Green Energy Finance

ACEF Deep Dive Workshop

Volker Bromund, 5th / 6th June 2017

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Supported by:
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Agenda – DDW “Green Energy Finance”

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1. Introduction to the Green Banking Programe

   09:00 – 09:30h, speaker: Octavio B. Peralta (ADFIAP)

2. Introduction to Wind Energy

   09:30 – 09:50h, speaker: Pramod Jain, (Innovative Wind Energy, Inc.)

3. **Project Structure and Financing Sources for Wind Farms**

   09:50 – 10:30h, speaker: Volker Bromund (RENAC)

4. **Wind Farm Cash Flow Planning Case Study**

   11:00 – 11:45h, speaker: Volker Bromund (RENAC)

5. Panel Discussion: “Changing Landscape of Wind Energy Tariffs”

   11:45 – 12:30h, chair: Pramod Jain, (Innovative Wind Energy, Inc.)

AGENDA

Project structure and financing sources for wind farms

Financing options for commercial projects

- Three types of financing typically used for RE projects
  - Corporate Finance
  - Project Finance
  - Capital Market Finance

- Different markets have different financing standards
- The decision for a financing form typically depends on the maturity of
  - the financial sector
  - the energy market
  - project developer´s experience

Corporate Finance vs. Project Finance

Corporate Finance (on-balance lending)

Lender

Information about management, performance etc.

Loans based on company cash flows, company assets as collateral

Company

Investment in RE project

Project Finance (off-balance lending)

Sponsor develops the project

Lender

Detailed due diligence, Cash-flow analysis etc.

Sponsor/ Investors

Equity contribution

Loan based on project cash flow only, collateral based on project cash flows and project assets

Corporate vs. Project Finance

	Corporate Finance	*Project Finance*
Loan paid back by the...	Sponsoring company	Cash flows generated by project
Liability	The sponsor may / must tap all possible sources of liquidity	The liability of the company comprises only the equity invested in the project
Bank‘s DD focus	Last year‘s balance sheet, P&L statement, company strategy and market development	Expected cash flows and risks of project
Bank decision depends on the ...	Creditworthiness of the sponsor	Volume, reliability and projectability of the project‘s future cash flows

Project Finance for commercial projects

- ***Project Finance*** without / with limited recourse to the sponsor
  - Project debt is provided by banks and other financial institutions, project equity is paid-in by the sponsor(s) or external Investors
  - The project‘s creditworthiness and debt capacity exclusively depends on the project cashflows
  - “Non- or limited recourse”- financings without or with limited recourse to the sponsor’s balance sheet
  - Characteristics: requires stable, forecastable project cash flows, ideally from a reliable public support scheme (e.g. feed-in tariff) or a long-term power purchasing agreement, “growth engine” for green energy markets in many developed countries, knowledge-intensive, transaction costs can be high

→ The broad access to non-recourse Project Finance forms the “financial foundation“ of the unprecedented RE success story in Germany!

→ It enables not only big corporates, but especially SMEs to carry out sizeable projects without requiring strong balance sheet support

Risks in Project Finance

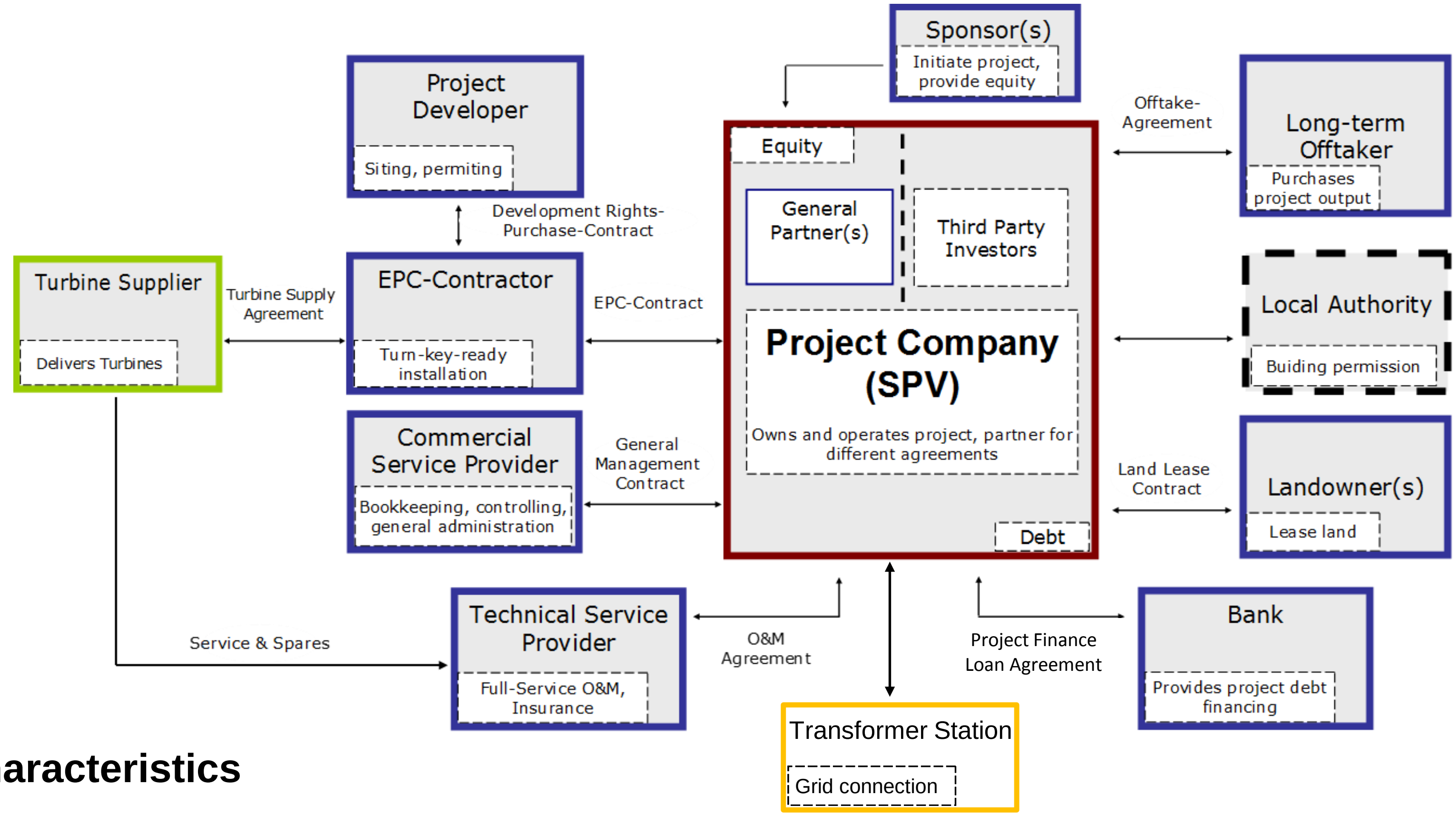
Technical Risks

Construction Risk	Operation & Maintenance	Technology Risk
EPC Contractor	Manufacturer	Proven Technology

Financial Risks

Resource Risk	Country Risk	Market Risk
Availability (resource study e.g. on wind availability)	Insurance	- Feed in Tariff - Price of resource

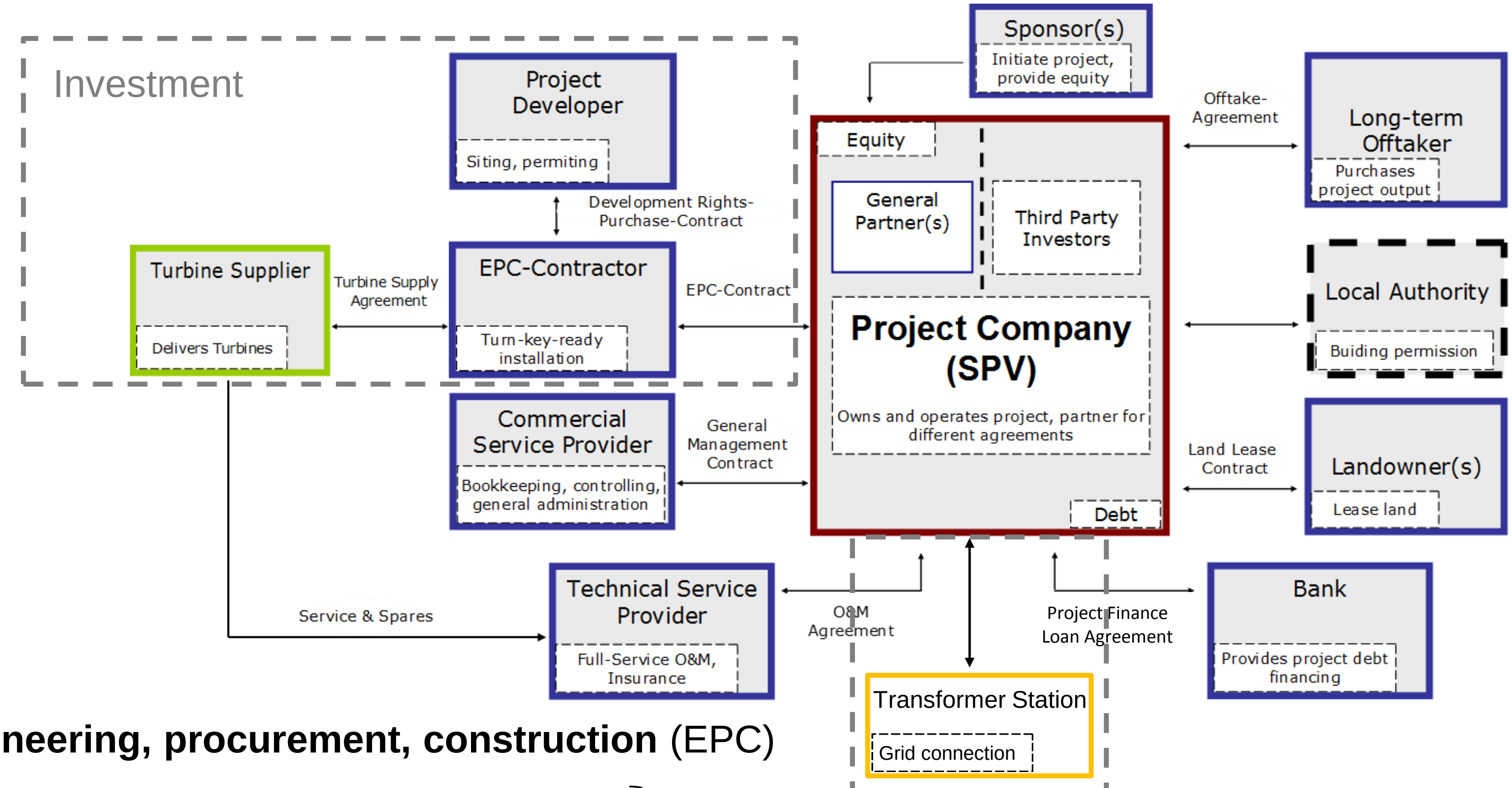
RE – project finance structure



Definition / characteristics

- Legally-independent project company
- Cash flow of the project is the main source of collateral and loan repayment
- Long-term contractual relationship
- Higher degree of leverage compared to corporate finance

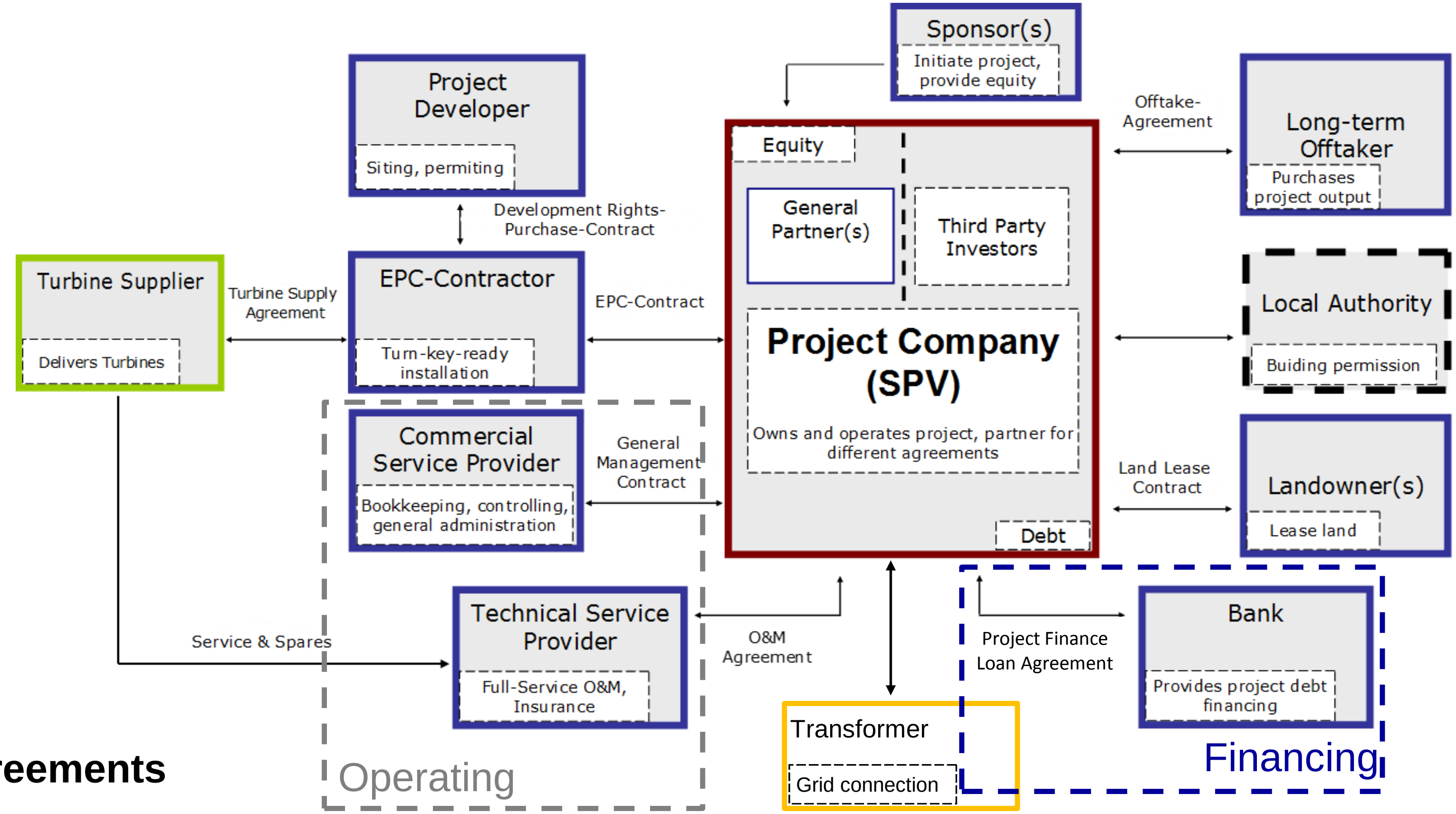
Contracts in the investment phase



- **Engineering, procurement, construction** (EPC)
- Turbine supply agreement
- Project development-/ BoP-contract
- Grid connection-/ Grid usage agreement
- Capital procurement contracts (if any)

} alt. „***Multi-Contracting***“ (attention: interfaces !)

Contracts in the operating phase



Operating agreements

- Offtake-agreement / PPA
- Land rights contracts
- O&M-/ operating agreements
- Insurance contracts

Financing agreements

- Project finance loan agreement
- Shareholder agreement

Wind farm cash flow planning case study

Introduction to the case

- Super Wind Investor Ltd. ("SWI") got the opportunity to acquire a used Vestas V44 600kW turbine that has been installed in Northern Germany 14 years ago.
- The turbine is operating under the German renewable energy feed-in tariff scheme (EEG–Renewable Energy Act) which is remunerating the turbine for a period of at least 20 years from the commissioning date.
- SWI can operate the turbine for at least 6 additional years under the same conditions as before (same feed-in tariff).
- SWI considers an investment under the pre-condition that it can raise a bank loan for co-financing.
- Turbine acquisition date shall be 01 January 2017.
- Let's show SWI how to evaluate the project from a banker's perspective!

Overview of project input parameters

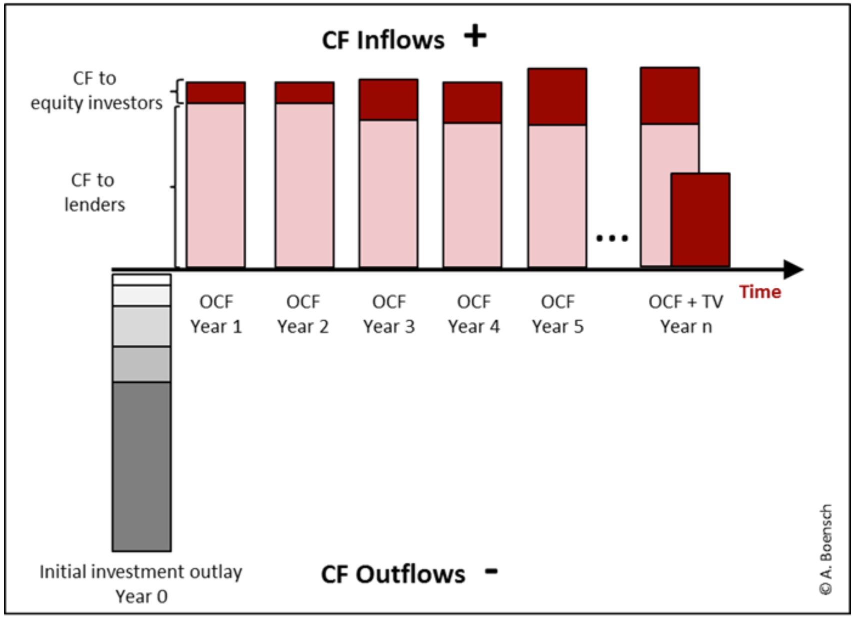
- Turbine purchase cost: EUR 230,000
- Average historic energy production: 1,100 MWh p.a.
  - Availability losses: 5.0% p.a.
  - Electrical losses: 2.0% p.a.
- Feed-in tariff: EUR 91 / MWh until 31 December 2022 (for 6 years)
- Operating cost per year:
  - O&M contract Vestas: EUR 20,000, indexed with 2.0% p.a.
  - Caretaker / maintenance man: EUR 2,400, indexed with 2.0% p.a.
  - Electricity consumption cost: EUR 1,200, indexed with 2.0% p.a.
  - Land leases: 8.0% of the electricity revenues
  - Insurance cost: EUR 2,200, indexed with 2.0% p.a.
  - Accounting / annual report: EUR 1,500, indexed with 2.0% p.a.
  - Dismantling cost: EUR 40,000, accumulated in years 5 & 6

Cash flow estimation

Incremental project cash out- and inflows

Principle of Cash Flow (CF) planning

- **Initial investment outlay**. The up-front cost of the renewable energy technology and all other fixed assets.
- **Operating cash flows over the project life**. → *To be evaluated…*



Case Study: Investment Cost Budget

- The total upfront **investment cost** for the used wind turbine is **EUR 230,000**.
- The investor can provide **EUR 90,000** of **equity**.
- He needs a **bank loan** of

EUR 230,000 Investment

– EUR 90,000 Equity

= **EUR 140,000** Bank loan

Step 1: Revenue calculation

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Principle of cash flow planning

Revenues (+)	Operational Costs (-)	Taxes (-)	CADS (=)

- Under the project finance approach, cash flow positions follow a hierarchy called cash flow waterfall.
- This concept requires annual revenues to cover periodical costs in a strict order.

Step 1:

Revenues (+)	Electricity Volume x Electricity Price
	No. of Green / CO_2 Certificates x Certificate Price
	Interest Income (on Reserve Accounts)

* CADS: Cash Available for Debt Service

Case study: Revenue calculation

- **Annual energy production**:

	1,100.0 MWh	Gross production
–	55.0 MWh	5.0% Availability loss
–	20.9 MWh	2.0% Electricity loss
=	**1,024.0 MWh**	Net output

- **Feed-in tariff: EUR 91.0 / MWh**
- **Electricity revenues p.a.**: 1,024 MWh x EUR 91.0 = **EUR 93,193**
- No revenues for green energy certificates in Germany
- Interest income depends on reserve account size

Step 2: Calculation of operational costs and taxes

Principle of cash flow planning

Revenues (+)	Operational Costs (-)	Taxes (-)	CADS (=)

- Under the project finance approach, cash flow positions follow a hierarchy called cash flow waterfall.
- This concept requires annual revenues to cover periodical costs in a strict order.

Step 2:

Operational Costs (-)	Operations & Maintenance (O&M)
	Land Leases and Compensation Payments
	Insurance
	Others (e.g. Electricity Consumption, Bookkeeping)
Taxes (-)	Taxes Payable

Case study: operational costs, taxes

- Detailed cost schedule for all six operating years:

Year	1 2017	2 2018	3 2019	4 2020	5 2021	6 2022
O&M Contract Vestas	20,000	20,400	20,808	21,224	0	0
Maintenance Man	2,400	2,448	2,497	2,547	2,598	2,650
Electricity Consumption	1,200	1,224	1,248	1,273	1,299	1,325
Land Leases	7,455	7,455	7,455	7,455	7,455	7,455
Insurance	2,200	2,244	2,289	2,335	2,381	2,429
Dismantling costs					20,000	20,000
Accounting	1,500	1,530	1,561	1,592	1,624	1,656
Total Operating Costs	**-34,755**	**-35,301**	**-35,858**	**-36,426**	**-35,357**	**-35,515**
Trade Tax	-6,745	-6,682	-6,617	-6,552	-6,676	-6,657
EBITDA	**51,693**	**51,210**	**50,717**	**50,215**	**51,160**	**51,020**
Income Tax	-7,936	-7,855	-7,773	-7,688	-7,833	-7,806

- All costs increase at 2% p.a., except land leases.
- O&M payments are stopped two years before the project ends.
- Taxes are calculated from P/L statement.

*EBITDA: Earnings Before Interest, Tax, Depreciation and Amortization

Step 3: Summing up all positions to receive CADS

Case study: cash flow available for debt service (CADS)

Year	1	2	3	4	5	6
	2017	2018	2019	2020	2021	2022
Park Output Potential	1,100	1,100	1,100	1,100	1,100	1,100
Availability Losses	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Electrical Losses	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Net Output	1,024	1,024	1,024	1,024	1,024	1,024
Electricity Price	91.00	91.00	91.00	91.00	91.00	91.00
Electricity Revenues	93,193	93,193	93,193	93,193	93,193	93,193
Total Income	**93,193**	**93,193**	**93,193**	**93,193**	**93,193**	**93,193**
O&M Contract Vestas	20,000	20,400	20,808	21,224	0	0
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CADS	**43,757**	**43,355**	**42,945**	**42,526**	**43,327**	**43,215**

Step 4: From CADS (Cash Available for Debt Service) to ECF (Equity Cash Flow)

Principle of cash flow planning

Cash Flow Available for Debt Service (CADS)	
Debt Service (-)	Interest Payments
	Debt Repayments
DSRA (-)	Debt Service Reserve Account
(=) Equity Cash Flow (ECF)	

- **CADS** is predominantly used to meet the project's annual debt service.
- Debt service consists of the scheduled **annual interest** and **debt repayments**.
- Debt holders usually demand an additional **D**ebt **S**ervice **R**eserve **A**ccount (**DSRA**).
- DSRA: **6-months debt service**.

Case study: Debt service

- The bank loan of EUR 140,000 is to be repaid in annual installments:
  - Year 1: - EUR 20,000 → EUR 120,000
  - Year 2: - EUR 40,000 → EUR 80,000
  - Year 3: - EUR 40,000 → EUR 40,000
  - Year 4. - EUR 40,000 → EUR 0
- Loan tenor is usually shorter than project tenor (here: 4y < 6y)

  → **risk buffer**
- **Interest rate**: **3.5%** p.a.

Step 4: From CADS to ECF

Case Study: Equity Cash Flow (ECF)

Year	1	2	3	4	5	6
	2017	2018	2019	2020	2021	2022
CADS	**54,791**	**54,210**	**53,443**	**52,667**	**53,110**	**52,998**
Redemption	-20,000	-40,000	-40,000	-40,000	0	0
Interest	-4,900	-4,200	-2,800	-1,400	0	0
Debt Service	**-24,900**	**-44,200**	**-42,800**	**-41,400**	**0**	**0**
Cash before DSRA	29,891	10,010	10,643	11,267	53,110	52,998
Cash incl. DSRA	29,891	32,110	32,043	31,967	53,110	52,998
DSRA *Target*	22,100	21,400	20,700	0	0	0
DSRA *Actual*	22,100	21,400	20,700	0	0	0
Equity Cash Flow (ECF)	**7,791**	**10,710**	**11,343**	**31,967**	**53,110**	**52,998**

- Interest rate is only applied to the outstanding loan amount.
- DSRA (*Target*) is calculated as **50%** of **next year's debt service**.
- DSRA (*Actual*) is the actual ("real") cash reserve amount that the turbine was able to accumulate in the respective period.
- Annual ECFs can be distributed to the equity investor.

Key financial project ratios

Key financial project ratios - DSCR

$$DSCR_t = \frac{CADS_t}{\text{Debt Service}_t}$$

$$LLCR_t = \frac{\text{PV of } CADS_t \text{ over Loan Life}}{\text{Debt Outstanding}_t}$$

$$PLCR_t = \frac{\text{PV of } CADS_t \text{ over Project Life}}{\text{Debt Outstanding}_t}$$

- The **Debt Service Cover Ratio** (DSCR) indicates, to what extent CADS exceeds the scheduled debt service in a given period.

Case study: DSCRs

- To calculate the DSCRs for the sample project, we divide the annual CADS by the total debt service.
  - Sample calculation for year 1:
  - $DSCR_1$ = EUR 54,791 / EUR 24,900
  - **$DSCR_1$ = 2.20**
- All DSCR values need to be >1 for a project to be bankable.

Key financial project ratios – LLCR, PLCR

$$DSCR_t = \frac{CADS_t}{\text{Debt Service}_t}$$

$$LLCR_t = \frac{\text{PV of } CADS_t \text{ over Loan Life}}{\text{Debt Outstanding}_t}$$

$$PLCR_t = \frac{\text{PV of } CADS_t \text{ over Project Life}}{\text{Debt Outstanding}_t}$$

- The **Loan Life Cover Ratio** (LLCR) and the **Project Life Cover Ratio** (PLCR) take an aggregated view on the project putting the present value (PV) of the respective CADS values into relation to the outstanding debt.
  - loan life considered for LLCR
  - project life considered for PLCR

Case study: LLCR, PLCR

- Sample LLCR calculation (year 3):
  - $LLCR_3 = \frac{\frac{53,443}{1,035}+\frac{52,667}{1,035^2}}{80,000}$
  - $\mathbf{LLCR_3 = 1.26}$
- Sample PLCR calculation (year 3):
  - $PLCR_3 = \frac{\frac{53,443}{1,035}+\frac{52,667}{1,035^2}+\frac{53,110}{1,035^3}+\frac{52,998}{1,035^4}}{80,000}$
  - $\mathbf{PLCR_3 = 2.44}$
- LLCR >1: project surpluses more than sufficient to cover aggregate debt service over the loan life.
- PLCR shows additional potential to stretch tenors in case a loan restructuring is needed.

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Evaluation of case results

Evaluation of case results

Case study: Overview of all project ratios

Year	1 2017	2 2018	3 2019	4 2020	5 2021	6 2022
CADS	**54,791**	**54,210**	**53,443**	**52,667**	**53,110**	**52,998**
Redemption	-20,000	-40,000	-40,000	-40,000	0	0
Interest	-4,900	-4,200	-2,800	-1,400	0	0
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Equity Cash Flow (ECF)	**7,791**	**10,710**	**11,343**	**31,967**	**53,110**	**52,998**
DSCR	2.20	1.23	1.25	1.27	n/n	n/n
LLCR	1.41	1.25	1.26	1.27	n/n	n/n
PLCR	2.04	2.01	2.44	3.71	n/n	n/n

All minimum values observed in year 2.

Key results of ratio analysis					
Ø-DSCR	1.49	Ø-LLCR	1.30	Ø-PLCR	2.55
Min-DSCR	1.23	Min-LLCR	1.25	Min-PLCR	2.01

>1.0 ☑ >1.0 ☑ >1.5 ☑

Project looks financially feasible from a lender‘s perspective!

Do you have any questions?

Thank you!

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