



CDM Guide Book for Oil & Gas Sector

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Background



- Context
- Purpose – one-stop document for project developers in oil & gas sector
- Guide book includes decisions made to date; future additions may be added





Guide Book outline



- Chapter 1: Introduction
- Chapter 2: CDM Institution
- Chapter 3: CDM Project Requirements & Project Cycle
- Chapter 4: Baseline Methodology & Monitoring Methodology
- Chapter 5: Types of CDM projects in oil & gas sector
- Chapter 6: Example of Application of a Baseline Methodology
- Chapter 7: Specific Issues in Oil & Gas sector





CDM Institutions

- a) COP/MOP - high authority
- b) Executive Board – CDM Supervisory Body:
 - Make recommendations to the COP/MOP on further modalities and procedures for the CDM
 - Approve new methodologies
 - Accredite operational entities
 - Register a validated project as a CDM project
 - Develop and maintain the CDM registry
 - Issue verified CER for a CDM project activity





CDM Institutions (2)



- c) Designated National Authority (DNA):
- each Party (i.e. both Annex 1 and non-Annex 1 countries) participating in the CDM
 - project that does not have an Annex-1 participation by the time of registration is allowed to proceed – when finds a buyer, an approval from respective DNA is required
- d) Designated Operational entity (DOE) – to validate project or verify/certify CER
- Unless small-scale projects or granted by EB, same DOE cannot conduct both validation & verification of the same project
 - List of accredited DOEs per sectoral scope:
<http://cdm.unfccc.int/DOE/scopes.html#10>
- e) Project Participants : Government institutitons, Local government/Municipalities, Private companies, NGOs, community groups, or Financial institutions





CDM Institutions (3)



f) CER buyers/investors

Multilateral Carbon Managers	Annex-1 Countries Carbon Fund Managers
<p>Bio Carbon Fund*</p> <p>Climate Change Capital Carbon Fund</p> <p>Community Development Carbon Fund*</p> <p>European Carbon Fund</p> <p>FE Global-Asia Clean Energy Services Fund</p> <p>Greenhouse Gas – Credit Aggregation Pool</p> <p>Grey K Environmental Fund LP</p> <p>KfW Carbon Fund</p> <p>Merzbach Carbon Financing</p> <p>Multilateral Carbon Credit Fund</p> <p>Private Energy Market Fund</p> <p>Prototype Carbon Fund*</p> <p>Trading Emissions Plc</p> <p>Umbrella Carbon Facility*</p>	<p>Austrian CDM Project and CER Sale Facility Agreement & Austrian JI/CDM Programme</p> <p>Belgian JI/CDM Tender</p> <p>CAF-Netherlands CDM Facility, IFC-Netherlands Carbon Facility, Netherlands Clean Development Mechanism Facility, Netherlands Emissions Reduction Co-operation Funds, Netherlands European Carbon Facility & Rabobank-Dutch Government Carbon facility</p> <p>Japan Carbon Facility & Japan Greenhouse Gas Reduction Fund</p> <p>CAF-Spain Carbon Initiative & Spanish Carbon Fund</p> <p>CERUPT</p> <p>Danish Carbon.dk Public Procurement Programm & Danish Carbon Fund</p> <p>Ecosecurities and Standard Bank Carbon Facility</p> <p>Finnish CDM/JI Pilot</p> <p>Swedish JI/CDM Programme</p>





CDM Project Requirements

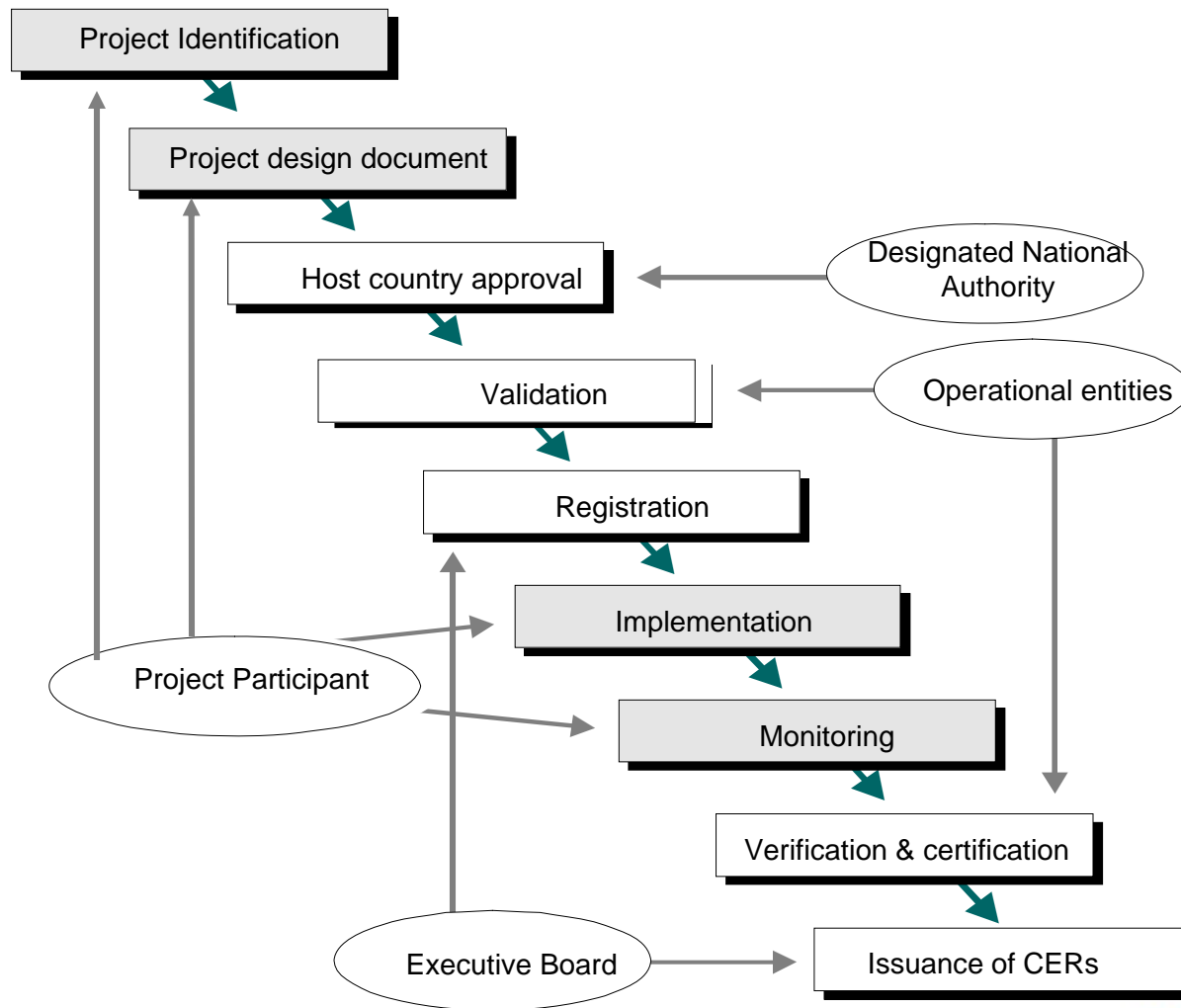


- Dual objectives: reduce GHG emissions & contribute to sustainable development
- Voluntary
- Real, measurable, long term reduction
- Additional: *“emissions... are reduced below those that would have occurred in the absence of the registered CDM project activity.” (Para 42 Marrakech Accord)*
- No diversion from ODA funding
- Share of proceeds to cover Adaptation and Administration
- No CERs from nuclear facility





CDM Project Cycle





Registration



- Registration fee = advance payment of the SOP-Admin for the emission reductions achieved during the first year.
 - SOP-Admin is USD 0.10/CER issued for the first 15,000 tCO₂ and USD 0.20/CER issued for any amount > 15,000 tCO₂, for which issuance is requested in a given calendar year
 - Maximum registration fee USD 350,000
 - No registration fee for CDM projects with annual emission reduction over the crediting period < 15,000 tCO₂
- If an activity is not registered, any registration fee above USD30,000 shall be reimbursed.

DOE submits request for registration, registration fee paid



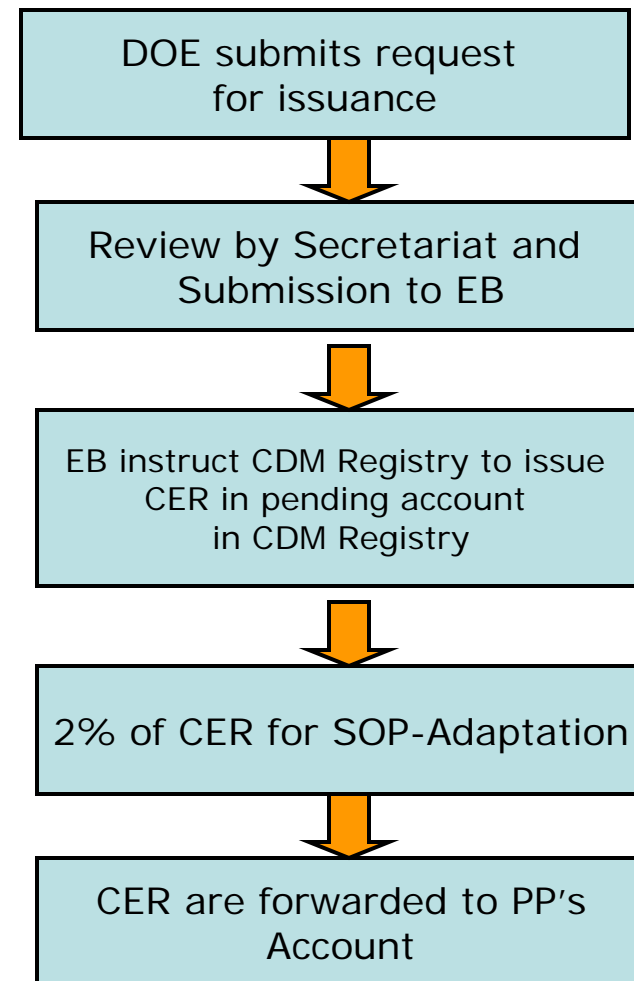
Review by Secretariat and Submission to EB



Within 8 weeks after date of receipt, project will be registered, unless there is request for review

Issuance of CERs

- Process:
 - Within 15 days after date of receipt EB will instruct CDM Registry to issue requested CERs, unless there is a request for review
 - SOP-Admin must be received; registration fee is deducted from SOP-Admin





CDM Transaction Costs (for regular projects)



Project cycle step	Cost (\$)
Project preparation and assessment	10,000-20,000
Project Design Document & Monitoring Plan	20,000-30,000
New Baseline methodology	15,000-20,000
Validation	10,000-20,000
Registration with EB	0.10/CER issued for first 15,000 tCO₂ requested issuance, and 0.20/CER issued amount in excess of 15,000 tCO₂, up to 350,000
CER purchase negotiation and transaction	15,000-25,000 (or % of CER value)
Verification & Certification	10,000-25,000





CDM Project timeline

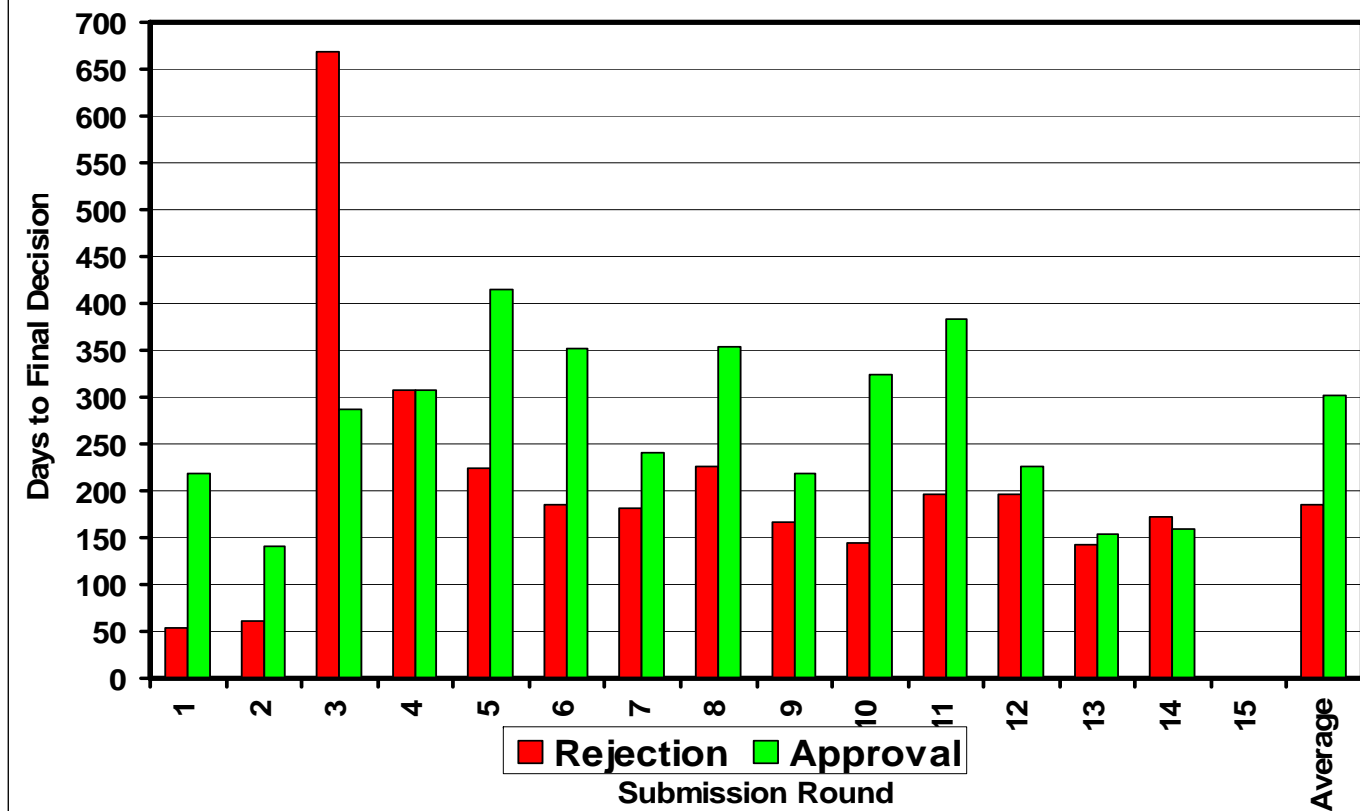


Project cycle step	Time required
Project preparation and assessment	1-2 months
Project Design Document & Monitoring Plan	1-3 months
New Baseline methodology	3-10 months
Validation	~2 months *
Registration with EB	8 weeks
CER purchase negotiation and transaction	1-3 months

* Longer time if LoA from host country is not ready. Average delay is 4.5 months (UNEP Risoe, Aug 2006)



Average time to final decision from the date of initial methodology submission



Source: UNEP Risoe CDM Project Pipeline, Aug 2006



Baseline & Monitoring Methodology



- Project developers can propose new methodology or use an approved methodology
- Approved Baseline Methodology in O&G sector:
 - AM0009 ver2: Recovery and Utilization of Gas from Oil Wells that otherwise would be flared
 - AM00023: Leak Reduction from Natural Gas pipeline compressors or gate stations
- Components of Baseline methodology:
 - Baseline approach
 - Baseline scenario
 - Additionality
 - Project Boundary
 - Leakage





Baseline Approach



- Basis of selecting baseline
- Selected based on paragraph 48 of CDM Modalities & Procedures (COP Decision 17/CP.7). 3 baseline approaches:
 - a) Existing actual or historical emissions, as applicable; or*
 - b) Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment; or*
 - c) The average emissions of similar project activities undertaken in the previous five years, in similar social, economic, environmental and technological circumstances, and whose performance is among the top 20 per cent of their category.*
- Rationale of choice is explained in PDD



Baseline Scenario

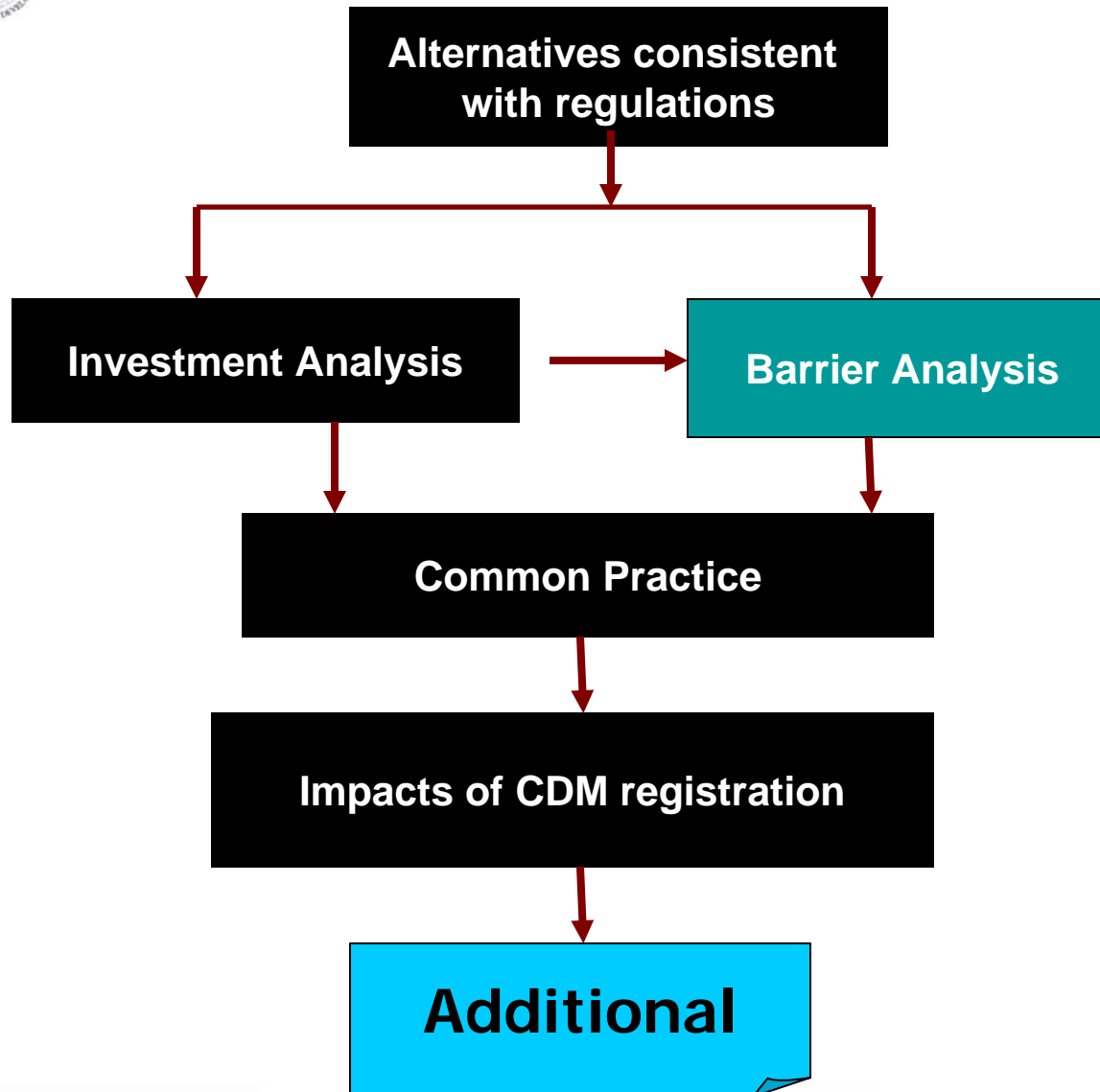


- Plausible scenario of GHG emissions in the absence of proposed CDM activity
- May be more than one, including Business-As-Usual (BAU)
- Takes into account aspects: regulatory, technology, investment, etc.
- Principles:
 - Transparent
 - Conservative





Additionality assessment





Note on Additionality



- Alternative scenarios must be realistic and credible
- Investment Analysis:
 - All key economic and technical parameters and assumptions used must be clearly presented in the PDD
 - A positive NPV or high IRR is not necessarily implying non-additionality
 - During validation the DOE is entitled to ask for an NPV or IRR assessment even though this step is not selected



Note on Additionality (2)



- **Barriers can be in the form of:**
 - Financial/Economic barriers, such as difficulty in accessing funding, local market, etc
 - Technology barriers
 - Project is first of its kind
 - Others, e.g. organizational limitations
- **Common Practice:** there is no specific guidance on the definition of common practice → analysis of public, official recent data is recommended



Project Boundary & Leakage



- Project boundary is drawn to include all GHG anthropogenic emissions sources under control of project participants – geographical or physical boundary
- Leakage : emissions that occur outside project boundary but can be measured and directly attributable to CDM project activity
- Other terms used: direct and indirect, on-site and off-site emissions (optional)



Illustration of sources of emissions



	Direct	Indirect
On-site	GHG emissions due to gas consumption during recovery, transport and processing of gas Fugitive emissions during recovery, transport and processing of gas GHG emissions due to consumption of additional fuel required to support the CDM process	GHG emissions from construction or installation of recovery, transport, and processing units
Off-site	GHG emissions due to use of products (from processing plant) by end-users GHG emissions due to transporting of products (from processing plant) to end-users GHG emissions due to transport of equipments/units	GHG emissions due to fuel combustion to support oil production



Crediting period



- Crediting period starts after the date of registration of CDM project
- Total anticipated crediting period for both options must not be longer than the expected project lifetime
- Rule of thumb: start the crediting period minimum four months after the start of validation
- 10 (fixed) vs. 3x7 (renewable) :
 - 3x7 yrs gives higher financial gain; but
 - Validity of baseline must be reviewed in each crediting period





Monitoring Methodology



- Monitoring Plan contains description:
 - Parameters that need to be monitored
 - Measurement/estimation/calculation methods
 - Standards used (recommended national or international standards)
 - Monitoring frequency
 - Portion of data to be monitored
 - Data recording (electronic, manual)
 - Estimation of leakage





Monitoring methodology (2)



- Validation places emphasize on the quality and actual applicability of the Monitoring Plan described in the PDD
- Management procedures for implementing the Monitoring Plan is important
- DOE carries out verification of the authenticity of the uncertainty levels and instruments during Verification stage



Types of CDM projects in O&G sector



- Sectoral Scope 10: Fugitive emissions from fuels (solid, liquid, gas), e.g. leak reduction in NG pipeline or compressor, flare reduction
- Flare reduction types of activities:
 - Re-injection of associated gas
 - Gas utilization on-site
 - Collection and market to downstream markets
- Carbon dioxide Capture & Storage (CCS)





Re-injection of associated gas



- a) Gas is stored in buffer reservoir to cater fluctuations in consumption → not causing additional GHG emission reduction
- b) Gas is temporarily stored in a reservoir to leave time for development of a future gas valorisation project to be completed without postponing development → gas storage+delayed utilization maybe eligible as CDM



Re-injection of associated gas (2)

- c) Gas injection into a reservoir for permanent storage purpose → similar to CCS, concerns: permanence & safety
- d) Gas injection for enhancing oil recovery (EOR) → may qualify as CDM project, concerns: difficult to assess balance of gas, may improve economics without significant GHG reduction



Carbon dioxide Capture & Storage (CCS)



- Essentially is the capture of CO₂ from large stationary sources, its transportation to an appropriate injection site where it is pumped into underground geological formations (aquifers, depleted oil reservoir)
- Example: Sleipner gas storage in North Sea
- Global geological capacity estimates: 1,700-2500 Giga tones CO₂ – how much effectively can be used as CO₂ storage is still uncertain



• Issues:

CCS (2)



- High cost
- Public perception on its safety (leakage) & permanence
- Sequestration under KP does not include CCS
- Two new methods on CCS have been proposed:
 - The White Tiger Oil Field Carbon Capture and Storage in Vietnam, and
 - Capture of the CO₂ from the LNG complex and its geological storage in the aquifer located in Malaysia
- Meth Panel are assessing these methodologies and will advise the Board recommendation for decision by COP/MOP 2





Application of Approved Baseline methodology - Illustration



- Baseline methodology using approved methodology AM0009 ver2, with applicability:
 - Gas at oil wells is recovered & transported in pipelines to a process plant
 - Energy for transport & processing of recovered gas is generated using recovered gas
 - In the absence of project activity, gas is mainly flared
 - Products are likely to substitute in the market the same type of fuels or fuels with higher carbon content
 - Substitution of fuels due to project activity is unlikely to lead to an increase in fuel consumption





Baseline Scenario



- Option 1: Release to the atmosphere at the oil production site (venting).
- Option 2: Flaring at the oil production site.
- Option 3: On-site consumption.
- Option 4: Injection into the oil reservoir.
- Option 5: Recovery, transportation, processing and distribution to end-users.





Analysis of Options



	Legal	Economic Attractiveness	Conclusion
Option 1: Venting to atmosphere	Prohibited	Highly attractive	Not implemented
Option 2: Flaring on site	Not prohibited	Highly attractive	Current practice
Option 3: On-site consumption	Not prohibited	Highly attractive	Current practice
Option 4: Injection into oil reservoir	Not prohibited	Highly unattractive	Not implemented
Option 5: Recovery, transport, and distribution to end users	Not prohibited	Unattractive	Not implemented





Specific Matters: CER Ownership & Sharing



Option 1: CER owned by government, but CER revenue is shared through existing or amended PSC agreement

Option 2: CER not shared, but incentive is applied for CDM investment

Option 3: Sharing Built on a Separate Voluntary Agreement

⇒ Preferred option may depend on the type of activity.





Thank you

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Identified Options for CER ownership and sharing



1. CER owned by government, but CER revenue is shared through existing or amended PSC agreement

- Upstream projects - GHG emissions reduction installations are set up within the oil and gas production facility
- Contractor will benefit from the additional gas used according to the existing PSC, and revenue from CER through oil/gas profit share
- Avoid having 2 parallel contracts
- In practice blending the CER revenue stream into oil/gas profit could be complicated - may require establishment of escrow accounts to be managed by project participants





Options for CER ownership and sharing (cont'd)



2. CER not shared, but incentive is applied for CDM investment

- No change in PSC split ratio
- Special incentive (credit provision) to encourage CDM investment (e.g. similar to incentive for frontier areas)
- May facilitate faster process and increase active PSC participation
- Challenge: agreement on size of the incentive



Options for CER ownership and sharing (cont'd)



3. Sharing Built on a Separate Voluntary Agreement

- 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
 - Ownership share based on funding share
 - But, it requires negotiation of a parallel agreement which could hinder progress of the project