



UNDP Regional CDM Project

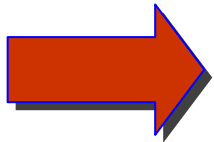
Sanju Deenapanray

CDM National Project Coordinator

prakash.deenapanray@undp.org

22 September 2008

Agenda

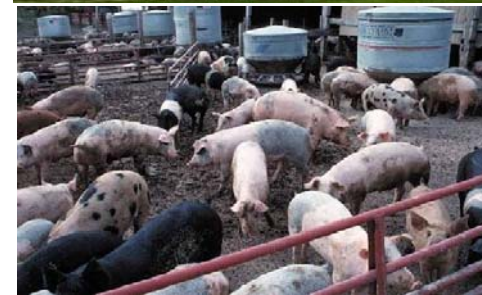


Carbon trading – why, what and how?

The CDM project cycle

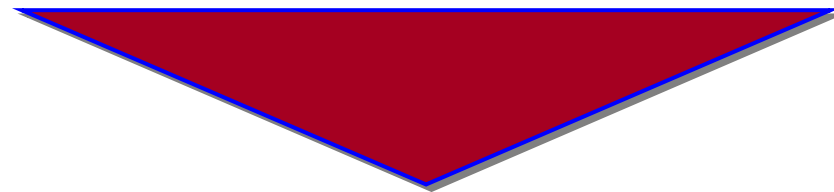
Scoping Studies – 3 examples

UNDP's Carbon strategy



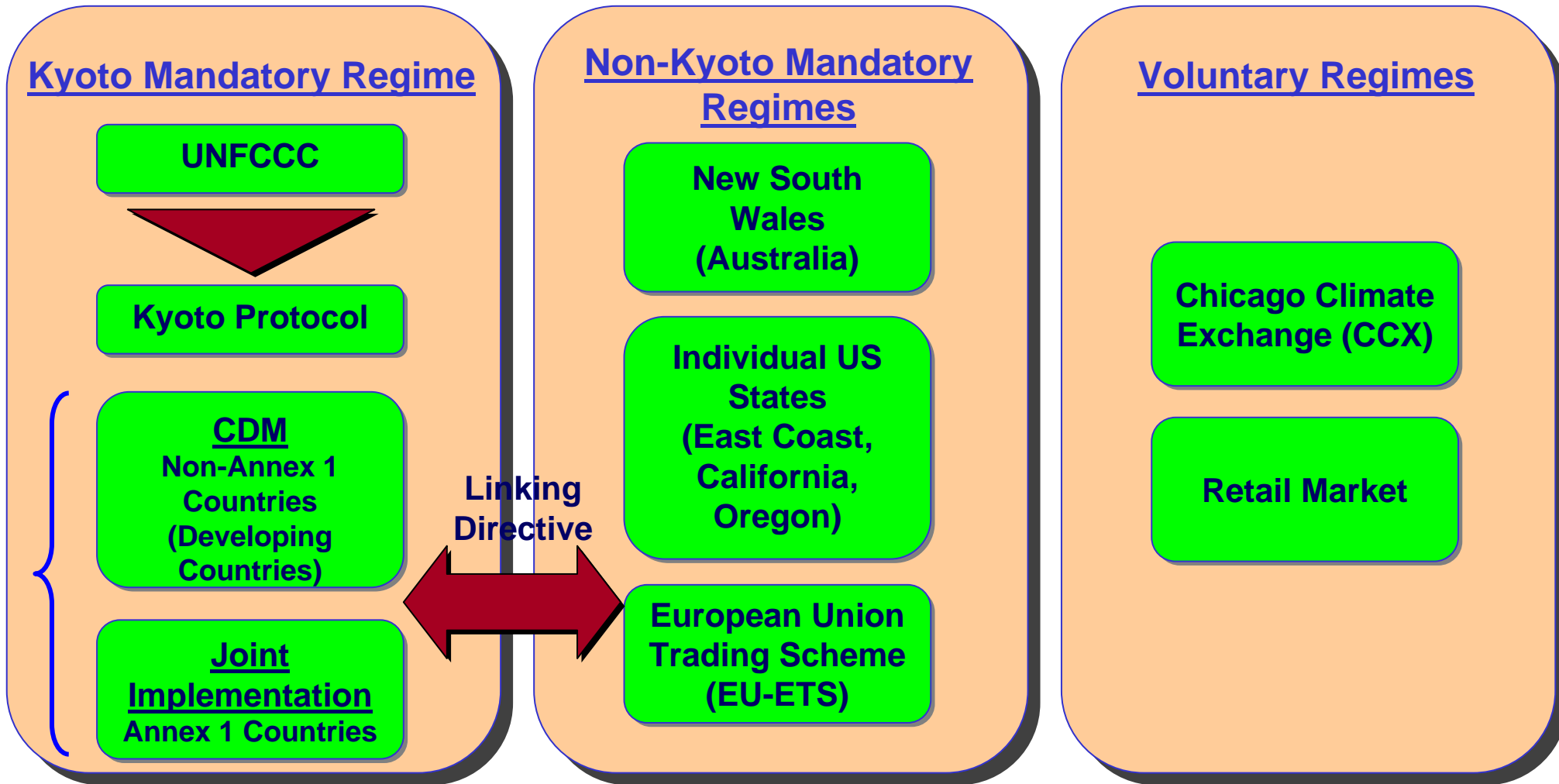
Why Carbon Markets?

- **Climate Change is the sole reason for Carbon markets**
- **Climate Change is due to the accumulation of anthropogenic greenhouse gases (e.g. CO₂) in the atmosphere**
- **This is leading to global warming with its numerous Economic, Social and Environmental impacts**



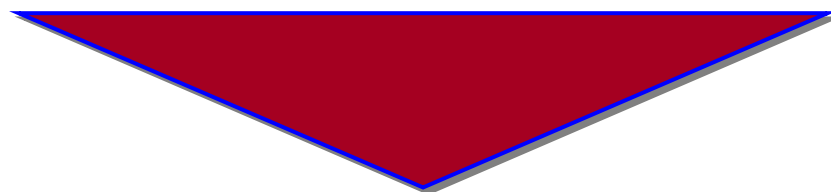
- **Institutionalization of market-based mechanisms to reduce emissions of greenhouse gases in the atmosphere**
- **Reductions can be made by (1) Mitigation, and (2) Sequestration**

There are over 45 carbon markets – but 3 principal regimes



What is the voluntary carbon market?

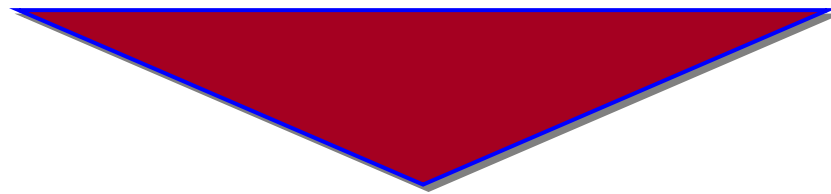
- **Companies** practising corporate social responsibility, seeking positive public relations and ‘testing the waters’
- Green-minded **consumers** – ‘carbon neutrality’
- **NGOs** – circumventing CDM restrictions and costs



- Some voluntary markets (notably the Chicago Climate Exchange) do have project guidelines and rules
- But many voluntary-sector project designs are unique – agreed by buyer and seller

Why use the voluntary carbon market?

- **More flexible** – greater range of project-types and methodologies permitted
- **Lower-cost** – less onerous project design and monitoring requirements
- **Less bureaucratic** – typically lacks the paperwork and delays associated with CDM



- **Less rigorous** – ‘additionality’ and carbon benefits may be more questionable

The Kyoto Protocol provides the basis for the CDM market

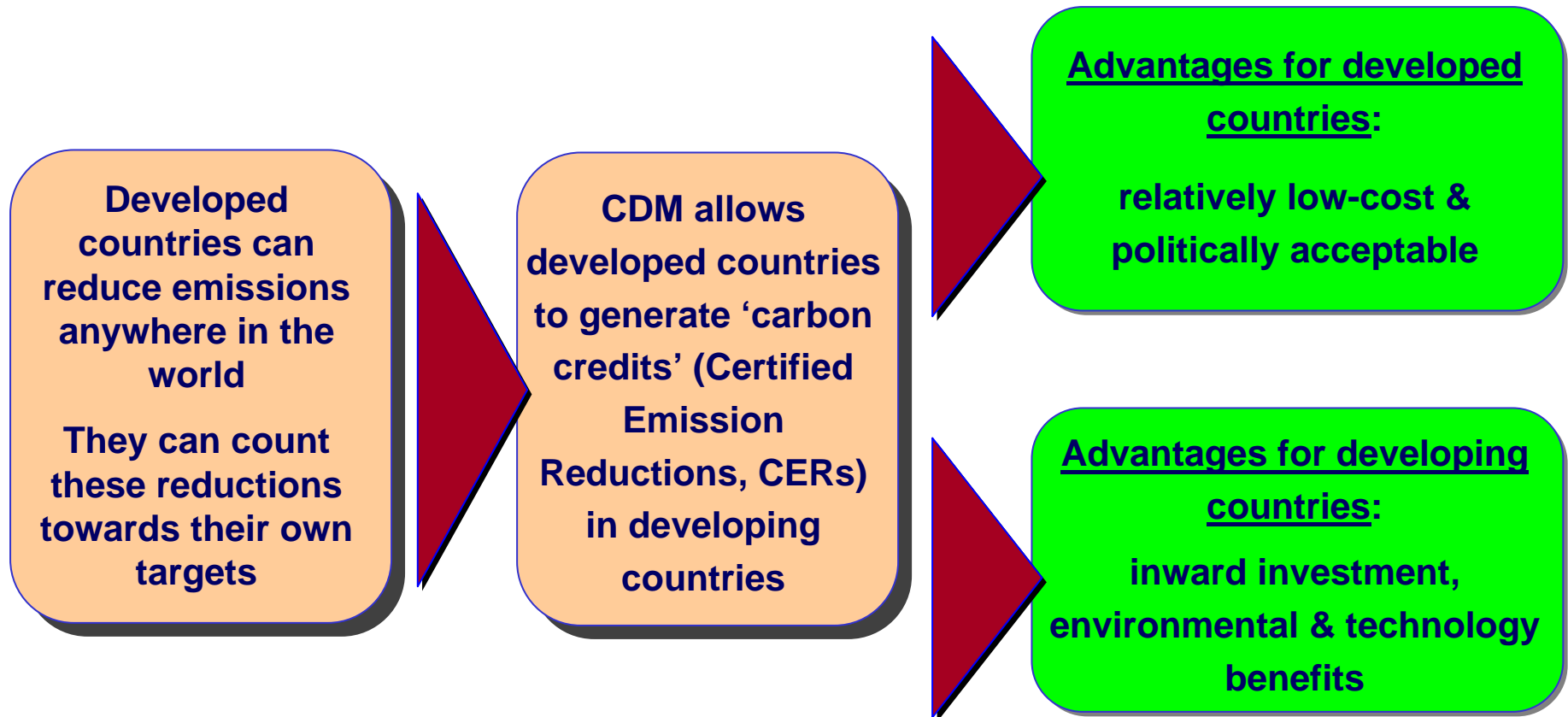
Kyoto Protocol

The Protocol creates legally binding obligations for Annex 1 countries to return their emissions of greenhouse gases to an average of **5%** below their 1990 levels by 2012

Marrakech Accords

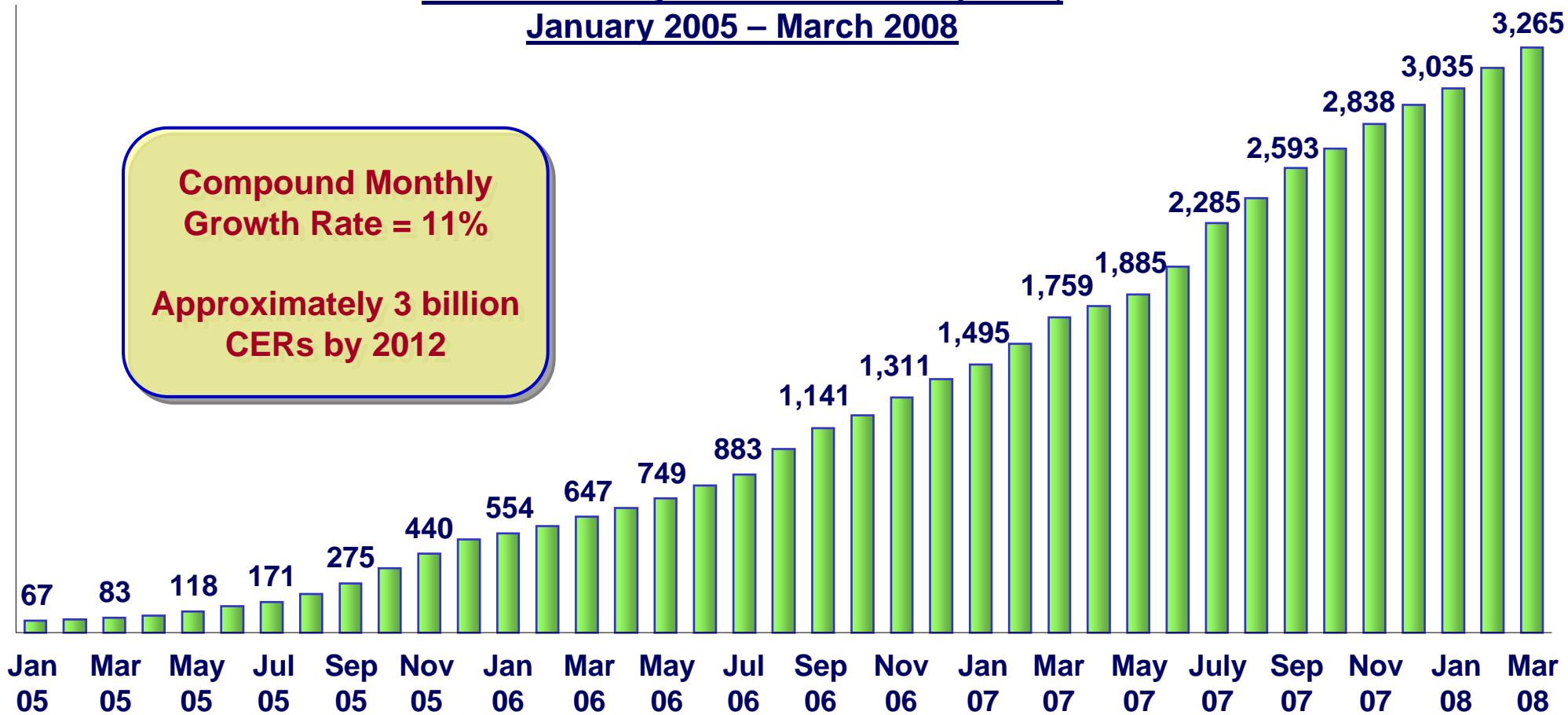
Define the principles of the Kyoto Protocol's flexible mechanisms: the Clean Development Mechanism (CDM), Joint Implementation (JI) and Emissions Trading (ET)

The role of the Clean Development Mechanism (CDM)

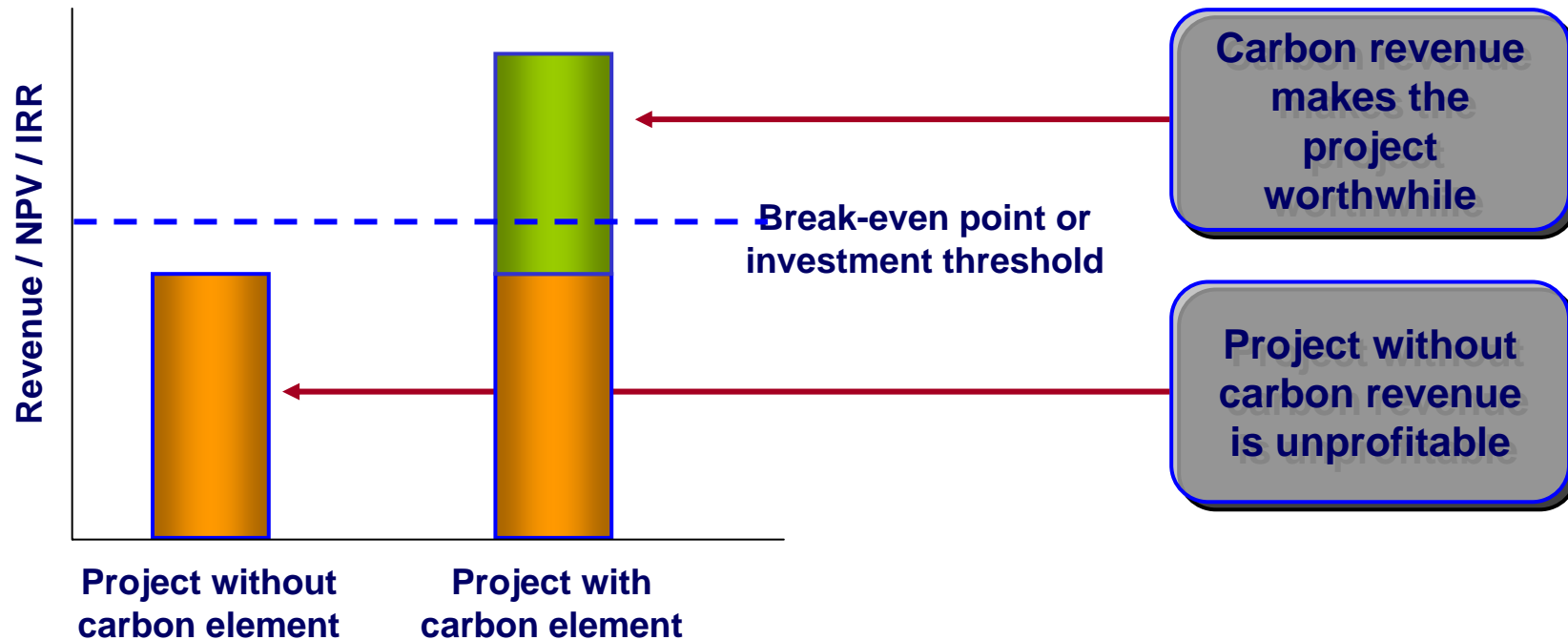


The primary CDM market was worth \$7.4 billion in 2007

Number of Projects in the CDM Pipeline,
January 2005 – March 2008



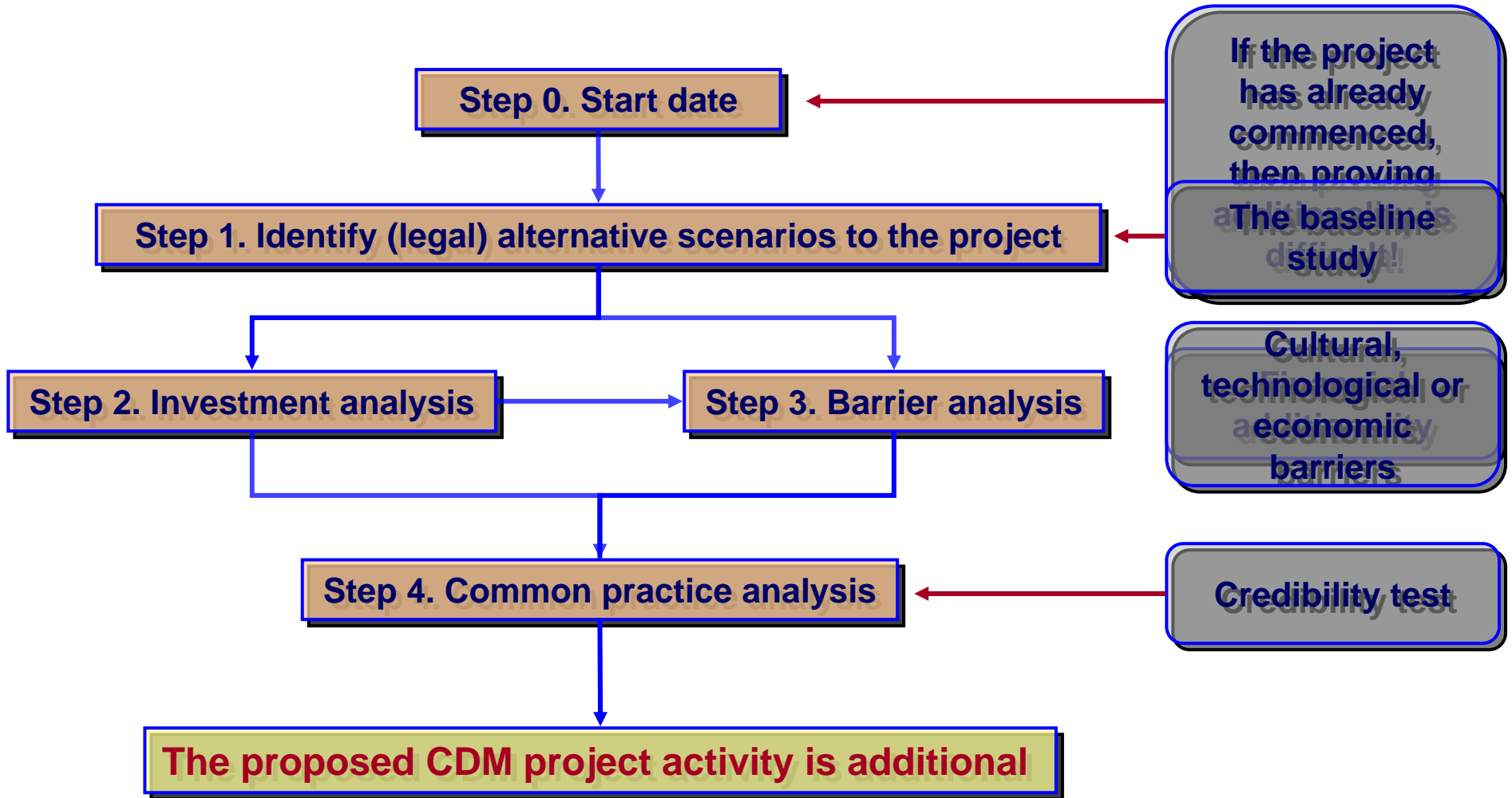
Adding a Carbon credit layer to existing revenue



Additionality

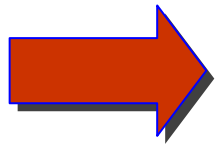
- Has been defined as:
 - **Environmental additionality** – reductions in GHG emissions
 - **Financial additionality** – the project only happens because of the financial incentive offered by carbon credits
 - **Legal additionality** – the project does more than what is required by local law
- The Kyoto Protocol is somewhat vague, stating simply:
 - *“Reductions in emissions must be additional to any that would occur in the absence of the project activity”*
- Assessment of additionality is intrinsically linked with baseline establishment

The additionality tool



Agenda

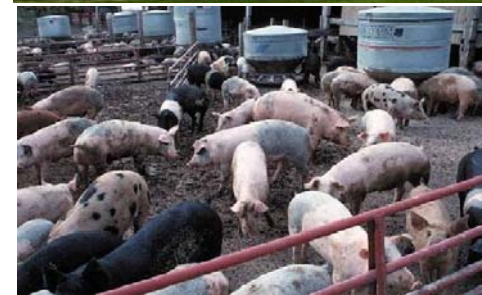
Carbon trading – why, what and how?



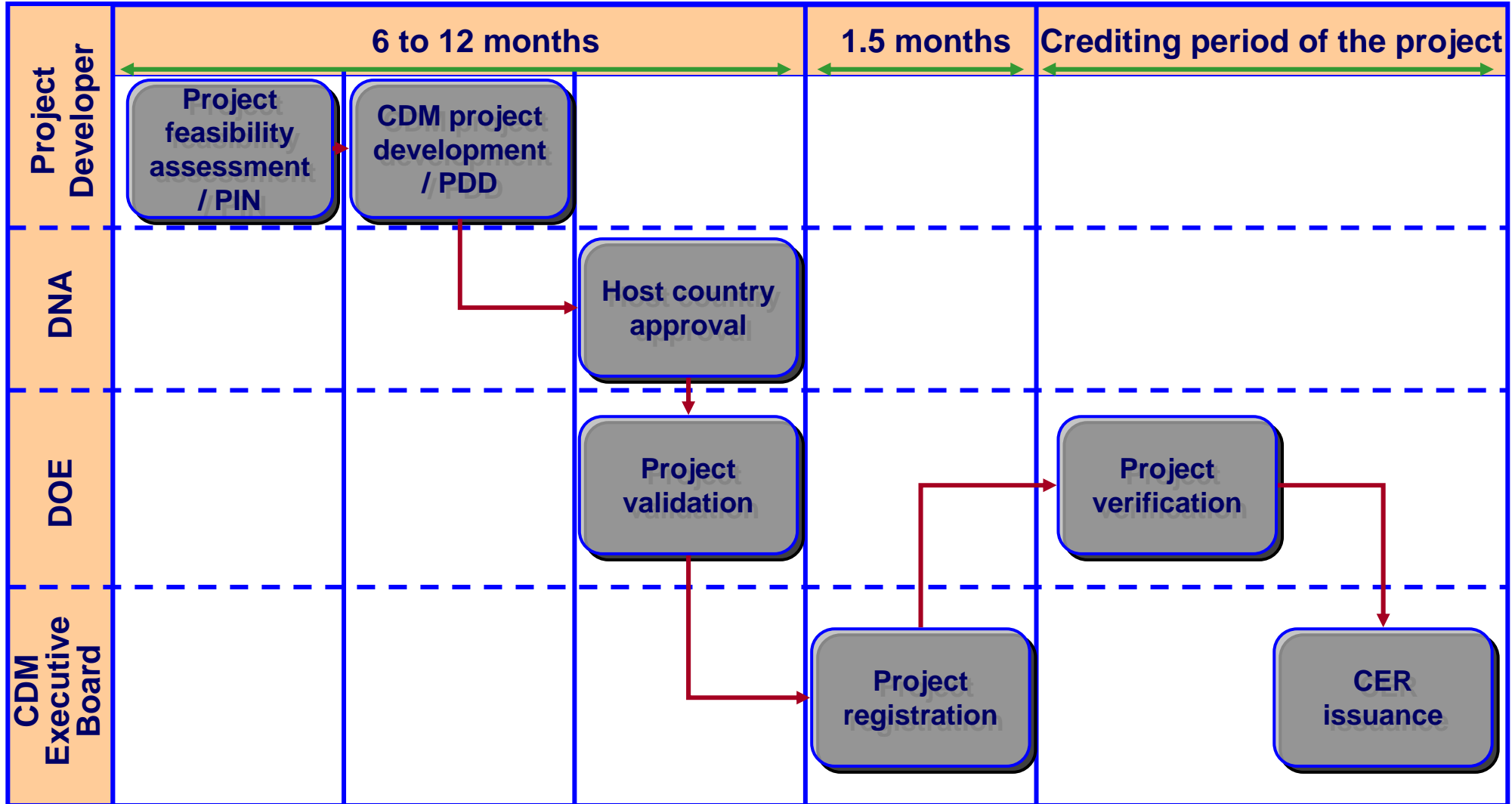
The CDM project cycle

Scoping Studies – 3 Examples

UNDP's Carbon strategy



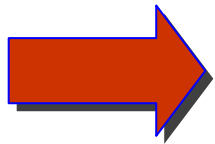
The CDM project cycle



Agenda

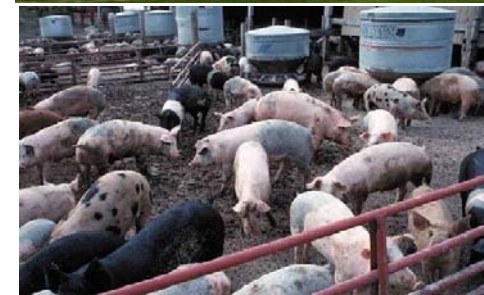
Carbon trading – why, what and how?

The CDM project cycle

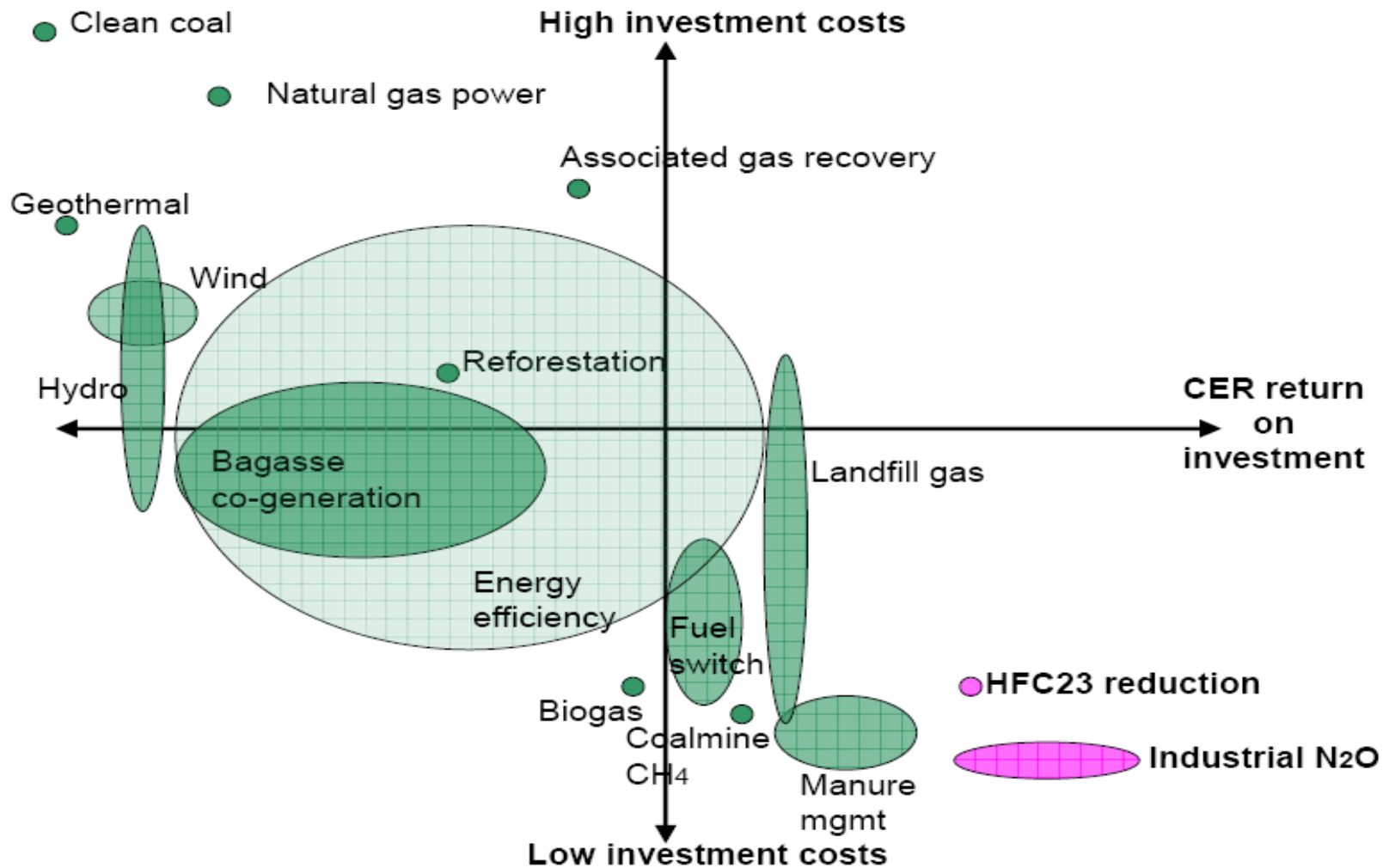


Scoping Studies – 3 Examples

UNDP's Carbon strategy



Not all carbon projects are born equal...



Example 1 - Solar Hot Water Units

- The Government of Mauritius is providing an economic incentive to deploy Solar Hot Water (SHW) units
- Incentive – Rs10,000 /SHW unit
- An estimated Rs2million in rebate provided until end-2009
- Deployment of 20,000 SHW units (double market penetration by end-2009)
- Defined baseline using estimates of installed SHW units, instantaneous gas and electrical water heaters (@ end 2007)
- Used trade data for instantaneous gas and electrical water heaters
- Thermal energy required ~ 600kWh/yr/hh



Example 1 - Solar Hot Water Units

- Project can yield **between 5,200 tCO₂e/yr and 7,000 tCO₂e/yr** by the end of 2009 (for **20000 SHW units**)
- Upper limit is based on suppressed demand equivalent to 3kWp electrical (heating value = 807kWh/yr/hh)
- Assuming 1 CER = Euro 10 (conservative), carbon layer is in the range of **Euro 52,000-70,000 per year** by end of 2009
- Estimated Potential for SHW units in Mauritius:
~117,800SHW units → 30,510-41,200 tCO₂e/yr
→ Euro305,100-412,000/yr.
- Need to consider Programmatic CDM (pCDM)



Example 2 – 25MWp Wind Farm

- Mauritius has a ‘dirty’ grid, with $EF_{\text{grid}} = 0.9473 \text{ tCO}_2/\text{MWh}$ (@2007)
- Supporting environment for a RET like wind energy
- Parameters used in calculations:

Long-term wind speed measured at Bigara

8000 hrs operation

Sensitivity analysis: CF = 25%, 33% & 40%

Discount rate = 10%

Price of CER: Euro10 (pre-2012) & Euro5 (post-2012)

Methodology: AMC0002/version 2007



Example 2 – 25MWp Wind Farm

Capacity Factor, CF	Emission Reductions, tCO ₂ /yr	NPV, Euro (10% discount rate)
25%	47,364	2,011,676 (2,816,347)
33%	62,520	2,655,413 (3,717,578)
40%	75,782	3,218,682 (4,506,155)

- Estimated total potential for Mauritius: 3-5 times above



Example 3 – Savings via Energy Efficiency (hotel of ~180 rooms)

		Carbon layer
Lighting	526,248	29,172
AC/Refrigeration (20% gain in EE)	552,000	33,000
Electric Motors (20% gain in EE)	428,947	25,894
Organic Waste	24,000	21,000
WVO	277,550	5,500
Hot Water	-----	-----
TOTAL (Rs/yr)	1,808,745	114,566

Lighting

Cost, Rs/yr	%incandescent	%halogen	%fluorescent	%efficient
1. 14,644,671	76.4	19.6	0.9	3.1
2. 2,584,134	39.6	39.2	12.4	8.8
3. -----	-----	-----	-----	-----
4. 4,053,691	21.2	47.7	25.9	5.2
5. 956,862	28.7	18.6	9.6	43.1
6. 14,058,341	23.9	74.1	0.6	1.4
7. 1,160,072	9.3	24.6	39.5	26.7
8. 661,847	36.9	8.3	54.8	0.0

Significant opportunity for energy efficiency gains

Lighting (potential for savings)

Energy savings from 220 X 36W lamps

$220 \times [(36+15)-24]W \times 24h/day \times 30day/month = 4276.8 \text{ kWh/month}$

Reduction in energy bill (yearly)

$4276.8kWh/month \times 5.3Rs/KWh \times 12month/year = Rs272,004 \text{ per year}$

Savings on cost of replacing lamps (15000 hrs Eco vs 3000 hrs Conv.)

$220 \text{ unit} [(5 \times Rs45/unit) - Rs60/unit] = Rs36,300 \text{ every 20 months}$

or Rs 21,353 per year

Total savings per year = Rs293,357

Conversion costs (initial)

$220 \times Rs 480 / \text{unit} = Rs105,600$

Payback Time = 4.3 months! (& 5 times less Mercury)

Typically between 1-6 months for lighting

example organic waste

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Cumulative biomass (tonnes)	1,420	2,839	4,259	5,678	7,098	8,518	9,937
Methane generation (m3)	6,743	13,486	20,229	26,972	33,716	40,459	47,202
Methane generation (tonnes)	4.5	9.0	13.6	18.1	22.6	27.1	31.6
Carbon dioxide equivalent (tonnes)	95	190	285	380	474	569	664
Carbon revenue (Euro)	949	1,898	2,846	3,795	4,744	5,693	6,641
Discount factor (10% discount rate)	1	0.909	0.826	0.751	0.683	0.621	0.564
Discounted carbon revenue (Euro)	949	1,725	2,351	2,850	3,240	3,535	3,746

Other benefits:

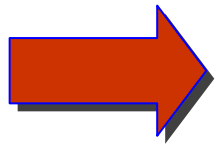
1. Save Rs540,000/year on waste collection & disposal
2. Can use methane for fuel switch (lighting / cooking / etc..)

Agenda

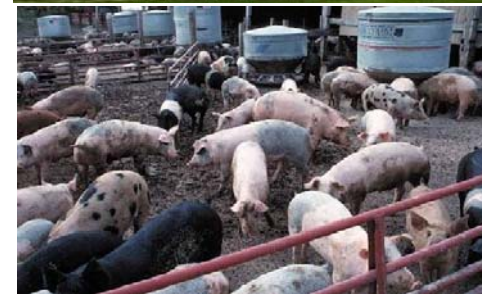
Carbon trading – why, what and how?

The CDM project cycle

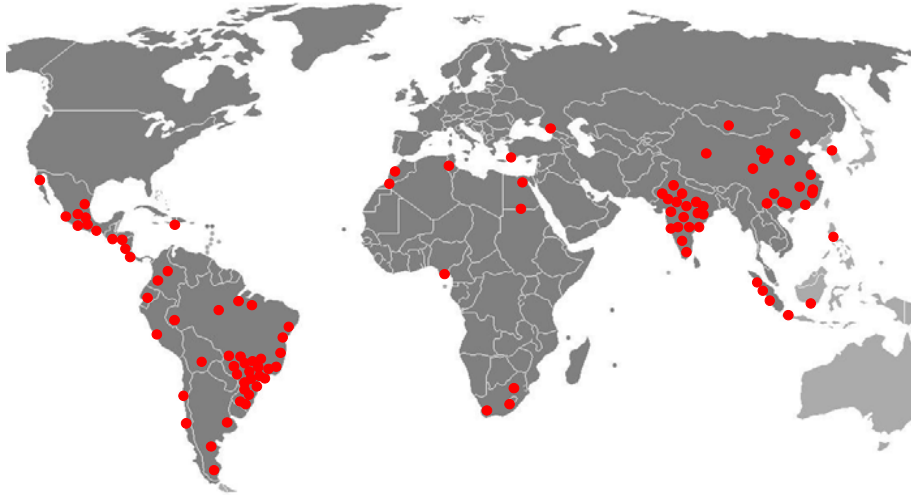
Scoping Studies – 3 Examples



UNDP's Carbon strategy



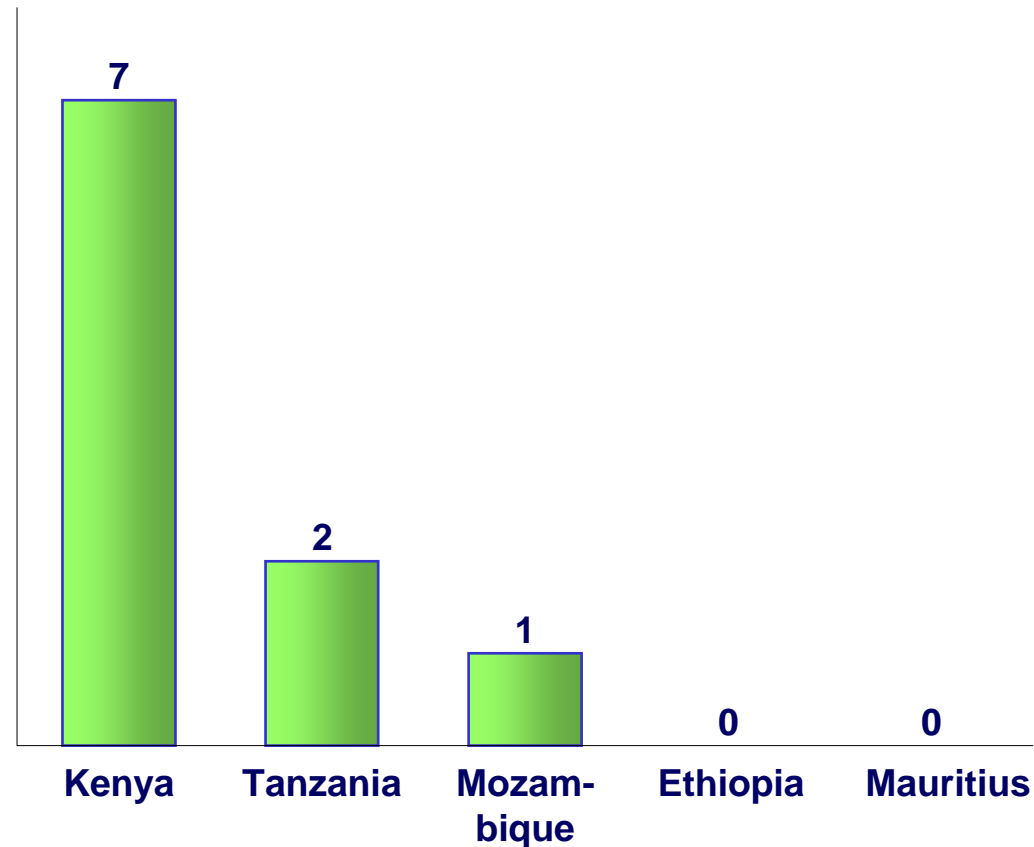
Sub-Saharan Africa is struggling ...



- 4 countries (China, India, Brazil and South Korea) account for 70% of CDM projects and 80% of CERs through to 2012
- Sub-Saharan Africa accounts for just over 1% of registered projects worldwide and 2% of CERs through to 2012
- 88 non-Annex 1 countries have yet to benefit from any registered CDM project activity

Number of CDM Projects In Selected Countries (March 2008)

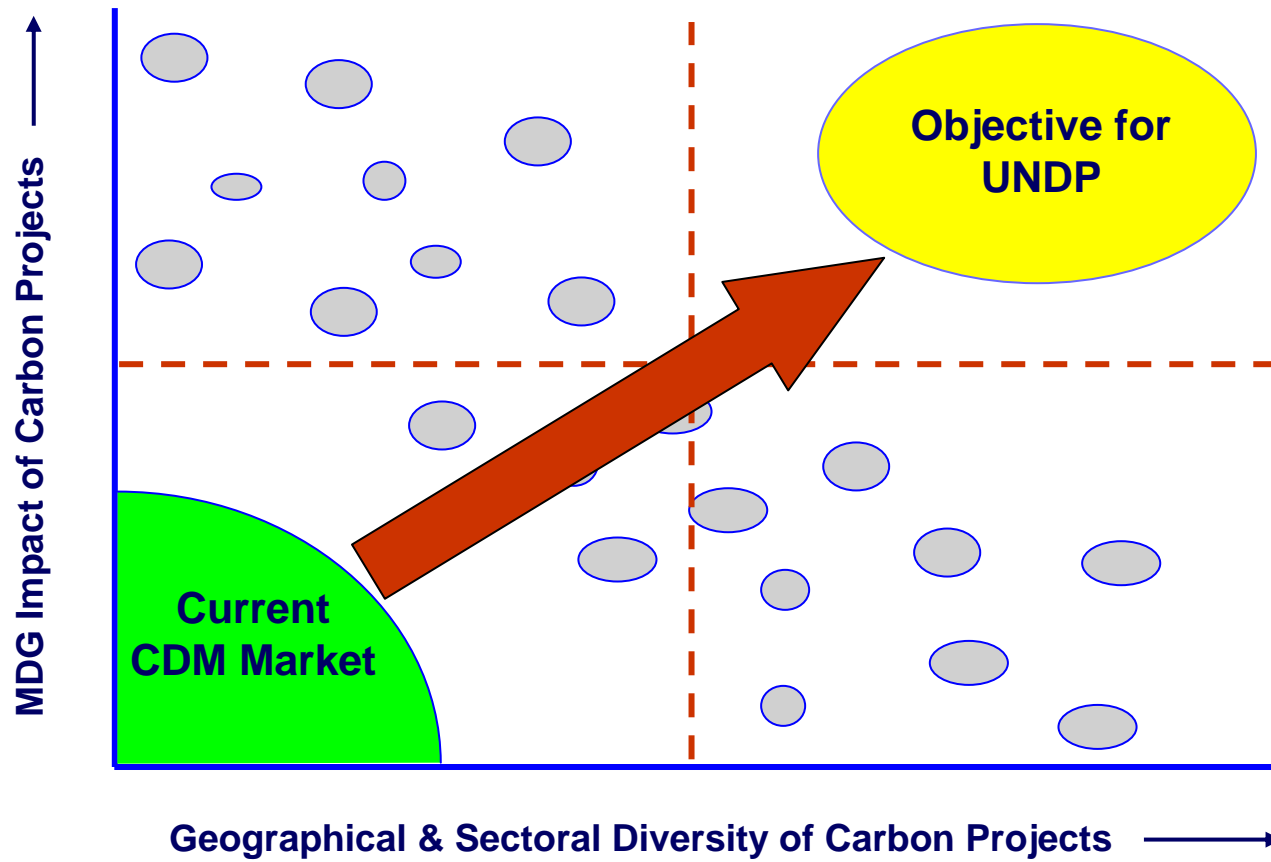
(Registered projects)



The Millennium Development Goals

Goal 1: Eradicate extreme poverty & hunger	Potential CDM Link
Target 1: Halve the proportion of people whose income is less than \$1/day	HIGH
Target 2: Halve the proportion of people who suffer from hunger	MEDIUM
Goal 2: Achieve universal primary education	
Target 3: Ensure that children everywhere, boys & girls, complete full primary schooling	LOW
Goal 3: Promote gender equality & empower women	
Target 4: Eliminate gender disparity in primary & secondary education	LOW
Goal 4: Reduce child mortality	
Target 5: Reduce under-5 mortality by two-thirds	MEDIUM
Goal 5: Improve maternal health	
Target 6: Reduce the maternal mortality ratio by three-quarters	LOW
Goal 6: Combat HIV / AIDS, malaria & other diseases	
Target 7: To reverse the spread of HIV / AIDS	LOW
Target 8: To reverse malaria, other diseases	MEDIUM
Goal 7: Ensure environmental sustainability	
Target 9: Reverse the loss of environmental resources	HIGH
Target 10: Halve the proportion of people without access to safe drinking water	MEDIUM
Target 11: Significant improvement in the lives of 100m slum dwellers	MEDIUM

UNDP's objective



Linking the MDGs and the CDM

MDG Targets	CDM Project-Types
Goal 1: Eradicate extreme poverty & hunger	Energy for local enterprises; lighting to facilitate income generation; employment opportunities
Goal 2: Achieve universal primary education	Reduce time spent by children on energy provision; lighting for reading; energy for educational media
Goal 3: Promote gender equality & empower women	Modern energy services free girls and women's time spent on energy provision
Goal 4: Reduce child mortality	Energy supply for health clinics; reduced air pollution from traditional fuels
Goal 5: Improve maternal health	Energy supply for health clinics; reduced air pollution from traditional fuels
Goal 6: Combat HIV / AIDS, malaria & other diseases	Energy supply for health clinics; cooling of vaccines and medicines
Goal 7: Ensure environmental sustainability	Afforestation / Reforestation; substitution of non-renewable biomass; waste management

UNDP's two-pronged carbon strategy

Capacity Development

Creating an 'operational' CDM framework in participating countries – an environment in which functioning public institutions are able to effectively interact with the private sector to jointly develop carbon projects.

MDG Carbon Facility

Provides support to project developers – through provision of a comprehensive package of services to assist private-sector project developers with the preparation and implementation of carbon projects.

CDM capacity development in southern / eastern Africa

- **6 participating countries:**
 - **Ethiopia**
 - **Tanzania**
 - **Kenya**
 - **Zambia**
 - **Mauritius**
 - **Mozambique**
- **Regional coordination, with in-country activities devolved to National Project Coordinators**
- **Co-implementation arrangement with UNEP**
- **The project will be aligned with Government strategy and fully ‘joined up’: cross-Ministry participation**

How do we build national capacity to engage with the CDM?

**Workshops, tutorials, technical support, awareness-raising,
PIN & PDD development, scoping studies...**

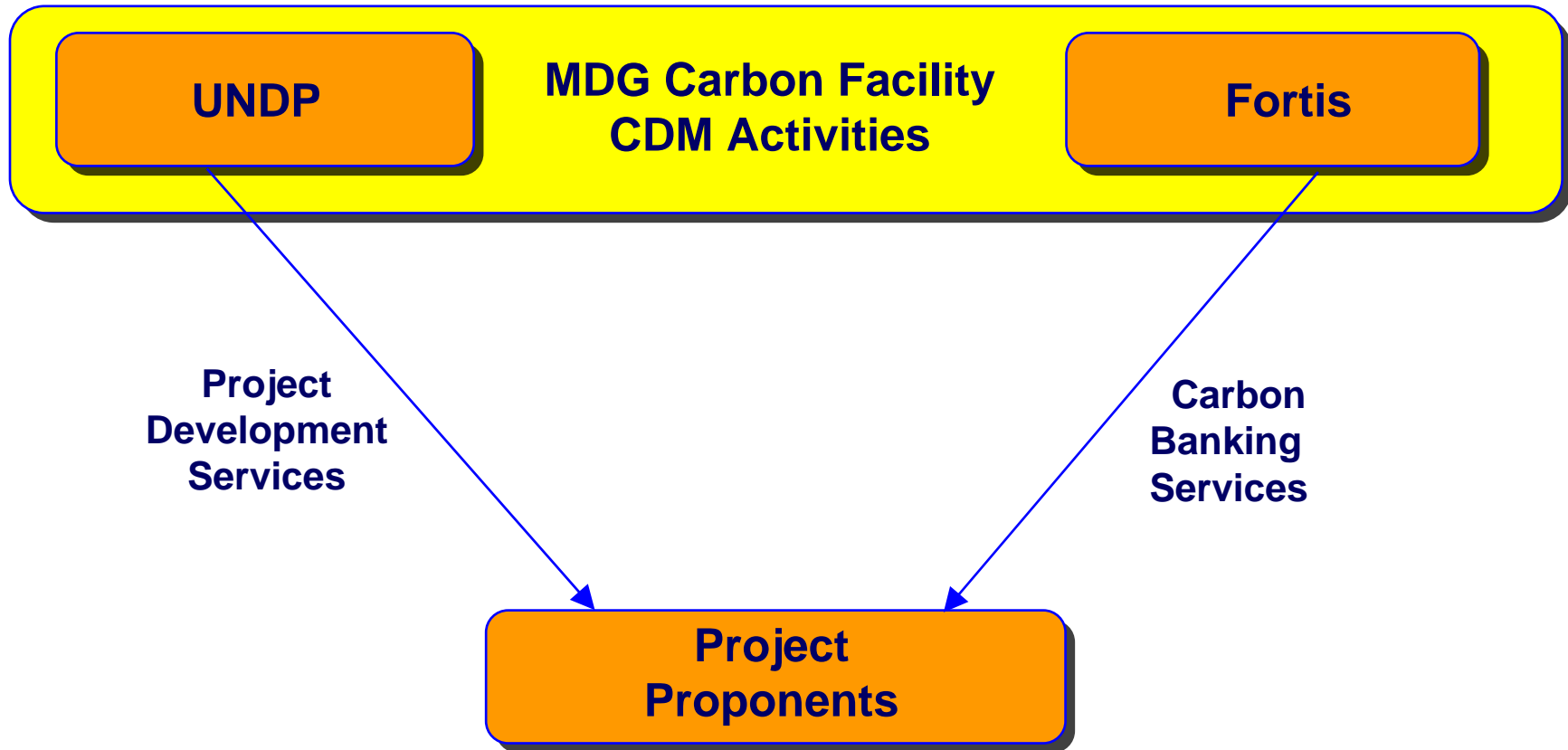
**...for the DNA, government ministries & agencies,
consultants, trade bodies, academics, project developers, etc.**

Constant in-country presence – not fly in, fly out

**Dual agency implementation (with UNEP) – mutual
strengths**

Regional-level assistance and resources

MDG Carbon Facility



www.mdgcarbonfacility.org

MDG Carbon Facility – pricing formula

UNDP has partnered with Fortis Bank: Fortis purchases the credits generated by MDG Carbon projects

Fortis applies a standardized pricing formula for all MDG Carbon projects. The pricing formula consists of 2 components, with pricing set at the *higher* of:

(i) Floor component: €[x]

OR (ii) Indexed component: [x]% of EUA Phase II market price

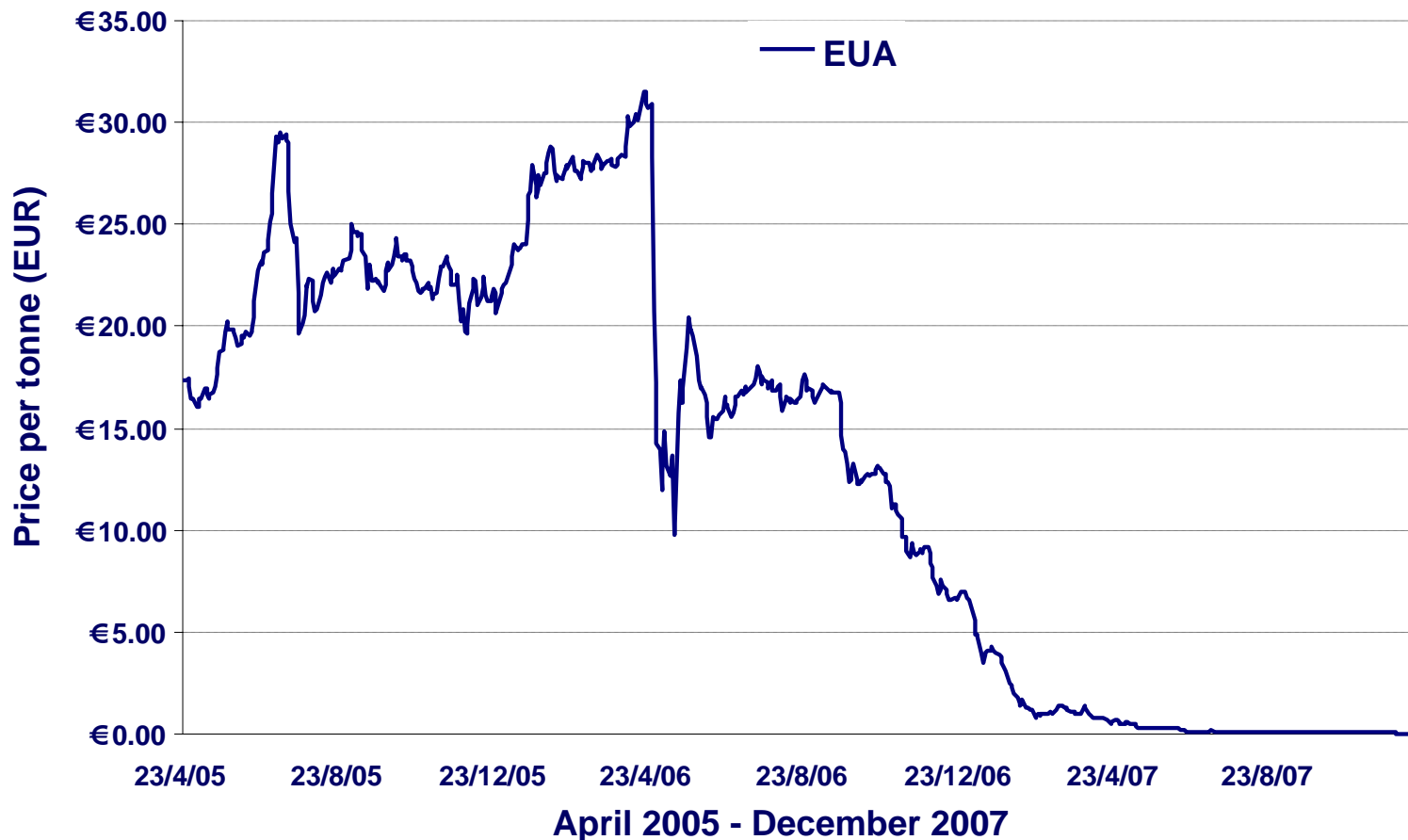
The pricing formula:

- **sets a fixed price per credit for all credits**
- **is applied at ERPA signing / PDD validation, not at delivery of credits**

MDG Carbon Facility – pricing considerations

- **Pricing is a priority for MDG Carbon.** UNDP seeks to maximize inflows to developing country and their project proponents
- Fortis' pricing terms are the result of a competitive tender process. Fifteen of the world's leading international banks participated
- The attractive level of MDG Carbon's pricing reflects the premium the market places on the programme's development mission
- Fortis is rated AA- , providing a secure, hard-currency revenue stream to project proponents

Historical market data – European Union ETS Phase 1



The floor component protects against market volatility. Under the EUA Phase I there was a significant market downturn

End

Sanju Deenapanray

CDM National Project Coordinator

3rd Floor, Anglo Mauritius House

Port Louis

Tel: 208 2416 – 211 0155

Fax: 2084871

prakash.deenapanray@undp.org

http://un.intnet.mu/undp/html/mauritius/energy_sector.htm