

Project: Helgoland

Date: november-19

Output

Client: General Case Helgoland (GER)

Wind Energy

Type of Turbine	80 kW
# Turbines	1 turbine(s)
Period	20 years

Average wind speed on h	8,43 m/s
Hub height	30 meters
Reference height Wind Study	30 meters 8,43 m/s

Output Wind Energy

Total kW/h per year	306.138 kWh
Availability turbine	95%
Available kW/h per year	290.831 kWh

Output Solar Energy

Average Full Load Hours	877 FLH
kWp solar energy	10 kWp
m2 sun panels	55 m2 592 sf
Production sun panels	8.768 kWh

Years of other Capex depreciation 20 years

Capex (year 0)

Wind energy	Per turbine	Total turbines	USD
Turbine	€ 170.000,00	€ 170.000,00	192.100,00
Civil work	€ 70.000,00	€ 70.000,00	79.100,00
Other	€ 10.000,00	€ 10.000,00	11.300,00
Total wind energy	€ 250.000,00	€ 250.000,00	282.500,00

Solar energy	Per kWp	Total solar panels	USD
Solar panels	€ 1.100,00	€ 11.000,00	12.430,00
Civil work	€ 100,00	€ 1.000,00	1.130,00
Total solar energy	€ 1.200,00	€ 12.000,00	13.560,00

Other capex	Replacement(s) (Not year 0)	Total capex	USD
New Diesel generator	€ -	€ -	-
Battery	€ -	€ -	-
Electrical	€ -	€ -	-
Power management	€ -	€ -	-
Other source	€ -	€ -	-
Total other capex	€ -	€ -	-
Total Capex		€ 262.000,00	296.060,00

Opex (per year)

Wind energy	Per Turbine	Total turbines (average per year)	USD
M&O	€ 3.200,00	€ 3.200,00	3.616,00
Major Maintenance	€ -	€ -	-
Insurance	€ 2.500,00	€ 2.500,00	2.825,00
Other	€ -	€ -	-

Solar energy	Per kWp	Total solar panels	USD
Opex Solar Panels	€ 25,00	€ 250,00	282,50

Other opex	Unit	Per unit	Sum of units per year	Total per year	USD
Opex New Diesel Genset	Per kWh	€ -	0	€ -	-
Opex Battery	Per kWh	€ -	0	€ -	-
Opex Grid Energy	Per kWh	€ -	0	€ -	-
Opex Management	Per MW	€ -	0	€ -	-
Additional opex	Per unit	€ -	0	€ -	-

Opex per year € **5.950,00** 6.723,50

Interest costs a year (average) € 5.402,44 6.104,76

Repayment costs a year (average) € 13.100,00 14.803,00

Costs a year € **24.452,44** 27.631,26

Residual value after period (average) € -

Revenue on selling energy € -1.527,46 c -1.726,03

Cost of Energy System divided by the total consumption per year € **0,0628** c 0,071

Cost of Energy from the grid divided by the total consumption per year € 0,050 c -

Average cost of energy per kWh in new situation € **0,113** c -

Cost of current situation per kWh Current source € 0,220 c 0,249

Price selling energy € 0,09

Calculation of energy costs (average day)

Hour	Energy load (kWh)	Average wind speed (m/s)	Average output turbine(s) kWh	Output solar kWh	Overload kWh	Total average costs of Renewables	Extra sources	Total costs	Selling kWh	Feed-in income
12:00 AM	32,59	7,4	29,31	-	-3,28	€ 1,83	€ 1,18	€ 3,02	€ 0,19	€ -
1:00 AM	30,62	7,4	29,09	-	-1,53	€ 1,82	€ 0,98	€ 2,80	€ 0,26	€ -
2:00 AM	29,80	7,3	28,87	-	-0,94	€ 1,81	€ 0,91	€ 2,72	€ 0,29	€ -
3:00 AM	29,75	7,5	29,52	-	-0,23	€ 1,85	€ 0,85	€ 2,70	€ 0,33	€ -
4:00 AM	30,71	7,7	30,17	-	-0,54	€ 1,89	€ 0,90	€ 2,79	€ 0,32	€ -
5:00 AM	34,26	7,8	30,83	0,01	-3,43	€ 1,93	€ 1,24	€ 3,17	€ 0,20	€ -
6:00 AM	39,87	8,3	32,64	0,08	-7,14	€ 2,05	€ 1,77	€ 3,83	€ 0,08	€ -
7:00 AM	43,06	8,8	34,46	0,41	-8,20	€ 2,20	€ 1,96	€ 4,16	€ 0,07	€ -
8:00 AM	43,79	9,2	36,33	1,14	-6,33	€ 2,38	€ 1,67	€ 4,05	€ 0,11	€ -
9:00 AM	44,07	9,5	37,56	1,98	-4,53	€ 2,54	€ 1,44	€ 3,98	€ 0,18	€ -
10:00 AM	43,45	9,9	38,80	2,69	-1,97	€ 2,69	€ 1,18	€ 3,87	€ 0,31	€ -
11:00 AM	43,09	10,2	40,03	3,04	-0,02	€ 2,80	€ 1,01	€ 3,81	€ 0,41	€ -
12:00 PM	42,81	10,0	39,43	3,19	-0,19	€ 2,78	€ 1,01	€ 3,78	€ 0,40	€ -
1:00 PM	41,87	9,9	38,83	3,11	0,07	€ 2,73	€ 0,96	€ 3,70	€ 0,40	€ -
2:00 PM	41,42	9,7	38,23	2,90	-0,29	€ 2,67	€ 1,00	€ 3,67	€ 0,38	€ -
3:00 PM	42,60	9,1	35,99	2,40	-4,21	€ 2,48	€ 1,37	€ 3,86	€ 0,18	€ -
4:00 PM	46,46	8,6	33,73	1,75	-10,99	€ 2,28	€ 2,44	€ 4,72	€ 0,01	€ -
5:00 PM	51,67	8,0	31,54	0,96	-19,17	€ 2,07	€ 4,22	€ 6,28	€ -	€ -
6:00 PM	54,12	7,9	31,06	0,31	-22,74	€ 1,97	€ 5,00	€ 6,98	€ -	€ -
7:00 PM	53,91	7,8	30,57	0,06	-23,27	€ 1,92	€ 5,12	€ 7,04	€ -	€ -
8:00 PM	52,62	7,6	30,09	0,00	-22,53	€ 1,88	€ 4,96	€ 6,84	€ -	€ -
9:00 PM	48,62	7,6	29,91	-	-18,71	€ 1,87	€ 4,12	€ 5,99	€ -	€ -
10:00 PM	42,39	7,5	29,72	-	-12,67	€ 1,86	€ 2,79	€ 4,65	€ -	€ -
11:00 PM	36,43	7,5	29,53	-	-6,90	€ 1,85	€ 1,68	€ 3,53	€ 0,07	€ -
	1000,00	8,43	796,25	24,01	-179,74	€ 52,16	€ 49,77	€ 101,92	€ 4,18	€ -

Extra sources:	Current source
Selling price overload:	€ 0,09 per kWh

	kWh	Per year
Profit feed in tariff wind energy	290.831	€ -
Profit feed in tariff sun energy	8.768	€ -
Profit on savings current costs	282.628	€ 62.178,09
Income Selling overload kWh/h	16.972	€ 1.527,46

Average costs per situation for this energy load (First year)

kWh/h	Energy Load per period			
	Day	Week	Month	Year
	1.000	7.000	30.438	365.250

Energy source	Percentage	Total Costs per kWh in the Current situation		Costs per kWh	Total Costs per kWh
		KWh per day	kWh per year		
Diesel	0%	0	0	0 €	0,56 €
Grid	100%	1.000	365.250	€ 0,22	€ 0,22
Renewable Energy	0%	0	0	0 €	0,10 €
	100%	1.000	365.250	€	0,22

Energy source	Total Costs per kWh in the New situation (Exclusive incomes)				
	kWh per day	Costs per kWh	Cost per day	Cost per year	Average Costs per kWh
Wind Energy	796	€ 0,063	€ 49,83	€ 18.200,00	€ 0,050
Solar Energy	24	€ 0,097	€ 2,33	€ 850,00	€ 0,002
Current source	226	€ 0,220	€ 49,77	€ 18.176,91	€ 0,050
	-	-	-	-	-
	-	-	-	-	-
	-	€ -	€ -	€ -	€ -
	-	€ -	€ -	€ -	€ -
Interest	1.000	€ 0,015	€ 14,79	€ 5.402,44	€ 0,015
	-	€ -	€ -	€ -	€ -
	-	€ -	€ -	€ -	€ -
Residual value	1.000	€ -	€ -	€ -	€ -
Revenue on selling energy	46	€ -0,090	€ -4,18	€ -1.527,46	€ -0,004
		€	€ 101,92	€ 37.226,91	€ 0,1125

Finance sheet

Clients saving on current costs per year	€	62.178,09	
Feed in per year	€	-	
Turnover selling energy per year	€	1.527,46	
Turnover per year	€	63.705,56	71.987,28
Profit/Loss after period	€	1.066.733,79	1.205.409,18

Commercial loan

Amount debt	€	222.700,00
Repayment period		18
Interest		4,0%
Delay repayment		0
Type of repayment		Annuity

Crowd funding

Amount debt	€	39.300,00
Repayment period		10
Interest		6,0%
Delay repayment		0
Type of repayment		Annuity

	Interest costs	Repayment costs
Commercial loan	€ 93.952,66	€ 222.700,00
Crowd funding	€ 14.096,11	€ 39.300,00
Total	€ 108.048,76	€ 262.000,00
Average per year	€ 5.402,44	€ 13.100,00

Tax	0%
Inflation	2,0%
Inflation in turnover?	Yes
IRR on total investing (Based on EBITDA)	24,13%
IRR on equity (Based on change in cash)	-
DSCR (minimum)	2,57
Payback Period	4,29

Financial statements

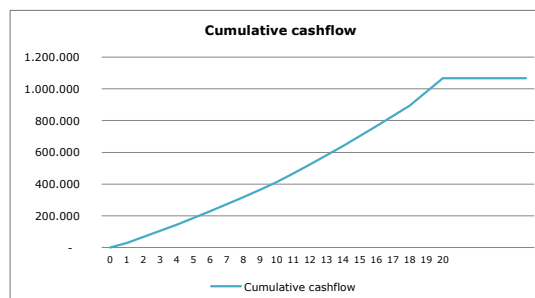
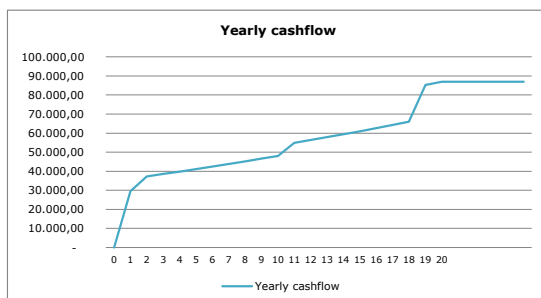
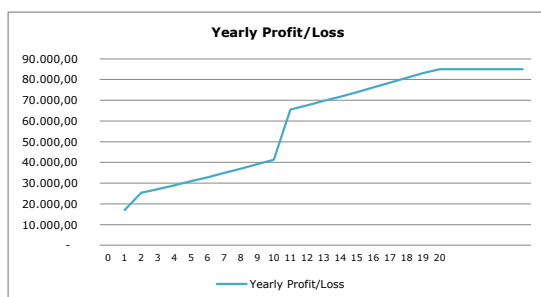
Income Statement	0	1	2	20	Total
Savings on current source	€ -	€ 63.421,66	€ 64.690,09	€ 92.393,38	€ 1.540.979,42
Feed in tariff	€ -	€ -	€ -	€ -	€ -
Selling excess energy	€ -	€ 1.558,01	€ 1.589,17	€ 2.269,73	€ 37.855,58
Income selling residual value	€ -	€ -	€ -	€ -	€ -
Turnover	€ -	€ 64.979,67	€ 66.279,26	€ 94.663,10	€ 1.578.834,99
M&O Turbines	€ -	€ 3.264,00	€ 3.329,28	€ 4.755,03	€ 79.306,62
Major Maintenance Turbines	€ -	€ -	€ -	€ -	€ -
Insurance Turbines	€ -	€ 2.500,00	€ 2.500,00	€ 2.500,00	€ 50.000,00
Other costs turbines	€ -	€ -	€ -	€ -	€ -
Opex solar panels per kWp	€ -	€ 255,00	€ 260,10	€ 371,49	€ 6.195,83
Opex New Diesel Generator	€ -	€ -	€ -	€ -	€ -
Opex Battery	€ -	€ -	€ -	€ -	€ -
Opex Grid Energy	€ -	€ -	€ -	€ -	€ -
Opex Management	€ -	€ -	€ -	€ -	€ -
Additional opex	€ -	€ -	€ -	€ -	€ -
Total Opex	€ -	€ 6.019,00	€ 6.089,38	€ 7.626,52	€ 135.502,44
EBITDA	€ -	€ 58.960,67	€ 60.189,88	€ 87.036,59	€ 1.443.332,55
Interest costs	€ -	€ 11.266,00	€ 10.739,75	€ -	€ 108.048,76
Extra finance costs	€ -	€ 6.550,00	€ -	€ -	€ 6.550,00
EBTDA	€ -	€ 41.144,67	€ 49.450,13	€ 87.036,59	€ 1.328.733,79
Deprecation costs	€ -	€ 24.100,00	€ 24.100,00	€ 2.100,00	€ 262.000,00
Profit/(Loss) (before tax)	€ -	€ 17.044,67	€ 25.350,13	€ 84.936,59	€ 1.066.733,79
Tax*	€ -	€ -	€ -	€ -	€ -
Profit/(Loss) in EUR	€ -	€ 17.044,67	€ 25.350,13	€ 84.936,59	€ 1.066.733,79

* No tax on 'Savings on current source'

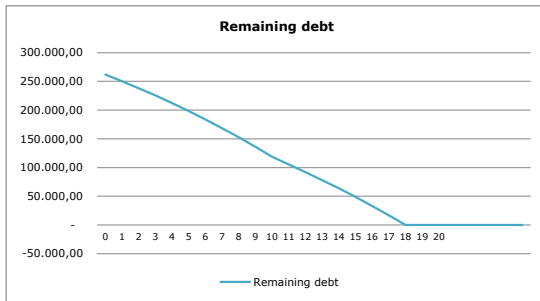
Financial statements

Cashflow Statement	0		1		2		20	
Operating activities								
EBITDA	€	-	€	58.960,67	€	60.189,88	€	87.036,59
Tax	€	-	€	-	€	-	€	-
Net operating activities	€	-	€	58.960,67	€	60.189,88	€	87.036,59
Financing activities								
Commercial Loan	€	-	€	-8.908,00	€	-8.560,65	€	-
Crowd funding	€	-	€	-2.358,00	€	-2.179,10	€	-
Financing	€	262.000,00	€	-	€	-	€	-
Repayment	€	-	€	-11.665,42	€	-12.191,67	€	-
Net financing activities	€	262.000,00	€	-29.481,42	€	-22.931,42	€	-
Investing activities								
Capex	€	-262.000,00	€	-	€	-	€	-
Net investing activities	€	-262.000,00	€	-	€	-	€	-
Cash begin	€	-	€	-	€	29.479,24	€	979.697,20
Change in cash	€	-	€	29.479,24	€	37.258,46	€	87.036,59
Cash end in EUR	€	-	€	29.479,24	€	66.737,70	€	1.066.733,79

Balance Sheet	0		1		2		19		20	
Assets										
Wind Energy System	€	250.000	€	237.500	€	225.000	€	12.500	€	-
Liquid assets	€	-	€	29.479	€	66.738	€	979.697	€	1.066.734
Total assets	€	262.000	€	267.379	€	280.538	€	981.797	€	1.066.734
Liabilities										
Equity	€	-	€	-	€	17.045	€	981.797	€	981.797
(Profit/Loss)	€	-	€	17.045	€	25.350	€	83.181	€	84.937
Total Equity	€	-	€	17.045	€	42.395	€	981.797	€	1.066.734
Debt	€	262.000	€	250.335	€	238.143	€	-	€	-
Total liabilities	€	262.000	€	267.379	€	280.538	€	981.797	€	1.066.734

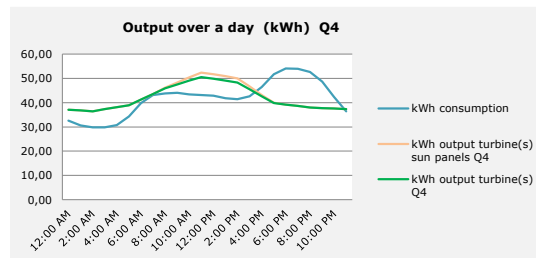
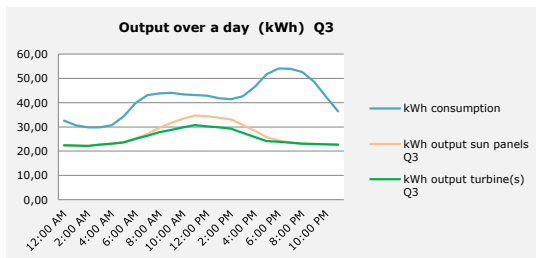
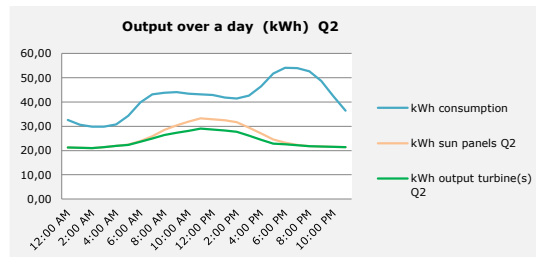
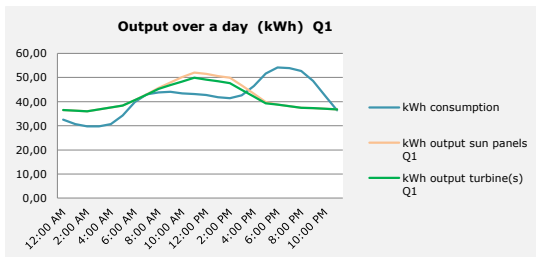


Financial statements

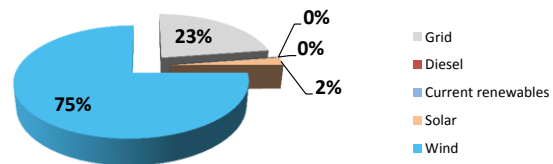


Notifications:

How green is your energy load?



How green is your energy load?

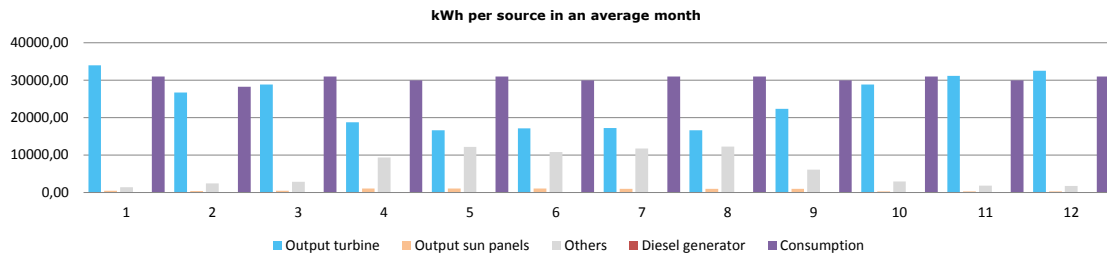


77% Renewable*

	kWh a year	Percentage
Energy consumption	365.250	100%
Grid	82.622	23%
Diesel	0	0%
Current renewables	0	0%
Solar	8.272	2%
Wind	274.356	75%

* This is exclusive any delivery of overload energy to others!

How green is your energy load?

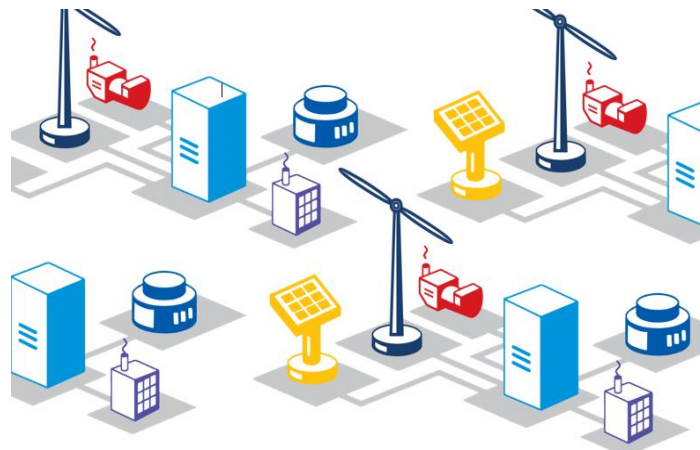
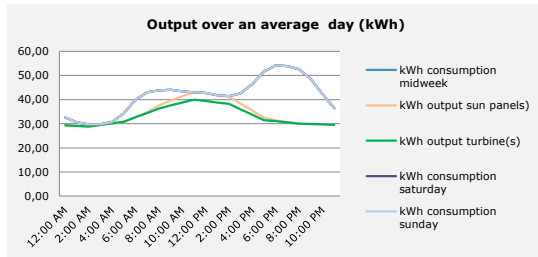


Diesel generator savings based on assumptions

Liters diesel fuel in current situation based on the energy consumption
0 liter

Liters diesel fuel in the new situation based on the energy consumption
0 liter

Saving of liters diesel fuel per year
0 liter



Glossary

(Average) Wind speed:	This is the average wind speed taken over a day that's blown at the location of the wind turbine. How more specific the wind speed per period, how better the case can be calculated.
Full Load Hours:	This is a value of the hours the sun panels will do there work at full strenght, based on the average sloar radiation on the location. With this value you can calculate the production of the sun panels.
Reference height:	This is the reference height of the wind speed that's measured to calculate the output of the wind turbine.
Energy consumption:	This is the energy need for which a solution has to be found.
Energy loads:	This is the fluctuation over a day in the energie need. How more specific the energie need per period, how better the case can be calculated.
Capex	The capex is the initial investment. In other words the cost that has to be made at the beginning of the project when the wind turbine is not working yet.
Opex	The opex are the (yearly) costs that will be made when the wind turbine is working. Costs like maintentance and insurance are part of it.
Feed in	This is the tarif that (most of the time) the government will pay tho renewable projects to stimulate a better world.
Inflation:	Inflation is the sustained increase in the general price level of goods over a period of time.
IRR:	Internal Rate of Return (IRR) is a metric used in capital budgeting to estimate the profitability of potential investments. Internal rate of return is a discount rate that makes the net present value (NPV) of all cash flows from a particular project equal to zero.
DSCR:	The Debt-Service Coverage Ratio (DSCR) states net operating income as a multiple of current debt obligations due within one year.
Payback period:	The payback period is the length of time required to recover the cost of an investment.