The CMM Market and Project Options:
The Prelude to Project Finance

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Overview

- The CMM Markets
  - Energy
  - Carbon Credits
- Project Options
- Players and Stakeholders

Markets and Good Project Design: Prerequisites to Finance

- Understanding of market means secure greatest value for project: maximize profit
- Project design is critical for identifying most profitable technical option
- Knowing the players and stakeholders is important for project integration and business planning
- Together and in a coherent plan, financiers can see that all aspects thought through

CMM Markets

- Energy
  - Local variations in power/heat/gas prices and ability to sell
  - May influence project option
- Carbon Credits
  - Global
  - Influenced by policy
  - Future unclear

Considerations: Market

- Customer
  - Access: (Monopolies? Grid/pipeline access?)
  - Reputation/ability to pay?
- Price
  - Meets discounted cash flow requirements?
- Contract
  - Long term versus short term
  - Responsibility and Risk allocation
    - Sales/guarantees
    - Operations and maintenance
    - Power/energy sales/purchase agreements
- Finance: Who invests? Credit rating? Debt:Equity?

Carbon Credits

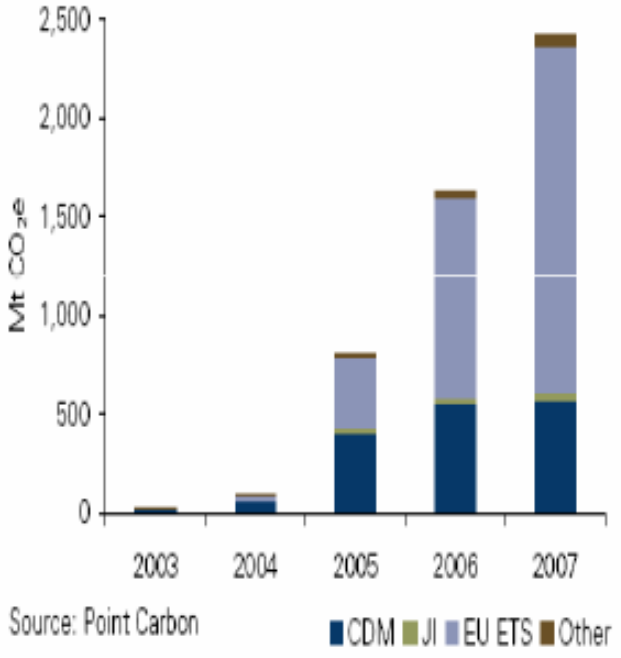
- For most of Eastern Europe/CIS, “Joint Implementation” “Emission Reduction Units” (ERUs) are the type of credit
- Demand comes from countries/companies with caps on emissions
- Credit revenue stream critical for many otherwise marginal/loss making projects
  - Could be over ½ of revenues

How to create a credit?

- Project design document
  - Demonstrate project is beyond business as usual: wouldn't do project without the credits
  - Clear idea of baseline, design and process for measuring emission reductions
- Validation by third party
  - Approved by the United Nations
- Country approval
  - Each country has different requirements
- United Nations approval
- Monitoring report
- Third party verification of emission reductions
- Credit issuance/transfer

Credit Prices and Volumes

Prices (€) of EUAs and CERs
2005 -2007



Volumes (million t):
EU ETS.CERs. ERUs and Other_

Market for CMM ERUs Good, far from perfect

- CMM attractive project type
- JI projects start in 2008
- ERUs command good prices (5 – 15 euros/credit)
  - depends on how advanced project is and perceived risks
- Host country approval issues

Credit Market Uncertainties

- Uncertainty regarding credits after 2012 (end of Kyoto period)
  - No international framework in place
  - ERUs are not given crediting approval post-2012
  - Therefore few parties willing to buy credits/value credit streams from 2013
  - Secondary concern is a “gap” if treaty decision comes too late (took a decade to prepare for Kyoto)
  - Thus, payback needs to be quick (prohibits starting some good projects)

Progress post-Kyoto

- UN Conference in Bali (December 2007) set timetable
  - Goal to formalize agreement in 2009
  - U.S. is “in”: important for creating deeper market demand
- EU: increasing stringency post-2012 in their trading scheme, but uncertainty regarding potential for ERUs to enter market

Carbon Sales Get Attention But Do Not Discount Power Sales!

Plant Configuration

Size of plant: 10 MWel
- Choose modules of 1.0-1.5 MWel for flexibility
- Mine power demand exceeds this (12 MWel base load)
- Operating hours: 7000/year*

Waste heat captured
- Approximately 75,000,000 kWhTh produced
- Mine heat demand exceeds this

* While engines under perfect conditions may operate in excess of 8000 hours/year, field experience indicates significantly lower system availability.

Key Capital Cost Elements:

CHP Plant:	€ 6 million
Transformers/elec.	€ 500,000
Monitoring:	€ 300,000
Development Costs:	€ 1.3 million
TOTAL	€8.1 million

Annual Operating Costs:

CHP O&M	€ 1.1 million
Monitoring:	€100,000
Administration:	€100,000
Credit Reg/mgmt.(3 yr): €100,000	
TOTAL:	€1.4 million

Bottom Line

Costs/Sales/Production Rates

Costs/Price

Avoided power costs =	€0.04 /kWhel
Avoided heat costs =	€0.003/kWhth
Credit sales (much delivery risk borne by project) =	€10/t

Production

Power:	65 million kWhel
Heat:	75 million kWhth
CO2 credits:	250,000 t/year

Annual Revenue Streams

Revenues/year

Power:	€ 2.6 million
Heat:	€ 0.3 million
Credits:	€ 2.5 million
TOTAL:	€ 5.4 million

Financial Results

(Assume 12% Discount Rate, after tax)

NPV =	€4 million
IRR =	20%

Different credit prices; IRR:

€0 =	1%
€5 =	11%
€10 =	20%
€15 =	28%

*Example based on actual case-study

General Considerations: Technical feasibility

- Integration with mining:
  - Gas Supply
  - Energy Demand
- Hardware choice:
  - Local or international (cost versus reliability)
  - Operations and servicing skills/availability
  - Spare parts
- Who will manage project?
  - Mine – are skills available?
  - Contractor – availability, quality and cost?
  - Developer – may want significant equity % to manage

Technical Options:

- Ventilation air methane: limited options, flow reversal reactors most advanced
- 30+%: power generation, local and mine uses
- > 90%: pipeline injection, chemicals, plus all other options viable

Power production most common for new projects

Partners and Stakeholders

- Mine and Coal Holding Company
- Markets:
  - energy consumers
  - carbon credit purchasers
- Authorities
- Equipment Suppliers
- Investors
- Plant design, procurement and construction
- Plant operations and maintenance

Mine and Coal Company

- Coal Company:
  - Core business mining coal
  - Relationship motivated by:
    - Taking problem (methane) off hands, and,
    - Providing additional revenues without inordinate risks
- Coal Mine:
  - Coal production core motive and skills
  - Relationship motivated by:
    - Minimizing distractions from coal production
    - Providing energy to mine coal

Markets: Energy Consumers

- Motivated by:
  - energy costs
  - security of supply
  - CMM projects (even if mine is consumer) face challenge if availability of energy supply is in question
  - Therefore, can usually compete only if
    - energy cost is better than current supplier
    - and project can demonstrate high availabilities

Markets: Carbon Credit Buyers

- Motivated to lock-in lowest credit price agreements from mines
  - Project Based Credits 7 – 14 Euros/t discounted (at least partially) because of delivery risk
  - The further the project is along, the higher the price
  - But if seller is not seen as reliable or creditworthy, then suffers steep discounts
- Most buyers do not understand CMM technical options, need to rely on others:
  - Technical Consultants? Mines? Project developers?

Equipment Suppliers

- Equipment Suppliers = Equipment Sales
  - Shorter term focus
  - Some do offer certain guarantees, servicing, and financing, but focus on off-taking equipment, market share and realizing highest margins
  - Cost is only one factor in project profitability
    - Keeping project running is more important

Investors

- Varies, but largely motivated by:
  - Low risk/high return on investment, or,
  - Market share, or,
  - Carbon credits, or,
  - Maximizing equity in projects
- Capabilities vary, depending on:
  - Knowledge of local markets,
  - Access to additional capital
  - Technical know-how

You Have a Project
What Are Your Next Steps?

- Package your project
  - Project idea note
  - Feasibility study
  - Business plan
- Define your risk profile within defined business model
- Assess finance options to balance risk
- Seek firm or indicative offer of funding
  - What is the difference
- What follows
  - Funding
  - Question/Answer
  - More formal study

Conclusions

- CMM markets in Eastern Europe/CIS are stronger than ever
- A well thought-out and comprehensive design (technical/financial/partnerships and their integration) is important in securing finance

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