


Financing Renewable Energy Projects

Risks & Bankability Review




Emma Haight, Vice President, NIBC Bank N.V.
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NIBC

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General Financing Considerations (1/2)

Key Considerations

Regulatory	
In the UK	**Other Geographies**
ROC level drops across the Renewable Energy technologies in April 2016. From April 2017 CfD will be introduced	**Political risk** in developing countries will be a key concern
Dedicated biomass cap of 400MW	**Regulatory** uncertainty over the life of the proposed project
Lack of clarity surrounding CHP grandfathering of sustainability requirements	Regulatory **track record** across the board of Renewable Energy technologies will be another key area

Technology	
Potential Problems	**Solutions**
Low load factors can be caused by both technology related issues and fuel shortages	EPC **guarantees** and O&M guarantees. Interfaces managed appropriately.
Plant efficiency below design levels can lead to more fuel than forecast being required	Conservative annual scheduled maintenance in the base case as confirmed by a **Technical Adviser ('TA')**. Fuel flexibility and on-site storage.
Forced outages due to intermittency of main electrical grid connection	Important to have sufficient **contractual and financial preparation** for major maintenance events
New or too complex technologies potentially ill-suited to the project	TA review of technology to be used and assessment of **reference plants** and adequate stock of **spare parts**

General Financing Considerations (2/2)

Due Diligence Requirements

Purpose and Description

- The purpose of due diligence is risk mitigation and is absolutely crucial as independent verification of Sponsors' claims and assurances of verifications
- Various independent advisers (all with strong track record) have to be appointed before Financial Close to perform due diligence on behalf of the senior debt lenders
- Key areas of due diligence are:
  - Legal
  - Technical
  - Insurance
- In addition, financial modeling of the base case is a key element which also requires a full model audit including the modeling of tax and downside scenarios

Examples of Sensitivities

- Example sensitivities on a complicated biomass project:
  - CAPEX breakeven level
  - Construction delay (6 or 12 months)
  - Inflation increase/decrease
  - Interest rate increase
  - O&M breakeven
  - Availability breakeven (no Liquidated Damages)
  - Fuel availability breakeven
  - Fuel costs increase by 50%
  - Fuel costs increase
  - Fuel costs breakeven level
  - Power price / Offtake breakeven
  - Pöyry Low Brown Power, ROCs[1] and LECs[2]
  - Ash (or other waste product) Revenue at 0% and Landfill costs at 100%
  - Pöyry Low, OPEX +10%, Availability -5%, Inflation -1%
  - Pöyry Low and 10% increase in fuel price

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1: Renewables Obligation Certificates
2: Levy Exemption Certificates

NIBC Case Study – Onshore Wind

Sixpenny Wood Wind

Project Description

- Sixpenny Wood Wind farm is located in Yorkshire , Northern England
- NIBC acted as sole MLA in the senior debt financing for this AES Corporation backed wind farm
- The project size is 20.5MW
- Senior debt volume of GBP 22.5m
- Financial Close in December 2011

Impression

Key Risks	Solutions
Construction Risk	Contracts with strong counterparties with the contingency amounts and liquidated damages approved by the TA
Availability Risk	Obtained a 5-year 97% availability guarantee from a turbine manufacturer with over 1000 installed turbines world-wide
O&M Risk	Comprehensive 5 year contract from the turbine manufacturer to cover all replacement costs
Power Market Risk	Run b/e sensitivities to ensure the project is able to repay debt at very low power prices
Interest Rate and FX Risk	Hedging of up to 80%

Wind
Solar
Biomass

NIBC Case Study – Offshore Wind

Project Boreas

centrica

GBP 425 million
Senior Secured
Loan Facility
for financing of a
Wind Portfolio

Mandated Lead Arranger

NIBC 2009

Project Description

- Boreas consists of a portfolio of 26 MW onshore and 194 MW offshore wind parks
- NIBC acted as Mandated Lead Arranger with Centrica as the equity sponsor
- Investment volume of GBP 343m
- Portfolio produces electricity for appr. 200,000 British households
- Financial Close in October 2009

Impression

Key Risks	Solutions
Construction Risk	Contracts with strong counterparties with one of the sites already fully operational
Off-take Risk (offtake for only 50% of project revenues were in the initial PPA)	CP to FC is appointing an acceptable offtake arrangement for the remaining 50% ROCs with a suitably rated counterparty on similar terms to the current PPA
O&M Risk	Comprehensive 5 year contract from the turbine manufacturer to cover all replacement costs
Wind Yield Risk	Robust onsite energy yields with 2+ years of historic data as well as wake losses from nearby sites were used by the wind consultant
Interest Rate and FX Risk	Hedging of up to 80%

Financing Wind Projects

Key Risks

Onshore wind is an industry with a long track record

The costs of Offshore wind are reducing as the technology becomes more efficient

	Key Risks
Onshore	▪ Security of timely turbine delivery ▪ Construction risk considered to be low but bottle necks can occur as a result of availability of large scale cranes ▪ Intermittency of wind yield (North Atlantic Oscillation) ▪ Availability of a long-term PPA
Offshore	▪ Construction risks remain fairly high and increase the further away from shore the projects will be ▪ Grouting and turbine sinking during operations ▪ Availability of a long-term PPA ▪ Regulatory risk in relation to ongoing government support ▪ Size and shareholding structure can be challenging

NIBC Case Study – Solar

Groß Dölln

Project Description

- Groß Dölln is a 128MW photovoltaic park located on a former military airport c. 50km north of Berlin
- Groß Dölln is among the largest photovoltaic projects in Germany
- Thin film modules by First Solar and inverters from SMA
- Total investment volume of €196m including promotional loan by Kreditanstalt für Wiederaufbau (KfW)
- Equity was provided by a closed end fund from asset manager CommerzReal (Commerzbank subsidiary)
- Financial Close in October 2012

Impression

Key Risks	Solutions
Construction Risk	Turn-key and day-certain EPC contract with a strong counterparty with a solid track record
Technology Risk	Use experienced manufacturers with actual track record of energy production
Theft Risk	The site was fenced and equipped with cameras, in line with insurance companies' requirements
Solar Yield Risk	Two irradiation studies have been performed. The lower of the two studies was used as Base Case and the TA made a further deduction

Financing Solar Projects

Key Risks and Mitigants

Solar is generally considered by banks to be a relatively low risk technology

Key Risks

- Dealing with companies of limited credit worthiness
- Size of company Balance Sheet may be smaller than the size of the contract
- Limited solvency of panel providers
- Availability of robust local sub-contractors
- Dealing with multiple counterparties and security complications in case of rooftop solar
- Regulatory risk remains a concern in many countries; accentuated in the care of solar
- Theft and damage risk; size of ground mounted installations means they are often in remote locations that can be difficult to monitor

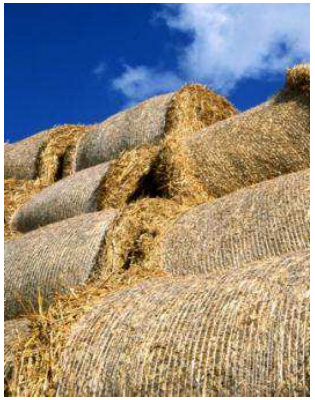
Mitigants

- Construction and O&M fairly fast and straight forward
- The yield of solar farms is more certain than other technologies such as wind
- Within the realm of intermittent technologies, solar is one of the most predictable

Solar
Wind
Biomass

Financing Biomass Projects (1/4)

Overview of Key Risks



Fuel Supply

- Security of supply & stock buffer
- Early year procurement
- Fuel price fluctuations (incl. FX)
- Moisture content
- Composition of fuel

Offtake Security

- Limited number of creditworthy offtakers
- Lack of reliable market over a project's life for the product that is produced

Biomass Project

Technology & Security package

- Boiler type
- Inexperienced sponsors
- Conveyor systems
- Flexibility of technology for advancements in fuel technology

Agreements Interface

- EPC, O&M and Fuel Supply Agreement specifications
- Fuel unloading
- O&M availability guarantee

NIBC Case Studies – Biomass

EPR Ely

- 31MW straw fired power plant in Ely, Cambridgeshire; Financed in 1998, COD 2000
- Sponsor: Energy Power Resources Limited (EPR); D&B and O&M Contractor: FLS Miljo
- Fuel supply: Anglian Straw 75%; Northern Straw 25%
- NIBC financed with Lloyds and Bayerische Vereinsbank AG (now UniCredit)
- Refinanced 2005

Sleaford

- c.38MW straw fired biomass facility located in Lincolnshire – closed December 2012
- Sponsor: BNP Paribas Clean Energy Fund, Eco2
- Annual fuel requirement of c.200,000 tpa
- Project anticipated to be eligible for 1.5 ROCs
- 4 bank club, c. GBP 120m financing

Project Brigg

- 38MW straw fired biomass facility located in Lincolnshire; Financing Q2 2013, COD 2015
- NIBC is acting as advisor to the Sponsors, analysing bankability, compiling bank club and structuring debt
- Sponsor: Balfour Beatty Investments, Eco2
- NIBC Advisory team has drawn upon knowledge gained from the above transactions, coupled with more recent analyses of the banking market, specifically undertaken on Brigg, to put together a bankable structure, and ensure a viable transaction

Solar
Wind
Biomass

Financing Biomass Projects (2/4)

Fuel Supply

Problems	Solutions
Fuel availability – lack of supply surplus, price fluctuations, contract term	Better storage, storage optimisation and fixed price supply agreements
Composition of fuel supply	Fuel storage and buffer risk passed on to the fuel supplier to the extent possible
Fuel buffers – storage, location, quantity	Market research in catchment area ensuring sufficient redundancy of supply
Obligation to churn fuel buffers	Relevant fuel market monitoring continuously throughout project life to pre-empt fluctuations
Wet weather and out of date baling and storage methods affecting buffer stocks	Monitoring bale moisture in the fields and having robust and varied fuel alternatives
Credit risk on fuel suppliers	Increase the number of individual suppliers so if some default then there will still be sufficient fuel to operate the plant
Maintaining **relationships** with farmers	Sign forward contracts and use robust feedstock advisers

Solar
Wind
Biomass

Financing Biomass Projects (3/4)

Offtake Security

- Equity investors and senior Debt providers would require certainty of sale of the product produced by the plant (e.g. biofuels, electricity, heat)

Problems	Solutions
Limited number of creditworthy offtakers in the market (e.g. Big 6)	Floor (or quasi-floor) price guaranteed in Power Purchase Agreements
Lack of reliable market over a project's life for the product produced	Offtake agreement to cover high percentage (85%+) of the plant's production
Lack of market track record for the product produced by the project	1. Robust tenor & pricing of Offtake agreements 2. Certainty in Change in Law provisions in Offtake agreements

Solar
Wind
Biomass

Financing Biomass Projects (4/4)

Agreements Interface

Problems	Solutions
O&M contract specifications may contain narrow moisture content range for acceptable fuel	Attention to straw rejection mechanics, maximising retention within technology limitations
Poor interface relationship between EPC and O&M contracts – risk that delay & availability LDs do not pay out	Management Services Agreement with key parties to manage both FSAs and O&M as well as the interface between the two
Plant efficiency below design levels can lead to more fuel than forecast being required	1. O&M guarantees covering wide straw specs as far as possible and relevant alternative fuel use 2. O&M specs must be at least as wide as those of the fuel supply agreements 3. O&M guarantees must be based on reasonable straw specs

Technology & Security Package

Problems	Solutions
Non-proven boiler technology	Use boiler types with proven technology
Inexperienced sponsors	Focus on sponsors with a proven track record
Inflexibility of technology for advancements in fuel technology	Design of biomass plant that allows for flexibility

Conclusions

	Key Risks	Lenders' Perspective
Solar	▪ Counterparty credit risk ▪ Technology risk ▪ Political risk ▪ Damage and theft risk	▪ Considered to be more straight forward that other renewable energy technologies

Wind	▪ Wind yield risk ▪ Offtake risk ▪ Regulatory risk ▪ Operational risks (offshore in particular)	▪ Vast track record but low availability of easily accessible high wind yielding sites

Biomass	▪ Fuel Supply Risk ▪ Interface Risk ▪ Technology Risk ▪ Security of Offtake	▪ Several projects around the world banked but still concerns over technology risk and fuel supply

Contact Details

Straw storage with sacrificial stacks

Emma Haight

Vice President
UK Infrastructure & Renewables
Tel: +44 207 375 7939
Mob: +44 (0)7581 639 527

Emma.Haight@nibc.com