

Power Station Economics**Offshore Wind**

Capacity	MW	4000
Load Factor (Availability)	%	40%
Annual output	TWh	14.02
	MWh	14016000
	kW	4000000
Construction time	years	4
Project life	years	30

Fuel

Efficiency		100%
Fuel consumed	MWh	14016000
Gas cost	US\$/mmbtu	0
	US\$/MWh	0.00

Convert mmbtu to MWh 3.413

NPV 1133.4

US\$=€1

EIA Estimates

Capital Cost	US\$/kW	3617	14468.1 US\$mm
Fixed Cost	US\$/kW	92.7	370.7 US\$mm
Variable Costs	US\$/MWh	0	0.0 US\$mm
Gas Cost	US\$/MWh	0.00	0.0 US\$mm

Carbon output per MWh	Tonnes	0.00
Carbon price	US\$/t	0.00

Corporate Tax Rate 25%

Electricity Price	US\$/MWh	132	€/MWh	117
Capacity Payment	US\$/kW	0	US\$/MWh	132

Project Economics

		2023	2024	2025	2026	2027
Utilisation		0%	0%	0%	0%	40%
Output	MWh	0	0	0	0	14016000
Price	\$/MWh				132	132
Revenues	\$mm				0.0	1850.1
Capacity Payment	\$mm				0.0	0.0
Capex	\$mm	-3617.0	-3617.0	-3617.0	-3617.0	0.0
Total	\$mm	-14468.1				
Variable Cost	\$mm	0.0	0.0	0.0	0.0	0.0
Fixed Cost	\$mm	0.0	0.0	0.0	0.0	-370.7
Fuel Cost	\$mm	0.0	0.0	0.0	0.0	0.0
Cost of Carbon	\$mm	0.0	0.0	0.0	0.0	0.0
Total Costs	\$mm	0.0	0.0	0.0	0.0	-370.7
Operating Cashflow	€mm	0.0	0.0	0.0	0.0	1479.4

Depreciation		30	0.0	0.0	0.0	0.0	-482.3
Pre-tax profit	€mm		0.0	0.0	0.0	0.0	997.1
Corporation Tax		25%	0.0	0.0	0.0	0.0	-249.3
Net Income	€mm		0.0	0.0	0.0	0.0	747.8
Post-tax Cashflow	€mm		0.0	0.0	0.0	0.0	1230.1
Net Cashflow	€mm		-3617.0	-3617.0	-3617.0	-3617.0	1230.1
Cumulative Net Cashflow			-3617.0	-7234.0	-10851.1	-14468.1	-13238.0
Discount Rate		5.74%					
Discount Factor		1	1.06	1.12	1.18	1.25	1.32
Discounted Cashflow	€mm		-3420.6	-3234.9	-3059.2	-2893.1	930.5
NPV	€mm		1133.4				
IRR	%		6.5%				

Payback (Years)

Breakeven Utilisation

Breakeven Gas Price

Breakeven Electricity Price

Breakeven Carbon Price

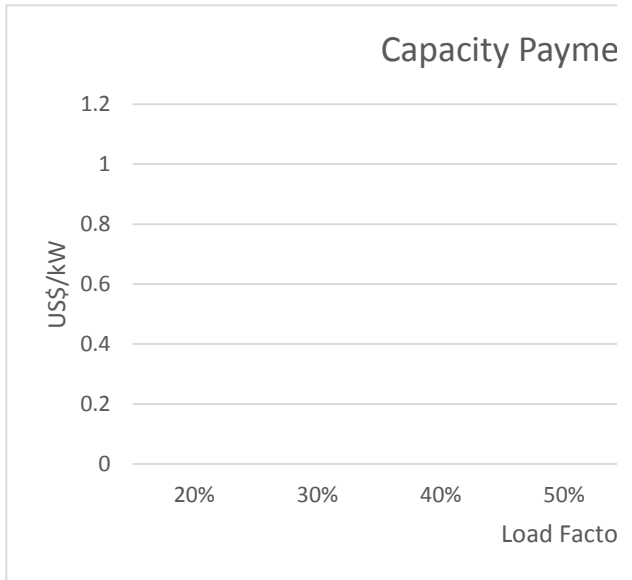
Discount Rate	
Cost of Interest	5.2%
Tax Rate	25%
Cost of Debt	3.9%
Cost of Equity	7.6%
Share of Debt	50%
Share of Equity	50%
WACC	5.74%

Debt and Interest	2023	2024	2025	2026	2027
Cumulative Debt	1809	4411	7114	9923	10310
Interest on Debt	70	172	277	386	401

Total Interest Paid	2654
Capital paid off	7234
	9888

Capacity Payment

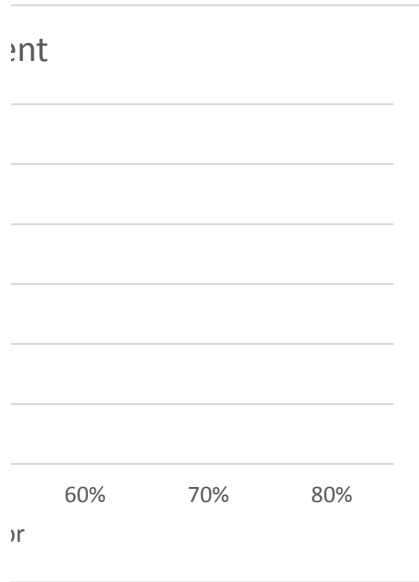
Load Factor
20% 30% 40% 50% 60% 70%



-482.3	-482.3	-482.3	-482.3	-482.3	-482.3	-482.3	-482.3	-482.3
997.1	997.1	997.1	997.1	997.1	997.1	997.1	997.1	997.1
-249.3	-249.3	-249.3	-249.3	-249.3	-249.3	-249.3	-249.3	-249.3
747.8	747.8	747.8	747.8	747.8	747.8	747.8	747.8	747.8
1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1
1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1
-12007.9	-10777.8	-9547.7	-8317.6	-7087.5	-5857.4	-4627.3	-3397.2	-2167.1
1.40	1.48	1.56	1.65	1.75	1.85	1.95	2.07	2.19
879.9	832.2	787.0	744.2	703.8	665.6	629.5	595.3	563.0

2028	2029	2030	2031	2032	2033	2034	2035	2036
9481	8620	7725	6796	5830	4827	3785	2702	1577
369	336	301	265	227	188	147	105	61

80%



-482.3	-482.3	-482.3	-482.3	-482.3	-482.3	-482.3	-482.3	-482.3
997.1	997.1	997.1	997.1	997.1	997.1	997.1	997.1	997.1
-249.3	-249.3	-249.3	-249.3	-249.3	-249.3	-249.3	-249.3	-249.3
747.8	747.8	747.8	747.8	747.8	747.8	747.8	747.8	747.8
1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1
1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1
-937.0	293.1	1523.2	2753.4	3983.5	5213.6	6443.7	7673.8	8903.9
2.31	2.44	2.58	2.73	2.89	3.05	3.23	3.42	3.61
532.4	503.5	476.1	450.3	425.8	402.7	380.8	360.2	340.6

2037	2038	2039	2040	2041	2042	2043	2044	2045
408	-806	-2067	-3378	-4740	-6154	-7624	-9151	-10737
16	-31	-80	-131	-184	-240	-297	-356	-418

-482.3	-482.3	-482.3	-482.3	-482.3	-482.3	-482.3	-482.3	-482.3
997.1	997.1	997.1	997.1	997.1	997.1	997.1	997.1	997.1
-249.3	-249.3	-249.3	-249.3	-249.3	-249.3	-249.3	-249.3	-249.3
747.8	747.8	747.8	747.8	747.8	747.8	747.8	747.8	747.8
1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1
1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1	1230.1
10134.0	11364.1	12594.2	13824.3	15054.4	16284.5	17514.6	18744.7	19974.8
3.82	4.04	4.27	4.52	4.77	5.05	5.34	5.65	5.97
322.1	304.6	288.1	272.4	257.6	243.6	230.4	217.9	206.1

2046	2047	2048	2049	2050	2051	2052	2053	2054
-12385	-14097	-15876	-17724	-19644	-21639	-23711	-25864	-28101
-482	-549	-618	-690	-765	-842	-923	-1007	-1094

2055
40%
14016000
132
1850.1
0.0

0.0
-370.7
0.0
0.0
-370.7

1479.4

-482.3

997.1

-249.3

747.8

1230.1

1230.1
21204.9

6.31

194.9

2055

-30425

-1184

WACC

Cost of Equity	
Equity market re	10.57%
Risk Free Rate	4.61%
Beta	0.5
Cost of Equity	7.59%
Interest Rate	5.19%
Tax Rate	25%
Cost of Debt	3.89%
WACC	6.50%
% Debt	50%
% Equity	60%

Equity Market Return

MSCI World Index

% Return

2009	31%
2010	12%
2011	-1%
2012	17%
2013	27%
2014	6%
2015	0%
2016	8%
2017	23%
2018	-8%
2019	28%
2020	17%
2021	22%
2022	-18%

Average	11.8%
10yr average	10.6%
5 year average	8.3%

Debt Yields

Risk Free Return

US Treasury	4.61%
UK LIBOR	5.37%
US AAA	5.19%
UK AAA	6.20%

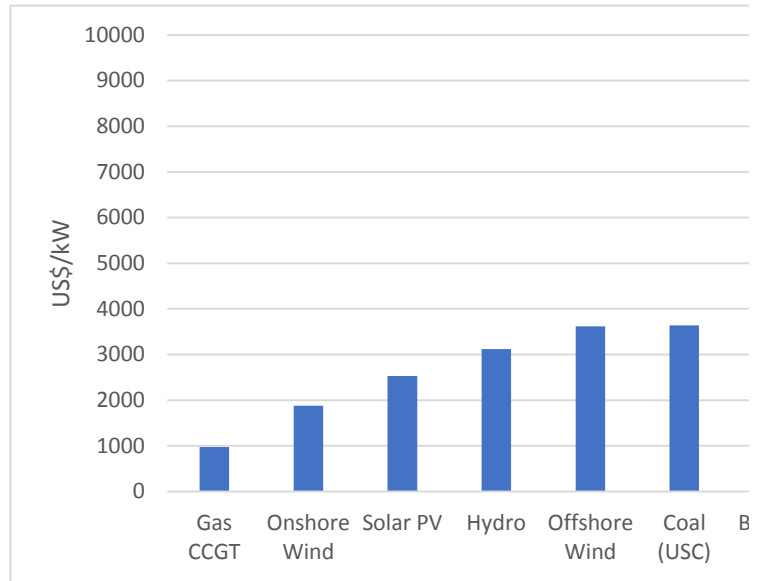
Beta and Leverage Analysis

Industry Name	Number of firms	Beta	D/E Ratio
Oil/Gas (Integrated)	4	0.98	11.50%
Oil/Gas (Production and Exploration)	174	1.26	20.08%
Oil/Gas Distribution	23	0.99	71.41%
Oilfield Svcs/Equip.	101	1.38	32.60%
Power	48	0.73	77.16%

Software (Internet)	33	1.55	17.66%
Utility (General)	15	0.64	74.18%

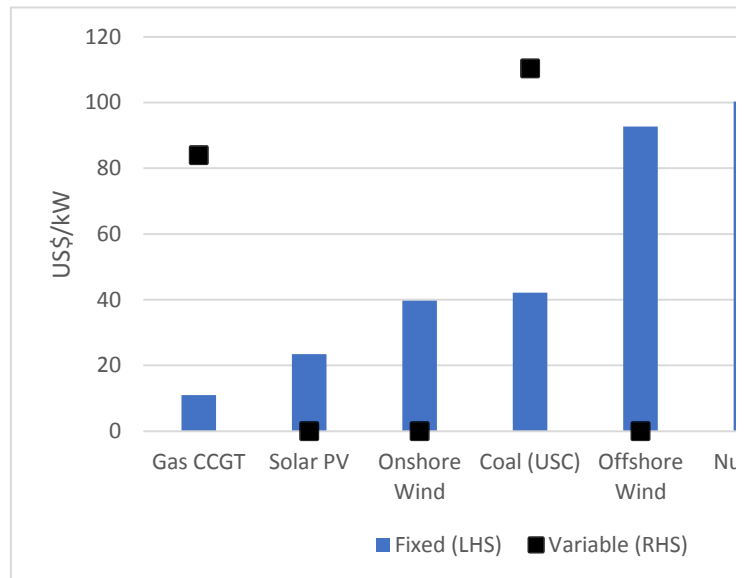
Capital Costs

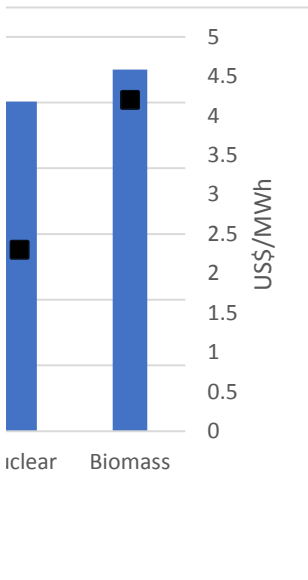
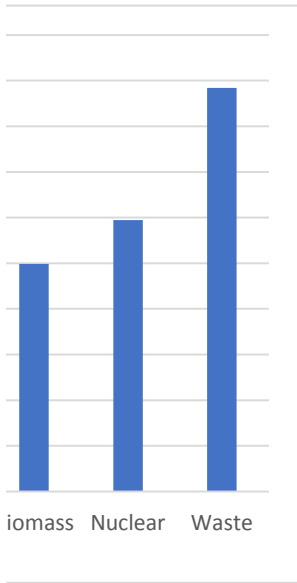
	US\$/kW
Gas CCGT	978
Onshore Wind	1877
Solar PV	2534
Hydro	3123
Offshore Wind	3617
Coal (USC)	3636
Biomass	4985
Nuclear	5945
Waste	8843



Operating Costs

	Fixed (LHS)	Variable (RHS)
Gas CCGT	11	3.5
Solar PV	23.4	0
Onshore Wind	39.7	0
Coal (USC)	42.1	4.6
Offshore Wind	92.7	0
Nuclear	100.3	2.3
Biomass	110	4.2





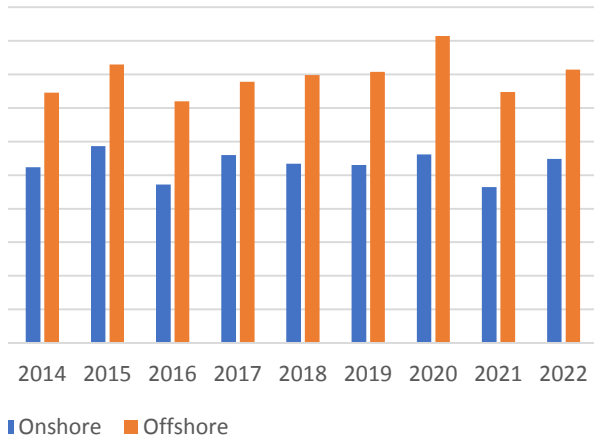
	2010	2011	2012	2013	2014	2015	2016	2017
Onshore	21.9%	27.9%	25.8%	28.4%	26.2%	29.3%	23.6%	28.0%
Offshore	30.5%	37.0%	35.8%	39.1%	37.3%	41.5%	36.0%	38.9%

	10yr ave	5yr ave	3 yr ave
Onshore	26.7%	26.4%	26.2%
Offshore	39.7%	40.8%	41.3%



2018	2019	2020	2021	2022
26.7%	26.5%	28.1%	23.2%	27.4%
39.9%	40.4%	45.7%	37.4%	40.7%

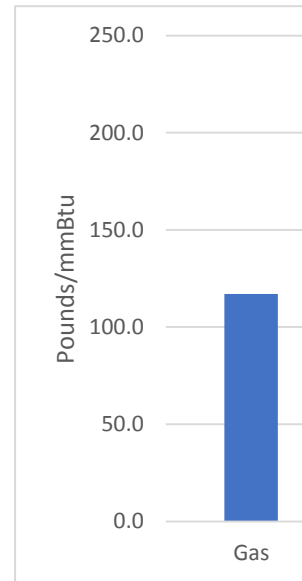
Farm Load Factors

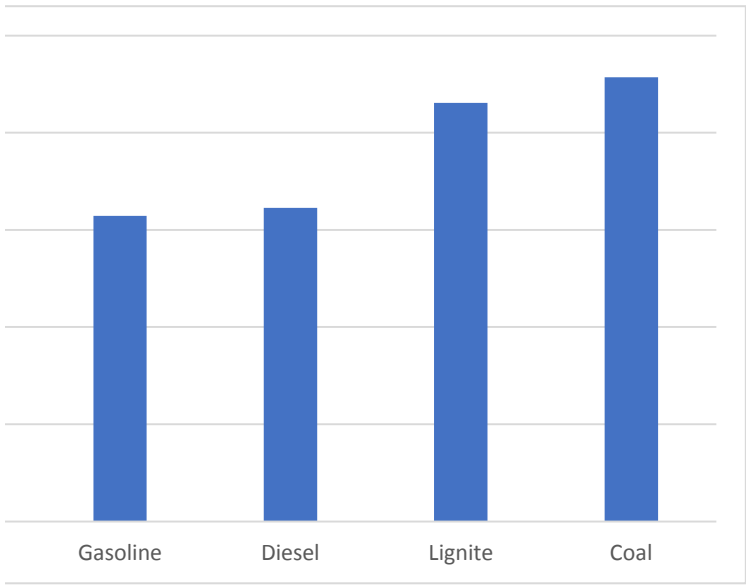


2.205

Pounds per mmBtu Tonnes per Tonnes per MWh

Gas	117.0	0.053	0.181
Gasoline	157.2	0.071	0.243
Diesel	161.3	0.073	0.250
Lignite	215.4	0.098	0.333
Coal	228.6	0.104	0.354
Wind			0
Solar			0





Cost Breakdown

US\$mm

Capex 14468

Opex 10751

Cost of Finance 20071

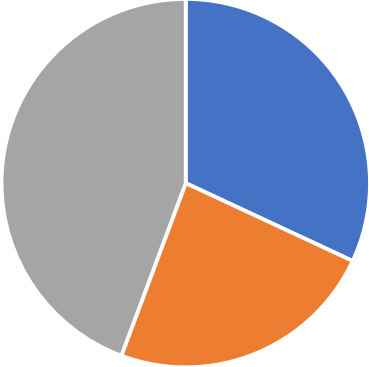
Cost of Finance

Total Cashflow 21205

Total Discounted Cashflow 1133

Difference 20071

US\$mm



■ Capex ■ Opex ■ Cost of Finance