



# Integrating Carbon Finance into Your Project

The World Bank

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# Outline

- How Emission Reductions are demonstrated and calculated
- Impact of Carbon Finance on cash-flow
- Disbursement of carbon revenue
- Funding project preparation and upfront payments
- WB pricing approach and factors affecting price
- Power Sector Case Study: Hydro Project in Ecuador

# How to demonstrate ERs: “Additionality”



- The most complex feature of CDM
- Additionality is demonstrated if greenhouse gas emissions are reduced below those that would occur in the absence of the CDM project
- Additionality assessment is part of CDM Methodology utilizing typically Additionality Tool
  - More simple assessment is available for small scale projects

# How to demonstrate ERs: “Baseline” methodology



- Approved procedure to determine emission reductions from a project activity over time including:
  - determination of emissions in the relevant reference scenario (baseline) and in the project scenario
  - procedures to collect and use data to calculate emission reductions: monitoring
  - demonstration that the project reduces emissions compared to baseline: additionality
- Approval of methodologies by CDM Executive Board



# Additionality Tool

**Step 1. Identification of all realistic & credible alternatives to proposed project**

(choose between step 2 or 3)

**Step 2. Investment analysis**

**Step 3. Barrier analysis**

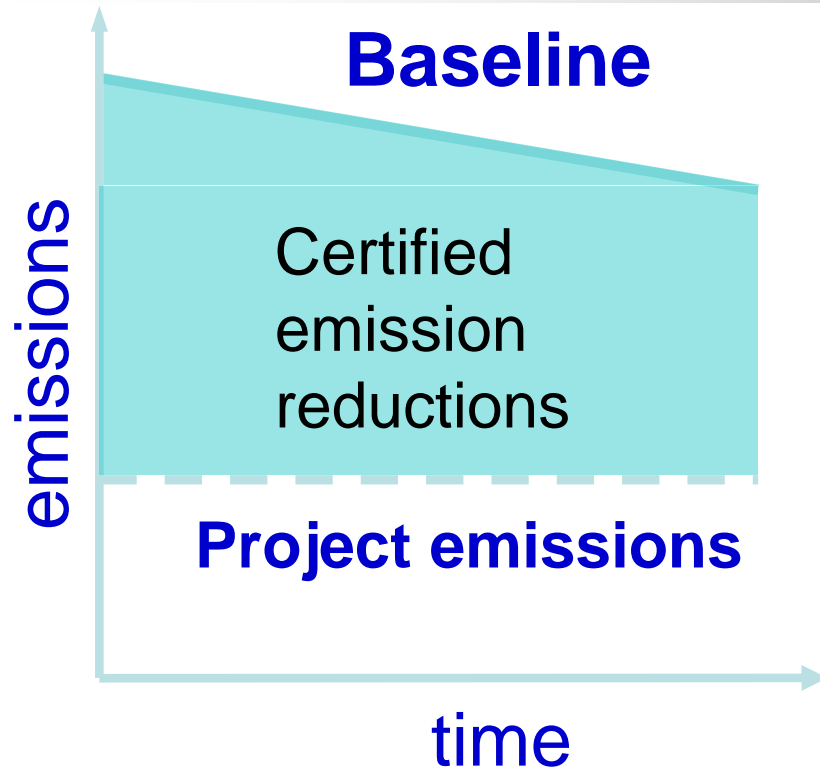
**Step 4. Common practice analysis**

**Step 5. Impact of CDM registration**

**Project Activity is Additional**



# Baseline/Additionality



## Main Challenges:

- Baselines are counterfactual/hypothetical
- Determining “additionality” based on subjective assessment

The difference between the actual project emissions and the emission baseline constitute the volume of CERs

If project = baseline → no CERs

# Impact of Carbon Finance



- **Higher annual cash flow and Internal Rates of Return**
  - Up to 3.0% incremental IRR for renewables / energy efficiency
  - >\$3-\$8 per MWh for renewables, energy efficiency
  - >20% incremental IRR for CH<sub>4</sub> (i.e. landfill gas)
  
- **High quality cash flow and contract value**
  - OECD buyers (investment-grade payers)
  - \$ or €denominated
  - Long-term contract with no price fluctuation guarantees flow
  - Payments abroad eliminate currency conversion and transfer risks
  
- **ER revenues + Financial engineering allow access to capital markets and boost project bankability (borrowing against ER streams)**



# Impact of Carbon Finance, Examples

Incremental IRR (%) - integrating carbon finance						
Renewable Energy						
Price/ER	<i>Purchase period (years)</i>					Impact per MWh
	5 (2008– 2112)	7	10	14	21	
8 USD	0.8 %	1.1%	1.4 %	1.6 %	1.9 %	5.06 USD
10 USD	1.0 %	1.4%	<b>1.7 %</b>	2.1 %	2.3%	6.33 USD
Solid Waste Management						
8 USD	37.9 %	45.1 %	49.2 %	50.7 %	51.3 %	66 USD
10 USD	52.3 %	59.1 %	<b>62.4 %</b>	63.5 %	63.8 %	82 USD



# Disbursement of Carbon Revenue

- Payments are typically made against delivered ERs to the Project Sponsor over the Crediting Period
- Crediting period can be 10 years or renewable 3\*7 years
- Example:
  - ERs are generated in 2008
  - ERs are verified in early 2009
  - Payment is made on VER contracts based on positive verification report
  - Payment is made on CER contracts based on positive certification and issuance of CERs by CDM Executive Board.
- WB is one of few buyers purchasing beyond 2012!



# Upfront Financing

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- Upfront payments possible
- Maximum of 25% of ERPA value
- Not exceeding investment cost
- (Bank) Guarantee required



# Funding CDM Project Preparation

- The main CF document at preparation stage are:
  - Project Idea Note (PIN)
  - Carbon Finance Document (CFD)
    - An elaborated version of the PIN including additional details on financing and risk analysis.
  - Project Design Document (PDD) and Monitoring Plan (MP)
- The project sponsor/developer is usually expected to prepare PIN and CFD
  - World Bank can support this work
- The World Bank typically contracts consultants to prepare the PDD and MP
  - Some or all the costs will be later recovered from the emission reduction payments.



# World Bank Pricing Approach

- Focus on transparency and consistency in setting prices for projects across the portfolio (\$2Billion);
- Assures equitable benefit sharing for sellers and buyers
- Adding/subtracting adjustments for different risk components and risk allocation in ERPAs
  - Project risk
  - Kyoto regulatory risk
  - Purchase beyond 2012
  - Other ERPA Terms and other project factors
- Sometimes additional price /discounts
  - Additional community and/or environmental benefits
  - Market premium/discount for technology and region/country
- Price adjustments
  - Upfront payment
  - Costs and expenses

# Carbon Finance in the Abanico Hydroelectric Project in Ecuador





# Main Characteristics

- 30 MW Run-of-river mini hydroelectric plant in Ecuador
- Project to be developed in two phases:
  - **Phase I:**
    - Installed capacity: 14.9 MW
    - Annual average generation: 111 GWh
    - Investment cost: US\$ 21 million
    - Commissioning & Start up date: Jan-2006
  - **Phase II:**
    - Additional capacity: 14.9 MW
    - Increment in annual average generation: 111 GWh
    - Investment cost: US\$ 12.5 million
    - Commissioning & Start up date: Jan-2008
- Financially viable (~16% IRR; US\$ 1.1 million / MW)



# Constrains for Construction

- High Country Risk (CCC+ sovereign rating by S&P) in the Latin America Region
  - The lowest Foreign Direct Investments in South America (US\$ 4,843 million '98-'02)
  - Among the highest local interest rates worldwide (14-15% in US\$ terms)
  - Negative business environment for the energy sector;
- **Result:** no private hydroelectric plants

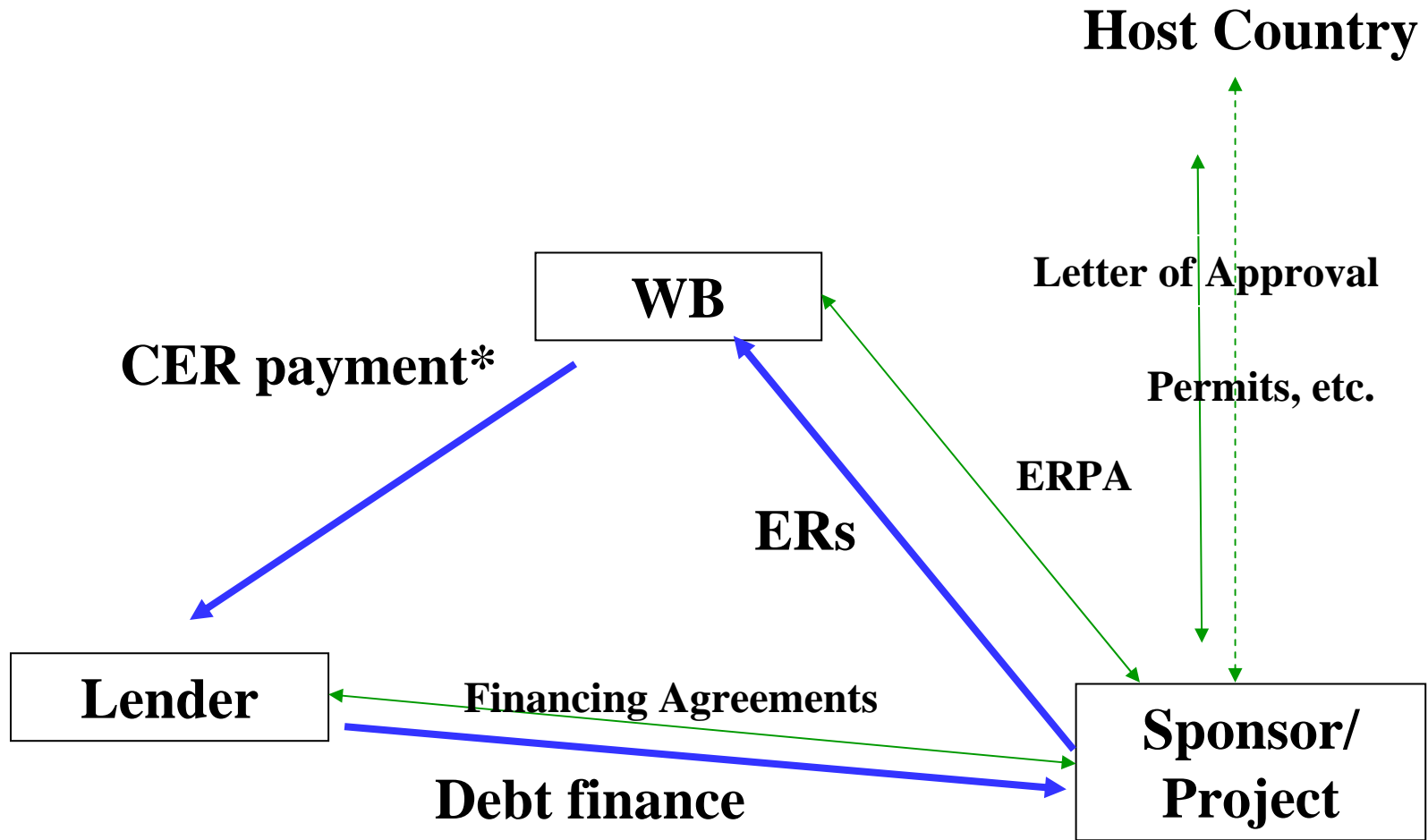


# Methodology

- **Baseline Methodology:** “Consolidated baseline methodology for grid-connected electricity generation from renewable sources ACM 0002”;
- **Additionality / Eligibility for CF:** “Tool of the demonstration and assessment of additionality”. Analysis based on country risk and sectoral barriers, demonstrating that such project is not “business as usual” and that CF alleviates existing hurdles;
- **Emission Factor:** Calculated according to CDM methodology = 0.668 tCO<sub>2</sub>e / MWh of electricity sold to the grid (displacement of fossil fuels);
- **Emission Reductions:** 806 kt CO<sub>2</sub>e up to 2012 (i.e. US\$ 4.03 million).



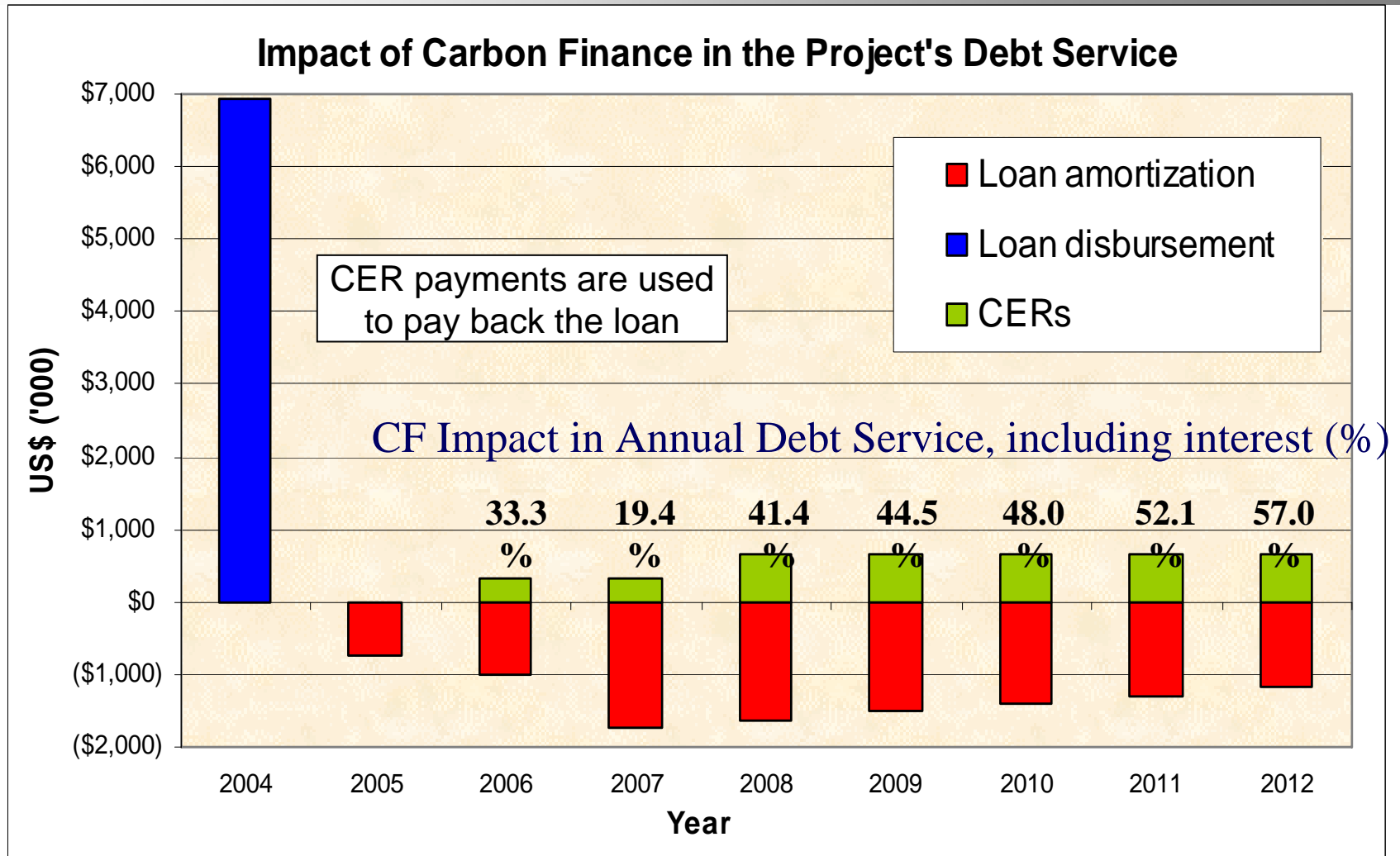
# Carbon Transaction Structure



*\*Typically CER payments are made directly to the Project Sponsor*



# Impact of Carbon Finance (1)





# Impact of Carbon Finance (2)

- **Slightly increase in cashflow IRR**
  - From 15.61% to 16.33% (0.72% increase in IRR)
- **Financial engineering**
  - ERPA cash flow helped project to comply with lender's covenant of project's minimum off take agreements to secure debt service
  - Payments for the CERs to the lender eliminate convertibility and transfer risks (1% reduction in loan's interest rate due to ERPA)
- **Result: Value added CER revenues + Financial engineering allowed project bankability and financial closure !**
  
- **Construction began immediately after financial closure**



**Thank you**

[www.carbonfinance.org](http://www.carbonfinance.org)