

TE-Ch2_Fundamentals-Power-Gen-Ex-2-1-to-2-4.xls
Ex. 2-1_WACC

Item	Conventional power projects	
	Equity	Debt
Asset shares	30%	70%
Expected returns after tax		
Risk free rate of return / interest	5.0 %/a	5.0 %/a
Venture risks premium	6.0 %/a	1.0 %/a
Country risk premium *)	0.0 %/a	0.0 %/a
Cost of capital in nominal terms, after tax	11.0 %/a	6.0 %/a
Corporate tax **) 25%	3.7 %/a	0.0 %/a
Cost of capital in nominal terms, before tax	14.7 %/a	6.0 %/a
WACC_n in nominal terms, before tax	8.60 %/a	
./. Inflation rate ***)	2.00 %/a	
WACC_r inflation adjusted	6.47 %/a	

*) This is country specific, for most developed countries it is zero

***) This is a typical value, the rates depend on the country's tax legislation

***) The 2%/a inflation rate is the longterm target value in most economies

TE-Ch2_Fundamentals-Power-Gen-Ex-2-1-to-2-4.xls
Ex. 2-2__CAPEX

Item	Unit	Steam PP	CCGT PP
Input data			
Construction time	years	5	2.5
Payments per year, equal	-	4	4
Overnight costs	mIn. US\$	1200	380
Reinvestment:			
Replacement of Gas turbine	mIn. US\$	0	95
Year after commissioning	a	0	15
Discount rate	-	6.5%	6.5%
Present values *)			
Overnight costs	mIn. US\$	1,200	380
Interest during construction	mIn. US\$	143	16
in percent of overnight costs	-	12%	4%
Present value of reinvestment	mIn. US\$	0	37
CAPEX, at commissioning time	mIn. US\$	1,343	433

*) PV Reference time, commissioning date

TE-Ch2_Fundamentals-Power-Gen-Ex-2-1-to-2-4.xls
Ex. 2-3_LEC_Anuity

Item		Unit	Steam PP	CCGT PP
Power and energy balance				
Power output, net		MW	600	400
Equivalent operating hours		h / a	5,500	5500
Power generation, net		MWh / a	3,300,000	2,200,000
Efficiency, net		-	42%	55%
Fuel consumption		MWh _t / a	7,857,143	4,000,000
CAPEX, incl. IDC+reinvest		mln. US\$	1,343	433
Discount rate, in real terms		% / a	6.5%	6.5%
Lifetime		a	35	25
Fixed OPEX		% Capex	2.50%	1%
Fuel price LHV, w.o. escalation ¹		US\$ / MWh _t	12.29	27.5
Annual OPEX, at start of operation				
OPEX, fixed		mln. US\$ / a	33.56	4.33
OPEX variable ²⁾	10%	mln. US\$ / a	106.18	121.00
Annual costs, incl. escalation for OPEX				
Annualized CAPEX		mln. US\$ / a	97.76	35.37
Fixed OPEX ³⁾	0.5%/a esc	mln. US\$ / a	35.68	4.55
Variable OPEX ³⁾	1.5%/a esc	mln. US\$ / a	128.26	140.88
Total annual costs		mln. US\$ / a	261.71	180.80
Levelized electricity cost		US\$ / MWh	79.30	82.18

1) price coal 100 US\$/tce

natural gas LHV

25 US\$/MWh

2) fuel +.10% non-fuel costs

3) escalation in real terms

TE-Ch2_Fundamentals-Power-Gen-Ex-2-1-to-2-4.xls
Ex. 2-4_LEC_PV

Item		Unit	Steam PP	CCGT PP
Power and energy balance				
Power output, net		MW	600	400
Equivalent operating hours		h / a	5,500	5,500
Power generation, net		MWh / a	3,300,000	2,200,000
Efficiency, net		-	42%	55%
Fuel consumption		MWh _t / a	7,857,143	4,000,000
CAPEX, PV total		mln. US\$	1,343	433
Discount rate, in real terms		% / a	6.5%	6.5%
Lifetime		a	35	25
Fixed OPEX		% Capex	2.50%	1.00%
Fuel price LHV, w.o. escalation ¹⁾		US\$ / MWh _t	12.29	27.50
Annual OPEX, at start of operation				
OPEX, fixed		mln. US\$ / a	33.56	4.33
OPEX variable	10%	mln. US\$ / a	106.18	121.00
Costs present values, incl. escalation for OPEX				
CAPEX		mln. US\$	1,343	433
Fixed OPEX ³⁾	0.5%/a esc	mln. US\$	490	56
Variable OPEX ³⁾	1.5%/a esc	mln. US\$	1,761	1,723
Total		mln. US\$	3,594	2,211
PV of electricity production		MWh	45,317,593	26,908,509
Levelized electricity cost		US\$ / MWh	79.30	82.18

1) price coal 100 US\$/tce natural gas LHV 25 US\$/MWh

2) fuel +.10% non-fuel costs 3) escalation in real terms