Powering the UK
The role of the power and gas sector in the wider economy
1. Introduction

Energy UK\(^1\) commissioned Ernst & Young to prepare a report that provides a ‘snapshot’ of the power and gas sector today and its current contribution to the UK economy. The report looks at the impact of the power and gas sector in a number of broad areas, both nationally and from a regional perspective.

In this report we use the term power and gas sector to include:

- In the electricity sector: generation, transmission and distribution and retail.
- In the gas sector: transmission, distribution and the retail sector (i.e., downstream activities).

It does not include the upstream oil and gas sector or the mining sector.\(^2\) The report reviews the available data on the direct economic value created by this sector through a series of key metrics including Gross Value Added (GVA), employment and investment. It also considers the indirect contribution of the sector to the UK economy and whether it is a stable and sustainable core sector in the UK.

The report puts the sector into context by comparing it to other sectors in the economy and by looking at how its contribution has changed over time. It also considers, where relevant, how the sector in the UK compares to similar sectors across Europe.

All data used in this report are from publicly available sources – in particular we have extensively used data from the UK Office for National Statistics (ONS) and the statistics division at the OECD.

---

\(^1\) Energy UK represents Britain’s gas and electricity industry in the media and with key stakeholders. It runs campaigns and commissions research on key issues affecting the energy industry. www.energy-uk.org

\(^2\) We recognise that some datasets referenced may have different definitions, for example they may include the upstream oil and gas sector (and call it the ‘energy’ sector), or they may include the water sector (and call it the ‘utilities’ sector). Our definition is stated above and where we reference different datasets with different definitions we state so.
2. Key findings

► Our findings in this report indicate that, in 2010, the direct impact of the power and gas sector in terms of Gross Value Added (GVA) was around £28 billion. In addition, the wider economic benefits that the sector drives are even more significant – the sector ‘punches above its weight’.

► The power and gas sector has a significant impact on other industries through increased consumption along the supply chain; a pound spent in investment in this sector has a larger indirect effect on the rest of the economy than most other sectors. In terms of employment, each new direct job in the power and gas sector supports around three jobs elsewhere in the UK economy.

► The power and gas sector also contributes more, relatively, to the various regions of the UK than almost any other sector of the UK economy – the sector ‘shares the wealth’, and acts as a counterbalance to the concentration in the South East in sectors such as finance.

► Recent investment and a need to meet new regulatory requirements in the way we produce and distribute energy has led to an increase in jobs in the sector at a time when unemployment generally was on the rise. The biggest value can be seen outside of the traditional South East stronghold created in the financial and banking sector, with considerable benefits both in terms of economic output and employment arising in the North East, South West, Scotland and Northern Ireland.

► As a high skill, high investment sector, it will continue to create jobs and drive value creation in the UK at a time of weak growth for the UK as a whole.

► The sector is highly capital intensive and has the potential to become a major driver of innovation and a highly skilled workforce. Despite the recent downturn it invested £8.5 billion in 2010 and £11 billion of investment is expected in 2011. The shift to a low-carbon economy and the need to upgrade an ageing infrastructure will require an even higher level of investment in the future.

► As a result, we are likely to see a change in the sector. Investors in low-carbon technologies (such as nuclear, renewables or carbon capture and storage CCS), and smart grid and smart metering developers will work alongside major utilities in a new expanded sector, focussing on ‘clean’ energy.

► It is important to recognise the significant cost implications of the shift to a low-carbon economy and the high level of investment required. It comes at a time of high and rising commodity prices and follows the introduction of additional environmental legislation which puts increasing financial and social obligations on utilities and energy companies.

Powering the UK  The role of the power and gas sector in the wider economy 2
3. The sector’s contribution to the UK economy

The power and gas sector has a widespread economic impact across all sectors of the economy. These impacts arise:

- Directly from the employment and production activities occurring within the sector.
- Indirectly through:
  - The industry’s purchases of intermediate inputs and capital goods from a variety of other UK industries.
  - The personal purchases of employees and business owners both within the power and gas sector and from the additional income generated in the supply chain to the sector.

Together these effects result in the power and gas sector having a positive widespread economic impact throughout all sectors of the UK economy and in all geographic areas.

The direct contribution to the economy

Growth in developed economies has been driven in the past few decades primarily by the service sector, and in particular in the UK, by the financial sector. The service sector now accounts for 77% of the UK economy, with the industrial sector contributing 21%. Within this the contribution to the economy from the power and gas sector has increased slightly over the past two decades providing in part a counterbalance in the face of the decline of the manufacturing sector.

Overall the direct contribution to the UK economy in terms of Gross Value Added (GVA) from the power and gas sector was estimated to be around £28 billion in 2010 accounting for 2.4% of UK total GVA. Including the indirect effects, the sector’s GVA was £92 billion, or around 8% of UK total GVA.

The power and gas sector’s total employment impact to the national economy in 2010 amounted to 128,000 full-time and part-time jobs, accounting for 0.4% of the total employment in the country.

<table>
<thead>
<tr>
<th>2010, £</th>
<th>Mining</th>
<th>Manufacturing</th>
<th>Power and Gas sector</th>
<th>Construction</th>
<th>Information and Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>GVA (billion)</td>
<td>21.6</td>
<td>128.2</td>
<td>28.2</td>
<td>67.0</td>
<td>85.2</td>
</tr>
<tr>
<td>Turnover (billion)</td>
<td>49.2</td>
<td>473.2</td>
<td>87.7</td>
<td>204.3</td>
<td>184.6</td>
</tr>
<tr>
<td>Share of UK economy (GVA)</td>
<td>1.8%</td>
<td>10.9%</td>
<td>2.4%</td>
<td>5.7%</td>
<td>7.3%</td>
</tr>
</tbody>
</table>

3 ONS, April 2011.
4 Manufacturing contributed 75% of the industrial sector in 1995 against 60% in 2008.
5 ONS, April 2011.
contribution to the total economy has only marginally increased from 2.1% in 1995 to 2.4% in 2010 — as illustrated in chart 1. This relative long term stability, however, hides changes over a shorter term. The period can in fact be divided into two phases:

► A first phase between 1995 and 2003 when the size of the sector actually shrank in absolute and relative terms. This was the result of low commodity prices (oil falling below US$20 a barrel in the late 1990s) combined with a relatively flat growth in demand, low levels of investment in the sector and the effect of the liberalisation of the wholesale and retail markets.6

► A second phase after 2003 when the sector expanded from 1.3% of the UK economy to today’s 2.4%. This was the result of a rise in global commodity prices, together with an increased investment in infrastructure to address security of supply concerns and to respond to environmental legislation.

This trend is not unique to the UK and is similar to what most of the other major developed economies8 have experienced over the same period: the utilities sector’s relative size fell between the early 90s (average of 2.3% of GDP in major developed economies in 1990) and the early 2000s (average of 1.8% of GDP in major developed economies in 2000 for example) and has increased again since (to around 2.1% of GDP in 2009). In fact, in all other major G7 economies the power and gas sector recorded the smallest contribution to GDP between 2000 and 2004.9

**Gross Value Added — what does it mean?**

One way to measure the size of a company, industry, or economy is to determine its output or turnover. The Gross Value Added or GVA generated by all the industries in all sectors of an economy adds up to that country’s GDP (Gross Domestic Product).

The standard method for calculating the direct contribution of an industry to GDP or GVA is to measure its so-called ‘value added’. That is to calculate the difference between the industry’s total pre-tax revenue and its total bought-in costs (i.e., costs excluding wages and salaries), adjusted for any changes in stocks. Revenue, or turnover, is the total income received in a determined period. Both GVA and GDP are used as indicators of the economic wealth of an area (country, region, city, etc.) based on the value of products and services and income generated by businesses. The changes in GDP and GVA over time are used to measure growth of a sector and/or economy.

**GVA + taxes on products – subsidies on products = GDP**

An increase in GVA can be the result of increased profitability (via increased volume of outputs, or prices) or a reduction of input costs. Shares in GVA measure the relative contribution of the factors of production, labour and capital, to the value created. Therefore an increase in sector GVA can result from an increase in jobs, investment or labour productivity in that sector.

---

6 Of these four factors low input prices were the most relevant factor to the turnover and value added performance.

7 ONS, Workplace based GVA.

8 Major developed economies are defined as the G7 countries.

9 OECD STAN database 2010. When comparing sectors at international level the utilities sector includes power, gas and water companies. Due to statistical discrepancies in sources and methodologies it is not possible to compare directly data from different sources.
3. The sector’s contribution to the UK economy (continued)

The indirect impact on the economy

The broad economic contribution of the power and gas sector is not limited to direct impacts — i.e., the direct value added produced by the sector itself. It also derives from the contribution that the sector makes through:

- The consumption of intermediate goods and products in the supply chain, i.e., the indirect effect.
- The increased consumer spending owing to the initial direct and indirect effects (this may include spending on housing, food, transport, clothing, education and entertainment), i.e., the induced effect.

The power and gas sector has one of the greatest impacts on other sectors through increased consumption along the supply chain. Supply chain businesses that may work fully or partially with the power and gas sector cover a wide range of industries and services, including equipment manufacturing, engineering, consultancy, human resources, legal, finance, education and research. The power and gas sector therefore has a wide impact on many different sectors: a pound spent in investment in this sector has a larger indirect effect on the rest of the economy than most other sectors.

When we include the indirect effect, the absolute and relative contribution of the power and gas sector to the economy increases to around £92 billion in 2010 in terms of GVA — or around 8% of GDP (see table 2). Significantly, in terms of employment, each new direct job in the power and gas sector supported around three jobs elsewhere in the UK economy.

Creating jobs during recession years

Data shows that the sector’s total employment impact to the national economy in 2010 amounted to 128,000 full-time and part-time jobs, accounting for 0.4% of the total employment in the country or 2.8% of the industrial sector. This level of employment by the sector is similar to that of other major developed countries (where it ranges from 0.3% of total employment in the US to 0.6% of total employment in Germany). However, whilst small in terms of direct job opportunities, the sector supports a significant number of other jobs in the supply chain.

In addition, the power and gas sector is also one of only a few sectors in the economy which has created new jobs over the past two years. Whilst the recession has resulted in an overall fall in the total UK workforce between 2008 and 2010 (from 32 million to 31.2 million), the power and gas sector showed remarkable resilience and moved in a countercyclical direction to create employment over the same period (growing from 83,000 to 128,000).

New jobs for new infrastructure

An example of where and how jobs have been created in this sector is the construction of a combined Cycle Gas Turbine station in Staythorpe. Npower has been constructing this power station over the past three years and it officially opened in May 2011. It supported 6,000 people during its construction and will create 80 long-term jobs, benefitting the local economy to the tune of £10 million per annum.

It looks as though this trend will continue as labour intensive investment projects begin over the next ten years. These projects will involve both temporary (for example, during construction) and permanent (ongoing operation and maintenance as well as customer service) job creation. For example, SSE plans to create 7,000 jobs in Scotland in a number of projects, including those that develop sources of renewable energy, between 2011 and 2016.

Table 2 — Direct and indirect contribution to GVA and employment

<table>
<thead>
<tr>
<th></th>
<th>Direct</th>
<th>Indirect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>GVA</td>
<td>£28.2bn</td>
<td>£64.2bn</td>
<td>£92.4bn</td>
</tr>
<tr>
<td>Employment</td>
<td>128,000</td>
<td>351,000</td>
<td>479,000</td>
</tr>
</tbody>
</table>

10 Whilst we acknowledge the contribution from induced effects we do not estimate them in this report, although as the power and gas sector generally creates higher value and employment than other sectors, the impact would be expected to be positive.
11 The metric used to assess indirect impact on the economy is the indirect ‘economic multiplier’, which we have calculated from 2008 ONS data. Out of 100 sectors and sub-sectors in the UK economy, the power and gas sector ranks in the top 10 in terms of the size of the economic multiplier.
12 Ernst & Young Analysis based in ONS, Input-Output tables, 2008.
13 Ernst & Young Analysis based in ONS, Input-Output tables, 2008.
15 This at the time when manufacturing has experienced a 0.5% decrease between 2008 and 2010 and when even the Information and Communication sector, which had previously been a key source of job-creation, has seen job losses.
Impact on productivity and skills

The power and gas sector has one of the highest labour productivity levels of all sectors in the UK economy (measured as GVA per head). The sector GVA per head was £183,000 in 2009 – well above the UK average of £35,500 and other industries such as manufacturing or transport. This is a reflection of the high level of capital intensity in the sector (see below) but also in part of the quality and efficiency of the workforce.

The skills of the workforce affect how well an economy, a sector, or a company can adapt to changing conditions, as skilled workers are better able to adapt to new technologies and identify market opportunities. Skills also matter to individuals, having a considerable impact on whether they are in or out of work and the remuneration received. There is a very strong and positive correlation between possession of formal qualifications, employment, labour market participation rates and labour productivity.

The UK Employment and Skills Almanac 2009, produced by the UK Commission for Employment and Skills, provides the latest information on qualification levels (an indicator for skills) in different sectors. The mining, quarry, energy and water sector has among the highest levels of qualification of any other industry within the primary and secondary sectors, just behind the banking and finance industry and the public administration, education and health services sector. In 2009 about 60% of employees in the mining, quarry, energy and water sector had achieved level 3 qualification (A-levels or equivalent) or above and 36% level 4 (degree) or above.

Skills development in the sector

Companies in the sector provide opportunities for their employees to obtain professional qualifications that lead to career progression and skills enhancement. For example, E.ON provides opportunities for ex-military personnel in E.ON’s ‘Engineering Academy’ as well as offering opportunities for current employees to further their training or achieve chartered status at the Academy.

EDF Energy have also made an investment of £3 million in a new Energy Skills Centre at Bridgwater College which opened in January 2011. A further £1.5 million was also invested to establish a construction skills training centre at the college. This type of investment creates a well rounded and efficient workforce within the sector, and as we have seen earlier, this will benefit the wider economy too.

---

17 The source for this data (UK Employment and Skills Almanac 2009) does not distinguish between these industries. This report assumes that the level of skills is similar across all three.
3. The sector’s contribution to the UK economy (continued)

One of the consequences of such high productivity and skills level is the impact on earnings for power and gas sector workers. Average earnings in the sector are consistently higher than both the UK average and other capital intensive industries (though slightly lower than the Information and Communication sector) as illustrated in Table 3.

The earnings within the sector are also fairly evenly distributed — more so than the average for the UK economy and other sectors. The difference between the lowest (and the highest) paid decile of the workforce and the average earnings is in fact smaller than the average for the UK. 18

Table 3 — Average earnings for selected sectors (2008-2010)19

<table>
<thead>
<tr>
<th>Year</th>
<th>UK average (all employees)</th>
<th>All index of production industries</th>
<th>Power and gas sector</th>
<th>Manufacturing</th>
<th>Information and communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>26,137</td>
<td>29,145</td>
<td>38,038</td>
<td>24,979</td>
<td>39,977</td>
</tr>
<tr>
<td>2009</td>
<td>26,450</td>
<td>29,888</td>
<td>37,820</td>
<td>29,125</td>
<td>39,501</td>
</tr>
<tr>
<td>2010</td>
<td>26,528</td>
<td>29,943</td>
<td>37,763</td>
<td>29,125</td>
<td>39,742</td>
</tr>
</tbody>
</table>

Contribution to the Exchequer

Corporation tax

The power and gas sector is an important contributor to the Exchequer each year:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total HMRC CT receipts £ billion</th>
<th>Major energy players CT payments £ billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>43</td>
<td>1.5</td>
</tr>
<tr>
<td>2008</td>
<td>46</td>
<td>1.3</td>
</tr>
<tr>
<td>2009</td>
<td>44</td>
<td>1.3</td>
</tr>
</tbody>
</table>

In 2009, the sector contributed around 3% of total HMRC Corporation Tax receipts; the sector GVA in the same year was less than 3% of total UK GVA.21 This sector contribution to the Exchequer is therefore relatively higher than its size would suggest – which is particularly important for the current economic and fiscal situation in the UK.

Income tax and national insurance

This report has already discussed the growing and increasingly skilled workforce in this sector. This translates into higher income tax and employee/employer national insurance payments – the example below illustrates how the sector generated income tax and national insurance contributions during 2009 for the economy. 112,000 employees earning an average income of £37,820 in 2009 will have contributed in total approximately £712 million of income tax, and £399 million employee national insurance. In addition, their employers paid approximately £464 million in employer national insurance.22

---

18 The earnings of the lowest paid 10% of the workforce in some sectors in the UK are as much as 72% lower than the average earnings in that sector. For power and gas they are approximately 52% lower than the sector’s average earnings. The earnings of the highest 10% of the workforce for some sectors is 99% higher than the average earnings in that sector. For power and gas it the earnings of the highest paid 10% of the workforce is 74% higher than the sector average.
19 ONS, Gross Annual Pay for all employee jobs, 2008-2010
20 This excludes corporation tax paid on upstream gas activities
21 ONS, GVA Time series for all UK, 2009
22 Company accounts, UK Tax calculator
4. Helping regional economies grow

The power and gas sector has a key role to play in regional development. Particularly in the North East, the South West, Scotland and Northern Ireland.

The power and gas sector has shown particular resilience within most regions during the recession, being one of only a few sectors to increase jobs at a time when generally unemployment was on the rise.

Regional contribution of the power and gas sector

The sector has particular importance to regional development, both in terms of economic output and employment. The value of this sector tends to come from activity in the North East, the South West, Scotland and Northern Ireland. The map below demonstrates the importance of the sector to the UK regions and Devolved Administrations during 2008.23

The map shows the relative contribution of the sector to the regional economy – i.e., showing each region’s power and gas utility sector share of GVA relative to the UK average.

There are only four regions where the power and gas sector’s share of GVA is lower than the UK average – London, the South East, the North West and Wales.

Table 4: GVA, regional power and gas sector/regional economy, 2008

<table>
<thead>
<tr>
<th>Region</th>
<th>GVA Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>2.39%</td>
</tr>
<tr>
<td>North West</td>
<td>1.34%</td>
</tr>
<tr>
<td>Yorkshire and The Humber</td>
<td>1.69%</td>
</tr>
<tr>
<td>East Midlands</td>
<td>2.46%</td>
</tr>
<tr>
<td>West Midlands</td>
<td>2.05%</td>
</tr>
<tr>
<td>East of England</td>
<td>1.92%</td>
</tr>
<tr>
<td>London</td>
<td>0.69%</td>
</tr>
<tr>
<td>South East</td>
<td>1.56%</td>
</tr>
<tr>
<td>South West</td>
<td>2.67%</td>
</tr>
<tr>
<td>Wales</td>
<td>1.60%</td>
</tr>
<tr>
<td>Scotland</td>
<td>2.56%</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>1.89%</td>
</tr>
</tbody>
</table>

23 Please note that as the regional data is calculated in a different methodology from the national data some discrepancies with data shown in section 2 may appear.
4. Helping regional economies grow (continued)

The impact of the recession in the regions

Whilst it was widely expected that London would, in the short to medium term, be the most severely hit of the UK regions in the 2008-2009 recession (due to its origins in the financial sector), it fared better than expected in terms of income and employment. At the same time, despite their more diverse economies, many regions suffered job losses and a decline in output, in particular those regions historically reliant on industries such as manufacturing or construction. The latest data shows that London’s income per capita fell by 2.5% between 2008 and 2009, less than the nationwide fall of 2.9%.24

On the other hand, as we have noted previously, the power and gas sector has shown particular resilience within most regions during the recession. While the total workforce declined in many regions, employment in the power and gas sector increased: 27,000 new jobs were created in 2009 and 19,000 in 2010.25

Regional job creation and skills centres

► National Grid has learning centres in Eakring, Nottinghamshire and Millbury. In 2010, 164 new early career learners were inducted into strategic technical programmes, alongside a strong apprenticeship programme in the East Midlands.

► British Gas has made a commitment to invest £60 million by the end of 2012 to create more than 3,700 jobs in smart meter delivery and home insulation. The six British Gas training academies – in Glasgow, Leeds, Leicester, Thatcham, Tredegar and Dartford – will deliver training for these new roles.

► Scottish Power has training centres near Glasgow and Liverpool for regulatory and certification training for employees. It also works with young and disadvantaged people in the local communities to bridge links between education and employers and promote careers within the energy and utility sector.

► CountryWide Energy has built a training facility at Witney and a new training centre at its Evesham headquarters, with courses in customer services, product knowledge and other continual development training.

*These are some examples from latest company reports and are not exhaustive

24 ONS, Workplace based GVA by industry.
25 ONS, Annual Business Survey.
The map shows the growth in the number of jobs in this sector from 2008-2010 as a percentage of total workforce in the region. There has been an increase in all but one region over this two year period. In particular, the East Midlands experienced a significant increase in the level of employment in the sector in 2008 and 2009, as did the North East. Data for Northern Ireland not available.

Table 5 - electricity and gas workforce jobs as a proportion of total regional workforce jobs, 2008 and 2010

<table>
<thead>
<tr>
<th>Region</th>
<th>2008</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>North East</td>
<td>0.4%</td>
<td>0.8%</td>
</tr>
<tr>
<td>North West</td>
<td>0.2%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Yorkshire and The Humber</td>
<td>0.3%</td>
<td>0.5%</td>
</tr>
<tr>
<td>East Midlands</td>
<td>0.5%</td>
<td>0.8%</td>
</tr>
<tr>
<td>West Midlands</td>
<td>0.4%</td>
<td>0.5%</td>
</tr>
<tr>
<td>East of England</td>
<td>0.3%</td>
<td>0.2%</td>
</tr>
<tr>
<td>London</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>South East</td>
<td>0.3%</td>
<td>0.4%</td>
</tr>
<tr>
<td>South West</td>
<td>0.3%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Wales</td>
<td>0.4%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Scotland</td>
<td>0.4%</td>
<td>0.7%</td>
</tr>
</tbody>
</table>
Future investment commitments

The UK’s energy sector faces significant challenges over the next 10-15 years, both to maintain secure energy supplies and meet climate change and renewables targets. Meeting these challenges will require substantial investment over the coming years. Our 2009 study ‘Securing the UK’s energy future — meeting the financing challenge’ concluded that £200 billion of new investment is required to meet the UK’s energy goals in the next 10 – 15 years. In October 2010, in our publication ‘Capitalising the Green Investment Bank – Sowing the seeds of success’ we updated this figure to a total of £250 billion of capital expenditure that would be required in the low carbon sector over the next 15 years – equivalent to an average of £15-£16 billion per annum. This investment will more than double the value of the UK’s total energy supply asset base (after taking into account depreciation) and is equivalent to UK energy suppliers investing approximately £9,000 on behalf of each and every UK household by 2025. Indeed the UK Government’s recent Electricity Market Reform (EMR) White Paper 2011 ‘Planning our electric future: a White Paper for secure, affordable and low-carbon electricity’ – sets out the Government’s strategy for securing future energy supply in the UK via a new institutional framework that encourages investment in the sector.

The power and gas sector will be primarily responsible for delivering this investment. Generators, suppliers and other energy companies have already invested an average of £5.5 billion per annum over the past decade. In 2009, investment reached £8.2 billion, an 18% increase from 2008, despite the deep recession; in 2010 investments were around £8.5 billion. At circa 28% of GVA (and 9% of total turnover) the level of investment in the sector is considerably higher than the average for the UK as a whole (around 11%-12% of GVA) or for other capital intensive sectors (I&C level is around 25%) – see chart 2.

This current level of investment will need to be materially increased over the next 15 years as approximately £15 billion will be required each year to achieve the £250 billion target. Already there are plans to invest £11 billion in 2011 (see box on page 12 for examples of utilities investments). This represents a significant increase on the current rate of investment but is nevertheless not yet sufficient to meet the UK’s objectives. To do so will therefore not only require a step-change in the rate of investment but will also have a significant impact on the levels of return required for the sector and also considerable implications for the size of the power and gas sector and its contribution to the UK economy.
Energy companies have committed to several short and longer term investment plans to help meet energy demand in the UK over the next ten years. For example:

- National Grid plans to spend £19 billion between 2011 and 2015, with its focus expected to be on structural changes to the sources of gas and electricity supply.
- EDF is planning on investing around £20 billion on four new nuclear power plants whilst at the same time investing in developing new renewable sources.
- Npower has invested over £1 billion in new energy infrastructure for the UK in each of the last three years. It has also committed to investing billions of pounds over the next ten years on new-build investment programmes.
- British Gas (Centrica) plans to invest £1.6 billion in 2011.
- E.ON plans to invest £2.3 billion in renewable energy across Europe in the period 2011-2013, following investments of £1 billion in 2010. This includes the 1 GW London Array offshore wind farm in the UK.
- Scottish Power plans to spend £15 billion during 2011-2020. This will be invested in clean energy projects to help meet the government’s carbon reduction targets. Scottish Power plans to invest £3 billion in electricity networks in Scotland by 2020. Projects will include the connection of up to 5GW of renewable energy.
- SSE is planning to spend £8 billion over the period 2011-2016. £3 billion of this will be in Scotland and £1.5 billion in renewable energy.

*These are some examples from latest company reports and are not exhaustive

Where is investment going?

The pattern of future spending in the power and gas sector is continuing to shift away from traditional technologies to low carbon, renewable and more efficient sources of generation and distribution. In addition to agreeing to a challenging EU renewables target by 2020 (15% of final energy consumption to be met from renewable sources, which implies around 30 to 35% renewable generation in the electricity mix) the UK alone has made the achievement of carbon reductions a statutory requirement. Through the legislation establishing the carbon budgets it set a reduction in CO2 emissions of 34% by 2020 compared to 1990 levels.
5. Investing for the future (continued)

Most of the investment and the research being undertaken in the energy sector is currently devoted to new low carbon technologies: renewable generation, nuclear power, Carbon Capture and Storage (CCS), microgeneration, smart metering, smart grids, energy efficiency and energy management devices, biofuels, and electric vehicles. Of the £200 billion to be invested over the next ten to fifteen years in the power and gas sector, we estimated that approximately £120 billion would be invested in CCS, renewables (including offshore grid) and energy efficiency technologies (including smart metering and smart grids) and £35 billion in nuclear power.26 Less than 25% is expected for ‘traditional’ technologies – i.e., fossil fuel generation technologies and import gas infrastructure.

The power and gas sector and companies operating in it, particularly the large utilities but also new venture capital investors, will therefore increasingly shift their attention and their investment to low carbon technologies. The sector itself therefore is likely to change its boundaries and definition. For example, if we expanded our definition of the power and gas sector in the UK to include all activities involved in the low carbon technology supply chain (which include water management, waste and recycling and environmental goods production for example) the size of the sector would already be around 6% of UK GVA and would be expected to grow to above 8% by 2020.27

An additional benefit from the expansion of the sector into new technologies and products is the potential opportunities for exports. Already, the power and gas sector has contributed £2.3 billion to UK exports in 2010 and this is expected to grow to £5.4 billion in 2020; the low carbon technologies sector is expected to grow from around £11 billion in 2010 to £27.4 billion in 2020, offering a significant opportunity for growth.28

26 Ernst & Young, ‘Securing the UK’s energy future – meeting the financing challenge’, 2009.
27 See Innovas, Low Carbon and Environmental Goods and Services: an industry analysis, (2009), both for a definition of what is included in the ‘Low Carbon Economy’ and for the analysis around future projections.
New markets and new focus for investment

Two sectors that have attracted significant investment recently have been the renewables and cleantech markets.

► Between 2009 and 2010, there was a 30% rise in global investment in renewable energy to £95 billion, with 90% of this coming from G20 countries.29

► Whilst solar power is the fastest growing energy source in Europe, wind power is the dominant renewable source, and offshore wind power generation now contributes to 12% of renewable energy generation.30

► Despite a degree of regulatory uncertainty and a fall in government spending in the sector, private sector investment remains strong.

► The UK had the highest low carbon technology investment in Europe coming from venture capital/private equity financing, second only to the USA among the G20 countries.31

► The UK also has wave and tidal projects in development. The waters off the coast of Scotland have attracted large corporates, such as Siemens and Vattenfall, which are investing in UK wave/tidal energy companies in the region.

► The UK is also making a significant contribution in the move towards cleaner energy sources via investment in research, skills and training: academically, Imperial College, London, is considered to be the ‘number one Cleantech University’ in Europe and in the top three globally. It has significant corporate partnerships, including a £70 million, 10 year collaboration project with Qatar Petroleum and Shell International for the development of carbon storage technologies. It also has a joint venture agreement with Rolls-Royce to develop low carbon aero engines.

Energy suppliers are proposing innovative financing mechanisms to fund investment:

► Ecotricity recently offered investors ‘Ecobonds’ to raise funds for new windmills, sunmills and renewable gas sources in the UK.

► Green Motion (UK) Limited has signed an exclusive technology agreement with Green Energy (UK) Plc. The partnership will give Green Motion’s Network One stations the unique distinction of being the only UK charging points to connect electric cars directly with energy from green sources such as wind and solar.

UK companies are responding to the changes in the energy sector by diversifying their investment plans to include renewable energy sources and cleantech:

► E.ON is planning to build two new Biomass plants. Construction is expected to commence in 2011 and 2012. They will collectively power up to 240,000 homes.

► SSE currently has 47 onshore wind farm projects and seven offshore. Sites are either in the planning stage or under construction.

► Good Energy commissioned its repowered 9.2MW wind farm at Delabole in Cornwall in late 2010. It will provide renewable power to around 7,000 homes.

► In partnership with Enviropower, Green Energy UK will be using landfill waste to supply renewable energy to 8,000 homes around the UK.

► ScottishPower Renewables created its Global Offshore Wind Division in Glasgow in 2010 to promote projects up to 10,000 MW.

6. The international context

The UK still remains one of the most competitive energy markets, with prices well below the European average.

Rising commodity prices and the introduction of environmental legislation are putting increasing pressure on utilities and energy companies.

A rising trend in commodity costs driven primarily by demand in developing countries and the capital investment costs to shift to a low carbon economy are likely to drive up energy prices across Europe.

The cost implications of shifting the UK to a low carbon economy and the high level of investment required in the sector are significant. They need however to be put into context: the high level of investment needed comes at a time of high and potentially rising commodity prices and the introduction of environmental legislation is putting increasing pressure on utilities and energy companies.

All these factors have already had an impact on both wholesale and retail prices over the past seven years and will continue to put increasing pressure on them in the next decade (see chart 3). Retail energy prices in the UK have increased above inflation over the past ten years – pushed by an unprecedented rise in oil and other fossil fuel prices.

Chart 3. Energy prices 1995-2010 (oil prices, energy prices index and retail price index compared, 2006=100)

---

32 World Bank Commodity Outlook reports.
33 DECC Energy prices statistics.
Notwithstanding the recent price increases the UK still remains one of the most competitive energy markets (see box on page 17), with prices below the European average (both in absolute terms and also in terms of how much they have increased over the past 10 years) – as illustrated in chart 4 below.

Chart 4. EU countries domestic electricity and gas prices 2009  

Chart 5. EU countries increase in domestic electricity and gas prices 2000-2009  

Between 2000 and 2010 prices in the UK also increased by less than the EU average – see chart 5 above. These charts show how Compound Annual Growth Rates (CAGR) for domestic electricity and gas prices compare across Europe over the period 2000-2010.

---

34 DECC Energy Price statistics.  
35 DECC Energy Price statistics.  
36 The average growth rate of prices over this period.
6. The international context (continued)

At the same time, future pressure on prices is not unique to the UK and will affect all other European countries. Citigroup (in 2009)\(^{37}\) and the EU Commission (in 2010)\(^{38}\) estimated that around one trillion euros must be invested in the EU energy system over the next 10 years in order to meet energy policy objectives and climate goals.\(^{39}\) The International Energy Agency and the Department of Energy in the US expect energy prices to rise between 2010 and 2020 by at least 20%.\(^ {40}\) Therefore, as all European countries adjust to the new energy environment of high commodity prices and investing in low carbon technologies, it is likely that the UK price level will remain below or around the European average.\(^ {41}\)

**Competitive markets in Europe**

The UK currently has one of the most competitive energy markets in Europe.

According to the Datamonitor Market Competitiveness Index (2010) the UK has the second most competitive power market (after Finland) and the most competitive gas market amongst the EU27 countries. The index measures effective competition in each market and draws on nine underlying metrics grouped into three broad clusters: market framework; supplier push; customer pull.

The UK featured at the top of the list for most competitive energy markets in the Oxera evaluation of European markets, last published for BERR (currently BIS/DECC) in 2007. The Oxera analysis also considered issues around unbundling, regulated prices, market concentration.\(^ {42}\)

According to the most recent EU Benchmarking report (2010) from the European Commission (which monitors progress in creating the internal gas and electricity market) the UK has the lowest concentration in the electricity and gas markets, and has the highest number of companies with a market share in excess of 5% in both the electricity and gas market. In addition to having one of the lowest domestic and industrial power and gas prices in Europe, this data reinforces Datamonitor and Oxera’s assessments that the UK has one of the most competitive energy markets in the EU.

---

39 The Commission estimates that about half of it will be required for networks, including electricity and gas distribution and transmission, storage, and smart grids.
41 Though we do recognise that due to the different energy mix and policy targets some countries may well see smaller increase in prices than in the UK.
7. Conclusion

This report has helped to determine the direct and indirect contribution that the power and gas sector makes to the UK economy. The industry’s total direct UK value-added was £28 billion in 2010, accounting for 2.4 percent of UK total GVA; including the indirect effects the GVA was £92 billion, accounting for around 8% of UK total GVA. In this report we also highlighted how the sector has particular importance with respect to the contribution it makes to regional development. Together these effects result in the power and gas sector having a widespread economic impact throughout all sectors of the UK economy and in all geographic areas.

We illustrate this point in chart 6 below where we compare different sectors in terms of the spread of the economic benefits to the UK economy. We consider two variables: the level of indirect effect in the economy (i.e., how much additional output is generated in the rest of the economy); and the regional distribution of the sector (how much a sector’s economic activity is concentrated within one or two regions or whether it is equally distributed across all regions).

The power and gas sector has one of the highest indirect impacts on the economy of all sectors (expressed in the chart above on the vertical axis)\textsuperscript{44}, and also a high level of regional distribution (expressed on the horizontal axis). This means that the economic benefits from the sector are not concentrated but are widely distributed across the economy and its real impact on the UK economy is larger than a direct analysis may suggest. Our study has also found evidence that its resilience during recession is crucial to the development of other sectors in the UK and that its continued strength will be important to long term growth.

As the UK shifts towards a low carbon economy and other sectors work towards greener solutions, the power and gas sector is reacting by significantly increasing investment, particularly in low carbon technologies.

The amount of new investment needed is unprecedented; creating greater opportunities for the power and gas sector to make a considerable contribution to the UK economy.

\textsuperscript{43} Ernst & Young analysis based on ONS data (2008).
\textsuperscript{44} The metric used to assess indirect impact on the economy is the indirect ‘economic multiplier’, which we have calculated from 2008 ONS data.
## Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCS</td>
<td>Carbon Capture and Storage – A greenhouse gas mitigation technology for biofuels, which produces negative carbon emissions.</td>
</tr>
<tr>
<td>CO2</td>
<td>Carbon dioxide.</td>
</tr>
<tr>
<td>Direct Impact</td>
<td>Value added directly by a sector.</td>
</tr>
<tr>
<td>Downstream Gas Sector</td>
<td>Sector incorporating gas transmission, distribution and retail.</td>
</tr>
<tr>
<td>Electricity Sector</td>
<td>Sector incorporating electricity generation, transmission and distribution, and retail.</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product – this metric is an indicator of economic wealth. It measures the market value of all final goods and services produced within a sector and/or economy during a given period. It is calculated by adding taxes on products and deducting subsidies on products from GVA. The change in GDP over time can be used to measure the growth of a sector and/or economy. See box on page 4 for more detail.</td>
</tr>
<tr>
<td>GVA</td>
<td>Gross Value Added. This metric is an indicator of economic wealth. It measures the difference between a sector and/or economy’s total pre-tax revenue and its total bought-in costs (i.e., costs excluding wages and salaries), adjusted for any changes in stocks. The change in GVA over time can be used to measure the growth of a sector and/or economy. See box on page 4 for more detail.</td>
</tr>
<tr>
<td>HMRC</td>
<td>HM Revenue and Customs – the organisation responsible for collecting taxes.</td>
</tr>
<tr>
<td>I&amp;C Sector</td>
<td>Information and Communications Sector.</td>
</tr>
<tr>
<td>Indirect Effect</td>
<td>The contribution that a sector makes through the consumption of intermediate goods and products in the supply chain. For example, supply chain businesses may work fully or partially with the energy sector, and cover a wide range of sectors, including consultancy, engineering, human resources, legal, finance, education and research.</td>
</tr>
<tr>
<td>Induced Effect</td>
<td>Increased consumer spending owing to the initial direct and indirect effects, which may include spending on housing, food, transport, clothing, education and entertainment.</td>
</tr>
<tr>
<td>Multiplier</td>
<td>A measure of the extent to which an endogenous variable changes in response to a change in an exogenous variable. For example, suppose a one-unit change in some variable x causes another variable y to change by M units. Then the multiplier is M-In other words, the multiplier attempts to quantify the additional effects of a change in one variable beyond those that are immediately measurable (the direct effect). M can also be defined as a ‘carry-through effect’. The general method for calculating long-run multipliers (M) is called ‘comparative statics’. That is, comparative statics calculate how much one or more endogenous variable changes in the long run, given a permanent change in one or more exogenous variables.</td>
</tr>
<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development – the OECD defines itself as a forum of countries committed to democracy and the market economy, providing a platform to compare policy experiences, seeking answers to common problems, identifying good practices, and co-ordinating domestic and international policies of its members. It therefore publishes economic data sets for its member countries which we have referred to in this report. <a href="http://www.oecd.org/">www.oecd.org/</a></td>
</tr>
</tbody>
</table>
| **ONS** | Office for National Statistics: the ONS is responsible for the production of a wide range of economic and social statistics, in both electronic and hardcopy format. They cover topics such as the UK’s National Accounts (such as Gross Domestic Product, National Income and Expenditure); UK Balance of Payments; population, demography and migration; government output and activity; business output and activity; prices (such as consumer and producer); the labour market (such as employment, unemployment and earnings); vital events (such as births, marriages, morbidity and deaths); social statistics (for example statistics about neighbourhoods and families).

The ONS collects information from various sources including the Annual Business Survey, the Labour Market Survey and the National Census. It gathers information about all sectors, including the power and gas sector.

We have presented ONS data throughout the report, and it has provided us with a basis for much of our analysis.

www.statistics.gov.uk |
| **P&G** | Power and Gas sector — this incorporates electricity generation, transmission, distribution and supply and gas transportation and supply.

It does not include upstream gas (searching for and the recovery and production of crude oil and natural gas). |
| **T&D** | Transmission & Distribution — this refers to the transmission and distribution component of the electricity sector. |
| **Value Added** | The difference between the value of outputs and the costs of inputs for a company, industry, or economy.

See box on page 4 for more detail. |
Sources

- Citigroup, Pan-European Utilities: The Trillion-Dollar Decade, 2009
- Datamonitor Market Competitiveness Index, 2010
- Department of Energy and Climate Change (DECC)
- Ernst & Young, ‘Capitalising the Green Investment Bank – Sowing the seeds of success’, 2010
- Ernst & Young, ‘Securing the UK’s energy future – meeting the financing challenge’, 2009
- European Commission, Energy infrastructure priorities for 2020 and beyond – A Blueprint for an integrated European energy network, 2010
- Innovas, Low Carbon and Environmental Goods and Services: an industry analysis, 2009
- International Energy Agency, World Energy Outlook
- Office for National Statistics (ONS)
- Organisation for Economic Cooperation and Development (OECD)
- Oxera, Forward projections of energy market competitiveness rankings, 2007
- UK Commission for Employment and Skills
The opinions of third parties set out in this publication are not necessarily the opinions of the global Ernst & Young organization or its member firms. Moreover, they should be viewed in the context of the time they were expressed. This publication contains information in summary form and is therefore intended for general guidance only. It is not intended to be a substitute for detailed research or the exercise of professional judgment. Neither Ernst & Young LLP nor any other member of the global Ernst & Young organization can accept any responsibility for loss occasioned to any person acting or refraining from action as a result of any material in this publication.
About Ernst & Young
Ernst & Young is a global leader in assurance, tax, transaction and advisory services. Worldwide, our 141,000 people are united by our shared values and an unwavering commitment to quality. We make a difference by helping our people, our clients and our wider communities achieve their potential.

Ernst & Young refers to the global organization of member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit www.ey.com

The UK firm Ernst & Young LLP is a limited liability partnership registered in England and Wales with registered number OC300001 and is a member firm of Ernst & Young Global Limited.

Ernst & Young LLP; 1 More London Place, London, SE1 2AF.
© Ernst & Young LLP 2011. Published in the UK. All Rights Reserved.

In line with Ernst & Young’s commitment to minimise its impact on the environment, this document has been printed on paper with a high recycled content.

Information in this publication is intended to provide only a general outline of the subjects covered. It should neither be regarded as comprehensive nor sufficient for making decisions, nor should it be used in place of professional advice. Ernst & Young LLP accepts no responsibility for any loss arising from any action taken or not taken by anyone using this material.

www.ey.com/uk