

# Case study issuance: Landfill gas

**UNDP training course  
Tashkent, May 14, 2009**

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## Overview of review of issuances

- **17 projects reviewed so far**
- **Total CER reduction by reviews: 121,136 CERs**
  - **20% no issuance! (15,000 – 45,000 CERs)**
  - **10 below 1,000 CER reduction**
- **Average delay: 111 days**
  - **Min: 26, max: 355**
- **Duration of delay shows no correlation**
  - **with EB decision date**
  - **with reasons for review**



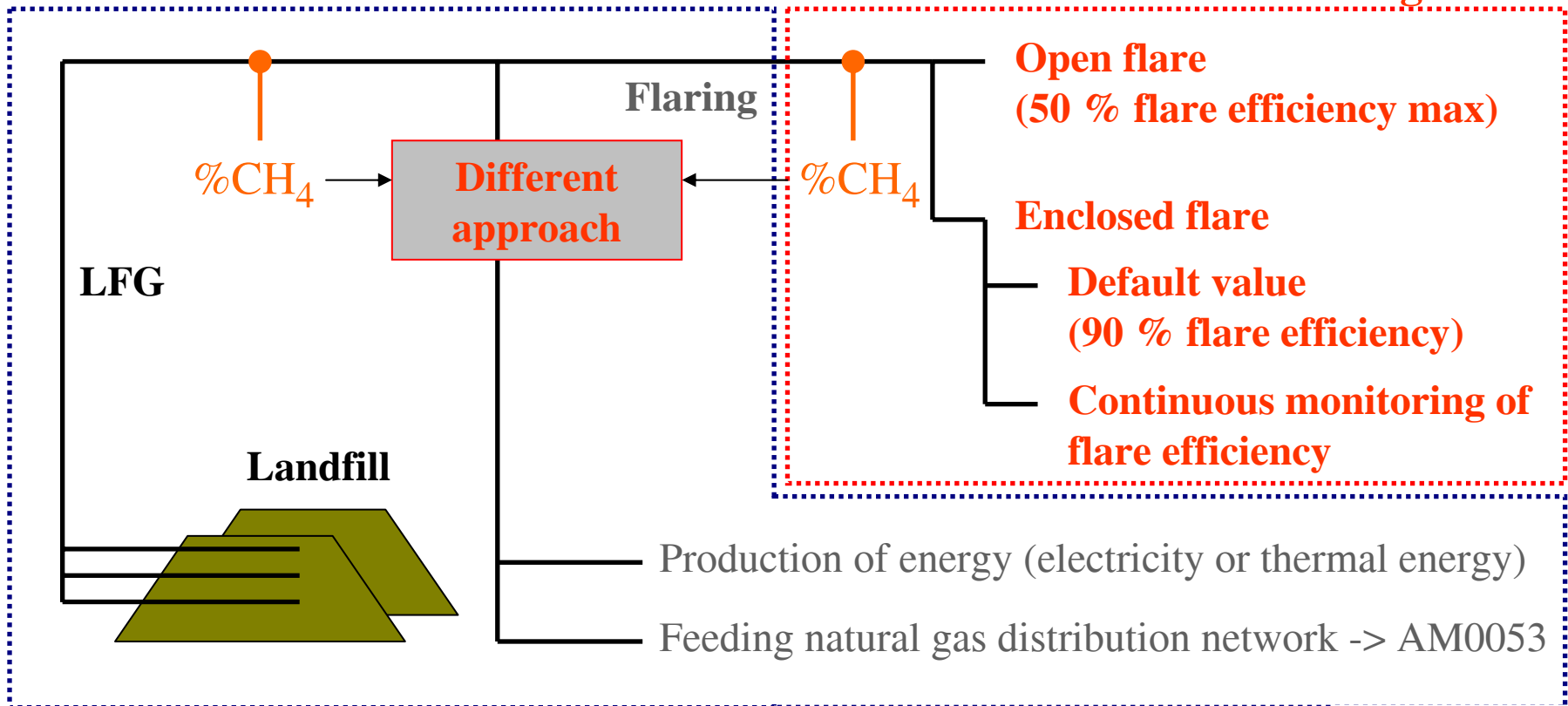
# Reasons for reviews

- **Flare efficiency** not monitored/determined as required
- Not clear if measurement/determination of **methane concentration in LFG** has been done at a 95 % confidence level
- **Incomplete data** as a result of electricity blackouts or other malfunctions of measuring equipment or data loggers
- Not clear if **calibration** has been undertaken appropriately

# ACM0001 Scope of monitoring - methane fraction/flare efficiency

ACM0001 ver. 10

“Flaring Tool”




# Measurement of methane fraction according to ACM0001

Data / Parameter:	W <sub>CH4</sub>
Data unit:	m <sup>3</sup> CH <sub>4</sub> / m <sup>3</sup> LFG
Description:	
Source of data:	To be measured continuously or periodically by project participants using certified equipment
Measurement procedures (if any):	Shall be measured using equipment that can directly measure methane content in the landfill gas, estimation of methane content of landfill gas based on measurement of other constituents of the landfill gas such as CO <sub>2</sub> is not permitted. Preferably measured by continuous gas quality analyser
Monitoring frequency:	
QA/QC procedures:	The gas analyser should be subject to a regular maintenance and testing regime to ensure accuracy
Any comment:	

• What is continuous?  
=> <every 2 minutes

• Not in flaring tool

• 4x/year or 4x/quarter?



## Measurement of methane fraction according to the “Flaring Tool”

<b>Data / Parameter:</b>	$f_{v_{i,h}}$
Data unit:	-
Description:	in the residual gas in the hour $h$ where $CO, CO_2, O_2, H_2, N_2$
Source of data:	Measurements by project participants using a continuous gas analyser
Measurement procedures:	Ensure that the same basis (dry or wet) is considered for this measurement and the measurement of the volumetric flow rate of the residual gas ( $FV_{RG,h}$ ) when the residual gas temperature exceeds $60\text{ }^\circ\text{C}$
Monitoring frequency:	
QA/QC procedures	Analysers must be periodically calibrated according to the manufacturer’s recommendation. A zero check and a typical value check should be performed by comparison with a standard certified gas.
Any comment:	As a simplified approach, project participants may only measure the methane content of the residual gas and consider the remaining part as $N_2$ .



# Conclusions "methane fraction"

## Continuous less risky

- Periodical measurements are risky
  - Practical application of 95% confidence interval is not clear as no clear guidance
  - EB 45 requested MP to provide further clarification and additional guidance
  - If you apply it, expect many questions
- What is continuous? < every 2 min



## Determination of flare efficiency - Flaring Tool I

- **Open flare: Efficiency 0% or 50% (if flame detected more than 2/3 of hour)**
- **Enclosed flare and default 90%**
  - **0% if  $T < 500$  °C for more than 1/3 hour**
  - **50% if  $T > 500$  °C for more than 2/3 hour but manufacturers specifications on proper flare operation not met**
  - **90% if  $T > 500$  °C for more than 2/3 hour but manufacturers specifications met continuously**



## Determination of flare efficiency - Flaring Tool II

- Enclosed flare and continuous monitoring
  - **0% if  $T < 500\text{ }^{\circ}\text{C}$  for more than 1/3 hour**
  - **Determined efficiency based on methane mass flows rates before and after flare**

What is appropriate?  
Where to measure in  
2m  
diameter  
flare  
exhaust?

Measurement procedures:	Extractive sampling analysers with water and particulates removal devices or in situ analysers for wet basis determination. The point of measurement (sampling point) shall be in the upper section of the flare (80% of total flare height). Sampling shall be conducted with appropriate sampling probes adequate to high temperatures level (e.g. inconel probes). An excessively high temperature at the sampling point (above $700\text{ }^{\circ}\text{C}$ ) may be an indication that the flare is not being adequately operated or that its capacity is not adequate to the actual flow.
Monitoring frequency:	Continuously. Values to be averaged hourly or at a shorter time interval

No precedent yet



## Conclusions “flare efficiency”

### **Enclosed flare & 90% default is best mix**

- **Open flare = less CERs (-40% compared to default for enclosed)**
- **If enclosed, ensure you meet requirements (especially manufacturers specification)**
- **Great risk enclosed & continuous**
  - **0%, if you do not meet the monitoring requirements!**
  - **It might be technically possible to fulfil the requirements, but very complex**
  - **No precedent/issuance**
  - **Limited additional profit compared to 90% default?**



## Recommendations for “low risk” monitoring

### **Best combination ACM0001 ver. 10/flaring tool**

- **Continuous monitoring of methane fraction**
  - **At least every 2 minutes**
- **Opt for default value of 90% flare efficiency**
  - **Requires enclosed flare!**
  - **Continuous monitoring of flare (exhaust) temperature**
  - **Continuous monitoring of manufacturer’s specification**
- **Procedures for electricity blackout**
  - **Make sure backup and no data loss for previously monitored data**

# **Regulatory risk facing the CDM today and in the future**

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## Lessons from the CDM

- **Industrialized country investment in CDM projects is rare – “unilateral” CDM prevails**
- **“Cat and mouse game” between project developers and regulators**
  - **Significant share of non-additional projects**
  - **Vicious circle of increased checks and increased workload of regulators**
- **Projects do not contribute to sustainable dev.**
- **Important project types not mobilized by CDM**
- **Host countries do not want to “graduate”**



# CDM reform in general

- **Delegation of decision-making** from EB to the secretariat and/or committees and panels
- **All decisions on requests for review** for registration and issuance
  - **Accreditation** of validators and verifiers
  - **Methodology approval** and revision
  - **Development of new methodologies** (benchmarks)
- **Full-time professional staff** working in the support structure
- **Criteria for forwarding issues** to EB



# CDM reform in general

- **Classification system for decisions**
  - **Formal hierarchy** of decisions to deal with potential conflict between decision criteria
  - **Poor decisions taken in the past should not continue to be applied in similar cases in the future**
- **Appeals procedure**
  - **New appeals body at level between EB and COP**
  - **Appeals chamber within EB**
  - **Appeals heard by EB if decisions delegated to support structure**



# CDM reform in general

- **EB membership more professional**
  - Code of conduct
  - Declaration of all pecuniary / professional interests that may affect **impartiality**: no carbon market involvement
  - Members with **government functions** refrain from active participation in decision-making on CDM projects in which an organization of their government is involved
- **Methodologies**
  - **Standardization of benchmarks** both in terms of emissions intensity and investment test
  - **Additionality benchmark**
  - **Subsidization of meth development**



# CDM reform in general

## DOEs

- **Suspension or withdrawal** of DOE accreditation, based on the number of reviews initiated, repeat errors, non-compliance with standards or proven misconduct
- Publication of **statistics** on DOE performance
- Publication of negative validation reports
- **Hiring** of DOEs by **Secretariat** based on tender
- **Mandatory training** for **DOE staff** organized by **Secretariat**



# Regional distribution

- **Country quotas**
- **Alleviated rules for projects in LDCs/Small Island States**
  - Higher small scale project thresholds
  - No additionality test
- **Upfront financing to cover project cycle costs**
  - Grants from **buyers**
  - Grants from **EB**
  - Upfront payment to be **reimbursed by CERs** from revolving fund



# Reform options

- **Replace CDM by sectoral crediting mechanism based on no-lose targets for all except LDCs**
  - Data needs
  - Lack of direct incentives for private sector
- **Discounting of CERs according to degree of development of host country**
- **Introduction of stringent sectoral benchmarks**
- **Incremental reform**
  - Appeals procedure, hierarchy of decisions, programmatic CDM, inclusion of new project types

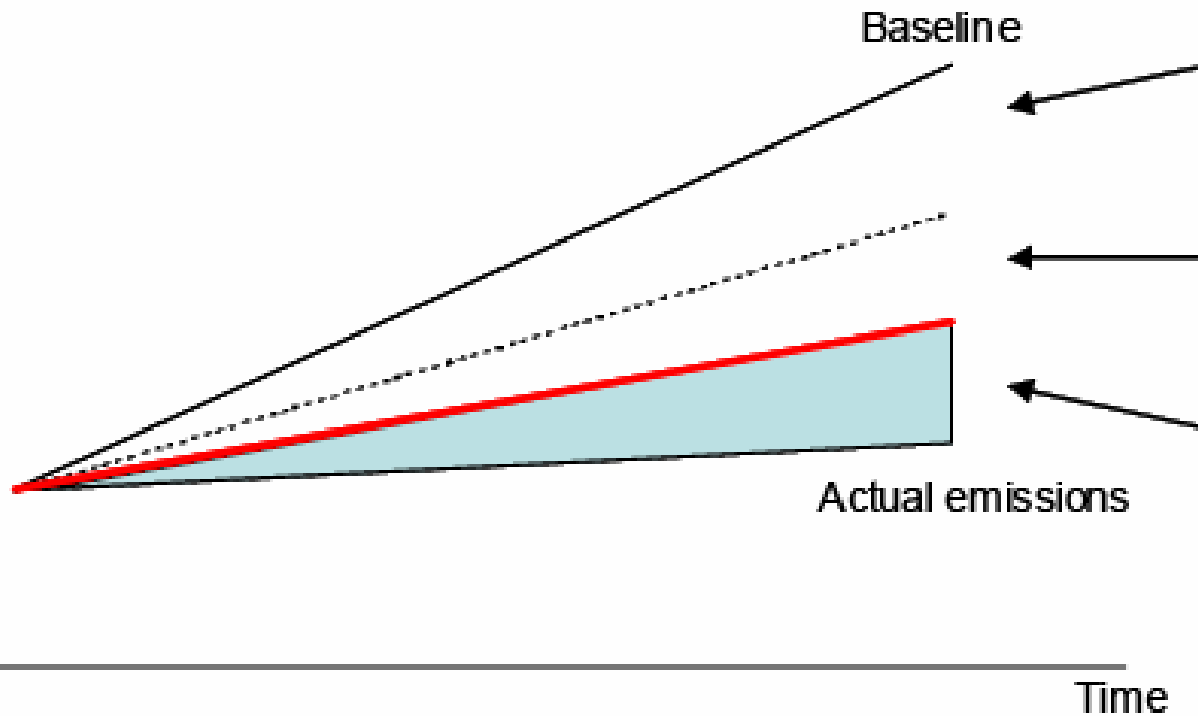


## Sectoral no-lose targets

- Risk of hot air
- **Absolute / relative targets?**
- How are **data** collected?
- How is the **incentive** transmitted to the owners of installations?
- Requires **efficient and unbiased host country government**
- Seen as **first step towards commitments**

# Sectoral no-lose targets

GHG Emission  
Level



**SNLT**

**Credits**

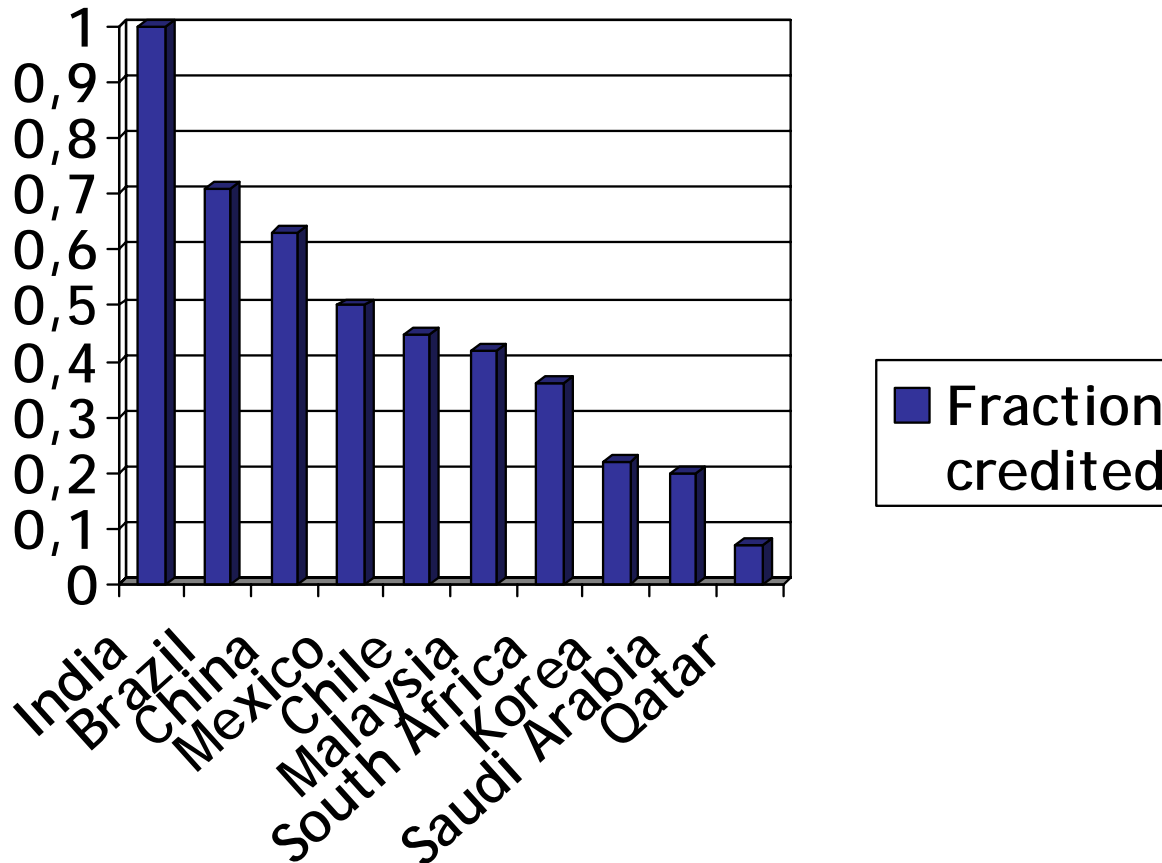


## Discounting of CERs

- **1 tonne of CO<sub>2</sub>-eq. reduction gives 0.x CERs**
  - **Could be differentiated according to per capita emissions and per capita GDP**
  - **Can cover aggregated loss of additionality but does not stop non-additional projects**
  - **Sets incentive for advanced countries to engage beyond the CDM**
    - **Contribution to global reduction**



# Discounting of CERs





# **Gas flaring case study: Al Shaheen field, Qatar**

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## The project set-up

- **Recovery and utilization of associated gas at the Al-Shaheen oil field located ~90 km off the coast of Qatar**
  - **Installation of three new platform complexes**
  - **Compressor facility**
  - **20 inch sub-sea gas pipeline**
- **Flaring at the Al-Shaheen oil field currently accounts for >20% of Qatar's flaring**



## Testing additionality

- **Memo from Qatar Petroleum to Maersk Oil Qatar that the intention of the Al-Shaheen project was “to regulate the State of Qatar’s GHG emissions under the UNFCCC and its mechanisms”**
- **Possible baseline scenarios**
  - **Venting to the atmosphere at the oil production site**
  - **Flaring at the oil production site**
  - **On-site consumption**
  - **Injection into the oil reservoir**
  - **Recovery, transportation, processing and distribution to end-users**

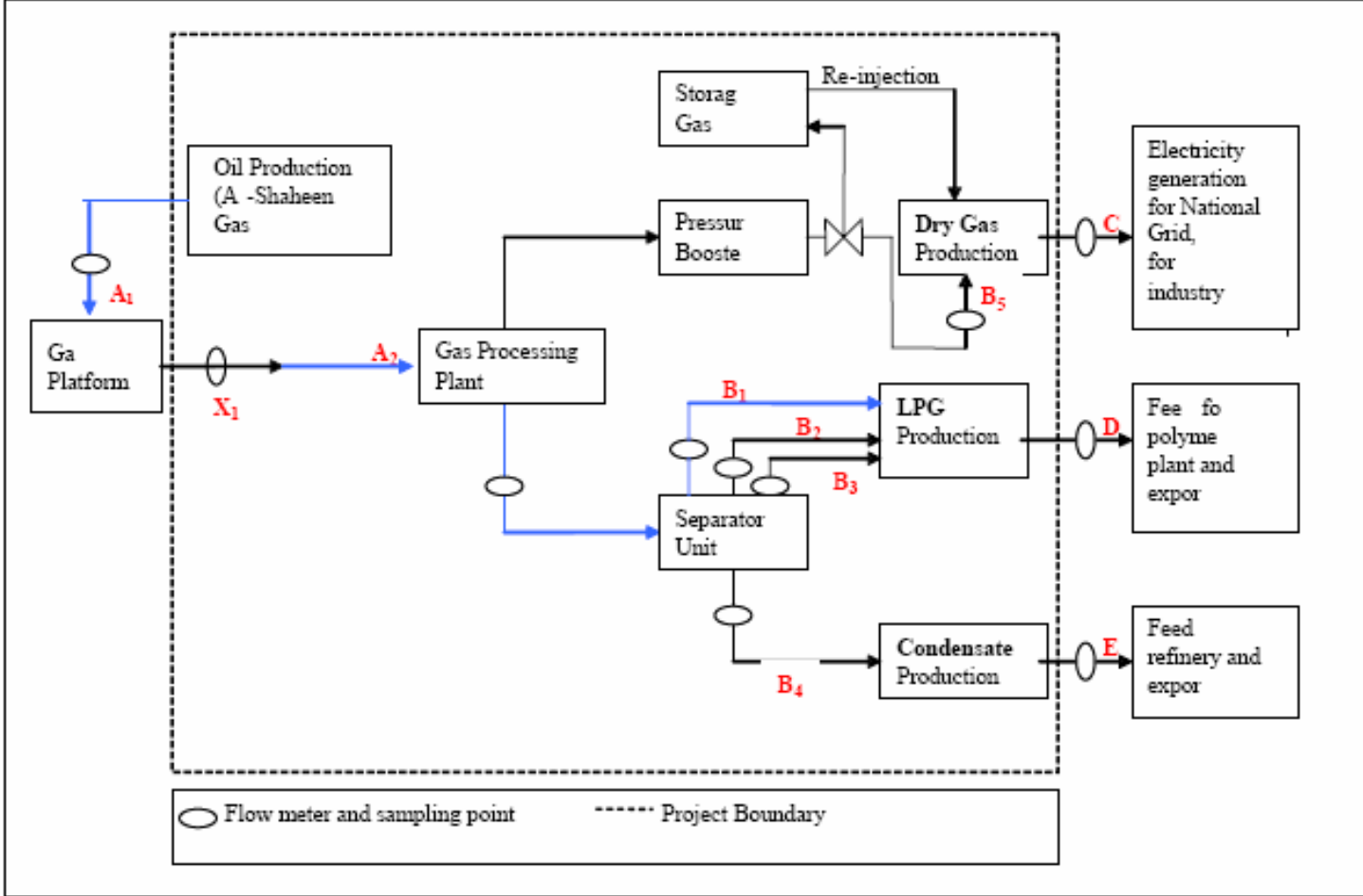


# Baseline evaluation

- **Venting at the oil production site**
  - **Illegal, thus excluded**
- **Flaring at the oil production site**
  - **Allowed**
- **On-site consumption**
  - **All possible uses already covered, thus excluded**
- **Injection into the oil reservoir**
  - **Could damage the oilfield, thus excluded**
- **Recovery, transportation, processing and distribution to end-users**
  - **Allowed, not economically viable**



# Monitoring





# Monitoring

Task	On-site technician within the GPP at Qatar Petroleum	Manager of the GPP at Qatar Petroleum	HSE Dept within Qatar Petroleum
Collect Data	E	R	I
Enter data into Spreadsheet	E	R	I
Make monthly and annual reports	N/A	E	R
Archive data & reports	I	E	R
Calibration/Maintenance; Rectify faults	I	R	I

**E = Responsible for executing data collection**  
**R = Responsible for overseeing and assuring quality**  
**I = To be informed**



## Registration risks

- **Demonstration of additionality wholly inadequate**
- **Quantification of investment test necessary**
- **Metric units to be used**
- **Unclear date of Environmental Impact Assessment**
- **Complete lack of stakeholder consultation – consultation has to be held**



## Issuance risks

- **Gas composition data measurement at many different points**
  - **Some failures are likely**
  - **Application of the 95% confidence interval rule for periods with missing data points**
- **Consistency of measurement techniques over time**
- **Calibration of flow meters**
- **Pipeline leakages**



## Hydropower China

- **24 MW water-diversion-type run-of-river project**
- **Plant load factor 64.8%, crediting from April 2008**
- **Annual estimated CERs: 97,403**
- **Timeline**
  - **PDD published for comments: Aug. 22, 2007**
  - **Validation report completed: Jan. 9, 2008**
  - **Registration request submitted: Feb. 24, 2008**
  - **Registration request published: April 2, 2008**
  - **Request for review discussed by EB: August 2, 2008**
  - **Registered after corrections: Sep. 12, 2008**



# **Hydro case study: Shaba 24 MW project, China**

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## Additionality argument

- **10% IRR benchmark** for hydro plants <25 MW published by Ministry of Water Resources 1995
- Investment cost 104 m RMB (feasibility study) + 24 m RMB (“Report on Investment Increase”)
- **IRR 7.73%**, with CER sale at 8 € 14.53%
- Sensitivity analysis (investment cost -10%):  
9.21%
- Common practice: 11 similar projects after 2002 in Yunnan, but **financed by state or CDM**



## Where is the additionality?

- **Construction start: June 2005**
- **First mention of CDM in company documents: December 2005.**
- **Key argument: Shortage of funds led to construction stop only overcome by the potential CER revenues**
- **Inconsistency of values used in the PDD with the feasibility study**



## Where is the additionality?

- If costs incurred before start of CDM consideration (5 m RMB) are deducted, IRR increases to 8.3%
- Cost increase of 24 m RMB clearly overestimated, as **new loan only covered 20 m RMB**
- Developer **waited for 1 year** until the CDM consultant could find a buyer who would finance validation and writing of the PDD