


Opportunities for Carbon Trading in Fertiliser Industry

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Global warming.....

Is a reality now !!!



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Startling stories...



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The Cause.....

Green House Gases (GHGs)

Green house gas (GHG)	Global Warming Potential (GWP)
Carbon-di-oxide (CO ₂)	1
Methane (CH ₄)	21
Nitrous oxide (N ₂ O)	310
Per fluoro carbons (PFCs)	Upto 9,500
Hydro fluoro carbons (HFCs)	Upto 11,700
Sulphur hexa fluoride (SF ₆)	23,900

Human activities are increasing the concentration of Green House Gases ("GHGs") in the atmosphere.
This enhances the green house effect, commonly known as "Climate Change"

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In this presentation

- 1 Kyoto Protocol and CDM projects
- 2 The opportunities and procedures
- 3 CDM status – India and World
- 4 CDM opportunities in fertilizer sector



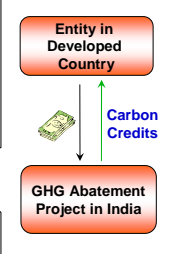
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Kyoto Protocol and CDM

- Emission reduction targets for Developed countries
- GHG emission reduction by 5.2% below 1990 levels in 2008-2012 commitment period

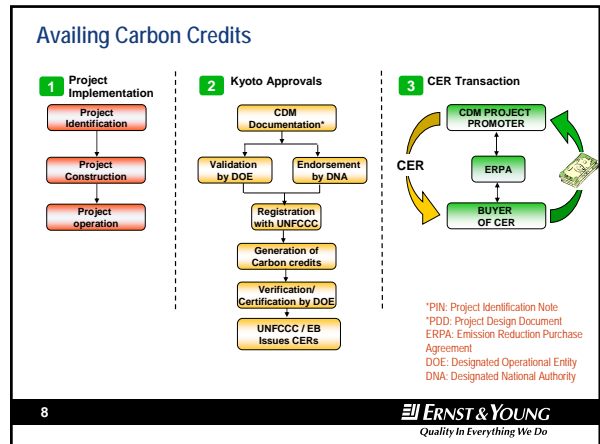
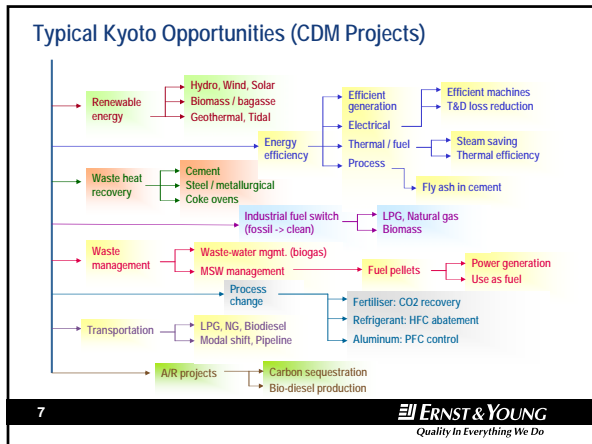
Kyoto Protocol Mechanisms

- Clean Development Mechanism ("CDM")
- International Emission Trading ("IET")
- Joint Implementation ("JI")



Carbon credits are measured in terms of Certified Emission Reduction ("CER")
One CER equals 1 MT CO₂ equivalent

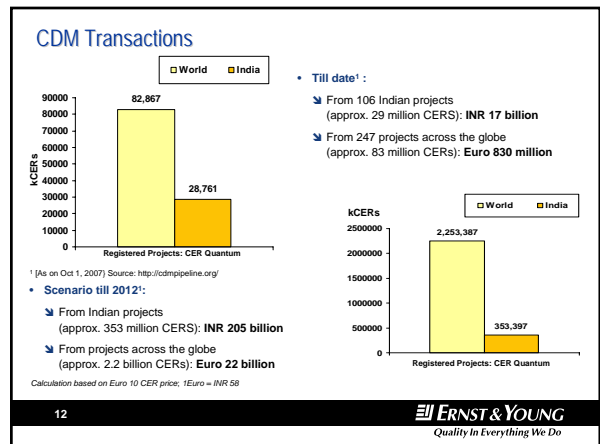
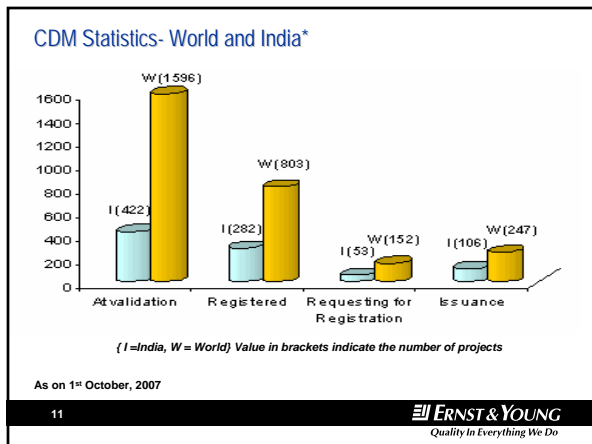
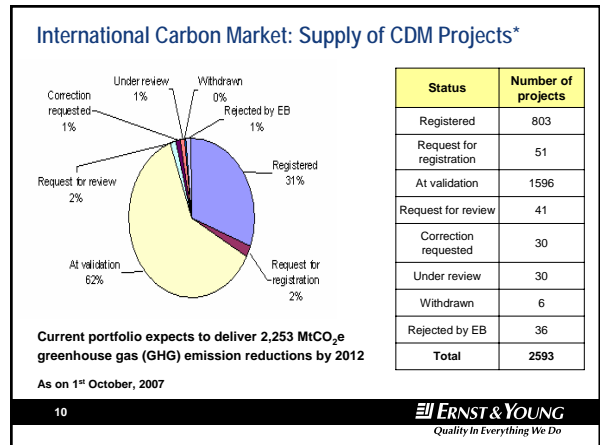
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International Carbon Market: Demand for CDM Projects

- Major demand blocks in the CDM market :
 - European Union Emission Trading Scheme (EUETS) including countries like Spain, France, Italy Greece, Belgium, Portugal, Netherlands and Ireland : Potential demand of 500 MtCO₂e
 - Canada : Potential demand of 228 MtCO₂e
 - Japan : Potential demand of 208 MtCO₂e
- Total potential demand : 4,842 MtCO₂e during the five years of the first commitment period 2008-2012.

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Fertilizer Industry in CDM Space



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Country wise distribution of CDM projects

Country	No. of Projects in fertilizer industry
Brazil	3
China	23
Chile	1
Colombia	2
Egypt	1
India	21
Indonesia	1
Israel	4
Pakistan	1
Peru	1
South Africa	2
South Korea	4
Overall	63



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CDM Potential of Indian Fertilizer Industry




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Fertilizer Industry in India : An Overview

- ▶ **Fertilizer sector is very crucial for Indian economy**
 - ▶ Contributes 20% to our GDP
 - ▶ Ensures food security for the country.
- ▶ **One of the largest energy consumers in India**
 - ▶ Share of nearly 15% in total industrial energy consumption.
- ▶ **Depending on the feedstock, the specific energy consumption of fertilizer plants in India varies as follows* :**
 - ▶ Gas : 5.42 to 6.86 Gcal/MT
 - ▶ Naptha : 5.55 to 7.69 Gcal/MT.
 - ▶ Fuel Oil : 7.92 to 8.23 Gcal/MT

*FAI statistics (2006-07)




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Potential CDM projects in Fertilizer Industry

Project Type	GHGs Targeted
▶ Energy Efficiency	CO ₂
▶ Fuel Switch	CO ₂
▶ Feed Switch	CO ₂
▶ CO ₂ Recovery (CDR)	CO ₂
▶ Process Gas recovery	CH ₄ , CO ₂
▶ N ₂ O emission abatement	N ₂ O
▶ Use of natural Inhibitors	N ₂ O, CO ₂




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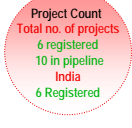
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Project Type – Energy Efficiency

- ▶ **Description of the project activity**
 Retrofitting/ installing energy efficient technologies in fertilizer plant to reduce the specific consumption of steam or energy and thereby reducing GHG emissions.
- ▶ **Methodologies applicable**
 - ▶ AM0018 (Large Scale methodology)
 - ▶ AMS II.D. (Small Scale methodology)
- ▶ **Typical examples**
 - ▶ Reduction in steam consumption of Ammonia/ Urea plant through revamping of Ammonia/ Urea plant.
 - ▶ Reduction in thermal energy consumption of Primary Reformer by installing parallel auto-thermal reforming system.



GHGs Targeted
CO₂



Project Count
Total no. of projects
6 registered
10 in pipeline
India
6 Registered

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Project Type – Fuel Switching

- Description of the project activity**
 - Switching from higher carbon intensive fossil fuels like Naphtha, HSD, FO used in utilities / Ammonia plant to lower carbon intensive fuels like Natural Gas, Process Gas, thereby reducing GHG emissions.
- Methodologies applicable**
 - ACM 009 (Large Scale)
 - AMS III.B.(Small Scale)
- Typical examples**
 - Fuel switchover from Naphtha fuel to Natural Gas fuel in Primary Reformer.
 - Partial Fuel switchover from Coal fuel to Process Gas fuel in Boiler.

GHGs Targeted
CO₂

Project Count
Total no. of projects
1 registered
8 in pipeline
India
0 registered

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Project Type - Feed Switching

- Description of the project activity**
 - The project involves switching from higher carbon intensive fossil feed like Naphtha to lower carbon intensive fossil feed like Natural Gas used in the primary reformer. The feed switchover results in reduction in excess CO₂ emissions, thereby reducing GHG emissions
- Methodology applicable**
 - NM 165 rev (New proposed methodology)
- Typical example**
 - Feed switch project from Naphtha feed to Natural Gas feed at a Urea Manufacturing facility.

GHGs Targeted
CO₂

Project Count
Total no of projects
1 in pipeline
India
0 registered

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Project Type - CO₂ Recovery (CDR)

- Description of the project activity**
 - Recovering of CO₂ from the flue gases and utilizing the recovered CO₂ for Urea production, thereby reducing GHG emissions.
- Methodology applicable**
 - NM 170 rev (New proposed methodology)
- Typical example**
 - Installation of Carbon Dioxide Recovery (CDR) plant at Urea manufacturing facility.

GHGs Targeted
CO₂

Project Count
Total no. of projects
2 in pipeline
India
0 registered

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Project Type - Process Gas Recovery

- Description of the project activity**
 - Recovering the process gas like off gases etc. which were earlier vented out to atmosphere and utilizing as a fuel in the utilities. The GHG emission reductions of project is on account of the ensuing:
 - Avoidance of CH₄ emissions to atmosphere – Process gas contains certain quantity of methane. Thus recovering would lead to reduction in CH₄ (GHG) emissions
 - Fuel switchover- Process gas consists of substantial quantity of hydrogen, hence partial fuel switching from fossil fuel to less carbon intensive process gas would lead to CO₂ (GHG) emission reductions.
- Methodology applicable**
 - Methodology yet to be developed for Methane Avoidance part
 - AMS III.B. (Small Scale methodology) can be used for Fuel switch part
- Typical example**
 - C – 03 off gases recovery project at Urea plant.

GHGs Targeted
CH₄, CO₂

Project Count
Total no of projects
2 registered
India
2 registered

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Project Type - N₂O emission Abatement

- Description of the project activity**
 - Project involves using technologies / measures resulting in abatement of N₂O emissions in the atmosphere
- Methodologies applicable**
 - AM 0028 (Large Scale methodology)
 - AM 0034 (Large Scale Methodology)
- Typical Examples**
 - Installing catalytic decomposition equipment at the tail gas downstream between HNO₃ absorber and stack.
 - Installation of a secondary catalyst to decompose N₂O inside the reactor

GHGs Targeted
N₂O

Project Count
Total no of projects
9 Registered
26 in pipeline
India
0 registered

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Project Type - Use of Natural Nitrification Inhibitors

- Description of the project activity**
 - Usage of natural nitrification inhibitors like Neem Oil that would delay the nitrification process and would reduce N₂O emissions
- Methodology applicable**
 - New methodology under preparation
- Typical example**
 - Use of Neem Coated Urea instead of plain Urea

GHGs Targeted
N₂O
CO₂

Project Count
Total no of projects
2 in pipeline
India
0 registered

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Snapshot of Registered projects from Indian Fertilizer sector

Plant	Project Title	Methodology	CER potential (ktCO ₂ e)
Indo Gulf Fertilizers	Energy efficiency through installation of modified CO ₂ removal system in Ammonia Plant	AM0018	240
	Avoidance of methane gas emission to atmosphere from C-03 washing tower by effectively utilizing the C-03 off gas as fuel in primary reformer	AMS III.D.	98
	Reducing heat loss into atmosphere along with the flue gases by utilizing it for preheating of combustion air of service boiler	AMS II.D	17
	Installation of Plate Type Heat Exchanger for preheating combustion air of primary reformer and reducing heat loss to atmosphere through flue gases	AMS II.D	120
IFFCO	Reduction in Steam Consumption through Revamping of Ammonia Plant of IFFCO plants	AM0018	2950
Tata Chemicals Limited	Alternate arrangement for preheating NG feed	AMS II.D.	18
	Installation of additional Urea trays in urea reactors	AMS II.D	28
	Off gases utilization from C-03 washing tower in Primary Reformer as fuel	AMS III.D.	72
Total			3,543

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Unrealized GHG mitigation Potential

Key Observations :

- Most of the projects in the fertilizer sector world wide are registered under the N₂O Abatement category (AM0028 and AM0034) category.
- However, in Indian scenario, most of the projects registered are under Energy Efficiency category, using mainly two methodologies namely, AMS II.D and AM0018.
- Thus, there is a tremendous opportunity for the Indian fertilizer sector to avail CDM benefits in other project types



*Derived from FAI statistics (2006-07)

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Thank You

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