

Project financing in the wind power sector



General conditions for investments in wind energy

- EEG
 - _ Fixed feed-in tariff and purchase obligation for energy suppliers creates planning security for manufacturers, system operators and financiers for 20 years
 - _ Only electricity produced in Germany is subsidized; electricity generated abroad (EU) is not subsidized
 - _ The costs of pricing are passed on to the consumer through an equalization mechanism
- Kyoto Protocol
- European Union
- Germany

Example project

- Up to Nine WTGs
- Two manufacturers
- 25.8 MW
- Approx. 65 million kWh annual energy yield
- BImSchG has been granted, construction has begun, the KG has awarded a GÜ the contract for turnkey construction
- Classic project financing
- Connection to a 110 kV transformer station
- Usage contracts concluded for 30 years for the areas required for the wind turbine sites, clearance areas, paths, etc.
- All areas are secured under the law of obligations and in rem

Technical project conditions

- Wind in m/s
- Power characteristic curve from approx. 2.5/4 m/s up to a max. of 12/14 m/s, then no more additional yield
- Full load hours vs. operating hours
- Downtimes due to technical defects or maintenance work
- Manufacturer availability guarantee of 95-98%
- E.g. technical availability = 97%; 3,023 full load hours
- Parking efficiency (shading effect)

Main components

- Machine train: hub shaft, gearbox, clutch, brake, generator shaft, generator, cooling system
- Tower variants, foundation variants
- Windward rotor, three rotor blades
- Special equipment Shadow casting modules, etc.
- Day and night marking (Light)

Condition Monitoring System

- Online monitoring - early detection of damage possible
- Shadow impact module - different WTG types !
- Remote diagnosis

Projektentwicklung

- Lease in % and/or €
- Agricultural User contract
- Conditions/additional provisions BImSchG e.g. shutdown in case of noise

Construction and operation

- Trades: cables & paths, foundations, WTGs ...
- Site management
- GÜ - General Contractor
- uNB
- SDL
- Acceptances ...

Operational management

- Technical B. Monitoring & Maintenance
- Commercial B.
- Maintenance of compensatory measures, shutdown, night-reduced operation, etc.
- Guidelines & regulations: accident prevention
- Dismantling, guarantees, repowering, etc.

Financing requirements

- Approx. 6% Project development: expert opinions, securing land, etc.
- 94% Investment with borrowed capital if possible
- 80% Costs for WTG - down payment - interim financing
- WTG purchase, guarantees (sureties), infrastructure
- Advance lease payment
- Financing costs: bank fees, discount, interest, dismantling guarantees for WTG, UW, ...
- Operation e.g. KG

Operations

- The project now generates a cash flow from which the debt capital is serviced
- Current costs are borne, debt capital is serviced and interest is paid on equity from profits

Costs

- Leases
- Grid usage/ electricity purchase
- Insurance for operational risk: machinery, business interruption and liability insurance, damage caused by forces of nature, operating errors, failure of safety equipment, ...
- Operational management commercial/technical
- Guarantee commissions e.g. dismantling guarantee
- Interest/ repayment _ risk situation is (hopefully) constantly improving
- Taxes: donor tax, interest income tax, property tax

Types of financing

- Pre-financing of the WTG order
- Reservation fee, guarantees, down payment
- Interim financing during the construction period
- Project financing of the KG from commissioning

Project Stakeholder

- Energy supplier
- Grid connection contract, grid usage contract
- UW operating company
- Wind farm operating company e.g. KG
- Utilization agreements with landowners
- Loan and security agreement with financ. credit institution
- Subcontractor
- General contractor
- Work contracts, purchase contracts, etc.

Security contracts

- Project rights such as contracts with GÜ, UW, KG, EVU, etc.
- Value date and disbursement requirements
- Conditions: in the course of the project

Company forms

- Significant tax advantages
- Simple transfer of company shares
- Share deal/ asset deal
- Flexible limitation of liability to the liability contribution entered in the commercial register (HG)
- General partner (full partner)
- Limited partner Limitation of liability according to HG

Audit of the credit institution

- Structure of the company
- Proof by HRA + general partner
- E.g. liability contribution, pledging of business or company shares, pledging of liability contributions

Audit of the credit institution

- Examination of the requirements EEG
- BImSchG Conditions, ancillary provisions regarding cash flow
- Binding grid connection commitment! Repeated problems despite EEG.
Usually only with permit, sometimes with system supply contract
- Attention: if UW does not belong to EVU Special case with UW operator contract

Audit of the credit institution

- Real estate collateral must be available under the law of obligations and in rem
- Numerous special features and requirements by the financing bank and investor
- Other contracts: Pre-developer, brokerage
- Management contracts

Collateral for credit default, default, payment difficulties

- Feed-in revenues
- Wind turbines and auxiliary systems
- All rights and claims arising from
- GÜ contract, insurance contracts, usage and licensing contracts, operating and erection permit, UW usage contract, other project contracts
- Right of entry into wind turbine supply contract
- Pledging of the operating company's project accounts
- Security in rem at the UW
- Transfer of the exercise of the bpD in favor of the financing bank

Economic project conditions

- Project brokers, pre-developers, project developers and all project participants expect appropriate remuneration for their services
- Additional return requirements from investors! E.G. 4.9% IRR
- Supply and demand determine the price and vary according to market conditions

Investors

- Until a few years ago, several hundred limited partners per project
- Market change in tax legislation towards institutional investors, investment funds, financially strong individual investors, strategic investors, energy suppliers, ...
- There are currently few alternatives on the market
- High level of experience in Germany with regard to wind yield forecasts, cost forecasts, construction and operation
- Sales and price risk are virtually eliminated by the EEG
- Germany is economically and politically stable
- = high planning security

Investors

- The alternative risks and security are always weighed up. This is the basis for the return requirement
- Therefore: Hedging of forecast revenues and assumptions on cost trends with regard to cash flow
- Selection of technology is relevant! Manufacturer experience
- Possibilities for repowering and/or expansion
- At least two wind reports from renowned experts
- Methods generally IRR taking into account the cash flow after financing and before taxes
- The investor joins the project after completion and commissioning

Debt capital provider

- Cash flow must cover debt service and ensure adequate protection against risks
- Debt service cover ratio (DSCR): Debt service cover ratio describes the extent to which cash flow is sufficient to cover debt service
- $DSCR = \text{cash flow of the period before debt service} / \text{debt service of the period or subsequent period}$

Debt capital provider

- Hedging of future debt service payments is usually agreed through a liquidity reserve or the debt service reserve (SDR)
- Depending on the debt service of the following year, e.g. 25% or 50% of the debt service of the respective year
- In addition to cash flow, a hedge for debt service, which is why it is taken into account when calculating the DSCR
- E.g. with a DSCR of 1.0, the debt service for the period is covered by the cash flow

DSCR

a measurement of a company's cash flow to pay current debt obligations

$$DSCR = \frac{\text{Cashflow of Period before Debt Service} + \text{debt service reserve}}{\text{Debt Service of Period or Following period}}$$

- A key indicator of the project's ability to service capital. The banks' requirements with regard to the level of the ratio vary, whereby the project quality and the hedging of the economic parameters play a significant role, e.g. a DSCR of 1.05 - 1.2
- In addition, e.g. two wind reports, manufacturer guarantees/experience + full maintenance contracts
- Scenarios could be e.g. best, expected and worst case

Loan Life Cover Ratio

LLCR

$$= \frac{\text{Present value of the cash flow outstanding over the remaining term of the loan}}{\text{outstanding loan balances}}$$

- consideration of the entire project duration

landowner and approval authority

- Punctual payments of rents
- Securing demolition
- Conditions and ancillary provisions
- Compensatory measures

Investment and Financing Investment Plan

- Wind turbines and infrastructure
- Wind turbines including transport, assembly, commissioning, foundations, remote monitoring, paths & crane areas, cable laying, transfer station, compensation measures, other infrastructure
- Grid connection
- Cable delivery, substation, grid connection costs
- Project control and monitoring (€41,600,000)

Investment and Financing Investment Plan

- General Contractor
- Subsoil investigation/surveying, expert opinion costs, development planning, public fees, planning, project development, other, land registry entry costs, one-off compensation for use, rent advance payments, land purchase
- Planning and project management (€2,700,000)
- Discount KFW loan, bank fees, company costs, legal and tax advice, due diligence, construction period interest, cost reserve
- Financing/sales (€700,000)
- Total (€45,000,000)

Debt capital

- Determine maximum debt according to key figures
- The remainder is equity share
- External financing, e.g. via KFW environmental program

Finanzierungsplan in TEUR		€	%
KFW		21.000	47
KFW		10.000	22
FK	31.000		
EK	14.000	14.000	31
Summe	45.000	45.000	100

Cash Flow Rechnung am Beispiel 0-5 Jahre

Income	0	1	2	3	4	5
Income						
FIT						
Interest rates						
Total Income						
expenditure						
Operating costs						
Cash Flow 1						
Interes rates dept						
Repayment dept						
Cash Flow 2						
Trade Earning tax						
withholding tax on interest						
Total Expenditures						
Cash Flow 3						
liquidity						

economic framework

- Project period: typically around 20 years. The price is set by the EEG for this period. Year 0 is the year of commissioning
- Income: Revenue from electricity & interest
- Expenses: Operating expenses, interest and repayment payments, and taxes

Economic framework

- Repayment: e.g. KFW loan over 20 years with a linear repayment and a KFW loan with a linear repayment over 10 years. For both loans, 2 years of repayment-free periods are normally taken into account
- Facility dismantling: requirement from the approval and agreements with property owners. Can only be taken into account in the last year.
- Cash Flow 3: liquidity per period for the required debt service reserve and for distribution to investors
- Liquidity stock: builds up or decreases over the periods depending on Cash Flow 3. A high liquidity stock is generated in the first two years of operation in particular. No liquidity outflows during this time for e.g. distributions.

Beispiel Kostenstruktur

Example cost structure

- Sensitivity analysis with “stress test” = electricity yields less than 5% over the entire term
- What happens with DSCR?

Alternatives e.g. bonds

- Same principles as for project financing - repayment depends on cash flow
- Difference: Independence from a bank's willingness to finance this type of project
- Repayment over the term of the bond, repayment does not have to be linear
- The capital provider is not a bank, but investors in the bond
- Different risk classes and ratings can be introduced, each of which results in a different interest rate
- The bond can also be issued as a subordinated bond, in which case it can be viewed as equity. 100% of the investment can also be borne
- Terms of up to 25 years are possible
- Several wind farms can be combined

mezzanine

- The investor has no say and does not provide any collateral
- Collateral can therefore be used for debt financing
- M. financing includes interest on a higher risk premium, which means that the interest costs are higher than with traditional loans, e.g. fixed term of seven years, same interest rate with the same rating
- Refinancing usually via the issue of fund shares...
- E.g. citizen participation

Turbine Supply Loan

- Before issuing guarantees, the valuation conditions are ensured
- Significantly increased demand has changed conditions considerably
- Longer delivery times
- Earlier date for making advance payments
- Provision of contract performance guarantees by the client or reservation fees
- Significant extension of the project duration until delivery and commissioning can take place. The project duration can be shortened by pre-financing
- Pre-financing before reservation fees, advance payments and the issuing of contract performance guarantees

Turbine Supply Loan: Requirements

- Satisfactory due diligence, e.g. approval capability and chances of implementation
- The economic viability of the project meets the usual requirements of project financing
- Opportunity for the financing bank to enter into the WEA supply contract
- The WEA supply contract allows the WEA to be used for another project

Turbine Supply Loan: collateral securing

- Assignment
 - The rights from the WEA supply contract
 - Existing project rights
 - Pledge of the company shares in the project company (limited partnership share) or
 - If applicable, use of part of the equity or
 - If applicable, a corresponding guarantee for an equity share by the investor
-
- Possible possibility of entering into the contract with GÜ

Risks: Revenues

- No price uncertainty due to EEG
- Electricity quantities are based on estimates and reports, statements from manufacturers, experience of the availability of wind turbines and estimates of expected grid losses
- Technical problems can be covered by machine breakdown and business interruption insurance. Here, the electricity revenue and machine damage are reimbursed, less deductibles

Risks: Costs for repairs and replacement investments

- The first wind turbines are just reaching 20 years of service life...
- Full maintenance contracts, including a guarantee of availability, can minimize risk
- Duration ten to twelve years
- Residual risk remains with the project company

Risk: Price increases

- Cash flow should take price increases into account
- Conclusion of long-term contracts with fixed prices or specific price protection clauses within a limited framework
- Cost overrun during the investment phase: risk can be countered with fixed-price contracts, for example

Risk: Insolvency of the operating company

- = loan default = no full repayment of the loan
- Option I: continued operation is uneconomical
- Realization of collateral, claims, receivables or movable property from the insolvency estate

Risk: Insolvency of the operating company

- Variant II: continued operation is economical
- The entry rights of the financing credit institution enable the bank to enter into all rights and obligations
- E.g. security in rem is provided with a reservation in favor of the "bank"
- Contracts are continued and the wind farm continues to "run"

Risk: insolvency of the general contractor

- All claims, demands and rights of the general contractor against its subcontractors, e.g. wind turbine suppliers, must be assigned to the operating company as security
- The latter can then be passed on to the financial institution
- Chain assignment enables the bank or limited partnership to directly enforce the rights on subcontractors
- The wind farm itself can thus be completed by the operating company or bank

Risk: Insolvency of the Sub-Station company

- Besondere Sicherheit zugunsten des finanzierenden Kreditinstituts, das Wegfall des Netzanschlusspunktes droht
- Sicherheitsabtretung der Ansprüche und Rechte aus UW-Nutzungsvertrag
- Nießbrauchrecht zugunsten der Betreibergesellschaft oder finanz. Kreditinstitut

Risic: Technology

- Availability, depending on the manufacturer a guarantee of 95% to 98% is offered
- 1% less availability = 1% less revenue

Risk: Forecast & Premise

- Two wind reports
- Yield increases with the 3rd power
- Comparison with actual yields
- Wind measurement over 1 year
- Transformer and transformer losses: input data on electricity volume, cable diameters and length of the cable route
- Sometimes reports differ by up to 10% even when using the same data basis!