

# Project Financial Analysis and Financing

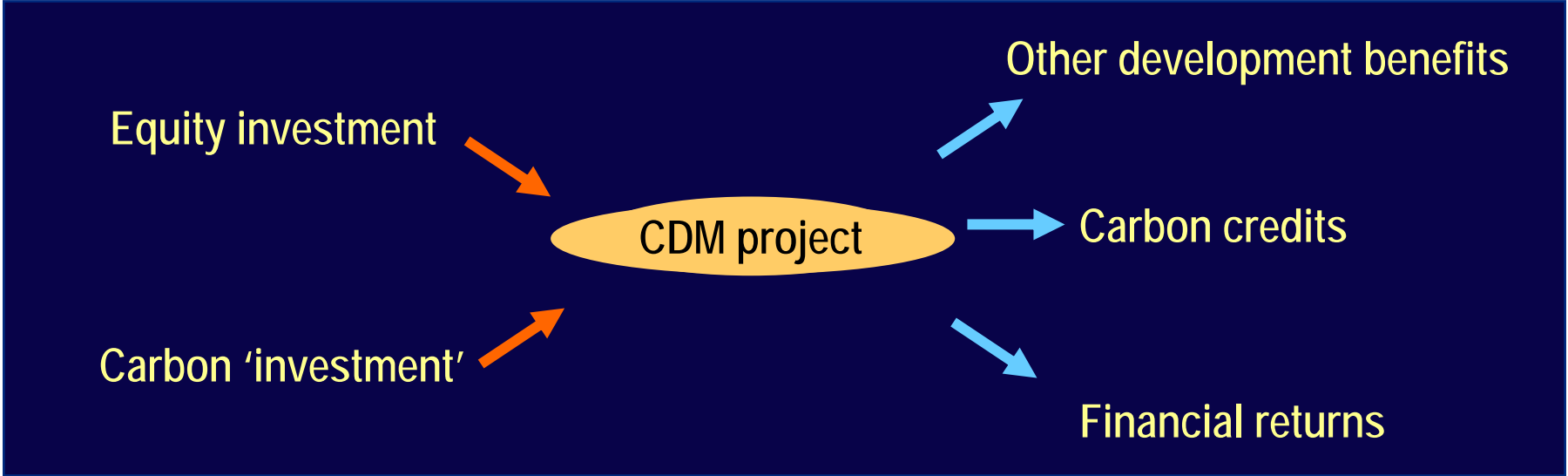
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Randall Spalding-Fecher, ECON Poyry

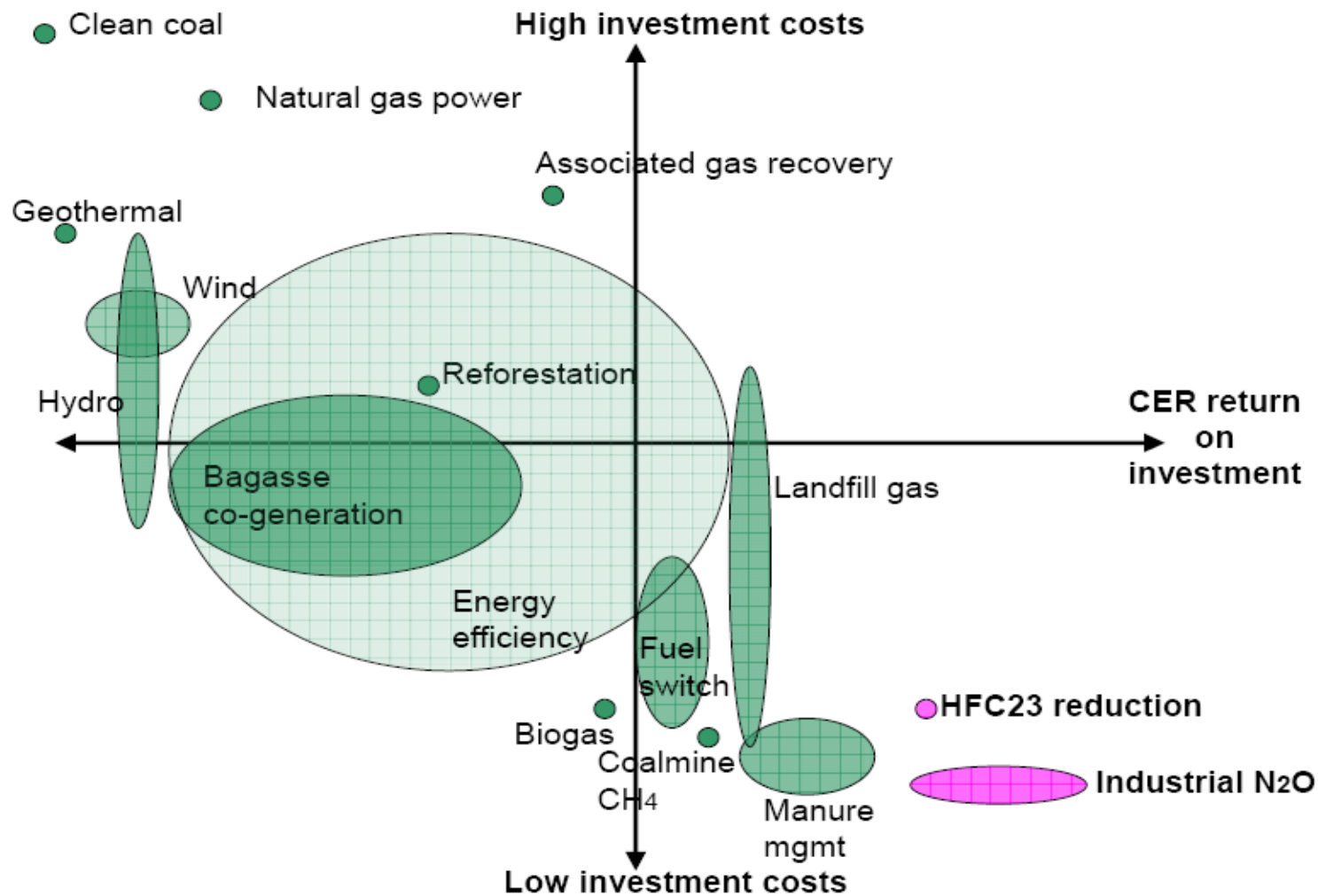
CD4CDM Third National Workshop

Port Louis, Mauritius

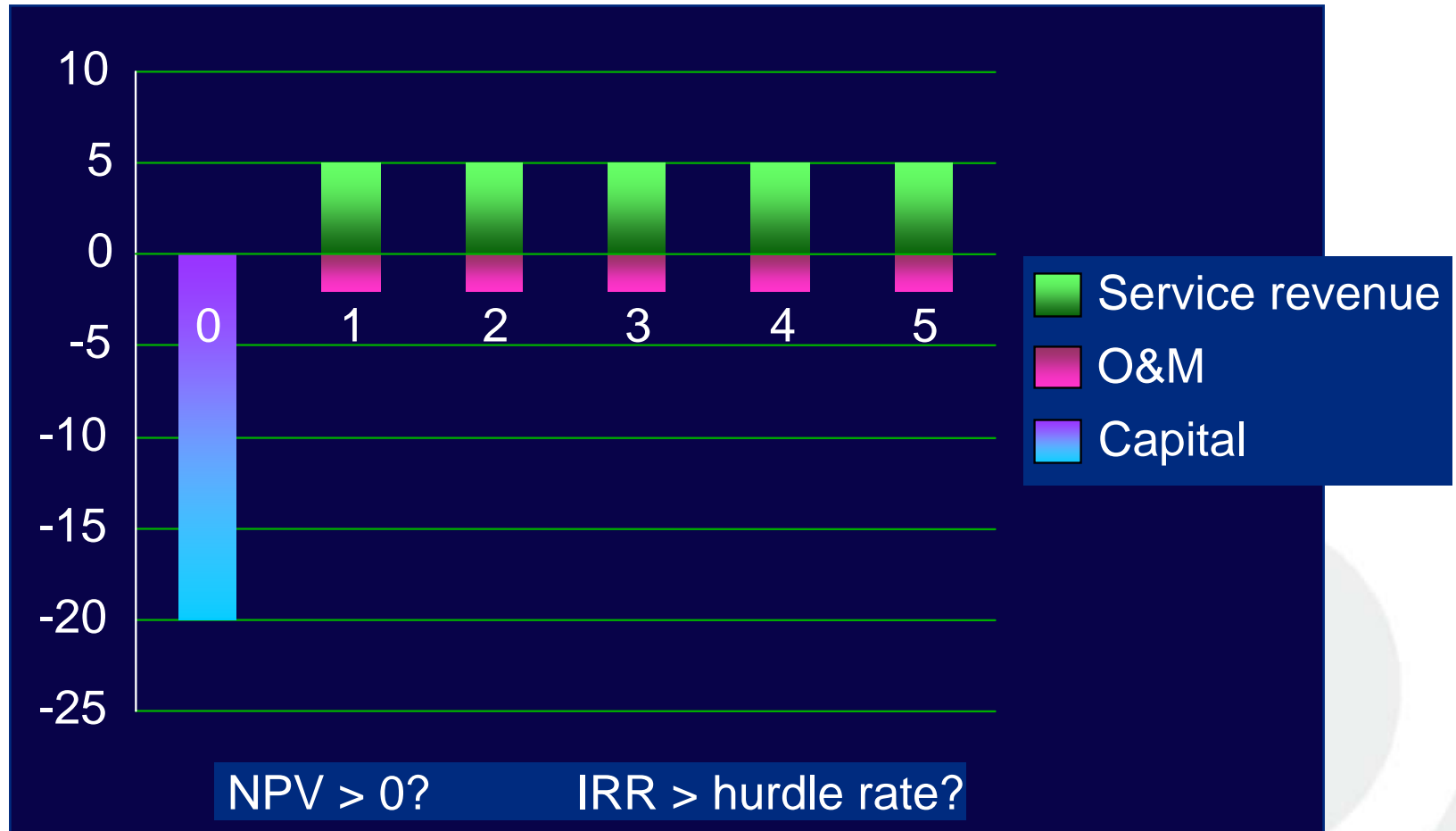
# How is a CDM project different?



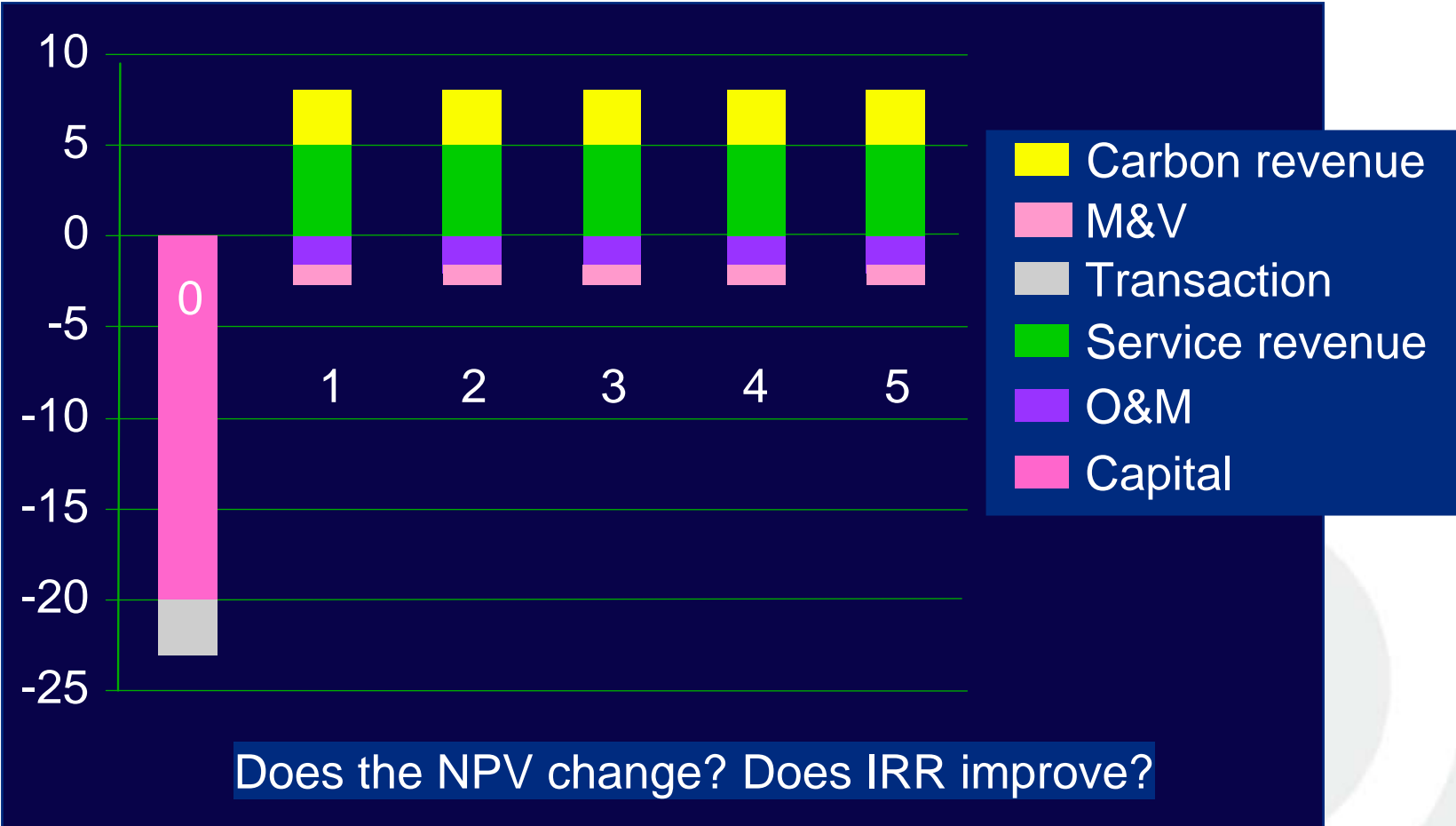
# Not all carbon projects are born equal...



# Typical investment project assessment



# CDM investment project assessment



# Additional costs and benefits

- Initial transaction costs
  - CDM project development
  - Could be very substantial - search for mechanisms to reduce (eg through bundling)
- Ongoing transaction costs: monitoring and verification
  - Must track GHG emissions, and maybe other impacts
  - Also a substantial cost, but depends on which methods
- Carbon Revenue - how much will this be?

# Transaction cost components

- Developing project documentation (PIN, PDD, EIA)
- Negotiation and development of legal contracts (including ERPA)
- Professional fees for validation (DOE), brokerage, etc
- Host Country DNA Approval
- Admin fee to EB (“share of proceeds”)
- Internal monitoring
- 2% of CERs to adaptation fund (except LDCs)
- Credit sharing with host nation?

# Coût des projets en MDP et marché volontaire

Activité	Estimation des Coûts (\$US)		
	Projet MDP - Grande échelle	Projet MDP – Petite échelle	Voluntary Gold standard*
Document Descriptif de Projet	45,000	20,000	7,500
Consultation des parties prenantes et approbation par le pays hôte	10,000	5,000	2,500
Validation	30,000	12,500	5,000
Frais d'enregistrement	30,000	12,500	5,000
Transaction Négociation & Contrat	20,000	10,000	5,000
Suivi du projet (périodique)	Variable	Variable	Variable
Vérification initiale	15,000	7,500	2,500
Vérification périodique (coût par vérification)	10,000	5,000	2,500
<b>Total approximatif</b>	<b>&gt;160,000</b>	<b>&gt;65,000</b>	<b>&gt;25,000</b>

\* Cas d'une projet à Petite Echelle <5 000 tCO<sub>2</sub>/an. Le coût d'un projet à Grande Echelle est significativement plus élevé.

# Estimating carbon revenue

Carbon revenue = carbon credits x carbon price

Carbon credits = baseline emissions - actual emissions

- Credits likely to accrue each year, so does carbon revenue
- Critical issue is baseline - a projection of 'what would have happened' without the project
- Not all credits may count - eg liability issues

# But how much are CER's worth?

- Exact price not as important as range of prices - requires risk management from the project developer
  - Is the volume of credits guaranteed? Are there penalties for non-delivery?
  - What is the contract signed? Pre- or post-registration?
  - eg €9-14/tCO<sub>2</sub>

# Pricing categories

- Non-firm volume. Buyer buys what seller delivers even if emissions reductions turn out not to qualify as CERs.
- Non-firm volume. Contract contains preconditions, e.g. that the underlying project qualifies for the CDM.
- Firm volume. Contract contains preconditions (as above). Usually strong force majeure clauses and high credit rating requirements.
- Firm volume. No preconditions. Forward spot trades will in the future fit this category. Currently only the JSE's Carbon Credit Notes fit under this category.

# The IRR uplift typically provided by carbon revenues

## Impact of CER Revenue on the Internal Rate of Return of CDM Projects

Technology	$\Delta$ IRR
Hydro	0.8-2.6
Wind	1.0-1.3
Bagasse	0.4-3.6
Biomass	2-7
Municipal Solid Waste	>5
Forestry	2-7

Source: Robert Kelly, UNDP

Thank you!

# Sources of finance: project finance

# Sources of project finance (1)

<b>Institution / Fund</b>	<b>Types of Financing</b>	<b>Sector Focus</b>	<b>Conditions</b>
International Finance Corporation (IFC) – Global Environmental Fund (GEF)	Concessional finance : low-interest loans, convertible debt, or loan guarantees	All climate friendly technologies	The project must satisfy stringent environmental standards and conform to host country and World Bank guidelines
Development Bank of Southern Africa	Loan finance, Equity investments and Guarantees	Very broad - funding physical, social and economic infrastructure	
UN Environment Programme (UNEP) AREED	enterprise development services and start-up financing		
E & Co	technical assistance, intermediary services, finance and direct investment	All renewables	
Good Energies Inc	Private equity finance	solar photovoltaics (PV) and wind energy	

# Sources of project finance (2)

Institution / Fund	Types of Financing	Sector Focus	Conditions
Actis Energy Fund / Globeleq	Private equity finance	Power sector. All renewables	Investment range in Africa is between US\$4 million - \$50 million
Aureos Southern Africa Fund	Equity and quasi-equity related investments		small and medium sized enterprises in SADC countries
Triodos Renewable Energy for Development Fund	Seed capital (up to maximum €50,000)	Most small scale renewables	projects should focus on bringing electricity to underserved people, making use of proven technology
German Investment and Development Company (DEG)	debt capital	Energy Efficiency, Bioenergy, Small hydropower, Wind projects	
Dutch Development Bank (FMO) - LDC Infrastructure Fund	loans to equity investments in enterprises	power, environmental investments and other infrastructure activities	Long term debt (up to 20 years) up to a maximum of €15.5 million in €, USD or local currencies Equity investments (minority shares only) up to €7.75 million

# Sources of finance: carbon purchasers

# Purchasers vary in size and method

Annex 1 Government	Volume to be Procured	Procurement Agency	Procurement Method	Budget / other comments
Netherlands – ERUPT	16 Mt CO <sub>2</sub> e	Government procurement agency	Formal tender & procurement	5 rounds
Netherlands – EBRD	-	EBRD	Outsourced fund management	€2 m
Netherlands – CERUPT	-	Government procurement agency	Formal tender & procurement	Discontinued after 1 round
Netherlands – INCAF	-	International Finance Corporation (IFC)	Outsourced fund management	€4m
Netherlands – Clean Dev Facility	16 – 32 Mt CO <sub>2</sub> e	World Bank	Outsourced fund management	
Netherlands – CAF	Up to 10 Mt CO <sub>2</sub> e	Local development bank	Outsourced fund management	
Denmark – DEPA	-	National environmental protection agency	Formal tender & procurement	DKK 200m (all funds)
Denmark – CDM	-	Existing cooperation programmes	Internal fund management	See above
Denmark	Up to 1.7 Mt CO <sub>2</sub> e	Private bank (Standard Bank London)	Outsourced fund management	See above. CEE & FSU

# Purchasers vary in size and method (2)

<b>Annex 1 Government</b>	<b>Volume to be Procured</b>	<b>Procurement Agency</b>	<b>Procurement Method</b>	<b>Budget / other comments</b>
Sweden	-	National energy Agency (STEM)	Internal fund management	Small programme SEK 350m 1997-2004, SEK 20m p.a. 2005-07
Finland	Up to 1.4 Mt CO <sub>2</sub> e	National environment institute (SYKE)	Internal fund management	Pilot Programme €10m
Austria	35 Mt CO <sub>2</sub> e	Private Bank (Kommunalkredit)	Formal tender & procurement	€36m p.a. 2005-2012
Austria	1.25 Mt CO <sub>2</sub> e	Private consultancy (Ecosecurities)	Outsourced fund management	Small scale CDM in Latin America
Germany KfW Carbon Fund	-	German development bank (KfW)	Formal tender & procurement	€10m initial capital
Italy	-	World Bank	Outsourced fund management	\$15m
Belgium (Flanders)	5.4 Mt CO <sub>2</sub> e p.a.	Private consultancy (BGP)	Formal tender & procurement	
Japan	Up to 100 Mt CO <sub>2</sub> e p.a.	Japanese development bank (JBIC)	Fund management	
Canada	10 Mt CO <sub>2</sub> e p.a.	Undecided	Undecided	

**Thank you!**

# Putting is all together - wind power example

- Simple example: Small wind energy project
- Technical data:
  - 5 MW capacity
  - Capacity factor: 33%
  - Economic life: 25 yrs, but only 2 years crediting period
  - GHG emissions: zero
- Non-GHG costs and revenue
  - Can sell electricity at 33 local cents/kWh
  - Capital cost local currency unit 6000/kW
  - O&M: 1.5% capital, 3.1 lc/kWh (7.5 LCU/US\$)



# Wind example: estimating CERs

- Determine the baseline against which CDM project is measured
- See 'combined margin' approach to emissions factor – in this example 0.9 kgCO<sub>2</sub>/kWh
- Calculate carbon saved
  - 14 450 MWh \* 0.9 kgCO<sub>2</sub>/kWh = 13 000 tCO<sub>2</sub> per year
  - Or about 273 000 tCO<sub>2</sub> over 21 year crediting period
- But what will happen to CERs after 2012?

# Wind example: carbon revenue and CDM costs

- Assume contract price of CERs is \$3-8/tCO<sub>2</sub>
  - Revenue from CERs: LCU 0.3-0.8 m/yr
- But also have additional costs
  - Verification costs - assume 5% of capital spread over life of project (LCU 70 000/yr) - difficult to estimate
  - Initial transaction costs (search costs, project preparation, approval process) \$40 000

# IRR with and without CDM project

<i>Carbon price</i>	<i>Without CDM project</i>	<i>With CDM project</i>
\$3 per ton CO <sub>2</sub>	13.4%	14.0%
\$5 per ton CO <sub>2</sub>	13.4%	14.8%
\$8 per ton CO <sub>2</sub>	13.4%	15.8%

# Key success factors for CDM projects

Easiest to implement -> Lowest risk -> Highest price

- Use approved baseline and monitoring methodology
- Proven technology
- Short lead times
- Simple financing arrangements (i.e. internal)
- Project team has right mix of skills (e.g. carbon advisory, finance, technology, operations)
- Large enough to cover transaction costs
- “Unilateral” projects will get higher price, but put more risk on developer

# Transaction cost estimates (1)

<b>Conventional project activities</b>	<b>Additional CDM activities</b>	<b>Estimated additional costs (US\$)</b>
Project feasibility activities	CDM project screening, develop baseline, MP	\$20,000 – 60,000
Project planning and basic design	Complete PDD and seek host country approval	\$5,000 – 40,000
Project approval activities	Validation	\$15,000 – 40,000
Detailed design, procurement and final contracting	Marketing of carbon credits	Internal costs, or if brokers are used, payments will be due with credits

Source: Ecosecurities

## Transaction cost estimates (2)

<b>Conventional project activities</b>	<b>Additional CDM activities</b>	<b>Estimated additional costs (US\$)</b>
Negotiation of PPA	Negotiation of an ERPA	Lengthy and expensive exercise until standard ERPAs are developed. \$10,000 – 40,000
	Registration fee with CDM Executive Board	\$5,000 – 30,000 depending on project size
Operation, sales, maintenance, admin	Internal monitoring and external verification	Unknown, \$3,000 – 15,000 annually or biannually

Source: Ecosecurities

# Transaction cost estimates (3)

<b>Conventional project activities</b>	<b>Additional CDM activities</b>	<b>Estimated additional costs (US\$)</b>
	Transfer of carbon credits	If brokers are utilised success fee of 3 – 20% of the CER value
	Share of proceeds, registration fee with CDM EB	% of CERs, or their value. Exact % yet to be determined
	Adaptation fee – not applicable to LDC	2% of CERs
	Credit sharing with Host Country	Determined on a country and project basis