

UK BIG 6 UTILITY INVESTMENT TRENDS

A report for Greenpeace UK on the generation
investments of the Big 6 utilities

23 April 2012



CONTENTS

SECTION 1.	SUMMARY	1
SECTION 2.	A SHORT HISTORY	3
SECTION 3.	THE BIG 6 TODAY	5
3.1.	A few definitions	5
3.2.	The financial health of the industry	6
SECTION 4.	BIG 6 CAPACITY INVESTMENTS	8
4.1.	Methodology	8
4.2.	Big 6 and big investments	8
SECTION 5.	COMPANY PROFILES	11
5.1.	The cautious renewable investors	11
5.2.	The high renewable investors	16
5.3.	RWE npower	19
SECTION 6.	INVESTMENT IN CONTEXT	21
ABOUT US		23

TABLE OF FIGURES

Figure 1: Big 6 renewable and thermal new capacity investment since 2006	1
Figure 2: UK power generation Herfindahl Index	3
Figure 3: Evolution of the UK power generation industry	3
Figure 4: Generation fleet by technology at end-2011 (MW)	5
Figure 5: Group net debt to ebitda	6
Figure 6: Group ebitda (EURm)	6
Figure 7: Group capital expenditure (EURm)	7
Figure 8: Group common dividends (EURm)	7
Figure 9: Dividend and capital expenditure ratios (average over 2007–11)	7
Figure 10: Big 6 capacity investment, 2006-14 (GBP m)	8
Figure 11: Big 6 capacity investment, 2006-14 (MW)	8
Figure 12: Gross capacity additions since 2006 (MW)	9
Figure 13: Gross capacity addition mix since 2006 (%)	9

Figure 14: Big 6 renewable and thermal investment since 2006.....	9
Figure 15: Investment in capacity since 2006 normalised by volume of power sold in 2010 (GBPm/TWh)	10
Figure 16: Centrica key metrics.....	11
Figure 17: Centrica UK generation changes (MW)	12
Figure 18: Centrica UK generation investment (GBP m)	12
Figure 19: EDF Energy key metrics.....	13
Figure 20: EDF Energy UK generation changes (MW)	13
Figure 21: EDF Energy UK generation investment (GBP m)	13
Figure 22: E.ON UK key metrics	14
Figure 23: E.ON UK generation investment (MW).....	15
Figure 24: E.ON UK generation investment (GBP m).....	15
Figure 25: SSE key metrics.....	16
Figure 26: SSE UK generation investment (MW)	17
Figure 27: SSE UK generation investment (GBP m)	17
Figure 28: Scottish Power key metrics	17
Figure 29: Scottish Power UK generation investment (MW).....	18
Figure 30: Scottish Power UK generation investment (GBP m).....	18
Figure 31: RWE npower key metrics	19
Figure 32: RWE npower UK generation investment (MW).....	20
Figure 33: RWE npower UK generation investment (GBP m).....	20
Figure 34: Forecast renewable capacity to 2020 (GW).....	21
Figure 35: Forecast renewable generation (TWh/yr)	22

TABLE OF TABLES

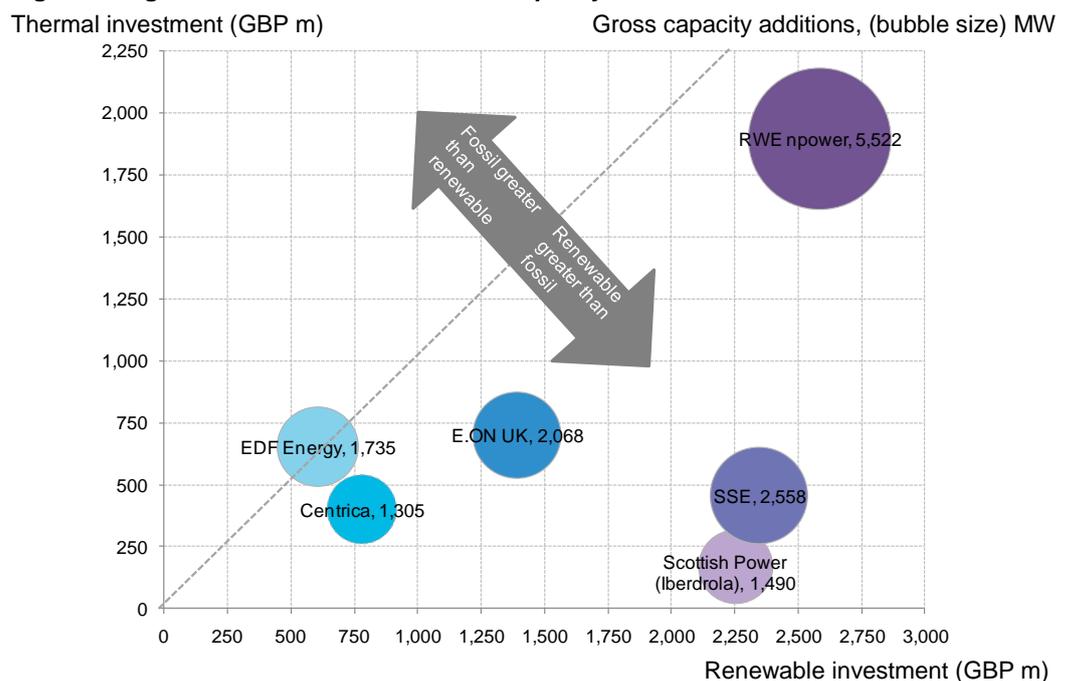
Table 1: Big 6 key metrics (Green shading are highest in each column, sand shading are lowest in each column)	2
Table 2: Big 6 market shares, 2010 (%)	4
Table 3: Top 10 generators by renewable installed capacity share, end-2011	4
Table 4: Reported financial results for the Big 6 UK business segments, 2007-11	6
Table 5: Reported capex for the Big 6 UK business segments, 2007-11	10

SECTION 1. SUMMARY

Energy prices in the UK are a political hot potato, with front pages pointing the finger at geopolitics and rising Asian demand, green energy policies and company profits. As a result, the Big 6 energy suppliers have come under heightened scrutiny, in particular over their profitability and spending on new capacity. This report analyses the Big 6's investment choices in the light of their financial situation and the implications for the UK government's aim to source 30% of electricity from renewables by 2020.

- Scottish Power, owned by Iberdrola, and SSE have made the largest commitment to renewable investment with over 80% of their new capacity investment going to the renewables sector since 2006. These investments sum to over GBP 2.25bn each over the period.
- EDF Energy and Centrica have made the smallest investments in fossil and renewable new capacity, each spending around GBP 1.25bn since 2006. It is unclear whether they are keeping their powder dry for nuclear new build or have simply not seen sufficiently attractive investment opportunities to persuade them to invest in more generation.
- Since 2006, RWE npower has spent almost GBP 4.5bn on thermal and renewable generation, with 60% of that investment going to renewables. This is almost twice the investment, and more than twice the capacity, of any other Big 6 company.
- E.ON UK, in common with RWE npower, has over 30% of its capacity due to retire by 2015 to comply with the LCPD. It has invested GBP 2.1bn on UK capacity since 2006, with two-thirds of that going to renewable capacity.
- Investment in new capacity is slowing as a recession-induced fall in power demand and new renewable and gas capacity have led to low prospective returns for fossil-fuel build. The financial crisis has made obtaining project finance a challenge, and for both renewable and fossil plants this has been exacerbated by the uncertainty around Electricity Market Reform.

Figure 1: Big 6 renewable and thermal new capacity investment since 2006



Source: Bloomberg New Energy Finance

Table 1 below shows the key metrics for the Big 6.

- Centrica has the lowest net debt/ebitda (earnings before interest, taxes, depreciation and amortisation), indicating a strong balance sheet. It has the highest dividend payout ratio and the lowest capex/operating income ratio, suggesting that it may see better value in returning capital to investors over capital investment compared with the other Big 6 utilities. Investments in recent years have been concentrated in upstream gas as a hedge for the downstream electricity and natural gas business.
- E.ON has the lowest operating margin at both UK and group level, the second highest net debt/ebitda and a significantly higher capex/operating income ratio at the group level than in the UK. Its lower-than-average renewable build, average thermal build and upcoming retirements imply it may see better opportunities for its limited capex budget outside the UK.
- EDF Energy has a high capex/operating income in the UK, together with a mid-ranking dividend payout ratio and net debt/ebitda. But it has built less than one-third of the capacity delivered by RWE npower. This illustrates the substantial capital expenditure required for the existing nuclear fleet and prospective nuclear new build. Expenditure on new nuclear capacity is not counted in our investment numbers as it has not yet reached final investment decision.
- RWE npower has a high capex/operating income in the UK, plus a mid-ranking dividend payout ratio and net debt/ebitda. It has built over 2.5 times the new capacity of any of its Big 6 peers, indicating a strategic push into the UK market.
- Iberdrola, the parent of Scottish Power, has been looking to invest its cash, as it has the highest capex/operating income at group level, highest operating margin, highest net debt/ebitda and lowest dividend payout ratio.
- SSE has the second highest gross renewable build with the second lowest capex/operating income ratio. It has the second highest dividend payout ratio, after Centrica, indicating the importance major UK investors, particularly pension funds, place on dividends.

Table 1: Big 6 key metrics (Green shading are highest in each column, sand shading are lowest in each column)

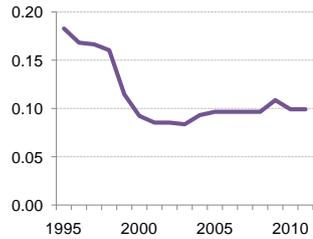
UK company	2007–11 operating margin		2007–11 dividend payout ratio	2011 net debt/ ebitda (x) (group)	2007–11 capex/ operating income (x)		Gross build since 2006	
	Group	UK			Group	UK	Renewable	Thermal
Centrica	9.7%	12.5%	74%	1.10	0.31	0.30	410	895
E.ON UK	6.3%	5.1%	56%	3.31	1.30	1.14	651	1,417
EDF Energy	13.3%	10.3%	58%	2.25	1.14	1.63	435	1,300
RWE npower	11.7%	5.1%	57%	2.16	1.00	1.64	1,822	3,700
Scottish Power (Iberdrola)	14.9%	11.8%	24%	3.80	1.31	Not available	1,490	0
SSE	6.6%	6.6%	63%	2.75	0.68	0.73	1,732	826
Big 6 mean	10.4%	8.6%	0.55	2.56	0.96	0.91	1,090	1,356

Source: Bloomberg New Energy Finance

SECTION 2. A SHORT HISTORY

The term ‘Big 6’ was coined to describe the major integrated power generation and distribution utilities in the UK, following EDF’s acquisition of British Energy in 2008. This takeover increased concentration in the industry to some extent, as shown by the Herfindahl index measure (Figure 2). But the index quickly fell back below 0.1 – the level at which a market is not considered concentrated – as EDF Energy disposed of the Eggborough power station as a condition of the takeover.

Figure 2: UK power generation Herfindahl Index



Source: Bloomberg New Energy Finance

The current investment trends of the Big 6 will play a crucial role in shaping the UK electricity system as it enters a period of renewal: operating generation and network assets are scheduled to retire in the next decade and the industry is under pressure to decarbonise while maintaining system reliability, energy security and end-user prices at palatable levels.

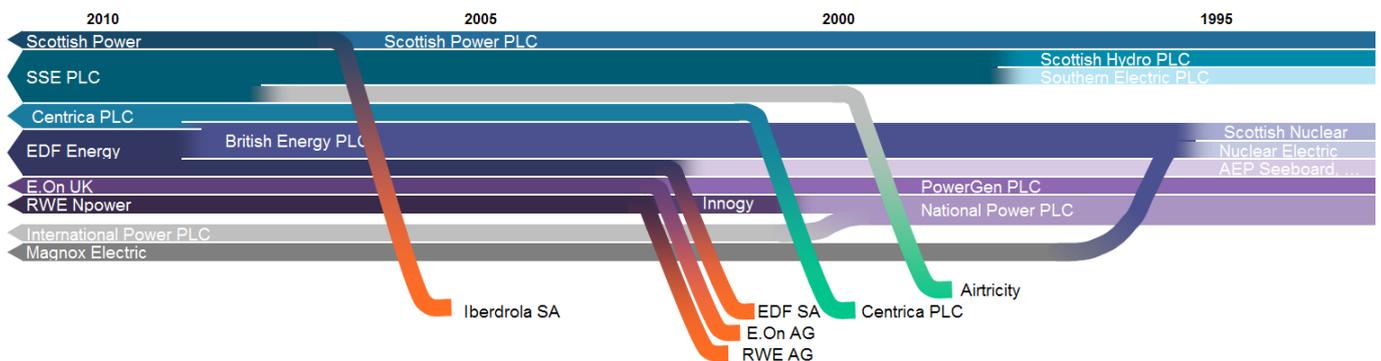
The UK energy regulator Ofgem has estimated that around GBP 200bn needs to be invested in new capacity, transmission and distribution up to 2020, while the government suggests that generation will require around GBP 110bn over that timescale. The Big 6 utilities have been, and will continue to be, important investors in achieving these aims.

The current power generation landscape began to emerge when EDF, E.ON and RWE entered the UK market over a short period in 2002. With the purchase of Scottish Power by Iberdrola, SSE PLC was left as the last remaining independent UK company that had emerged out of the privatisation of the industry in the early 1990s.

Centrica, the only other UK listed company in the Big 6, was itself a child of privatisation although this time of the gas industry. It entered the power generation business in 2001 and built its generation business rapidly through acquiring gas plants as well as constructing new combined-cycle gas plants and wind farms. The company grew its power interests dramatically by participating in the EDF takeover of British Energy in 2009.

Generation capacity in the UK will require GBP 110bn in investment through 2020.

Figure 3: Evolution of the UK power generation industry



Source: Bloomberg New Energy Finance. Note: Many companies, takeovers and mergers omitted for clarity.

The UK energy industry was originally privatised as separate generation, transmission and local distribution businesses. Over time this vertical separation has broken down, at the same time as the generation business has fragmented, such that today the Big 6 customer businesses are also the Big 6 generation businesses. The Big 6 have a more dominant position in the customer market than in the generation market (Table 2). However, they have a smaller share of the emerging renewable energy market thanks to new entrants (Table 3).

Table 2: Big 6 market shares, 2010 (%)

Company	Electricity generation	Domestic electricity sales	Non-domestic electricity sales	Total electricity sales	Generation business long/short (pp)
EDF Energy	18.9	13.3	22.9	19.4	-0.5
RWE npower	9.9	13.5	16.1	15.2	-5.2
Centrica	9.9	21.8	9.1	13.8	-3.9
E.ON UK	9.1	17.7	13.0	14.7	-5.6
SSE	9.0	19.0	16.3	17.3	-8.3
Scottish Power	8.2	11.3	4.6	7.0	1.2
Big 6 total	65.0	96.6	82.1	87.4	-22.3

Source: Ofgem, Department of Energy and Climate Change

The latest stage in the evolution of the UK power market has been a gradual but accelerating move to renewable energy driven by policy support from the UK government. The incumbents have been faced with numerous competitors in renewable generation, some of which they have bought and many of which they have worked with. Despite this, the Big 6 have only a 47% share of UK renewable capacity compared with 70% of all generation capacity. Table 3 shows the renewable installed capacity of the top 10 at the end of 2011.

The Big 6 have a 70% share of all generation capacity but only a 47% share of renewable capacity.

Table 3: Top 10 generators by renewable installed capacity share, end-2011

Rank (relative to overall rank)	Company	Capacity (MW)	Capacity share (%)
1 (+14)	Small Solar PV Owners	1,172	14.1
2 (+1)	RWE npower	1,135	13.6
3 (+2)	Scottish Power (Iberdrola)	948	11.4
4 (0)	SSE	734	8.8
5 (+15)	Vattenfall	590	7.1
6 (-5)	E.ON UK	454	5.5
7 (+19)	Miscellaneous Biomass Owners	343	4.1
8 (+19)	Fred Olsen Renewables	316	3.8
9 (+19)	Falck Renewables	275	3.3
10 (-8)	EDF Energy	268	3.2
12 (-6)	Centrica	191	2.3

Source: Bloomberg New Energy Finance

If we rank companies by zero-carbon capacity Centrica and EDF Energy move to the top of the table. This change, from their relatively low positions in the renewable ranking, is due to their ownership of the AGR Nuclear fleet.

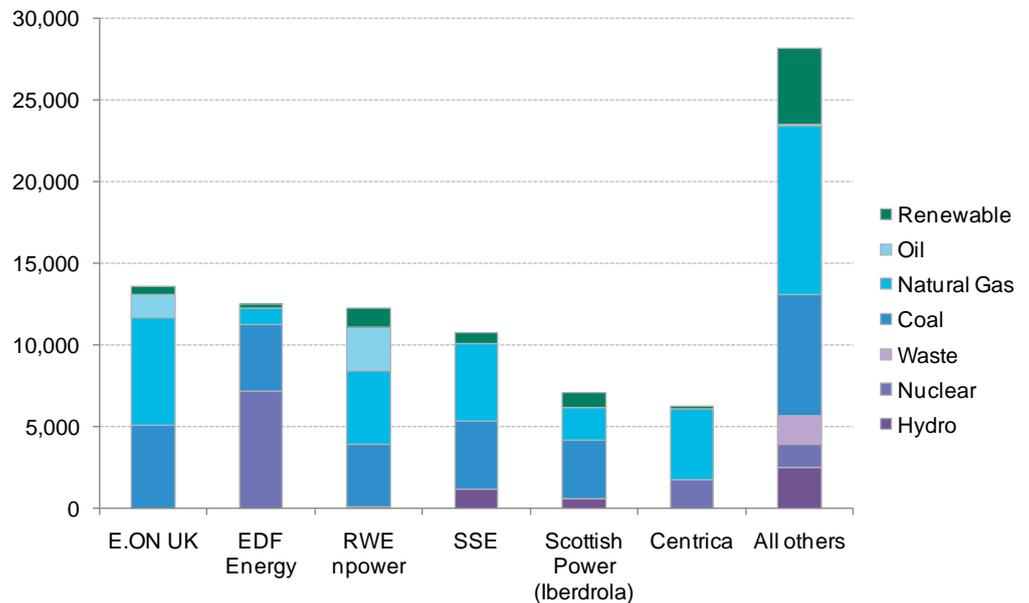
SECTION 3. THE BIG 6 TODAY

New renewable generation, the LCPD, depressed demand and depressed margins will transform the sector by 2020.

The Big 6 today face a large number of challenges: renewable new entrants, whose capacity comes in at the bottom of the generation stack, and reduces the run hours for many of their older and less efficient plants; the LCPD is forcing them to retire 12.5GW of capacity by the end of 2015; demand is depressed due to the financial crisis, which has led to a surplus of capacity in the UK and depressed operating margins; and some of their parent groups are tackling weakened balance sheets.

These challenges will transform the UK electricity sector by 2020. Figure 4 shows the current generation mix by company. As noted above, the Big 6 have a lower share of renewable capacity than the other players in the market. EDF Energy and Centrica both have significant nuclear capacity but these plants are scheduled to retire starting in the late 2010s, although life extensions are likely.

Figure 4: Generation fleet by technology at end-2011 (MW)



Source: Bloomberg New Energy Finance

3.1. A few definitions

This section analyses the balance sheets and income of the Big 6 using a number of standard financial metrics:

- **Revenue:** the money that the company brings in from its operations.
- **Operating income:** the money that the company makes from its ongoing operations. It is also often synonymous with operating profit and earnings before interest and taxes (EBIT).
- **Operating margin:** the operating income divided by the revenue. This measures how much company revenue is left after paying its operating costs.
- **Net debt:** this measure of financial strength is the debt of the company less its cash.
- **Capex:** the amount the company spends on investing in capital items, such as power stations, computer systems, buildings and transmission networks.
- **Capex/operating income:** a measure of how much of the money left after paying operating costs is used to invest in the future. This is not limited to be less than 100% as the company can also borrow to fund capex.

- *Ebitda* (earnings before interest tax and depreciation): a measure of how much money a company has left after paying operating costs. It is the operating income plus depreciation.
- *Dividends*: the money a company pays out to its owners.
- *Dividend payout ratio*: this is the ratio of dividends to operating income and is a measure of how much of the operating profit is returned to shareholders as dividends.

3.2. The financial health of the industry

The sizes of the Big 6 in the UK vary widely, with reported revenues over the last five years differing by a factor of three from the largest to the smallest (Table 4). These figures reflect reported results by company for their UK geographical entities over the last five financial years. They do not include the figures for British Energy and Scottish Power prior to their takeovers by EDF and Centrica, and Iberdrola respectively.

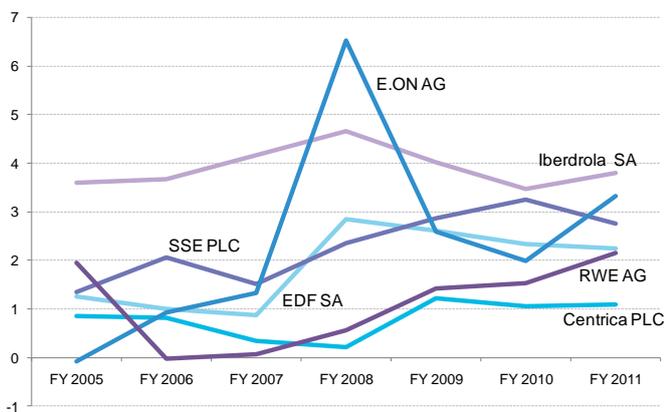
Table 4: Reported financial results for the Big 6 UK business segments, 2007-11

Company	For five years ending	Total revenue (GBP m)	Total operating income (GBP m)	Total capex (GBP m)	Operating margin	Capex/ operating income
Centrica	31 Dec 2011	75,811	9,499	2,897	12.5%	30.5%
E.ON UK	31 Dec 2011	63,188	3,194	3,644	5.1%	114.1%
EDF Energy	31 Dec 2011	38,912	4,020	6,559	10.3%	163.2%
RWE npower	31 Dec 2011	33,309	1,685	2,761	5.1%	163.9%
Scottish Power	31 Dec 2010	24,484	2,820	Not available	11.8%	Not available
SSE	31 Mar 2011	100,886	6,644	4,851	6.6%	73.0%

Source: Bloomberg. Note: Scottish Power results include only those stated by Iberdrola and cover four years. EDF Energy and Centrica do not include British Energy prior to the takeover. E.ON UK, RWE npower, EDF Energy and Scottish Power (Iberdrola) include varying amounts of trading and optimisation and upstream/midstream gas in the UK numbers. This makes direct comparison of the absolute numbers impossible.

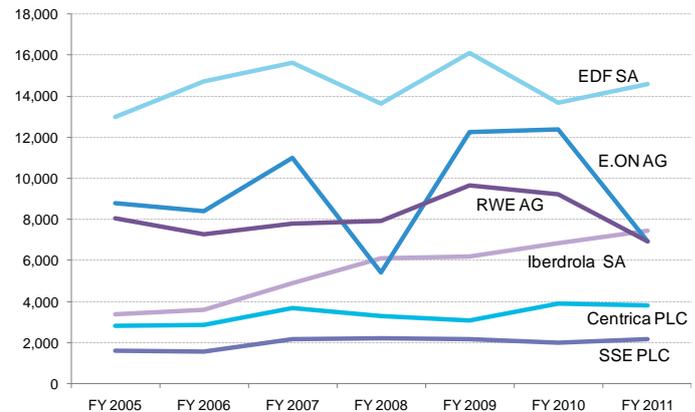
Figure 5 shows net debt as a multiple of ebitda for the parent companies of the Big 6. The European utility industry has seen debt rise while earnings have remained flat (Figure 6). Several factors are behind this trend, including post-Fukushima shutdowns in the German nuclear fleet; depressed demand in the financial crisis and the corresponding depressed margins; and the pain many European utilities have faced in paying oil-linked contract prices for natural gas that have been consistently higher than the spot market price. These factors have combined to cause an increase in the leverage of many of the major European utilities.

Figure 5: Group net debt to ebitda



Source: Bloomberg

Figure 6: Group ebitda (EURm)



The utilities are taking aggressive action to reduce these debts, including disposals of assets and major cost reduction programmes. Nonetheless, there is inevitable pressure on capital expenditure. The Big 6's parent companies largely maintained, or increased, their capital expenditure through the financial crisis (Figure 7). But this has now started to fall as projects committed before the crisis move to completion and the consequent reduction in demand has

lessened the need for new utility projects. The groups sought to maintain their dividend payouts through the economic downturn but 2011 saw payouts fall dramatically at EDF, E.ON and RWE (Figure 8). The two remaining UK listed utilities have, however, been able to maintain steady growth in their dividends.

Figure 7: Group capital expenditure (EURm)

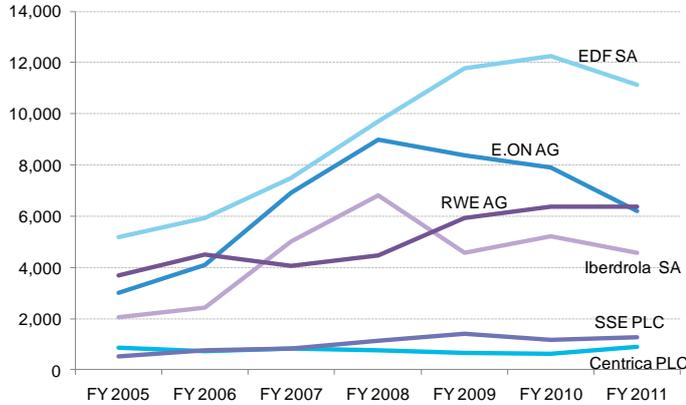
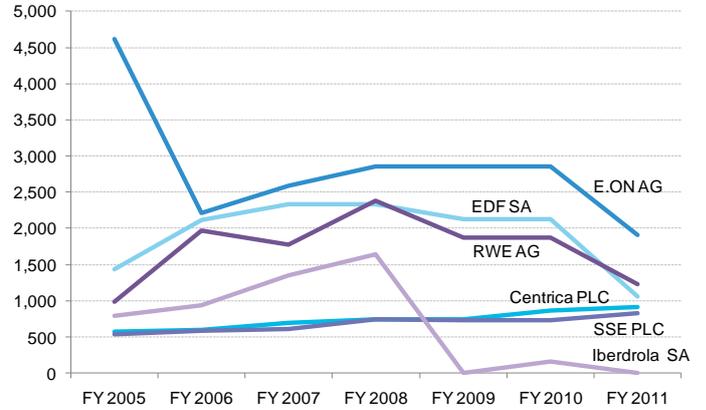


Figure 8: Group common dividends (EURm)

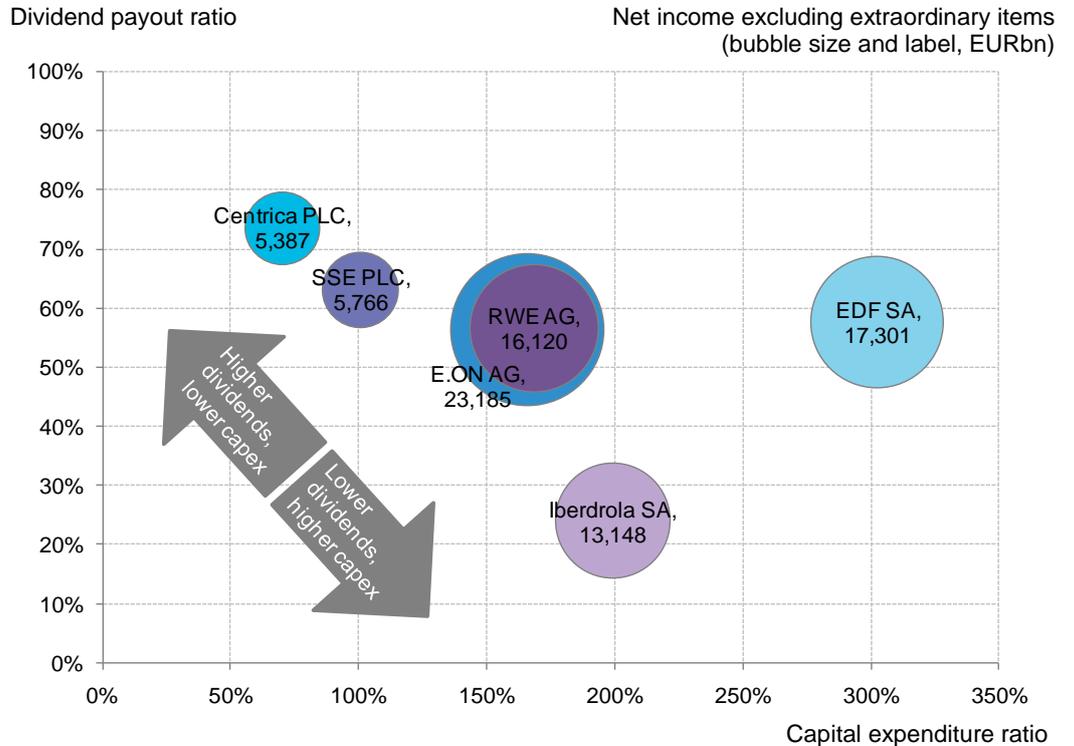


Source: Bloomberg

Spending on dividends and investment are not limited by cash flow; the companies can increase leverage and indeed did so during the financial crisis. However, in the long run companies must decide on the balance between investment and dividends that will deliver the best value to shareholders. Figure 9 illustrates these decisions by showing dividend payout ratio against capital expenditure ratio.

Companies must decide on the balance between investment and dividends that will deliver the best value to shareholders.

Figure 9: Dividend and capital expenditure ratios (average over 2007–11)



Source: Bloomberg. Note: the ratios are defined as: sum of common dividends/ sum of net income excluding extraordinary items and sum of capital expenditure/sum of net income excluding extraordinary items.

SECTION 4. BIG 6 CAPACITY INVESTMENTS

This section reviews the investment actions of the Big 6 since 2006 to understand their strategies and the impact on the UK generation landscape.

4.1. Methodology

The Big 6 have constructed 14GW of new capacity at a cost of over GBP 13bn since 2006.

The first step was to identify every new build project, every major repowering or upgrade and every asset purchase or disposal undertaken by the Big 6, and their predecessors, since 2005. This amounted to some 153 individual records. For each record, the Bloomberg New Energy Finance database, Bloomberg financial records and other public sources were used to establish the cost of the project/transaction. We were able to establish verified values for some 60% of the projects. For the remainder, we estimated the value using costs of similar projects being undertaken at similar times.

The estimates do not cover the various other capital investments undertaken by the generation businesses of the Big 6 in the UK, for example capitalised maintenance work, computer systems, office buildings, distribution networks, smart meters, etc. For this reason, the capital expenditure estimates only account for around 50% of the reported UK company figures.

To estimate the distribution of the capital expenditure over time, we made assumptions for project duration and distributed the cost evenly over that time. The analysis did not include projects that are not yet under construction, meaning that the estimates do not cover all of the capital expenditures needed to reach final investment decision.

4.2. Big 6 and big investments

Ofgem estimated in 2009 that GBP 27bn would need to be spent on new generation capacity by 2015 to meet its Green Transition scenario.¹ By comparison, the Big 6 will have collectively invested over GBP 13bn in new capacity since 2006, once all of the currently under construction projects are completed. As a result, they will have constructed 14GW of new generation capacity, of which over half is gas-fired combined-cycle plants with the remainder made up largely of wind. In addition to new capacity, the Big 6 have collectively fitted flue gas desulphurisation equipment to 10GW of coal-fired plant, purchased a further 500MW of wind farms and undertaken work on biomass cofiring and repowering of the coal fleet.

Figure 10: Big 6 capacity investment, 2006-14 (GBP m)

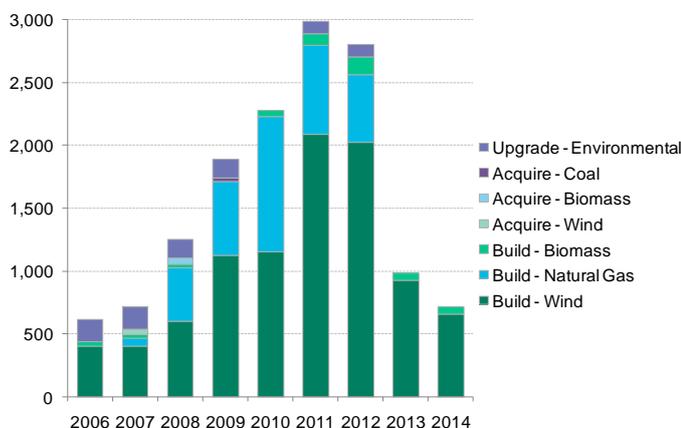
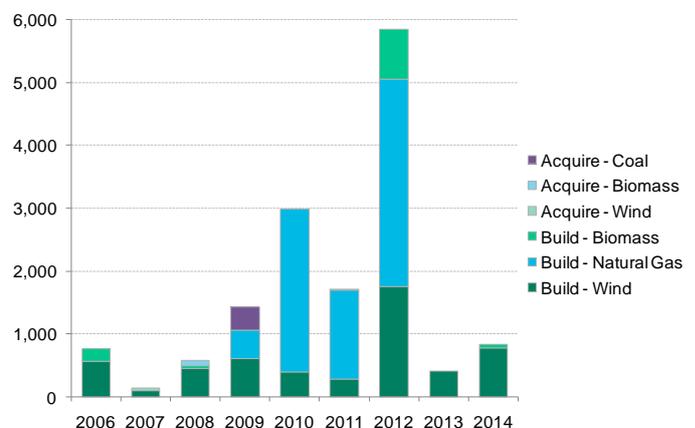


Figure 11: Big 6 capacity investment, 2006-14 (MW)



Source: Bloomberg New Energy Finance. Note: MW capacity excludes repowering and retrofits. Includes all projects under construction at start 2012.

1 Ofgem, Project discovery energy market scenarios, 9 October 2009

All of the Big 6 have invested in both renewable and thermal capacity in the last five years but the relative proportions of renewables versus fossil-fuel varied considerably (Figure 12). At one end of the range is Scottish Power with 100% new renewable capacity, while EDF Energy, Centrica, E.ON UK and RWE npower have added more than two-thirds of their capacity from natural gas. The investment mix of non-Big 6 players ('All others') has been more renewables-heavy than every member of the Big 6, with the exception of Scottish Power.

Figure 12: Gross capacity additions since 2006 (MW)

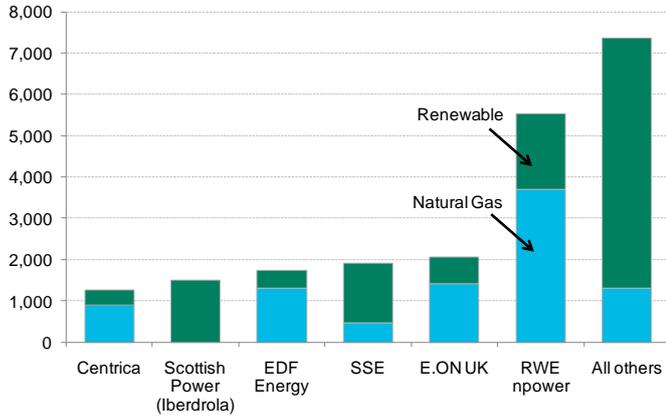
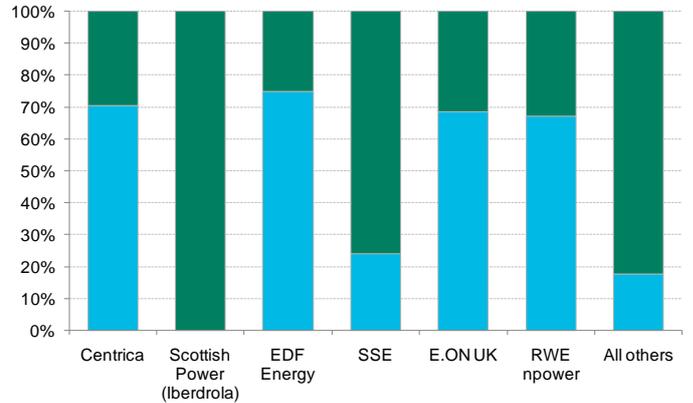


Figure 13: Gross capacity addition mix since 2006 (%)



Source: Bloomberg New Energy Finance. Note: Includes capacity under construction at start 2012. Excludes acquisitions and disposals

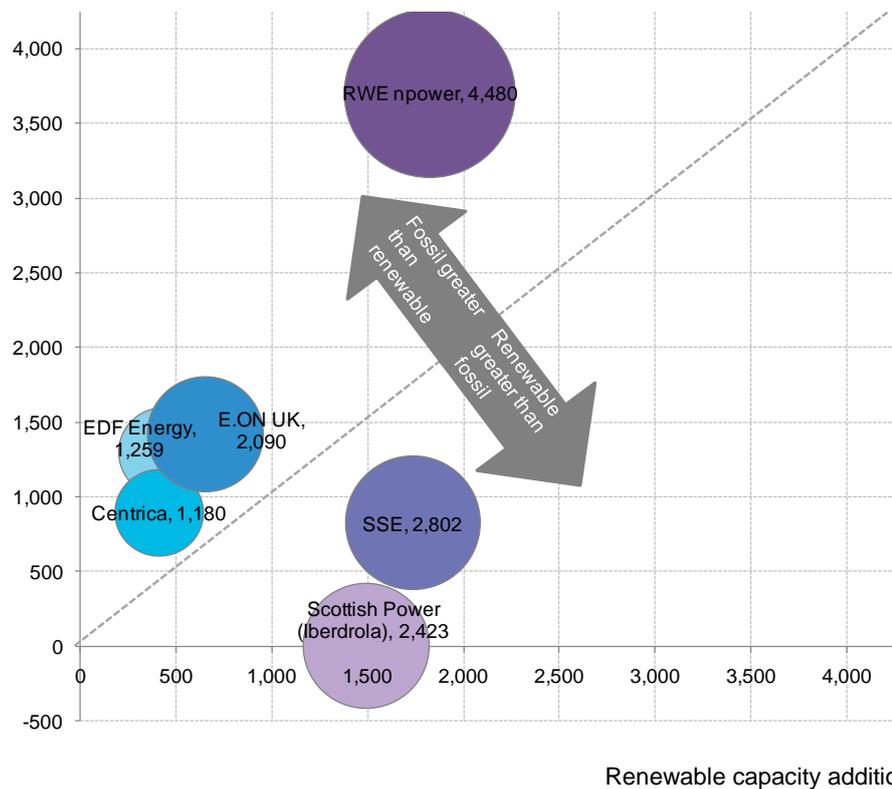
Figure 14 plots renewable capacity additions against thermal capacity additions, highlighting three investment strategies: the high renewable investors of Scottish Power and SSE; the cautious renewable investors of Centrica, EDF Energy and E.ON UK; and RWE npower as the only big spender in both categories.

Figure 14: Big 6 renewable and thermal investment since 2006

Thermal capacity additions (MW)

Gross investment, (bubble size) GBP m

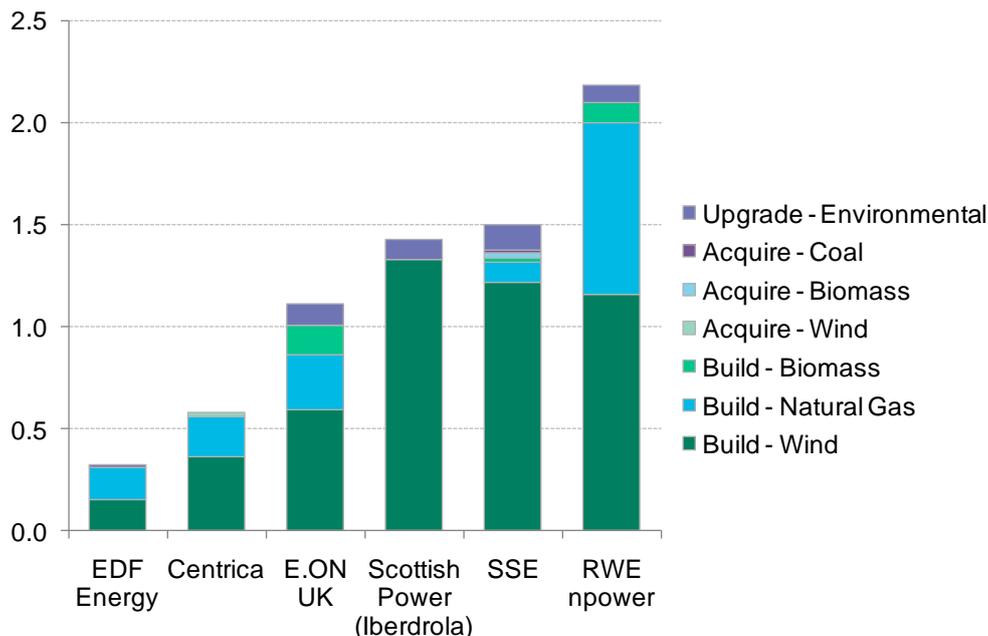
We identified three strategies among the Big 6: cautious renewable investors, high renewable investors and big spender.



Source: Bloomberg New Energy Finance

Figure 15 shows total capacity investment spending divided by power sold by each company in 2010. This direct comparison of the level of investment against the size of the wholesale market confirms our three strategic groupings. The cautious renewable investors – EDF Energy, Centrica and E.ON UK – have also spent the least in relation to the size of their businesses. The high renewable investors – SSE and Scottish Power – have also invested more than average in relation to the size of their company. Lastly the big spender – RWE npower – is also the biggest spender in relation to its existing business volume.

Figure 15: Investment in capacity since 2006 normalised by volume of power sold in 2010 (GBPm/TWh)



Source: Bloomberg New Energy Finance

Table 5 shows the reported UK capex for the last five years for the Big 6. This data is for the entire UK operations of each company whereas the capacity investment data only covers new capacity and environmental retrofits. There are significant differences in the data. EDF Energy has the highest total reported capital investment over the period but the second lowest new capacity investment. This discrepancy is partly driven by its substantial nuclear new build capex to date, which is not recorded in our numbers.

RWE npower has the lowest total reported capital expenditure but the highest new capacity investment. This is because renewable investment by RWE Group is not broken down by country and so is not included in our UK numbers below. These differences highlight the difficulty of using top-down reported numbers and the value of looking at specific projects to understand the activity of the Big 6.

Table 5: Reported capex for the Big 6 UK business segments, 2007-11

Company	For five years ending	Total capex (GBP m)	Operating margin	Capex/ operating Income
EDF Energy	31 Dec 2011	6,559	10.3%	163.2%
SSE	31 Mar 2011	4,851	6.6%	73.0%
E.ON UK	31 Dec 2011	3,644	5.1%	114.1%
Centrica	31 Dec 2011	2,897	12.5%	30.5%
RWE npower	31 Dec 2011	2,761	5.1%	163.9%
Scottish Power	31 Dec 2010	Not available.	11.8%	Not available.

Source: Bloomberg Note: EDF Energy and Centrica do not include British Energy prior to the takeover.

SECTION 5. COMPANY PROFILES

5.1. The cautious renewable investors

Centrica

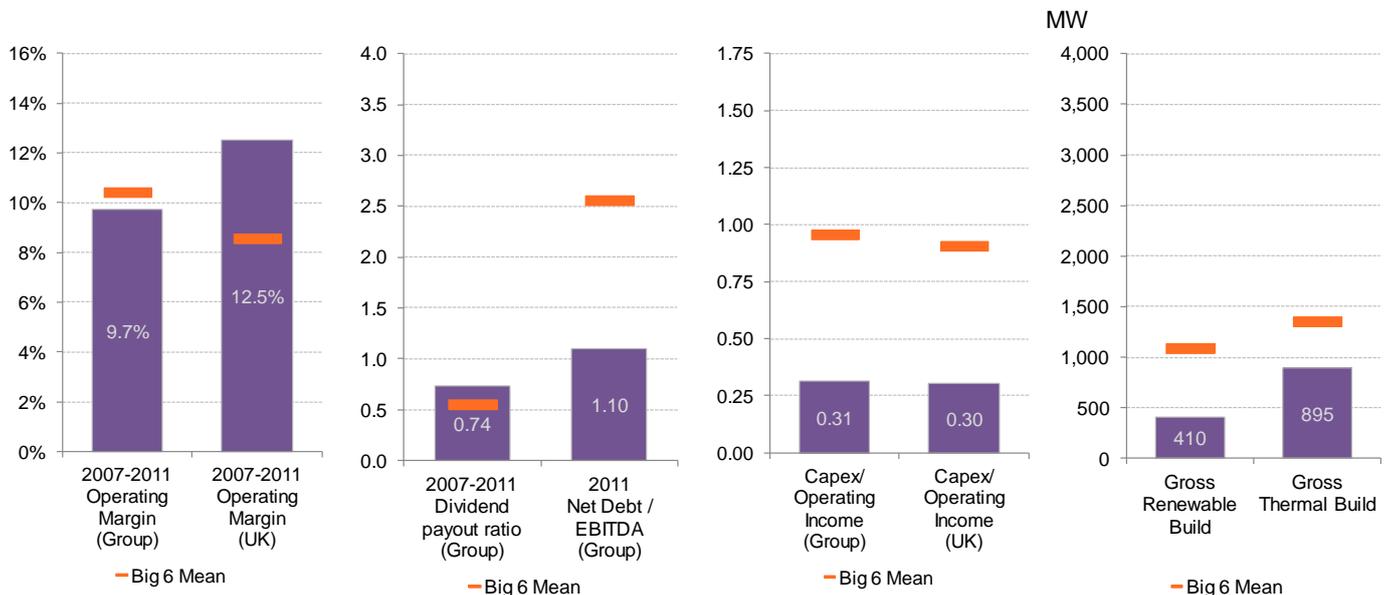
Centrica has made several investments in offshore wind, taking the construction risk in developing the Lynn and Inner Dowsing wind farm before selling a 50% equity share to TCW, a large US based institutional fund manager, and having a 50/50 partnership with Dong in the Lincs wind farm coming online in 2012. Centrica also has a solid position in the next wave of offshore wind development with the 580MW Race Bank moving to final investment decision in late 2012 and a pipeline of almost 5GW at Docking Shoal and in the Irish Sea, also a 50/50 venture with Dong. Should the final investment decision for the Round 3 projects get the go-ahead in the planned 2015/2016 timeframe then this combined development could take Centrica to 1GW of renewable capacity by 2020, although for comparison Scottish Power and SSE will reach this milestone by the end of 2012 and RWE npower has reached it already, largely due to their 750MW Tilbury conversion.

The changes that Centrica has made to their UK generation fleet since 2005 are dominated by two major transactions: the completion of Langage CCGT in 2010 and the purchase of the remaining 40% of the South Humber CCGT they did not already own. The level of ongoing investment in wind reflects the very large capital requirements of offshore wind in relation to installed capacity; Centrica will have invested almost GBP 1bn in 436MW of wind, while over the same period investing GBP 550m in 1,400MW of Natural Gas capacity. Centrica has no announced plans for further fossil fuelled plant build.

Centrica is on the hook for GBP 200m of the Hinkley Point C pre-FID costs and an estimated GBP 2bn of the total project cost. Despite this spending they have the lowest investment in the UK power sector of any of the Big 6. They have the lowest gross build and the lowest capex/operating income ratio but despite, or perhaps because of, this investment caution they have been able to maintain the highest operating margin. They also have the highest dividend payout ratio of the Big 6 suggesting that they take a poor view of the available investment opportunities and choose instead to invest in their upstream business and to return their money to investors.

“... can we get a satisfactory return out of new nuclear and that is, I think, the biggest question.” – Sam Laidlaw, CEO, Centrica

Figure 16: Centrica key metrics



Source: Bloomberg New Energy Finance

In common with SSE the capex/operating income ratio is depressed relative to their non-UK based peers due to the reporting conventions of the non-UK based companies, who choose to allocate much of their wholesale power trading revenues outside of their UK units. The capex is treated in the same way, but capex in trading units is negligible so ensuring that most of the UK related capex is reported while much of the trading income is not, leading to a lower ratio for the UK based companies.

Figure 17: Centrica UK generation changes (MW)

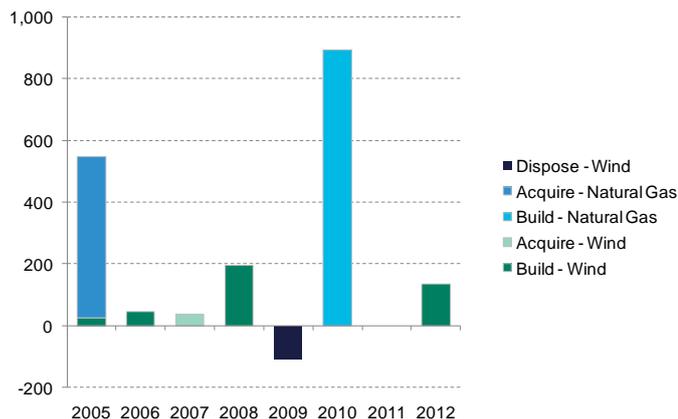
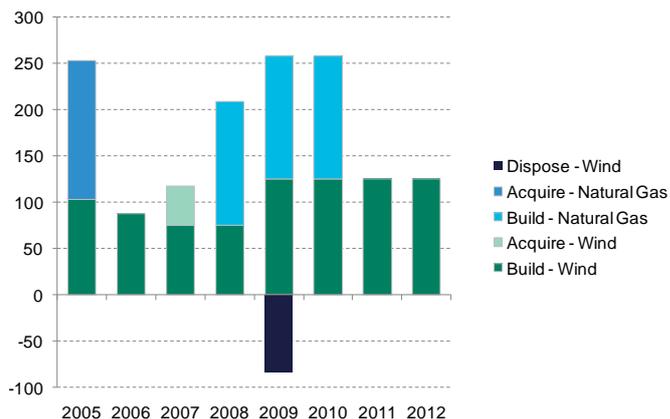


Figure 18: Centrica UK generation investment (GBP m)



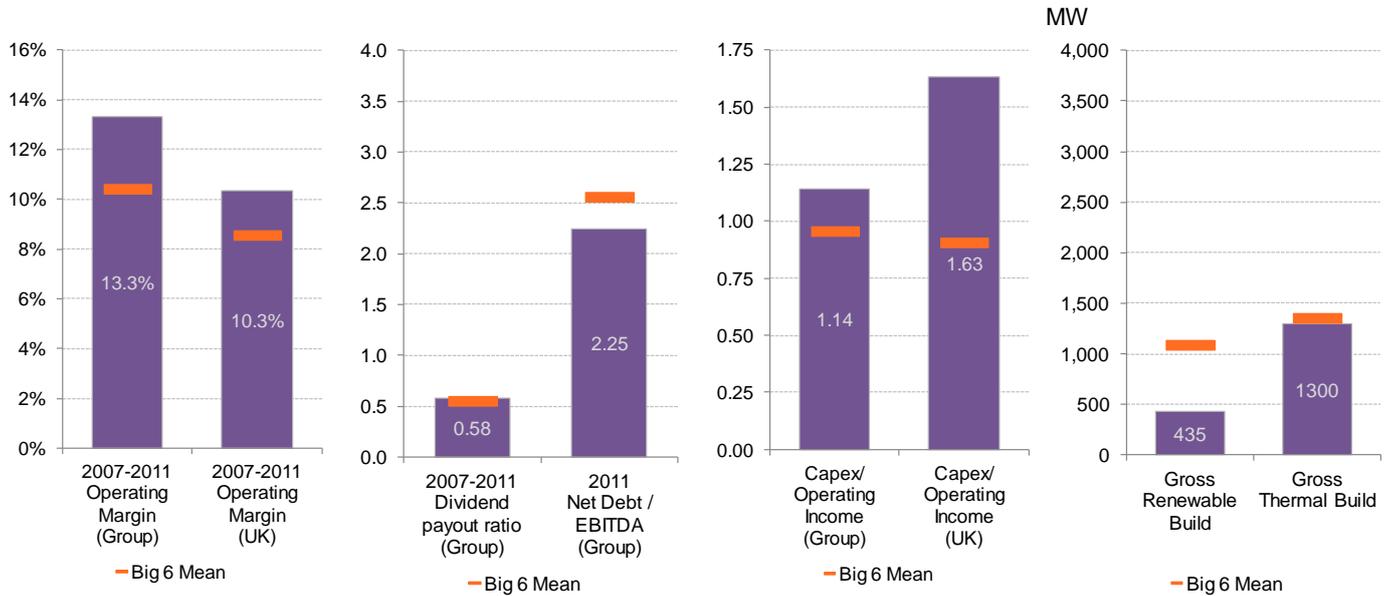
Source: Bloomberg New Energy Finance

EDF Energy

Of all the Big 6, EDF Energy has the lowest recorded investment in new capacity as a proportion of generation and the smallest replacement ratio of their existing fleet. The EDF Group, however, has a higher capital expenditure ratio over the last five years than any of the other Big 6 groups (Figure 9) and reported capital expenditure in the UK has been high. This apparent paradox is a result of the preparations for nuclear new build in the UK, particularly the GBP 10bn Hinkley Point C plant, and the relatively high investments needed for ongoing maintenance at nuclear facilities. EDF maintenance costs account for around one-third of its spending and the regulated utility business accounts for another one-third.

Hinkley Point C is the most advanced of the potential UK nuclear developments, with site work contracts announced. EDF Energy says that a final decision will be made before end-2012. The partnership has already made significant investments in this programme: EDF Energy has said it will spend up to GBP 1bn in pre-decision costs and this number matches up with the GBP 200m quoted by Centrica for its exposure. These large costs do not show up in our bottom-up investment numbers, as the final investment decision has not yet been made, but they do explain why the UK capex/operating income ratio remains above the average of the Big 6 despite gross build being below average.

Figure 19: EDF Energy key metrics

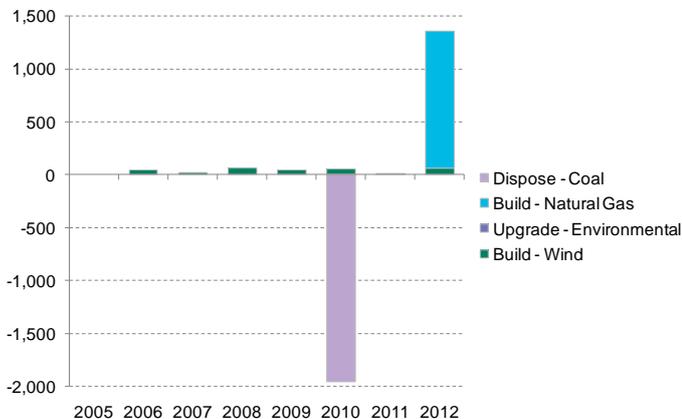


Source: Bloomberg New Energy Finance

EDF Energy has stayed largely on the sidelines of the rapid growth in renewable generation in the UK and we do not expect this to change in the medium term. Its gross renewable build is well below average for the Big 6 and it has a smaller renewable pipeline than any other big energy supplier in the UK, despite the upcoming Fallago Rigg and Teesside wind farms. It has said that it sees more attractive prospects for renewables in France, should it win the French offshore round, and in North America. In addition, almost all of EDF Energy's retail sales are covered by its own generation. Thus, we do not anticipate large new renewable investment in the UK from EDF Energy in the medium term.

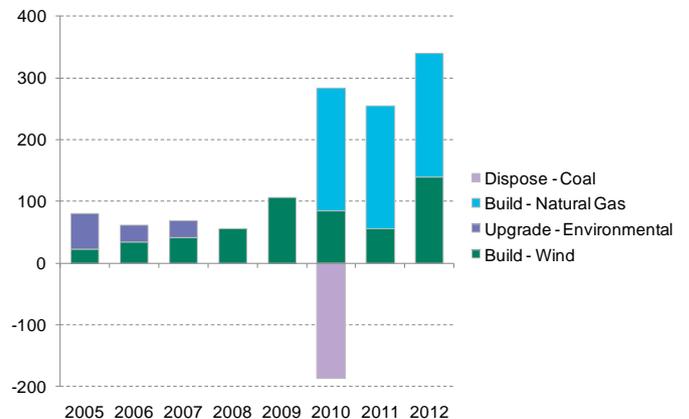
Its two coal plants, at Cottam and West Burton, have opted in to the LCPD, meaning that EDF Energy does not face the imminent loss of capacity facing four of the Big 6. It has, however, had to invest heavily in flue gas desulphurisation (FGD) equipment to meet emission standards. The large new West Burton CCGT facility, which has dominated its new capacity investment for the last few years, will double the gas-fired capacity owned by EDF Energy.

Figure 20: EDF Energy UK generation changes (MW)



Source: Bloomberg New Energy Finance

Figure 21: EDF Energy UK generation investment (GBP m)

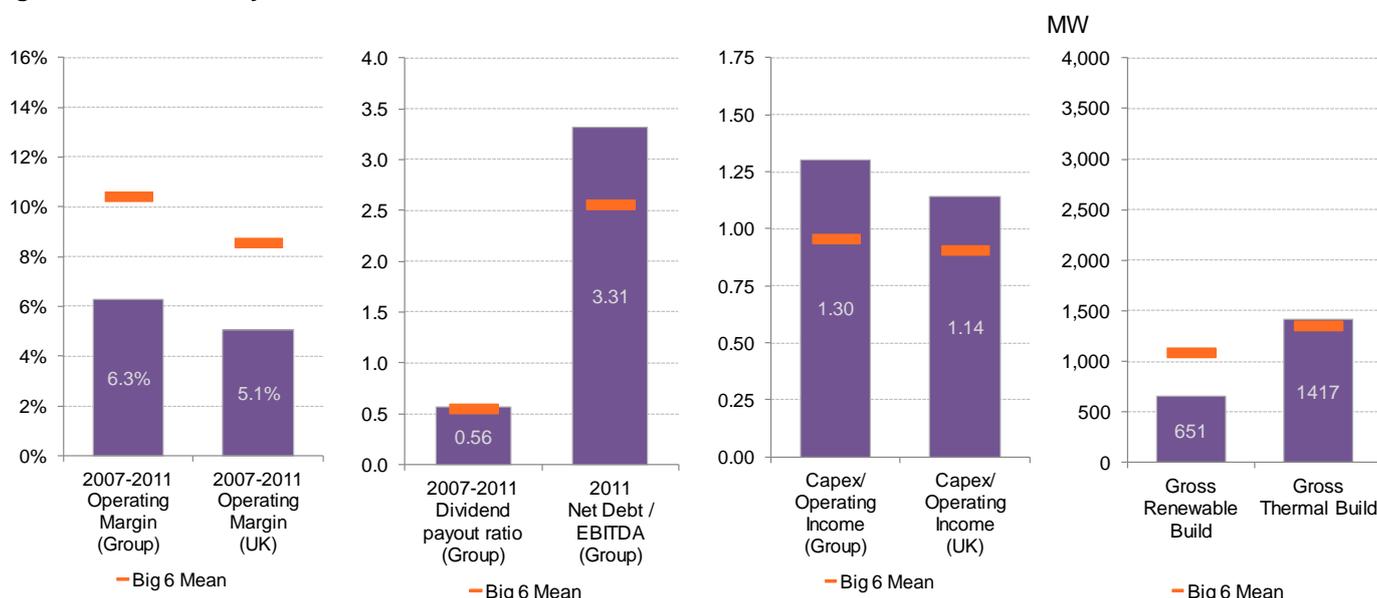


E.ON UK

E.ON UK have the largest installed capacity of any of the Big 6 but they will lose almost one third of this capacity, around 4.5GW, by the end of 2015 due to the LCPD opt-outs. Unlike RWE npower, however, they have not made the investments needed to replace this capacity.

E.ON UK has shelved attempts to replace the existing Kingsnorth coal fired plant with 2 new 800MW units and the current opted-out plant will close in March 2013. The Ironbridge plant will also have to close soon unless plans for a biomass conversion come to fruition. This will leave E.ON UK with only the 2GW Ratcliffe coal plant, on which they are currently spending several hundred million pounds to meet LCPD emission standards and improve plant efficiency. E.ON UK also own one of the three oil-fired peaking plants in the UK that must close by 2015. The loss of the Grain oil unit will be more than mitigated by the 2012 completion of the gas fired 1,400MW Grain combined cycle CHP facility

Figure 22: E.ON UK key metrics



Source: Bloomberg New Energy Finance

The final investment decision for the 2,620MW Drakelow plant has been delayed in the face of poor spark spreads, that is to say low profitability for gas fired generation. Whether or not this project will be resurrected remains to be seen.

The investments made by E.ON UK in renewable generation, in common with most of the other Big 6, have been focussed largely on wind but the investment programme has been more in-line with the approach of EDF Energy and Centrica than the aggressive investments of Scottish Power and SSE. E.ON UK has built well below the Big 6 average renewable capacity and around the average level of thermal capacity.

Major renewable investments to-date included the 180MW Robin Rigg project and 60MW Scroby Sands offshore project. The pipeline under-construction includes the mid-size Camster, Rosehall Woods and Tween Bridge Moor and a minority 30% stake in the Dong-led London Array – the largest offshore wind project currently under construction in the UK. E.ON UK also has a pipeline of offshore wind projects at the 700MW Rampion, which is in the development phase, and the 230MW Humber Gateway project.

“... we will rotate capital in our described growth areas, mostly outside Europe as well as in renewables.” Dr. Johannes Teyssen, CEO, E.ON

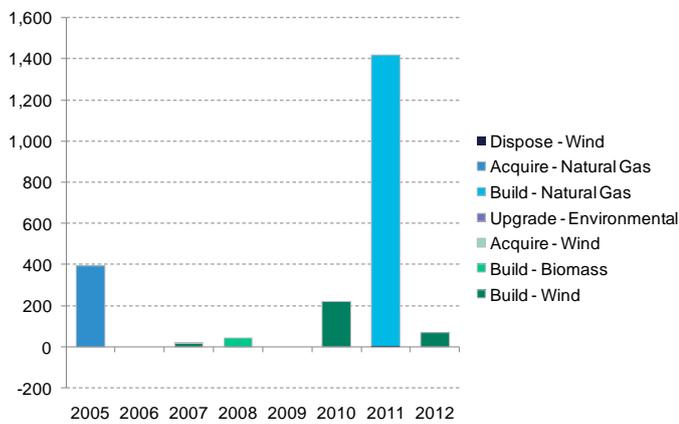
E.ON UK has also made some inroads into small Biomass developments with close to 100MW of small Biomass plant currently under development.

Horizon Nuclear, the 50/50 joint venture with RWE to build new nuclear power plants in the UK, starting with sites at Wylfa and Oldbury, is still making progress with investment in land completing in 2011 and planning and engineering work still in progress. Both E.ON and RWE have stated that they intend to exit from this venture and are looking for buyers for their stakes.

E.ON UK has been investing a lot of money and this shows up in the capex/operating income measures although the higher than average number here is also driven by lower than average operating margins. E.ON UK is in the middle of the Big 6 pack in terms of investment/volume of power and in cash terms but this spending has not pushed them up the Big 6 rankings in terms of capacity installed. The reason for this is that the money has been going to the Ratcliffe project described above, which shows up in our investment total but not in our capacity numbers as it is a refit project, and also the London Array project, the 30% stake in which gives E.ON UK the second largest offshore wind build of the Big 6 behind RWE npower. Offshore wind has a higher capital expenditure requirement than onshore wind, with our analysis showing average capital costs of GBP 3.25m/MW, more than 2.5 times the average cost of onshore wind. This cost advantage is offset to some extent by the higher load factors, availability of many more resource locations and reduced local opposition characteristic of offshore wind projects.

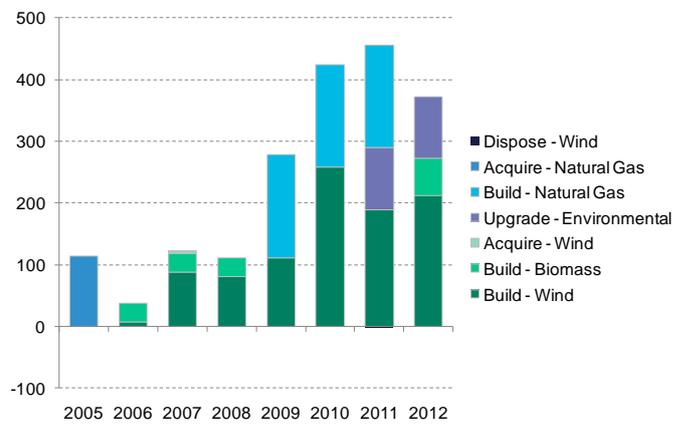
E.ON UK has a stated strategy to release capital from Europe and diversify into growth markets. They have taken action to achieve this, notably several European divestments and a major investment in Brazil. Despite this they are also committed to major utility scale projects in Europe and with that commitment should expect to see the go-ahead for more offshore wind in the future. E.ON UK will, however, have to pick up the pace of their capacity build if they are to keep up with the leaders.

Figure 23: E.ON UK generation investment (MW)



Source: Bloomberg New Energy Finance

Figure 24: E.ON UK generation investment (GBP m)



5.2. The high renewable investors

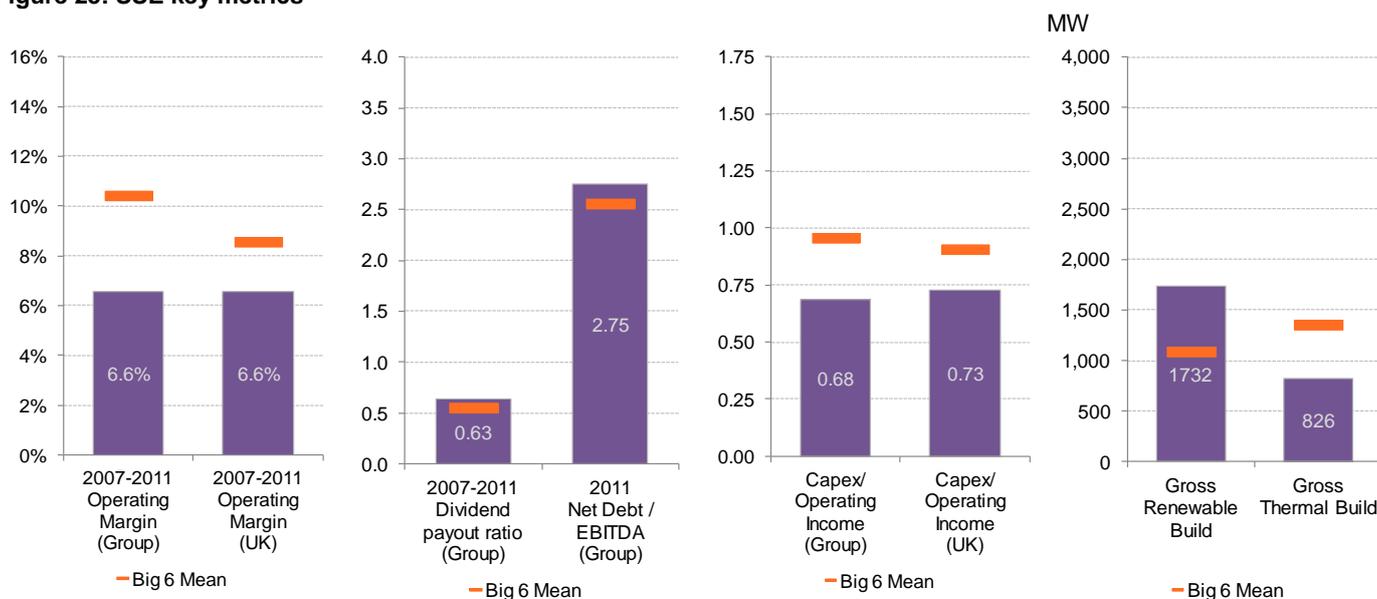
Scottish Power, owned by Iberdrola of Spain since 2007, and SSE have both been characterised by a strong bias toward investment in wind power since 2005. Both companies individually have more onshore wind capacity than the other four of the Big 6 combined.

Scottish Power, uniquely among the Big 6, has built only renewable capacity over this period. SSE is not far behind, having delivered two-thirds of its new installed capacity in the form of renewable power. None of the other Big 6 exceeded one-third of their new capacity in renewables.

SSE

SSE has a large generation fleet and is not far behind EDF Energy, RWE npower and E.ON UK in total capacity. The 10GW fossil fuelled fleet is split roughly evenly between natural gas and coal and has been augmented over the last five years with a 50% share in the new-build Marchwood power plant and the purchase of the Uskmouth coal plant. SSE has a pipeline of new and extended combined-cycle natural gas plants at Baglan Bay and on the existing sites at Keadby and Barking. However, like E.ON UK's Drakelow plant, the decision to invest in Baglan has been delayed by several years in the face of low demand and poor returns.

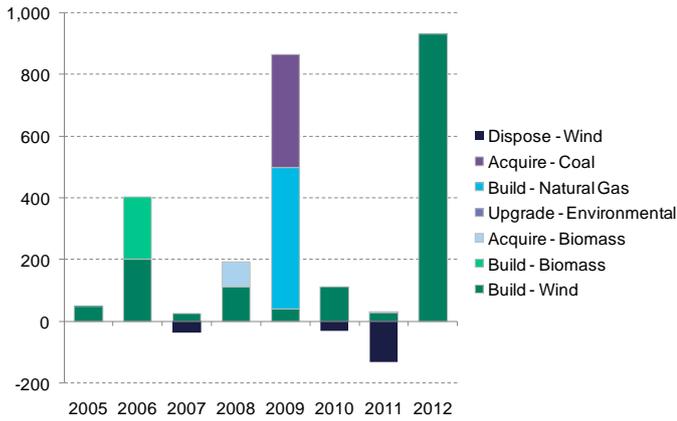
Figure 25: SSE key metrics



Source: Bloomberg New Energy Finance

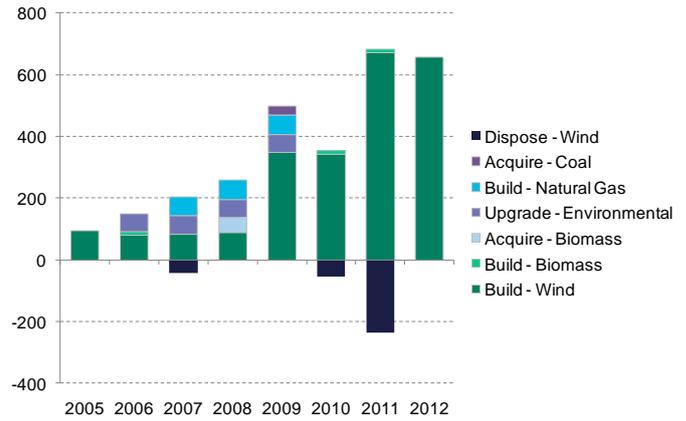
While bracketing SSE and Scottish Power together in terms of their overall investment strategy, SSE was relatively late to renewable energy investment. The acquisition of Airtricity in 2008 marked the real start of the investment boom for SSE and brought with it a strong wind pipeline and development expertise. This pipeline is coming to fruition in 2012 with the completion of some very large projects including the wholly owned Clyde and Griffin onshore wind sites and shares in the Gabbard and Walney offshore projects. SSE has also been at the forefront of taking development risk and then selling wind sites after construction, having disposed of 200MW of capacity over the period for over GBP 330m. The future pipeline for both onshore and offshore developments remains strong, with the Galloper offshore wind project shared with RWE, the Islay project and a significant position in the Round 3 Firth of Forth zone.

Figure 26: SSE UK generation investment (MW)



Source: Bloomberg New Energy Finance

Figure 27: SSE UK generation investment (GBP m)

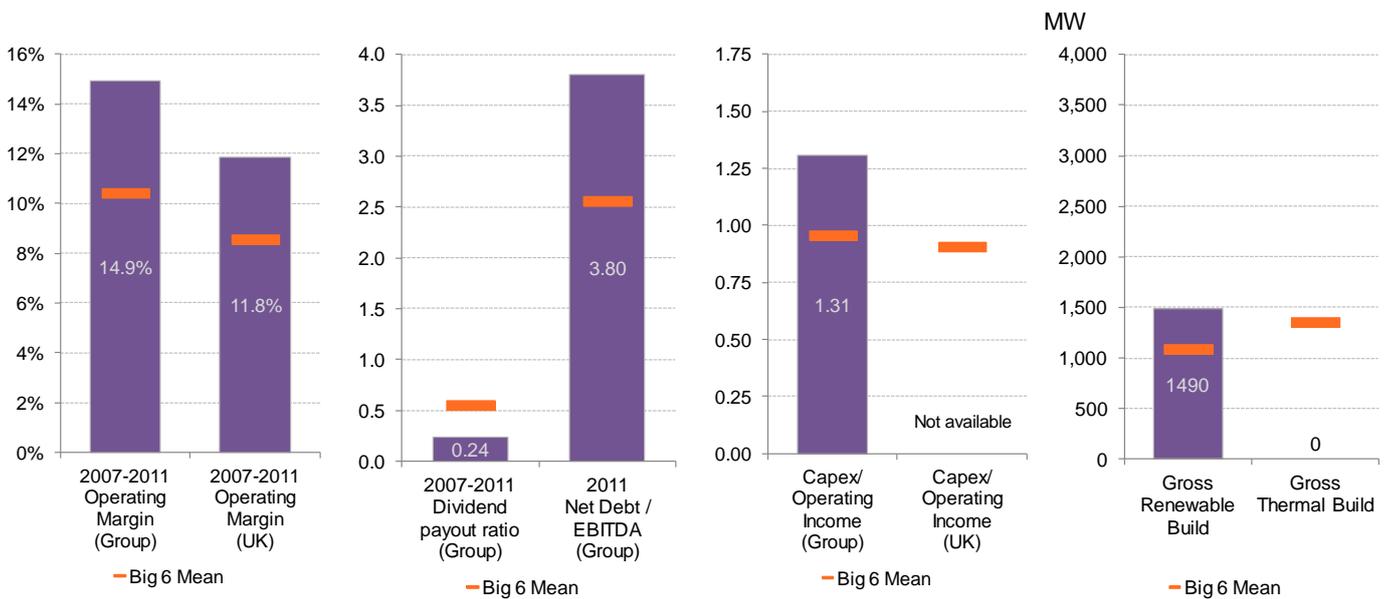


SSE has a lower-than-average capex to operating income ratio for the same reasons as Centrica, although its ratio is still double. Like Centrica this is partially due to the reporting conventions of the non-UK based companies, which allocate much of their wholesale power revenues outside of their UK units. The capex is treated in the same way but capex in trading units is negligible so ensuring a lower ratio for the UK-based companies.

Scottish Power

Scottish Power has already added 1GW of renewable generation since 2006 and by end-2014 this will increase by a further 50% as an additional 230MW of onshore wind and a 50% share in the West of Duddon Sands offshore project are completed. Apart from environmental upgrades to Longannet power station, these have been Scottish Power's sole generation investments.

Figure 28: Scottish Power key metrics



Source: Bloomberg New Energy Finance

The company were looking to invest in carbon capture and storage at Longannet to extend its useful life. But this appears to have run aground on the difference between the available subsidy and the cost of the scheme. This has led Iberdrola Power to suggest that the plant will close in 2018, leaving Scottish Power with no coal capacity. The company, in common with the rest of the Big 6, has put proposed new CCGT gas projects, at Damhead Creek and Cockenzie on hold as power demand has fallen.

Strictly no copying, forwarding, shared passwords or redistribution allowed without prior written permission of Bloomberg New Energy Finance. For more information on terms of use, please contact sales.bnef@bloomberg.net. Copyright and Disclaimer notice on page 26 applies throughout.

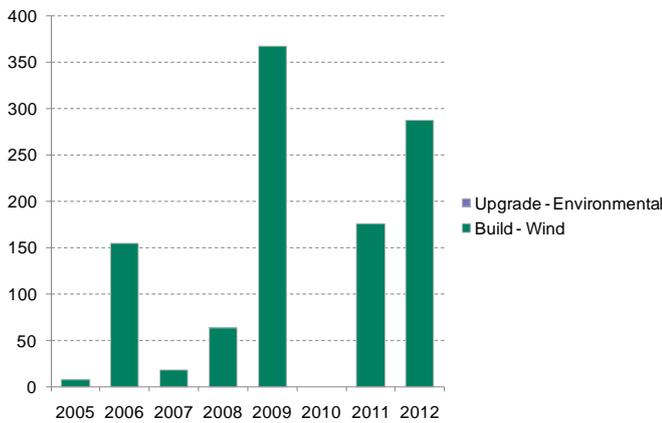
“UK generation activity ... requires greater definition to establish a clear framework ... to provide incentives for the necessary investments.” José Ignacio Sánchez Galán, CEO, Iberdrola

As the only Big 6 utility to also own transmission facilities, Scottish Power is also investing in the Western HVDC link. This will relieve a major bottleneck in the National Grid between Scotland and England and allow access for the former's wind resources to the latter's market.

Scottish Power has a position in the upcoming Round 3 offshore wind developments, with the Argyll array and the East Anglia projects. Final investment decisions are expected from 2015. These developments are shared with Vattenfall but final decisions, as with all Round 3 investment choices, depend on the level of subsidy to be provided and thus on the outcome of the EMR.

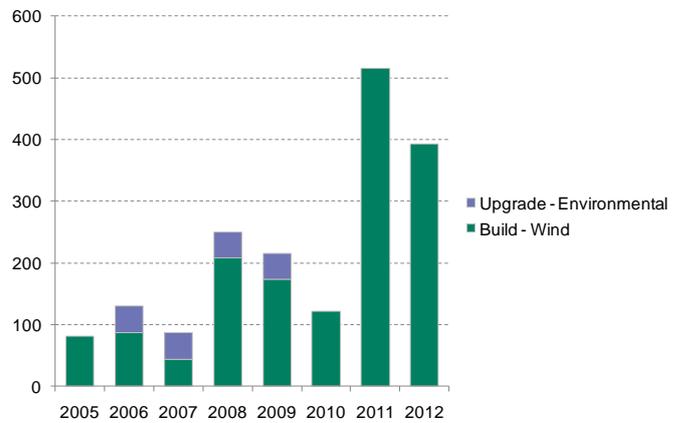
The Scottish Power/GDF Suez nuclear joint venture (Nugeneration) is making quiet progress with development of plans for a new nuclear station near the decommissioned Sellafield processing plant. The company has stated that it intends to take a slower approach to the project than EDF Energy and has yet to give a date for the final investment decision.

Figure 29: Scottish Power UK generation investment (MW)



Source: Bloomberg New Energy Finance

Figure 30: Scottish Power UK generation investment (GBP m)

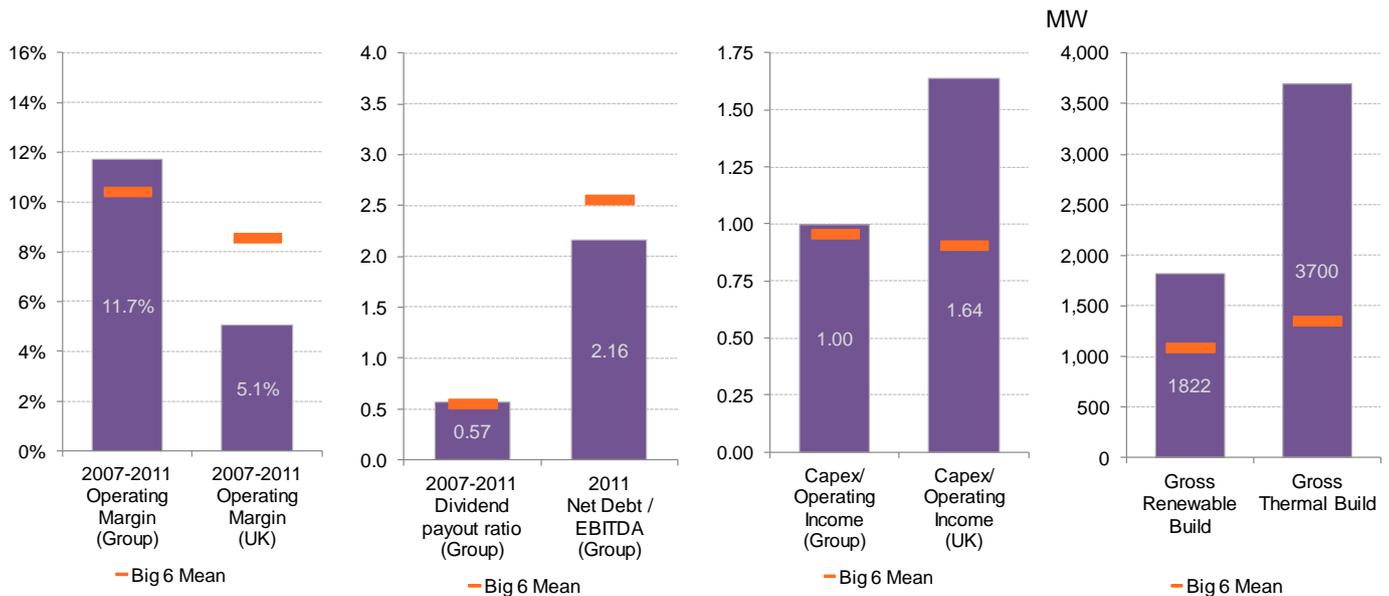


5.3. RWE npower

RWE npower has been by far the biggest spender in the UK power market since 2006. It faces the largest volume of LCPD-based retirements of any UK generator, with almost 6GW of capacity closing by 2015. The company has adopted an aggressive all-of-the-above build strategy that will have see over 5GW of new capacity on the ground by the end of 2012.

The key metrics for RWE npower reflect this approach, with capex/operating income measures well above average for the UK and the largest gross renewable and thermal build of the Big 6.

Figure 31: RWE npower key metrics



Source: Bloomberg New Energy Finance

Investment at RWE npower has been split roughly equally between thermal and renewable. Thermal spending has been dominated by the construction of two very large combined-cycle gas turbine plants at Staythorpe (1,700MW) and Pembroke (2,000MW) at a combined cost of over GBP 1.5bn. This investment will see the gas-fired proportion of the RWE npower fleet rise from 26% in 2005, on the commissioning of the Great Yarmouth purchase, to 45% after Pembroke is completed in 2012, to above 60% after the LCPD retirements through 2015.

RWE npower has permission to build a further 2GW gas plant at Willington. Should this go ahead, an increasingly unlikely possibility in the short to medium term given the current depressed spark spreads, it would bring RWE npower's CCGT capacity to 8.5GW.

In addition to the gas investments, RWE npower has spent some capital upgrading the Aberthaw coal station to meet the environmental requirements of the LCPD.

Renewable investment by RWE npower has boomed in recent years, giving it the most installed renewable capacity of any of the Big 6. This has been achieved through building a large amount of wind, both onshore and offshore – albeit at only half of the 1GW plus from SSE and Scottish Power – but significantly through the repowering of the Tilbury plant to burn 100% biomass.

Onshore wind investments from RWE npower have followed a little and often strategy, with development of many smaller wind farms and some innovative financing schemes under which RWE npower has taken on the development risk and then passed on the stable performing assets to other investors. RWE npower has undertaken offshore wind development in partnership with other investors, in common with everyone else in this highly capital intensive sector. The two very

large offshore wind farms at Gwynt y Mor and Greater Gabbard will give RWE npower over 600MW of new wind capacity through 2014.

As we discussed when focussing on E.ON UK, the investment in Horizon Nuclear continues to move slowly ahead, but RWE npower is looking for an exit.

The pipeline of offshore wind projects for RWE npower remains strong with development activity in several round 3 projects including the Atlantic array, the Dogger Bank mega-project that could see up to 13GW of capacity, the Galloper extension to Greater Gabbard and Triton Knoll.

Figure 32: RWE npower UK generation investment (MW)

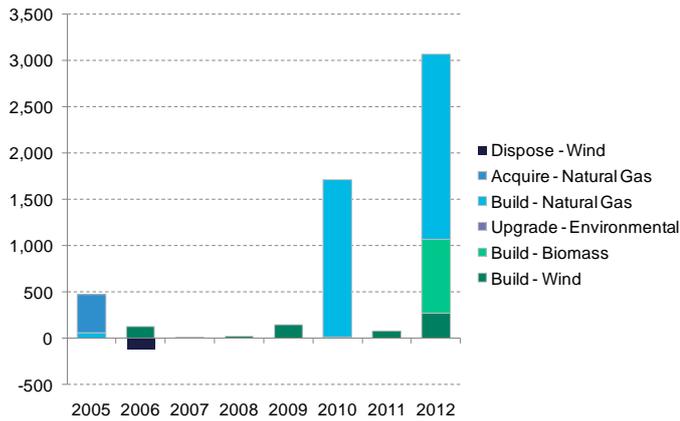
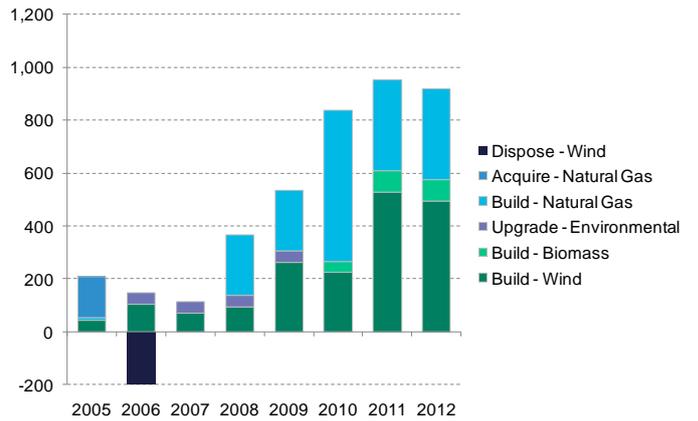


Figure 33: RWE npower UK generation investment (GBP m)



Source: Bloomberg New Energy Finance

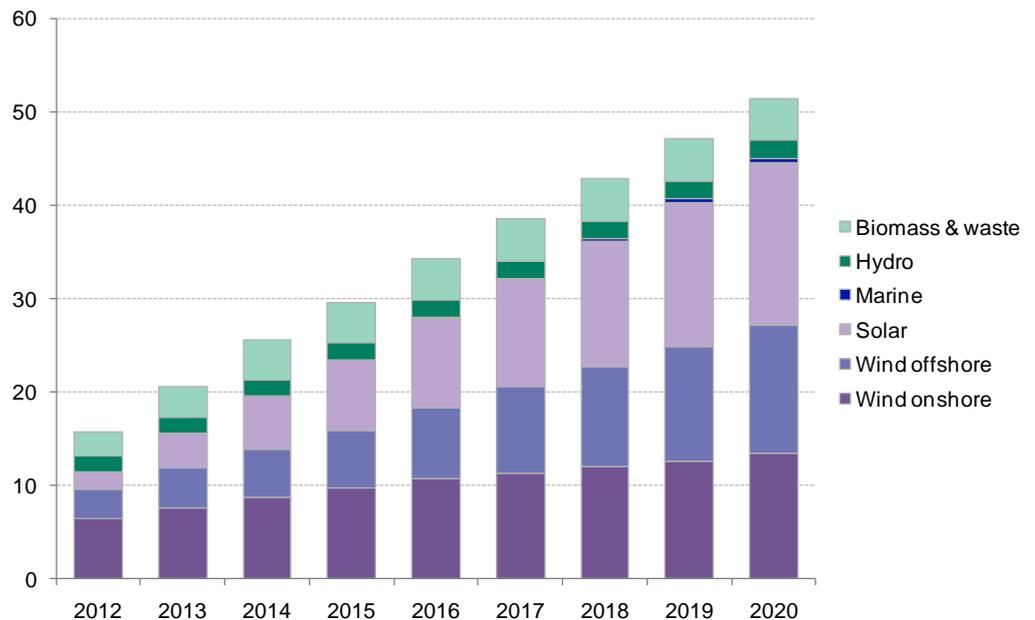
SECTION 6. INVESTMENT IN CONTEXT

The UK government aims for 30% of all electricity to come from renewable sources by 2020, in the context of the legally binding EU target of 15% of all energy by the same year. This is an aggressive target given renewables supplied 9.5% of total generation in 2011.² Even with relatively flat demand growth, this implies that installed capacity of renewable generation in the UK will need to more than triple from an average 13GW in 2011 to over 50GW by 2020.

Renewable new build in the UK has seen a compound annual growth rate (CAGR) of over 50% since 2006. These growth rates cannot be maintained. However, the target could be achieved if the industry moves from the forecast 3GW of new build across all technologies in 2012, to closer to 5GW.

Our recently released [White Paper on the UK power sector](#) discussed the potential for a supply crunch later this decade and reviewed the likely share of renewables in the generation mix given current policy and the latest Bloomberg New Energy Finance forecasts of cost reduction in renewables due to steep learning curves. The results are shown in Figure 34.

Figure 34: Forecast renewable capacity to 2020 (GW)

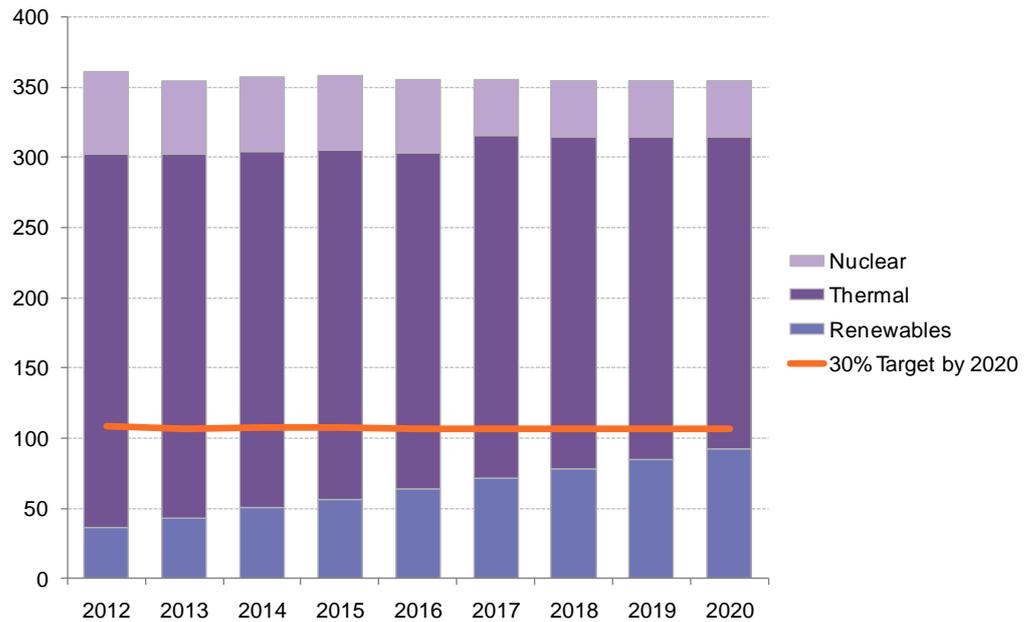


Source: Bloomberg New Energy Finance

Our forecast suggests that we will fall short of the target by around 10-15% as shown in Figure 35, short of further measures to accelerate delivery. This projection is based on the likely load factors for each technology and our expectation of relatively low growth in demand. The industry will achieve over 25% by 2020. Several factors – for example major coal plant operators moving ahead with vastly increased biomass co-firing – could push us above the target. Perhaps the biggest single factor is that total offshore wind capacity by 2020 is predicted to be 13.8GW. This is due to the relatively slow move to final investment decisions on the Round 3 capacity by the Big 6 and others, with many not expected until after 2015. With developers of sites for over 32GW already bid under Round 3 and the earlier Round 2 extension sites moving, accelerating the delivery of these offshore wind projects is perhaps the government's best hope to meet the target.

² Source: DECC Energy Trends Q1 2012.

Figure 35: Forecast renewable generation (TWh/yr)



Source: Bloomberg New Energy Finance

The Big 6 have a big role to play in helping the UK meet its targets. But for many of them, with the possible exception of EDF Energy and Centrica, balance sheets have become stretched over the last few years. Project financing has become more difficult and partnering with other developers, pension funds and sovereign wealth funds in these major developments has therefore become both desirable and necessary.

Given the current weak power prices across Europe, income for the Big 6 is likely to remain constrained until capacity margins tighten. Ironically the construction of renewable generation exacerbates this problem. This is because it enters into the wholesale markets at the bottom of the supply stack, thereby reducing run hours for marginal fossil-fuel fired plant and bringing down wholesale power prices. A spate of retirements of older, less efficient plant, or a return to demand growth, among other factors, could fix this.

The Big 6 will continue to play a major role in the operation of installed capacity and the development of the substantial projects needed to deliver 30% by 2020. However, their equity stake in the renewable sector, and their overall installed capacity and generation market share, are likely to decline. Developing these mega-projects requires them to bring in large sources of capital, including pension funds, that need secure and low-risk returns. The challenge to both the UK government, and the utilities, is to design a support framework that allows this while providing the regulatory certainty long-term investors need. This challenge is what must be solved by the finalised Electricity Market Reform.

ABOUT US

Subscription details

European Power Insight

sales.bnef@bloomberg.net

Contact details

Mike Lawn Head of European Power Service	mlawn5@bloomberg.net +44 20 7330 7680
Guy Turner Head of Market Analysis	gturner10@bloomberg.net +44 20 3216 4086

Copyright

© Bloomberg New Energy Finance 2012. This publication is the copyright of Bloomberg New Energy Finance. No portion of this document may be photocopied, reproduced, scanned into an electronic system or transmitted, forwarded or distributed in any way without prior consent of Bloomberg New Energy Finance.

Disclaimer

The information contained in this publication is derived from carefully selected public sources we believe are reasonable. We do not guarantee its accuracy or completeness and nothing in this document shall be construed to be a representation of such a guarantee. Any opinions expressed reflect the current judgment of the author of the relevant article or features, and does not necessarily reflect the opinion of Bloomberg New Energy Finance. The opinions presented are subject to change without notice. Bloomberg New Energy Finance accepts no responsibility for any liability arising from use of this document or its contents. Bloomberg New Energy Finance does not consider itself to undertake Regulated Activities as defined in Section 22 of the Financial Services and Markets Act 2000 and is not registered with the Financial Services Authority of the UK.