



# Carbon Finance – Implications for Long-Term Financing of Clean Energy Solutions

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# What is CDM?

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- The Clean Development Mechanism (CDM) under the Kyoto Protocol enables project developers in emerging economies to capture value by reducing emissions
  - Utilisation of greenhouse gases (HFC, N<sub>2</sub>O, CH<sub>4</sub>, SF<sub>6</sub>)
  - Improving energy efficiency (iron & steel, cement, petrochemical)
  - Use of renewable energy sources (wind, hydro, biomass)
  - Use of alternative fuels (bio-fuels)
  - Programmatic CDM – small scale project bundling (domestic energy efficiency)
- ➔ Generate certified emission reductions (CERs)
- Key drivers
  - Demonstrate additionality - not business as usual – new technology, process....
  - Considered CDM before proceeding with project – influenced decision
  - CER value generated within Kyoto compliance period (2008-2012)

***Market is moving along the abatement curve – focus on energy efficiency***



# Carbon Finance – The CER Revenue Stream

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- CER Pricing options:

## *Payment on delivery of CERs*

- Fixed price
- Floating price – % share of CER Index; above NDRC floor price of €8.50
- Combination of fixed and floating

## *Payment on delivery plus a partial prepayment of % of CER revenues*

- Provides up-front capital for project investment, alongside equity and loan funding
  - lenders can view advance payment as equity funding
  - reduces the need for equity funding – increases equity returns
  - advance/prepayment typically represents up to 20-40% of total project CER revenues
  - can represent up to 40% of project costs – methane projects (landfill, coal mine gas)



# CER Prices

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- No 'CER price' – there is a CER spread, linked to the forward prices quoted on Nordpool or European Climate Exchange (ECX) – the “CER Index”
  - Upper and lower limits of the CER spread relate to market – EU ETS/Japan
  - CER price depends on combination of factors:
    - Construction and implementation risk
    - Performance risk – technology, fuel supply, O&M
    - Stage of the CDM process – pre or post registration
    - CER Pricing option – prepayment lowers per CER unit price – capital at risk
- €8.50 + 20% prepayment is equivalent to €10.50
- Due-diligence is key – assess and manage risk
- CER price also depends on local country regulations – NDRC floor price in China


# Carbon Finance – The Pros and Cons

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## PROS

- CER revenue stream backed by foreign buyer: **KEY is strong credit**
  - Mitigates revenue risks in core business – diversify earnings, source of forex
  - Provides additional collateral for lenders
    - Already understand project performance risk
    - Need to understand CDM delivery risk, pre-registration
  - Underpins value of CER revenue stream for sceptical investors
- CER buyers providing equity investment, alongside CER off-take
- Supports the transfer of technology and know-how – risk mitigation where policy mechanisms are insufficient to support technology application

## CONS

- Complex process with changing rules – question eligibility, delay in CER flows
  - Relatively new market with limited track record of performance, delivery of CERs
  - Structuring and risk mitigation for advance payments can be challenging
  - Lack of clarity post-2012 is limiting investment decisions. Payback typically 5+ years
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# Bio-diesel Development Company (Bio Devco)

## Venture Capital Equity Investment + Carbon

Bio Devco is an agriculture focused service organization established in a rural environment and owns and operates decentralized biodiesel production units on farms

### Role of Carbon Investor

- Finance initial expansion of the company, investing €5.0million in a Series A financing with rights to all CERs generated by projects @ €5-6/CER)
- Fund and develop new CDM methodology for biodiesel production
- Contribute to strategy and business development of business through its equity participation of 30 to 40%

### Risks

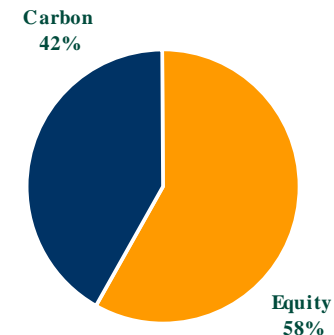
- Methodology and volumetric risk
- Farmers economics linked to fossil diesel prices and Biodiesel raw material prices
- Exit of investment arranged through a sale to a trade buyer or into the capital markets by end of 2012
- Ability to grow company at the required speed (i.e. HR & equipment procurement)

## Returns to Carbon Investor

### Carbon Investor Cashflows

|                 | 2006        | 2007     | 2008      | 2009      | 2010        | 2011        | 2012        |
|-----------------|-------------|----------|-----------|-----------|-------------|-------------|-------------|
| CER Volume      | 0           | 0        | 56,090    | 151,678   | 250,032     | 300,196     | 300,196     |
| Price           | 13.00       | 13.00    | 13.00     | 13.00     | 13.00       | 13.00       | 13.00       |
| Revenue         | 0           | 0        | 729,164   | 1,971,814 | 3,250,416   | 3,902,548   | 3,902,548   |
| COGS (€5.5/CER) | 0           | 0        | (308,492) | (834,229) | (1,375,176) | (1,651,078) | (1,651,078) |
| Opex            | (100,000)   | (25,000) | (25,000)  | (25,000)  | (25,000)    | (25,000)    | (25,000)    |
| Income          | (100,000)   | (25,000) | 395,671   | 1,112,585 | 1,850,240   | 2,226,470   | 2,226,470   |
| Capex/Divest.   | (5,000,000) | 0        | 0         | 0         | 0           | 0           | 14,012,410  |
| Cash Flow       | (5,100,000) | (25,000) | 395,671   | 1,112,585 | 1,850,240   | 2,226,470   | 16,238,880  |

### Value Carbon vs Equity



# Bio-gas Development Company

## Project Financing

Water Environmental Services (“WES”) provides technology for the treatment of wastewater that generates biogas for use in power, heat and steam production in agribusiness industries. WES is a technology leader, providing solutions that maximize performance and production of CERs, but has competitors that compete on cost with inferior technologies

### Role of Carbon Investor

- Provide an equity finance facility to be drawn on as required by CDM projects, permitting faster growth
- Use of finance facility will enable WES to offer their leading technology at a more competitive pricing level
- to apply WES’s technology to additional markets, for the company’s expansion

### Risks

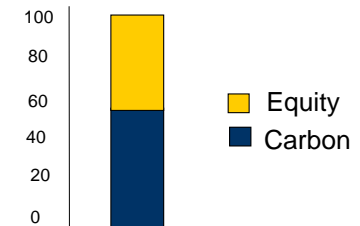
- WES has a history of volatile revenue, but has strong growth targets
- The projects in the pipeline have no validation of carbon assets as yet, hence regulatory risk is high
- The company is primarily focused in a country where the DNA has yet to develop

## Returns to Carbon Investor

### Carbon Investor Cashflows

|                            | 2007        | 2008        | 2009        | 2010        | 2011        | 2012        | 2013        |
|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| CER volume                 | 0           | 127,610     | 255,220     | 510,440     | 510,440     | 510,440     | 510,440     |
| Price €                    | 13          | 13          | 13          | 13          | 13          | 13          | 13          |
| Revenue                    | 0           | 1,658,930   | 3,317,860   | 6,635,720   | 6,635,720   | 6,635,720   | 6,635,720   |
| COGS (€/CER)               | 0           | 0           | (544,037)   | (1,437,307) | (3,573,080) | (3,573,080) | (3,573,080) |
| Operating expenditure      | (360,000)   | (420,000)   | (840,000)   | (240,000)   | (240,000)   | (240,000)   | (240,000)   |
| Income                     | (360,000)   | 1,238,930   | 1,933,823   | 4,958,413   | 2,822,640   | 2,822,640   | 2,822,640   |
| Capex                      | (1,067,887) | (1,067,887) | (2,135,773) | 0           | 0           | 0           | 0           |
| Cashflow                   | (1,427,887) | 171,043     | (201,950)   | 4,958,413   | 2,822,640   | 2,822,640   | 2,822,640   |
| Cumulative no. of projects | 3           | 6           | 12          | 12          | 12          | 12          | 12          |

### Value Carbon vs Equity



# Evolution of carbon finance is likely and essential

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- The first CDM projects were undisputedly additional as they provided the necessary financing for the abatement of waste gases, i.e. simple end-of-pipe solutions
  - ▶ Sustainable development value?
  - ▶ Need to move up the abatement curve faster and avoid windfall profits
  - ▶ Regulation or another mechanism will be needed to ensure these stay abated (e.g. HFC's, PFC's, N<sub>2</sub>O, etc.)
  
- Carbon financing is moving into more challenging abatement opportunities
  - ▶ Moving upstream - equity investment instead of simple carbon off-take contracts
    - technology and know how transfer
    - building sustainable businesses, not one-off projects
  - ▶ Regulation of CDM needs to evolve as we move along the abatement curve



# Carbon Finance – The Challenges towards 2012

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- Balance between use of carbon finance and policy – need financial carrot to balance policy stick
  - policy to follow on from CDM success – effective regulation
  - use carbon finance to provide financial incentive for change
  
- Greater clarity on carbon value opportunity – eligibility + certainty
  - benchmarking in industries – better definition than business as usual
  - establish dynamic baselines – ACM013 is a start
  - ..... build greater confidence in the process
  
- Carbon finance will be required to promote abatement only solutions – e.g. ventilation air methane (VAM), carbon capture and storage (CCS), etc.
  
- Innovation in the use of carbon finance to augment traditional project finance
  - building awareness
  - risk mitigation tools, to improve take up – IFC facilities
  - insurance products to mitigate CER delivery risks



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