



World Bank Carbon Finance Business - Introduction

Workshop and Business Roundtable

Brazil, March 2004

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Kyoto Protocol

The Kyoto Protocol



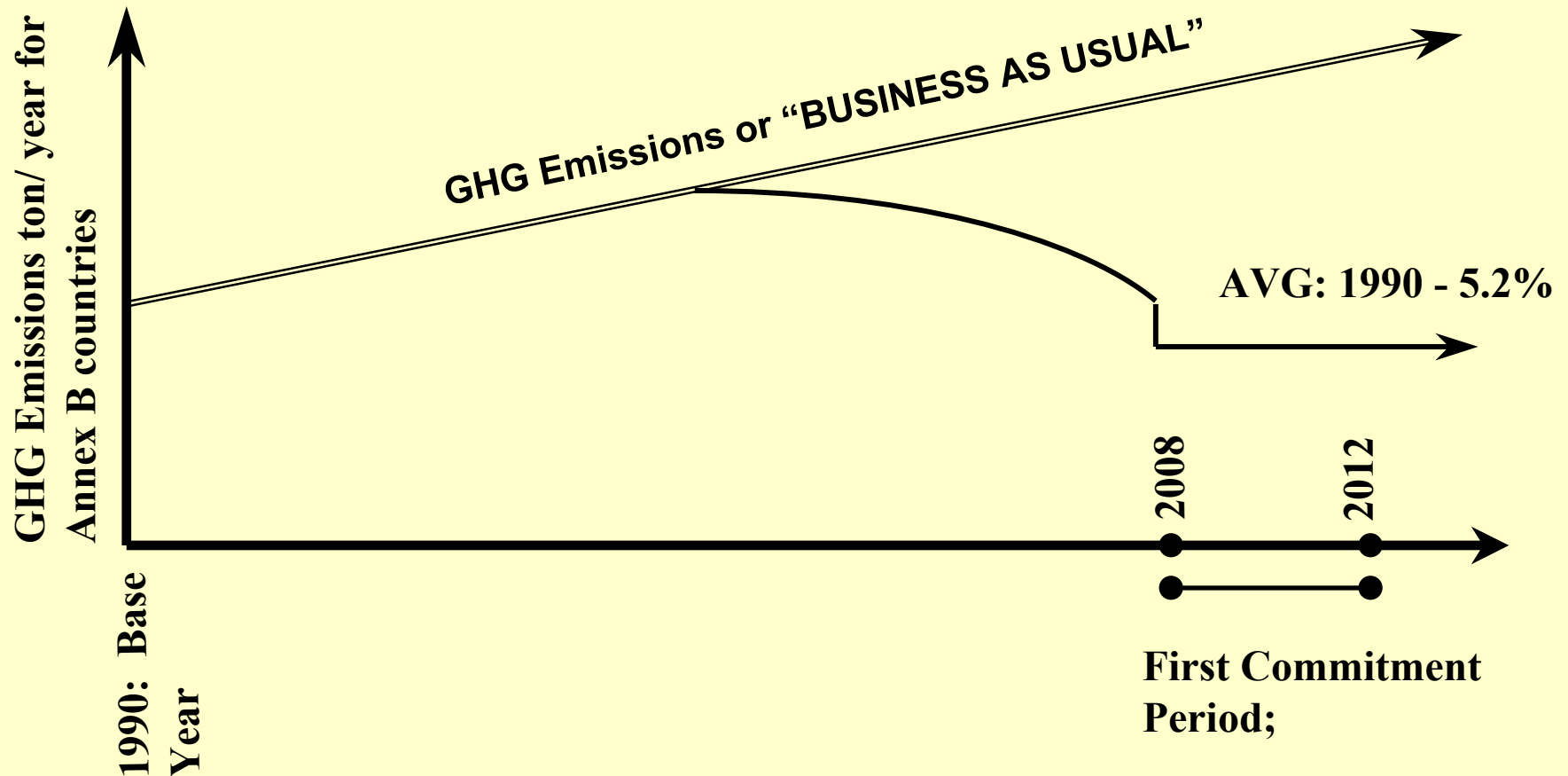
38 Industrialized Countries (Annex B countries)

- agreed to reduce greenhouse gases by 5.2 % below 1990 levels in the commitment period 2008-2012
- Total Demand for GHG Reductions: ~ 2800 - 4800 MtCO₂, including US

Status: Not yet in force

- Marrakech Accord: Final decision text agreed in Nov'01
- Coming into force: Requires ratification of 55 Parties to UNFCCC representing 55 % of industrialized countries' emissions (US constitutes ~ 36 %)
- As of end 2003, 110 Parties representing 43.9% of industrialized countries' emissions have ratified; with Russian ratification, Kyoto would come into force.

Graphical Representation of the Kyoto Protocol



Kyoto: policies and alternatives for Annex B Countries



- **Domestic Reductions**
- **International Credits (Kyoto Mechanisms):**
 - **International Emissions Trading**
 - **Project-based: Joint Implementation**
 - **Project-based: Clean Development Mechanism**

Supplementarity: (CoP 6 bis) “..domestic action shall constitute a significant element of the effort by each Party..”

The Kyoto Mechanisms: Clean Development Mechanism



Defined: credit for emission reduction investments in developing (non-Annex B) countries

Objectives:

- To promote sustainable development in developing countries
- To assist Annex B countries in meeting their emission reduction targets in cost-effective manner

Sinks:

- limited to afforestation and reforestation
- modalities were decided in CoP 9 - Milan (Dec. 2003) and were broadly favorable
- capped at 1% of base 1990 emissions of Annex B countries



Climate Change (Global warming): Why the Involvement of The World Bank ?

Why do we care? Bank's Mission: Poverty reduction and sustainable development



- **8 out of the 10 highest average yearly temperatures worldwide in the last century were registered in the last decade.**
- **The average temperature worldwide is expected to increase by 1.4°C to 5.8°C over this century from 1990 levels. (2003 Atlas)**
- **80% of carbon emissions are produced in richer countries.**

Climate change threatens the poorest disproportionately:

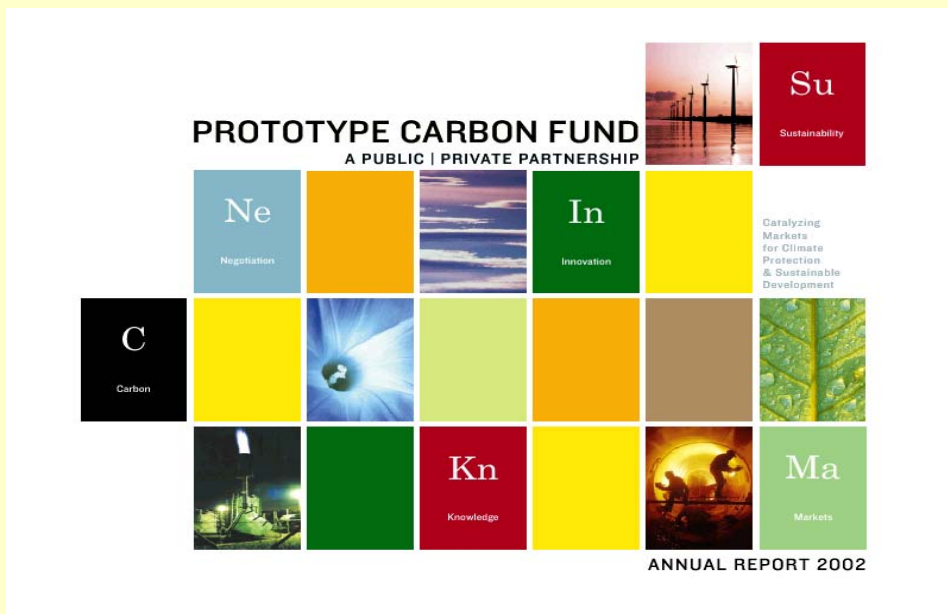
- **About 160k people die yearly from side-effects of global warming (from malaria to malnutrition) and it can double by 2020. (2003 Reuters Moscow)**
- **96% of deaths from natural disasters already occur in poor countries, more vulnerable to hurricanes, drought, and floods.**
- **Increased disruption in weather patterns is predicted to increase the cost to poor countries of up to 5% to 9% of GDP, retarding development efforts.**



CF Unit of the World Bank: Project Portfolio Development

World Bank

Carbon Finance Vehicles



Netherlands
CDM Facility

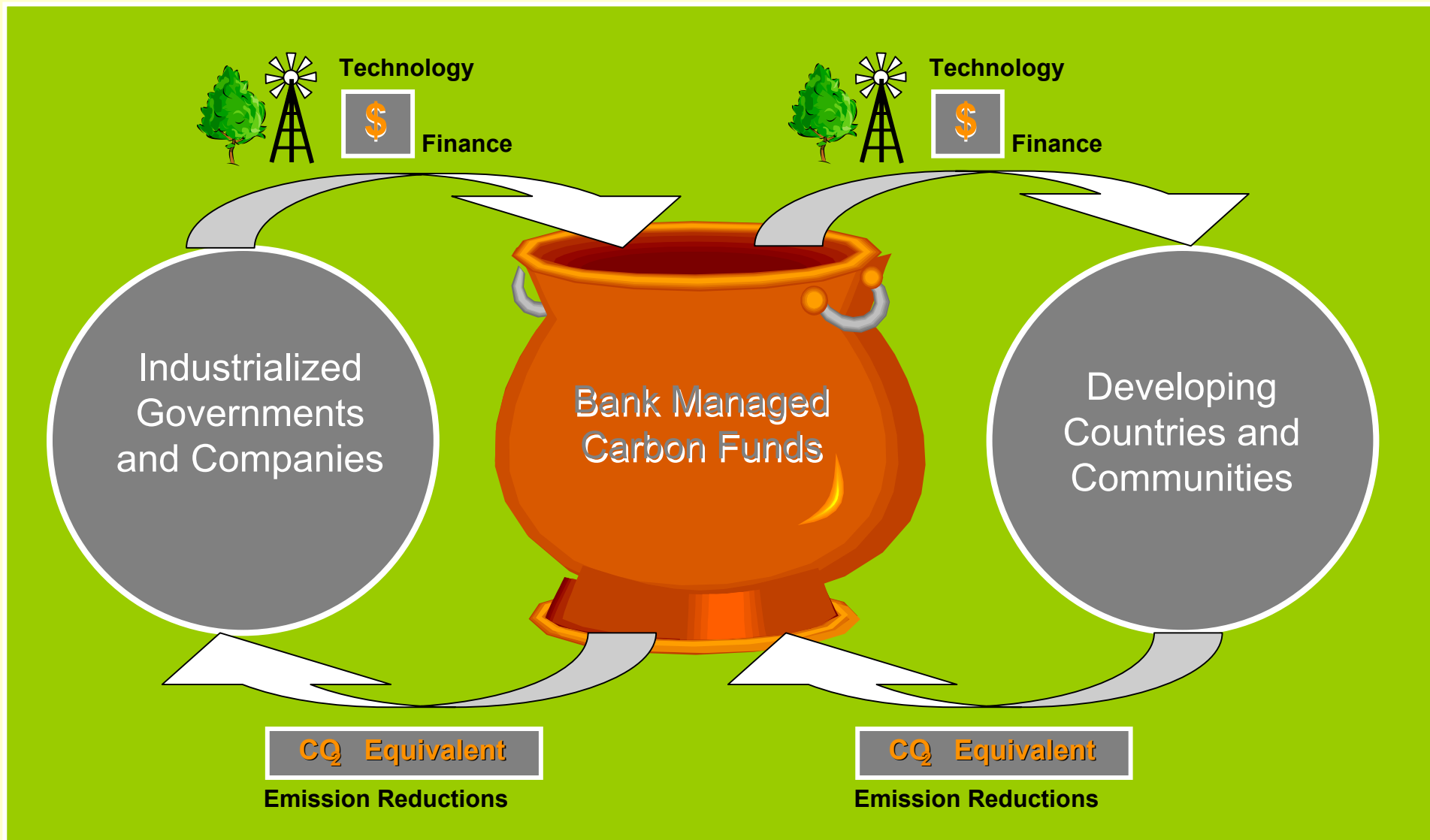


BioCarbon Fund



\$400 million in carbon finance under management

How Carbon Funds Work



World Bank Carbon Finance at a Glance



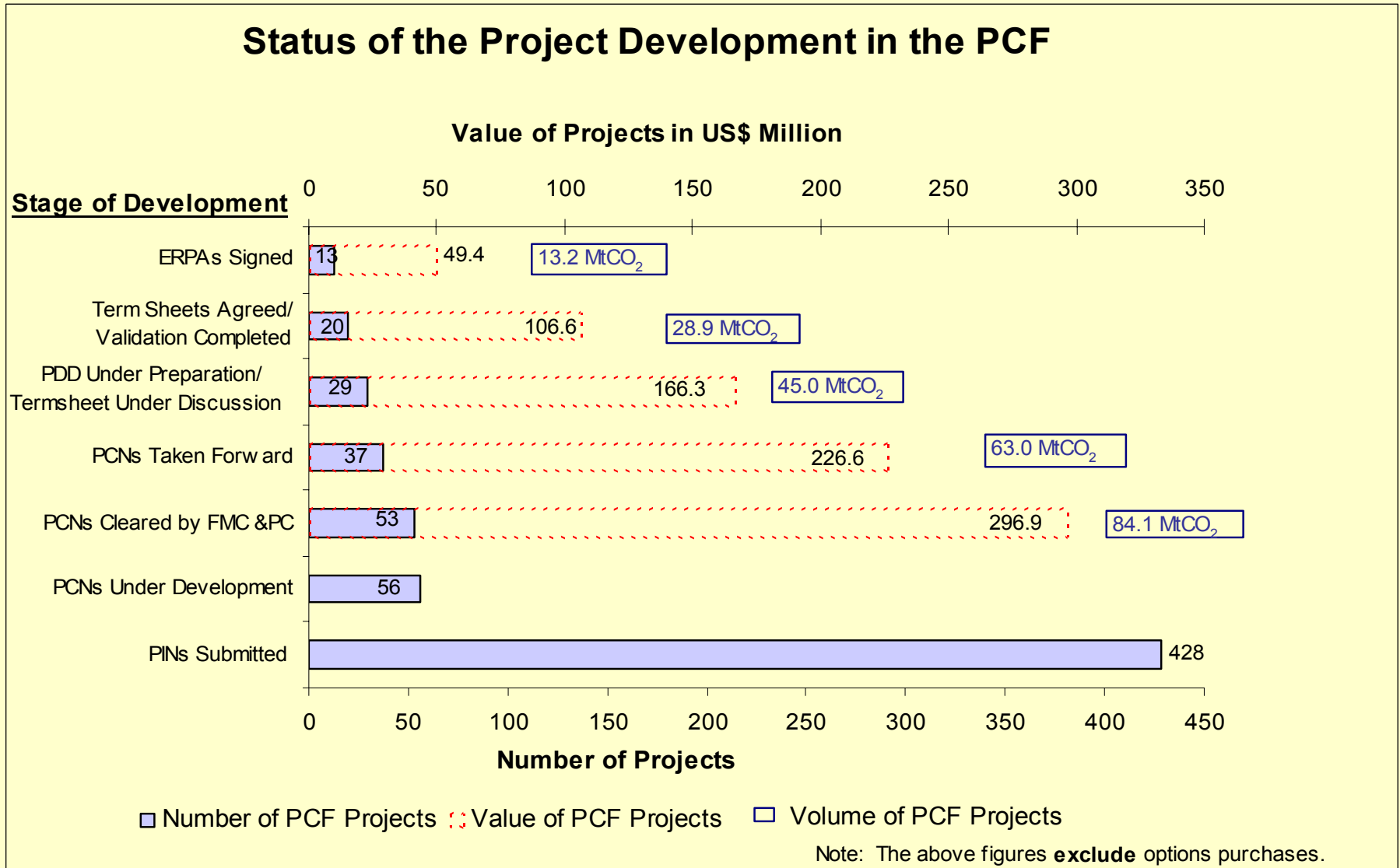
- **PCF: \$180 M funding - 17 private + 6 OECD**
- **NCDMF: \$90 M funding - NL**
- **CDCF: over \$ 40 M so far (\$ 70 - 100 M for Dec.'04)**
- **Italian Carbon Fund: \$15 M so far (\$ 80 M) - Italy**
- **BioCarbon Fund: approved by the WB board, operational mid-04**
- **New bilateral funds being negotiated**

Features of the PCF



- **Closed-end Mutual Fund structure with diverse portfolio to:**
 - **Enhance the Learning Experience**
 - **Reduce Transactions Costs**
 - **Minimize Project Risks**
- **Shareholding: 6 Governments - \$10M; 17 Companies - \$5M; add. voluntary contributions - \$35M (\$180M for 30 to 40 projects)**
- **PCF Products:**
 - **High value knowledge:**
 - **facilitate operationalization of CDM and JI**
 - **facilitate efficient market regulation**
 - **leverage for sustainable development for Parties**
 - **Competitively priced, high quality emissions reductions**
 - **target portfolio outcome price: ~\$5.6/tCO₂**
 - **target deal price: \$3-4/tCO₂**

PCF Projects Development



Pipeline for the Netherlands Facility



- **11 projects PCNs approved by the Netherlands in the pipeline with potential ER purchase of € 54 million**
 - **Waste management project in Brazil (€ 8.5 m)**
 - **Run of river hydro projects in**
 - **Colombia (€ 7.9 m)**
 - **Chile (€ 10.2 m)**
 - **Peru (umbrella project with 5-7 projects): € 8 -12 m**
 - **Ecuador (umbrella project with 4 sub-projects): € 6 -9 m**
- **Other potential activities include**
 - **Waste management in Mexico**
 - **Waste management in Vietnam**
 - **Wind energy in Philippines**

Fund Objectives and Projects Development

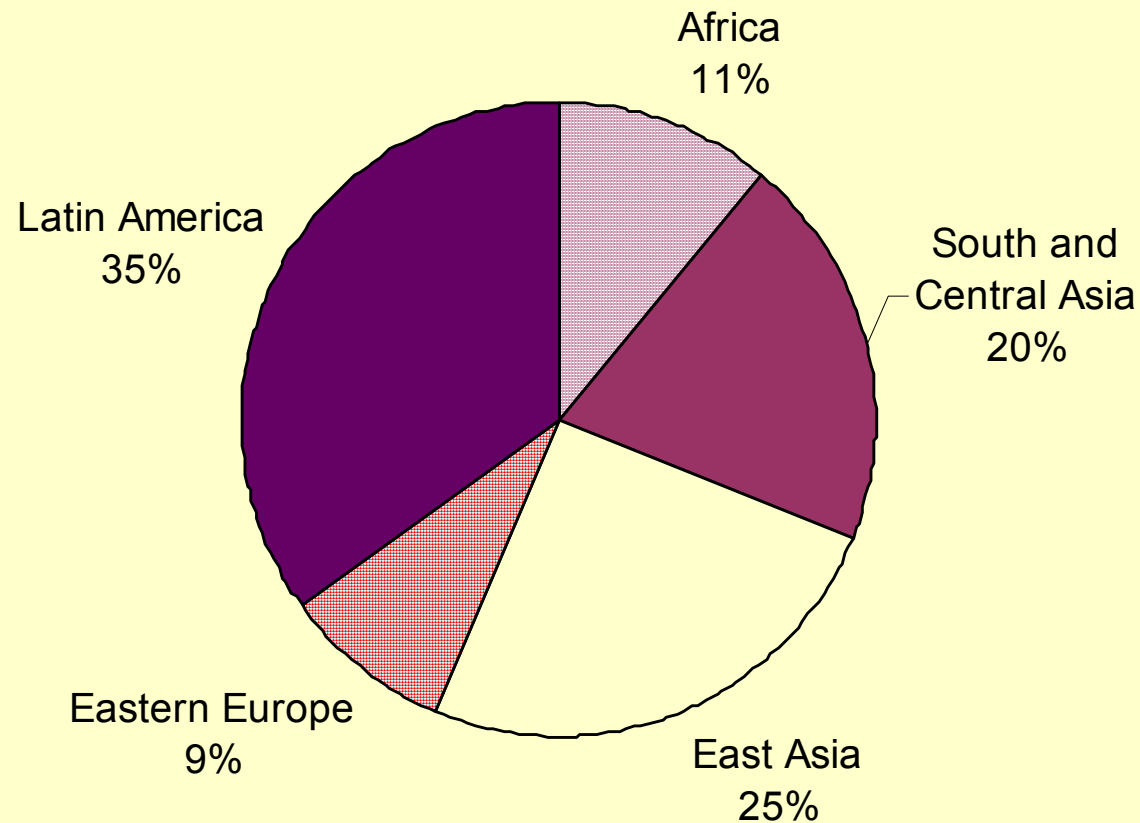


- **PCF: Catalyzing carbon market and learning-by-doing**
 - Geo-political and technology diversity in projects
 - Proactive in Africa but responding demand of developing countries
 - Small to medium size projects
- **Netherlands Clean Development Facility: Cost-effective and low risk emission reduction**
 - Proven technology in low risk, proactive and enabling local environment
 - Responding to demand (all projects to date in Latin America)
- **Community Development Carbon Fund: Enabling carbon finance for sustainable development of communities in poor countries**
 - Projects should have Local + Global environmental benefits + improve local livelihoods in communities
 - At least 25% of portfolio in LDCs and other poor smaller developing countries

Projects Development



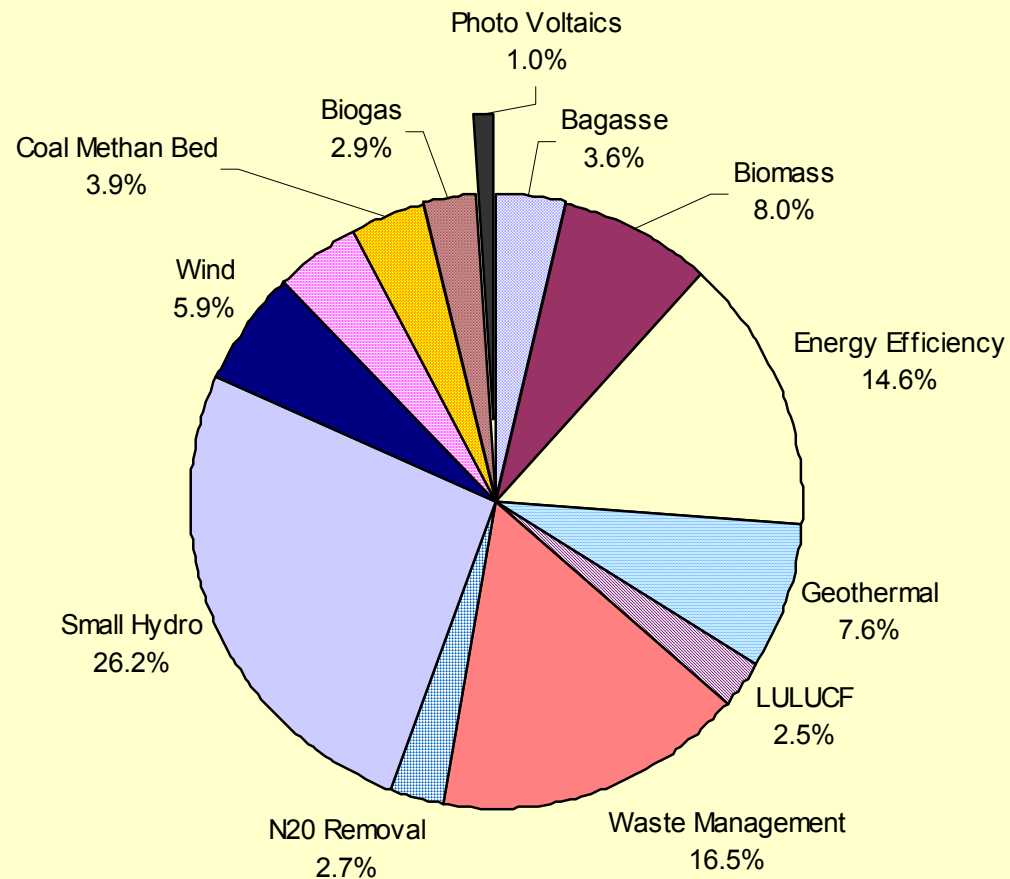
**Regional Distribution of Active Pipeline Projects for Carbon Financing (PCF, NCDF, and CDCF)
Total of Approx. US\$332 Million**



Projects Development



**Technological Distribution of Active Pipeline Projects for Carbon Financing (PCF, NCDF, and CDCF)
Total of Approx. US\$332 Million**



Project development summary



- **Total project currently taken forward under carbon finance: 66 projects; 90 MtCO₂e; \$ 332 M of purchase**
 - **This needs a total investment of about \$3 billion;**
 - **the underlying finance for the projects is the biggest challenge**
- **Low deal-flow origination from the Bank Group**
 - **just few of the projects have or are likely to have Bank Financing**
- **Carbon finance has significant impact on more powerful greenhouse gases (e.g. CH₄, N₂O, HFCs, PFCs, and SF₆)**
 - **Waste management has the greatest convergence of carbon finance impact and development impact**
 - **nitric acid manufacture, aluminum smelting are attractive due to impact of carbon finance but do not have direct sustainable development benefits**

World Bank Carbon Finance Strategy: Addressing Constraints



- **Expand “core” carbon market - PCF, NCDMF, Italian Carbon Fund, new OECD funds with first-of-a-kind transactions**
- **Extend carbon finance to the poorest - CDCF (25% poorest)**
- **Demonstrate carbon finance for sinks - BioCF**
- **Build Host Country capacity for CDM/JI - CF Assist**
- **Walk the Talk - World Bank Climate Protection Program (Offset Bank’s/Staff’s carbon footprint)**

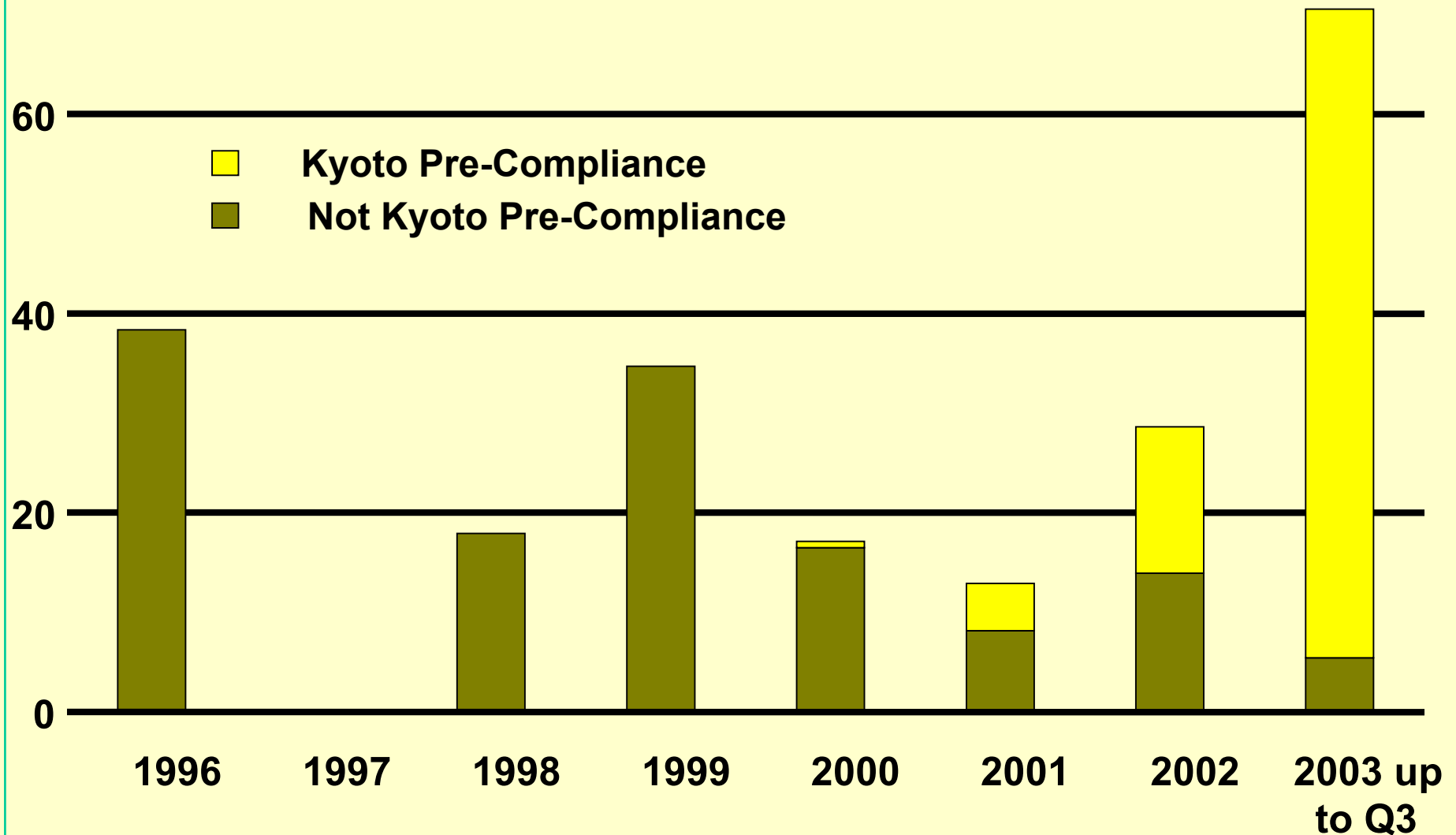


State and Trends in the Carbon Market

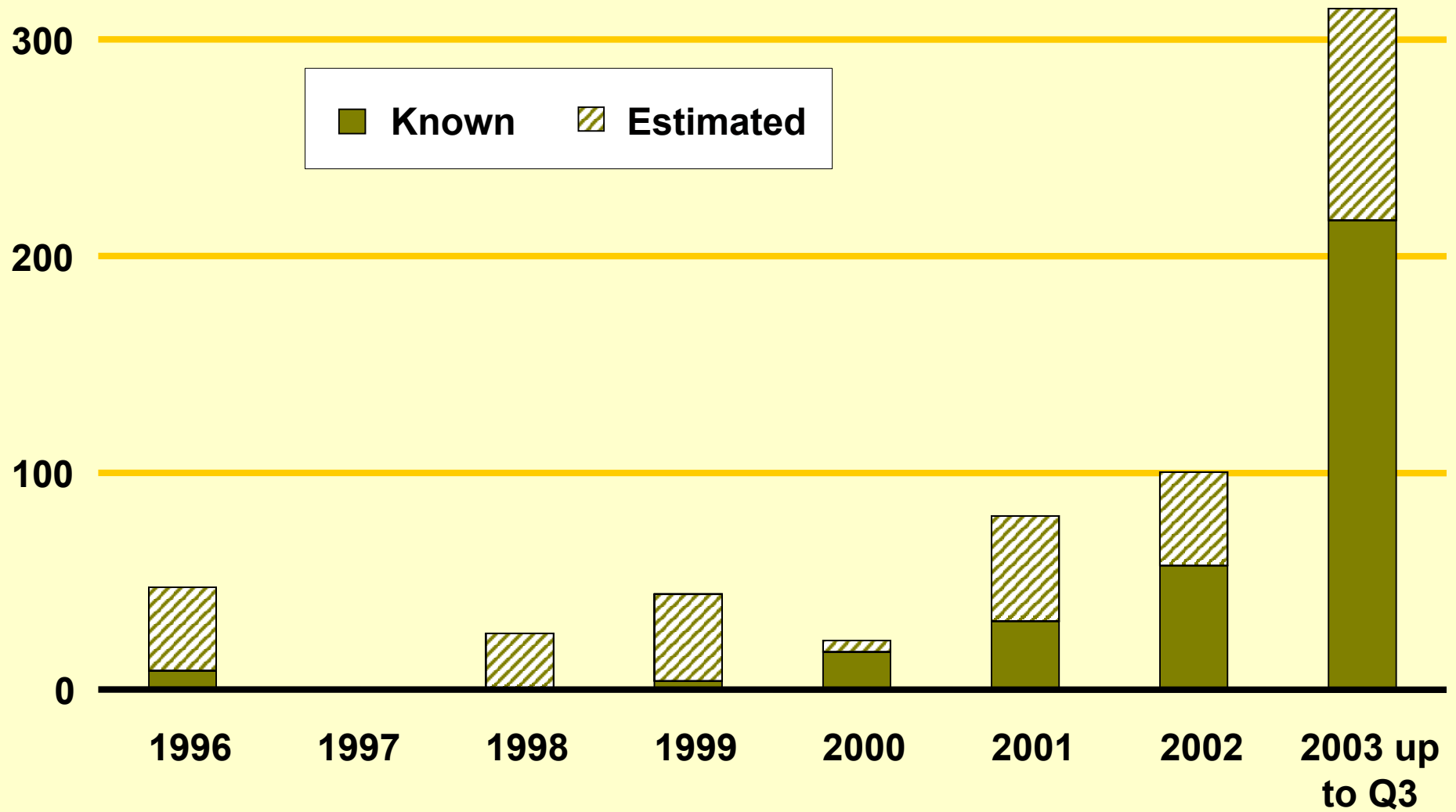
Main Driver: Compliance



Volume traded in project-based transactions, MtCO₂e



Market Value (million U.S. dollars)



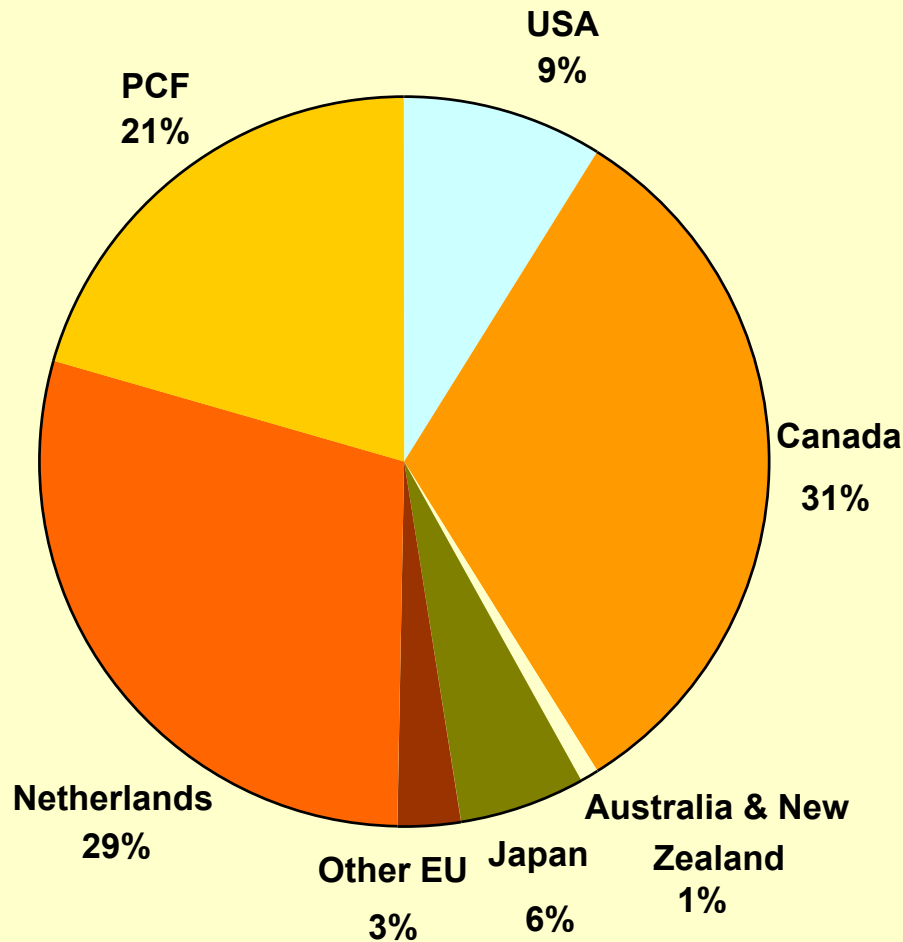
Market Intelligence: “Few Countries Benefiting, Little Private Sector Buying”



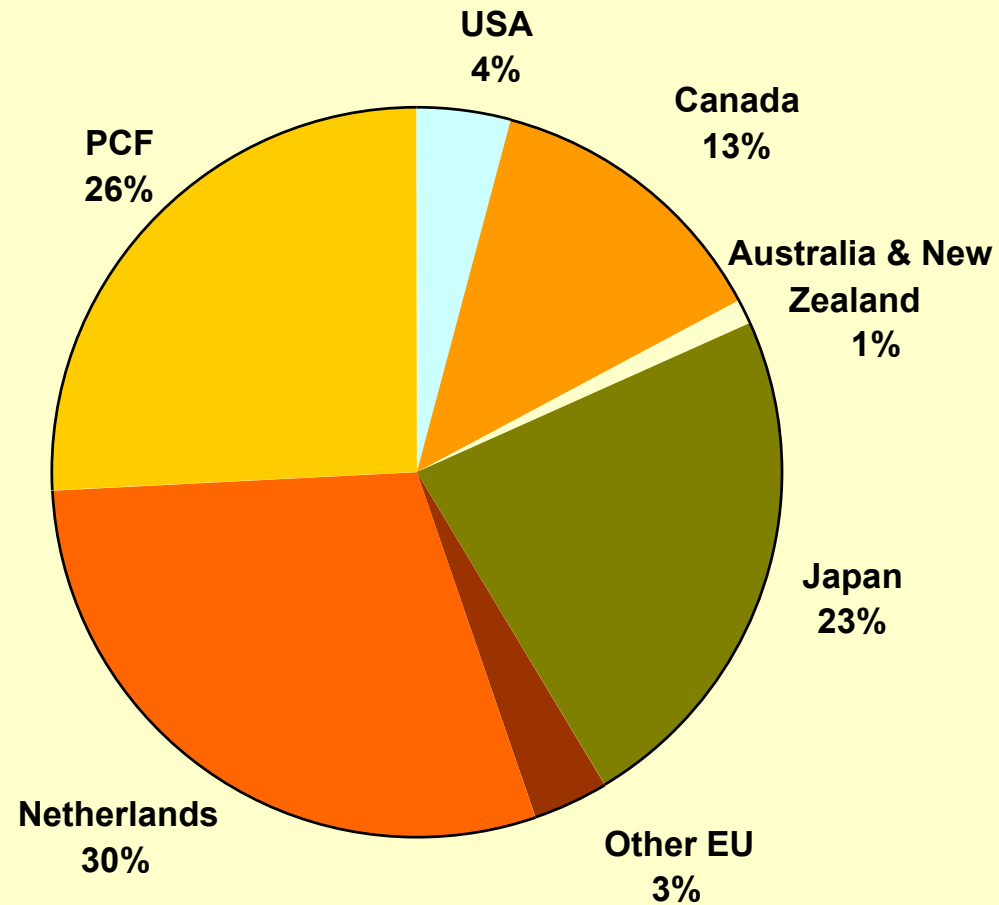
- **Market: cumulative 200 million tonnes CO₂ traded (between \$350 and 650 million) since 1996**
- **Market in 2003: 200 - 300 million U.S.\$ (between 300 and 650 million U.S.\$ since 1996)**
- **PCF experience, carbon finance between 1:6 and 1:8 of total project cost**
- **Carbon finance leverage in 2003: between 1.2 and 2.4 billion U.S.\$**

Who is buying?

In percent of volume purchased



2001-2002



2002-2003

Who's Buying?

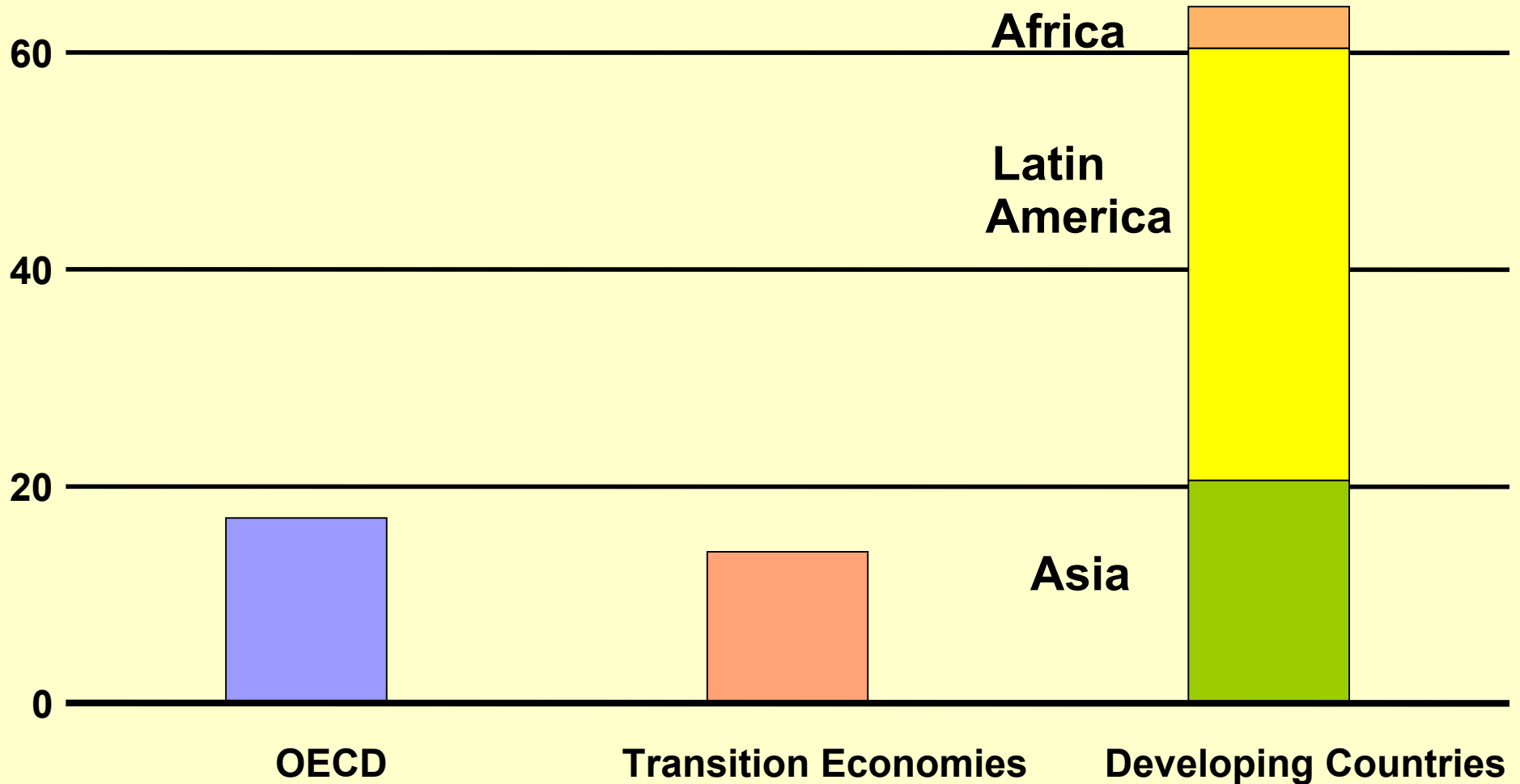


- **Government of the Netherlands single major buyer (30% of purchases in 2002-2003)**
- **Japanese public and private entities emerging as major purchasers**
- **Public sector still dominates, but private sector now represents over 40% of CDM volume (virtually none of JI)**

Who is Selling?



In million tCO₂e sold from 2002 to Q3 2003



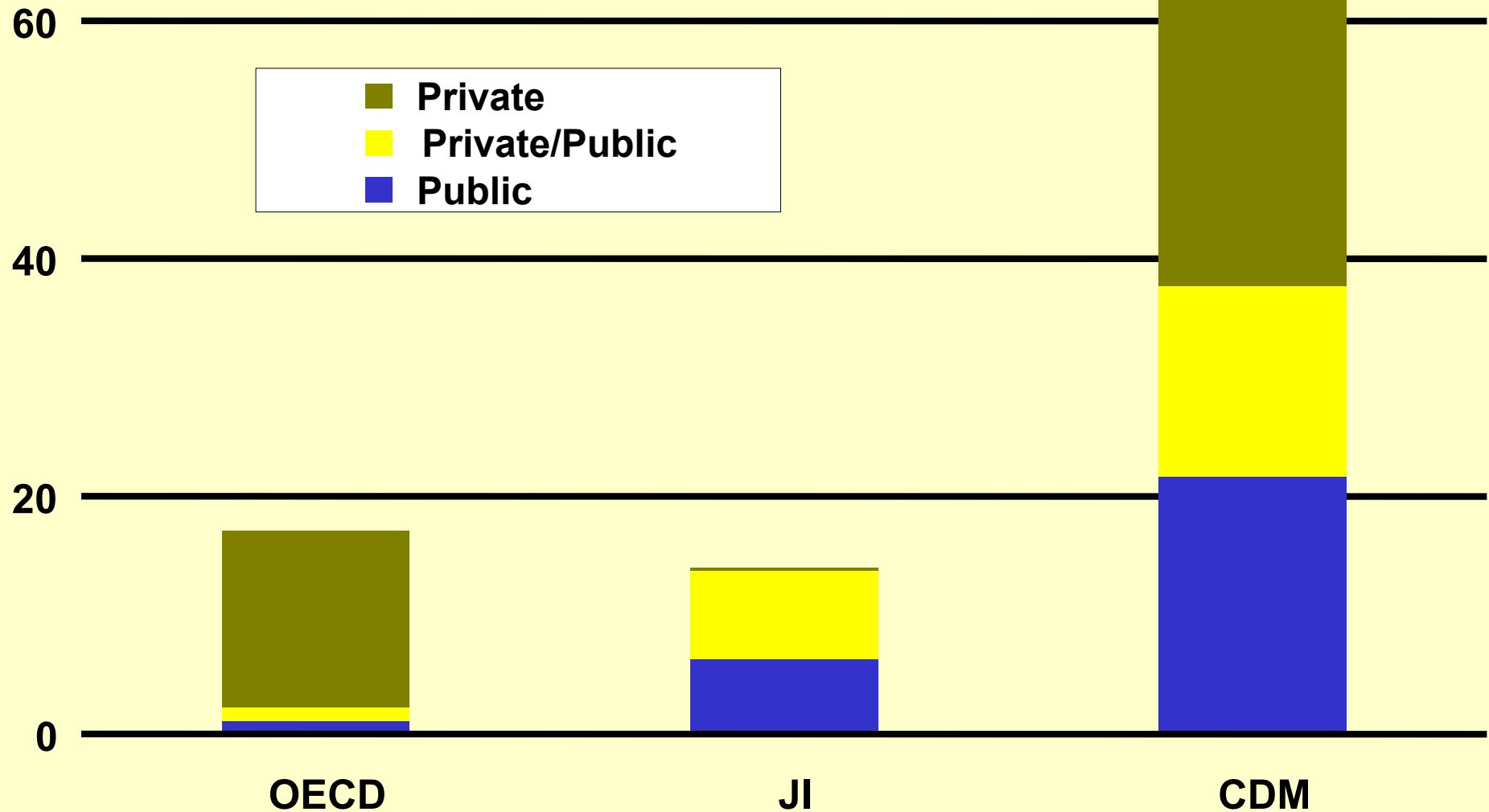
Who's selling?



- **90% of volume now contracted in JI or CDM Countries**
- **Latin & Central America remains dominant**
- **Asia emerging as major player**
- **Africa still largely bypassed**
- **Trades tend to concentrate on larger, middle-income countries**

Private Investment in CDM Increases

(million tCO₂e from 2002 to Q3 2003)



What to Expect of the Market in 2004



- **Contracted value is likely to double (~ 150 M tCO₂e)**
- **EU ETS will**
 - **create enormous potential carbon liabilities for European firms**
 - **drive the carbon market in 2004**
- **Current institutional buyers (like PCF and the Dutch) will lose dominant position**
 - **European corporate buyers will finally enter the market**
 - **Japanese activity in the market will further strengthen**
 - **Spain and Italy will enter the market**
- **Large sellers (China, India, Brazil, Indonesia and Mexico) will start shaping the market**

Key Findings in Market Development



- **Regulatory risk and uncertainty remains high, inhibiting larger direct private foreign investment in CDM/JI**
- **Volumes of CERs for first commitment period are severely limited by project lead times. OECD must buy AAUs to be in compliance.**
- **Small Countries / Projects and poorer communities are missing out.**
- **Buyers only want ERs delivered by 2012; they heavily discount ERs after 2012.**
- **If value of post 2012 ERs is not assured by 2006, CDM market activity will decline sharply.**

Lead Time Impact on CDM



5 year average

Wind, Efficiency, Waste to Energy



Large Hydro, Geothermal, Coal to Gas Power



2003

2006

2008

2012

**Second Commitment Period Rules and Targets
Need to be decided by 2006 to ensure continuity in
CDM Market Development**

◆ = Start Construction

Significance of CDM as a Source of Compliance Assets in OECD



- **OECD Compliance gap is 3-4 billion tons cumulative over 2008-12**
- **CDM seems unable to deliver more than 300-400 million tons of CO₂e to OECD by 2012 due to long project lead times**
- **CDM/JI will then, be ~20% of 1.5-2.0 billion ton cumulative “effective demand” for traded assets (i.e. assuming 50% contribution from domestic action)**
- **Excess Assigned Amount Units (AAUs) or “Hot Air” is key to Kyoto compliance but must be “greened” to be acceptable to most in OECD**
- **Hence demand for CDM assets is unconstrained, but supply is limited**

Russian Ratification



- **No signs of ratification before CoP10 in October**
- **Public posture of Mr. Putin's personal staff is aggressively negative (Mr. Ilarianov)**
- **Response by Ministry of Economy have been positive but "would investment be significant?"**
- **Informed observers view:**
 - **Inward investment prospect per se is not persuasive**
 - **Geopolitical positioning is far more important**
 - **Kyoto ratification is subordinate to other negotiations: WTO entry, Energy Charter and European Energy Trade**
 - **Domestic Energy Security is important medium term concern and would benefit from KP-linked investment**

Implications of Kyoto not Entering into Force



Plausible outcomes:

- **EU must continue to buy “CDM” emissions reductions (CERs)**
 - **Linking Directive of EU allowing CERs to be traded in EU under Emissions Trading Scheme will be approved by June. “Sinks” may have restrictions in short term.**
- **Canada and Japan will attempt to meet Kyoto targets for first commitment period in most cost-effective way - all CDM options will be used.**
- **Long Term: Global Carbon Trading is inevitable on increasing scale with or without Kyoto (CDM ?)**



Thank you!

www.carbonfinance.org

Full report on State and Trends of Carbon Market

available at

www.prototypecarbonfund.org/router.cfm?Page=Research

CF Unit of the World Bank



The Kyoto Protocol, which was adopted under the UN Framework Convention on Climate Change (UNFCCC), commits industrialized countries to reduce their carbon emissions by an average of 5.2 percent below their 1990 levels in the period 2008-2012. Two of the flexibility mechanisms provided in the Protocol - the Clean Development Mechanism (CDM) and Joint Implementation (JI) enable industrialized countries to meet some of their obligations through projects generating emissions reductions in developing countries and economies in transition.

The World Bank's carbon finance business leverages new public and private investment into such projects, significantly contributing to other WBG efforts to mainstream climate mitigation and adaptation concerns in developing countries.

PCF Projects Development



Project Portfolio Status as of September 15, 2003

Country/Project Name	Project Description	PCF Contract in million US\$	Cumulative million \$US	PCF ERPA ER tCO2e	Cumulative tCO2e	Total Project ER Generation tCO2e
ERPA Signed						
Latvia: Liepaja Solid Waste Management	Methane capture from waste management and CO ₂ reduction from power generation	2.48	2.48	387,933	387,933	864,600
Chile: Chacabuquito Small Hydro*	26 MW run-of-river hydro to replace coal or gas in the grid	6.69	9.16	1,750,000	2,137,933	1,764,200
Brazil: Plantar Sequestration and Biomass Use	Charcoal produced from sustainably harvested plantation replacing coke for pig iron manufacture	5.30	14.46	1,514,286	3,652,219	10,252,151
Costa Rica: Chorotega Wind Farm	8.4 MW wind farm to displace thermal power capacity addition	0.92	15.38	262,660	3,914,879	328,350
Costa Rica: Cote Small Hydro	6.3 MW hydro to replace thermal power generation	0.60	15.99	172,110	4,086,989	215,138
Colombia: Jeparachi Wind Farm	19.5 MW wind farm in the northern part of Colombia to displace a mix of coal- and gas-based power generation.	3.20	19.19	800,000	4,886,989	1,460,313
Uganda: West Nile Electrification Project	1.5 and 5.1 MW small hydro to replace a number of diesel generator sets in West Nile region	3.90	23.09	1,300,000	6,186,989	2,736,000
Guatemala: El Canada Small Hydro	43 MW peaking run-of-river hydroelectric plant in the west coast of Guatemala to displace thermal power plants	7.50	30.59	2000000	8,186,989	3,887,520
Hungary: Pannonpower Pécs Fuel Conversion Project	Conversion of Pécs Power plant's existing coal-fired boilers to biomass. Capacity 65 MWh and 49 MWel; annual generation 162 TJ heat and 334.3 GWh electricity	5.01	35.60	1,193,000	9,379,989	2,645,500
Romania: Afforestation	Afforestation of 6,852 ha of public land	3.08	38.67	854,985	10,234,974	1,594,437
Bulgaria: Svilosa Biomass	13.4 MW biomass-based boiler to utilize wood waste produced at the Svilosa pulp and cellulose plant to replace coal.	1.75	40.42	500,000	10,734,974	1,007,724
Moldova: Soil conservation	Afforestation of 14,394 ha of degraded and eroded state-owned and communal agricultural lands throughout Moldova	5.10	45.52	1,455,744	12,190,718	1,775,298

General PCF Information



The PCF's goal is to purchase emission reductions worth \$ 180 million from about 30 - 40 projects, and identify, prepare, and approve these transactions by mid-2004.

PCF participants' guidance on regional and technological diversity in the portfolio (2nd Ann. Meetings, Poland - 06/02):

No more than \$35 million to Latin America

\$25 million for countries in East Asia and the Pacific

\$25 million for Central and South Asia

\$20 million to projects in Africa

\$75 million for JI projects

Up to \$15 million for LULUCF projects.