

Advisory

SHHP as an instrument for energy access

Vienna, 29 May 2013

pwc

Agenda

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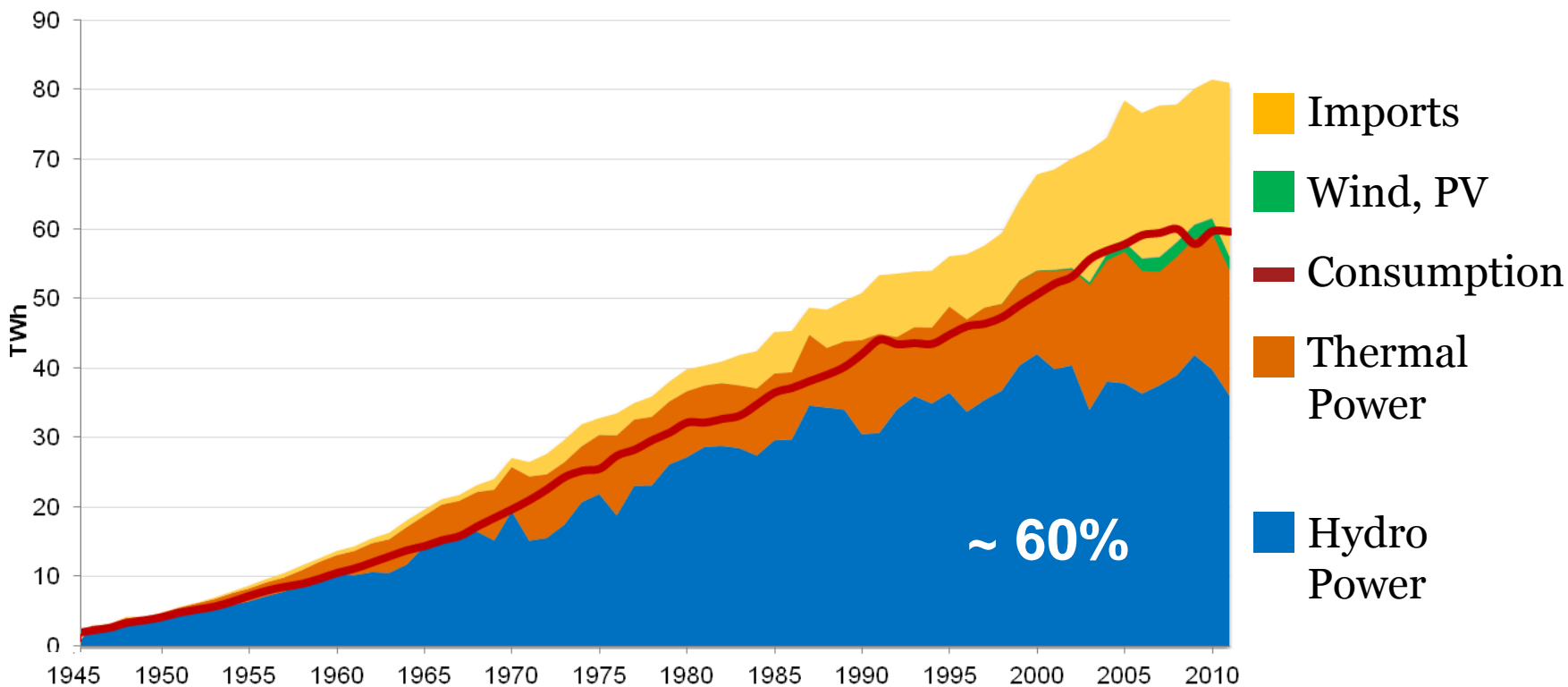
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General overview of the Austrian electricity market

1

Hydro power plays the major role in Austria's production mix for electricity

Gross electricity production vs. consumption in Austria (1945-2011)



Source: E-Control Austria

SHPPs play a vital role in supplying Austria's private households with electricity

around
3,500 SHPPs

producing
~ 6,200 GWh

supplying
1.7 mn households
(50 % of Austrian households)

Source: Verein Kleinwasserkraft Österreich, E-Control

Market player in Austria

2

Austrian companies have a leading position in producing, installing and servicing system components

Selected turbine producers



Source: Verein Kleinwasserkraft Österreich

Besides turbine production, other companies work in the fields of **designing, constructing, electrically engineering and operating SHPPs**

Operator models

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Operator models for HPP's mainly differ by grid connection and utilisation of produced electricity

Utility with / without own grid or connected with public grid

- Own distribution grid (y/n)
- Supply of end customers (y/n)
- Own production facility (y/n)
- Only SHPP or IPP (Independent power producer)

Industrial plant

- Own consumption (balance of electricity production and own consumption)
- Sale of SHPP-electricity to market (higher selling price with proof of origin)
- Own grid, industrial use
➔ no grid charges

Isolated application

- Production plant not connected to grid
- Outage = black out – Back-up needed (e.g. diesel generator, PV or battery-system)
- Appropriate for African rural areas
- AT: Only used in detached houses (e.g. alpine cabins)

Business plan / Financial model

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The business plan needs to reflect all financial and technical aspects in order to inform potential investors

General information

Corporate structure, Human Resources (staff,...), IT (hardware/software)

Technical information

- Location, plan of site, property
- Planning and authorisations (permits, operating license, etc.)
- Technical data of all components
- Hydrology /geology of HPP and catchment area
- Precipitation stations in the area
- Projected full load hours and annual electricity production

Financial information

- EPC (Engineering, Procurement, Construction) and any sub-contracts
- Feed-in tariffs, contracts regarding sale of electricity, projected prices and quantities
- Projected Capital Expenditure, Operation and Maintenance costs per year (costs of small and large audits)
- Taxation
- Bankable financial model with projected profit and loss statement, balance sheet, cash flow

Financial Modelling is the basis for Project finance

Financial Modelling – Goals

- Illustrate complex projects in a structured manner
- Determine KPIs/ target figures for the valuation of the project
- Provide insight of effects of changed framework conditions
- Understand cause-and-effect
- Assess certainty of planned result
- Decision and controlling support
- Evaluation of the economic viability of projects
- Analysis of risks / opportunities

Characteristics of project finance

- Establishment of an independent project company („SPV”)
- Off-balance-sheet financing (newly established SPV acts as a debtor)
- Cash-flow-related lending (future cash flows affect financing)
- Risk sharing (risk allocation reduces individual risks)
- Non-recourse vs. limited-recourse (no or limited liability of investors)
- Inexistence of payment guarantees (Sovereign, banks, corporation)

Project assessment process and development of the Financial Model

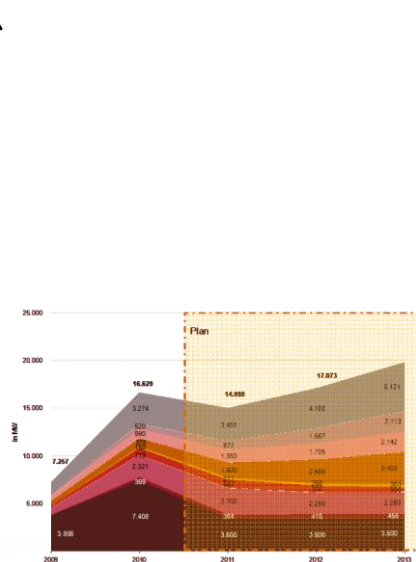
Step 1: Market Analysis & Qualitative Risk assessment

Step 2: Business Planning – Cash flow Modelling

Step 3: Quantitative risk assessment - Rating

Step 4: Financial structuring - Covenants

Complexity of the financial model



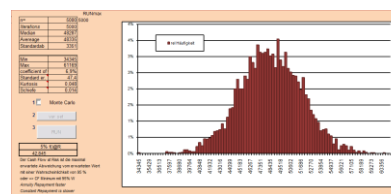
Cashflow

Cashflow calculation & waterfall

- Total revenues
- Interest income from cash balance
- Total OPEX
- Interest senior loans, junior loan & refinancing loan
- Interest shareholder loan
- Interest working capital loan
- Taxes
- +/- Change in working capital
- + Cash from MRA
- +/- Change in liabilities for unpaid interest

Operating cashflow

- Investments (incl. capitalized financing costs)
- Initial funding of DSRA
- Initial funding of MRA
- + Drawdown equity
- + Drawdown senior loan 1
- + Drawdown senior loan 2
- + Drawdown junior loan
- + Drawdown shareholder loan



Result:
→ Quantified default risk and rating

Risk Bucketing of Qualitative Factors

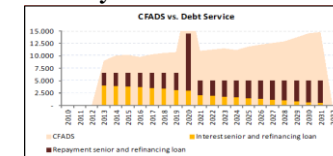
Gross Scorecard on Subfactor Scoring		
Rating Class	Lower limit	Upper limit
Aaa	0.00%	0.00%
Aa	0.00%	0.05%
A	0.05%	0.35%
Baa	0.35%	1.20%
Ba	1.20%	6.80%
B	6.80%	18.13%
Baa	18.13%	43.88%

Fundamental Project Risk Scoring		
	Range	Bucket of Risk
Aaa-A	0.4%	Low
Baa	1.2%	Low-Medium
Ba	6.8%	Medium-High
Below Ba	6.8%	High Risk

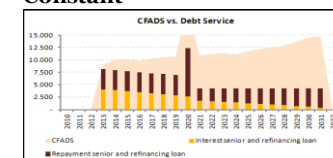
Fundamental Project Risk	
Fundamental Project Risk Bucket	Low

Result:
→ Credit conditions

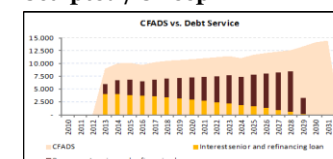
Annuity



Constant



Sculpted / Sweep

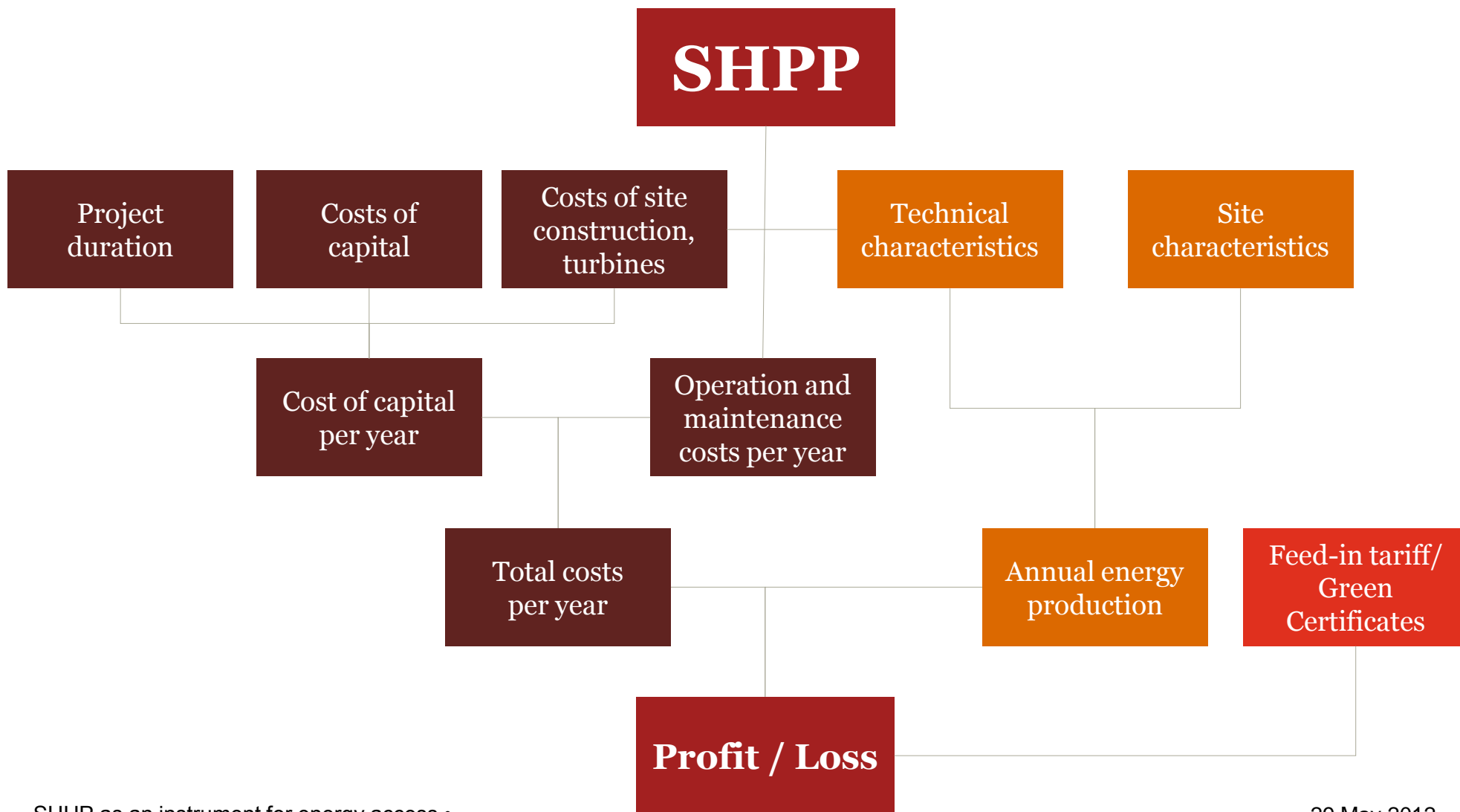


Result:
→ Pre Feasibility yes/no

Result:
→ Bankability

Development of the project / timeline

Value Drivers, influencing the profitability of SHPPs



Contact details

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Backup – Case study

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Definition Financial Model

„A financial model is a simplified illustration of reality that focuses on specific aspects and allows the analysis of different scenarios.“

*BUT a Financial Model can not illustrate the reality 1:1!
The decision what shall be considered is crucial:*

- Only various aspects of the reality and their consequences can be considered*
- Too little inputs: Results are not representative*
- To many inputs: Model is too complex and vulnerable to errors*

“A model is only as good as the assumption behind it.”

Major inputs for deriving the profitability

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Project Vienna - Example SHPP in Austria
Inputs

General Information	
Project name	Vienna
Country	Austria
Currency (of financing)	EURk
Corporate Tax Rate	25.0%

Project key dates		
	Start	End
Model timing	2013	2073
Construction period	2013	2014
Operational period	2014	2073
Duration of operation		60
Installed capacity	MW	2
Annual production/MW	MWh	4,000
Total annual reference pr	MWh	8,000
Investment cost for 1MW	kEUR/MW	2,300
Investment grant (20% fo	kEUR/MW	460
Total Investment cost	kEUR	3,680
Electricity price	EUR/MWh	45.0
Inflation rate		2.0%
Cost of Debt		3.5%
Equity Share		40%
Debt Share		60%
Repayment term	years	25
Operational expenditure	ct/kWh	2.5
Operational expenditure	kEUR/MWh	0.025

The Financial Model calculates the NPV and the IRR for the investment depending on the inputs

Profit and Loss statement		Constr. period	2013	2014	2015	2016
Annual production	MWh		8,000.0	8,000.0	8,000.0	8,000.0
Electricity price	EUR/MWh		45.0	45.9	46.8	47.8
Revenues	kEUR		-	367.2	374.5	382.0
- OPEX	kEUR		-	(200.0)	(200.0)	(200.0)
EBITDA	kEUR		-	167.2	174.5	182.0
EBITDA margin				45.5%	46.6%	47.6%
- Depreciation	kEUR		-	(61.3)	(61.3)	(61.3)
EBIT	kEUR		-	105.9	113.2	120.7
EBIT Margin				28.8%	30.2%	31.6%
-Interest	kEUR		(75.7)	(72.6)	(69.6)	(66.5)
EBT	kEUR		(75.7)	33.2	43.7	54.2
- Corporate tax	kEUR		-	(8.3)	(10.9)	(13.6)
Net Income	kEUR		(75.7)	24.9	32.7	40.7

Cashflow		Constr. period	2013	2014	2015	2016	2017
Total revenues	kEUR		-	367.2	374.5	382.0	389.7
- Total OPEX	kEUR		-	(200.0)	(200.0)	(200.0)	(200.0)
- Interest senior loan	kEUR		(75.7)	(72.6)	(69.6)	(66.5)	(63.4)
- Taxes	kEUR		-	(8.3)	(10.9)	(13.6)	(16.2)
Operating cashflow	kEUR		(75.7)	86.3	94.1	102.0	110.1
Investments	kEUR		(3,680.0)	-	-	-	-
Investment cashflow	kEUR		(3,680.0)	-	-	-	-
+ Drawdown equity	kEUR		1,472.0	-	-	-	-
+ Drawdown senior loan	kEUR		2,208.0	-	-	-	-
- Repayment senior loan	kEUR		(88.3)	(88.3)	(88.3)	(88.3)	(88.3)
Financing cashflow	kEUR		3,591.7	(88.3)	(88.3)	(88.3)	(88.3)
Cash BoP	kEUR		175.0	10.9	8.9	14.6	28.3
Total cashflow	kEUR		(164.1)	(2.1)	5.8	13.7	21.7
Cash EoP	kEUR	175.0	10.9	8.9	14.6	28.3	50.1

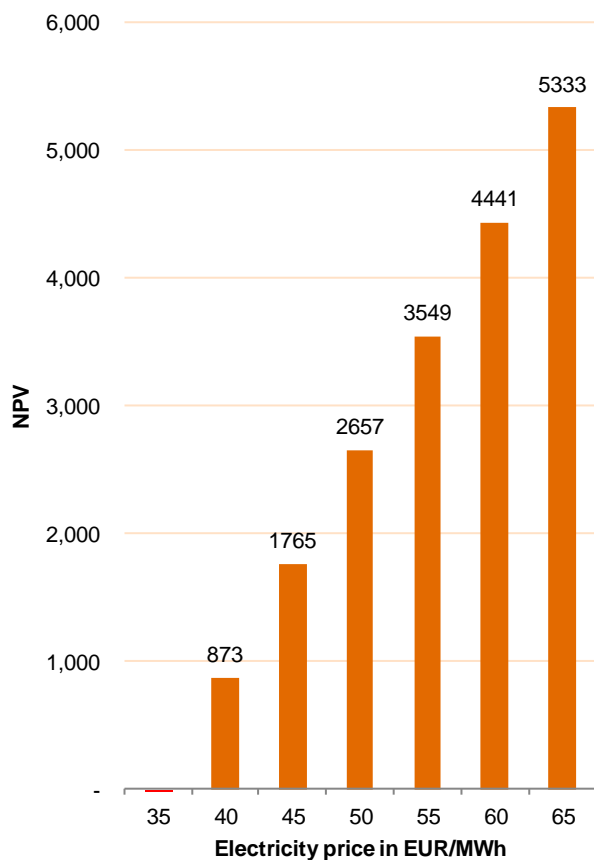
Balance Sheet		Constr. period	2013	2014	2015	2016
Tangible assets			3,680.0	3,618.7	3,557.3	3,496.0
Cash	175.0		10.9	8.9	14.6	28.3
Total assets			3,690.9	3,627.5	3,572.0	3,524.3
Equity	175.0		1,647.0	1,647.0	1,647.0	1,647.0
Profit/Loss b/f			(75.7)	(50.8)	(18.1)	22.6
Senior loan			2,119.7	2,031.4	1,943.0	1,854.7
Total liabilities & equity			3,690.9	3,627.5	3,572.0	3,524.3

Free Cash Flow		Constr. period	2013	2014	2015	2016	2017
EBIT			-	105.9	113.2	120.7	128.3
- Adjusted taxes	kEUR		-	(26.5)	(28.3)	(30.2)	(32.1)
NOPLAT	kEUR		-	79.4	84.9	90.5	96.3
+ Depreciation	kEUR		-	61.3	61.3	61.3	61.3
- Investments	kEUR		(3,680.0)	-	-	-	-
Free Cash Flow	kEUR		(3,680.0)	140.7	146.2	151.9	157.6
Discount rate		4.0%					
Discount factor			1.0	0.9	0.9	0.9	0.8
Net Present Value	kEUR		1,765.2	(3,538.5)	130.1	130.0	129.8
IRR			6.0%				

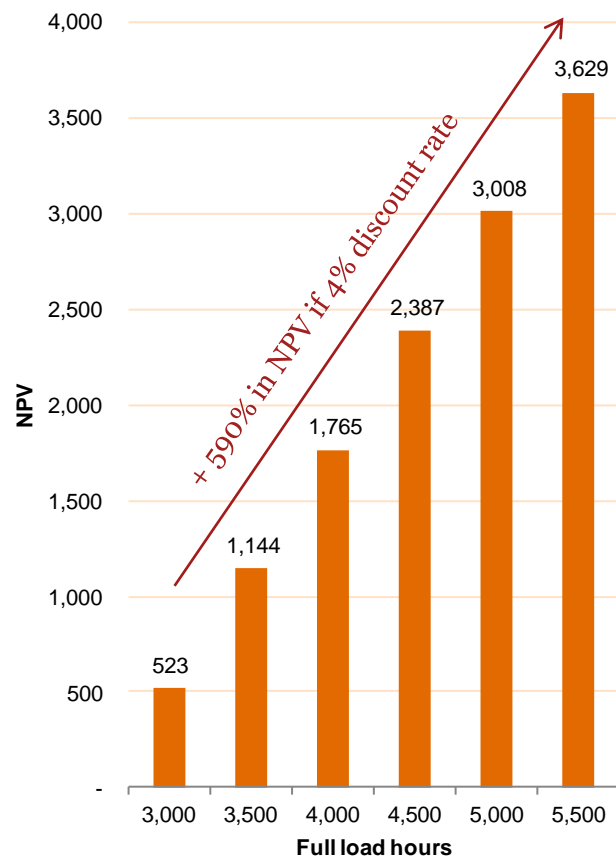
EBT	Earnings before taxes	IRR	Internal rate of return
EBIT	Earnings before interests and taxes	NOPLAT	Net operating profit less adjusted taxes
EBITDA	Earnings before interest, taxes, depreciation and amortisation	NPV	Net present value
OPEX	Operational expenditure		

Electricity price and full load hours and are highly sensitive to the NPV

Sensitivity analysis - NPV vs electricity price



Sensitivity analysis - NPV vs full load hours



Sensitivity analysis - NPV vs investment cost

