistance to Indonesia

## - CDM Project

- “Carbon Finance Development for Flare Reduction Projects”
- Launched February 2005
- To be completed by March 2006
- SOFRECO (France), Natsource (Canada) and CER Indonesia plus Indonesian advisors

# Indonesian Gas Flaring Reduction Opportunities

- Sixth largest LNG producer and exporter in the global gas market
- Largest natural gas reserve in Asia-Pacific
- Large oil producer with associated gas as a by-product
- Large potential for flare reduction and utilization (136.2 BSCF flared in 2003)
- Potential reduction of 8-10 million tonnes CO<sub>2</sub>e annually

# Indonesian Gas Flaring Reduction Opportunities (continued)

- Indonesia is in the top 10 gas flaring nations
- The productive use of flared gas would correspond to
  - The fuel supply to 4.6 GW of baseload power generation capacity worth an investment of \$3-4 billion
  - The generation of 30 TWh of electricity worth over \$1 billion at wholesale price

# Status of CDM in Indonesia

- Ratified Kyoto Protocol Dec 3, 2004
- DNA nearly established
- National Commission for CDM
- Sustainable development criteria articulated
- Process for CDM project approval articulated but,
- Limited CDM project pipeline (~ 8 Mt/year currently under CDM development)

# Issues Related to CDM and Gas Flaring in Indonesia

- Cooperation contract agreements between Government of Indonesia (GOI) and contractors govern the oil & gas development
  - Production Sharing Contracts (PSCs) grants ownership rights and defines revenue sharing and contract operations
- A gap for new products / byproducts
- Key issue is ownership of carbon assets
  - Adding CDM element to an existing PSC would require re-negotiation with no precedents to date

# Issues Related to CDM and Gas Flaring in Indonesia (continued)

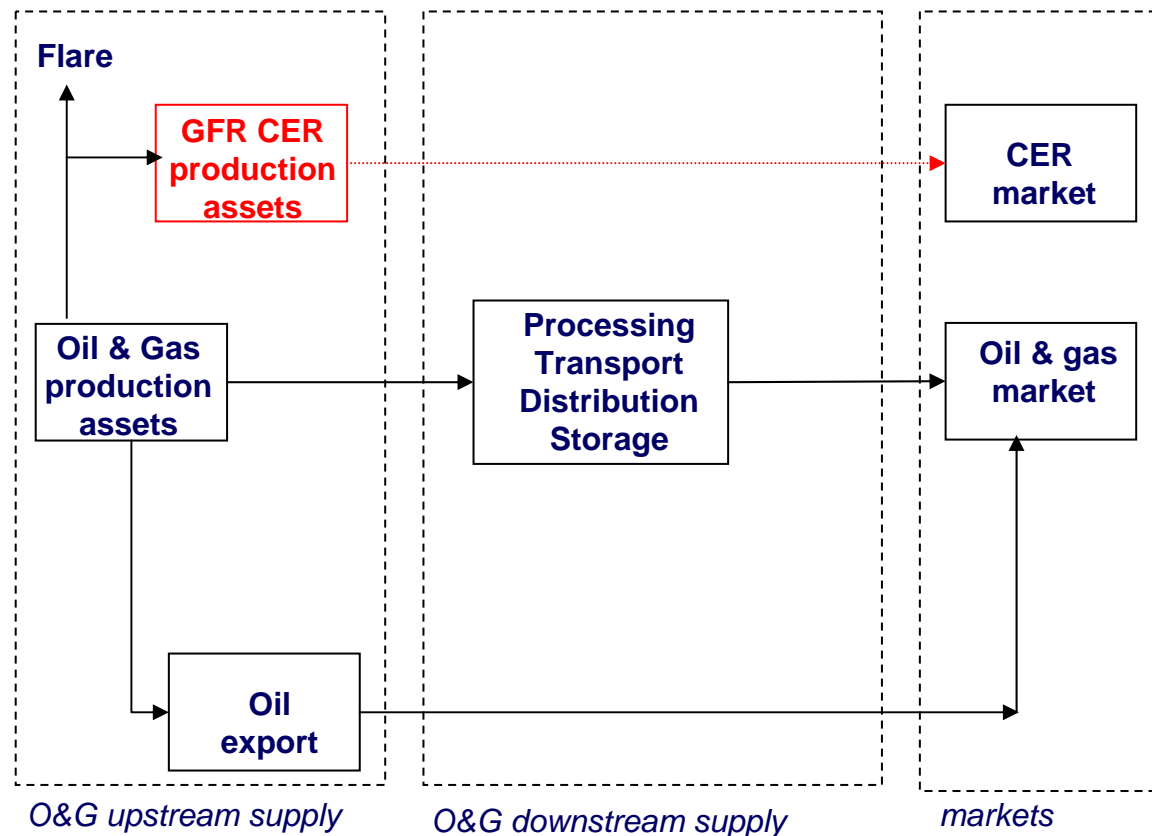
- 2001 law established new Implementation agency (BP MIGAS) to award Production Sharing Contracts and regulate upstream activities
- New regulatory agency (BPH MIGAS) to regulate downstream activities
- A CDM gas flaring reduction project that collects and markets the associated gas would need to deal with both upstream and downstream
- There is an ambiguity on the operational guidelines
- RESULT:
  - Investors in gas flaring reduction projects are without clear vision on their financial recovery
  - Potential developers are on stand-by, waiting for guidelines

# Alternative Principles for CER Ownership

- Treat CERs as a natural resource
  - Results in the state becoming the sole owner of the CERs with possibility of sharing among project developers in accordance with a future government regulation – could take a long time
- Treat CERs as a commodity
  - CERs classified as a “product derived from a natural resource”
  - Implies that project proponents are entitled to benefits accrued from the CERs – but what is the basis for ownership and revenue sharing as well as liability distribution?
  - Classically the companies investing in gas flaring reduction would have accrued these benefits

# Options for Ownership and Revenue Sharing

## 1. Sharing Based on Current Production Sharing Contract

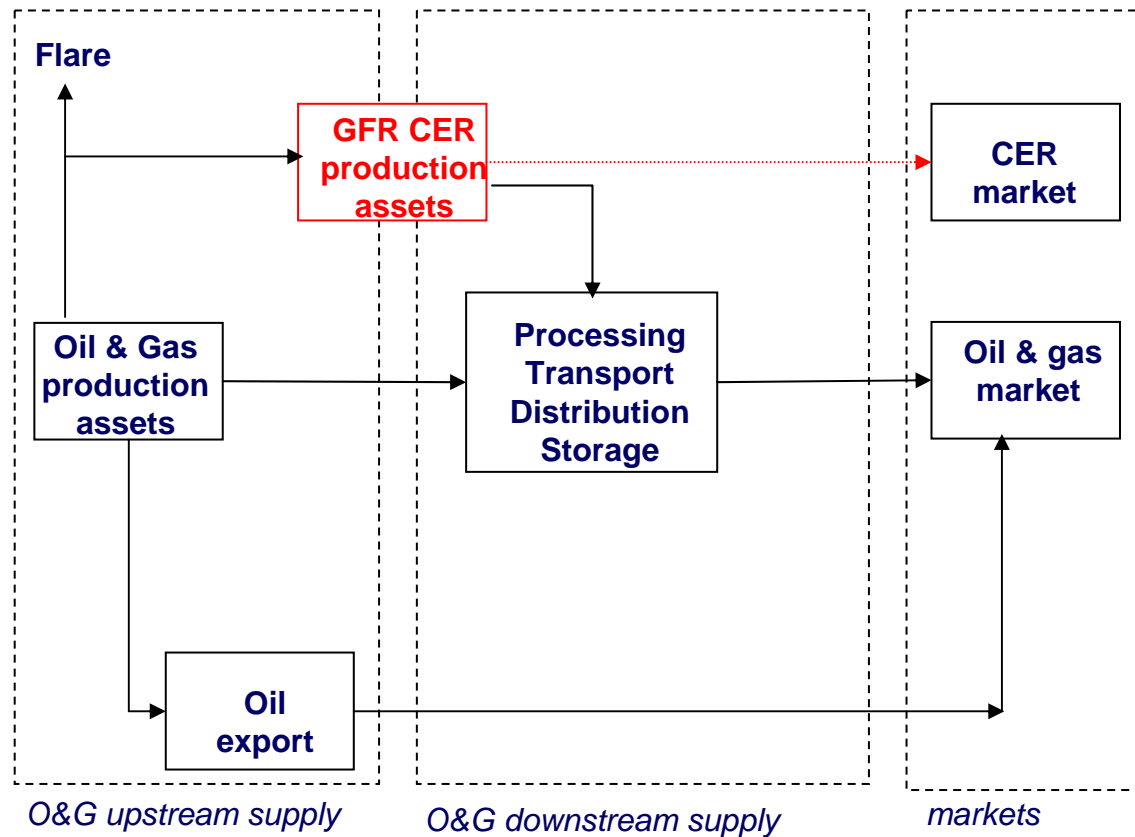


# Options for Ownership and Revenue Sharing

1. Sharing Based on Current Production Sharing Contract
  - Applicable for upstream projects (e.g. gas re-injection and gas utilization for own consumption)
  - Complications could arise from definitions of “cost recovery” and “investment” in Indonesian Law resulting in Government claiming the full title of CERs

# Options for Ownership and Revenue Sharing

## 2. Sharing Built on a Separate Voluntary Agreement



# Options for Ownership and Revenue Sharing

## 2. Sharing Built on a Separate Voluntary Agreement

- Applicable for downstream projects (e.g. recovery and marketing of gas for sale in downstream market)
- Separate joint venture established for CDM portion of project
- Proponents share CERs in same ratio as equity investment to the joint venture
- Leads to clear delineation of responsibilities and liabilities
- But, it requires negotiation of a parallel agreement which could hinder progress of the project

## Next Steps for Indonesia

- Options paper continues to be developed through discussions with stakeholders to Indonesia
- Capacity building sessions to develop and screen PINs
- Ongoing policy/ regulatory development in Indonesia with assistance from World Bank GGFR and project consortium

Sum up

## Overall Conclusion

- **The Flexible Mechanisms (JI/CDM) is a financial tool initiated under the Kyoto Protocol to facilitate the transfer of “clean” technology between countries in return for emissions reduction credits**
- **OPEC countries as well as others has the opportunity to capitalise in technology upgrades and flare reduction technologies which the mechanism would deliver**
- **Use of associated gas currently flared is an opportunity to utilise gas more effectively via the mechanism in an economic and sustainable manner**
- **The environmental and economic benefits KP can bring to participating countries are large and sustainable in the long-term**

## Overall Summary

- Kyoto mechanisms is driver for new flare reduction projects –
- Several countries are active - National procedures and projects need to be synchronized
- Not funding but project pipeline which is holding up the delivery of CERs
- Industry engaged but not linked with emerging processes
- GGFR active via demonstration projects with its Partners in finding projects to be eligible for participation in KM
- GGFR testing new issues eg ownership and policy development to remove barriers, reduce transaction costs and lead the way forward.