

Power Station Economics**Gas CCGT**

Capacity	MW	750
Load Factor	%	85%
Annual output	TWh	5.58
	MWh	5584500
	kW	750000
Construction time	years	3
Project life	years	20

Fuel

Efficiency		54%
Fuel consumed	MWh	10341667
Gas cost	US\$/mmbtu	4
	US\$/MWh	13.65

NPV	657.9
IRR	13.4%

Convert mmbtu to MWh 3.413

US\$=€1

EIA Estimates

Capital Cost	US\$/kW	978	733.5 US\$mm
Fixed Cost	US\$/kW	11.0	8.3 US\$mm
Variable Costs	US\$/MWh	3.5	19.5 US\$mm
Gas Cost	US\$/MWh	13.65	141.2 US\$mm

Carbon output per MWh	Tonnes	0.18
Carbon price	US\$/t	30.00

Corporate Tax Rate 20%

Electricity Price	US\$/MWh	66	€/MWh	95
Capacity Payment	US\$/kW	0	US\$/MWh	107

Project Economics

		2023	2024	2025	2026	2027
Utilisation		0%	0%	0%	85%	85%
Output	MWh	0	0	0	5584500	5584500
Price	\$/MWh				66	66
Revenues	\$mm				368.6	368.6
Capacity Payment	\$mm				0.0	0.0
Capex	\$mm	-244.5	-244.5	-244.5	0.0	0.0
Total	\$mm	-733.5				
Variable Cost	\$mm	0.0	0.0	0.0	-19.5	-19.5
Fixed Cost	\$mm	0.0	0.0	0.0	-8.3	-8.3
Fuel Cost	\$mm	0.0	0.0	0.0	-141.2	-141.2
Cost of Carbon	\$mm	0.0	0.0	0.0	-56.2	-56.2
Total Costs	\$mm	0.0	0.0	0.0	-225.1	-225.1
Operating Cashflow	€mm	0.0	0.0	0.0	143.4	143.4

Depreciation		20	0.0	0.0	0.0	-36.7	-36.7
Pre-tax profit	€mm		0.0	0.0	0.0	106.8	106.8
Corporation Tax		20%	0.0	0.0	0.0	-21.4	-21.4
Net Income	€mm		0.0	0.0	0.0	85.4	85.4
Post-tax Cashflow	€mm		0.0	0.0	0.0	122.1	122.1
Net Cashflow	€mm		-244.5	-244.5	-244.5	122.1	122.1
Cumulative Net Cashflow			-244.5	-489.0	-733.5	-611.4	-489.3
Discount Rate		4.93%					
Discount Factor		1	1.05	1.10	1.16	1.21	1.27
Discounted Cashflow	€mm		-233.0	-222.1	-211.6	100.7	96.0
NPV	€mm		657.9				
IRR	%		13.4%				

Payback (Years)

Breakeven Utilisation

Breakeven Gas Price

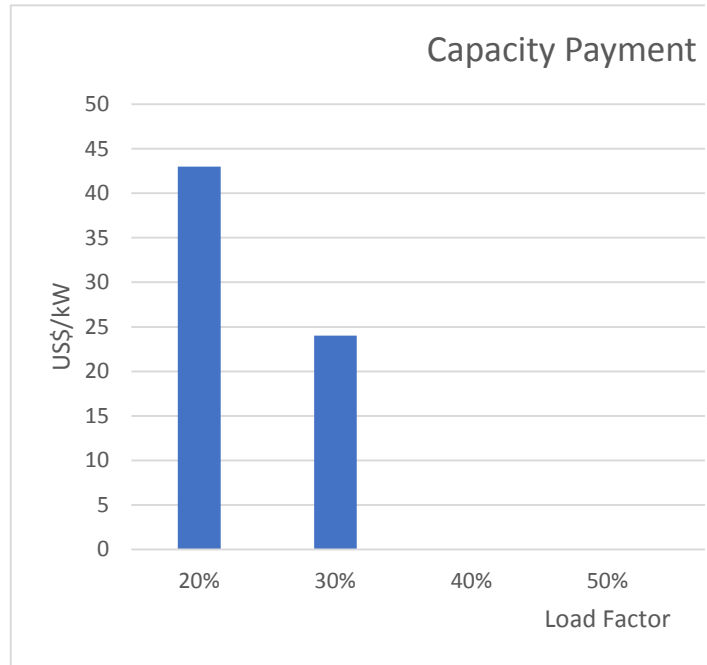
Breakeven Electricity Price

Breakeven Carbon Price

Discount Rate	
Cost of Interest	5.2%
Tax Rate	20%
Cost of Debt	4.2%
Cost of Equity	7.5%
Share of Debt	77%
Share of Equity	23%
WACC	4.93%

Debt and Interest	2023	2024	2025	2026	2027
Cumulative Debt	188	367	554	577	478
Interest on Debt	8	15	23	24	20
Total Interest Paid	-235				
Capital paid off	565				
	330				

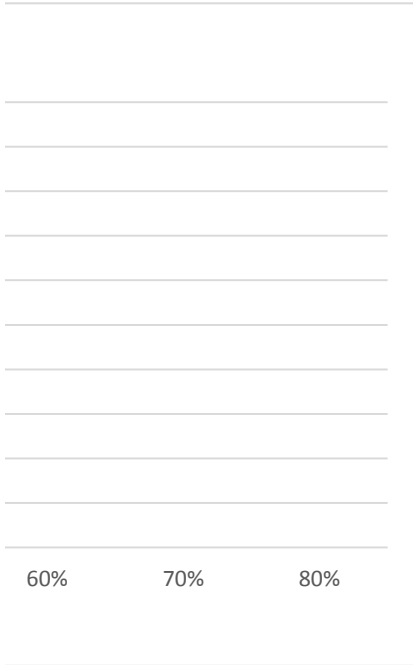
	Load Factor					
	20%	30%	40%	50%	60%	70%
Capacity Payment	43	24				



-36.7	-36.7	-36.7	-36.7	-36.7	-36.7	-36.7	-36.7
106.8	106.8	106.8	106.8	106.8	106.8	106.8	106.8
-21.4	-21.4	-21.4	-21.4	-21.4	-21.4	-21.4	-21.4
85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4
122.1	122.1	122.1	122.1	122.1	122.1	122.1	122.1
122.1	122.1	122.1	122.1	122.1	122.1	122.1	122.1
-367.2	-245.1	-123.1	-1.0	121.1	243.2	365.3	487.4
1.33	1.40	1.47	1.54	1.62	1.70	1.78	1.87
91.5	87.2	83.1	79.2	75.4	71.9	68.5	65.3

2028	2029	2030	2031	2032	2033	2034	2035
376	270	159	43	-77	-202	-333	-469
16	11	7	2	-3	-8	-14	-19

80%



-36.7	-36.7	-36.7	-36.7	-36.7	-36.7	-36.7	-36.7	-36.7
106.8	106.8	106.8	106.8	106.8	106.8	106.8	106.8	106.8
-21.4	-21.4	-21.4	-21.4	-21.4	-21.4	-21.4	-21.4	-21.4
85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4
122.1	122.1	122.1	122.1	122.1	122.1	122.1	122.1	122.1
122.1	122.1	122.1	122.1	122.1	122.1	122.1	122.1	122.1
609.5	731.6	853.6	975.7	1097.8	1219.9	1342.0	1464.1	1586.2
1.96	2.06	2.16	2.27	2.38	2.50	2.62	2.75	2.88
62.2	59.3	56.5	53.9	51.3	48.9	46.6	44.4	42.3

2036	2037	2038	2039	2040	2041	2042	2043	2044
-610	-758	-911	-1071	-1238	-1411	-1592	-1780	-1976
-25	-31	-38	-44	-51	-59	-66	-74	-82

-36.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
106.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-21.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
85.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
122.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1708.3	1708.3	1708.3	1708.3	1708.3	1708.3	1708.3	1708.3	1708.3
3.03	3.17	3.33	3.50	3.67	3.85	4.04	4.24	4.45
40.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

2045	2046	2047	2048	2049	2050	2051	2052	2053
-2180	-2393	-2492	-2595	-2703	-2815	-2932	-3054	-3181
-91	-99	-103	-108	-112	-117	-122	-127	-132

0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
0.0	0.0
1708.3	1708.3
4.67	4.90
0.0	0.0

2054	2055
-3313	-3450
-138	-143

WACC

Cost of Equity	
Equity market return	10.60%
Risk Free Rate	4.60%
Beta	0.49
Cost of Equity	7.54%
Interest Rate	5.19%
Tax Rate	20%
Cost of Debt	4.15%
WACC	4.93%
% Debt	77%
% Equity	23%

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%

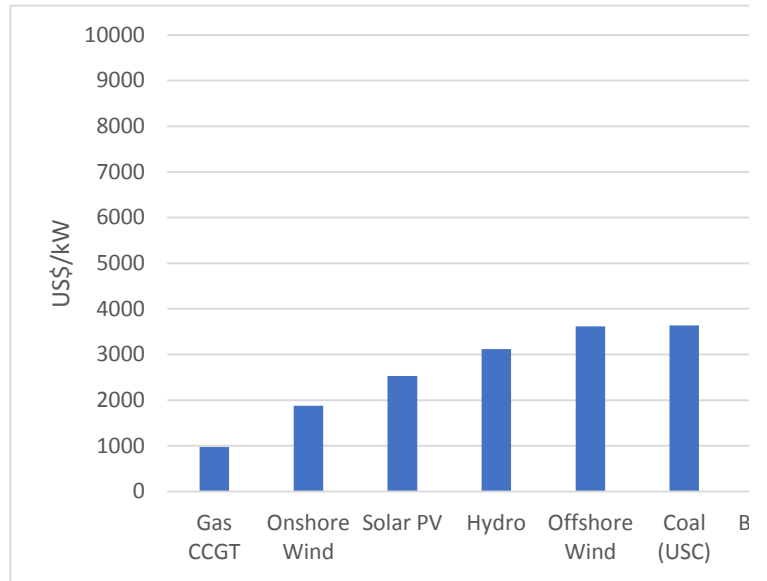
Beta and Leverage Analysis

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%

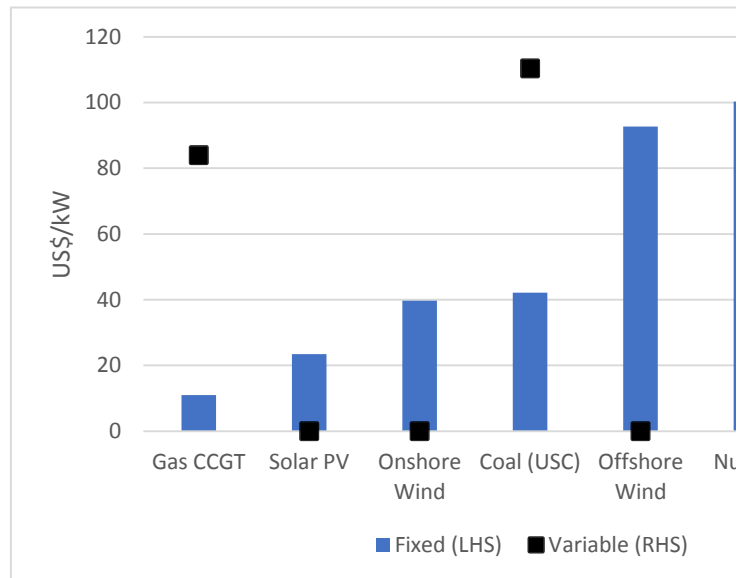
Capital Costs

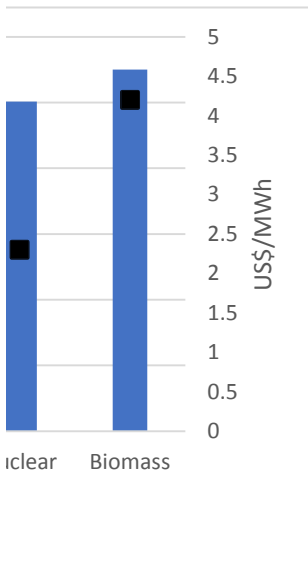
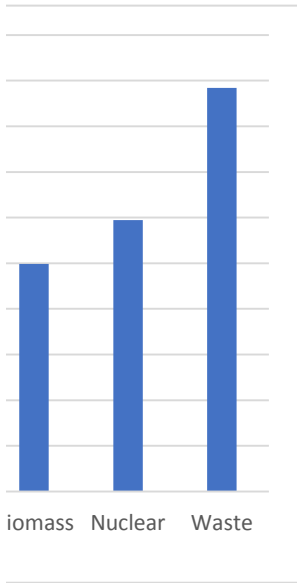
	US\$/kW
Gas CCGT	978
Onshore Wind	1877
Solar PV	2534
Hydro	3123
Offshore Wind	3617
Coal (USC)	3636
Biomass	4985
Nuclear	5945
Waste	8843



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





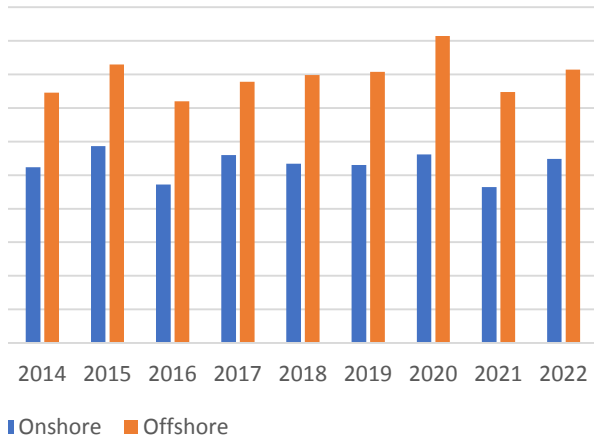
	2010	2011	2012	2013	2014	2015	2016	2017
Onshore	21.9%	27.9%	25.8%	28.4%	26.2%	29.3%	23.6%	28.0%
Offshore	30.5%	37.0%	35.8%	39.1%	37.3%	41.5%	36.0%	38.9%

	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%

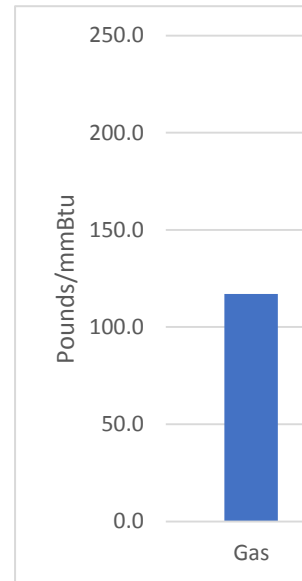
Farm Load Factors

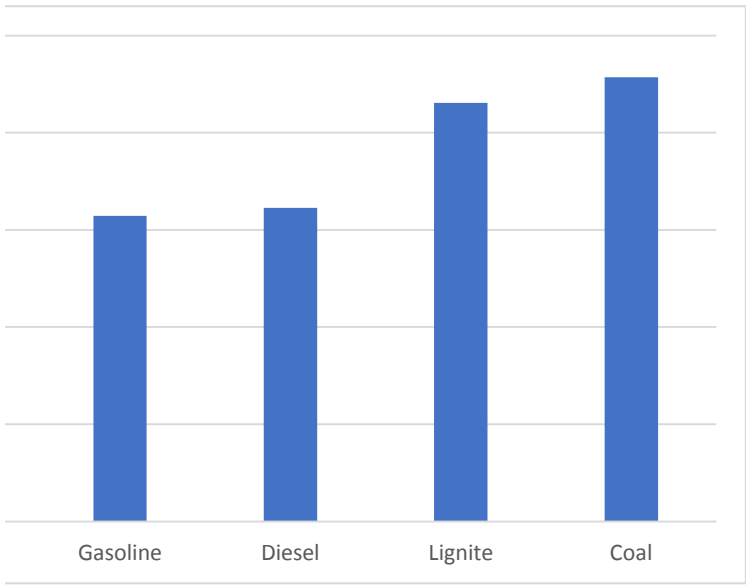


2.205

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 734

Opex 556

Cost of Finance 1050

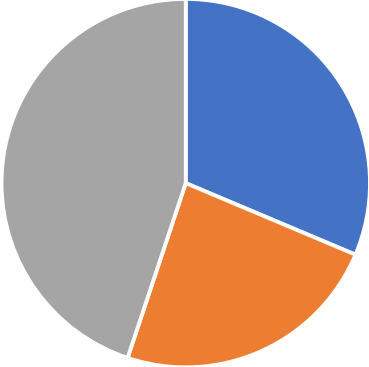
Cost of Finance

Total Cashflow 1708

Total Discounted Cashflow 658

Difference 1050

US\$mm



■ Capex ■ Opex ■ Cost of Finance