# Carbon Credits

**Climate Change India 2008' International Conférence 22-23 April 2008, Le Meridien, Pune**

**Global Markets Centre,**
**Deutsche Bank Group**



## Agenda

- Overview
- Global Carbon Markets, CDM & India
- Methodologies, Certification Process & Deal Structure

## Overview…



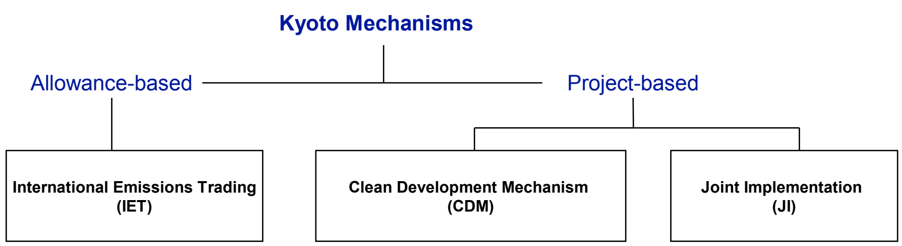


## Introduction to Carbon Markets

- Carbon dioxide is the new kid on the block in commodity trading.
- Fundamental difference – people are buying and selling a *lack or absence* of the commodity in question.
- Typical sellers fall into two categories.
- Sellers within Annex I countries will produce or expect to produce less than they are allowed to produce, so that they may sell the unused right to emit to someone who emits more than their allocated amount.
- In India sellers will gain credits from project based reductions and sell these to Annex I parties who emit more than their allocated amount.
- The emissions markets today are geared to achieving levels specified under the Kyoto Protocol by the UNFCCC.
- UNFCCC was established in 1992 as the overall framework guiding the international climate negotiations. The Kyoto Protocol specifies emission obligations for industrialized countries.

## Introduction to Kyoto Protocol

- Voluntary treaty signed by 141 countries, including the EU, Japan and Canada
- Target for reducing GHG emission by 5.2% below 1990 levels by ’12
- US, with over a fourth of global emissions, is not a party to the agreement.
- 2 types of transactions are allowed under Kyoto – Allowance-based, and Project-based



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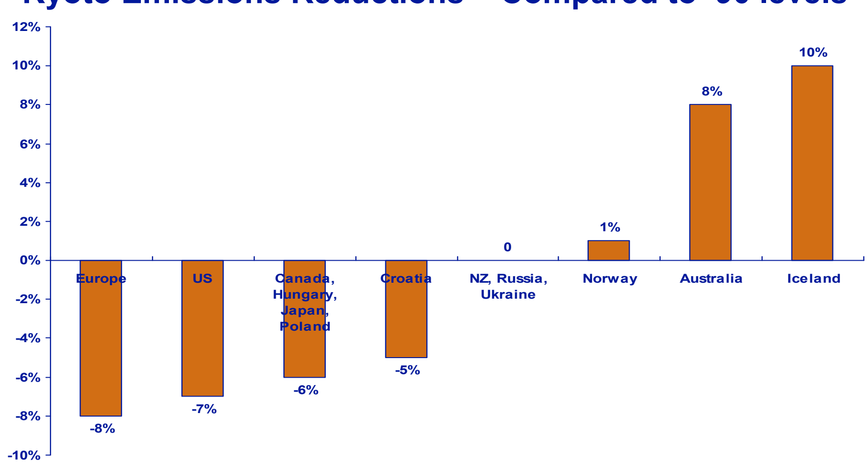
## Kyoto Emissions Reductions – Compared to ’90 levels




**NOTES**:
•Europe includes EU-15 includes Bulgaria, Czech Republic, Estonia, Latvia,Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, Switzerland
•The EU’s 15 member States will redistribute their targets among themselves, taking advantage of a scheme under the Protocol known as a “bubble”. The EU has already reached agreement on how its targets will be redistributed
•Some EITs have a baseline other than 1990.
•US has not ratified the Kyoto Protocol

Source: UNFCCC

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## 6 Greenhouse Gases with different Global Warming Potential vs. $CO_2$

- CO2 - Carbon dioxide - 1
- CH4 - Methane - 21
- N2O - Nitrous oxide - 310
- PFCs - Perfluorocarbons - 6,500-9,200
- HFCs - Hydrofluorocarbons - 11,700
- SF6 - Sulphur hexafluoride - 23,900



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## Global Carbon Markets, CDM & India…

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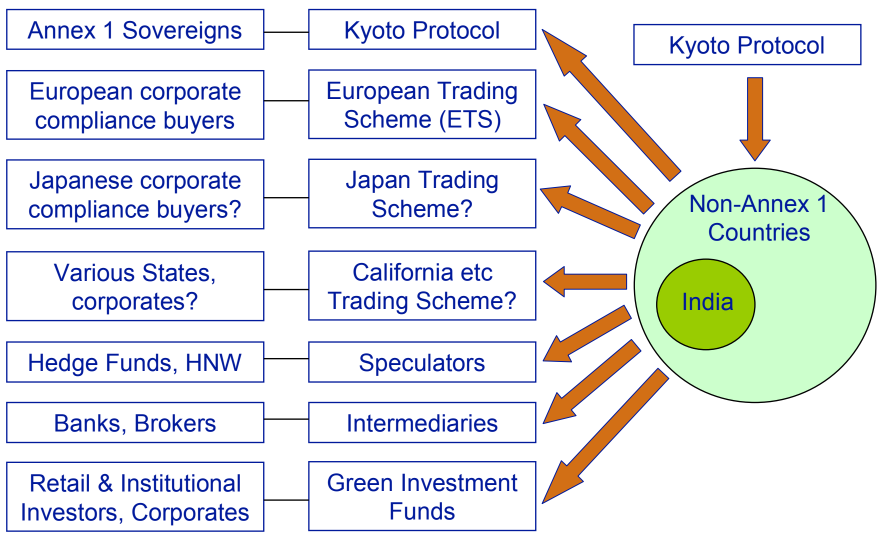
## The International Carbon Market



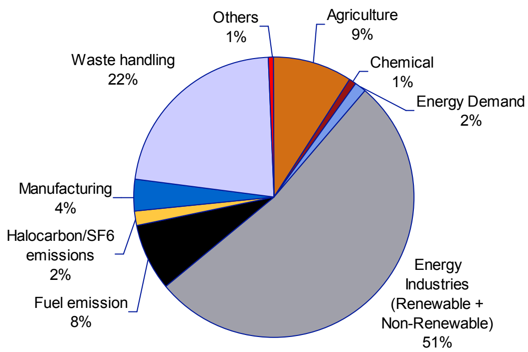





## Introduction to Clean Development Mechanism CDM)

- CDM refers to project-based emission reduction activities in developing countries. Certificates are generated through CDM from projects that lead to certifiable emissions reductions.
- There are 48 “Approved Methodologies” : UNFCCC registered methods for reducing Carbon emissions
- CDM project pipeline includes >2,100 projects with ~2.2B CERs by 2012, of which:
  – 818 are registered, with annual average annual 171M CERs, and
  – 42 projects with ~19M average annual CERs are awaiting registration.

## CDM Sector Scope

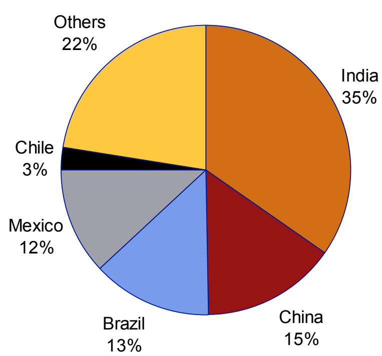



Source: UNFCCC; Last Update April 10, 2007





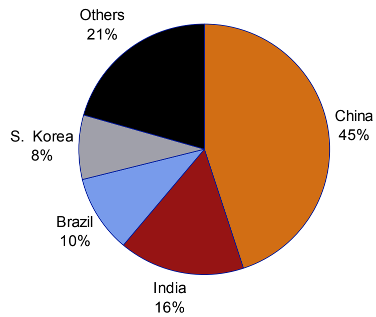
## Location of CDM Projects
### Total 818 registered projects, with India accounting for 283 & China at 123




Source: UNFCCC; Last Update October 16, 2007

# Expected annual avg CERs to sum 170M till 2012

**China leads with 77M, India follows with 27M avg annual CERs**




Source: UNFCCC; Last Update October 16, 2007



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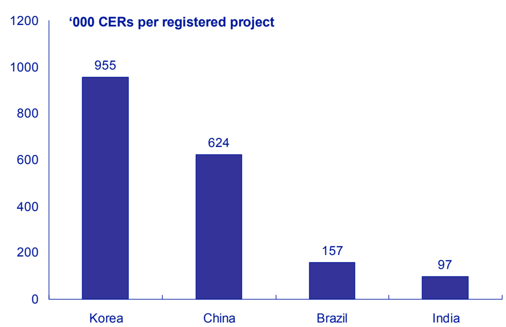
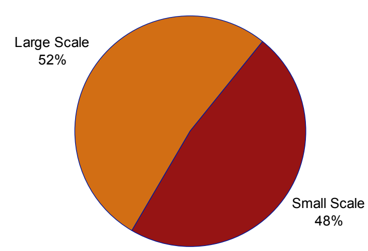
# Scale of Registered Projects

***Korea and China have large scale projects, with avg CER per project above 500k, while India has more small scale projects**

***More or less equally split between 439 large scale & 389 small scale projects**



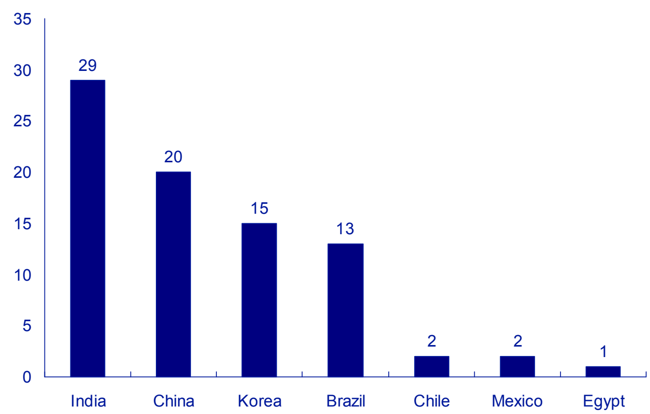




Note: Select countries taken

Source: UNFCCC; Last Update October 16, 2007

## CERs Issued till Date

**India leads with cumulative 29M CERs issued till date, followed by China at 20M**



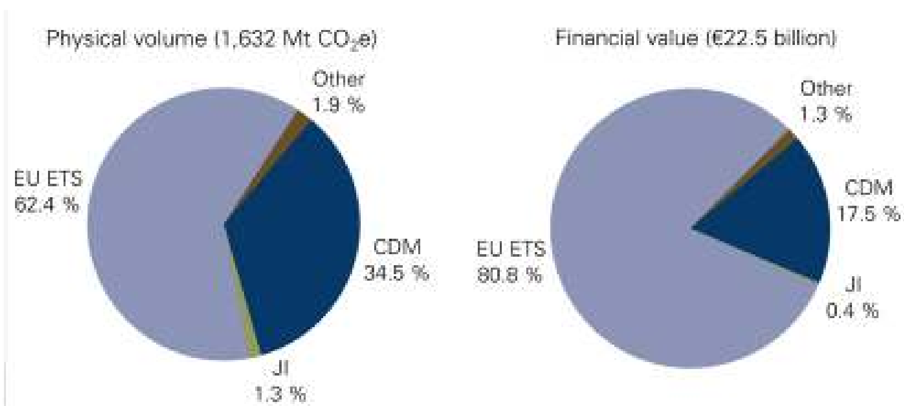

Source: UNFCCC; Last Update October 16, 2007





## EU ETS remains the dominant force

**CDM ~35% of volumes, but ~18% value**




Source: Point Carbon; Last Update – March 2007

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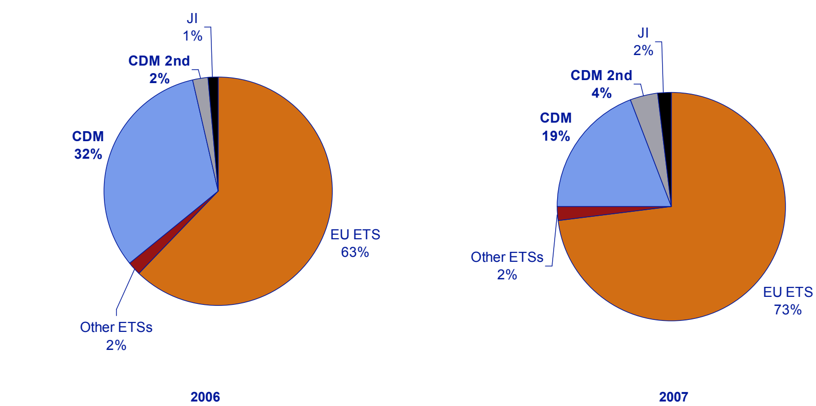
## CDM is expected to decline in Volume in CY07…




Source: Point Carbon – Last Update - March 2007

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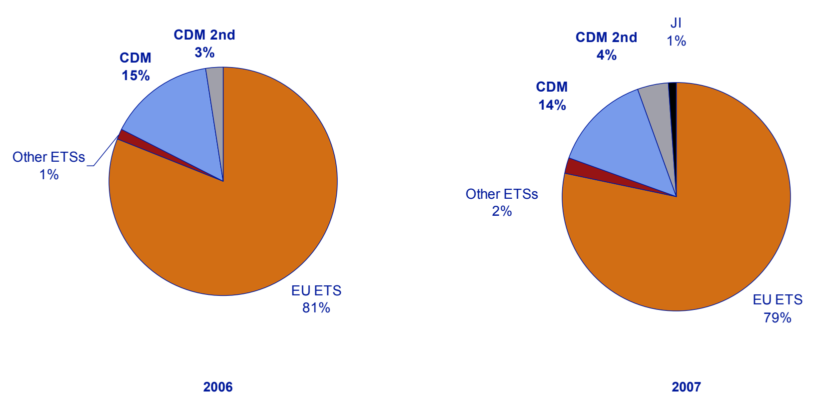
## …But near constant market share signals better pricing.




Source: Point Carbon – Last Update - March 2007

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## India Carbon Markets: Quick Facts

- India has an enormous potential due to its high fossil fuel use and large industrial energy efficiency improvement potential.
- India has 283 registered CDM projects, with avg annual CERs expected to go to 27M.
- Potential exists in all project sizes, but scale in India is lower than many. Avg CERs from a project are 97k, compared to 955k in Korea and 624k in China

| Project status | Number |
|---|---|
| PDDs | 756 |
| PDDs for public validation | 709 |
| Host country approval given | 641 |
| Registered by CDM EB | 268 |
| Issued CERs | 95 |
| Purchase Agreement signed | 96 |

Source: UNFCCC; Last Update October 16, 2007





## Running the numbers

Expected 2007 global Volume – 2,397 $MtCO_2e$

Value - EUR23.6B

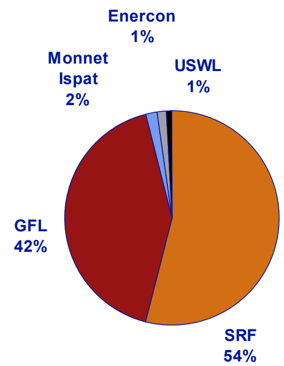
CDM is 18% of Market

India is 16% of CDM

This implies-

India opportunity Size - **EUR 680M**

## The Indian Landscape - Top CER owners in India




- Indian companies have been very active concerning ERPAs (Emission Reduction Purchase Agreements).
- HFC project developer SRF is reported to have earned 100 million € through CER sales in 2006-2007.

Source: UNFCCC; Last Update – Sep06



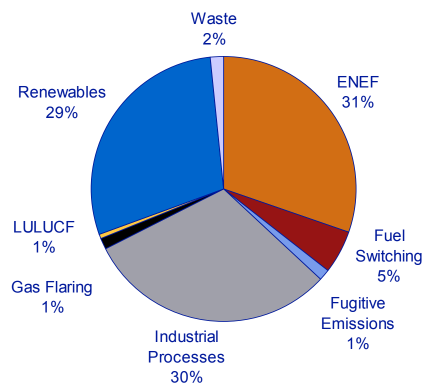


## India CDM Challenges – Rejections & Failures

- Due to additionality or methodology problems, there has been a high number of projects put under review by the EB and 7 rejections up to now, mainly small renewable energy projects.
- There have been many cases where the developers developed PDD and new baseline methodology without experienced consultants. This has led to several big failures in getting methodologies approved.
- Indian CDM climate is relatively poor which may explain the high share of unilateral projects.
- Insufficient guarantees and problems with enforcing contracts, as well as regulatory uncertainty are other challenges.

Source: Point Carbon; Last Update – August 2007

## Expected CER Volume in India by 2012 – By Technology




Source: Point Carbon; Last Update – August 2007

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## EUA and Secondary CER Prices, December '08


Source: Point Carbon; Last Update – August 2007

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## Methodologies, Certification Process and Deal Structure…



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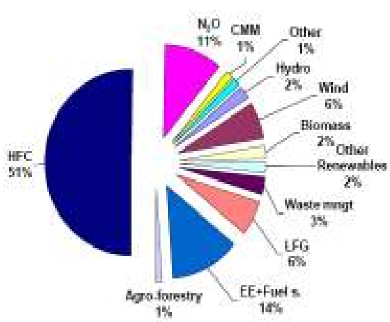
## UNFCCC-approved methodologies




2006 (until September 30)

- To qualify for **CER** issuance, reductions must be produced by a methodology approved by the **CDM-Exec Board**
- **48 emissions reductions methodologies** are approved
- Destruction of **GHG ( HFC-23, N2O) emissions** from the chemical industries have dominated early CDM projects
- In Indian scenario, projects related to **Renewable Energy, Energy Effeciency and Fuel Switching** are expected to dominate and account for **more than 50%** of CERs until 2012

Source: World Bank, IETA

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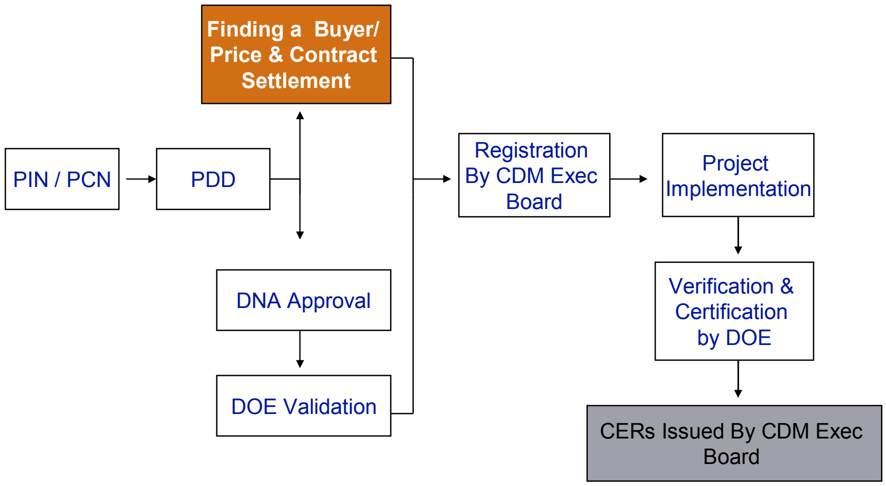
## Carbon Project Workflow

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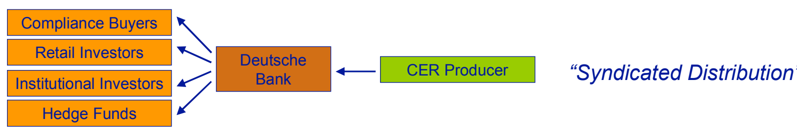
## CDM Project Documents

- **PIN (Project Identification Note)** – Developed to standardize submission requirements and review of project ideas. Provides information on:
  - Type and size of the project
  - Location
  - Anticipated amount of GHG reduction compared to “business-as-usual” scenario
  - Suggested crediting life time
  - Suggested CER price in $/ton CO2 equivalent reduced
  - Financial structuring
  - Socio-economic or environmental effects/benefits

- **PDD (Project Design Document)** – Developed to standardize the document format adopted by the CDM Executive board to be used for submitting CDM proposals. Provides information on:
  - General description of the project activity
  - Baseline methodology
  - Calculation of GHG emissions by sources
  - Duration of project activity/crediting period
  - Monitoring methodology and plan
  - Environmental impacts
  - Stakeholders comments

## Sales from CDM Projects – Differing Structures


However, with the structuring and balance sheet capabilities of a bank….







# V. Carbon Pricing

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## Carbon Pricing

- The CER & ERU price is currently related to the EUA price, but may decouple
  - Increasing demand from non-ETS sectors may INCREASE the CER & ERU price above EUAs
  - Increasing CER & EUA supply may REDUCE the price relative to EUAs

EU Emission Certificate vs CER Swap


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## Carbon Pricing

- Most emissions reductions contracts are fixed price forward purchase agreements with future deliveries out to 2012
  - As project performance, issuance and admissibility into the ETS are not guaranteed, the fixed CER & ERU price depends on a series of RISK FACTORS
  - Currently priced at ~ €9 – 12/tonne depending on the risks associated with each specific project
- Issued and "guaranteed delivery" forward CER & ERU contracts have NO project risk
  - Cannot yet be physically delivered into the ETS (due to "ITL" and "Article 17" issues) [1]
  - Currently trade at ~ €16 – 18/tonne, a substantial discount to EUAs

Typical Risks Associated with Project Implementation

Methodology Risk

Country Risk

Project Risk

Joint Implementation Risk

Legal Risk

1.) The intended resolution period for ITL and Article 17 is the end of 2008

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# Emissions Certificate Price and Risk Factors

25 EUR/tonne

EUAs

- Fully guaranteed for compliance use within the ETS
- EU Linking Directive eligibility
- Physical deliverability (ITL and Article 17)

Guaranteed Delivery CERs and ERUs
~ €16 – 17 / tonne

- Methodology risk
  - CER issuance is reduced / suspended for a given methodology
- Country risk
  - host nation revokes project Letter of Approval
  - host nation membership of the CDM suspended
  - political, social, economic crisis reduces / prevents project operation
- Project risk
  - delay / failure to complete construction and commissioning
  - delay / failure to gain CDM registration
  - project failure, reduction in capacity, repair & maintenance time
  - failure or delay in CER verification and issuance

"Primary" CERs
~ €9 – 12 / tonne

- Joint Implementation Risk
  - administrative and procedural uncertainties between Tracks 1 and 2
  - mechanisms for AAU retirement and ERU issuance
  - potential private sector / public sector conflicts of interest

"Primary" ERUs
~ €5 – 10 /tonne

- Acceptability and robustness of "soft greening"

~ €3 – 5 / tonne

"Soft Greened" AAUs

- Political and environmental aversion to "hot air"

~ €1 – 2 / tonne

"Raw" AAUs


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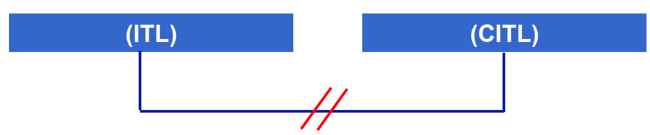
# CERs Trade at a Discount to EUAs

The **International Transaction Log (ITL)** is a UN software system that facilitates the transfer of CERs from the UN registry to national registries. The **Community International Transaction Log (CITL)** connects the ITL to European Union national registries.




**The ITL and CITL are currently *not* connected**

The ITL/CITL connection *must* be established in order to transact CERs on a spot basis in Europe.

Until this connection is established, CERs will be subject to **delivery risk** and will trade at a discount to EUAs. The European Commission has committed to making the ITL/CITL link operational **by April 2009**.

Any country wishing to trade ERs must comply with **Article 17**. Buyers of ERs must open a trading account within their own (or other) national registry in order to receive delivery of ERs.

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## Emissions Markets Glossary

| | |
|---|---|
| **AAU** | Assigned Amount Unit |
| **CDM (EB)** | Clean Development Mechanism (Executive Board) |
| **CER** | Certificate of Emissions Reductions |
| **$CH_4$** | Methane |
| **$CO_2$** | Carbon Dioxide |
| **$CO_2e$** | Carbon Dioxide Equivalent |
| **ERPA** | Emissions Rights Purchase Agreement |
| **ERUs** | Emissions Reduction Units (issued under the JI) |
| **ETS** | European Union Emissions Trading Scheme |
| **EUA** | European Union Allowances |
| **GHG** | Greenhouse Gases |
| **GWP** | Global Warming Potential |
| **HFCs** | Hydrofluorocarbons, including HFC-23 |
| **ITL** | International Transactions Log |
| **JI (SC)** | Joint Implementation (Supervisory Committee) |
| **LoA** | Letter of Approval |
| **NAP** | ETS National Allocation Plan |
| **$N_2O$** | Nitrous Oxide (also known as **"NOX"**) |
| **$SF_6$** | Sulphur Hexafluoride |
| **$SO_2$** | Sulphur Dioxide (also known as **"SOX"**) |
| **PDD** | Project Design Document |
| **PFCs** | Perfluorocarbons, including Perfluoromethane ($CF_4$) and Perfluoroethane ($C_3F_6$) |
| **RMUs** | Removal Units |
| **UNFCCC** | United Nations Framework Convention on Climate Change |

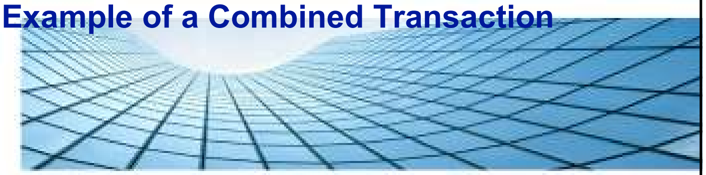


## VI. Trade Opportunities

### EUA Carry Trade

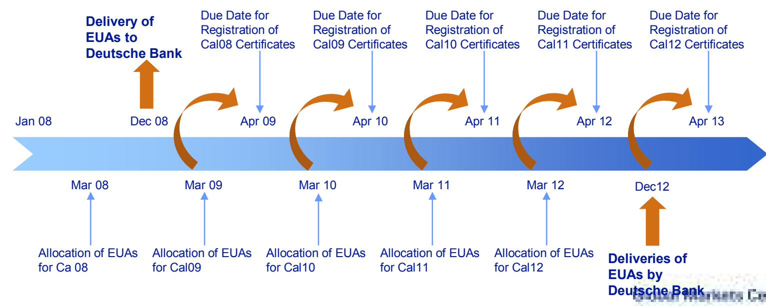
### EUA vs. CER / ERU Swap With or Without Cash Payment

### Example of a Combined Transaction



## EUA Carry Trade

- Rationale: Corporate delivers EUAs to DB in 2008 and receives them back in 2012 + Cash Payment
- This trade explores the fact that EUA allocation date for the ongoing year lies before the official EUA “give-up” date for the previous year. Variations of this trade are possible:
  - Delivery of ERs from Deutsche Bank to the corporate can occur on several dates date,
  - EUA delivery volumes on each date can differ
  - Instead of a specific ER delivery from Deutsche Bank, a mix of EUAs and CERs/ERUs can be delivered as a hybrid between the EUA carry trade and the EUA vs. CER swap



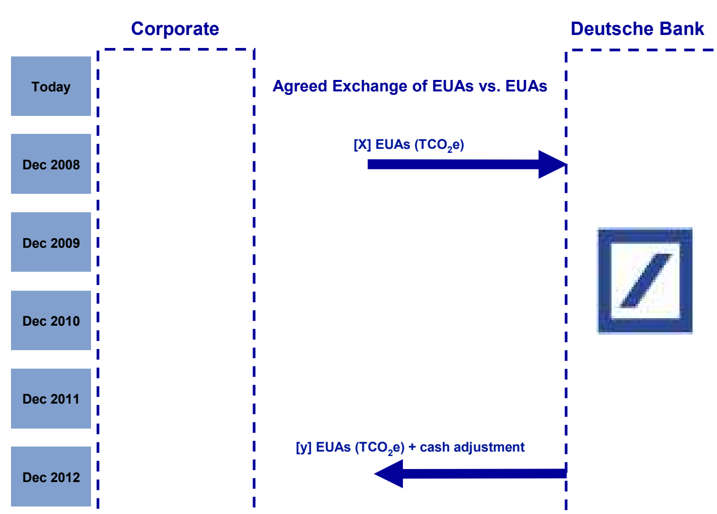





## EUA Carry Trade

**Standard Documentation :**
ISDA or EFET contract with Emission Annex or Long Form Confirmation

**Rationale:**
Use EUA allocation as an asset, instead of having it “sleeping” in the registry



## EUA vs. CER / ERU Swap

**Corporate delivers EUAs to DB each year and receives CERs/ERUs + cash payment *or* CERs/ERUs each year**

### Option 1.) Trade *With* Cash Payment

- For a given amount of **EUAs** the corporate receives the same amount of **CERs/ERUs plus a cash adjustment amount**
- The cash adjustment amount reflects the current discount in the market of CERs/ERUs to EUAs
- Flow of EUAs and CERs/ERUs and cash takes place on the same date

### Option 2.) Trade *Without* Cash Payment

- For a given amount of **EUAs** the corporate receives a **higher amount of CERs/ERUs**
- The deal is a pure exchange of certificates and there is no cash payment at any point in time
- Variations of this deal are possible:
  - Dates can be varied, i.e., only one swap transaction in one single year
  - Volumes can be varied

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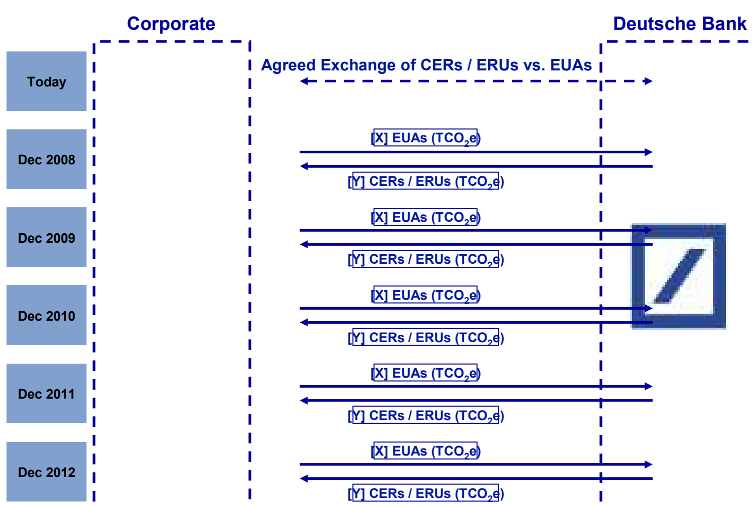
## EUA vs. CER / ERU Swap

**Standard Documentation:**

ISDA or EFET contract with Emission Annex or Long Form Confirmation

**Rationale:**

Make maximum use of the allowance of CERs / ERUs into the ETS and benefit from the discount of CERs/ ERUs to EUAs



## Example of a Combined Transaction

- A company needs 60,000 EUAs per year over a 5 year period for compliance
- The corporate delivers **EUAs** to DB in 2008
- Over the following 5 years, the entity receives the amount of **EUAs + CERs/ERUs** needed for compliance **+ a cash payment** from DB
- Alternatively, the cash payment can be received upfront in 2008 at a discounted rate

| Assumptions : Corporate Allocation and Requirements | | |
|---|---|---|
| | Yearly Value | Total Value |
| **Annual Allocation** | 1,500,000 | 7,500,000 |
| **Annual Requirement** | 1,560,000 | 7,800,000 |
| **Annual Shortfall** | 60,000 | 300,000 |
| **CER Allocation %** | 15% | 15% |
| **CER Allocation** | 225,000 | 1,125,000 |

| Transaction Details (Carport's Perspective) | |
|---|---|
| | Quantity |
| **EUAs Delivered in 2008** | 1,400,000 |
| **CERs Received in 2009** | 60,000 |
| **CERs Received in 2010** | 60,000 |
| **CERs Received in 2011** | 60,000 |
| **CERs Received in 2012** | 945,000 |
| **EUAs Received in 2012** | 615,000 |

| | |
|---|---|
| **Money Received in 2012** | XXX € [depending on price level] |
| **or Money Received in 2008** | XXX € - discount factor |

| Transaction Breakdown | | | | | |
|---|---|---|---|---|---|
| **Delivery Dates** | **EUAs Required** | **EUAs Allocation** | **EUAs** | **CERs** | **Total EUAs** |
| 15-Dec-08 | 1,560,000 | 1,500,000 | - 1,440,000 | 0 | 1,560,000 |
| 18-Dec-09 | 1,560,000 | 1,500,000 | | 60,000 | 1,560,000 |
| 24-Dec-10 | 1,560,000 | 1,500,000 | | 60,000 | 1,560,000 |
| 23-Dec-11 | 1,560,000 | 1,500,000 | | 60,000 | 1,560,000 |
| 21-Dec-12 | 1,560,000 | 1,500,000 | 615,000 | 945,000 | 1,560,000 |
| Total Dec-12 | 7,800,000 | 7,500,000 | - 825,000 | 1,125,000 | 7,800,000 |



# VII. Deutsche Bank and the Carbon Market

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# Deutsche Bank in the Emissions Markets

## Deutsche Bank is a proud to be a leader in the global emissions markets

- In the emissions markets established under the Kyoto Protocol, Deutsche Bank:
  - is involved in over 50 projects with total expected reductions of over 185m tonnes $CO_2e$
  - is one of only 2 banks in the Prototype Carbon Fund, the world's first carbon fund (April 2000)
  - is the only bank involved in the Umbrella Carbon Facility, the world's largest public sector deal ($719mio)
  - structured, syndicated and wrapped the world's largest private sector CER deal (28m tonnes) [1]
  - continues to source emissions reductions projects in LATAM, India, Asia, and Africa, leveraging extensive local relationships and expertise via Deutsche Bank's extensive branch network
  - has experience of a wide range of methodologies in a wide range of jurisdictions
- Deutsche Bank plays a significant role in the secondary Kyoto emissions reductions markets:
  - market-maker to all major emissions brokers and emissions traders
  - provides a wide range of value-added structured emissions products for compliance buyers and voluntary buyers, including "guaranteed delivery certificates"
  - provides a wide range of related services such as emissions certificate accounts, credit facilities etc.
  - provides emissions reductions investment products to institutional and retail investors, including cash-settled derivatives

1.) "Deal of the Year", *Energy Risk*, January 2007





# Deutsche Bank in the Emissions Markets

- Deutsche Bank is in discussions with select Annex 1 nations regarding:
  - providing advice and assistance regarding emissions trading, policy, and Kyoto compliance
  - "greening" of AAU surpluses (both "hard" and "soft") to increase AAU saleability
  - arranging inter-governmental sales and purchases of greened AAUs
  - structuring and establishing various Sovereign "green funds" to purchase emissions reductions certificates for both the public and private compliance sectors
- In the European Union Emissions Trading Scheme (EU-ETS), Deutsche Bank:
  - is a major market-maker and active trader of EUAs
  - is able to leverage an extensive European power and energy trading business
  - provides a wide range of value-added structured emissions products related to power and energy
  - works closely with the European commission, member states, and industry organisations on the ongoing development and implementation of EU-ETS policy and practice
- Deutsche Bank conducts and publishes extensive, well-regarded research and analysis on the global emissions markets which is:
  - widely read by corporates, sovereigns, financial institutions, investors, etc.
  - widely quoted in the international press and industry news services
  - freely available on request

## Deutsche Bank in the Carbon Market

- CER production and project off-take
  - Deutsche Bank involved in transactions with total expected reductions of over 185 million tonnes CO2e
  - Deutsche Bank involved directly or indirectly in over 30 projects globally
  - India specifically targeted as a key focus area
- Secondary market
  - Deutsche Bank emissions business established due to synergies with its global power and gas trading business
  - Long standing relationships with global utilities (compliance buyers)
  - Wide access to hedge funds, institutional and retail investors
  - Market maker with relationships to all major brokers
  - Proprietary and value added investment of the bank’s capital





## Deutsche Bank Credentials


**2006**

Deal of the Year

A new breed of deal emerged last year which fused physical energy trading with the merger and acquisition services of an investment bank. Deutsche Bank was at the front of the charge with a pioneering deal involving a £109 million combined cycle gas turbine power plant in Brimsdown, east Enfield, north London.

Best Investor Business

Deutsche Bank has thrown open the gates of the commodity market to the investor on the street. In traditional markets it has launched the first commodity-linked exchange traded fund (ETF) and in a significant move into Islamic finance, it launched the first Shariah-compliant commodity-linked note for high net worth individuals.

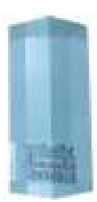
Risk AWARDS 2005

**2005**

**Energy Derivatives House of the Year**

**“The combination of true innovation with a massive derivatives trading book has turned Deutsche into one of the world's leading energy finance houses.”**

“…We needed a bank that would be able to manage the risk and would be comfortable with it," says Colin Campbell, Killingholme's chief executive…. We also wanted someone that would be able to give us a transparent price for our trading book..”



**2003**

**“…the German bank’s energy and commodity business has undergone something of a revolution.”**

“…it’s sophistication that differentiates Deutsche from most of its competitors…Few other houses can offer such complex products at a competitive price…Deutsche appears to have become number one among clients for structured commodity trades.”

## Deutsche Bank in the Carbon Market

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