



**Workshop CDM in Industrial Processes**

# **Recall of the Main Features of the Clean Development Mechanism (CDM)**

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# Overview

Background Kyoto Protocol and CDM

Baseline and Additionality

Approved Methodologies and Obstacles

Small Scale CDM and Sinks Projects

Recent developments in CDM Markets

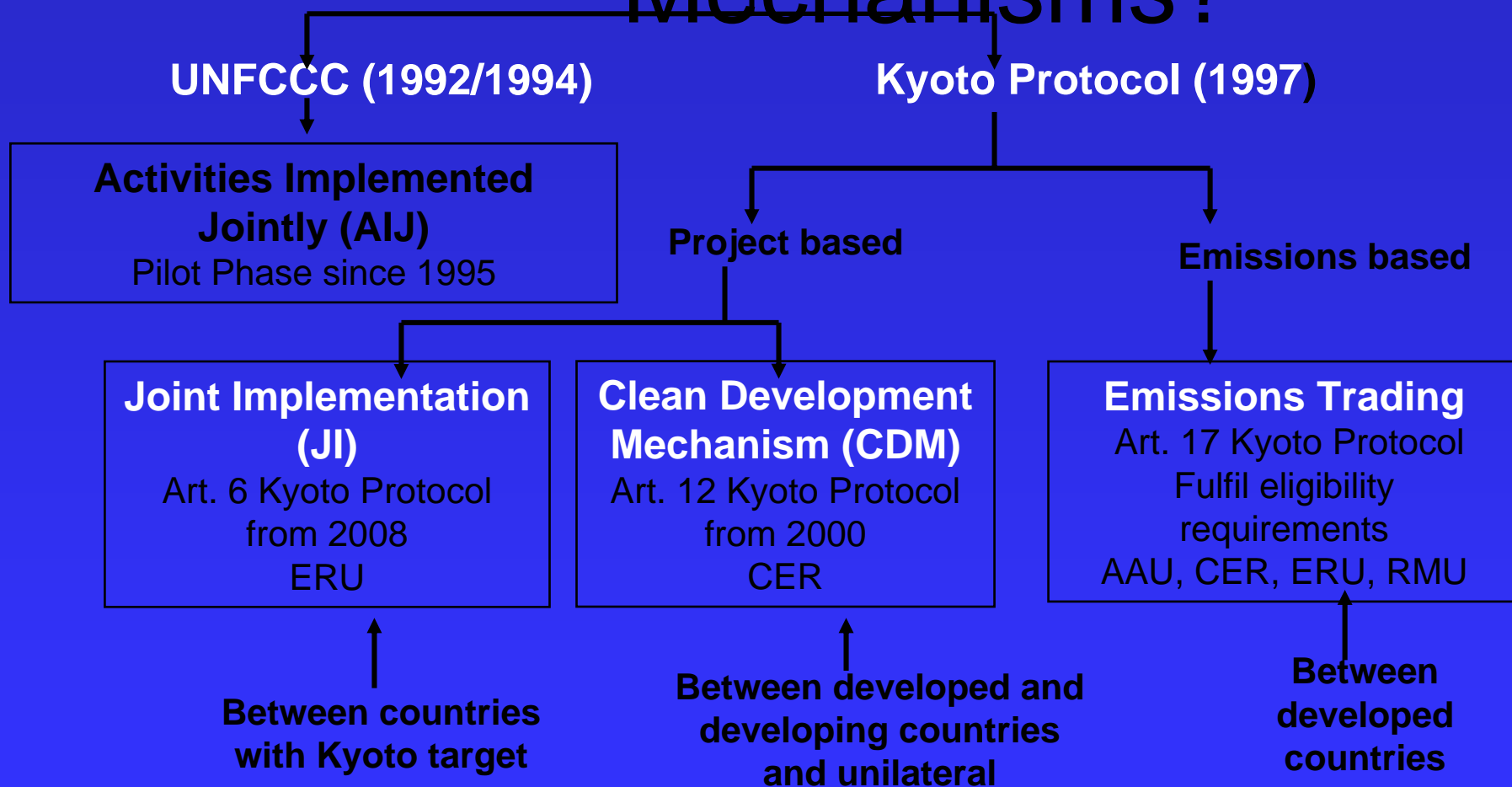
# Background + History

- 1992: United Framework Convention on Climate Change UNFCCC
- 1997: Kyoto-Protokoll: emissions targets for industrialized countries
- No targets for developing countries, but incentives for reductions on the basis of the Clean Development Mechanism
- 2001: Marrakesh Accords which set the rules for Flexible Mechanisms
- 2003: Rules for CDM sink projects
- 2004: Rules for small scale CDM sink projects
- Aim: cost effectiveness → Flexible Mechanism
- 2005: Kyoto Protocol in force. First Meeting of the Parties (MOP) to the Kyoto Protocol 28/11-9/12 in Montréal/Canada

# First Report of EB-CDM to MOP

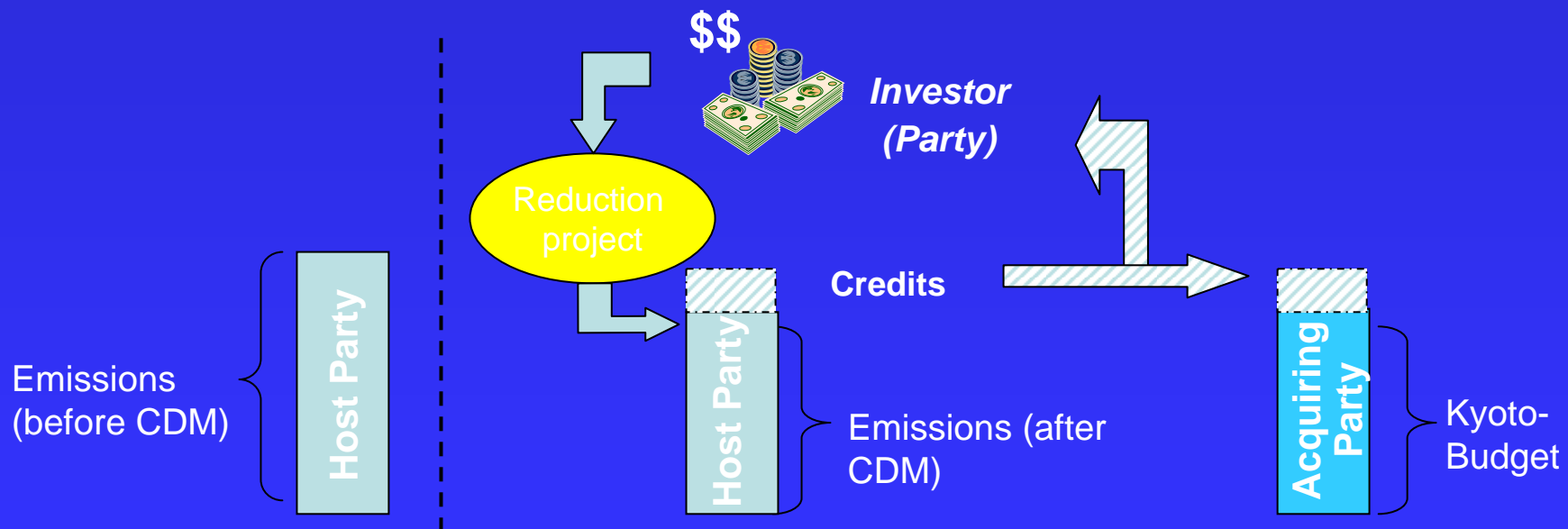
- Report of the Executive Board of the clean development mechanism and election of members of the Executive Board
- The Executive Board of the CDM reports on activities to each session of the COP/MOP. The annual report 2004–2005 is the first one which the Board will present to the COP/MOP. In exercising its authority over the CDM, the COP/MOP shall review annual reports, provide guidance and take decisions, as appropriate. Prior to the entry into force of the Kyoto Protocol, these functions were assumed by the COP at its eight, ninth and tenth sessions.
- The report provides information on progress made in the implementation of the CDM arising from action taken by the Board during its fourth year of operation. The progress includes the registration of CDM project activities, the accreditation and provisional designation of operational entities, the approval of new methodologies for baselines and monitoring, the consolidation of such methodologies, and improved access to information on the CDM through the UNFCCC CDM web site. The further development of the CDM registry, required for the issuance of certified emission reductions, is another important topic covered in this report.
- The report also addresses governance issues, notably measures taken to ensure the efficient, cost effective and transparent functioning of the CDM. The CDM Management Plan, due to be completed in September 2005, is of major importance in this respect. The need for resources commensurate to undertake required activities is also highlighted in the report. The report contains recommendations for decisions to be taken by the COP/MOP at its first session, including on the designation of operational entities.
- Action: Following its discussion of the item, the COP/MOP will be invited to take note of the report of the CDM Executive Board. The COP/MOP will also be invited to establish a contact group, and to consider any resulting draft decisions recommended by the group for adoption by the COP/MOP at its first session.

# What are the Flexible Mechanisms?



# Functioning of CDM

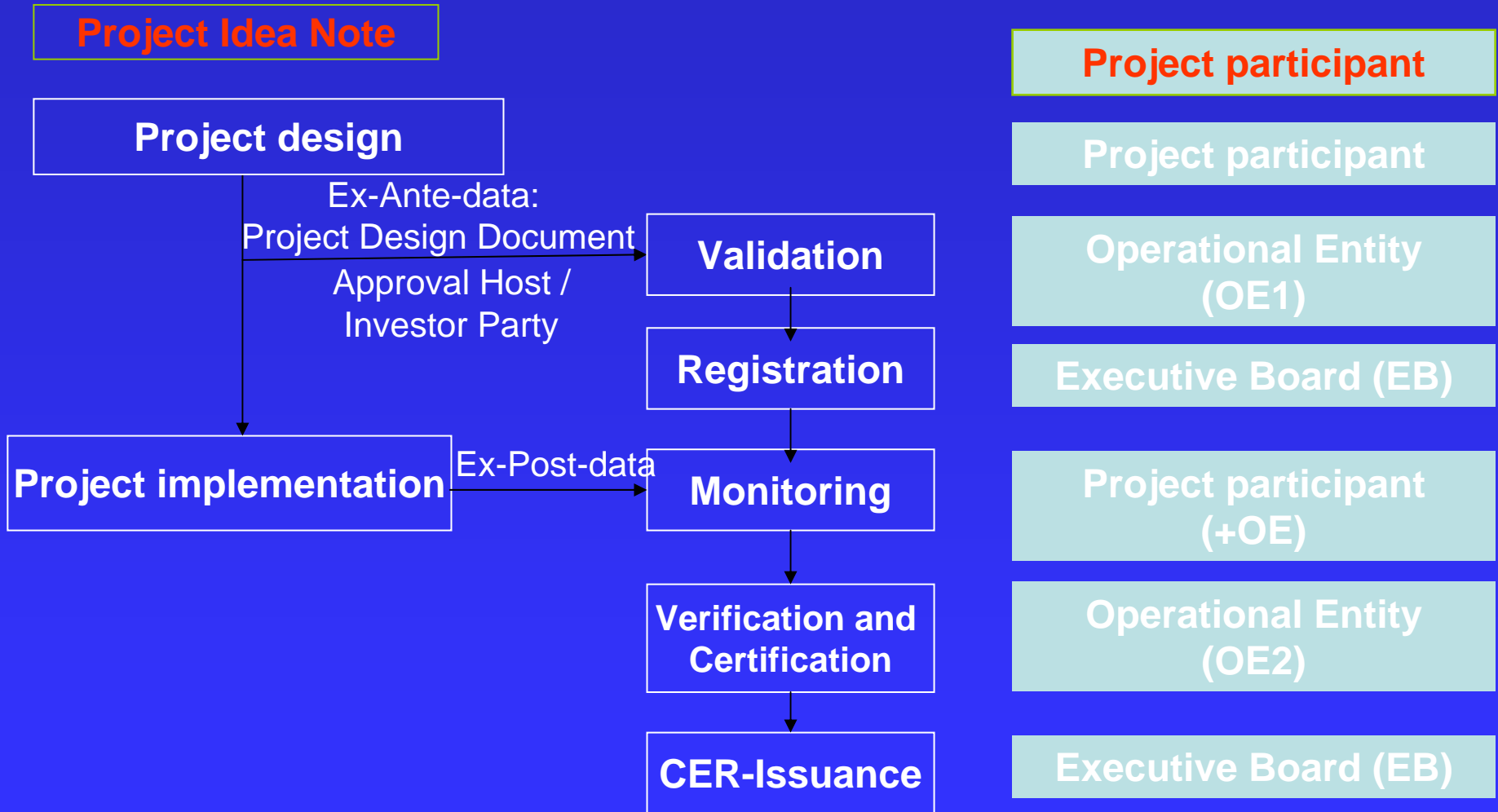
- Project proponent (government / private) invests in reduction project
- Certified Emissions Reductions (CERs) are generated
- CERs are credited on target of Investor (Party or entity)



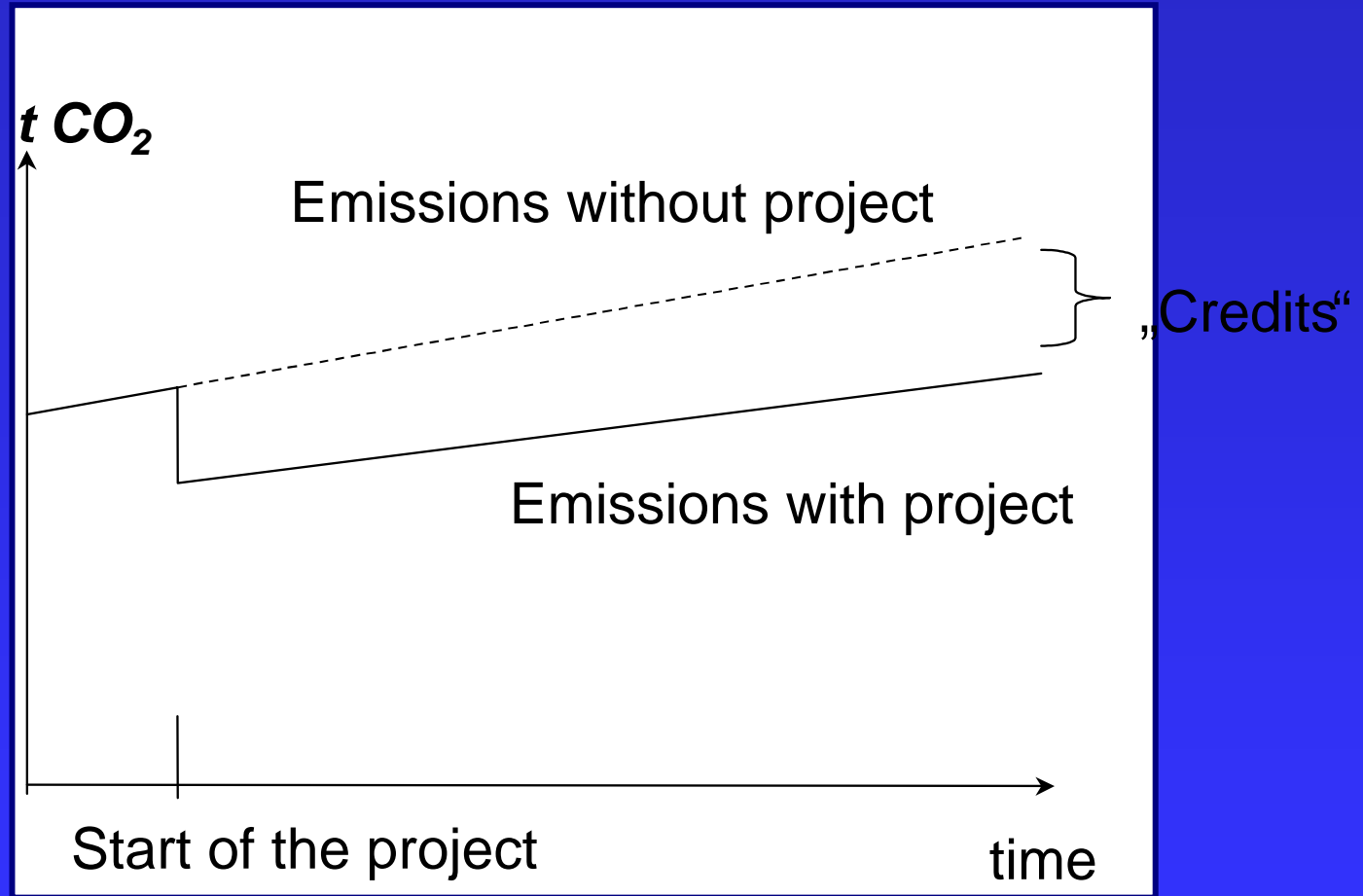
# Project Eligibility

- Only emissions of greenhouse gases listed in Annex A of the KP (Article 3 KP).
- Demonstrable contribution **sustainable development** (Annex p. 35, Para. 40a [2])
- Written Approval of **voluntary participation** of project participants. (Annex p. 35, Para. 40a [2])
- Refrain from using **official development aid** (Decision p. 20 [2])
- **Additionality**: Barriers or quantitative evidence
- Refrain from credits generated from **nuclear facilities** (Decision p. 20 [2])
- **Stakeholder** comments and a report to the designated operational entity on how due account was taken of any comments has been received (Annex p. 14, Para. 31 [2])

# CDM: Project-cycle



# Baseline



Crediting time: 3 x 7 years or 1 x 10 years

# Baseline: Case law and path dependency

- The EB does not provide a basic set of rules beyond the Marrakech Accords text
  - Exception: small scale projects
- All rules are developed by case law
- Project pioneers have to propose a new rule (“methodology”) for each new project type
  - Higher validation costs
  - Delay of several months
  - Risk of refusal
- The CDM regime is shaped by first proposers
- Important role of validators, methodology panel and expert reviewers

# Additionality and Baselines

**Kyoto Protocol** states CDM projects should lead to:

*Real, measurable, and long-term* benefits related to the mitigation of climate change; Reductions in emissions that are *additional* to any that would occur in the absence of the certified project activity (Art. 12, 5, b+c)

## **Environmental integrity**

- Prevent fictitious emissions reductions

## **Economic efficiency**

- Minimize sum of transaction costs for project participants and public institutions

# Additionality Tests

## **10th session of CDM EB states:**

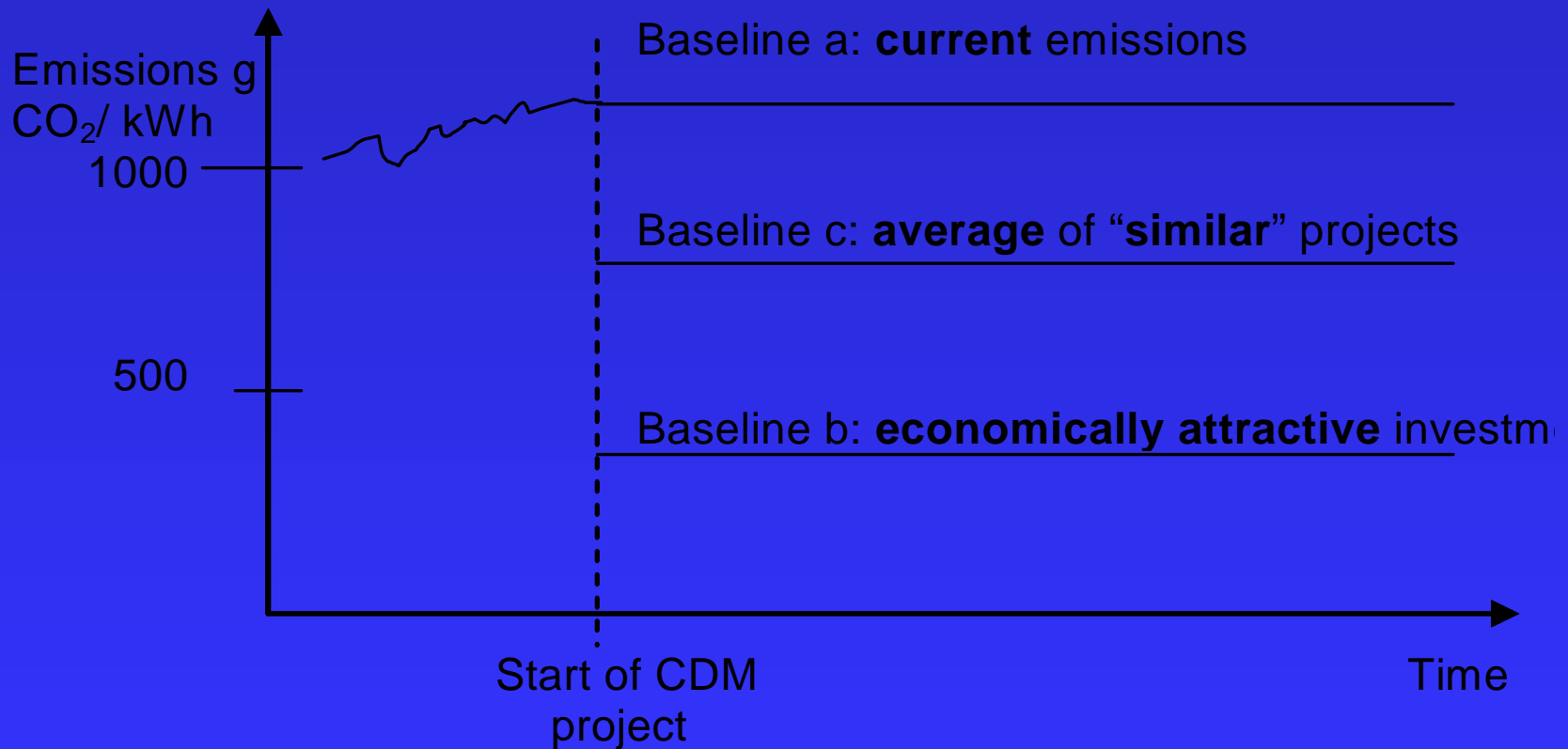
As part of [...] determining the baseline scenario an explanation shall be made of how, through the use of the methodology, it can be demonstrated that a project activity is additional and therefore not the baseline scenario.

- **Flow-chart / series of questions that lead to a narrowing of potential project options**
- **Qualitative / quantitative assessment of different potential options and an indication of why the non-project option is more likely**
- **Qualitative /quantitative assessment of one or more barriers facing the proposed project activity**
- **Project type is not common practice in the proposed area of implementation, and not required by recent/pending legislation/regulations**

## Links between baseline and additionality determination

- Project-by-project baseline approach allows integrated determination of additionality, e.g. by looking at the least-cost alternative project as a baseline or a control group.
- Benchmarks do not capture additionality; thus a separate additionality test is necessary

# Baseline principles



- a) old coal fired power station 1200 g CO<sub>2</sub>/kWh.
- b) gas turbine 450 g CO<sub>2</sub>/kWh
- c) 850 g CO<sub>2</sub>/kWh

# Status of Approval Process for Baseline Methodologies

- A CDM Methodology Panel was formed to revise all baseline and monitoring methodologies presented in order to give recommendations to the Executive Board (EB).
- Presently 48 projects are in the B class (under revision).
- Up to now **49** CDM methodologies were **rejected** (i. e. C-status), 46 in the first round. 2 methodologies have been withdrawn
- **23+4** CDM methodologies have been **approved** so far by the EB (i. e. A-status). Most have not been approved by the **first evaluation**.

# Accepted CDM Baseline and Monitoring Methodologies by Sector

Scope Number	Sectoral Scope	Methodology	Approved	Approved	DOEs accredited for validation
			Small Scale	Consolidated	
			Methodologies	Methodologies	
1	Energy industries (renewable - / non-renewable sources)	AM0004,AM0005,AM0007,AM0010,AM0014,AM0015,AM0019	AMS-I.A.,AMS-I.B.,AMS-I.C.,AMS-I.D.,AMS-II.B.AMS-III.B.	ACM0002,ACM0004	JQA,DNV-CUK,SGS-UKL,TUEV-SUED,TUEV-RHEIN,JACO,AENOR,BVQI,KPMG
2	Energy distribution		AMS-II.A.		JQA,DNV-CUK,SGS-UKL,TUEV-SUED,TUEV-RHEIN,JACO,AENOR,BVQI,KPMG
3	Energy demand	AM0017,AM0018,AM0020	AMS-II.C.,AMS-II.E.,AMS-II.F.		JQA,DNV-CUK,SGS-UKL,TUEV-SUED,TUEV-RHEIN,JACO,AENOR,BVQI,KPMG
4	Manufacturing industries	AM0007,AM0008,AM0014	AMS-II.D.	ACM0003	JQA,DNV-CUK,SGS-UKL
5	Chemical industries	AM0021			JQA,DNV-CUK,SGS-UKL
6	Construction				JQA,DNV-CUK,SGS-UKL
7	Transport		AMS-III.C.		JQA,DNV-CUK,SGS-UKL
8	Mining/mineral production				
9	Metal production				
10	Fugitive emissions from fuels (solid, oil and gas)	AM0009,AM0023	AMS-III.D.		JQA,DNV-CUK,SGS-UKL
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	AM0001			JQA,DNV-CUK,SGS-UKL
12	Solvent use				JQA,DNV-CUK,SGS-UKL
13	Waste handling and disposal	AM0002,AM0003,AM0006,AM0010,AM0011,AM0012,AM0013,AM0016,AM0022	AMS-III.D.,AMS-III.E.	ACM0001	JQA,DNV-CUK,SGS-UKL,TUEV-SUED,JCI
14	Afforestation and reforestation				
15	Agriculture	AM0006,AM0016	AMS-III.E.		DNV-CUK,TUEV-SUED

# Main reasons for revision / for non approval of the baseline methodology

**Additionality** You have to show that the project activity is not part of the baseline.

- insufficient / lack of justification
- wrong use of the term „environmental additionality“

**Choice of one of the following approaches (§ 48 Marrakesh Accords CDM M&P):**

- (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 projects 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.

- Selection of a wrong approach
- no decision for one of these approaches
- lack of clarity which approach is chosen

# Main reasons for revision resp. for non-approval of the baseline methodology

„most appropriate“ You have to identify the most appropriate approach among the three (see above) for the project activity.  
→ insufficient / lack of justification

## Transparency and conservatism

The baseline must be established in a transparent and conservative manner.

- **transparent:** detailed explanation and justification of assumptions.
- **conservative:** in the case of doubt, values that generate a lower baseline projection shall be used.

## Project activity is already under construction

- Project activity economically attractive?
- Indicates: the project activity is not additional.

# Small Scale CDM Projects (SSP)

- (i) renewable energy project activities with a maximum output capacity equivalent of up to 15 megawatts (or an appropriate equivalent);
- (ii) energy efficiency improvement project activities that reduce energy consumption on the supply and/or demand side, by up to the equivalent of 15 GW hours per use;
- (iii) Afforestation or Reforestation projects that are expected to result in net human-induced greenhouse removals of less than 8 kt of CO<sub>2</sub> per year and are developed or implemented by low-income communities or individuals (as determined by the Host Country); or
- (iv) other project activities that both reduce anthropogenic emissions by sources and directly emit less than 15 kt of carbon dioxide equivalent annually.

# Simplified Procedures for SSP

- (i) a simplified Project Design Document;
- (ii) simplified methodologies for determining a baseline and creating a monitoring plan;
- (iii) the ability to bundle project activities for the Project Design Document, registration and verification to reduce administration costs;<sup>11</sup>
- (iv) simplified provisions for environmental impact analysis;
- (v) lowered registration fee;
- (vi) an automatic ability to have the same DOE verify and certify emission reductions for a specific small scale CDM Project activity.

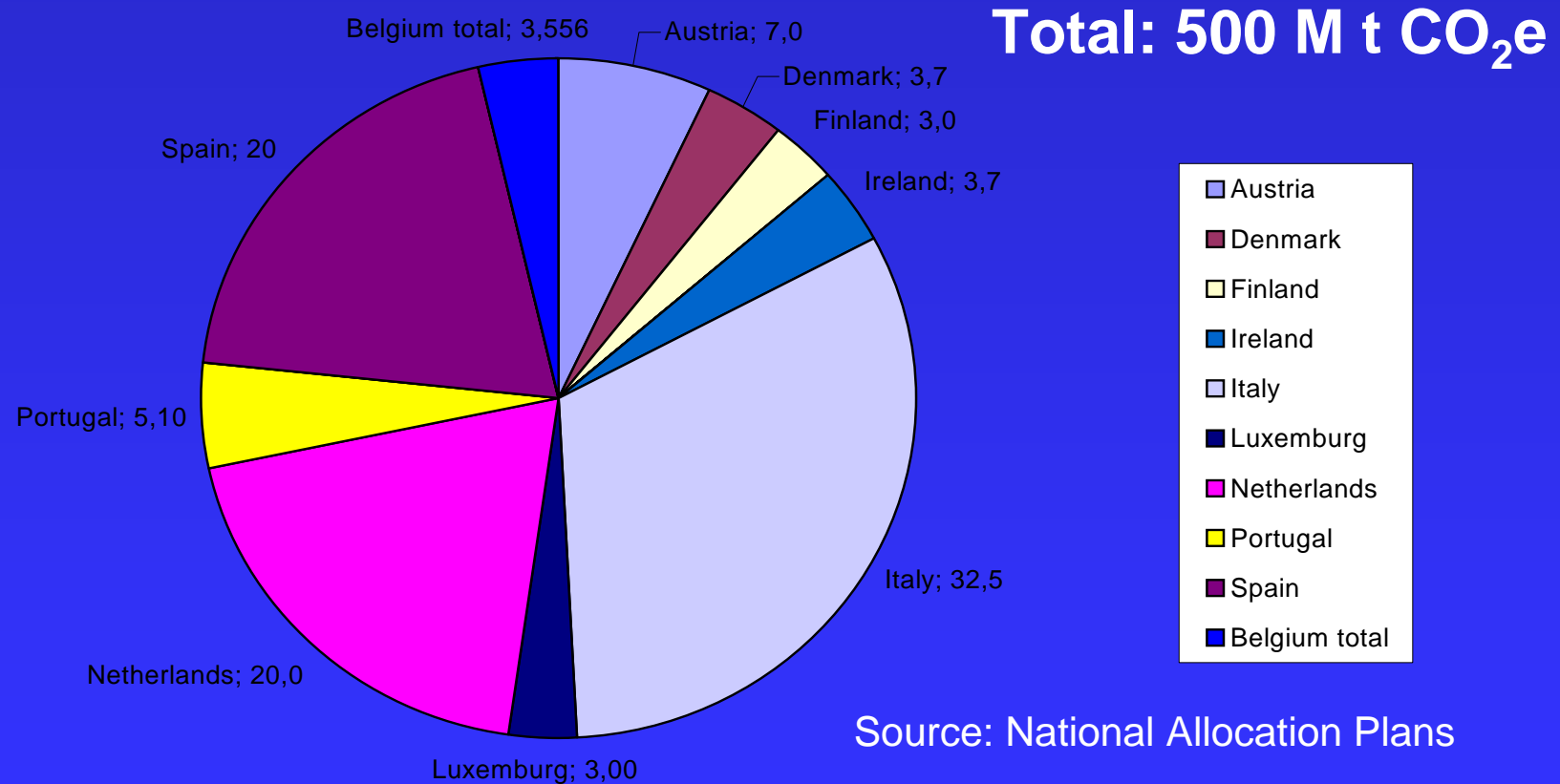
# Baselines for small scale projects

- Only category where baseline rules have been set by EB. Additionality test through proof of barrier
- 13 project categories with distinct rules
  - Electricity generation by the user; Mechanical energy for the user; Thermal energy for the user; Renewable electricity generation for a grid
  - Supply side energy efficiency improvements – T&D;-Generation; Demand-side programmes for specific technologies; EE and fuel switching measures for industrial facilities; for buildings
  - Agriculture; Switching fossil fuels; Emission reductions by low-greenhouse emission vehicles; Methane recovery and avoidance
- Example: Renewable electricity generation for a grid
  - Average of 1. weighted average emissions of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar, and 2. lower of most recent 20% of plants built or the 5 most recent plants;
  - Weighted average emissions of the current generation mix

# Thresholds for small-scale projects and transaction costs

Project type	Annual full load hours	GWh	CERs/year	TAC/ CER (\$)
Hydro 15 MW	8000	120	108,000	0.5
Wind 15 MW	2700	40	36,000	2
Energy efficiency 15 GWh	NA	15	13,500	20
Fuel switch coal to gas below 15kt	NA	NA	23,350	5

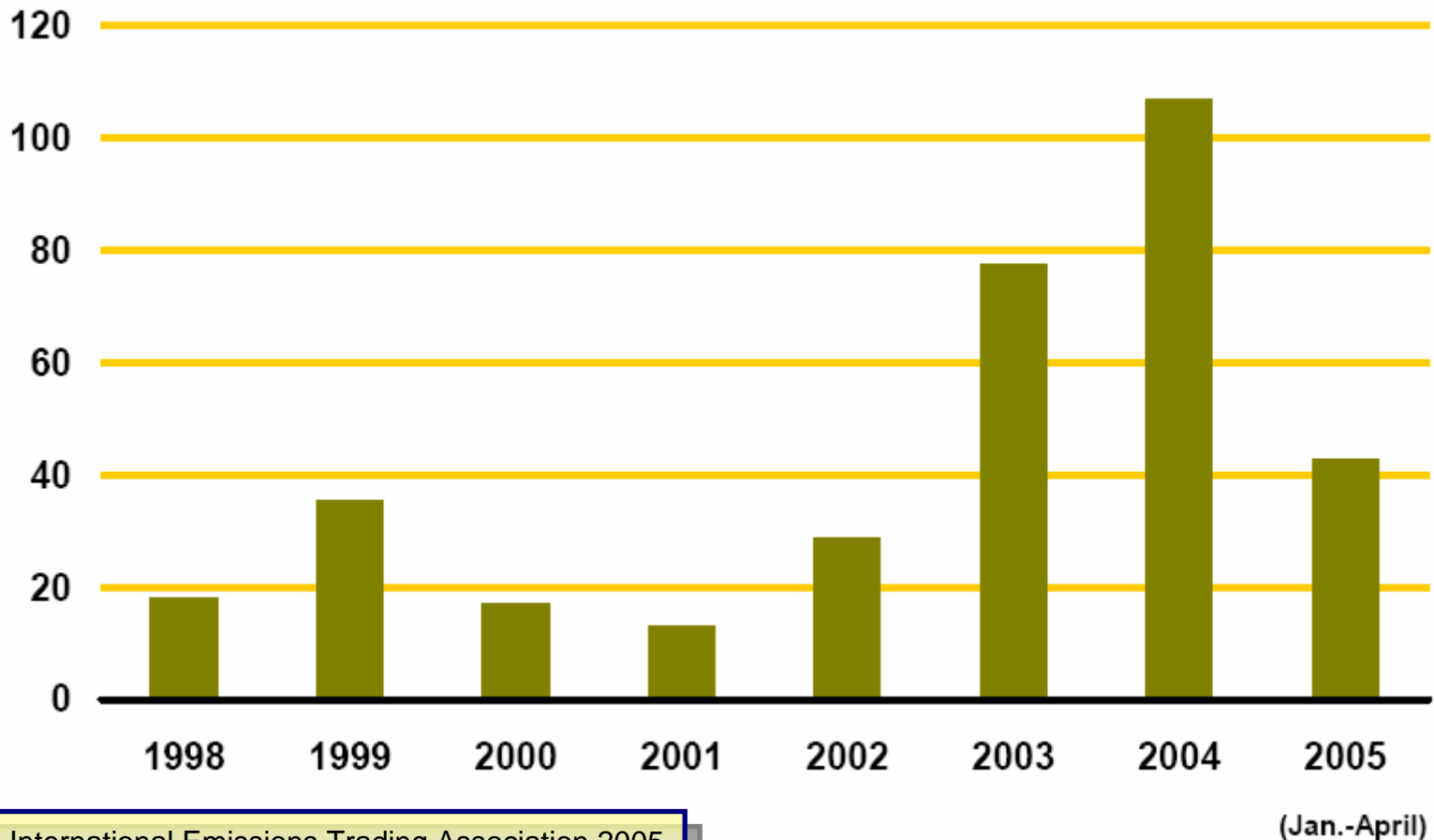
# European government expressed interest in Kyoto Mechanisms 2008-2012 (M t CO<sub>2</sub>e /a)



# The EU Linking Directive

- Final agreement: April 2004
- Accounting of CERs, ERUs in EU ETS
- Not dependent on ratification of Kyoto Protocol
- Restricted use of CERs / ERUs by operators (% defined in NAP)
- No nuclear, no sinks projects are eligible
- World Commission on Dams for Large hydro-power >20 MW
- Use of CERs from 2005
- Use of ERUs from 2008
  - Baseline has to reflect *acquis communautaire*
  - Cancellation of equivalent number from operator (direct) or registry (indirect)

# ANNUAL VOLUMES (million tCO<sub>2</sub>e) OF PROJECT-BASED EMISSION REDUCTIONS TRADED (up to 2012 vintages)



Source: International Emissions Trading Association 2005

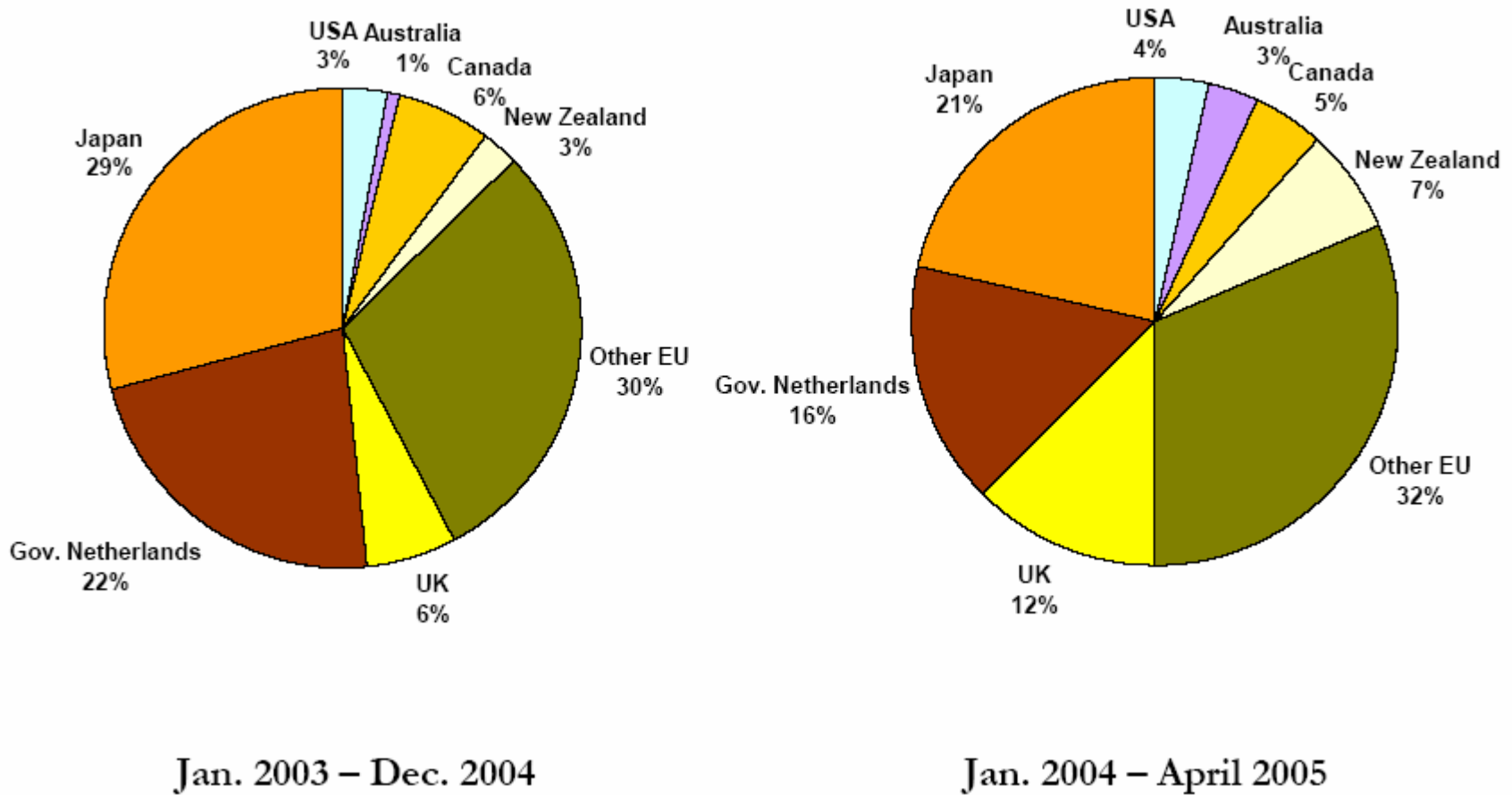
# Volumes Exchanged and Number of Transactions per Market Segment

	Total Project-Based Transactions	Compliance	Voluntary	Retail*
1998	17,976,538	0	17,907,448	69,090
1999	35,423,491	0	35,265,724	157,767
2000	17,094,425	387,933	16,507,407	199,085
2001	13,004,103	4,724,591	8,161,652	117,860
2002	28,776,967	14,676,748	13,893,209	207,010
2003	77,641,815	70,429,780	6,773,367	438,669
2004	107,010,089	104,600,758	2,299,050	110,281
2005 (Jan.-April)	42,863,095	39,823,182	2,995,000	44,913
<b>Total</b>	<b>339,790,524</b>	<b>234,642,992</b>	<b>103,802,856</b>	<b>1,344,675</b>

*Note: All volumes are for vintages up to 2012 only. Data for retail incomplete.*

Source: International Emissions Trading Association 2005

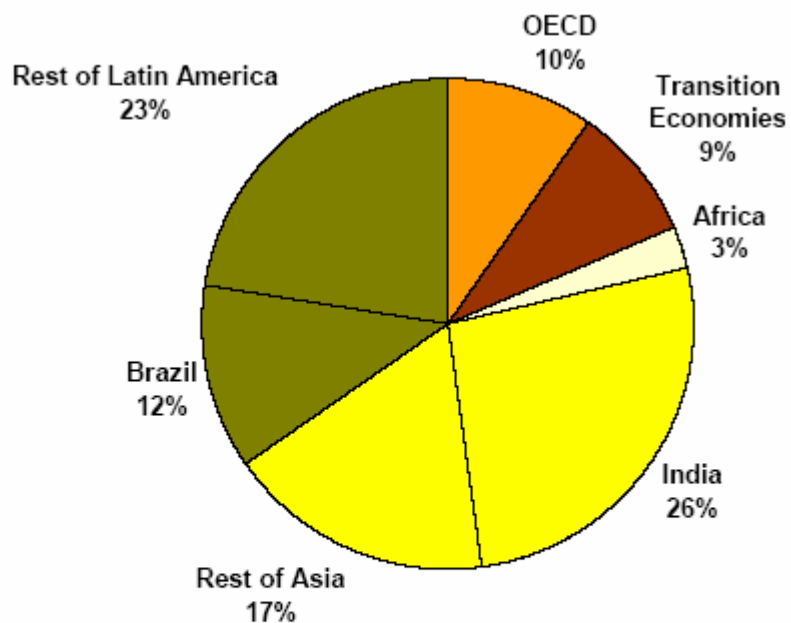
# MARKET BUYERS (share of volume of ERs purchased)



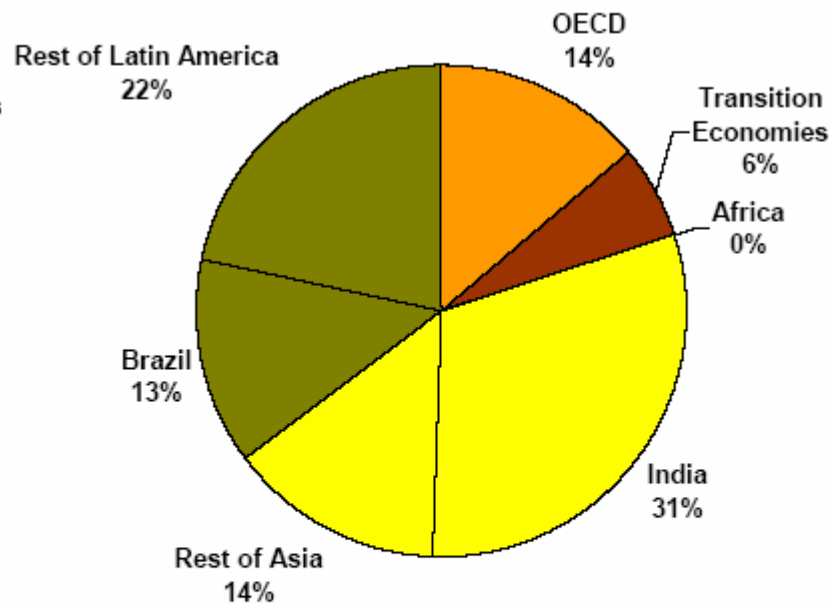
Source: International Emissions Trading Association 2005

Purchases of World Bank Carbon Funds allocated to Funds Participants pro rata their shares

# LOCATION OF EMISSION REDUCTION PROJECTS (in share of volume supplied)



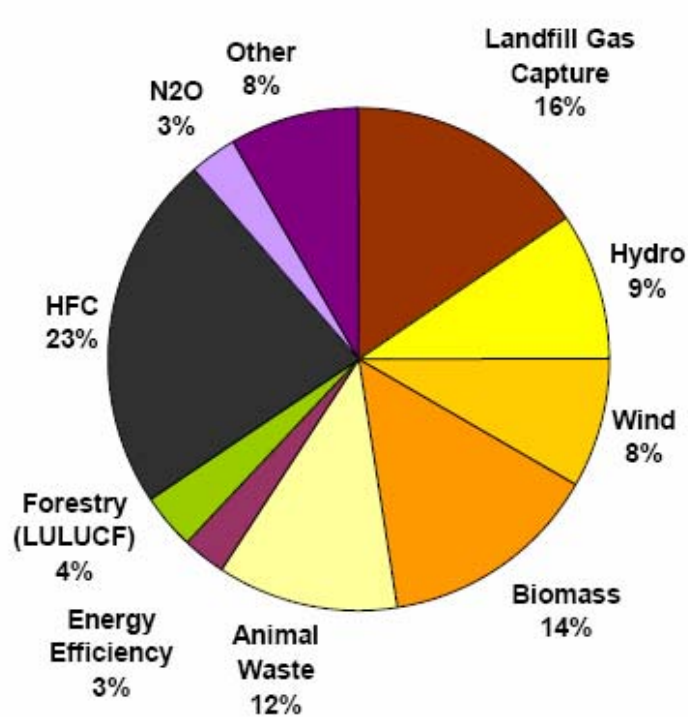
Jan. 2003 – Dec. 2004



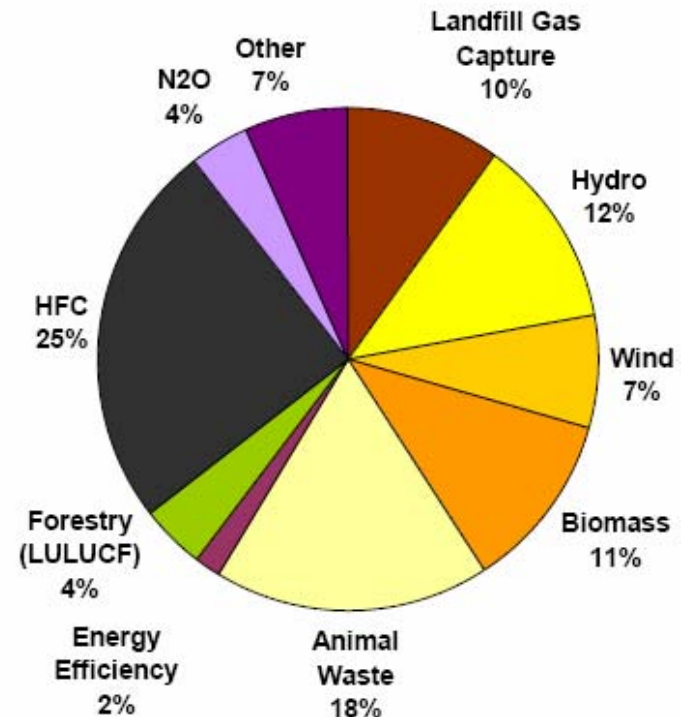
Jan. 2004 – April 2005

Source: International Emissions Trading Association 2005

# TECHNOLOGY SHARE OF EMISSION REDUCTION PROJECTS 2003- 2004 (in percent of total volume contracted)



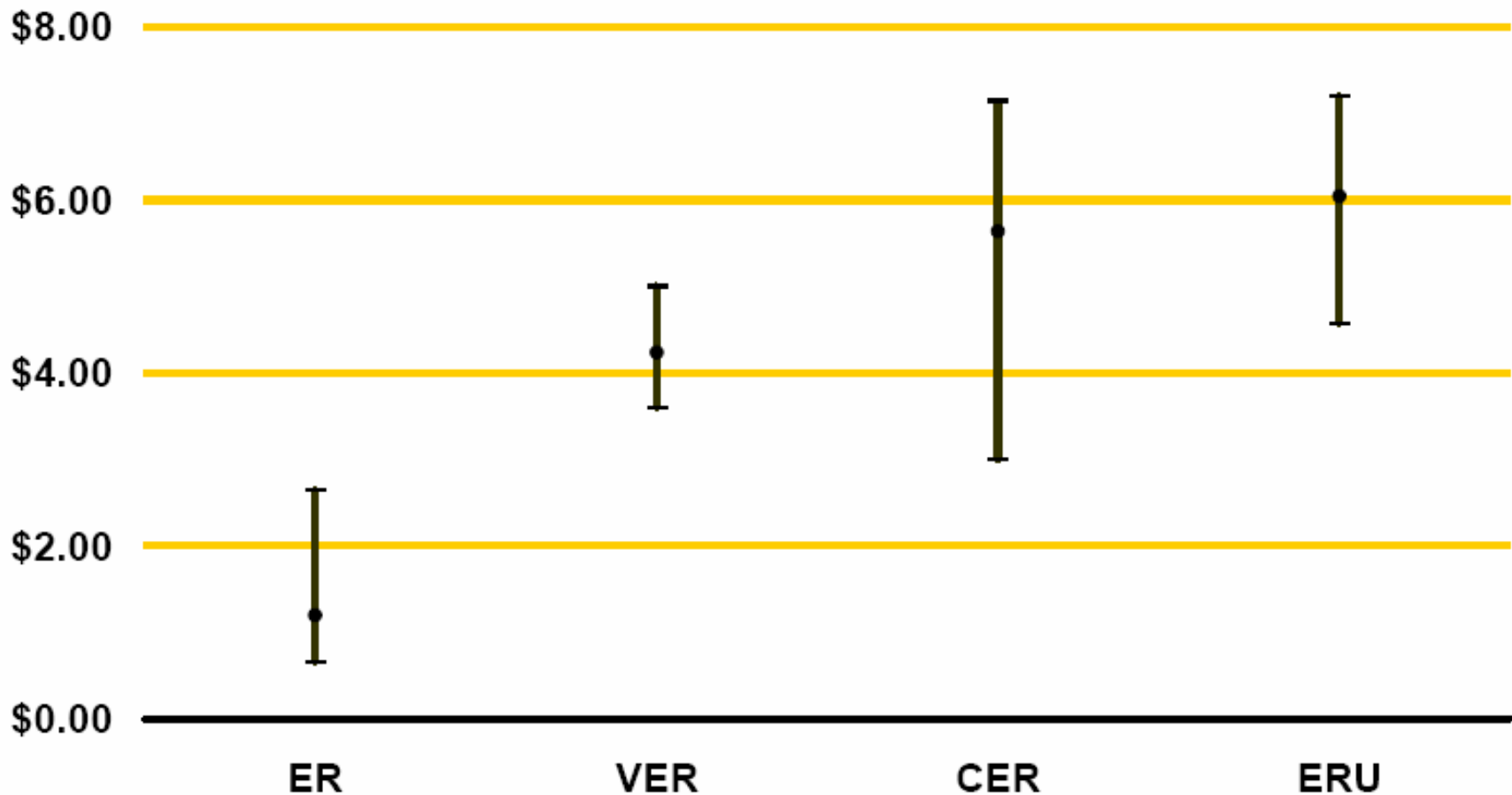
Jan. 2003 – Dec. 2004



Jan. 2004 – April 2005

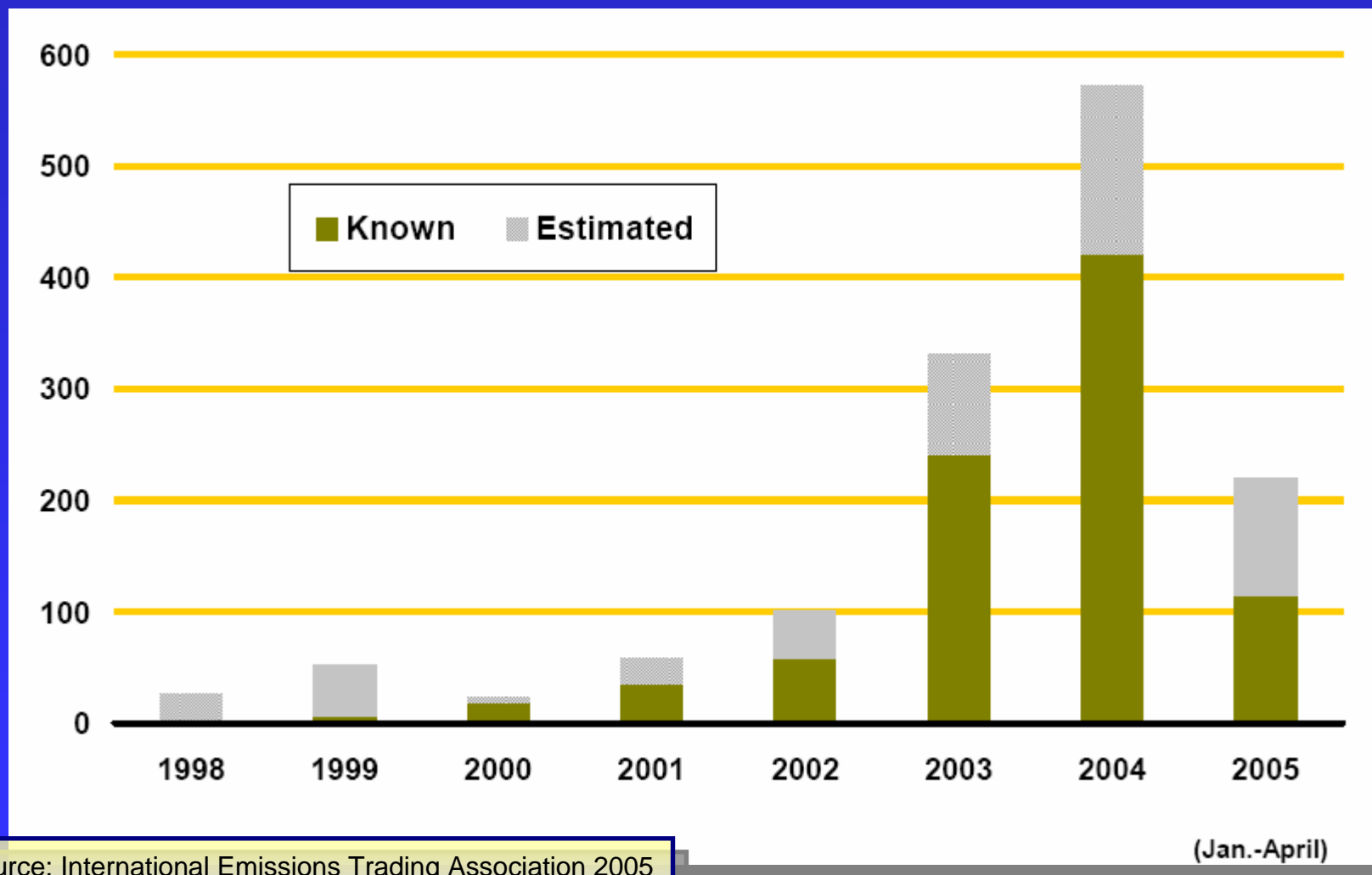
Source: International Emissions Trading Association 2005

# PRICES FOR NON-RETAIL PROJECT-BASED ERs January 2004 to April 2005 (in U.S.\$ per tCO<sub>2</sub>e)



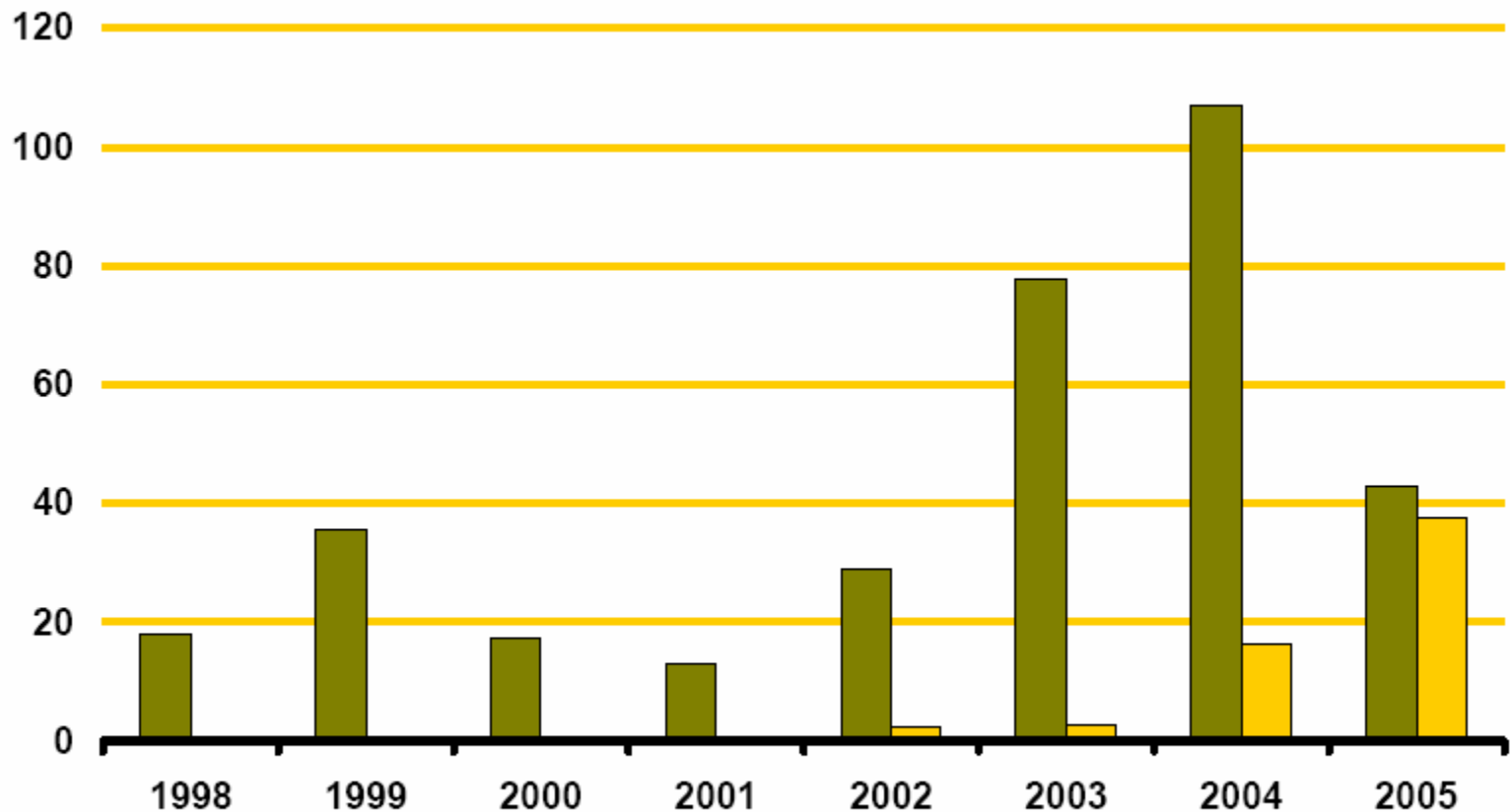
Source: International Emissions Trading Association 2005

# TOTAL MARKET VALUE (ESTIMATE) PER YEAR in million U.S.Dollars (nominal)



Source: International Emissions Trading Association 2005

# VOLUME EXCHANGED THROUGH PROJECT- (green) AND ALLOWANCE- (yellow) BASED TRANSACTIONS (million tCO<sub>2</sub>e)



Source: International Emissions Trading Association 2005

(Jan.-April)

# Summary: Project-based transactions (1)

- The market for project-based ERs is still growing steadily: 107 million metric tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e) have been exchanged through projects in 2004, a 38% increase relative to 2003 (78 mtCO<sub>2</sub>e). The volume exchanged so far in 2005 (January to April) is 43 MtCO<sub>2</sub>e, most of which under either Joint Implementation (JI) or the CDM. In the past 12 months, the number of JI and CDM projects under development has also increased substantially, with notably a large supply of unilateral CDM projects.
- New buyers of emission reduction have emerged. Private and public entities in Europe now represent 60% of the volume of ERs purchased through project-based transactions (Jan. 2004 to April 2005), against 21% for private and public entities in Japan and 4% for private entities in Canada.
- The supply of emission reductions has remained heavily concentrated in a few countries: notably India by far the largest supplier of project-based ERs on the market—, Brazil and Chile. Apart from a few small-scale deals, poorer or smaller countries have seen limited activity since January 2004. Africa, in particular, has seen to our knowledge only one new large-scale transaction during that period and, in comparison with other regions, has relatively few projects in preparation.

## Summary: Project-based transactions (2)

- HFC23 destruction is still the dominant type of emission reduction projects in terms of volumes supplied (25% from January 2004 to April 2005). Projects capturing methane and N<sub>2</sub>O from animal waste now rank second (18%), ahead of hydro, biomass energy and landfill gas capture (about 11% each). Projects abating non-CO<sub>2</sub> emissions account for more than half of the total volume supplied, while traditional energy efficiency or fuel switching projects, which were initially expected to represent the bulk of the CDM, account for less than 5%.
- Due to the heterogeneity of the underlying projects and contracts terms, the spread of prices of project-based emission reductions at any given time is very large. The whole spread has also moved substantially upward since last year. Verified Emission Reductions have traded between \$3.6 and \$5/tCO<sub>2</sub>e between January 2004 and April 2005, with a weighted average of \$4.23. Certified Emission Reductions have traded between \$3 and \$7.15/tCO<sub>2</sub>e over the same period of time, with a weighted average of \$5.63/tCO<sub>2</sub>e.<sup>3</sup> The decline of the dollar relative to the euro can explain only part of the observed increase relative to last year.

# Summary: Price of EUAs vs. Price of JI/CDM ERs (1)

- The widening gap between prices of carbon in JI / CDM and in the EU ETS is raising concerns from project sponsors and host countries. Three sets of elements can explain this differential.
- First, the markets for EUAs and for JI/CDM ERs are very different. Project-based ERs, as long as they have not been registered and delivered, are subject to important registration and delivery risks. By contrast, EUAs are government-issued, compliance-grade assets. And delivery risks in forward contracts for EUAs within Europe are likely to be smaller, on average, than in contracts for forward delivery of project-based ERs from developing countries.

## Summary: Price of EUAs vs. Price of JI/CDM ERs (2)

- Second, the two markets are only partially connected. Precisely, for a project-based ER to be valid under the pilot phase of the EU ETS (2005-2007), the seller must be able to guarantee delivery of CERs from the 2005, 2006 or 2007 vintages, which can be challenging. In addition, certain technical aspects of the import of CERs into the EU ETS are still subject to some uncertainty.
- Third, there are reasons to believe that the current prices of EUAs does not reflect longterm equilibrium price between supply and demand on the EU ETS: few entities are selling allowances, there are still large uncertainties over some national allocation plans, and weather and high oil prices have had an important impact on prices. Relatively thin volumes traded so far have also resulted in high price volatility.

# Conclusions

- The carbon market has gone a long way over the past 12 months. With the entry into force of the Kyoto Protocol, and the start of operation of the EU ETS, the carbon risk is increasingly perceived by Governments and firms alike as a strategic issue that should be carefully monitored, analyzed, and hedged against; and carbon transactions are among the most important tools to realize these goals. More than increase in volumes, the major change on the market over the past 12 months is probably in the realization that the carbon constraint is now serious. The increased number of players in the market, the large incipient demand flowing to carbon funds and Government tenders, or the apparition of sophisticated instruments for allowance trading are all signs that a major evolution is under way, as the market gears up for the a new and more operational phase.
- There are still plenty of challenges ahead, not least to reduce the regulatory uncertainties about the CDM, or to clarify the confusion between the price of EUAs and the price of allowance-based assets. Here patience is in order, as it will take a few more months for the EU ETS to operate in conditions more or less resembling a full and efficient market, at which time the price of carbon might provide a better indication of the equilibrium price of EUAs. But the critical issues ahead are clearly the ability of the CDM and JI to supply large volumes of emission reductions, and the amount of AAUs that Russia and Ukraine might put into the market.